

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L<sup>2</sup>-π-MOSV)

# 2SJ380

RELAY DRIVE, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.15 \Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 7.7 S$  (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 ( $T_a = 25^\circ C$ )

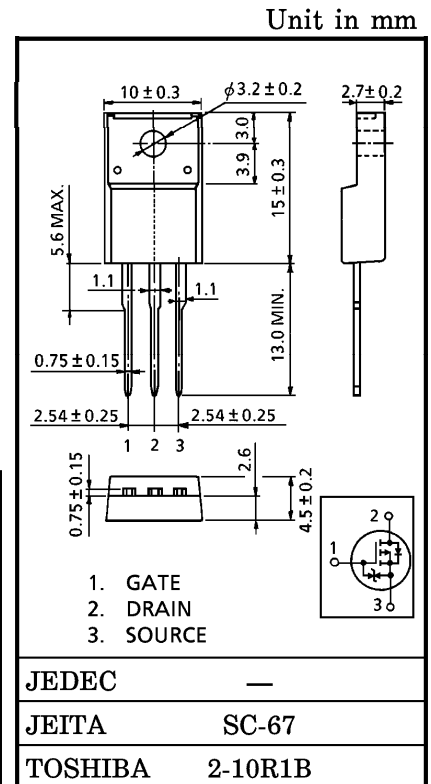
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	-100	V
Drain-Gate Voltage ( $R_{GS} = 20 k\Omega$ )		$V_{DGR}$	-100	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC (Note 1)	$I_D$	-12	A
	Pulse (Note 1)	$I_{DP}$	-48	A
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	35	W
Single Pulse Avalanche Energy (Note 2)		$E_{AS}$	312	mJ
Avalanche Current		$I_{AR}$	-12	A
Repetitive Avalanche Energy (Note 3)		$E_{AR}$	3.5	mJ
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	-55~150	$^\circ C$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	3.57	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ C/W$

- (Note 1) : Please use devices on condition that the channel temperature is below 150 $^\circ C$ .  
 (Note 2) :  $V_{DD} = -25 V, T_{ch} = 25^\circ C$  (initial),  $L = 2.94 mH, R_G = 25 \Omega, I_{AR} = -12 A$   
 (Note 3) : Repetitive rating ; Pulse Width Limited by maximum junction temperature.

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



Weight : 1.9 g (Typ.)

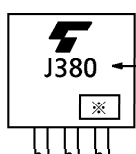
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V	—	—	±10	μA	
Drain Cut-off Current	I <sub>DSS</sub>	V <sub>DS</sub> = -100 V, V <sub>GS</sub> = 0 V	—	—	-100	μA	
Drain-Source Breakdown Voltage	V <sub>(BR) DSS</sub>	I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 0 V	-100	—	—	V	
Gate Threshold Voltage	V <sub>th</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA	-0.8	—	-2.0	V	
Drain-Source ON Resistance	R <sub>DS (ON)</sub>	V <sub>GS</sub> = -4 V, I <sub>D</sub> = -6 A	—	0.25	0.32	Ω	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -6 A	—	0.15	0.21		
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -6 A	4.5	7.7	—	S	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = 0 V f = 1 MHz	—	1100	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		—	200	—		
Output Capacitance	C <sub>oss</sub>		—	440	—		
Switching Time	Rise Time	t <sub>r</sub>		—	18	—	ns
	Turn-on Time	t <sub>on</sub>		—	30	—	
	Fall Time	t <sub>f</sub>		—	18	—	
	Turn-off Time	t <sub>off</sub>		Duty ≤ 1%, t <sub>w</sub> = 10 μs	—	65	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q <sub>g</sub>	V <sub>DD</sub> ≐ -80 V, V <sub>GS</sub> = -10 V	—	48	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	I <sub>D</sub> = -12 A	—	29	—		
Gate-Drain (“Miller”) Charge	Q <sub>gd</sub>		—	19	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current (Note 1)	I <sub>DR</sub>	—	—	—	-12	A
Pulse Drain Reverse Current (Note 1)	I <sub>DRP</sub>	—	—	—	-48	A
Forward Voltage (Diode)	V <sub>DSF</sub>	I <sub>DR</sub> = -12 A, V <sub>GS</sub> = 0 V	—	—	1.7	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = -12 A, V <sub>GS</sub> = 0 V	—	160	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 50 A / μs	—	0.5	—	μC

