

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSIII)

# 2SK2700

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

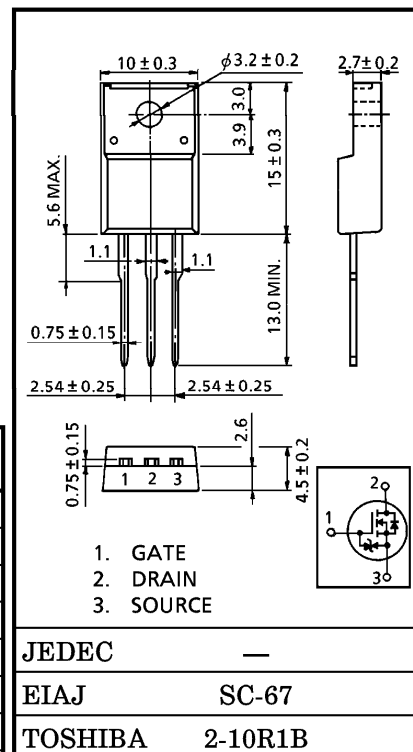
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 3.7 \Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.6 S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \mu A$  (Max.) ( $V_{DS} = 720 V$ )
- Enhancement-Mode :  $V_{th} = 2.0 \sim 4.0 V$   
( $V_{DS} = 10 V, I_D = 1 mA$ )

MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	900	V
Drain-Gate Voltage ( $R_{GS} = 20 k\Omega$ )		$V_{DGR}$	900	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	3	A
	Pulse	$I_{DP}$	9	A
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	40	W
Single Pulse Avalanche Energy**		$E_{AS}$	295	mJ
Avalanche Current		$I_{AR}$	3	A
Repetitive Avalanche Energy*		$E_{AR}$	4	mJ
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 1.9 g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	3.125	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ C/W$

Note ;

\* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

\*\*  $V_{DD} = 90 V, T_{ch} = 25^\circ C$  (initial),  $L = 60.0 mH, R_G = 25 \Omega, I_{AR} = 3 A$

**This transistor is an electrostatic sensitive device.**

**Please handle with caution.**

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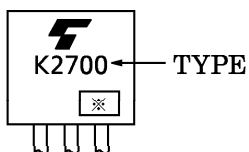
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT			
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$			
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = \pm 10\ \mu\text{A}, V_{DS} = 0\text{ V}$	$\pm 30$	—	—	V			
Drain Cut-off Current	$I_{DSS}$	$V_{DS} = 720\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	$\mu\text{A}$			
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	900	—	—	V			
Gate Threshold Voltage	$V_{th}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	2.0	—	4.0	V			
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 1.5\text{ A}$	—	3.7	4.3	$\Omega$			
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 20\text{ V}, I_D = 1.5\text{ A}$	0.65	2.6	—	S			
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	—	750	—	pF			
Reverse Transfer Capacitance	$C_{rss}$		—	10	—				
Output Capacitance	$C_{oss}$		—	70	—				
Switching Time	Rise Time	$t_r$				—	15	—	ns
	Turn-on Time	$t_{on}$				—	55	—	
	Fall Time	$t_f$				—	30	—	
	Turn-off Time	$t_{off}$				$V_{IN} : t_r, t_f < 5\text{ ns},$ $\text{Duty} \leq 1\%, t_w = 10\ \mu\text{s}$	—	110	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	$V_{DD} \cong 400\text{ V}, V_{GS} = 10\text{ V},$ $I_D = 3\text{ A}$	—	25	—	nC			
Gate-Source Charge	$Q_{gs}$		—	13	—				
Gate-Drain (“Miller”) Charge	$Q_{gd}$		—	12	—				

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	3	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	9	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 3\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.9	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 3\text{ A}, V_{GS} = 0\text{ V}$	—	1100	—	ns
Reverse Recovery Charge	$Q_{rr}$	$dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	—	7.2	—	$\mu\text{C}$

