

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L²-π-MOSV)

2SK2963

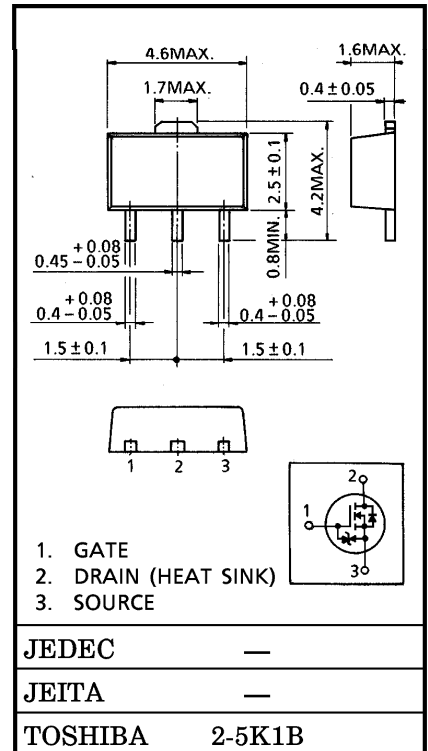
DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

Unit in mm

- 4 V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.5 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 1.2 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.) ($V_{DS} = 100 V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0 V$
($V_{DS} = 10 V, I_D = 1 mA$)

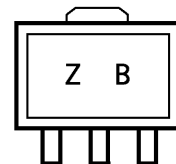
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC (Note 1)	I_D	1	A
	Pulse (Note 1)	I_{DP}	3	A
Drain Power Dissipation		P_D	0.5	W
Drain Power Dissipation (Note 2)		P_D	1.5	W
Single Pulse Avalanche Energy (Note 3)		E_{AS}	137	mJ
Avalanche Current		I_{AR}	1	A
Repetitive Avalanche Energy (Note 4)		E_{AR}	0.05	mJ
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	-55~150	°C



Weight : 0.05 g (Typ.)

MARKING



(The two digits represent the part number.)

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	250	°C/W

(Note 1) : Please use devices on condition that the channel temperature is below 150°C.

(Note 2) : Mounted on ceramic substrate (25.4 mm × 25.4 mm × 0.8 mm)

(Note 3) : $V_{DD} = 25 V, T_{ch} = 25^\circ C$ (initial), $L = 221 mH, R_G = 25 \Omega, I_{AR} = 1 A$

(Note 4) : Repetitive rating ; Pulse Width Limited by maximum junction temperature.

