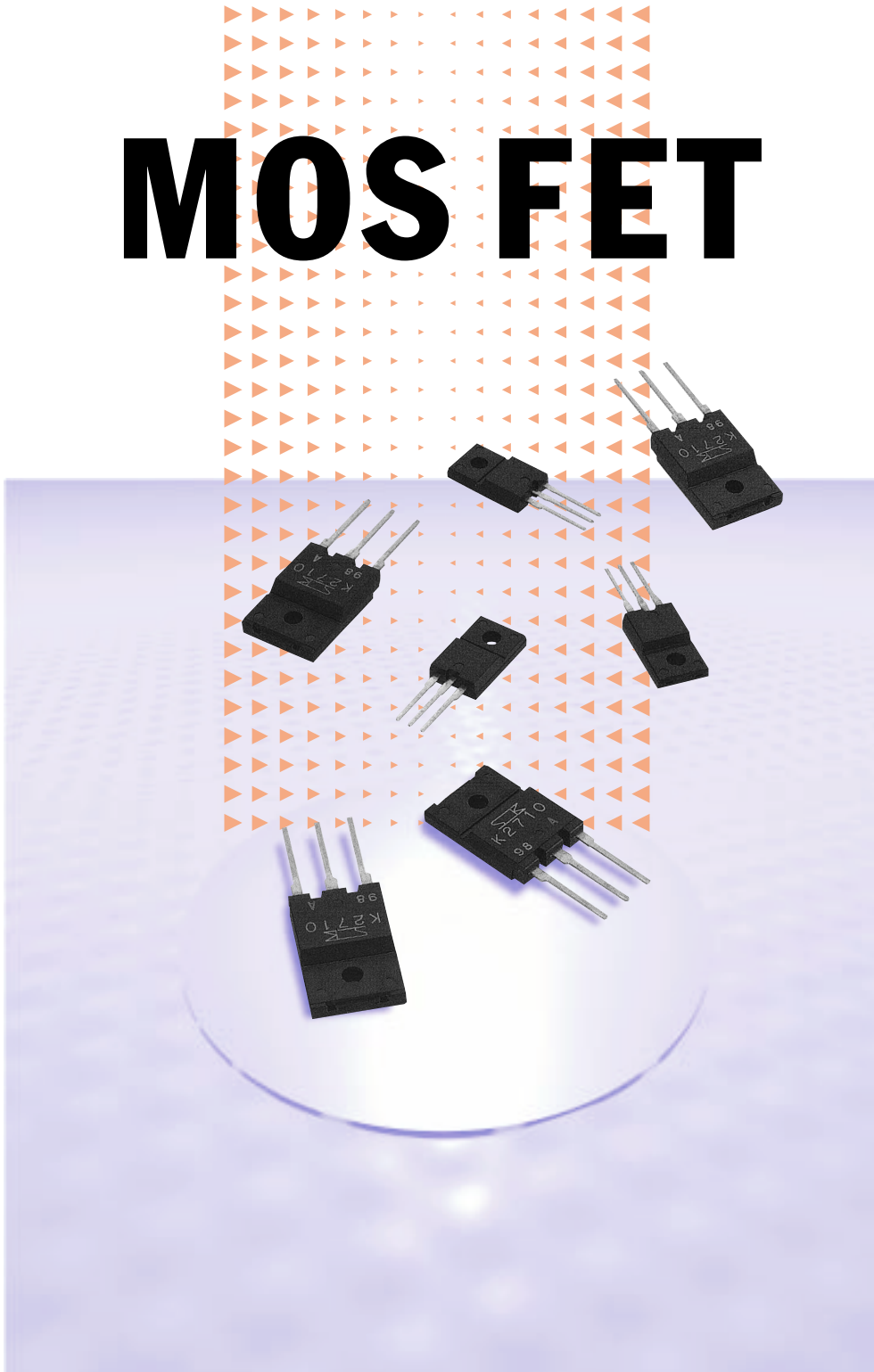


# MOS FET



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### Standard Minimum Packaged Quantity

Specify the number of standard minimum packaged units when placing order.

Series	Standard Minimum package Unit
FM20	100
FM100	105

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# Storage, characteristic inspection, and handling precautions

Inappropriate storage, characteristic inspection, or handling may impair the reliability of the device. To ensure high reliability, observe the following precautions:

## 1. Storage precautions

- It is recommended to store the device at room temperature (between 5 and 35°C) and relative humidity at 40 to 75%. Avoid storing the device in a place where the temperature or humidity is high or changes greatly.
- Store the device in a clean place that is not exposed to direct sunlight, and is free from corrosive or harmful gases.
- If the device is stored for a long time, check the solderability and lead condition before using the device.

## 2. Precautions on characteristic inspections

When carrying out characteristic inspections on receiving products or other occasions, take care to avoid applying a surge voltage from the measuring equipment and check the terminals of the measuring equipment for a short circuit or wiring errors. Measure the device within the range of its rated values.

## 3. Silicone Grease

When attaching heatsink, apply a small amount of silicone evenly to the back of the device and both sides of the insulator to reduce the thermal resistance between the device and heatsink.

Recommended silicone grease

- G746 SHINETSU SILICONE CO., LTD.
- YG6260 GE TOSHIBA SILICONE CO., LTD.
- SC102 DOW CORNING TORAY SILICONE CO., LTD.

Please select a silicone grease carefully since the oil in some grease can penetrate the product, which will result in an extremely short product life.

## 4. Screw tightening torque

If screws are not tightened with sufficient torque, this can increase the thermal resistance and reduce the radiation effect. Tightening screws with too great a torque damage the screw thread, deform the heatsink, or twist the device frame until it is damaged. There, tighten screws with a torque as shown below (Table 1).

Table 1: Screw Tightening Torque

Package	Tightening Torque
TO-220F	0.490 to 0.686 N•m (5 to 7 kgf•cm)
TO-3PF	0.686 to 0.822 N•m (7 to 9 kgf•cm)

## 5. Soldering temperature

If soldering is necessary, take care to keep the application of heat as brief as possible, and within the following limits:

- 260±5°C for 10 s max
- 350°C for 3 s max (soldering iron)

## 6. Heatsink

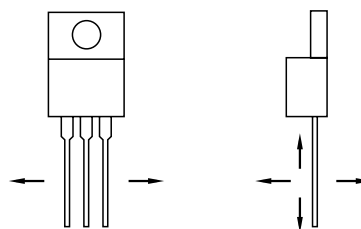
A large contact area between the device and the heatsink for effective heat radiation is required. To ensure a large contact area, minimize mounting holes and select a heatsink with a sufficiently smooth surface and that is free from burring or metal debris.

## 7. Handling precautions to protect power MOS FET from static damage

- When handling the device, physical grounding is necessary. Wear a wrist strap with a 1 MΩ resistor close to the body in the wrist strap to prevent electric shock.
- Use a conductive table mat or floor mat at the device handling workbench and to ensure grounding.
- When using a curve tracer or other measuring equipment, ground the equipment as well.
- When soldering, ground the bit of the soldering iron and the dip tank to prevent a leakage voltage from damaging the device.
- Store the device in the shipping container or a conductive container or use aluminum foil to protect the device from static electricity.

## 8. Load on Leads

When excessive load is exerted on leads, internal connections may be break. Load exerted in each of the following directions should be limited to below 1 kg for TO-220F and 2.5 kg for TO-3PF.



Directions in which load is exerted on leads

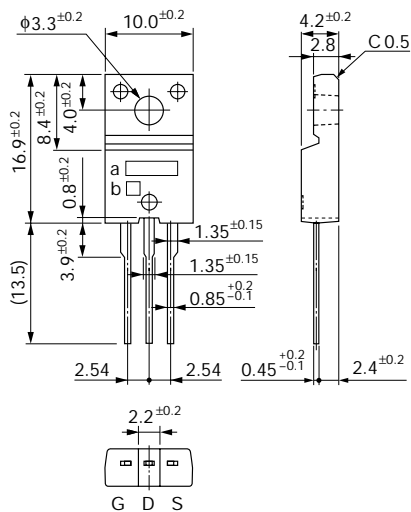
## 9. Lead Forming

We make several types of lead forming available, please consult with our personnel when necessary.

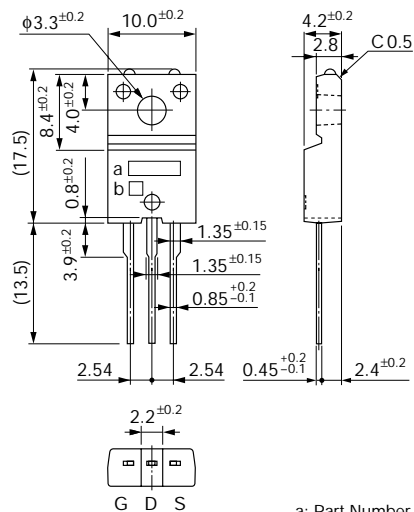
# External dimensions (Unit: mm)

## ① FM20 (TO-220F)

General product



UL approved product

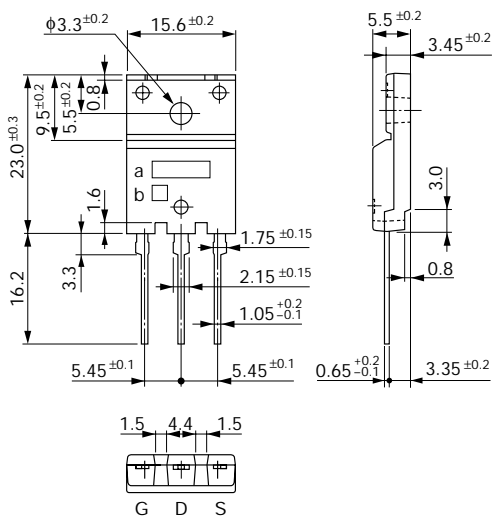


a: Part Number  
b: Lot Number

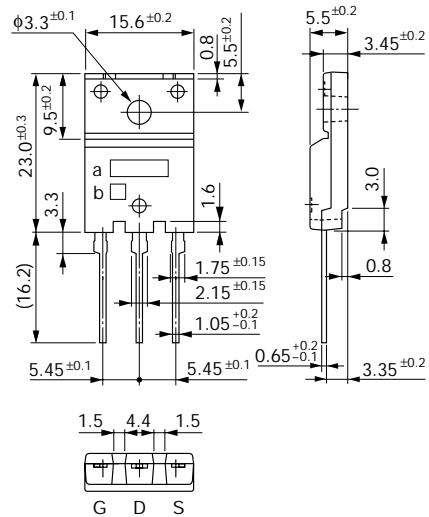
Weight: Approx 2.0g

## ② FM100 (TO-3PF)

General product



UL approved product



a: Part Number  
b: Lot Number

Weight: Approx 6.5g

# Avalanche energy capability of MOS FET

Sanken MOS FETs feature guaranteed avalanche energy capability.

## 1. What is avalanche energy capability ?

When a MOS FET is used for high-speed switching, the inductive load and wiring inductance may cause a counter electromotive voltage at cutoff that the device cannot withstand.

Avalanche energy capability is the non-clamped ability to withstand damage expressed as energy. As long as the energy applied to the device at cutoff is within the guaranteed avalanche energy capability, the device will not be damaged even if the Drain-Source voltage exceeds the capability.

For example, a Drain-Source voltage that is within the guaranteed capability when electrically stationary may exceed the limit at startup or cutoff. Usually, a snubber circuit or similar surge absorbing circuit is used to keep the Drain-Source voltage within the guaranteed capability. Sanken MOS FETs, however, do not require this kind of protective circuit because the avalanche energy capability is guaranteed. Sanken MOS FETs enable the number of parts to be reduced, saving board area.

\* Consult the engineering department of Sanken when planning to use MOS FETs in avalanche mode.

## 2. EAS calculation method

If the current in an inductive load L is  $I_{LP}$  at the moment when the MOS FET is cut off,  $E_{AS}$  can be expressed as follows:

$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{LP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}} \quad \text{..... ①}$$

\*  $V_{DD}$ : Supply voltage

If the value of L is not known in an actual circuit,  $E_{AS}$  can also be calculated from the actual voltage and current waveforms as follows:

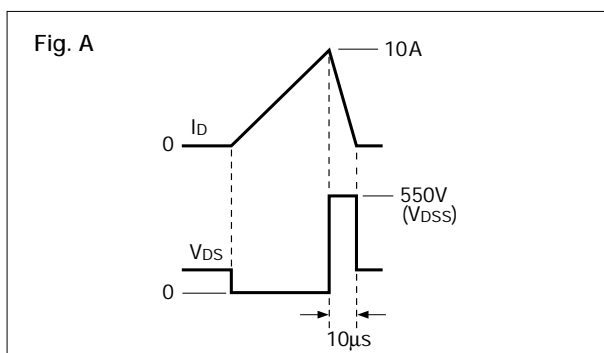
$$E_{AS} = P_s \cdot t \quad \text{..... ②}$$

\*  $P_s$ : Surge power   \*  $t$ : Surge time

The following calculation is used to determine  $E_{AS}$  where the voltage and current shown in Fig.A are applied to the MOS FET in a circuit.

Integrate the overlapping section of  $I_D$  and  $V_{DS}$  to calculate  $\int I_D \cdot V_{DS} \cdot dt$ . When the  $I_D$  waveform is triangular,  $E_{AS}$  will be as follows:

$$E_{AS} = \frac{1}{2} \cdot 10(A) \cdot 550(V) \cdot 10(\mu s) = 27.5(mJ)$$



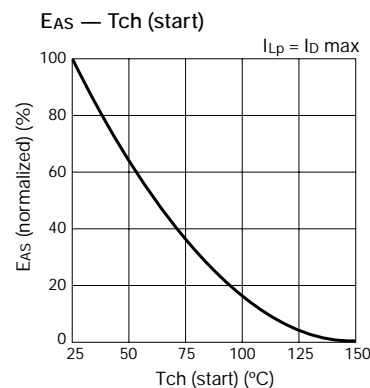
## 3. Temperature derating for EAS

The  $E_{AS}$  Value in the specifications is guaranteed when the channel temperature  $T_{ch}$  is 25°C. Since the  $E_{AS}$  Value drops as the channel temperature rises, derating depending on the temperature is necessary.

Fig.B shows the derating curve for single avalanche energy capability. This is the derating curve of  $E_{AS}$  and the channel temperature ( $T_{ch}$  (start)) immediately before the avalanche occurs in the product, with the  $E_{AS}$  value (maximum rating) at 25°C as 100%.

For example, if the product temperature is 50°C, the  $E_{AS}$  value is derated to 64% of the value at 25°C.

Fig. B



## 4. Continuous avalanche energy capability

This section explains the derating method for continuous avalanche.

Considering continuous avalanche as the repetition of a single avalanche, the safe operating area (SOA) is determined using the derating curve shown in Fig. B.

Calculate the energy and  $T_{ch}$  (start) of avalanche in the worst condition and determine SOA using the calculated data and the derating curve shown in Fig.B. The temperature rise due to avalanche should not cause the channel temperature to exceed the maximum rating.

The following is an example of determining SOA judgment by calculation when a MOS FET enters a transient avalanche state at power-on then changes to a stationary state.

Supposing that the waveform is as shown in Fig.C until the MOS FET changes to the stationary state, calculate the start loss and switching (turn-on/off) loss. To simplify the calculation, the average loss  $P_a$  and the last two waveforms are used for approximation. (Fig. D)

First, calculate the channel temperature  $T_{ch}$  ( $\tau$ ) at time ( $\tau$ ) where the temperature condition is severest.

If the  $T_{ch}$  ( $\tau$ ) value is within the maximum rating, there is no problem as far as the temperature is concerned.

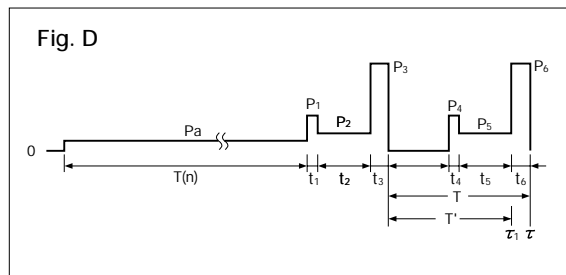
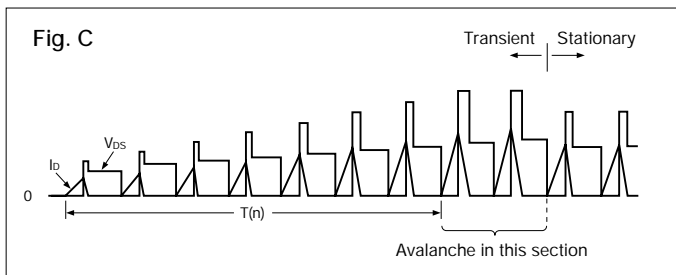
$$Tch(\tau) = Ta + Pa \cdot r_{ch-c}(Tn + T + t_1 + t_2 + t_3) + (P_1 - Pa) \cdot r_{ch-c}(T + t_1 + t_2 + t_3) - (P_1 - P_2) \cdot r_{ch-c}(T + t_2 + t_3) + (P_3 - P_2) \cdot r_{ch-c}(T + t_3) - P_3 \cdot r_{ch-c}(T) + P_4 \cdot r_{ch-c}(t_4 + t_5 + t_6) - (P_4 - P_5) \cdot r_{ch-c}(t_5 + t_6) + (P_6 - P_5) \cdot r_{ch-c}(t_6) \quad \textcircled{3}$$

\* Ta : Ambient temperature  
r<sub>ch-c</sub>(t): Transient thermal resistance at pulse width t

Then calculate the channel temperature Tch(τ<sub>1</sub>) immediately before avalanche.

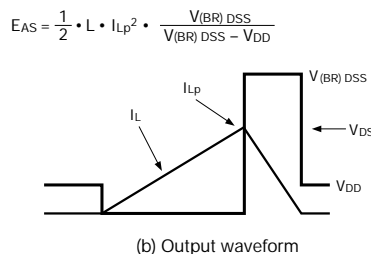
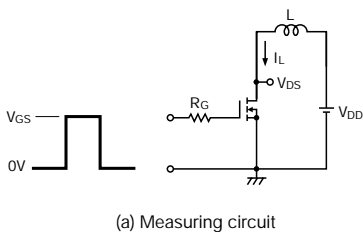
$$Tch(\tau_1) = Ta + Pa \cdot r_{ch-c}(Tn + T' + t_1 + t_2 + t_3) + (P_1 - Pa) \cdot r_{ch-c}(T' + t_1 + t_2 + t_3) - (P_1 - P_2) \cdot r_{ch-c}(T' + t_2 + t_3) + (P_3 - P_2) \cdot r_{ch-c}(T' + t_3) - P_3 \cdot r_{ch-c}(T') + P_4 \cdot r_{ch-c}(t_4 + t_5 + t_6) - (P_4 - P_5) \cdot r_{ch-c}(t_5 + t_6) + (P_6 - P_5) \cdot r_{ch-c}(t_6) \quad \textcircled{4}$$

This Tch(τ<sub>1</sub>) value becomes Tch(start). If the avalanche energy (EAS = P<sub>6</sub> · t<sub>6</sub>) is within the value derated from the guaranteed EAS value at the temperature, there is no problem as far as the avalanche energy is concerned.



## Avalanche energy capability measuring method

Fig. 1



## Switching time measuring method

Fig. 2

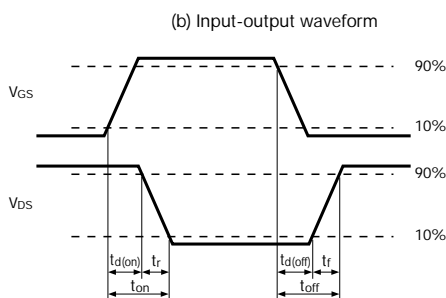
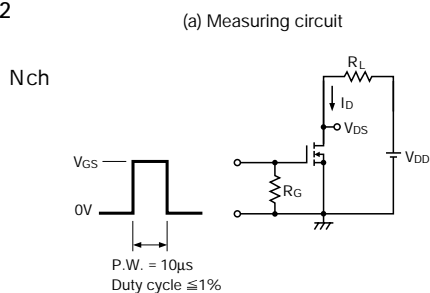
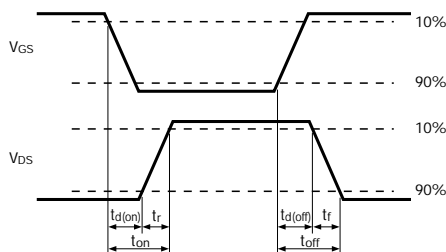
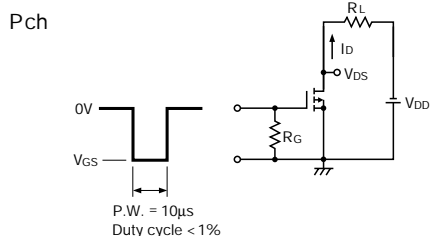


Fig. 3



# Product index by part number

Parameter Part Number	Absolute maximum ratings				Electrical Characteristics (Ta=25°C)		Package	Page
	V <sub>BSS</sub> (V)	I <sub>D</sub> (A)	P <sub>D</sub> (T <sub>C</sub> =25°C) (W)	EAS (mJ)	R <sub>DS(ON)</sub> max (V <sub>GS</sub> =10V) (Ω)	C <sub>iss</sub> (typ) (pF)		
* 2SJ424	-60	5	25	—	0.5	270	FM20	52
2SJ425	-60	8	30	—	0.28	580	FM20	53
○ 2SK1177	500	2.5	30	200	3.0	350	FM20	8
○ 2SK1178	500	4.0	35	260	1.5	610	FM20	9
○ 2SK1179	500	8.5	85	400	0.85	1300	FM100	10
○ 2SK1180	500	10	85	500	0.6	1800	FM100	11
○ 2SK1181	500	13	85	660	0.4	2700	FM100	12
2SK1183	200	3	25	36	1.5	140	FM20	13
2SK1184	200	5	30	67	0.8	260	FM20	14
2SK1185	100	5	25	16	0.54	180	FM20	15
2SK1186	100	9	30	32	0.27	350	FM20	16
2SK1187	100	12	35	58	0.16	650	FM20	17
2SK1188	60	10	25	2.1	0.2	300	FM20	18
2SK1189	60	15	30	6.2	0.1	640	FM20	19
2SK1190	60	22	35	17	0.05	1300	FM20	20
2SK1191	60	30	40	38	0.028	2500	FM20	21
2SK1192	60	40	90	38	0.028	2500	FM100	22
2SK1712	60	15	30	6.2	0.1	820	FM20	23
2SK2419	60	25	35	26	0.037	1300	FM20	24
2SK2420	60	30	40	38	0.028	2200	FM20	25
2SK2421	60	40	40	60	0.02	2400	FM20	26
2SK2701	450	7	35	130	1.1	720	FM20	27
* 2SK2702	450	10	35	300	0.8	1000	FM20	28
* 2SK2703	450	10	75	300	0.8	1000	FM100	29
* 2SK2704	450	13	40	400	0.57	1300	FM20	30
* 2SK2705	450	13	75	400	0.57	1300	FM100	31
* 2SK2706	450	18	85	700	0.3	2500	FM100	32
* 2SK2707	600	4.5	35	50	1.85	560	FM20	33
2SK2708	600	7	40	150	1.1	950	FM20	34
* 2SK2709	600	8.5	85	300	0.85	1200	FM100	35
2SK2710	600	12	85	400	0.55	1900	FM100	36
* 2SK2778	100	12	30	70	0.175	740	FM20	37
2SK2779	100	20	35	200	0.08	1630	FM20	38
2SK2803	450	3	30	30	2.8	340	FM20	39
* 2SK2805	450	15	80	550	0.38	2100	FM100	40
2SK2848	600	2	30	10	3.8	290	FM20	41
2SK2943	900	3	30	60	5.0	600	FM20	42
2SK2945	900	5	35	120	3.0	880	FM20	43
* 2SK3002	200	8	30	55	0.35	450	FM20	44
2SK3003	200	18	35	120	0.175	850	FM20	45
2SK3004	250	18	35	120	0.25	850	FM20	46
2SK3199	500	5	30	35	1.5	650	FM20	47
2SK3200	500	10	35	50	1.1	920	FM20	48
2SK3332	150	12	30	100	0.2	870	FM20	49
2SK3460	150	18	35	180	0.095	1900	FM20	50
FKV550T	50	50	35	150	0.013	2700	FM20	51

\* : Under development

○ : UL recognized parts are available (File No. 117753). Each UL recognized parts is marked with a ①, following its product number.



# Selection Guide

## ●Nch MOS FET

V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> (Ω) max	Part Number	Package	Page
50	50	13mΩ	FKV550T	FM20	51
60	10	0.2	2SK1188	FM20	18
	15	0.1	2SK1189	FM20	19
	★ 15	0.1	2SK1712	FM20	23
	22	50mΩ	2SK1190	FM20	20
	25	37mΩ	2SK2419	FM20	24
	30	28mΩ	2SK1191	FM20	21
	30	28mΩ	2SK2420	FM20	25
	40	28mΩ	2SK1192	FM100	22
	40	20mΩ	2SK2421	FM20	26
	100	5	0.54	2SK1185	FM20
9		0.27	2SK1186	FM20	16
12		0.16	2SK1187	FM20	17
★ 12		0.175	2SK2778	FM20	37
★ 20		80mΩ	2SK2779	FM20	38
150	★ 12	0.2	2SK3332	FM20	49
	★ 18	0.095	2SK3460	FM20	50
200	3	1.5	2SK1183	FM20	13
	5	0.8	2SK1184	FM20	14
	8	0.35	2SK3002	FM20	44
	18	0.175	2SK3003	FM20	45
250	18	0.25	2SK3004	FM20	46
450	3	2.8	2SK2803	FM20	39
	7	1.1	2SK2701	FM20	27
	10	0.8	2SK2702	FM20	28
	10	0.8	2SK2703	FM100	29
	13	0.57	2SK2704	FM20	30
	13	0.57	2SK2705	FM100	31
	15	0.38	2SK2805	FM100	40
	18	0.3	2SK2706	FM100	32
500	2.5	3	2SK1177	FM20	8
	4	1.5	2SK1178	FM20	9
	5	1.5	2SK3199	FM20	47
	8.5	0.85	2SK1179	FM100	10
	10	0.6	2SK1180	FM100	11
	10	1.1	2SK3200	FM20	48
	13	0.4	2SK1181	FM100	12
600	2	3.8	2SK2848	FM20	41
	4.5	1.85	2SK2707	FM20	33
	7	1.1	2SK2708	FM20	34
	8.5	0.85	2SK2709	FM100	35
	12	0.55	2SK2710	FM100	36
900	3	5.0	2SK2943	FM20	42
	5	3.0	2SK2945	FM20	43

★ : Logic drive

## ●Pch MOS FET

V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> (Ω) max	Part Number	Package	Page
-60	5	0.5	2SJ424	FM20	52
	8	0.28	2SJ425	FM20	53

# 2SK1177

External dimensions 1.....FM20

## Absolute Maximum Ratings (Ta = 25°C)

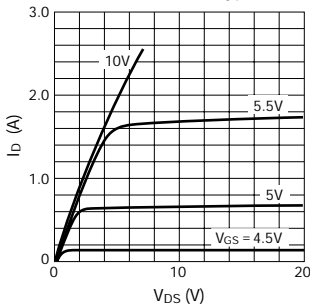
Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±2.5	A
I <sub>D</sub> (pulse)	±10 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	200	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 60mH, I<sub>L</sub> = 2.5A, unclamped, See Figure 1 on Page 5.