MARKING

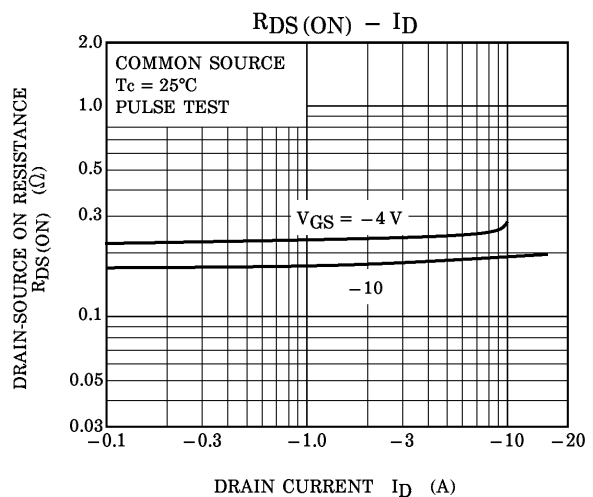
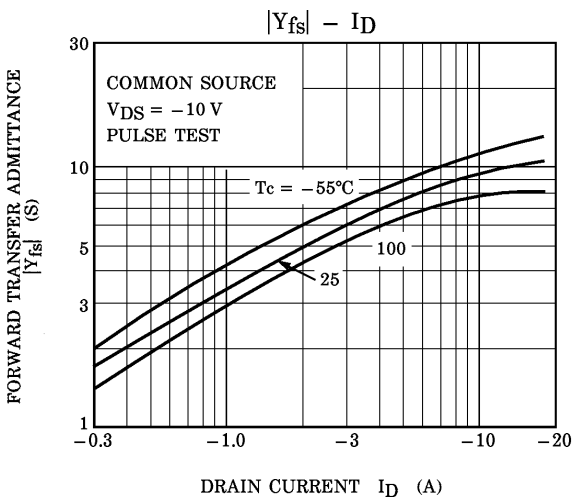
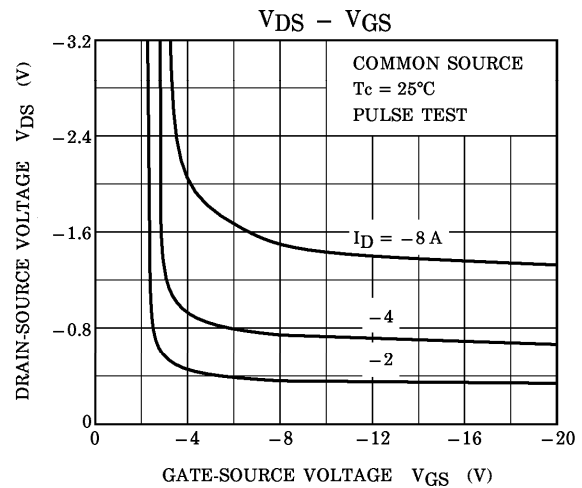
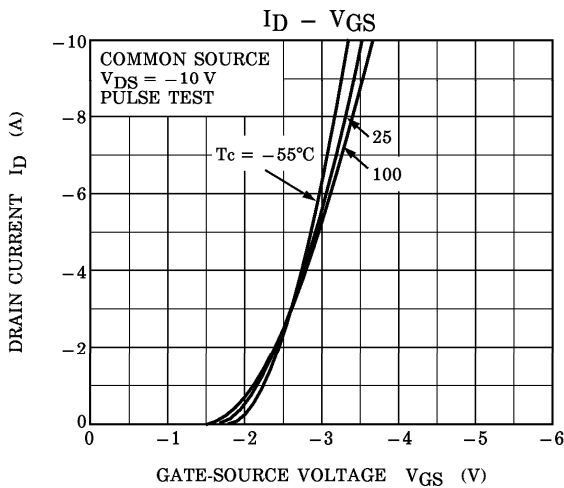
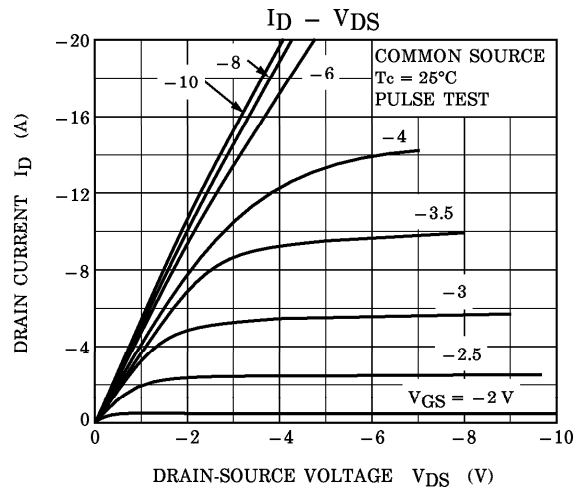
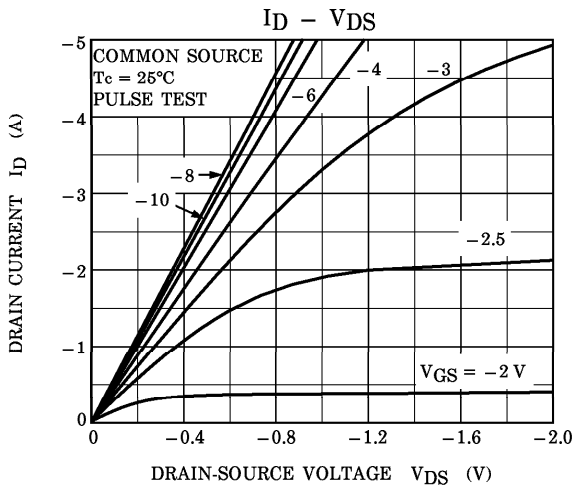