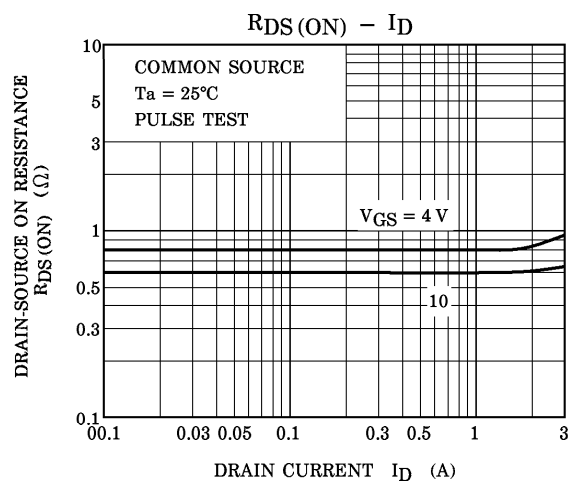
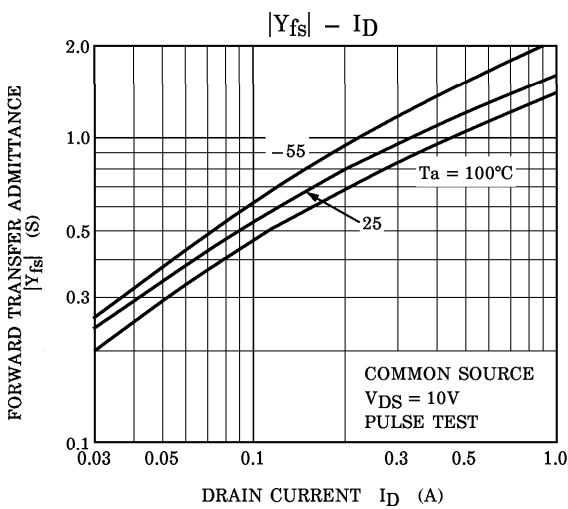
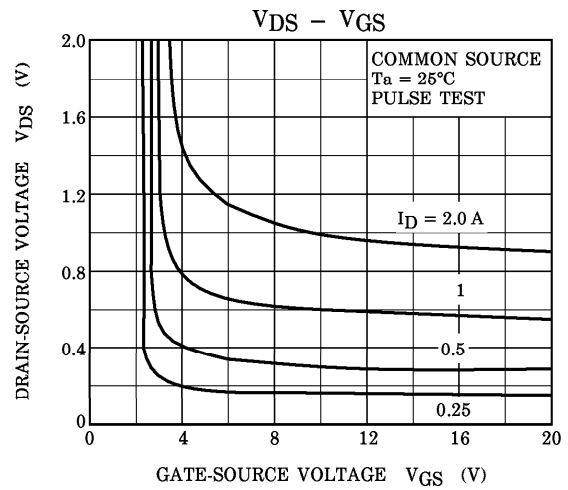
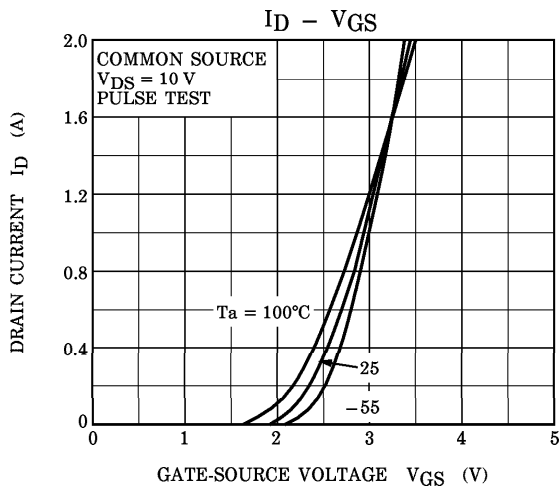
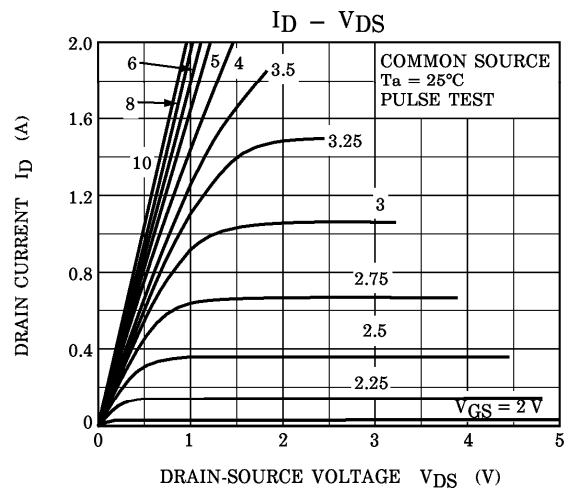
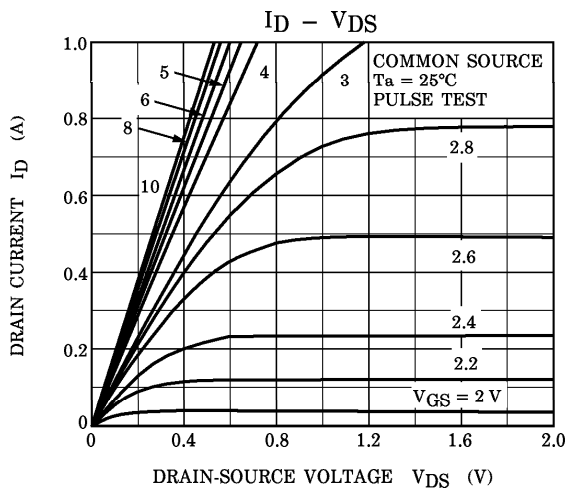
**This transistor is an electrostatic sensitive device.
Please handle with caution.**