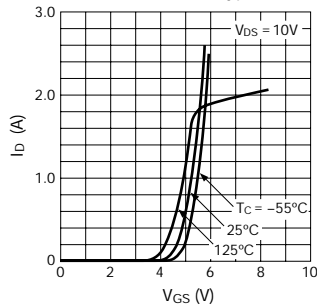
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	500			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	1.5	2.3		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1.4A
R <sub>DS(on)</sub>		2.6	3.0	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.4A
C <sub>iss</sub>		350		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		54		pF	
t <sub>on</sub>		50		ns	I <sub>D</sub> = 1.4A, V <sub>DD</sub> = 250V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		140		ns	

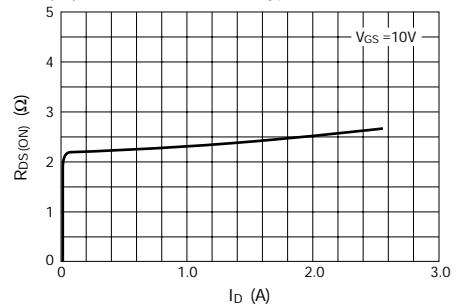
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



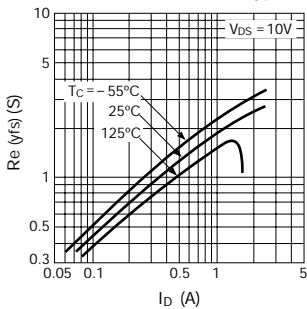
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



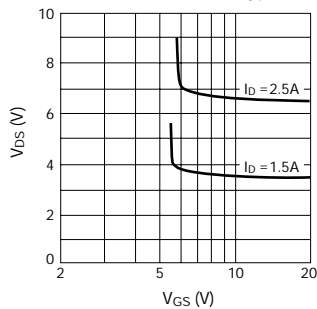
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



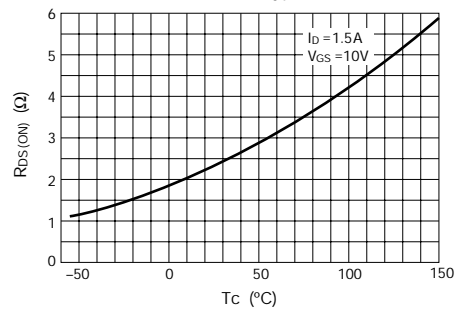
Re (yfs) - I<sub>D</sub> Characteristics (typical)



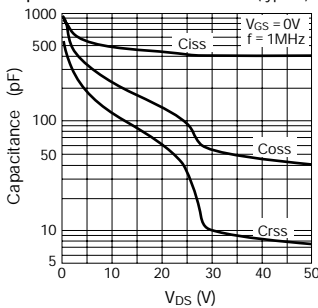
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



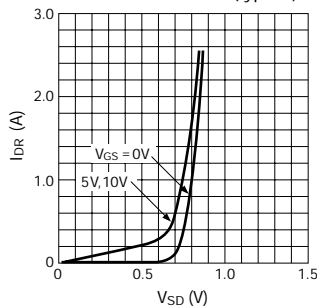
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



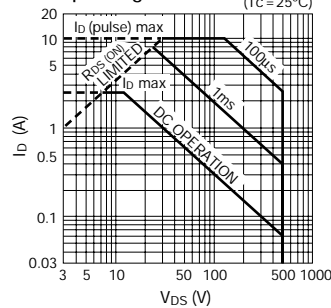
Capacitance - V<sub>DS</sub> Characteristics (typical)



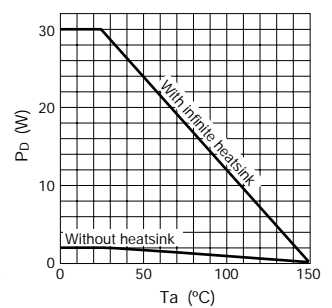
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - Ta Characteristics



# 2SK1178

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

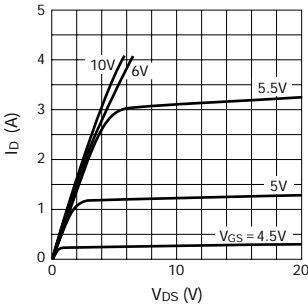
Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±4.0	A
I <sub>D</sub> (pulse)	±16 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	260	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 28mH, I<sub>L</sub> = 4.0A, unclamped, See Figure 1 on Page 5.

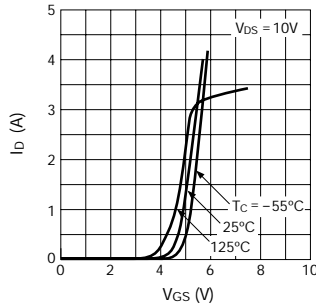
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	500			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	2.4	3.7		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 2.0A
R <sub>DS(on)</sub>		1.3	1.5	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.0A
C <sub>iss</sub>		610		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		91		pF	
t <sub>on</sub>		50		ns	I <sub>D</sub> = 2.0A, V <sub>DD</sub> = 250V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		120		ns	

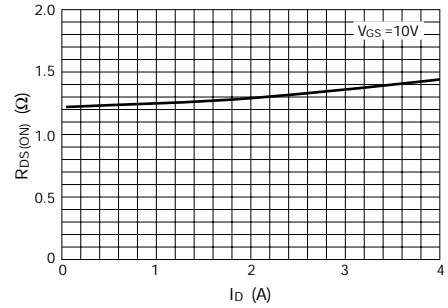
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



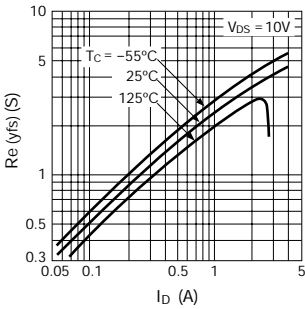
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



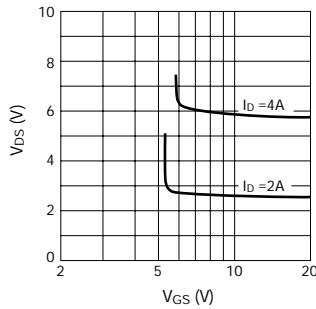
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



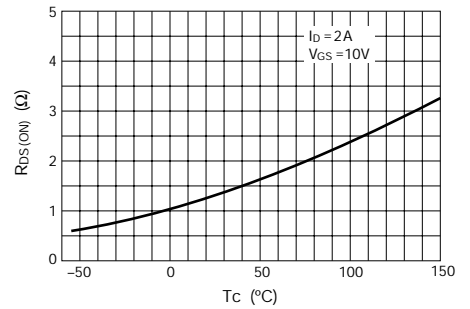
Re (yfs) - I<sub>D</sub> Characteristics (typical)



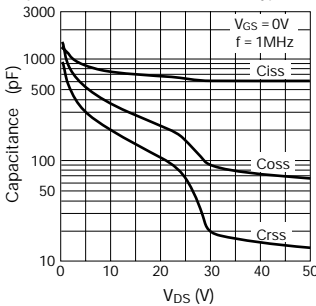
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



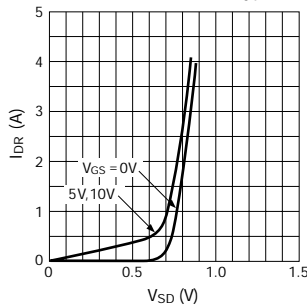
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



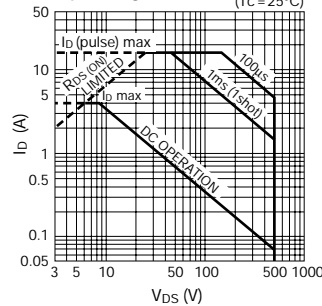
Capacitance - V<sub>DS</sub> Characteristics (typical)



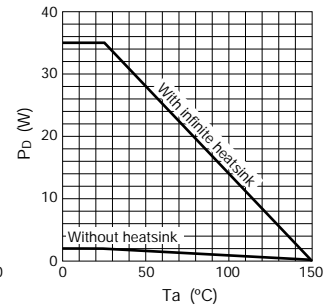
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1179

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

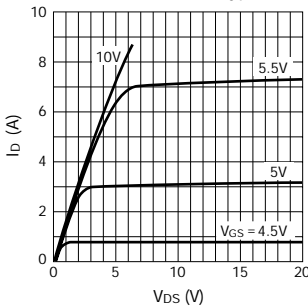
Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±8.5	A
I <sub>D</sub> (pulse)	±34 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	85 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	400	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 10mH, I<sub>L</sub> = 8.5A, unclamped, See Figure 1 on Page 5.

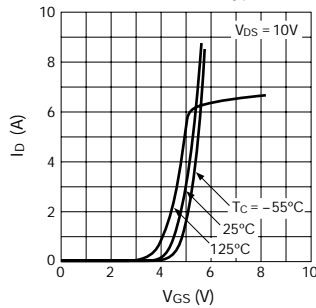
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	500			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	5.1	7.7		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4.5A
R <sub>DS(on)</sub>		0.70	0.85	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.5A
C <sub>iss</sub>		1300		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		180		pF	
t <sub>on</sub>		60		ns	I <sub>D</sub> = 4.5A, V <sub>DD</sub> = 250V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		110		ns	

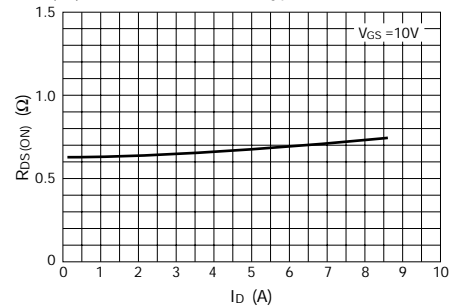
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



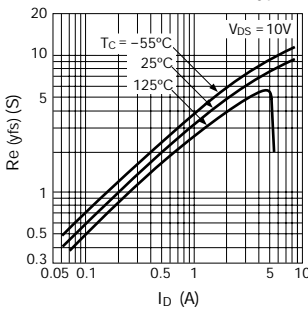
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



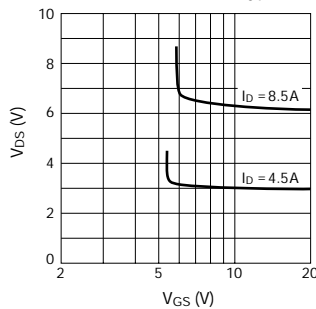
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



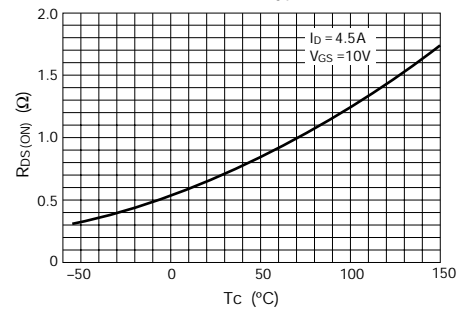
Re (yfs) - I<sub>D</sub> Characteristics (typical)



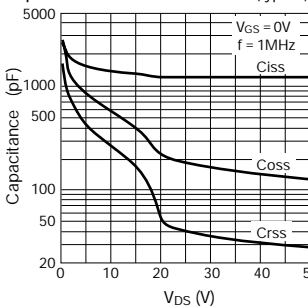
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



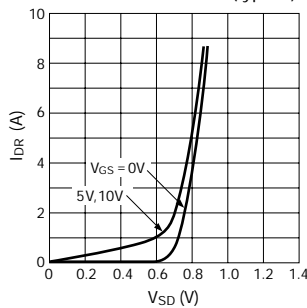
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



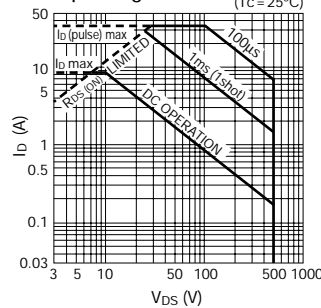
Capacitance - V<sub>DS</sub> Characteristics (typical)



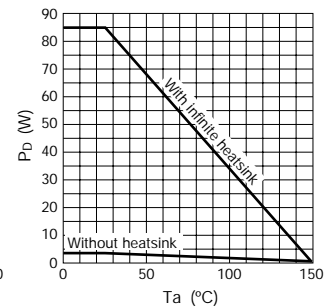
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1180

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

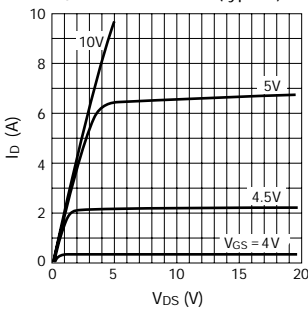
Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±10	A
I <sub>D</sub> (pulse)	±40 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	85 (T <sub>c</sub> = 25°C)	W
EAS *	500	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 9mH, I<sub>L</sub> = 10A, unclamped, See Figure 1 on Page 5.

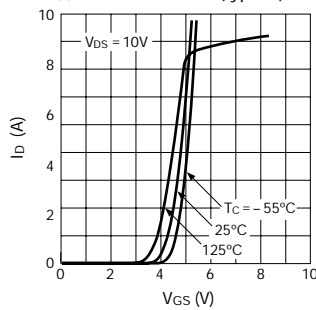
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	500			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	6.1	9.2		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 5.0A
R <sub>DS(on)</sub>		0.5	0.6	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.0A
C <sub>iss</sub>		1800		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		250		pF	
t <sub>on</sub>		60		ns	I <sub>D</sub> = 5A, V <sub>DD</sub> = 250V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		140		ns	

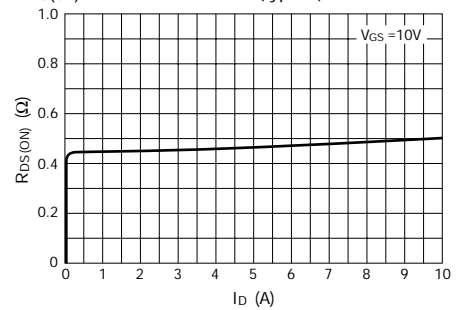
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



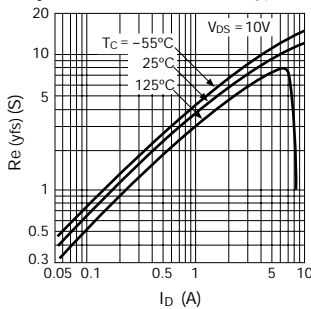
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



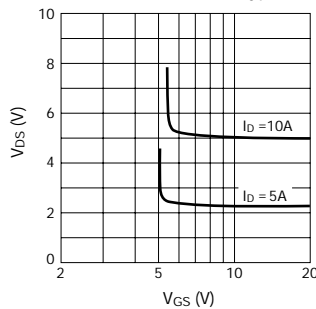
R<sub>DS(ON)</sub> - I<sub>D</sub> Characteristics (typical)



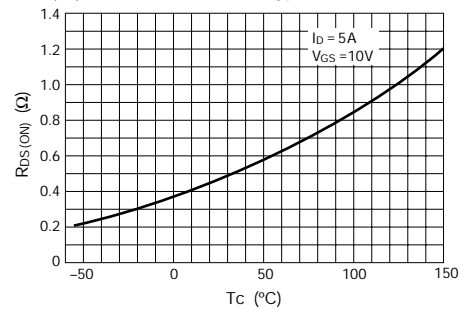
Re (yfs) - I<sub>D</sub> Characteristics (typical)



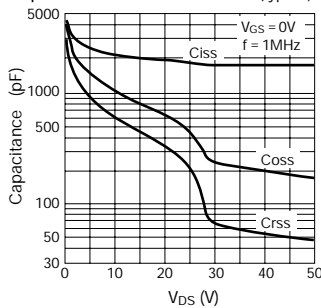
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



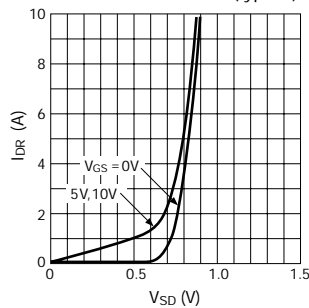
R<sub>DS(ON)</sub> - T<sub>c</sub> Characteristics (typical)



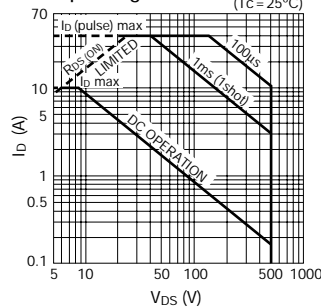
Capacitance - V<sub>DS</sub> Characteristics (typical)



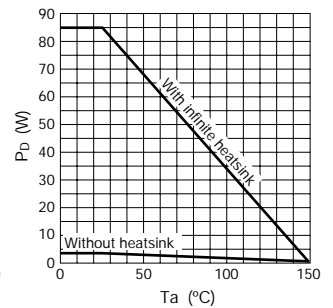
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1181

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

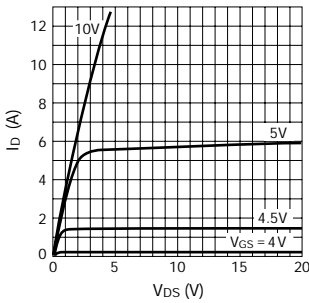
Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±13	A
I <sub>D</sub> (pulse)	±52 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	85 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	660	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 7mH, I<sub>L</sub> = 13A, unclamped, See Figure 1 on Page 5.

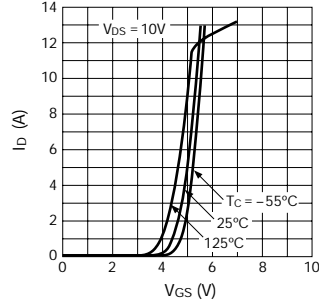
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	500			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	8.5	13		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.5A
R <sub>DS(on)</sub>		0.35	0.4	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6.5A
C <sub>iss</sub>		2700		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		350		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
t <sub>on</sub>		65		ns	I <sub>D</sub> = 6.5A, V <sub>DD</sub> = 250V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		180		ns	I <sub>D</sub> = 6.5A, V <sub>DD</sub> = 250V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.

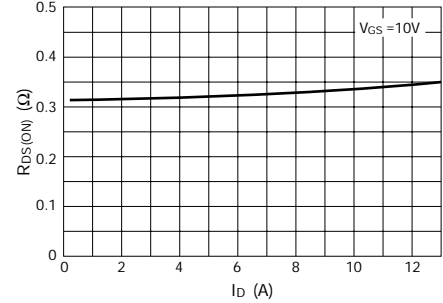
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



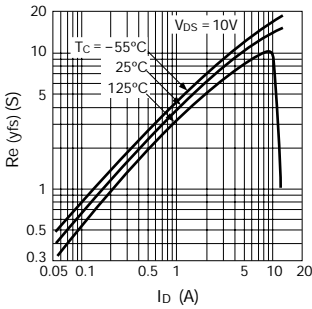
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



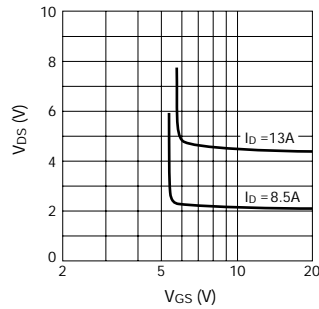
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



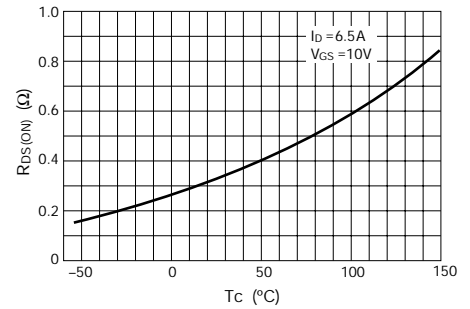
Re (yfs) - I<sub>D</sub> Characteristics (typical)



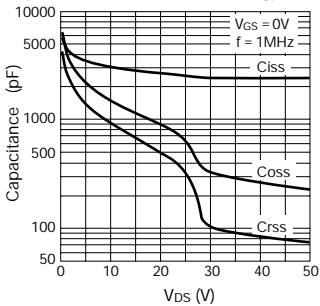
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



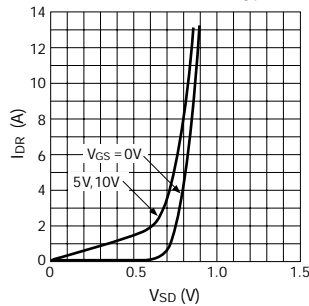
R<sub>DS(on)</sub> - T<sub>C</sub> Characteristics (typical)



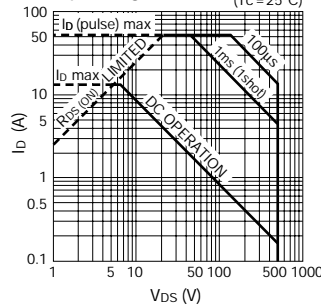
Capacitance - V<sub>DS</sub> Characteristics (typical)



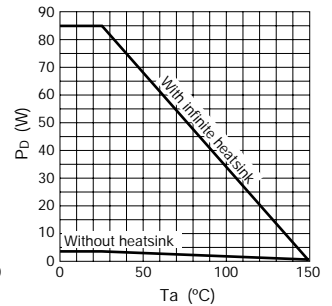
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>C</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1183

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

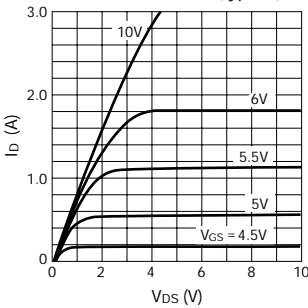
Symbol	Ratings	Unit
V <sub>DSS</sub>	200	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±3	A
I <sub>D</sub> (pulse)	±12 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	25 (T <sub>c</sub> = 25°C)	W
EAS *	30	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 6mH, I<sub>L</sub> = 3.0A, unclamped, See Figure 1 on Page 5.

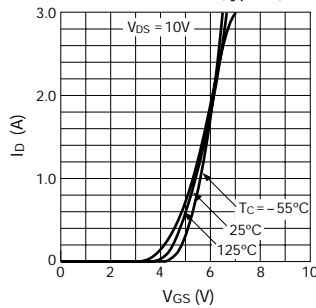
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	200			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	4.0		V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	0.8	1.2		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1.5A
R <sub>DS(on)</sub>		1.2	1.5	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5A
C <sub>iss</sub>		140		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		42		pF	
t <sub>on</sub>		35		ns	I <sub>D</sub> = 1.5A, V <sub>DD</sub> = 100V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		50		ns	

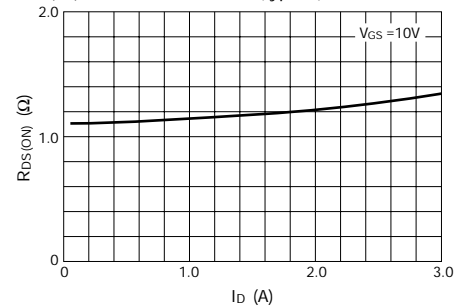
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



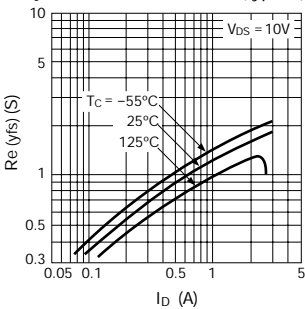
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



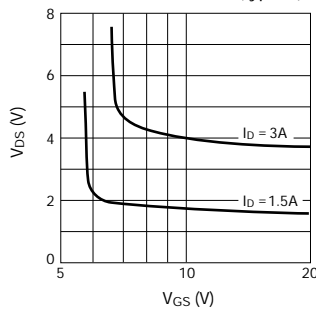
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



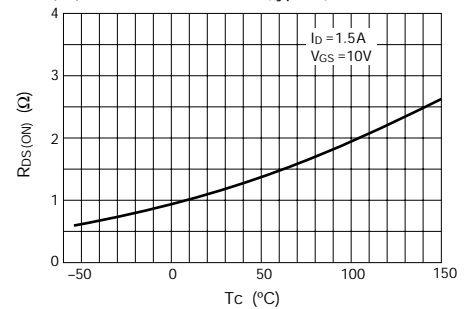
Re (yfs) - I<sub>D</sub> Characteristics (typical)



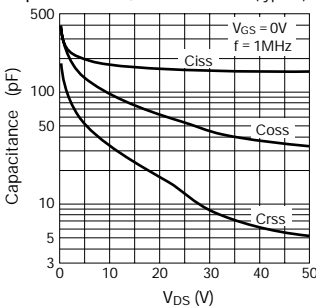
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



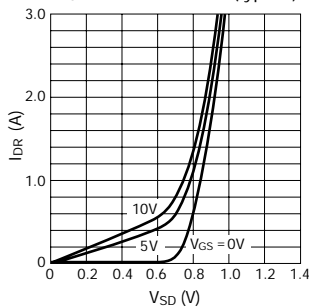
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



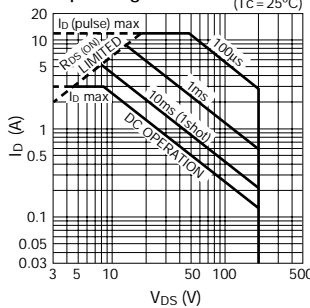
Capacitance - V<sub>DS</sub> Characteristics (typical)



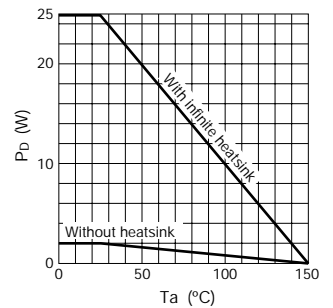
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1184

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

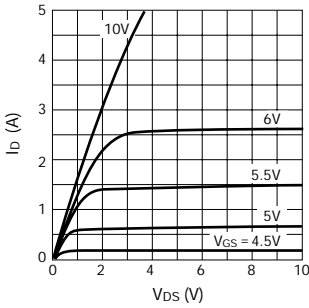
Symbol	Ratings	Unit
V <sub>DSS</sub>	200	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±5	A
I <sub>D</sub> (pulse)	±20 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	67	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 50V, L = 4mH, I<sub>L</sub> = 5.0A, unclamped, See Figure 1 on Page 5.