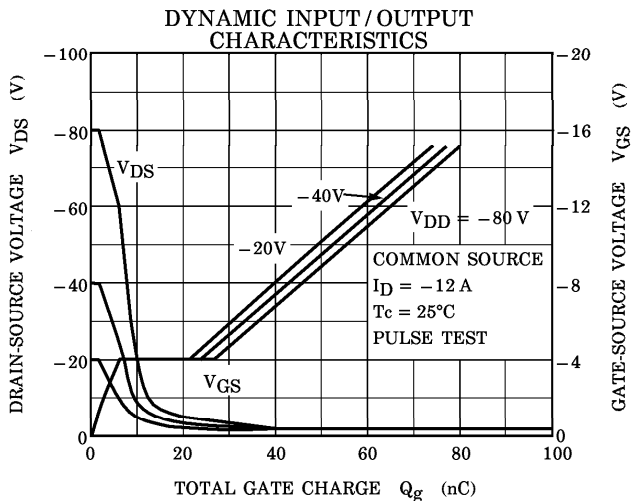
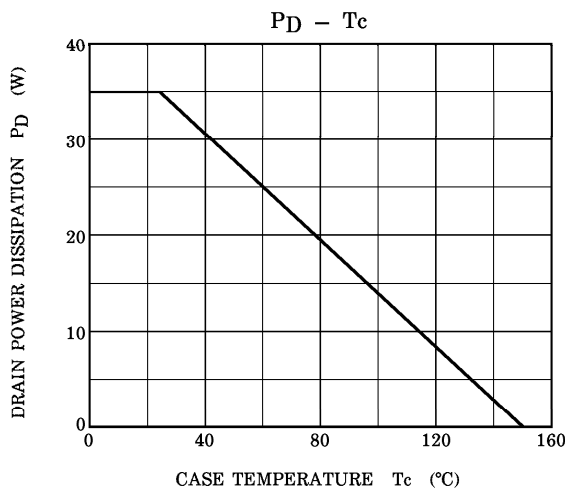
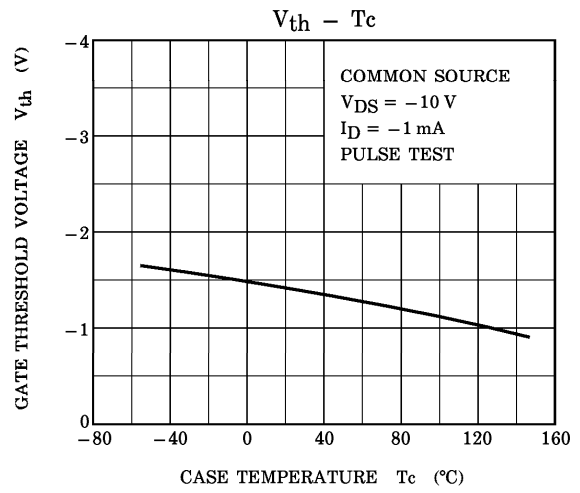