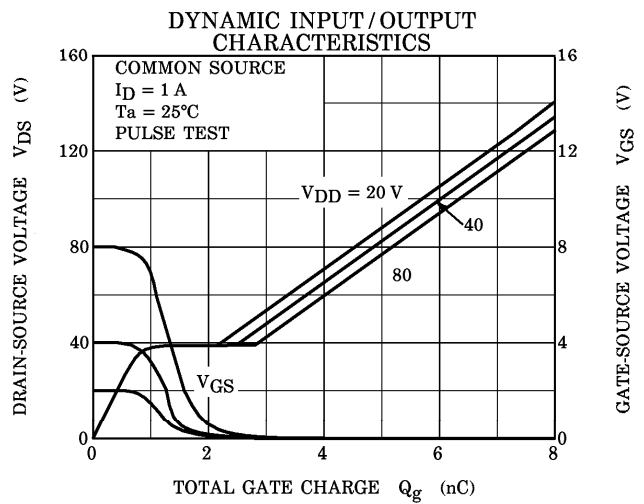
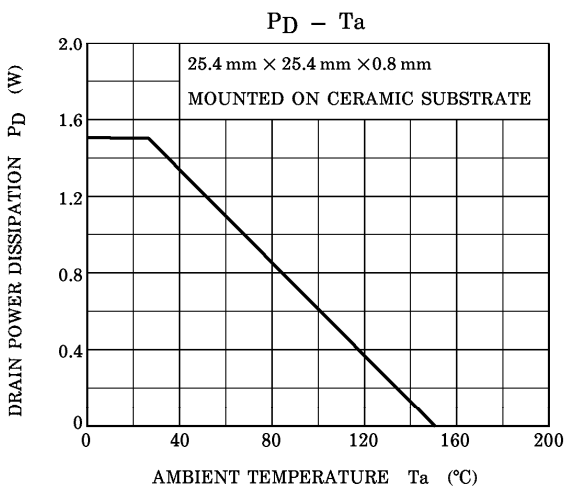
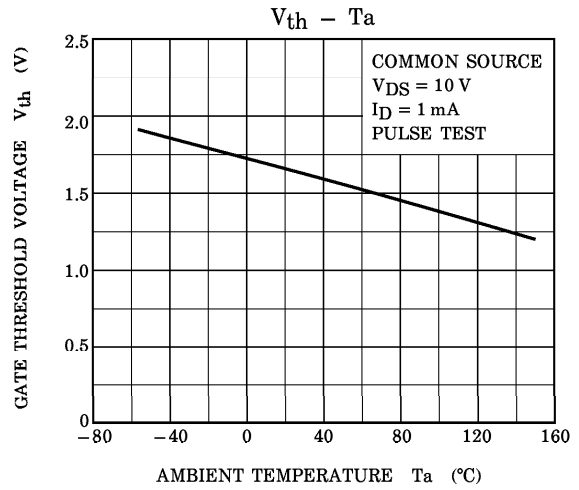
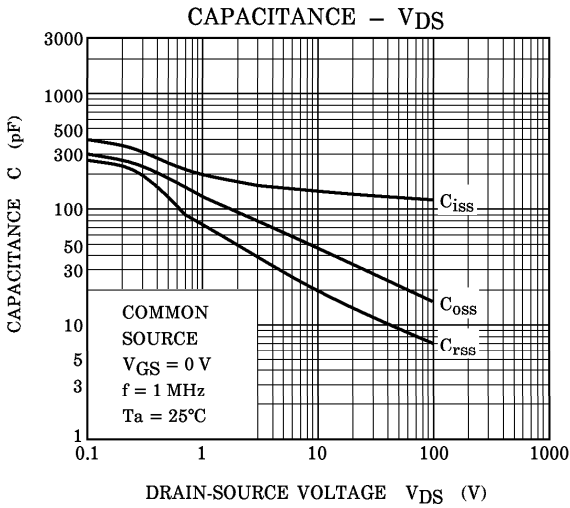
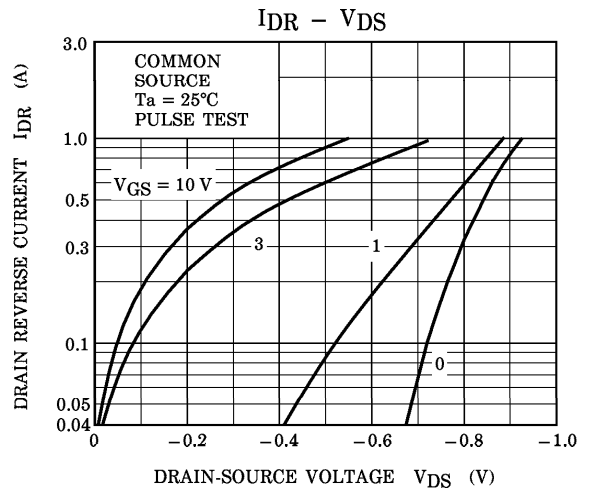
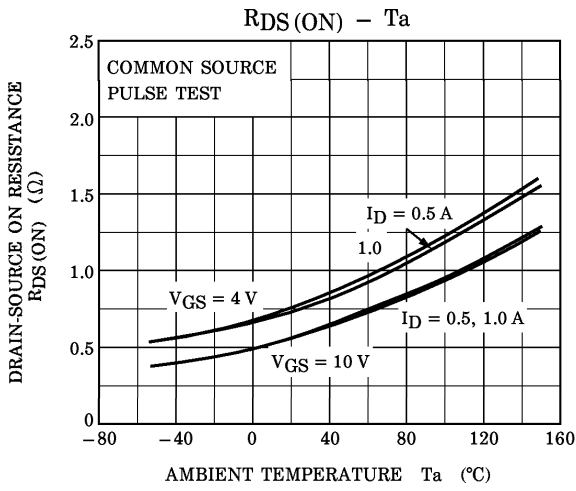
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