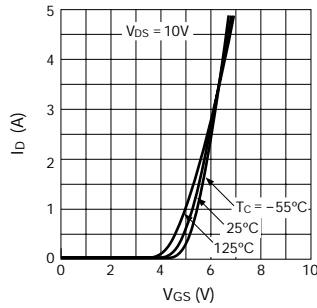
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	200			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	1.3	2.5		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 2.5A
R <sub>DS(on)</sub>		0.5	0.8	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A
C <sub>iss</sub>		260		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		100		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
t <sub>on</sub>		50		ns	I <sub>D</sub> = 2.5A, V <sub>DD</sub> = 100V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		60		ns	I <sub>D</sub> = 2.5A, V <sub>DD</sub> = 100V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.

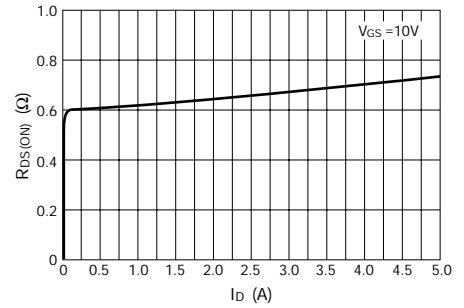
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



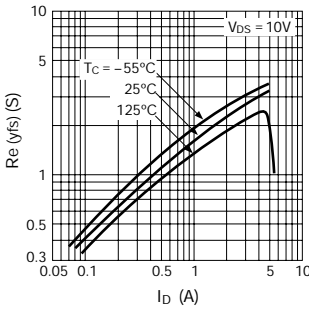
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



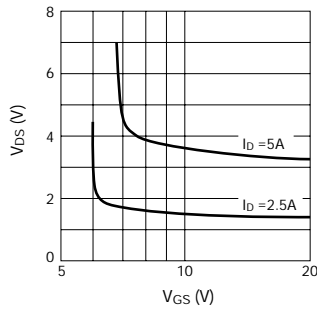
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



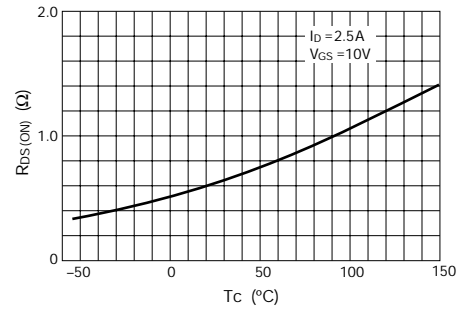
Re (yfs) - I<sub>D</sub> Characteristics (typical)



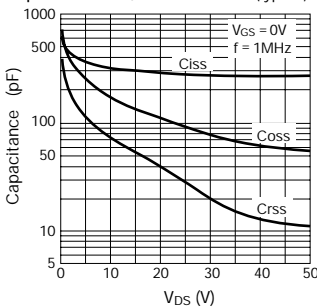
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



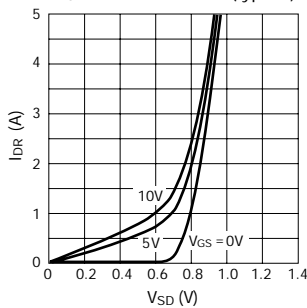
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



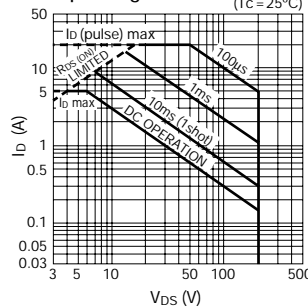
Capacitance - V<sub>DS</sub> Characteristics (typical)



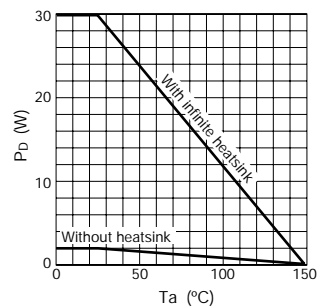
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics





# 2SK1185

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

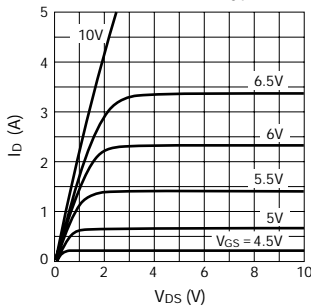
Symbol	Ratings	Unit
V <sub>DSS</sub>	100	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±5	A
I <sub>D</sub> (pulse)	±20 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	25 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	16	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 1mH, I<sub>L</sub> = 5.0A, unclamped, See Figure 1 on Page 5.

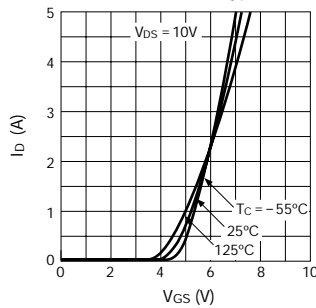
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	100			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	1.5	1.7		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 2.5A
R <sub>DS(on)</sub>		0.41	0.54	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A
C <sub>iss</sub>		180		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		82		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
t <sub>on</sub>		40		ns	I <sub>D</sub> = 2.5A, V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		40		ns	I <sub>D</sub> = 2.5A, V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.

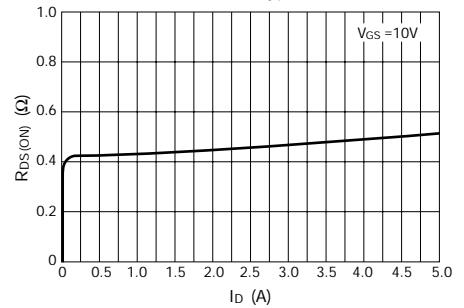
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



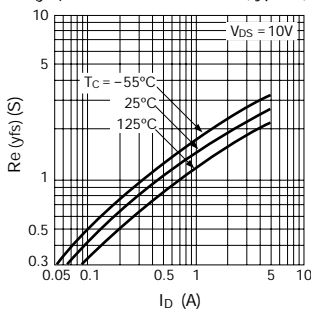
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



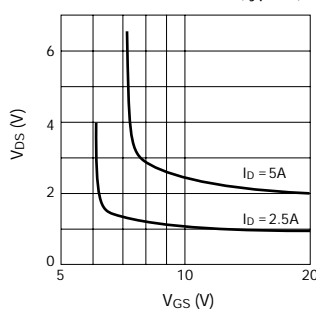
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



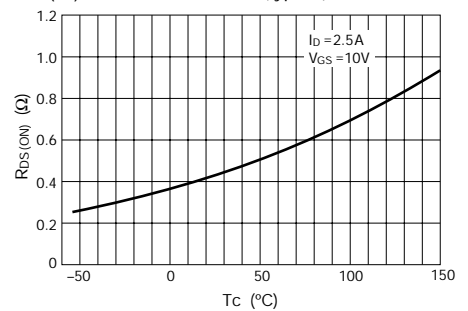
Re (yfs) - I<sub>D</sub> Characteristics (typical)



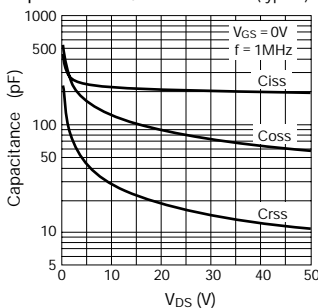
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



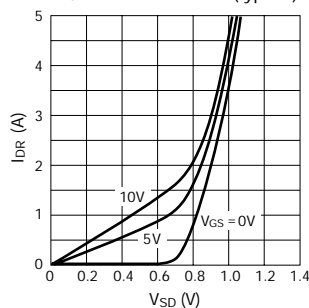
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



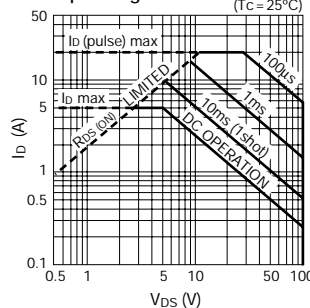
Capacitance - V<sub>DS</sub> Characteristics (typical)



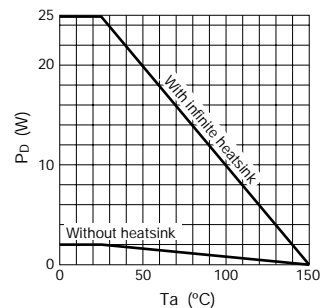
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1186

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

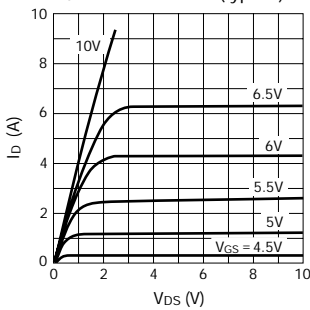
Symbol	Ratings	Unit
V <sub>DSS</sub>	100	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±9	A
I <sub>D</sub> (pulse)	±36 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	32	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 600μH, I<sub>L</sub> = 9.0A, unclamped, See Figure 1 on Page 5.

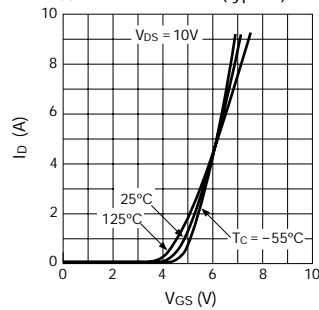
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	100			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	2.4	3.7		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4.5A
R <sub>DS(on)</sub>		0.24	0.27	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.5A
C <sub>iss</sub>		350		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		130		pF	
t <sub>on</sub>		60		ns	I <sub>D</sub> = 4.5A, V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		40		ns	

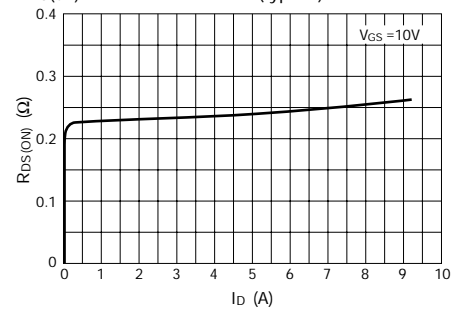
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



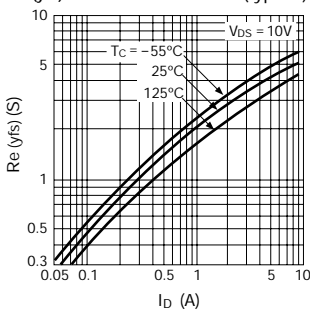
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



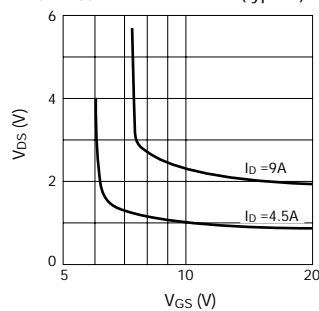
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



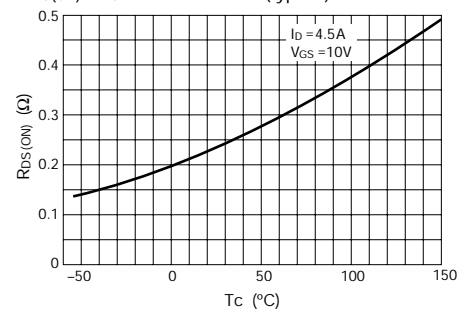
Re (yfs) - I<sub>D</sub> Characteristics (typical)



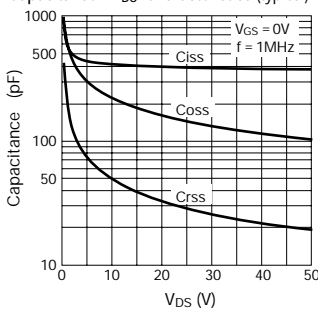
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



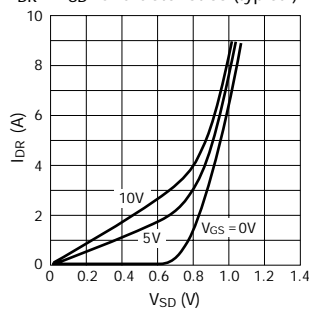
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



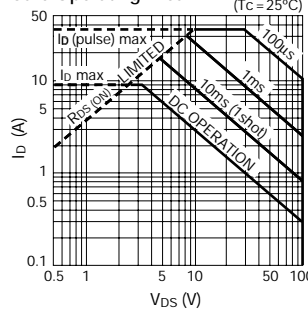
Capacitance - V<sub>DS</sub> Characteristics (typical)



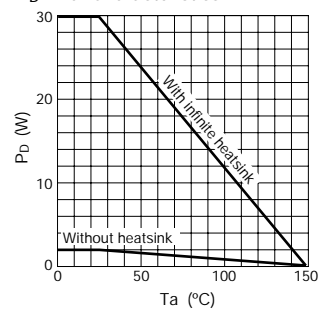
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1187

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

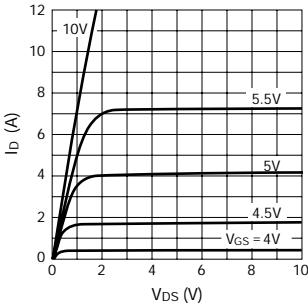
Symbol	Ratings	Unit
V <sub>DSS</sub>	100	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±12	A
I <sub>D</sub> (pulse)	±48 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	58	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 600μH, I<sub>L</sub> = 12A, unclamped, See Figure 1 on Page 5.

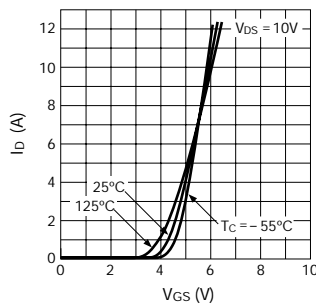
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	100			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	4.4	6.5		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.0A
R <sub>DS(on)</sub>		0.12	0.16	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6.0A
C <sub>iss</sub>		650		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		240		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
t <sub>on</sub>		70		ns	I <sub>D</sub> = 6A, V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		55		ns	I <sub>D</sub> = 6A, V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.

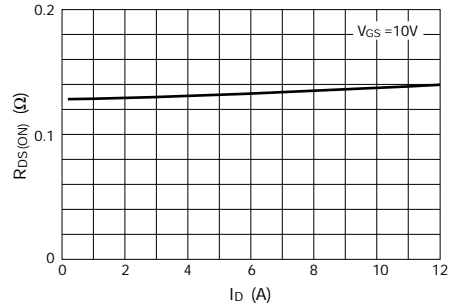
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



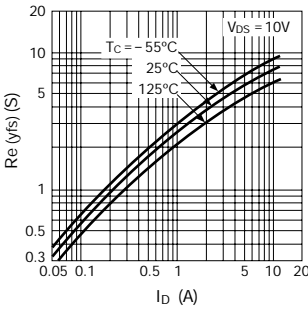
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



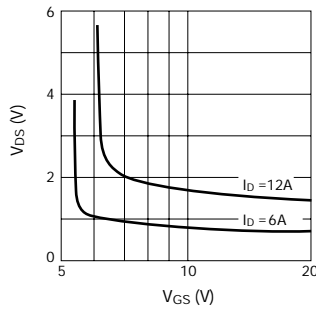
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



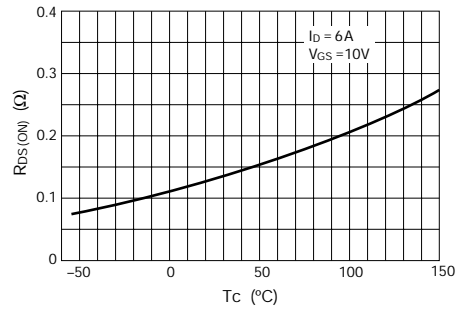
Re (yfs) - I<sub>D</sub> Characteristics (typical)



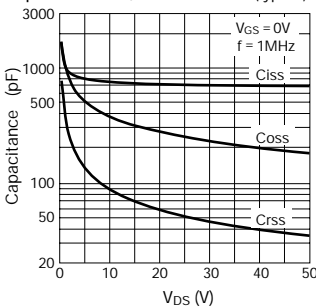
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



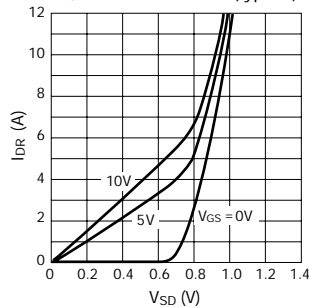
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



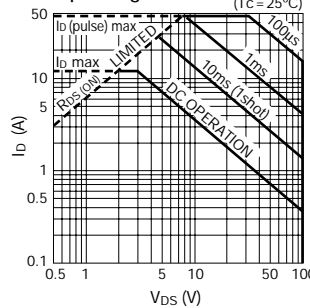
Capacitance - V<sub>DS</sub> Characteristics (typical)



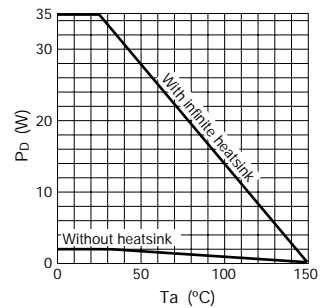
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - Ta Characteristics



# 2SK1188

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

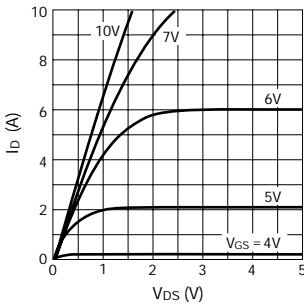
Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±10	A
I <sub>D</sub> (pulse)	±40 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	25 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	2.1	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 50μH, I<sub>L</sub> = 7.0A, unclamped, See Figure 1 on Page 5.

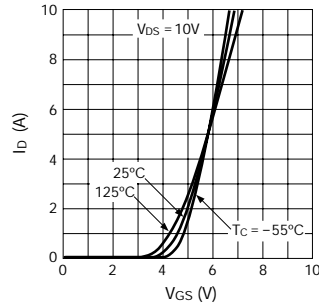
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	60			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	2.2	3.3		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 5.0A
R <sub>DS(on)</sub>		0.15	0.2	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.0A
C <sub>iss</sub>		300		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		160		pF	
t <sub>on</sub>		35		ns	I <sub>D</sub> = 5A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		35		ns	

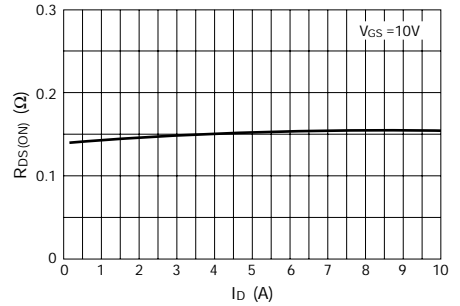
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



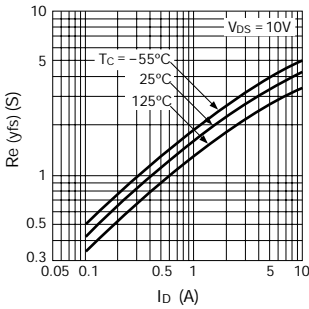
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



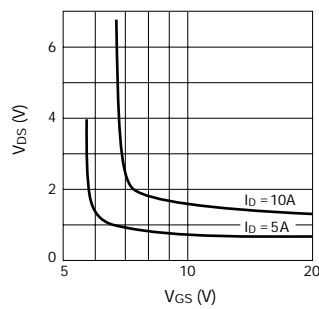
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



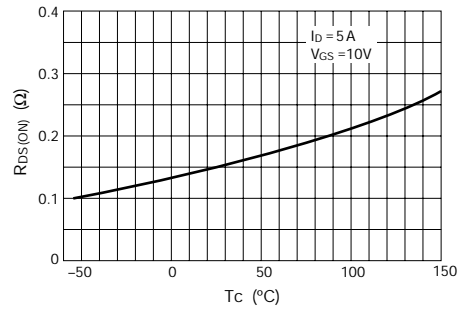
Re (yfs) - I<sub>D</sub> Characteristics (typical)



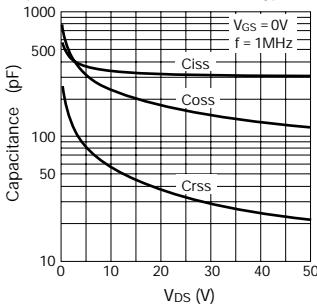
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



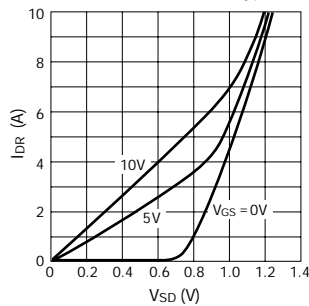
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



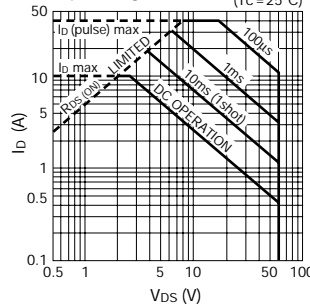
Capacitance - V<sub>DS</sub> Characteristics (typical)



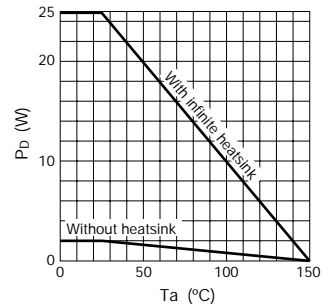
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1189

## External dimensions 1 ..... FM20

### Absolute Maximum Ratings (Ta = 25°C)

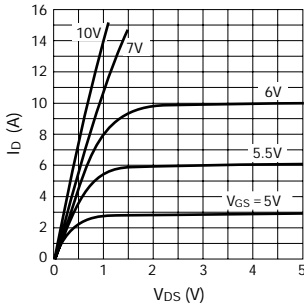
Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±15	A
I <sub>D</sub> (pulse)	±60 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	6.2	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 50μH, I<sub>L</sub> = 12A, unclamped, See Figure 1 on Page 5.

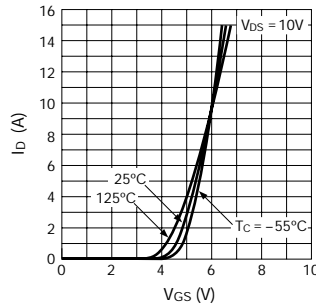
### Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	60			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	4.2	6.2		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 8.0A
R <sub>DS(on)</sub>		0.07	0.1	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 8.0A
C <sub>iss</sub>		640		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		350		pF	
t <sub>on</sub>		110		ns	I <sub>D</sub> = 8A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		45		ns	

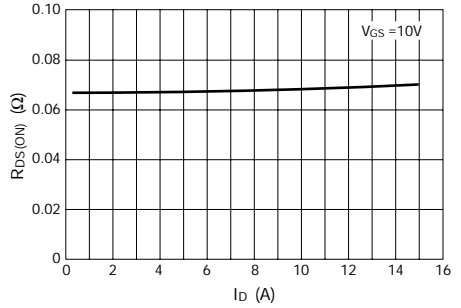
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



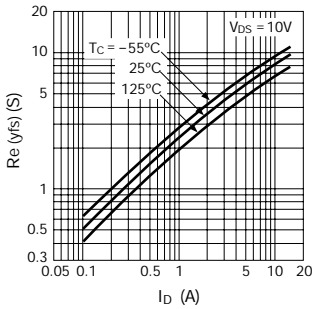
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



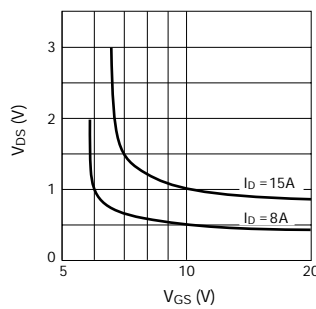
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



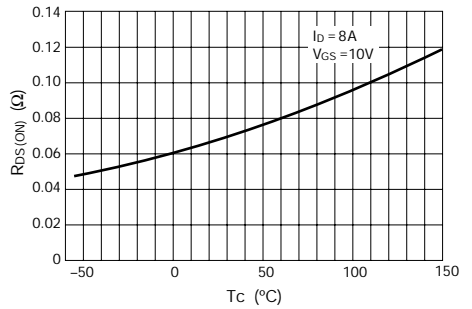
Re (yfs) - I<sub>D</sub> Characteristics (typical)



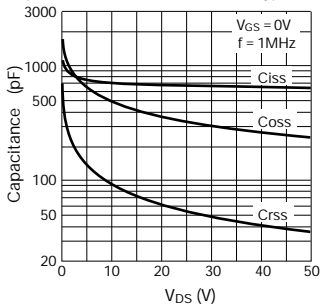
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



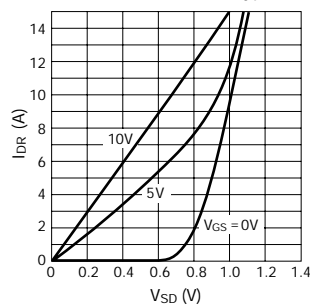
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



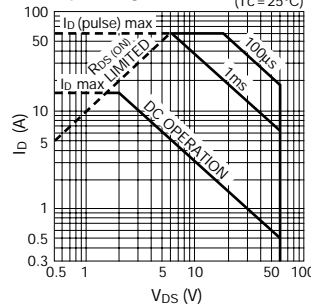
Capacitance - V<sub>DS</sub> Characteristics (typical)



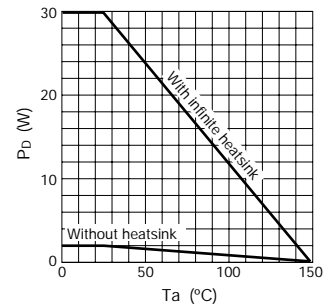
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1190

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

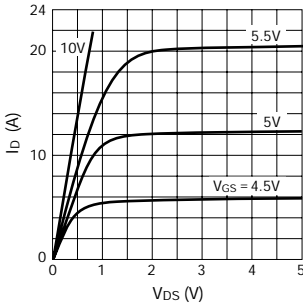
Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±22	A
I <sub>D</sub> (pulse)	±88 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	17	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 50μH, I<sub>L</sub> = 20A, unclamped, See Figure 1 on Page 5.