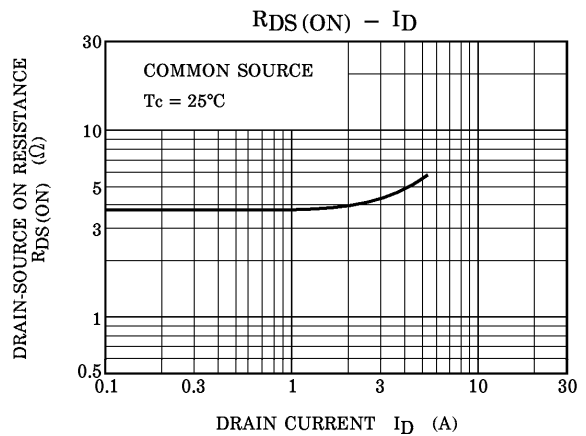
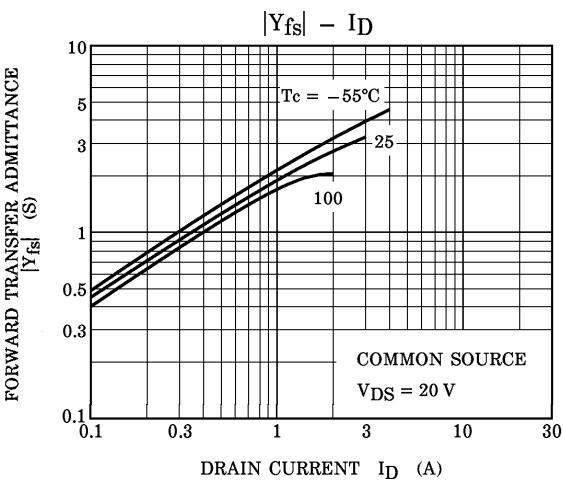
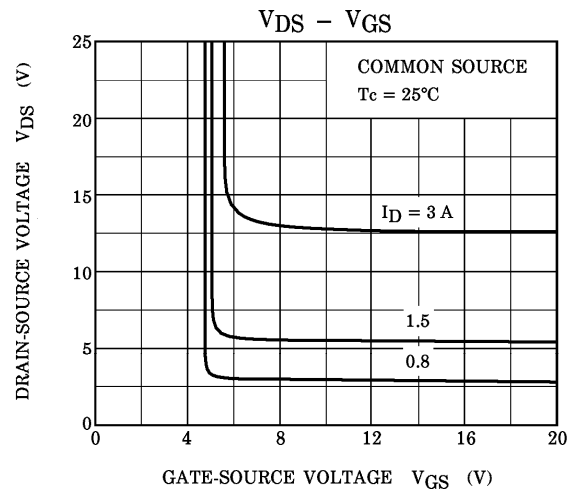
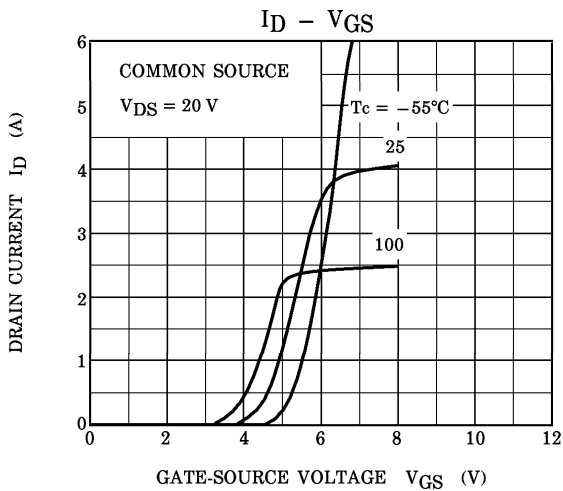