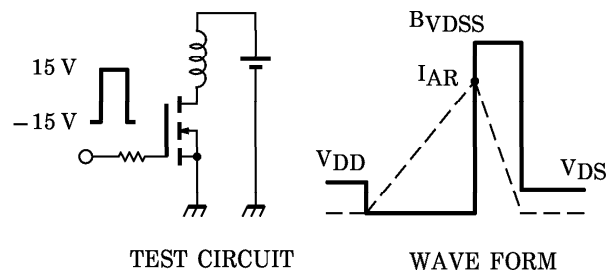
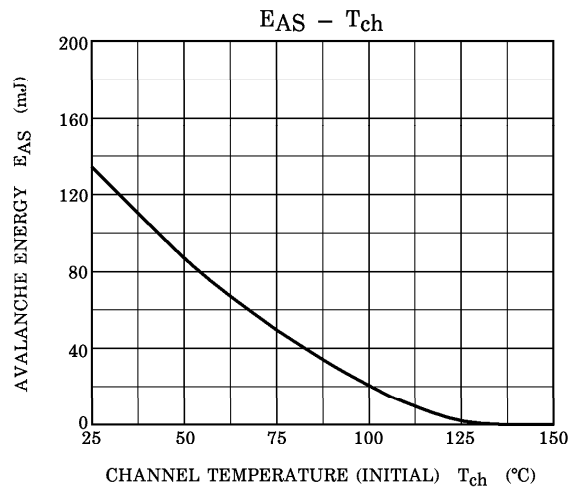
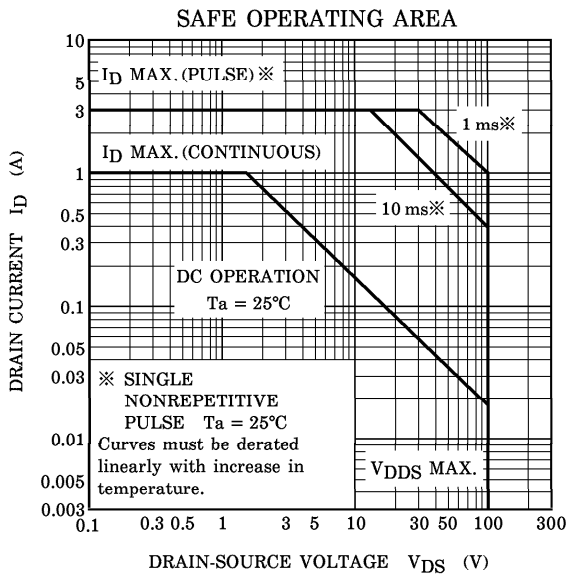
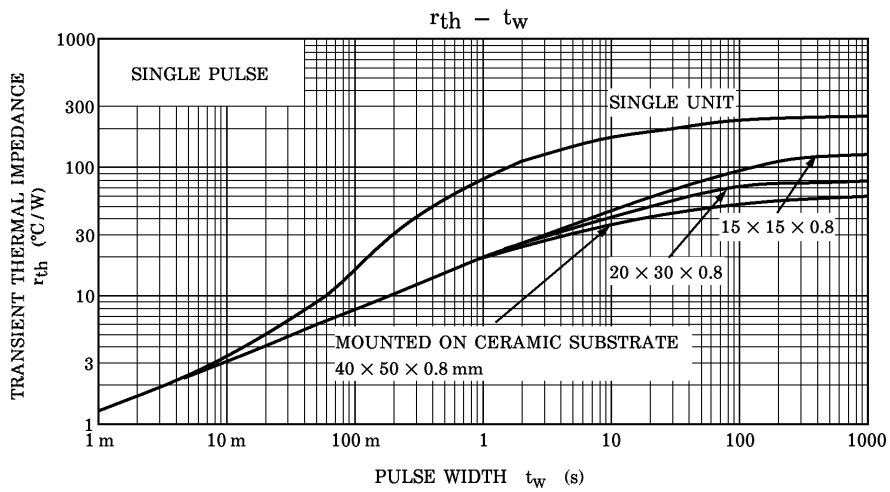
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	μA
Drain Cut-off Current		I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	100	—	—	V
Gate Threshold Voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	0.8	—	2.0	V
Drain-Source ON Resistance		R _{DS (ON)}	V _{GS} = 4 V, I _D = 0.5 A	—	0.65	0.95	Ω
			V _{GS} = 10 V, I _D = 0.5 A	—	0.5	0.7	
Forward Transfer Admittance		Y _{fs}	V _{DS} = 10 V, I _D = 0.5 A	0.6	1.2	—	S
Input Capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	140	—	pF
Reverse Transfer Capacitance		C _{rss}		—	20	—	
Output Capacitance		C _{oss}		—	45	—	
Switching Time	Rise Time	t _r		—	8	—	ns
	Turn-on Time	t _{on}		—	13	—	
	Fall Time	t _f		—	45	—	
	Turn-off Time	t _{off}		Duty ≤ 1%, t _w = 10 μs	—	175	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≐ 80 V, V _{GS} = 10 V, I _D = 1 A	—	6.3	—	nC
Gate-Source Charge		Q _{gs}	—	4.3	—		
Gate-Drain ("Miller") Charge		Q _{gd}	—	2	—		

SOURCE-DRAIN RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current (Note 1)		I _{IDR}	—	—	—	1	A
Pulse Drain Reverse Current (Note 1)		I _{IDRP}	—	—	—	3	A
Forward Voltage (Diode)		V _{DSF}	I _{IDR} = 1 A, V _{GS} = 0 V	—	—	-1.5	V
Reverse Recovery Time		t _{rr}	I _{IDR} = 1 A, V _{GS} = 0 V	—	80	—	ns
Reverse Recovery Charge		Q _{rr}	dI _{IDR} / dt = 50 A / μs	—	140	—	μC







$$R_G = 25 \Omega$$

$$V_{DD} = 25 \text{ V}, L = 221 \text{ mH} \quad E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$

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