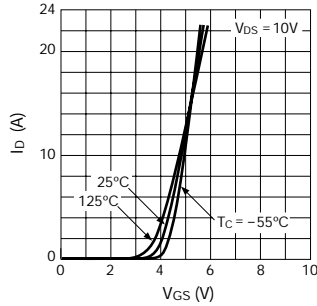
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	60			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	7.3	11		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 12A
R <sub>DS(on)</sub>		0.04	0.05	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A
C <sub>iss</sub>		1300		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		650		pF	
t <sub>on</sub>		130		ns	I <sub>D</sub> = 12A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		60		ns	

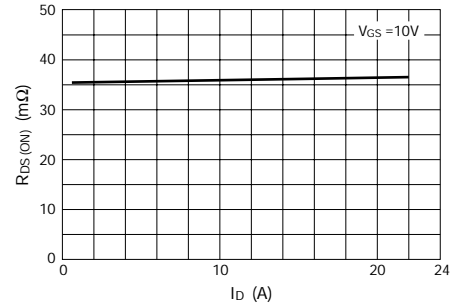
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



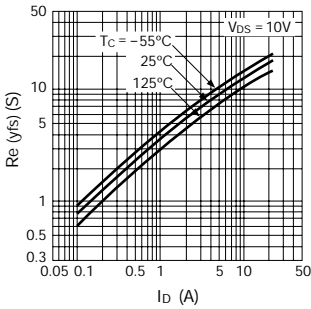
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



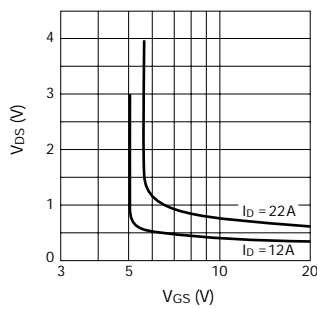
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



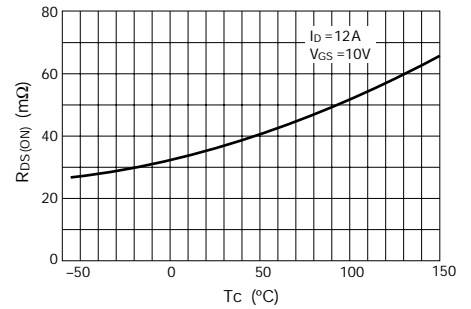
Re (yfs) - I<sub>D</sub> Characteristics (typical)



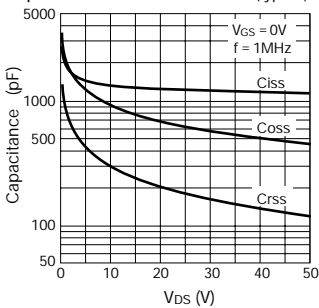
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



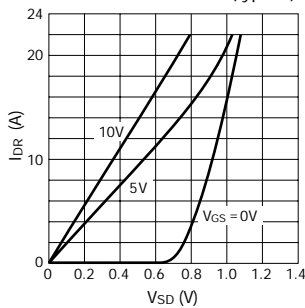
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



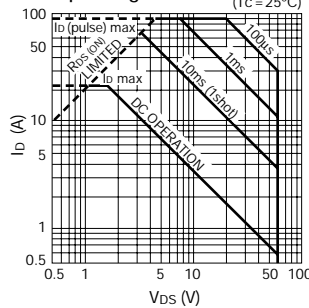
Capacitance - V<sub>DS</sub> Characteristics (typical)



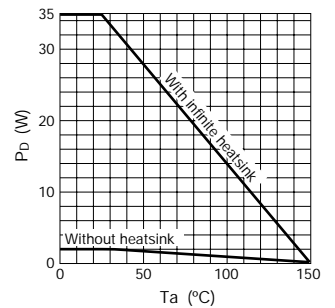
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1191

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

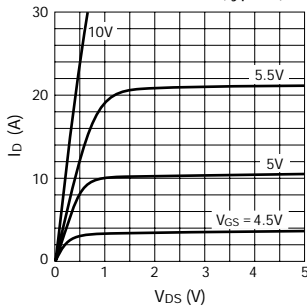
Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±30	A
I <sub>D</sub> (pulse)	±120 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	40 (T <sub>c</sub> = 25°C)	W
EAS *	38	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 50μH, I<sub>L</sub> = 30A, unclamped, See Figure 1 on Page 5.

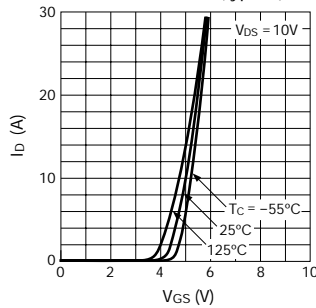
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	60			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	13	20		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 15A
R <sub>DS(on)</sub>		0.021	0.028	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 15A
C <sub>iss</sub>		2500		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		1200		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
t <sub>on</sub>		180		ns	I <sub>D</sub> = 15A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		120		ns	I <sub>D</sub> = 15A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.

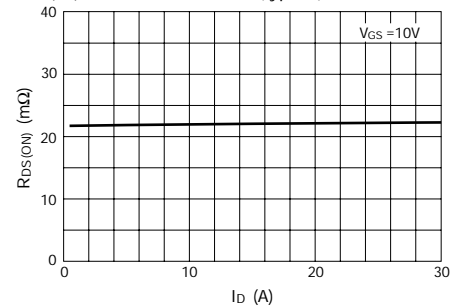
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



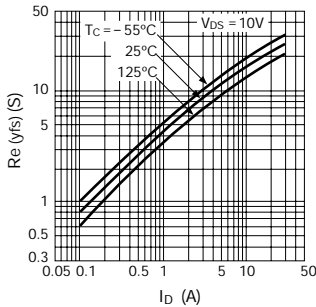
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



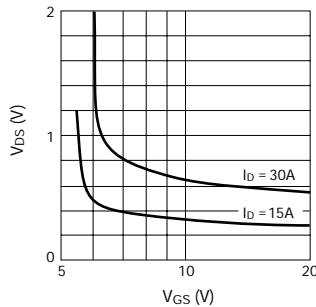
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



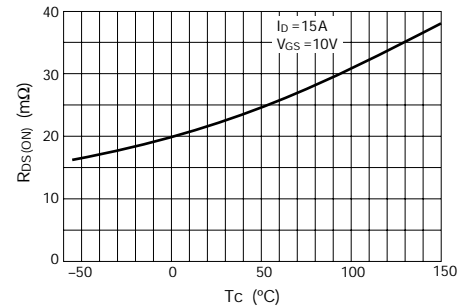
Re (yfs) - I<sub>D</sub> Characteristics (typical)



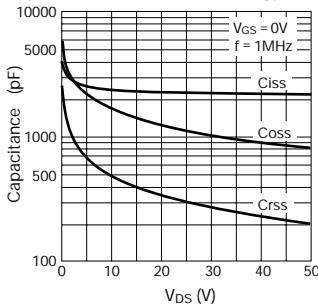
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



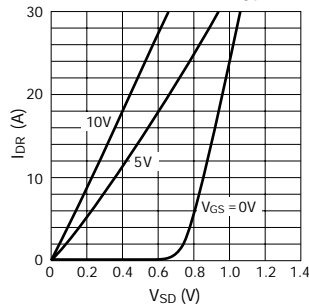
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



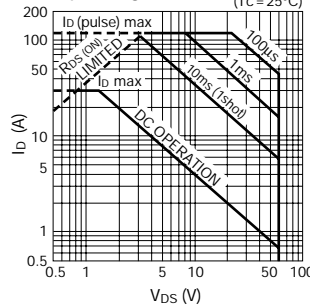
Capacitance - V<sub>DS</sub> Characteristics (typical)



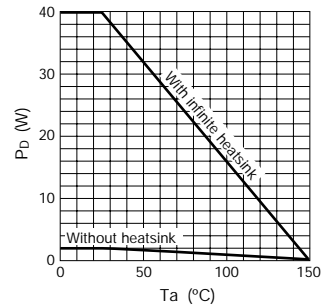
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK1192

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

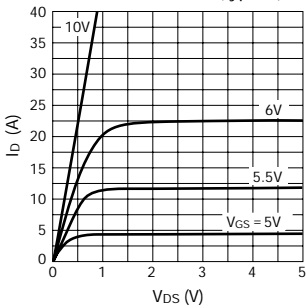
Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±40	A
I <sub>D</sub> (pulse)	±160 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	90 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *	38	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 50μH, I<sub>L</sub> = 30A, unclamped, See Figure 1 on Page 5.

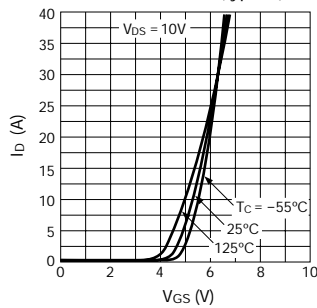
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	60			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	13	20		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 20A
R <sub>DS(on)</sub>		0.021	0.028	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
C <sub>iss</sub>		2500		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		1200		pF	
t <sub>on</sub>		260		ns	I <sub>D</sub> = 20A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		120		ns	

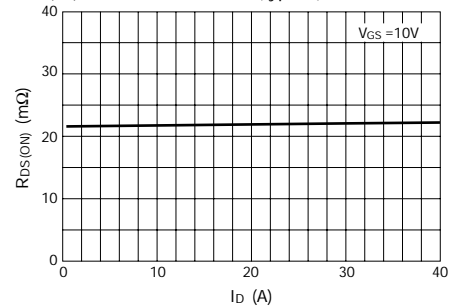
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



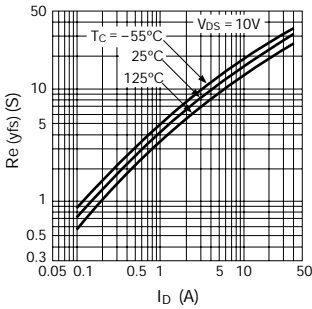
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



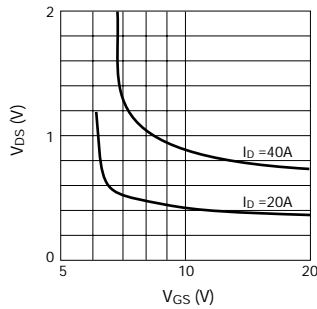
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



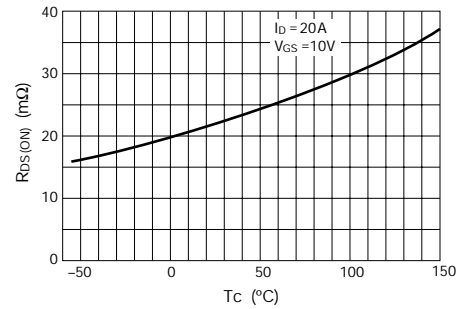
Re (yfs) - I<sub>D</sub> Characteristics (typical)



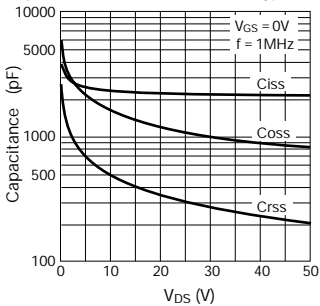
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



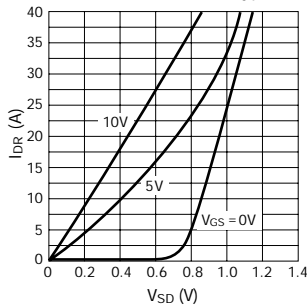
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



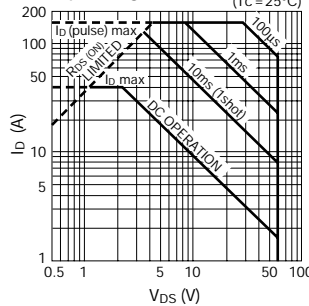
Capacitance - V<sub>DS</sub> Characteristics (typical)



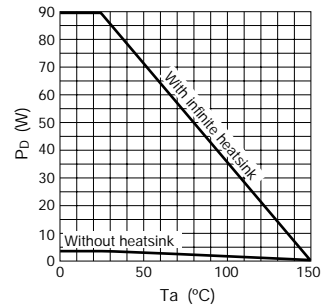
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - Ta Characteristics





# 2SK1712

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

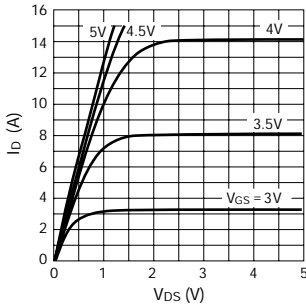
Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±10	V
I <sub>D</sub>	±15	A
I <sub>D</sub> (pulse)	±60 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
EAS *	6.2	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: V<sub>DD</sub> = 25V, L = 50μH, I<sub>L</sub> = 12A, unclamped, See Figure 1 on Page 5.

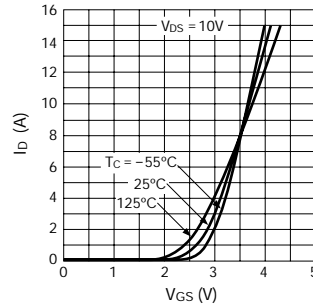
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	60			V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±10V
I <sub>DSS</sub>			250	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	1.0		2.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	5.6	8.4		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 8.0A
R <sub>DS(on)</sub>		0.12	0.14	Ω	V <sub>GS</sub> = 4V, I <sub>D</sub> = 8.0A
		0.07	0.1	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 8.0A
C <sub>iss</sub>		820		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		360		pF	
t <sub>on</sub>		100		ns	I <sub>D</sub> = 8A, V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		75		ns	

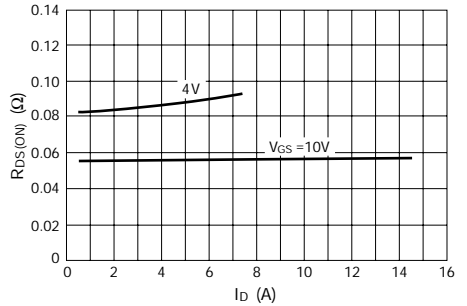
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



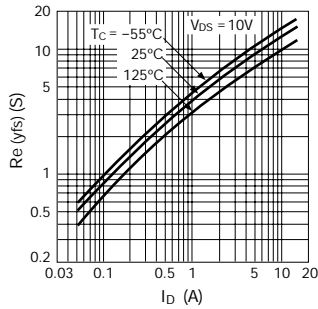
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



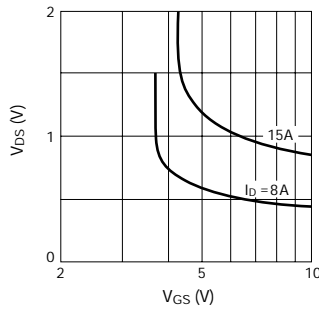
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



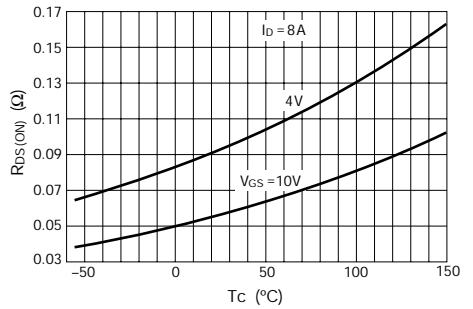
Re (yfs) - I<sub>D</sub> Characteristics (typical)



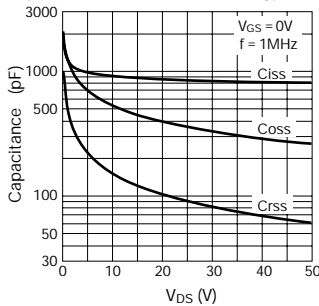
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



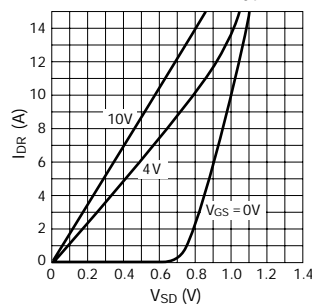
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



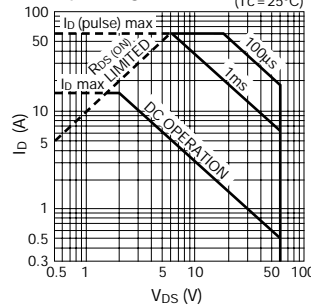
Capacitance - V<sub>DS</sub> Characteristics (typical)



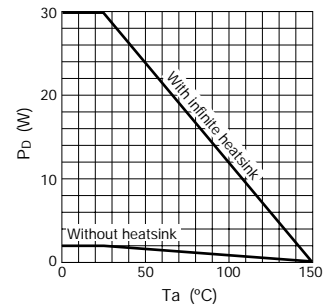
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2419

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±25	A
I <sub>D</sub> (pulse) *	±100	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
EAS	26	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	60			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re(yfs)	10	15		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 12A
R <sub>DS(on)</sub>		31	37	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A
C <sub>iSS</sub>		1300		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		500		pF	
C <sub>rSS</sub>		200		pF	
t <sub>d(on)</sub>		30		ns	I <sub>D</sub> = 12A, V <sub>DD</sub> ≐ 30V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 2.5Ω See Figure 2 on Page 5.
t <sub>r</sub>		160		ns	
t <sub>d(off)</sub>		75		ns	
t <sub>r</sub>		30		ns	
V <sub>SD</sub>		1.0	1.5	V	V <sub>GS</sub> = 0V, I <sub>SD</sub> = 25A

# 2SK2420

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±30	A
I <sub>D</sub> (pulse) *1	±120	A
P <sub>D</sub>	40 (T <sub>c</sub> = 25°C)	W
EAS *2	38	mJ
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

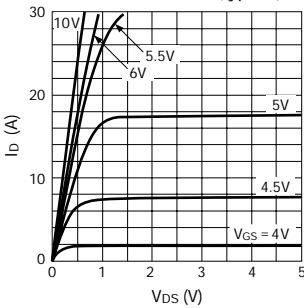
\*1: P<sub>W</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 50V, L = 50μH, I<sub>L</sub> = 30A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

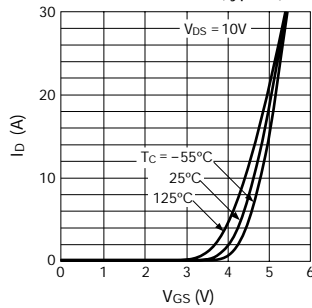
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	60			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	13	20		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 15A
R <sub>DS(on)</sub>		21	28	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 15A
C <sub>iss</sub>		2200		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		850		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
t <sub>on</sub>		210		ns	I <sub>D</sub> = 15A, V <sub>DD</sub> = 30V, R <sub>L</sub> = 2Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		145		ns	I <sub>D</sub> = 15A, V <sub>DD</sub> = 30V, R <sub>L</sub> = 2Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.

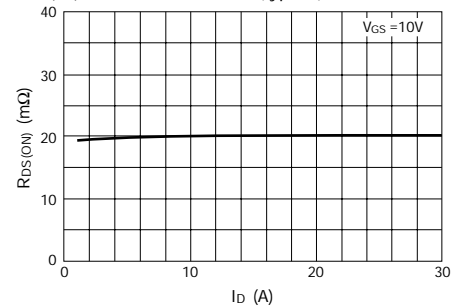
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



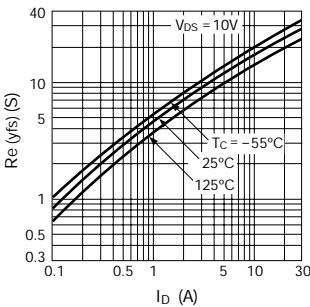
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



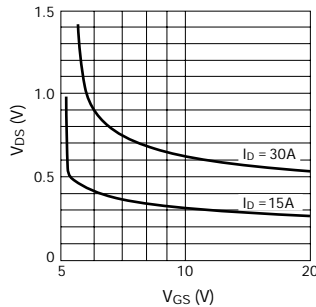
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



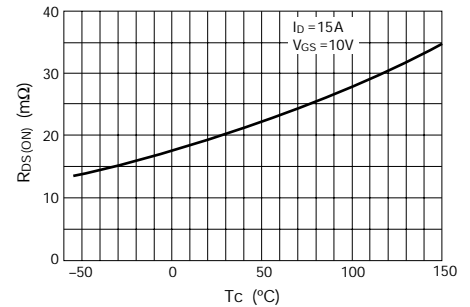
Re (yfs) - I<sub>D</sub> Characteristics (typical)



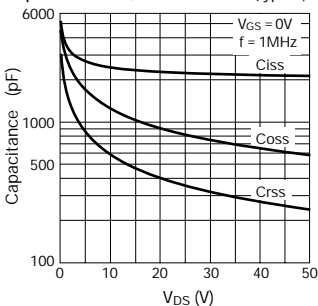
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



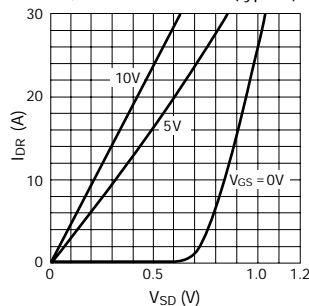
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



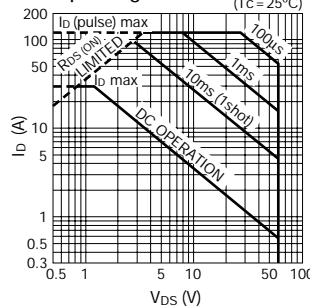
Capacitance - V<sub>DS</sub> Characteristics (typical)



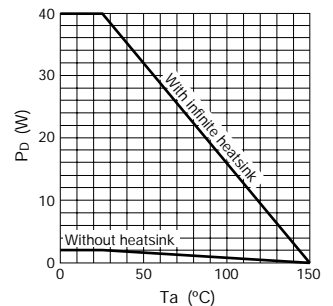
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2421

## External dimensions 1 ..... FM20

### Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±40	A
I <sub>D</sub> (pulse) *1	±160	A
P <sub>D</sub>	40 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	60	mJ
I <sub>AS</sub>	40	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

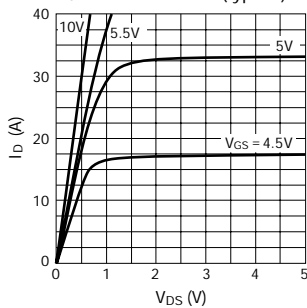
\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 20V, L = 50μH, I<sub>L</sub> = 40A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

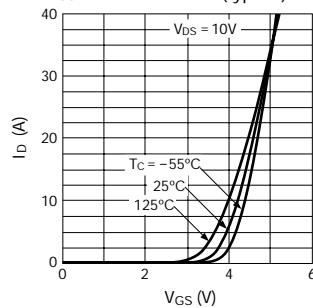
### Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	60			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	18	25		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 20A
R <sub>DS(on)</sub>		17.5	20	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
C <sub>iss</sub>		2400		pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		950		pF	
t <sub>on</sub>		400		ns	I <sub>D</sub> = 20A, V <sub>DD</sub> ≈ 30V, R <sub>L</sub> = 1.5Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>off</sub>		195		ns	

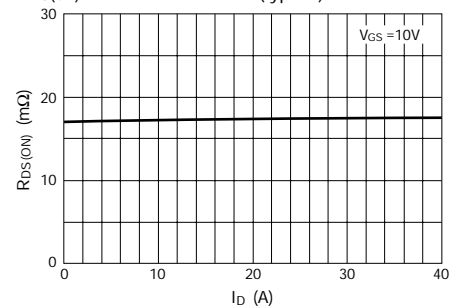
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



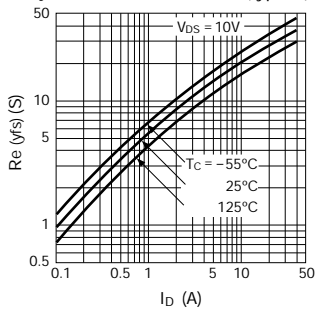
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



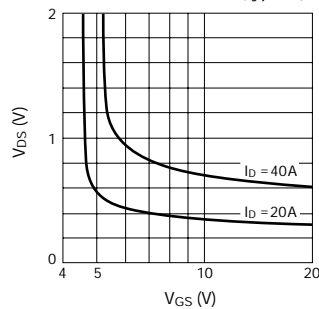
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