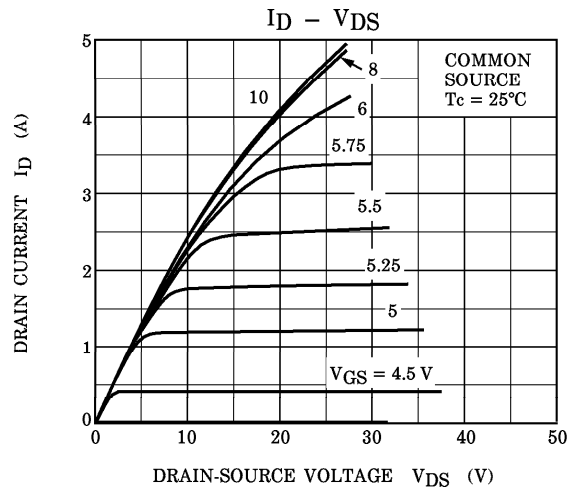
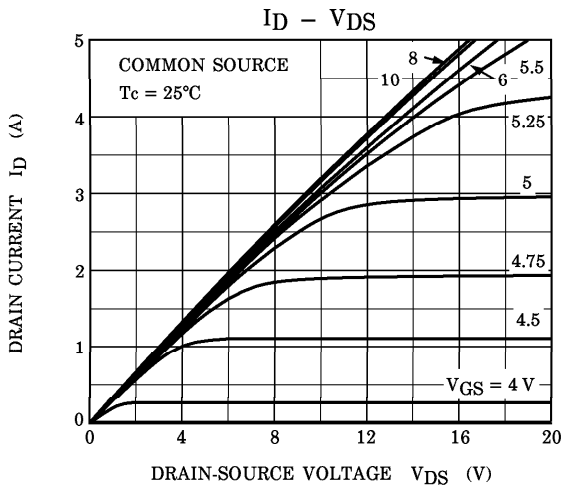
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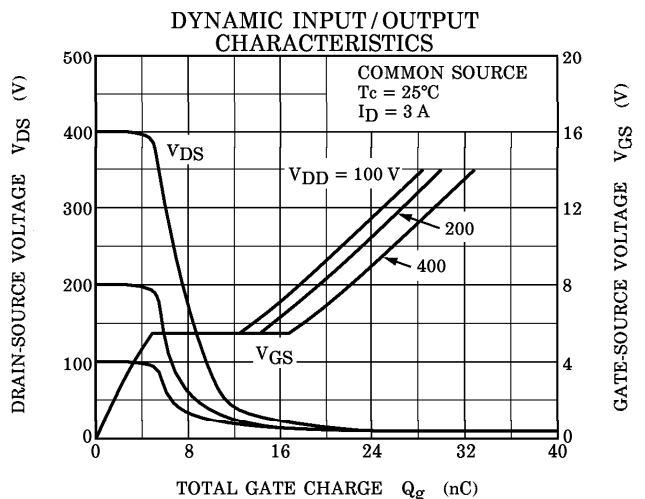
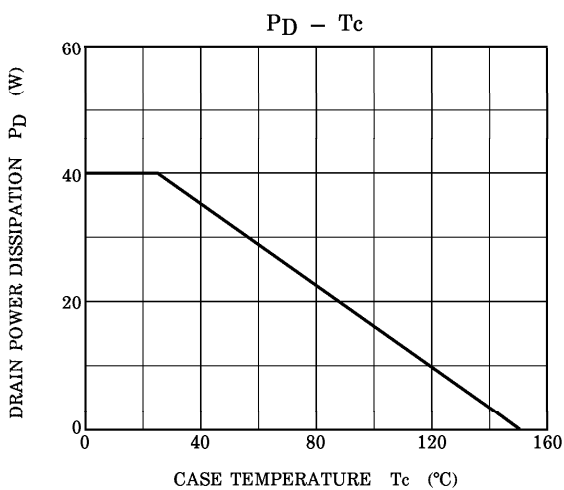