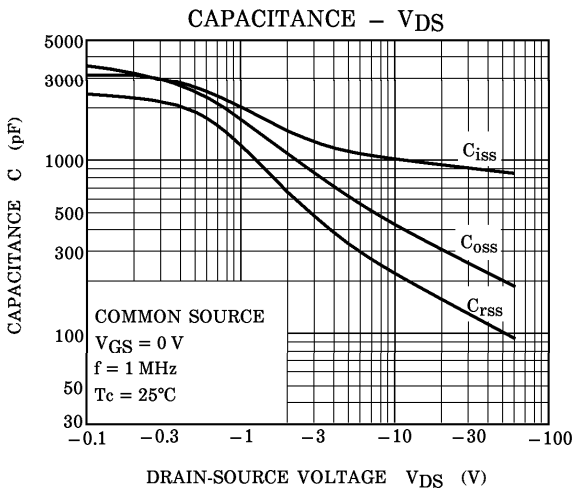
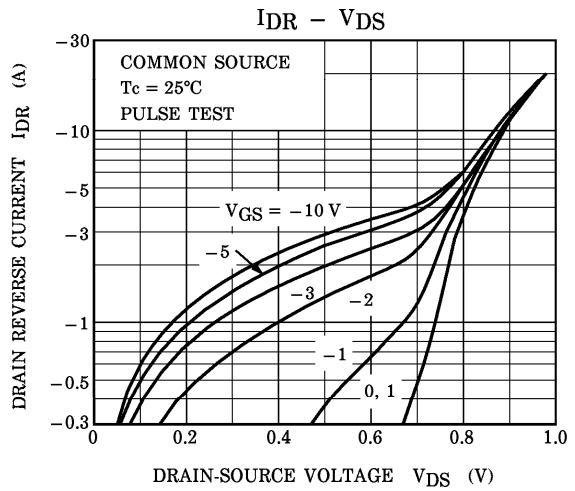
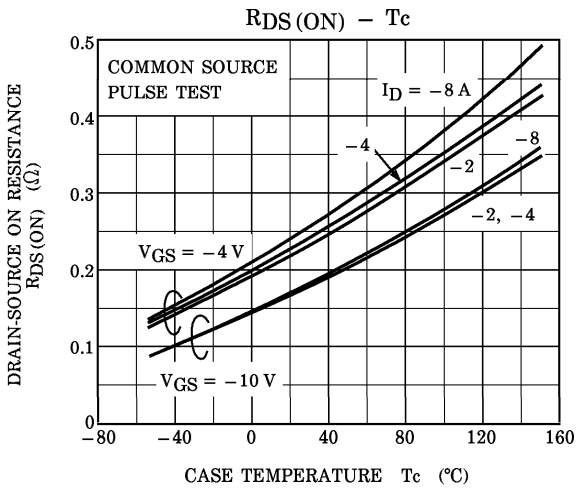
TYPE