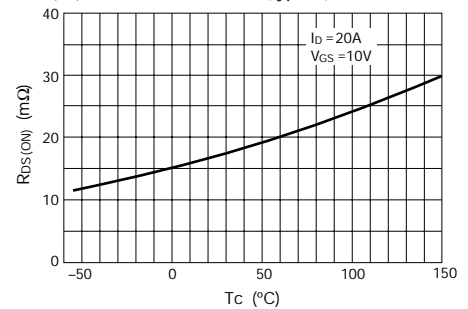
Re (yfs) - I<sub>D</sub> Characteristics (typical)



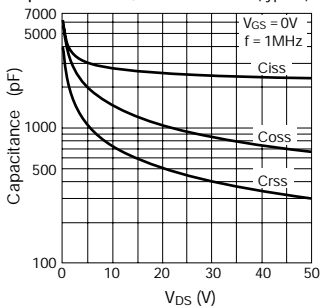
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



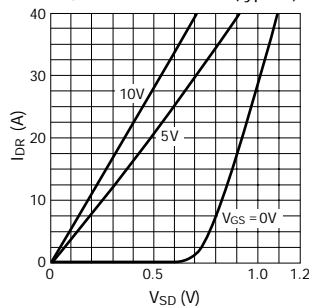
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



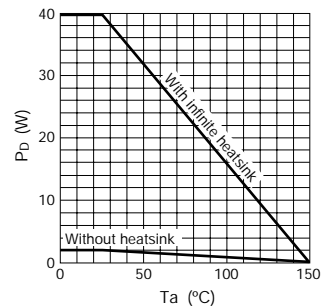
Capacitance - V<sub>DS</sub> Characteristics (typical)



I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2701

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±7	A
I <sub>D</sub> (pulse) *1	±28	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	130	mJ
I <sub>AS</sub>	7	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

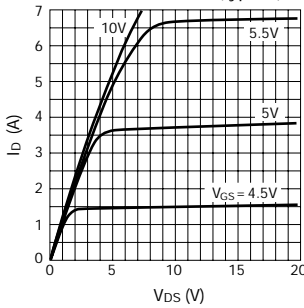
\*1: P<sub>W</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 5mH, I<sub>L</sub> = 7A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

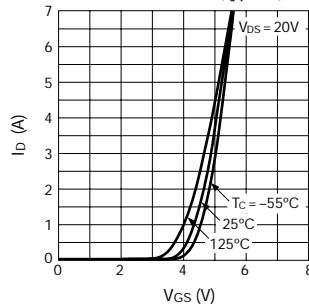
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
R <sub>e</sub> (yfs)	3.5	5		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 3.5A
R <sub>DS(on)</sub>		0.84	1.10	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.5A
C <sub>iss</sub>		720		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		150		pF	
C <sub>rss</sub>		65		pF	
t <sub>d(on)</sub>		25		ns	I <sub>D</sub> = 3.5A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 57Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		40		ns	
t <sub>d(off)</sub>		70		ns	
t <sub>f</sub>		50		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 7A, V <sub>GS</sub> = 0V

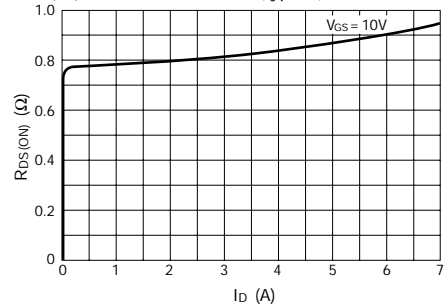
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



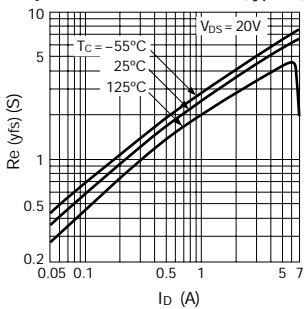
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



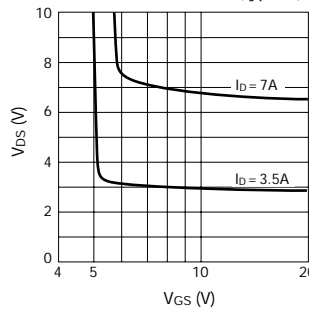
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



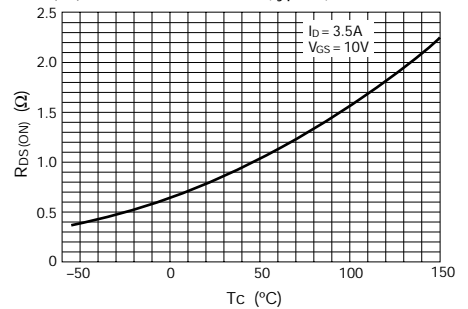
R<sub>e</sub> (yfs) - I<sub>D</sub> Characteristics (typical)



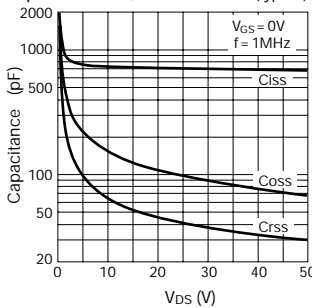
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



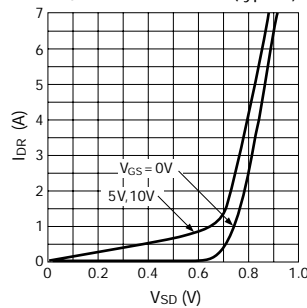
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



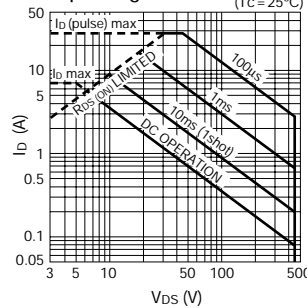
Capacitance - V<sub>DS</sub> Characteristics (typical)



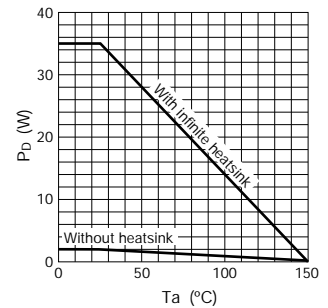
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2702

## External dimensions 1 ..... FM20

### Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±10	A
I <sub>D</sub> (pulse) *1	±40	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	300	mJ
I <sub>AS</sub>	10	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

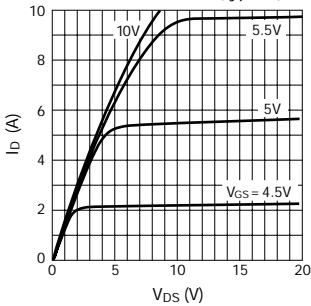
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 6mH, I<sub>L</sub> = 10A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

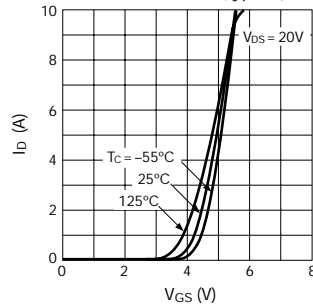
### Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	5	7		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 5A
R <sub>DS(on)</sub>		0.66	0.80	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A
C <sub>iss</sub>		1000		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		200		pF	
C <sub>rss</sub>		95		pF	
t <sub>d(on)</sub>		25		ns	I <sub>D</sub> = 5A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 40Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		85		ns	
t <sub>f</sub>		45		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 10A, V <sub>GS</sub> = 0V

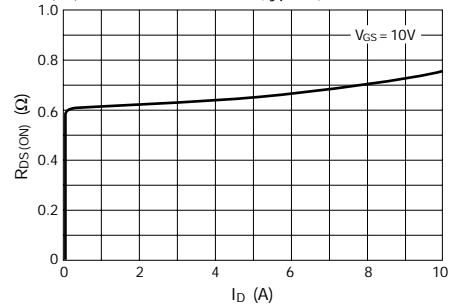
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



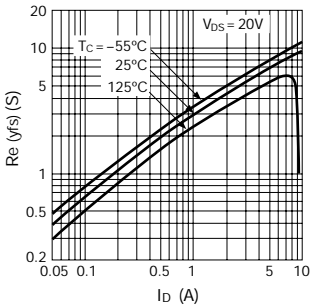
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



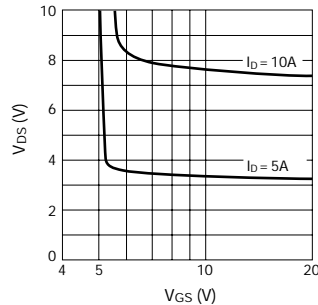
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



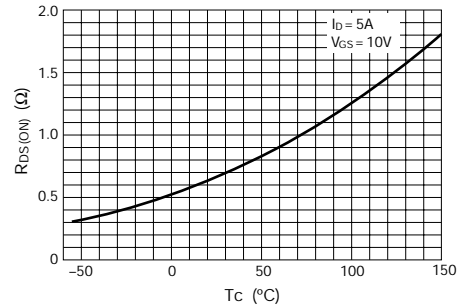
Re (yfs) - I<sub>D</sub> Characteristics (typical)



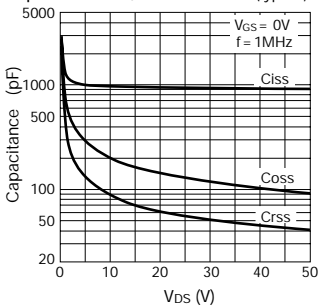
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



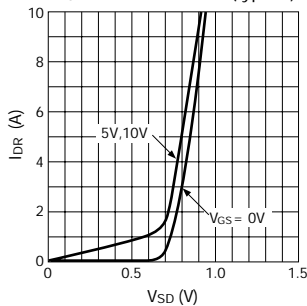
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



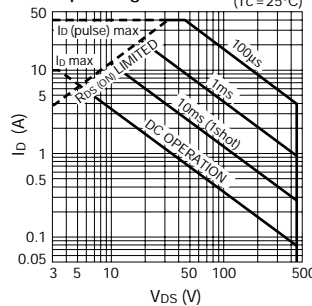
Capacitance - V<sub>DS</sub> Characteristics (typical)



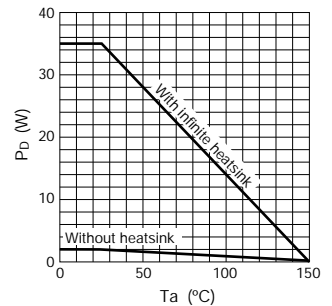
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2703

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±10	A
I <sub>D</sub> (pulse) *1	±40	A
P <sub>D</sub>	75 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	300	mJ
I <sub>AS</sub>	10	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

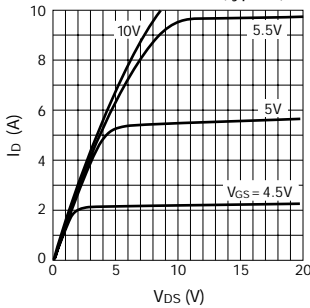
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 6mH, I<sub>L</sub> = 10A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

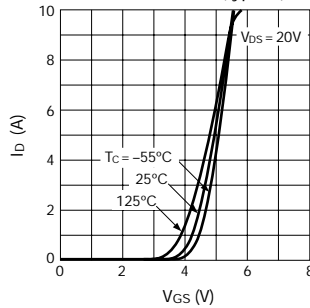
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	5	7		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 5A
R <sub>DS(on)</sub>		0.66	0.80	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A
C <sub>iss</sub>		1000		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		200		pF	
C <sub>rss</sub>		95		pF	
t <sub>d(on)</sub>		25		ns	I <sub>D</sub> = 5A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 40Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		85		ns	
t <sub>f</sub>		45		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 10A, V <sub>GS</sub> = 0V

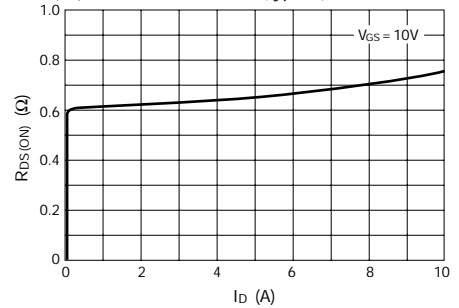
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



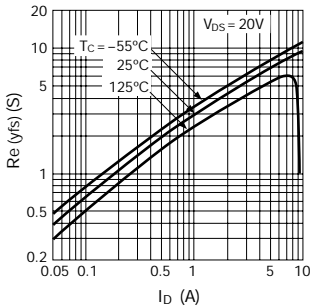
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



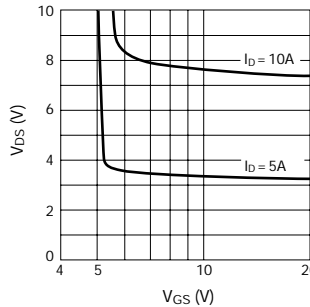
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



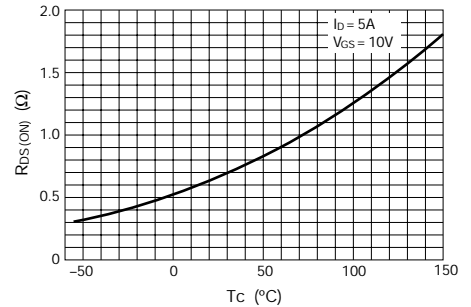
Re (yfs) - I<sub>D</sub> Characteristics (typical)



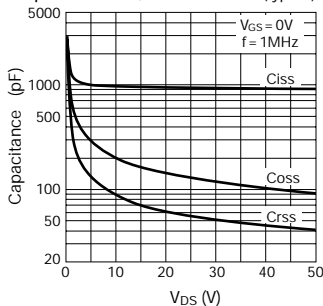
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



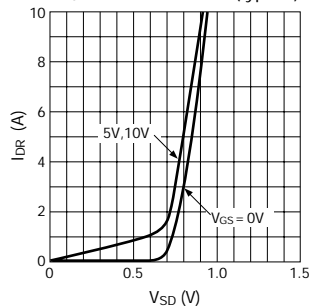
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



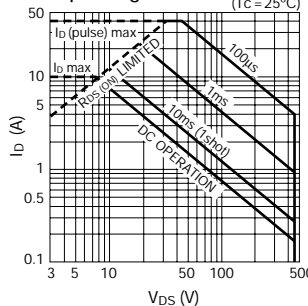
Capacitance - V<sub>DS</sub> Characteristics (typical)



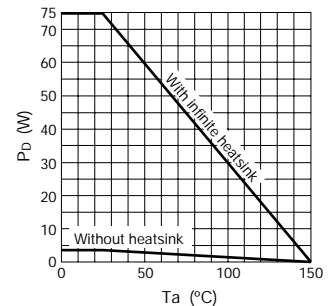
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2704

## External dimensions 1 ..... FM20

### Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±13	A
I <sub>D</sub> (pulse) *1	±52	A
P <sub>D</sub>	40 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	400	mJ
I <sub>AS</sub>	13	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

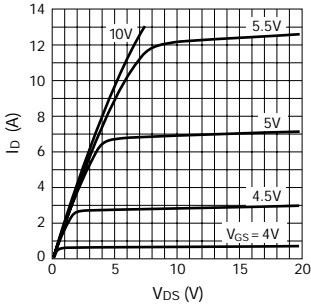
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 4.5mH, I<sub>L</sub> = 13A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

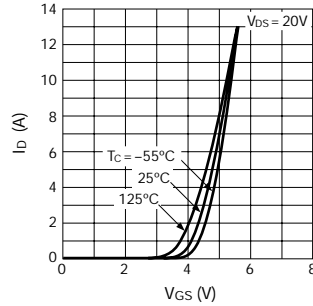
### Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
R <sub>e</sub> (yfs)	6.0	9.0		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 6.5A
R <sub>DS(on)</sub>		0.48	0.57	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6.5A
C <sub>iss</sub>		1300		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		280		pF	
C <sub>rss</sub>		130		pF	
t <sub>d(on)</sub>		30		ns	I <sub>D</sub> = 6.5A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 30Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		40		ns	
t <sub>d(off)</sub>		95		ns	
t <sub>f</sub>		50		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 13A, V <sub>GS</sub> = 0V

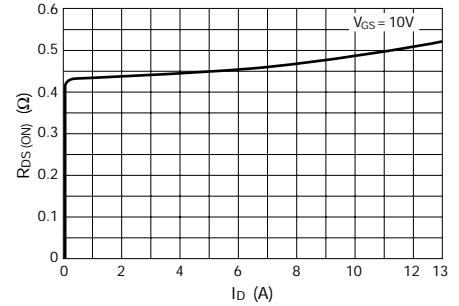
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



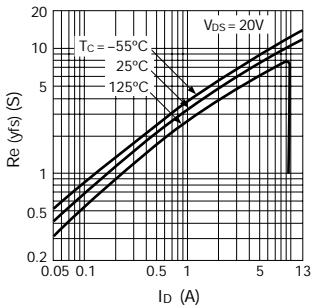
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



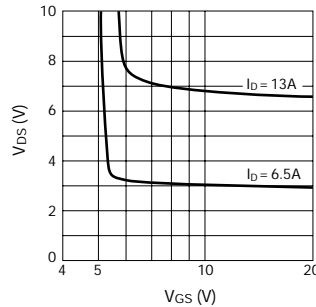
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



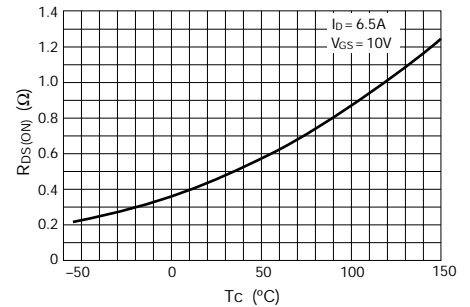
R<sub>e</sub> (yfs) - I<sub>D</sub> Characteristics (typical)



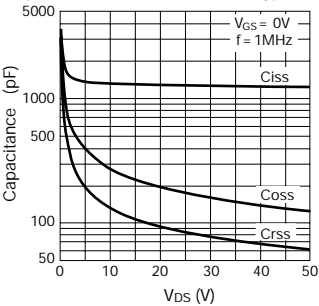
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



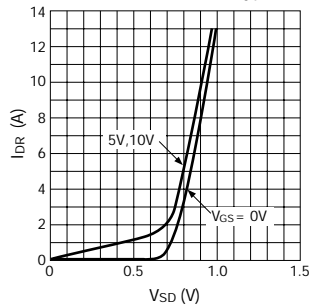
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



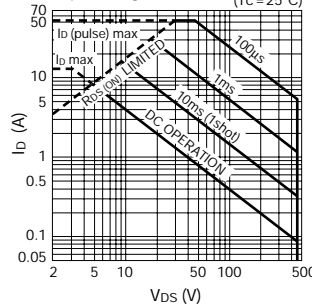
Capacitance - V<sub>DS</sub> Characteristics (typical)



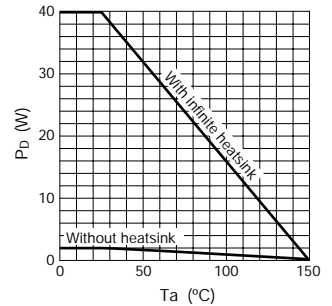
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics





# 2SK2705

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±13	A
I <sub>D</sub> (pulse) *1	±52	A
P <sub>D</sub>	75 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	400	mJ
I <sub>AS</sub>	13	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

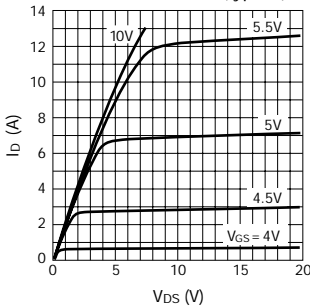
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 4.5mH, I<sub>L</sub> = 13A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

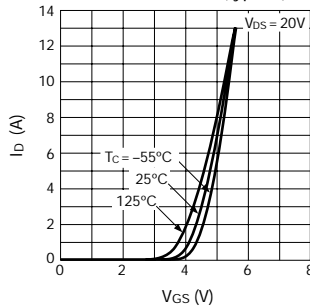
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	6.0	9.0		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 6.5A
R <sub>DS(on)</sub>		0.48	0.57	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6.5A
C <sub>iss</sub>		1300		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		280		pF	
C <sub>rss</sub>		130		pF	
t <sub>d(on)</sub>		30		ns	I <sub>D</sub> = 6.5A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 30Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		40		ns	
t <sub>d(off)</sub>		95		ns	
t <sub>f</sub>		50		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 13A, V <sub>GS</sub> = 0V

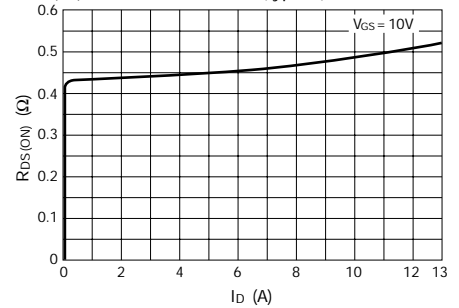
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



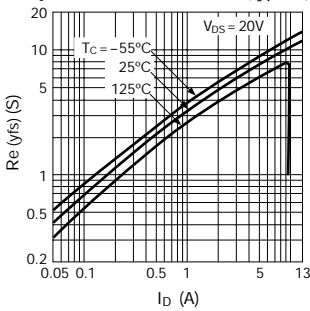
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



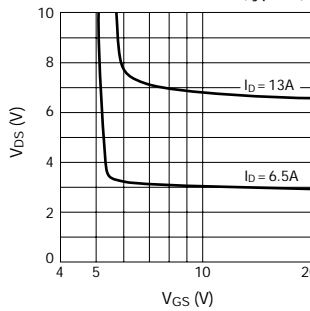
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



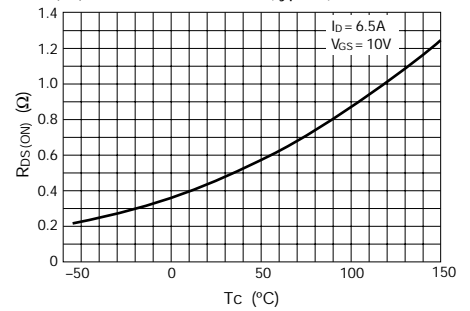
Re (yfs) - I<sub>D</sub> Characteristics (typical)



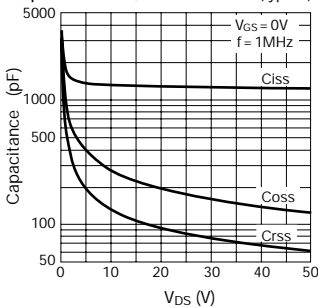
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



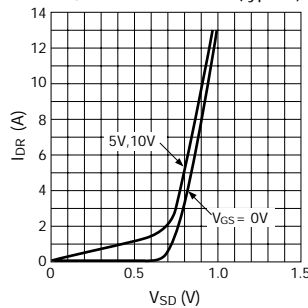
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



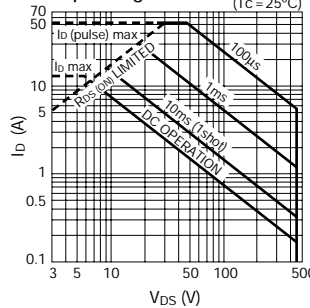
Capacitance - V<sub>DS</sub> Characteristics (typical)



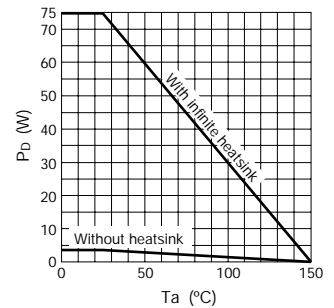
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - Ta Characteristics



# 2SK2706

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±18	A
I <sub>D</sub> (pulse) *1	±72	A
P <sub>D</sub>	85 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	700	mJ
I <sub>AS</sub>	18	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

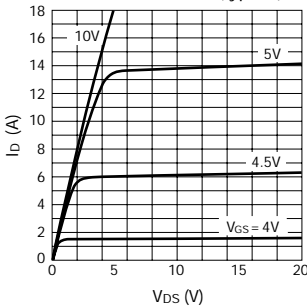
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 4mH, I<sub>L</sub> = 18A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

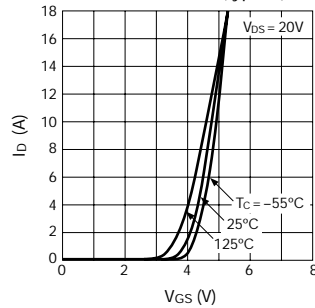
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	10	15		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 9A
R <sub>DS(on)</sub>		0.24	0.30	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9A
C <sub>iss</sub>		2500		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		500		pF	
C <sub>rss</sub>		260		pF	
t <sub>d(on)</sub>		40		ns	I <sub>D</sub> = 9A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 22Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		60		ns	
t <sub>d(off)</sub>		170		ns	
t <sub>f</sub>		85		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 18A, V <sub>GS</sub> = 0V

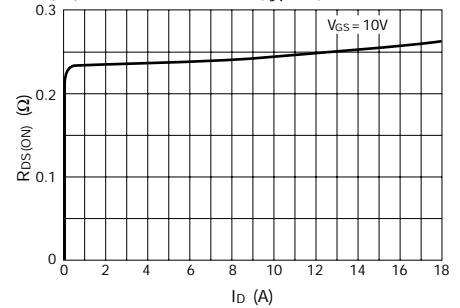
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



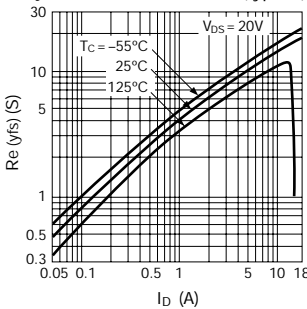
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



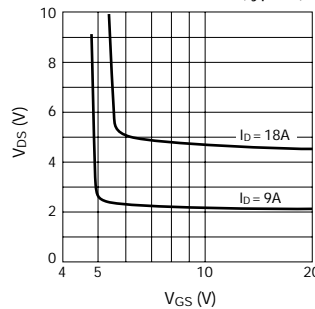
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