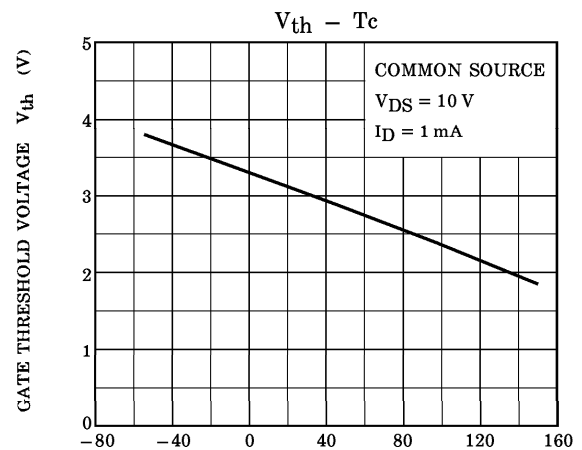
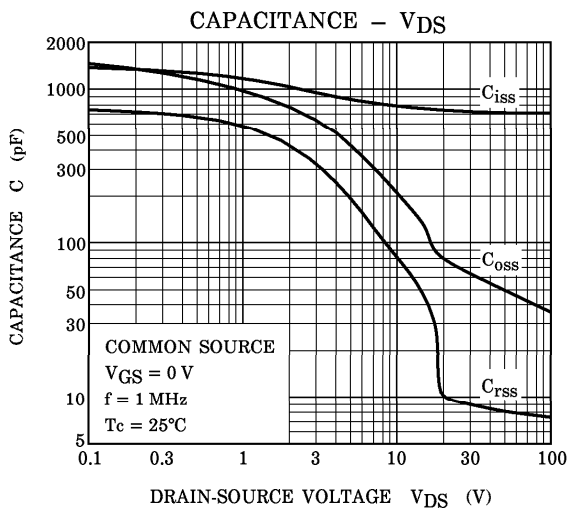
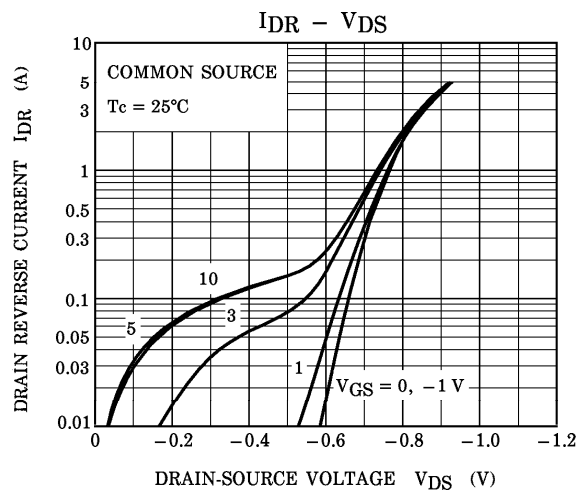
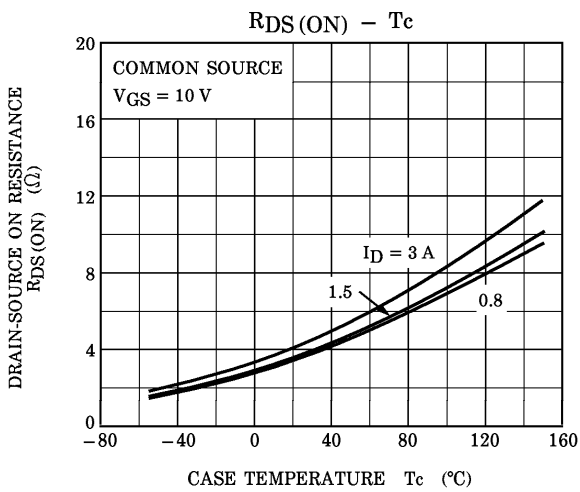