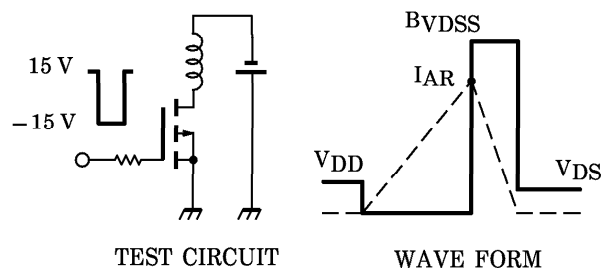
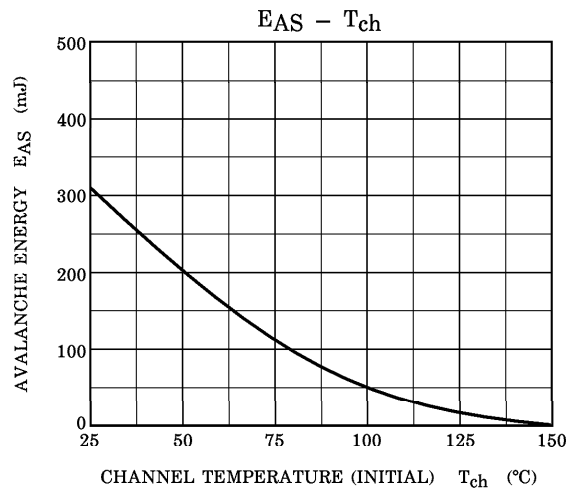
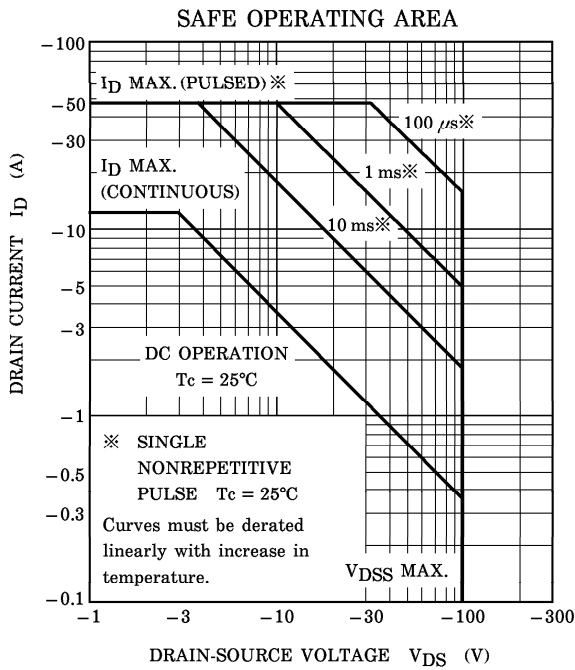
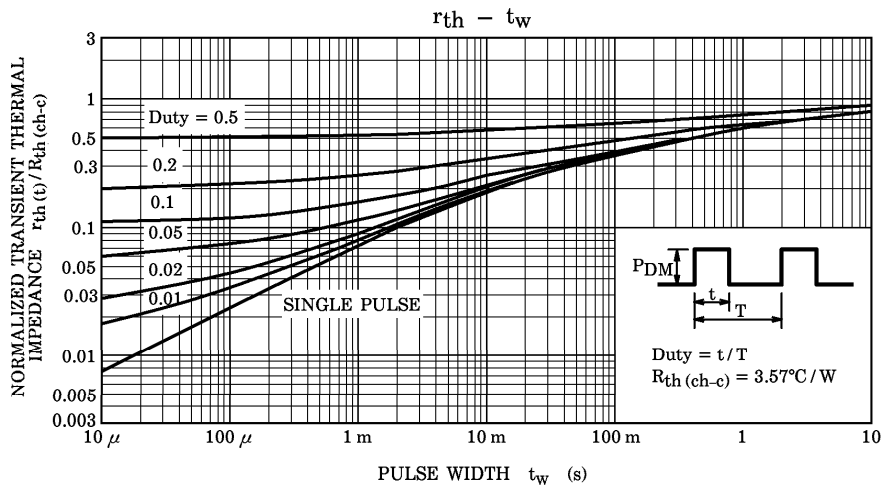
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$R_G = 25 \Omega$   
 $V_{DD} = -25 V, L = 2.94 mH$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{BV_{DSS}}{BV_{DSS} - V_{DD}} \right)$$

**RESTRICTIONS ON PRODUCT USE**

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