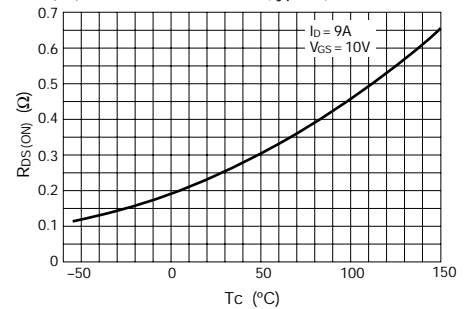
Re (yfs) - I<sub>D</sub> Characteristics (typical)



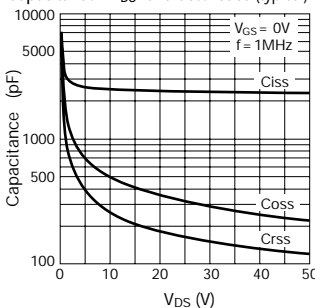
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



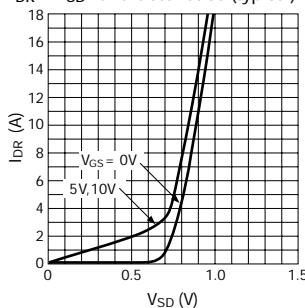
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



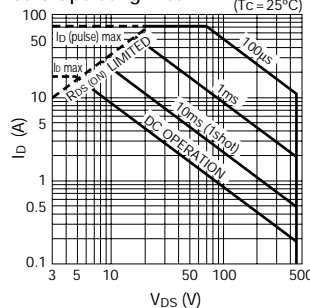
Capacitance - V<sub>DS</sub> Characteristics (typical)



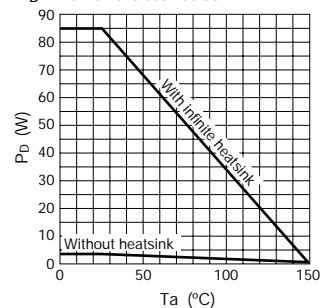
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2707

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	600	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±4.5	A
I <sub>D</sub> (pulse) *1	±18	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	50	mJ
I <sub>AS</sub>	4.5	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

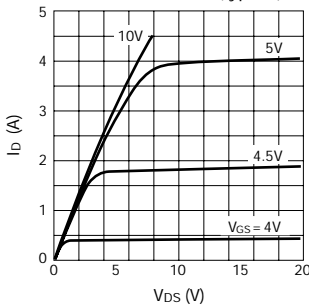
\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 30V, L = 5mH, I<sub>L</sub> = 4.5A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

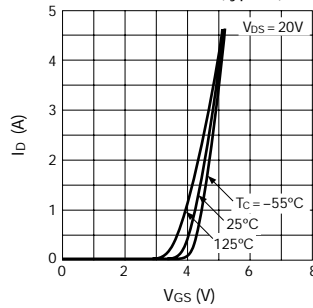
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	600			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	2.4	3.5		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 2A
R <sub>DS(on)</sub>		1.45	1.85	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2A
C <sub>iss</sub>		560		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		130		pF	
C <sub>rss</sub>		65		pF	
t <sub>d(on)</sub>		20		ns	I <sub>D</sub> = 2A, V <sub>DD</sub> = 250V, R <sub>L</sub> = 125Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		65		ns	
t <sub>f</sub>		90		ns	
V <sub>SD</sub>		0.9	1.5	V	I <sub>SD</sub> = 4.5A, V <sub>GS</sub> = 0V

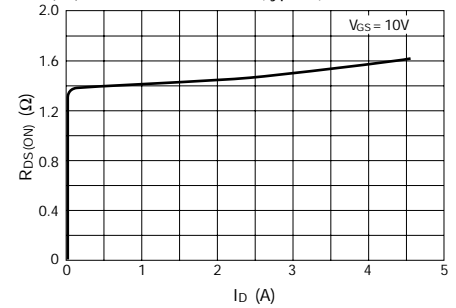
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



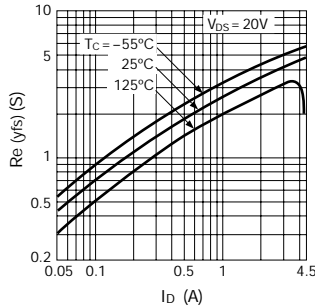
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



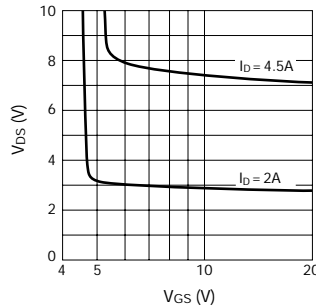
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



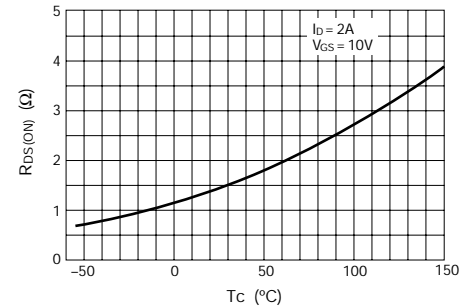
Re (yfs) - I<sub>D</sub> Characteristics (typical)



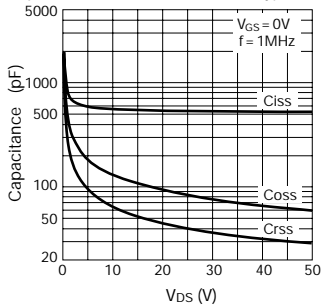
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



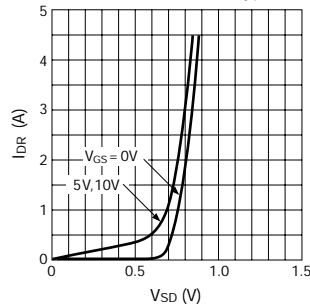
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



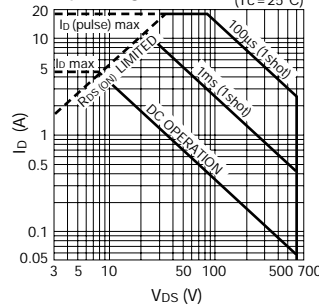
Capacitance - V<sub>DS</sub> Characteristics (typical)



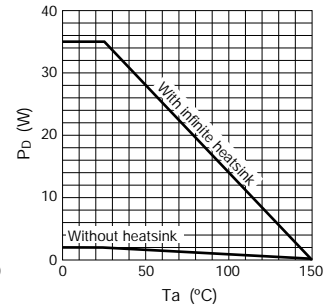
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2708

## External dimensions 1 ..... FM20

### Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	600	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±7	A
I <sub>D</sub> (pulse) *1	±28	A
P <sub>D</sub>	40 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	150	mJ
I <sub>AS</sub>	7	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

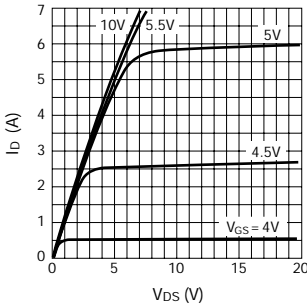
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 6mH, I<sub>L</sub> = 7A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

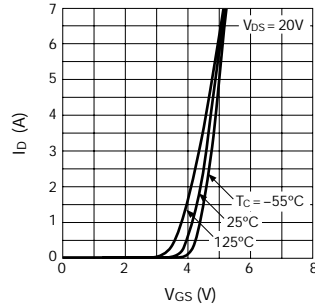
### Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	600			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	4.0	6.0		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 3.5A
R <sub>DS(on)</sub>		0.85	1.1	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.5A
C <sub>iss</sub>		950		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		220		pF	
C <sub>rss</sub>		120		pF	
t <sub>d(on)</sub>		30		ns	I <sub>D</sub> = 3.5A, V <sub>DD</sub> = 250V, R <sub>L</sub> = 71Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		27		ns	
t <sub>d(off)</sub>		100		ns	
t <sub>f</sub>		50		ns	
V <sub>SD</sub>		0.9	1.5	V	I <sub>SD</sub> = 7A, V <sub>GS</sub> = 0V

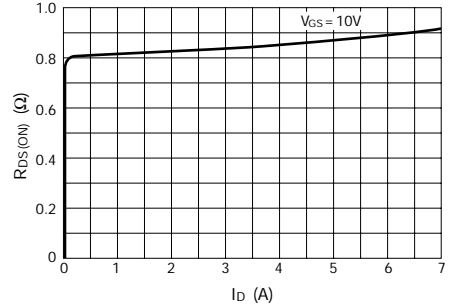
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



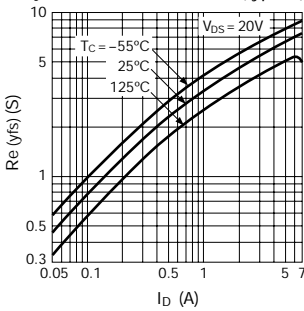
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



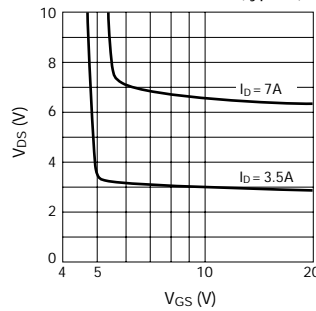
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



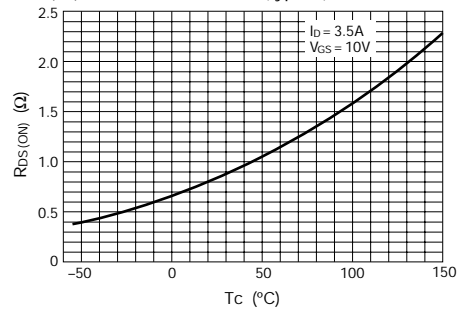
Re (yfs) - I<sub>D</sub> Characteristics (typical)



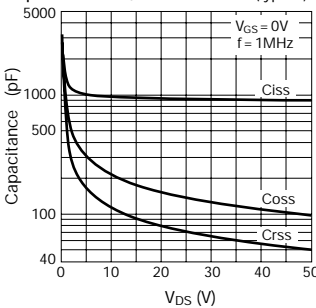
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



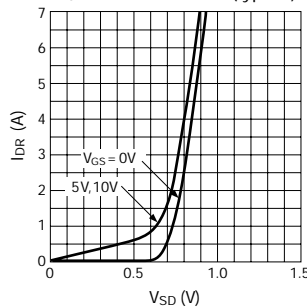
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



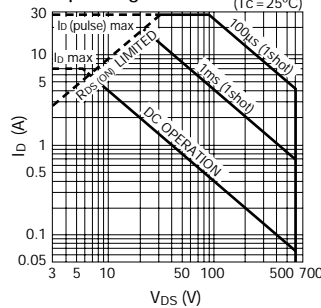
Capacitance - V<sub>DS</sub> Characteristics (typical)



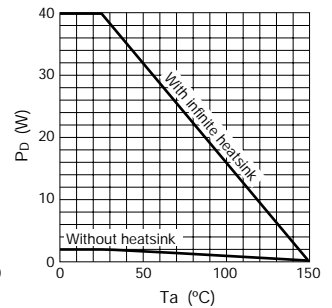
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - Ta Characteristics



# 2SK2709

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	600	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±8.5	A
I <sub>D</sub> (pulse) *1	±34	A
P <sub>D</sub>	85 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	300	mJ
I <sub>AS</sub>	8.5	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 8mH, I<sub>L</sub> = 8.5A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	600			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	5.0	7.0		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 4A
R <sub>DS</sub> (on)		0.65	0.85	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A
C <sub>iss</sub>		1200		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		270		pF	
C <sub>rss</sub>		150		pF	
t <sub>d</sub> (on)		30		ns	
t <sub>r</sub>		40		ns	I <sub>D</sub> = 4A, V <sub>DD</sub> = 250V, R <sub>L</sub> = 62.5Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>d</sub> (off)		110		ns	
t <sub>f</sub>		65		ns	
V <sub>SD</sub>		0.95	1.5	V	I <sub>SD</sub> = 8.5A, V <sub>GS</sub> = 0V

# 2SK2710

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	600	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±12	A
I <sub>D</sub> (pulse) *1	±48	A
P <sub>D</sub>	85 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	400	mJ
I <sub>AS</sub>	12	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

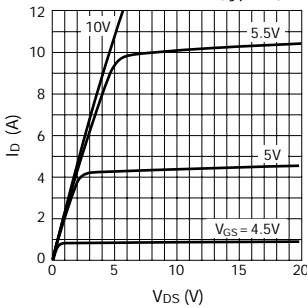
\*1: P<sub>W</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 5.5mH, I<sub>L</sub> = 12A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

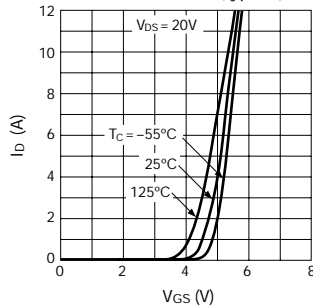
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	600			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	7.5	11		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 6A
R <sub>DS(on)</sub>		0.42	0.55	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6A
C <sub>iss</sub>		1900		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		410		pF	
C <sub>rss</sub>		240		pF	
t <sub>d(on)</sub>		35		ns	I <sub>D</sub> = 6A, V <sub>DD</sub> = 250V, R <sub>L</sub> = 20.8Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		45		ns	
t <sub>d(off)</sub>		160		ns	
t <sub>f</sub>		70		ns	
V <sub>SD</sub>		0.95	1.5	V	I <sub>SD</sub> = 12A, V <sub>GS</sub> = 0V

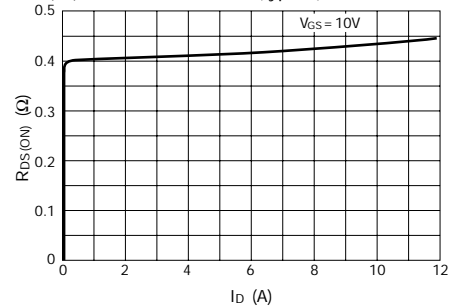
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



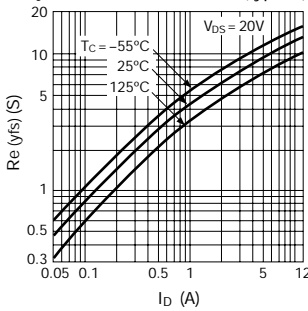
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



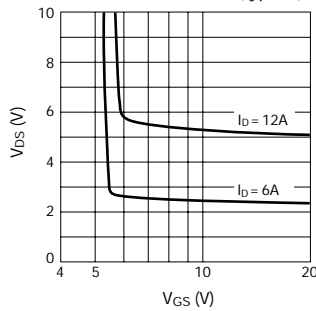
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



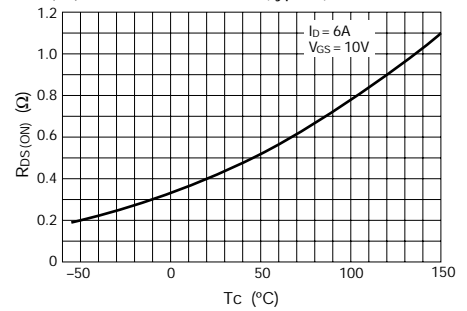
Re (yfs) - I<sub>D</sub> Characteristics (typical)



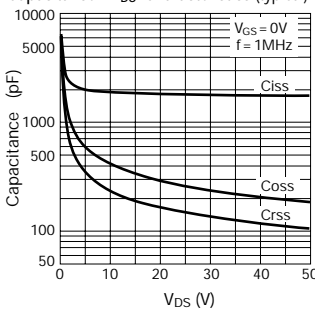
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



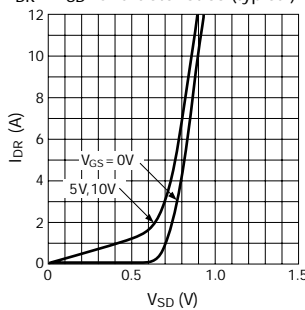
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



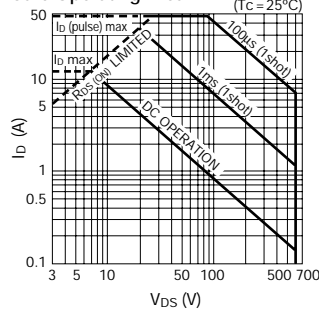
Capacitance - V<sub>DS</sub> Characteristics (typical)



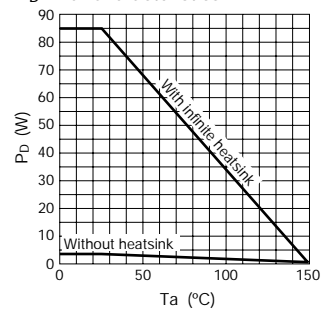
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - Ta Characteristics



# 2SK2778

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	100	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±12	A
I <sub>D</sub> (pulse) *1	±48	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
EAS *2	70	mJ
I <sub>AS</sub>	12	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

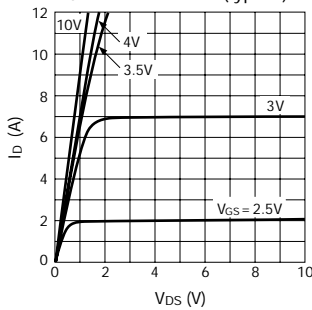
\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 25V, L = 730μH, I<sub>L</sub> = 12A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

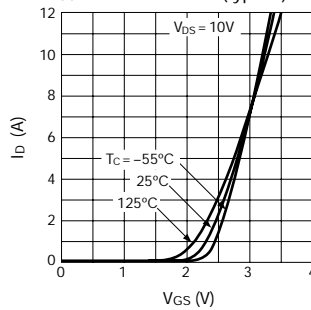
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	100			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	1.0		2.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	7	11		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
R <sub>DS(on)</sub>		105	175	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6A
		130	220	mΩ	V <sub>GS</sub> = 4V, I <sub>D</sub> = 6A
C <sub>iss</sub>		740		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		240		pF	
C <sub>rss</sub>		75		pF	
t <sub>d(on)</sub>		15		ns	I <sub>D</sub> = 6A, V <sub>DD</sub> ≈ 50V, R <sub>L</sub> = 8.3Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		55		ns	
t <sub>d(off)</sub>		60		ns	
t <sub>f</sub>		20		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 12A, V <sub>GS</sub> = 0V

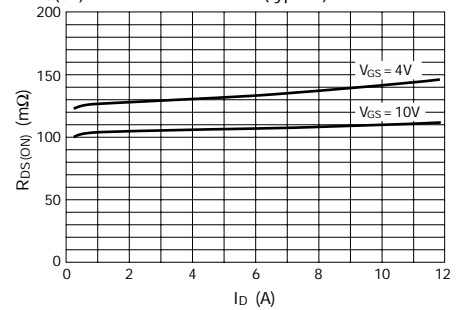
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



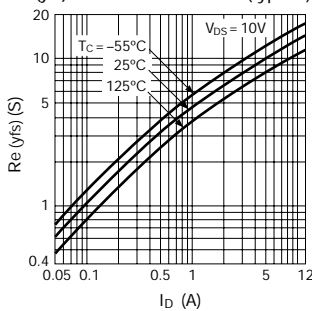
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



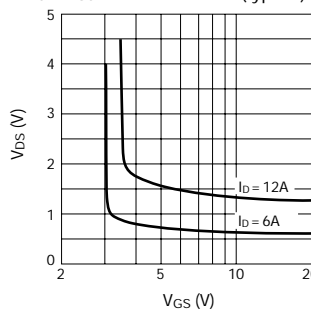
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



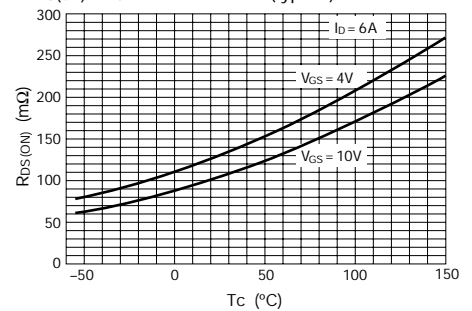
Re (yfs) - I<sub>D</sub> Characteristics (typical)



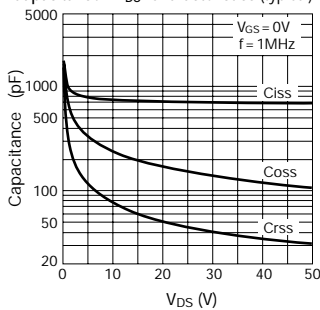
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



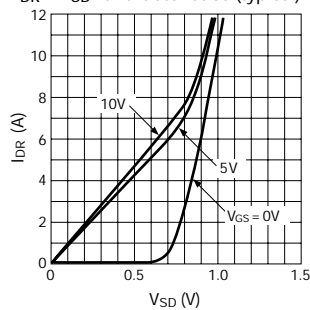
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



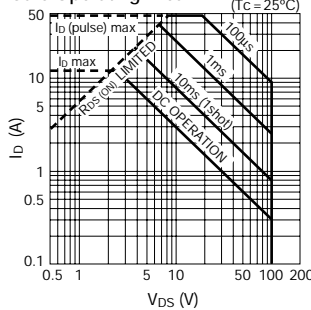
Capacitance - V<sub>DS</sub> Characteristics (typical)



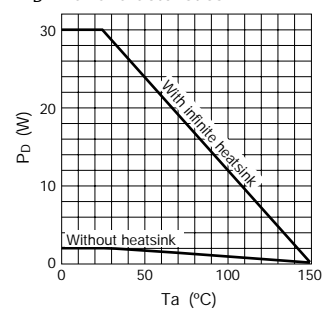
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2779

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	100	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±20	A
I <sub>D</sub> (pulse) *1	±80	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	200	mJ
I <sub>AS</sub>	20	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

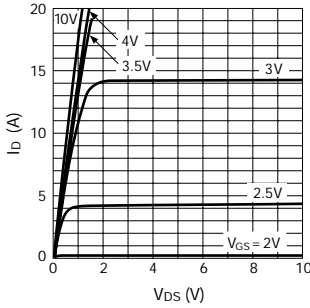
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 25V, L = 750μH, I<sub>L</sub> = 20A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

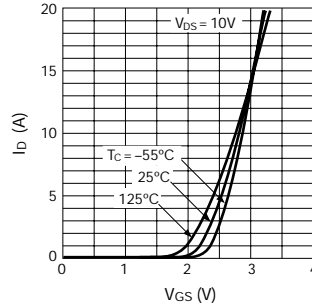
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	100			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	1.0		2.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	12	20		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 10A
R <sub>DS</sub> (on)		60	80	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A
		75	95	mΩ	V <sub>GS</sub> = 4V, I <sub>D</sub> = 10A
C <sub>iss</sub>		1630		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		480		pF	
C <sub>rss</sub>		180		pF	
t <sub>d</sub> (on)		20		ns	I <sub>D</sub> = 10A, V <sub>DD</sub> ≈ 50V, R <sub>L</sub> = 5Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		90		ns	
t <sub>d</sub> (off)		120		ns	
t <sub>f</sub>		55		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 20A, V <sub>GS</sub> = 0V

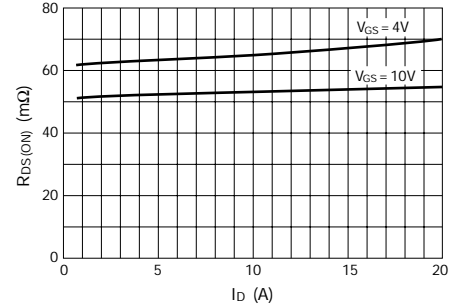
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



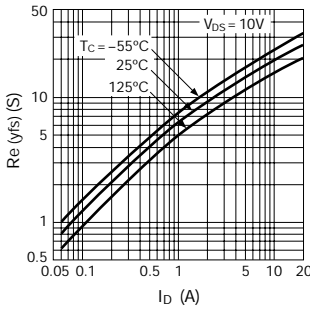
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



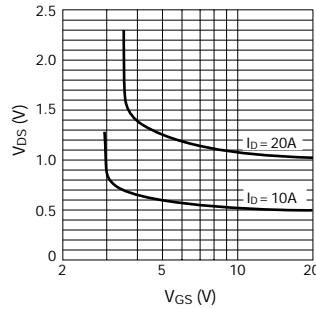
R<sub>DS</sub>(ON) - I<sub>D</sub> Characteristics (typical)



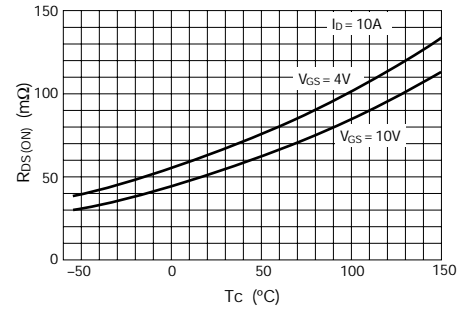
Re (yfs) - I<sub>D</sub> Characteristics (typical)



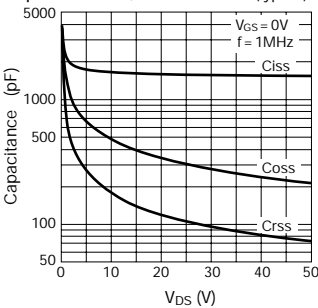
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



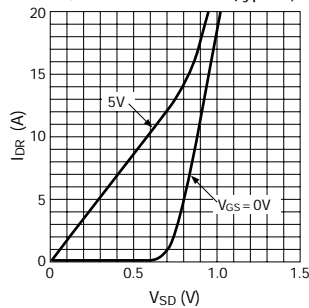
R<sub>DS</sub>(ON) - T<sub>c</sub> Characteristics (typical)



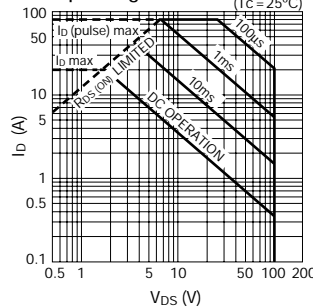
Capacitance - V<sub>DS</sub> Characteristics (typical)