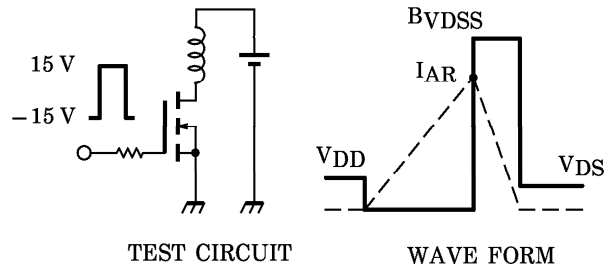
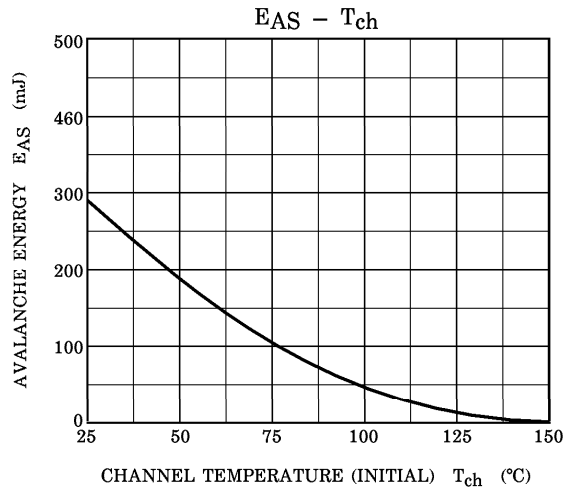
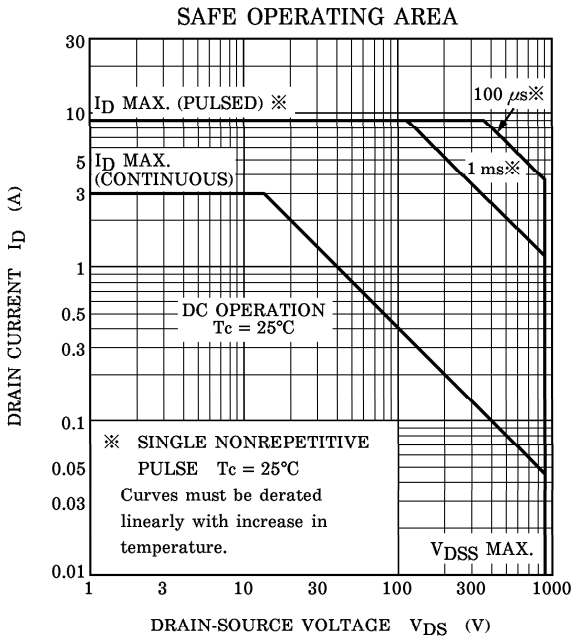
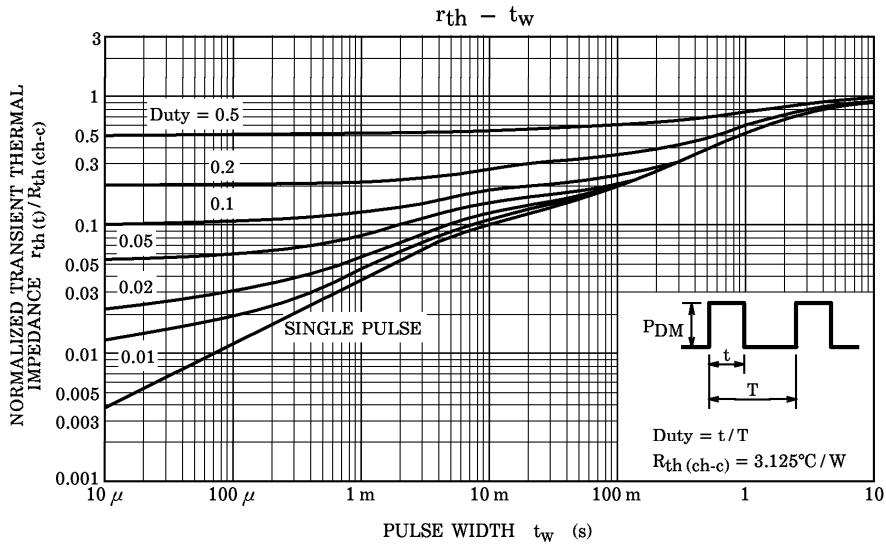
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 3 \text{ A}$ ,  $R_G = 25 \Omega$   
 $V_{DD} = 90 \text{ V}$ ,  $L = 60 \text{ mH}$

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