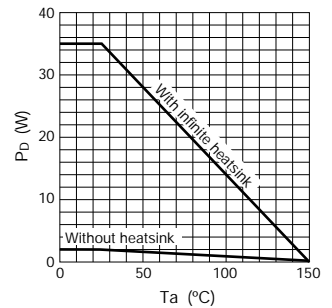
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - T<sub>a</sub> Characteristics





# 2SK2803

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±3	A
I <sub>D</sub> (pulse) *1	±12	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
EAS *2	30	mJ
I <sub>AS</sub>	3	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

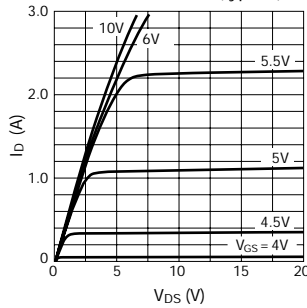
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 6.3mH, I<sub>L</sub> = 3.0A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

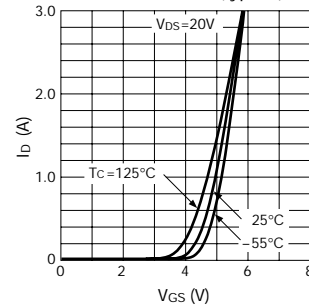
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
R <sub>e</sub> (yfs)	1.5	2.1		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 1.5A
R <sub>DS(on)</sub>		2.1	2.8	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5A
C <sub>iss</sub>		340		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		75		pF	
C <sub>rss</sub>		26		pF	
t <sub>d(on)</sub>		18		ns	I <sub>D</sub> = 1.5A, V <sub>DD</sub> = 200V, R <sub>L</sub> = 133Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		45		ns	
t <sub>f</sub>		85		ns	
V <sub>SD</sub>		0.9	1.4	V	I <sub>SD</sub> = 3A, V <sub>GS</sub> = 0V

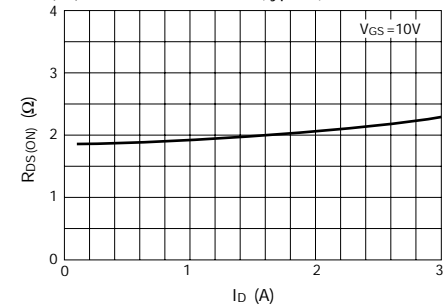
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



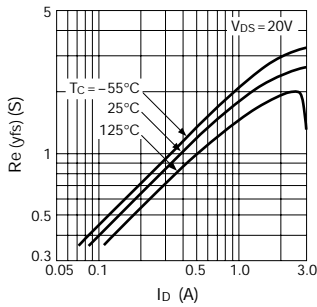
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



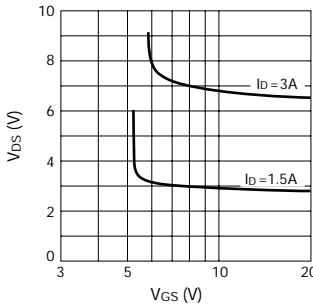
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



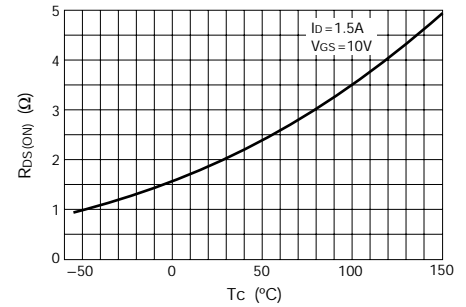
R<sub>e</sub> (yfs) - I<sub>D</sub> Characteristics (typical)



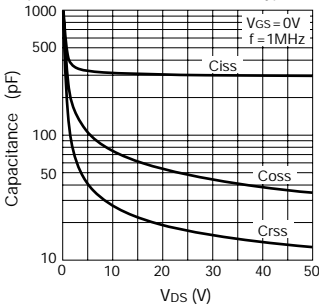
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



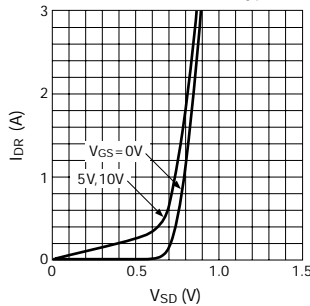
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



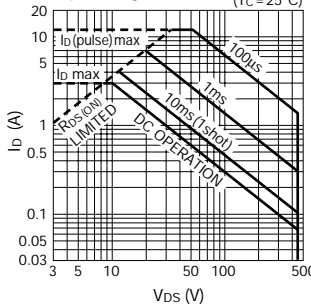
Capacitance - V<sub>DS</sub> Characteristics (typical)



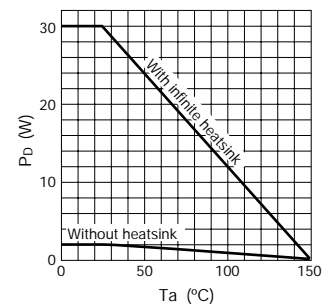
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2805

External dimensions 2 ..... FM100

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	450	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±15	A
I <sub>D</sub> (pulse) *1	±60	A
P <sub>D</sub>	80 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	550	mJ
I <sub>AS</sub>	15	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

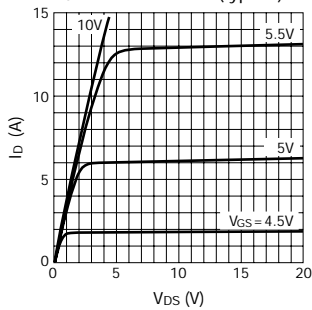
\*1: P<sub>W</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 4.6mH, I<sub>L</sub> = 15A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

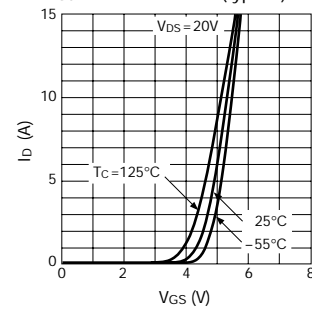
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)</sub> DSS	450			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 450V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	8.0	11.5		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 7.5A
R <sub>DS(on)</sub>		0.30	0.38	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.5A
C <sub>iss</sub>		2100		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		430		pF	
C <sub>rss</sub>		210		pF	
t <sub>d(on)</sub>		35		ns	I <sub>D</sub> = 7.5A, V <sub>DD</sub> ≈ 200V, R <sub>L</sub> = 26.7Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		45		ns	
t <sub>d(off)</sub>		130		ns	
t <sub>f</sub>		60		ns	
V <sub>SD</sub>		0.95	1.4	V	I <sub>SD</sub> = 15A, V <sub>GS</sub> = 0V

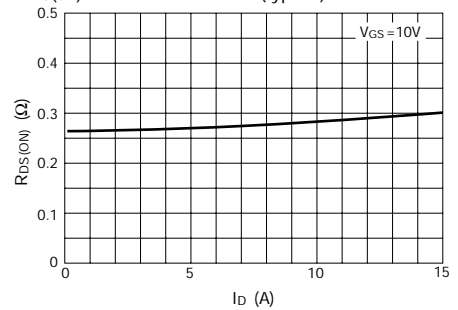
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



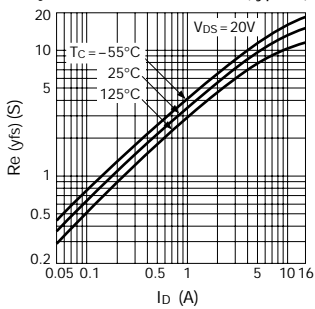
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



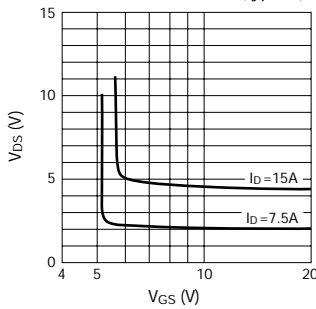
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



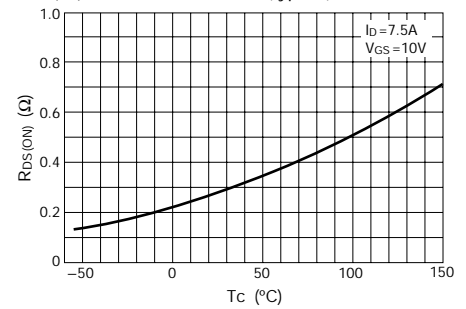
Re (yfs) - I<sub>D</sub> Characteristics (typical)



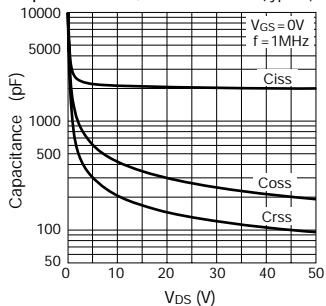
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



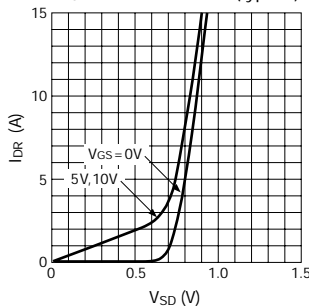
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



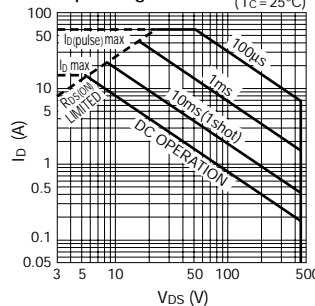
Capacitance - V<sub>DS</sub> Characteristics (typical)



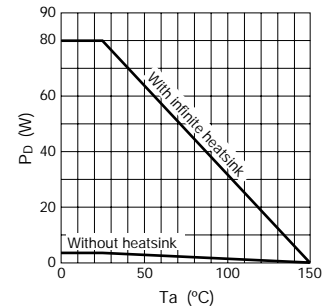
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (Tc = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2848

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	600	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±2	A
I <sub>D</sub> (pulse) *1	±8	A
P <sub>D</sub>	30 (T <sub>C</sub> = 25°C)	W
E <sub>AS</sub> *2	10	mJ
I <sub>AS</sub>	2	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

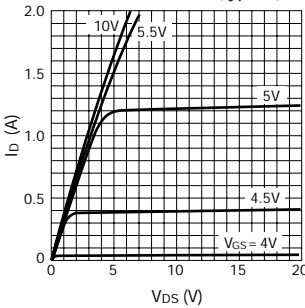
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 5mH, I<sub>L</sub> = 2.0A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

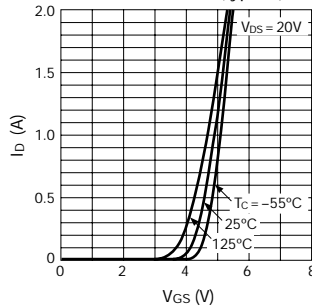
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	600			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re (yfs)	1.2	1.7		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 1A
R <sub>DS(on)</sub>		3.0	3.8	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1A
C <sub>iss</sub>		290		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		70		pF	
C <sub>rss</sub>		30		pF	
t <sub>d(on)</sub>		16		ns	I <sub>D</sub> = 1A, V <sub>DD</sub> = 250V, R <sub>L</sub> = 250Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		45		ns	
t <sub>f</sub>		145		ns	
V <sub>SD</sub>		0.9	1.4	V	I <sub>SD</sub> = 2.0A, V <sub>GS</sub> = 0V

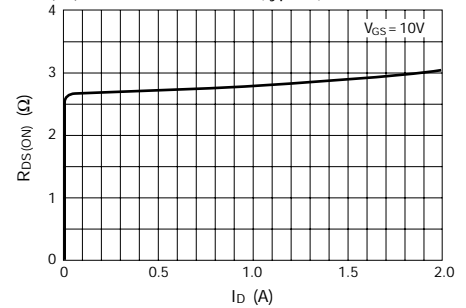
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



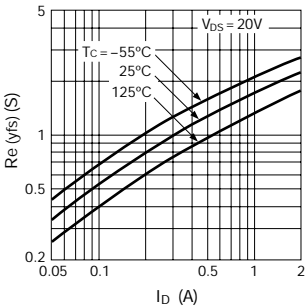
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



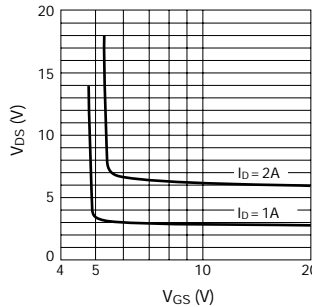
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



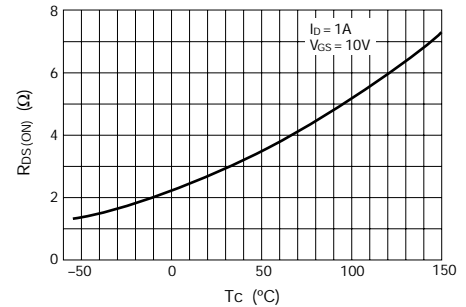
Re (yfs) - I<sub>D</sub> Characteristics (typical)



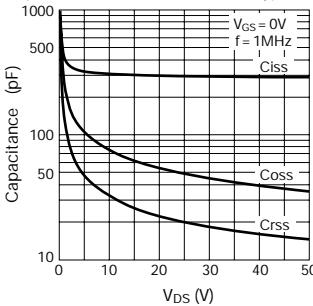
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



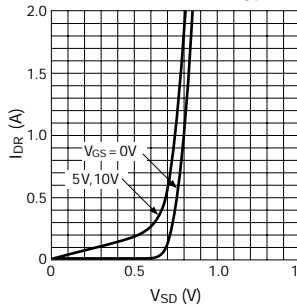
R<sub>DS(on)</sub> - T<sub>C</sub> Characteristics (typical)



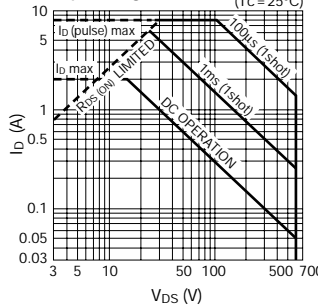
Capacitance - V<sub>DS</sub> Characteristics (typical)



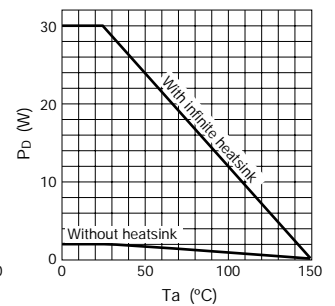
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>C</sub> = 25°C)



P<sub>D</sub> - Ta Characteristics



# 2SK2943

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	900	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±3	A
I <sub>D</sub> (pulse) *1	±12	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	60	mJ
I <sub>AS</sub>	3	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

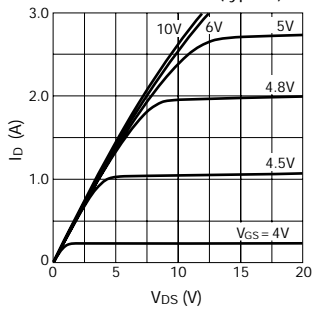
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 50V, L = 13mH, I<sub>L</sub> = 3A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

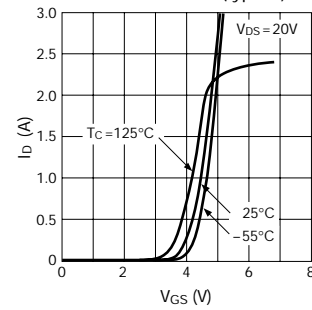
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V(BR)DSS	900			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 900V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re(yfs)	1.8	2.8		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 1.5A
R <sub>DS(on)</sub>		4.0	5.0	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5A
C <sub>iss</sub>		600		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		100		pF	
C <sub>rss</sub>		40		pF	
t <sub>d(on)</sub>		20		ns	I <sub>D</sub> = 1.5A, V <sub>DD</sub> ≐ 250V, R <sub>L</sub> = 167Ω, V <sub>GS</sub> = 10V See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		65		ns	
t <sub>f</sub>		100		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 3A, V <sub>GS</sub> = 0V

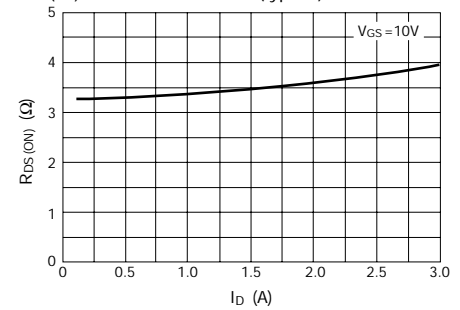
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



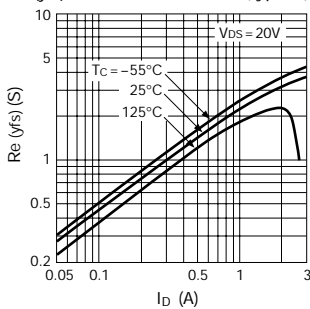
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



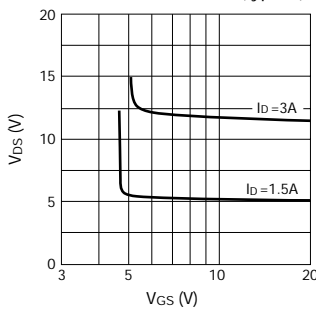
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



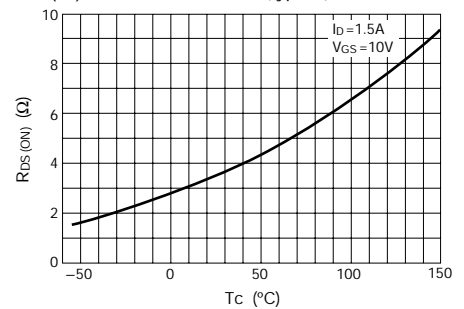
Re(yfs) - I<sub>D</sub> Characteristics (typical)



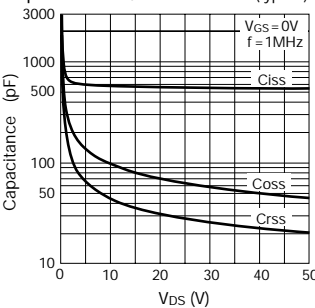
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



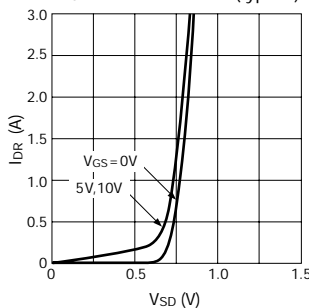
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



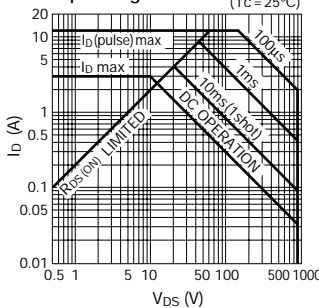
Capacitance - V<sub>DS</sub> Characteristics (typical)



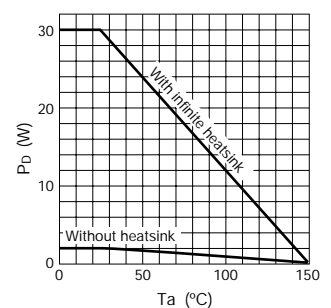
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK2945

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	900	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±5	A
I <sub>D</sub> (pulse) *1	±20	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	120	mJ
I <sub>AS</sub>	5	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 50V, L = 9mH, I<sub>L</sub> = 5A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	900			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 900V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re(yfs)	2.0	4.5		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 2.5A
R <sub>DS(on)</sub>		2.3	3.0	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A
C <sub>iss</sub>		880		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		140		pF	
C <sub>rss</sub>		70		pF	
t <sub>d(on)</sub>		25		ns	I <sub>D</sub> = 2.5A, V <sub>DD</sub> ≐ 250V, R <sub>L</sub> = 100Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		80		ns	
t <sub>f</sub>		70		ns	
V <sub>SD</sub>		0.9	1.5	V	I <sub>SD</sub> = 5A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		7.5		μs	I <sub>SD</sub> = ±100mA

# 2SK3002

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	200	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±8	A
I <sub>D (pulse)</sub> *1	±32	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	55	mJ
I <sub>AS</sub>	8	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 50V, L = 1.5mH, I<sub>L</sub> = 8A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V(BR) <sub>DSS</sub>	200			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
R <sub>e(yfs)</sub>	2.5	5.5		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4A
R <sub>DS(on)</sub>		270	350	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A
C <sub>iss</sub>		450		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		280		pF	
C <sub>rss</sub>		120		pF	
t <sub>d(on)</sub>		15		ns	I <sub>D</sub> = 4A, V <sub>DD</sub> ≐ 100V, R <sub>L</sub> = 25Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		25		ns	
t <sub>d(off)</sub>		50		ns	
t <sub>f</sub>		65		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 8A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		450		ns	I <sub>SD</sub> = ±100mA

# 2SK3003

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	200	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±18	A
I <sub>D</sub> (pulse) *1	±72	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	120	mJ
I <sub>AS</sub>	18	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 25V, L = 650μH, I<sub>L</sub> = 18A, unclamped, R<sub>G</sub> = 50Ω,  
See Figure 1 on Page 5.

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	200			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re(yfs)	7	11		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 9A
R <sub>DS(on)</sub>		130	175	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9A
C <sub>iss</sub>		850		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		550		pF	
C <sub>rss</sub>		250		pF	
t <sub>d(on)</sub>		20		ns	I <sub>D</sub> = 9A, V <sub>DD</sub> ≐ 100V, R <sub>L</sub> = 11.1Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		50		ns	
t <sub>d(off)</sub>		65		ns	
t <sub>f</sub>		80		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 18A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		500		ns	I <sub>SD</sub> = ±100mA

# 2SK3004

## External dimensions 1 ..... FM20

### Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	250	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±18	A
I <sub>D</sub> (pulse) *1	±72	A
P <sub>D</sub>	35 (Tc = 25°C)	W
E <sub>AS</sub> *2	120	mJ
I <sub>AS</sub>	18	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

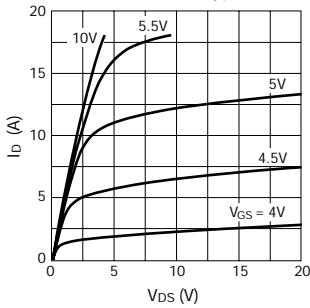
\*1: Pw ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 25V, L = 670μH, I<sub>L</sub> = 18A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

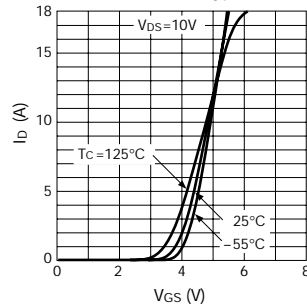
### Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V(BR)DSS	250			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 250V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0		4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re (yfs)	7	11		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 9A
R <sub>DS(on)</sub>		200	250	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9A
C <sub>iss</sub>		850		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		550		pF	
C <sub>rss</sub>		250		pF	
t <sub>d(on)</sub>		20		ns	I <sub>D</sub> = 9A, V <sub>DD</sub> ≐ 100V, R <sub>L</sub> = 11.1Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		50		ns	
t <sub>d(off)</sub>		65		ns	
t <sub>f</sub>		80		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 18A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		700		ns	I <sub>SD</sub> = ±100mA

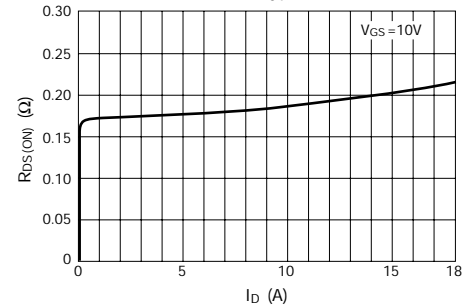
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



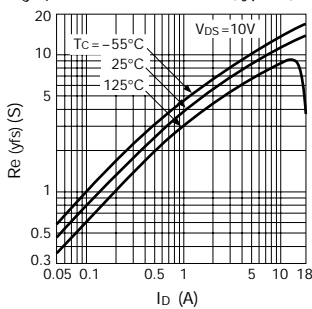
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



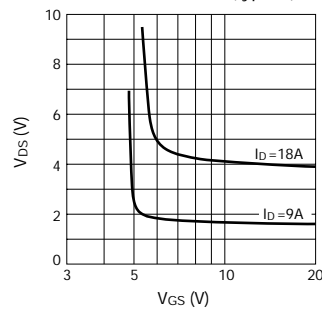
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



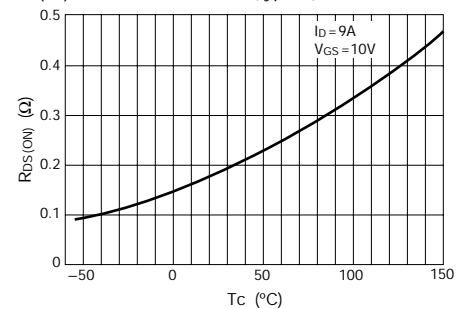
Re (yfs) - I<sub>D</sub> Characteristics (typical)



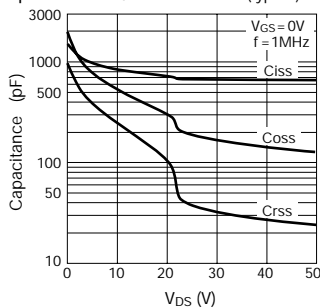
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



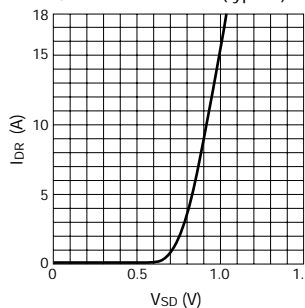
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



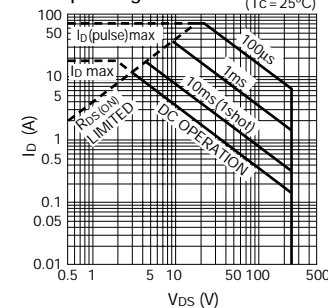
Capacitance - V<sub>DS</sub> Characteristics (typical)



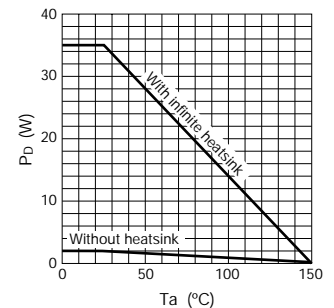
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - T<sub>a</sub> Characteristics





# 2SK3199

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±5	A
I <sub>D</sub> (pulse) *1	±20	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
E <sub>AS</sub> *2	35	mJ
I <sub>AS</sub>	5	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

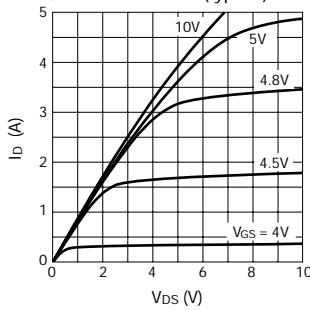
\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 30V, L = 2.6mH, I<sub>L</sub> = 5A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

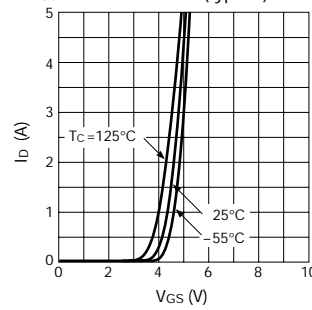
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	500			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Re(yfs)	3.5	5.2		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 2.5A
R <sub>DS(on)</sub>		1.2	1.5	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A
C <sub>iss</sub>		650		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		250		pF	
C <sub>rss</sub>		110		pF	
t <sub>d(on)</sub>		18		ns	I <sub>D</sub> = 2.5A, V <sub>DD</sub> ≐ 250V, R <sub>L</sub> = 100Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		30		ns	
t <sub>d(off)</sub>		60		ns	
t <sub>f</sub>		65		ns	
V <sub>SD</sub>		0.9	1.5	V	I <sub>SD</sub> = 5A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		2		μs	I <sub>SD</sub> = ±100mA, V <sub>GS</sub> = 0V

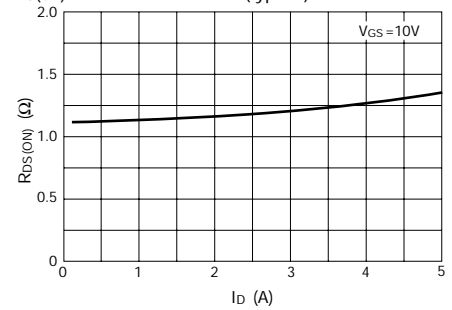
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



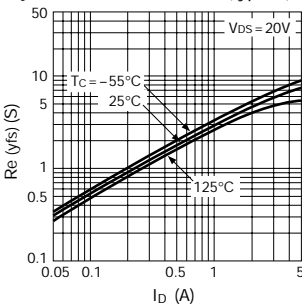
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



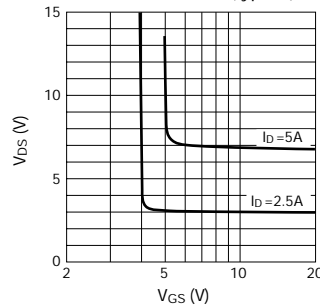
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



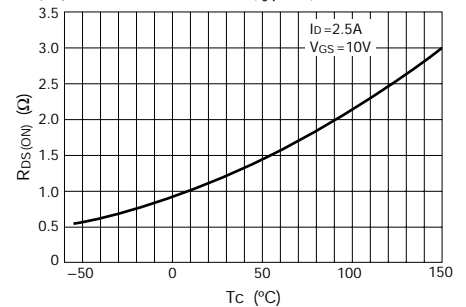
Re(yfs) - I<sub>D</sub> Characteristics (typical)



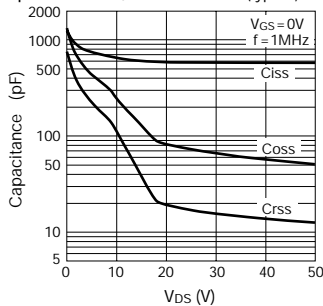
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



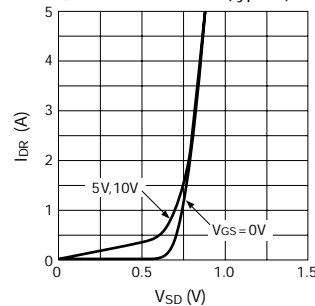
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



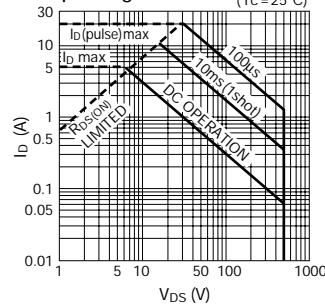
Capacitance - V<sub>DS</sub> Characteristics (typical)



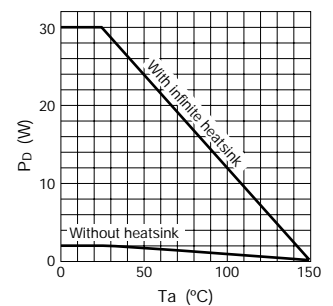
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - Ta Characteristics



# 2SK3200

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	500	V
V <sub>GSS</sub>	±30	V
I <sub>D</sub>	±10	A
I <sub>D</sub> (pulse) *1	±40	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
EAS *2	50	mJ
I <sub>AS</sub>	10	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 30V, L = 940μH, I<sub>L</sub> = 10A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	500			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = ±30V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	2.0	3.0	4.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
R <sub>e</sub> (yfs)	5.0	9.0		S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 5A
R <sub>DS(on)</sub>		0.85	1.1	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A
C <sub>iss</sub>		920		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		390		pF	
C <sub>rss</sub>		190		pF	
t <sub>d(on)</sub>		25		ns	I <sub>D</sub> = 5A, V <sub>DD</sub> ≐ 250V, R <sub>L</sub> = 50Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		35		ns	
t <sub>d(off)</sub>		75		ns	
t <sub>f</sub>		55		ns	
V <sub>SD</sub>		1.1	1.5	V	I <sub>SD</sub> = 10A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		80		ns	I <sub>SD</sub> = 5A, V <sub>GS</sub> = 0V, di/dt = 100A/μs

# 2SK3332

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	150	V
V <sub>GSS</sub>	+20, -10	V
I <sub>D</sub>	±12	A
I <sub>D</sub> (pulse) *1	±48	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
EAS *2	100	mJ
I <sub>AS</sub>	12	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

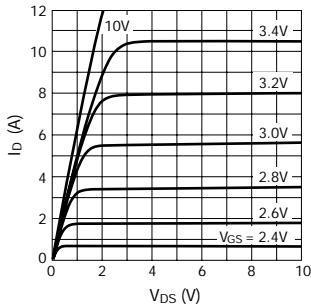
\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 25V, L = 1.2mH, I<sub>L</sub> = 12A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

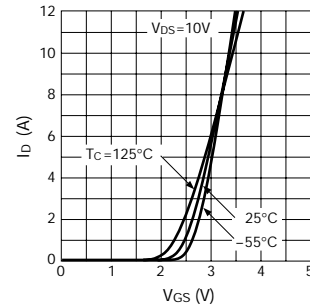
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	150			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = +20V, -10V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	1.0		2.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re(yfs)	6	11		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
R <sub>DS(on)</sub>		150	200	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6A
		170	230		V <sub>GS</sub> = 4V, I <sub>D</sub> = 6A
C <sub>iss</sub>		870		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		320		pF	
C <sub>rss</sub>		210		pF	
t <sub>d(on)</sub>		20		ns	I <sub>D</sub> = 6A, V <sub>DD</sub> ≐ 70V, R <sub>L</sub> = 12Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>r</sub>		50		ns	
t <sub>d(off)</sub>		85		ns	
t <sub>f</sub>		40		ns	
V <sub>SD</sub>		1.0	1.5	V	
t <sub>rr</sub>		500		ns	I <sub>SD</sub> = ±100mA

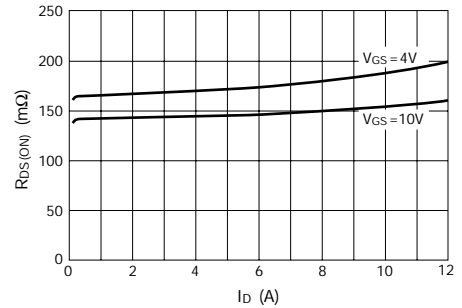
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



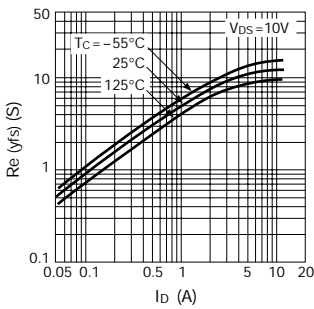
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



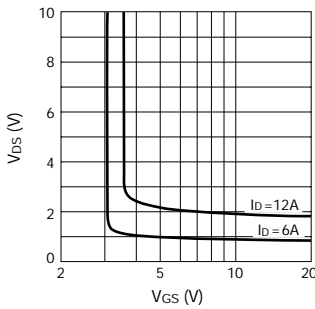
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



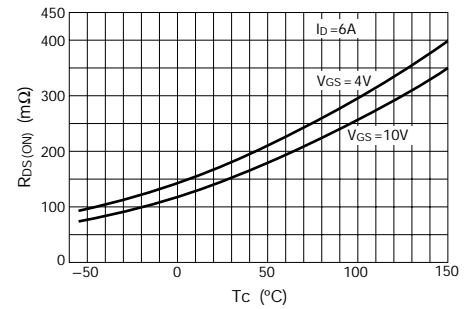
Re(yfs) - I<sub>D</sub> Characteristics (typical)



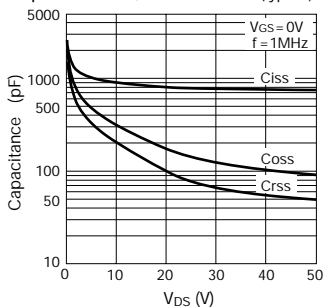
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



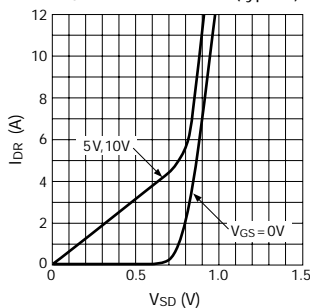
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



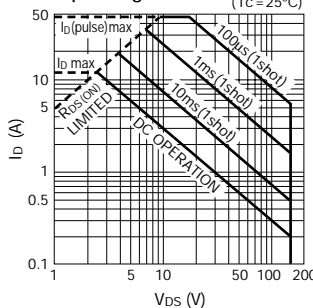
Capacitance - V<sub>DS</sub> Characteristics (typical)



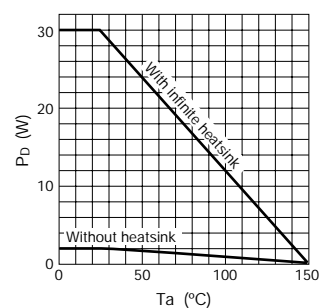
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SK3460

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	150	V
V <sub>GSS</sub>	+20, -10	V
I <sub>D</sub>	±18	A
I <sub>D</sub> (pulse) *1	±72	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
EAS *2	180	mJ
I <sub>AS</sub>	18	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

\*1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\*2: V<sub>DD</sub> = 25V, L = 930μH, I<sub>Lp</sub> = 18A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	150			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±100	nA	V <sub>GS</sub> = +20V, -10V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	1.0		2.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
Re(yfs)	13	20		S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 9A
R <sub>DS(on)</sub>		70	95	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9A
		80	105		V <sub>GS</sub> = 4V, I <sub>D</sub> = 9A
C <sub>iss</sub>		1900		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		630		pF	
C <sub>rss</sub>		420		pF	
t <sub>d(on)</sub>		25		ns	
t <sub>r</sub>		70		ns	I <sub>D</sub> = 9A, V <sub>DD</sub> ≐ 70V, R <sub>L</sub> = 7.8Ω, V <sub>GS</sub> = 10V, See Figure 2 on Page 5.
t <sub>d(off)</sub>		160		ns	
t <sub>f</sub>		75		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 18A, V <sub>GS</sub> = 0V
t <sub>rr</sub>		620		ns	I <sub>SD</sub> = ±100mA

# FKV550T

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	50	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±50	A
I <sub>D</sub> (pulse) *1	±150	A
P <sub>D</sub>	35 (T <sub>c</sub> = 25°C)	W
EAS *2	150	mJ
I <sub>AS</sub>	50	A
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

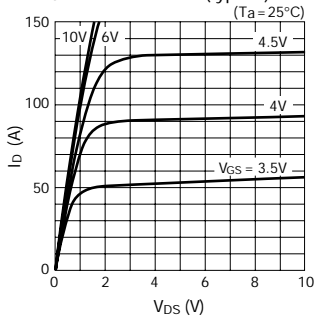
\* 1: P<sub>w</sub> ≤ 100μs, duty cycle ≤ 1%

\* 2: V<sub>DD</sub> = 20V, L = 72μH, I<sub>AS</sub> = 50A, unclamped, R<sub>G</sub> = 50Ω, See Figure 1 on Page 5.

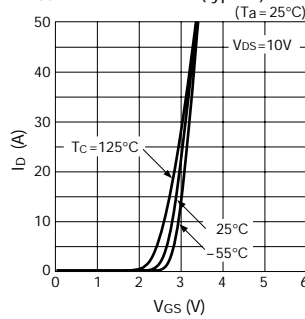
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR)DSS</sub>	50			V	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			100	μA	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	1.0		2.5	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250μA
R <sub>e(yfs)</sub>	20			S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 25A
R <sub>DS(on)</sub>		10	13	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 25A
C <sub>iss</sub>		2700		pF	V <sub>DS</sub> = 10V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		1100		pF	
C <sub>rss</sub>		500		pF	
t <sub>d(on)</sub>		20		ns	I <sub>D</sub> = 25A, V <sub>DD</sub> = 12V, R <sub>L</sub> = 0.48Ω, V <sub>GS</sub> = 10V See Figure 2 on Page 5.
t <sub>r</sub>		600		ns	
t <sub>d(off)</sub>		300		ns	
t <sub>f</sub>		100		ns	
V <sub>SD</sub>		1.0	1.5	V	I <sub>SD</sub> = 50A, V <sub>GS</sub> = 0V

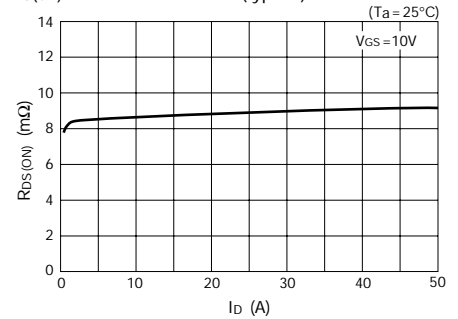
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



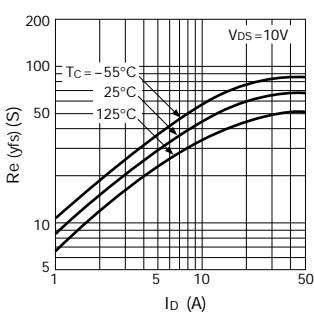
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



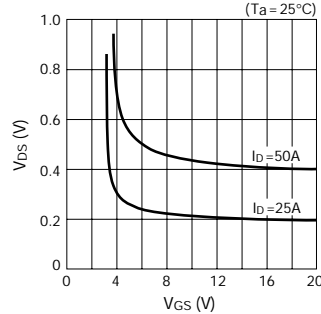
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



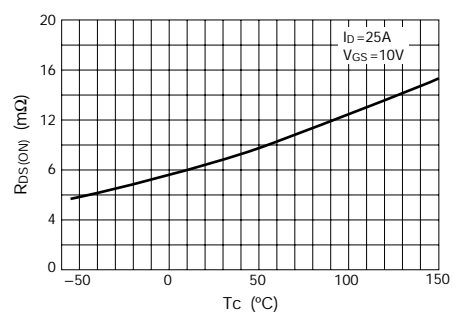
R<sub>e(yfs)</sub> - I<sub>D</sub> Characteristics (typical)



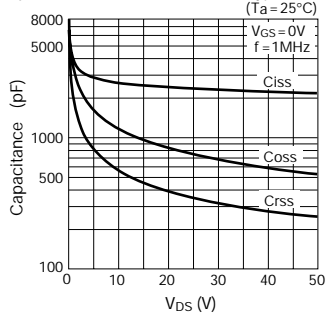
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



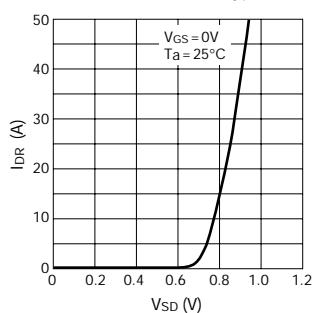
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



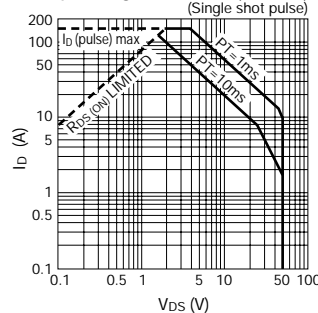
Capacitance - V<sub>DS</sub> Characteristics (typical)



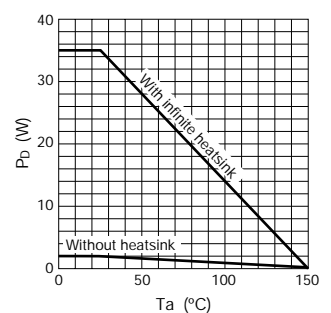
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area



P<sub>D</sub> - T<sub>a</sub> Characteristics



# 2SJ424

External dimensions 1 ..... FM20

## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	-60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±5	A
I <sub>D</sub> (pulse)	±20 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	25 (T <sub>c</sub> = 25°C)	W
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	-60			V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			-250	μA	V <sub>DS</sub> = -60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	-2.0		-4.0	V	V <sub>DS</sub> = -10V, I <sub>D</sub> = -250μA
Re (yfs)	1.0	1.6		S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -2.5A
R <sub>DS (on)</sub>		0.35	0.5	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.5A
C <sub>iss</sub>		270		pF	V <sub>DS</sub> = -25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		170		pF	
t <sub>on</sub>		75		ns	I <sub>D</sub> = -2.5A, V <sub>DD</sub> = -30V, V <sub>GS</sub> = -10V, See Figure 3 on Page 5.
t <sub>off</sub>		35		ns	

# 2SJ425

External dimensions 1 ..... FM20

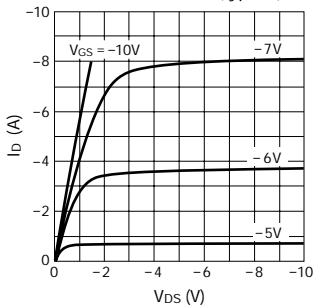
## Absolute Maximum Ratings (Ta = 25°C)

Symbol	Ratings	Unit
V <sub>DSS</sub>	-60	V
V <sub>GSS</sub>	±20	V
I <sub>D</sub>	±8	A
I <sub>D</sub> (pulse)	±32 (T <sub>ch</sub> ≤ 150°C)	A
P <sub>D</sub>	30 (T <sub>c</sub> = 25°C)	W
T <sub>ch</sub>	150	°C
T <sub>stg</sub>	-55 to +150	°C

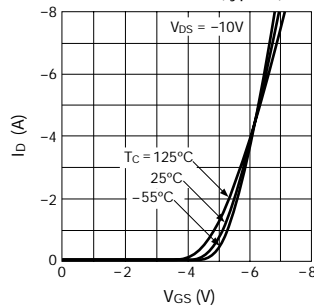
## Electrical Characteristics (Ta = 25°C)

Symbol	Ratings			Unit	Conditions
	min	typ	max		
V <sub>(BR) DSS</sub>	-60			V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
I <sub>GSS</sub>			±500	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub>			-250	μA	V <sub>DS</sub> = -60V, V <sub>GS</sub> = 0V
V <sub>TH</sub>	-2.0		-4.0	V	V <sub>DS</sub> = -10V, I <sub>D</sub> = -250μA
Re (yfs)	1.8	2.8		S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -4.0A
R <sub>DS(on)</sub>		0.2	0.28	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.0A
C <sub>iss</sub>		580		pF	V <sub>DS</sub> = -25V, f = 1.0MHz, V <sub>GS</sub> = 0V
C <sub>oss</sub>		360		pF	
t <sub>on</sub>		90		ns	I <sub>D</sub> = -4.0A, V <sub>DD</sub> = -30V, V <sub>GS</sub> = -10V, See Figure 3 on Page 5.
t <sub>off</sub>		45		ns	

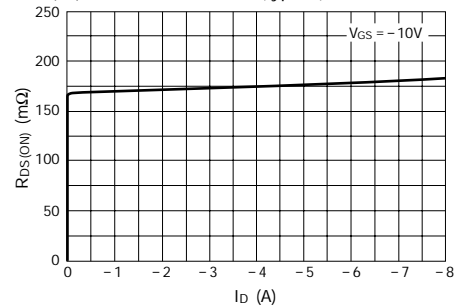
I<sub>D</sub> - V<sub>DS</sub> Characteristics (typical)



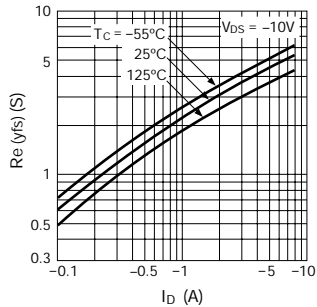
I<sub>D</sub> - V<sub>GS</sub> Characteristics (typical)



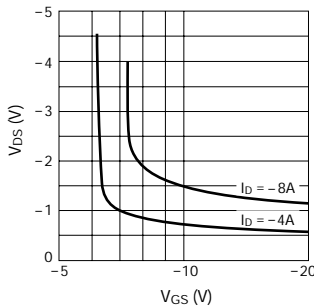
R<sub>DS(on)</sub> - I<sub>D</sub> Characteristics (typical)



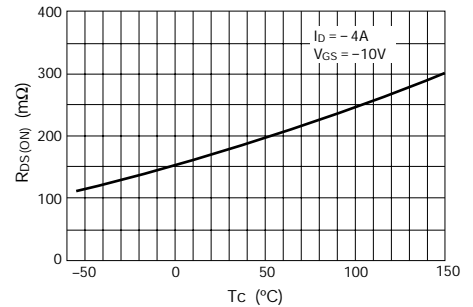
Re (yfs) - I<sub>D</sub> Characteristics (typical)



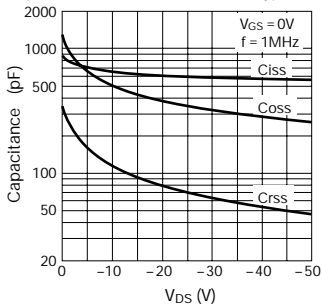
V<sub>DS</sub> - V<sub>GS</sub> Characteristics (typical)



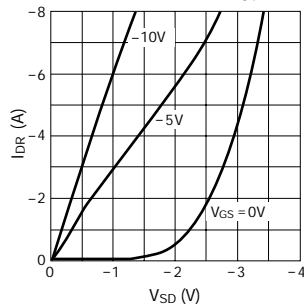
R<sub>DS(on)</sub> - T<sub>c</sub> Characteristics (typical)



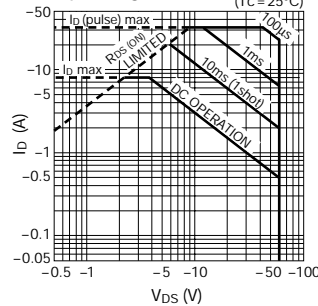
Capacitance - V<sub>DS</sub> Characteristics (typical)



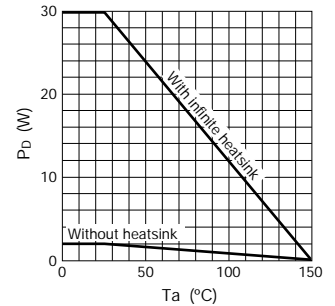
I<sub>DR</sub> - V<sub>SD</sub> Characteristics (typical)



Safe Operating Area (T<sub>c</sub> = 25°C)



P<sub>D</sub> - T<sub>a</sub> Characteristics



# Discontinued part guide

Discontinued Products					Substitute Part
Part Number	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	Package	
2SJ426	60	15	0.14	FM20	—
2SK979	450	10	0.7	MT100	—
2SK1193	60	45	0.002	MT100	—
2SK1367	400	3	1.80	FM20	2SK3199
2SK1368	400	5	1.00	FM20	2SK2701
2SK1369	400	10	0.55	FM100	2SK2704
2SK1370	400	15	0.30	FM100	2SK2706
2SK1711	60	10	0.200	FM20	2SK2778
2SK1713	60	22	0.050	FM20	—
2SK1714	60	30	0.028	FM20	—
2SK1715	60	40	0.028	FM100	—
2SK2156A	60	25	0.045	FM20	—
2SK2207	900	3	5.0	FM20	2SK2943
2SK2208	900	5	3.0	FM100	2SK2945
2SK2238	450	1.5	3.50	FM20	2SK2803
2SK2239	450	3	2.00	FM20	2SK3199
2SK2240	450	5	1.50	FM20	2SK3199
2SK2241	450	7	0.95	FM20	2SK2702
2SK2242	450	7	0.95	FM100	2SK2702
2SK2243	450	10	0.75	FM100	2SK2702
2SK2244	450	12	0.55	FM100	2SK2704
2SK2245	450	15	0.45	FM100	2SK2705
2SK2804	450	5	1.5	FM20	2SK3199

Not for new design					Substitute Part
Part Number	V <sub>DSS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> max (Ω)	Package	
2SK1366	400	2	3.60	FM20	2SK2803



MEMO



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