

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

# 2SK2717

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

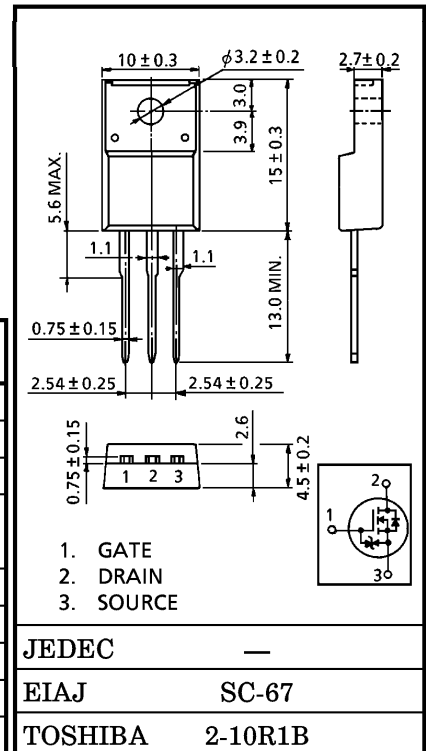
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 2.3\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 4.4S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 720V$ )
- Enhancement-Mode :  $V_{th} = 2.0 \sim 4.0V$  ( $V_{DS} = 10V, I_D = 1mA$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	900	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )	$V_{DGR}$	900	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Drain Current	$I_D$	5	A
	$I_{DP}$	15	
Drain Power Dissipation ( $T_c = 25^\circ C$ )	$P_D$	45	W
Single Pulse Avalanche Energy**	$E_{AS}$	595	mJ
Avalanche Current	$I_{AR}$	5	A
Repetitive Avalanche Energy*	$E_{AR}$	4.5	mJ
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 1.9g (Typ.)

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	2.78	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ C/W$

Note ;

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

\*\*  $V_{DD} = 90V, T_{ch} = 25^\circ C$  (initial),  $L = 43.6mH, R_G = 25\Omega, I_{AR} = 5A$

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

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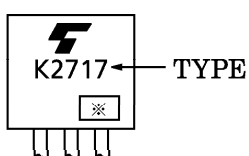
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V	—	—	±10	μA	
Gate-Source Breakdown Voltage	V <sub>(BR)GSS</sub>	I <sub>G</sub> = ±10μA, V <sub>DS</sub> = 0V	±30	—	—	V	
Drain Cut-off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 720V, V <sub>GS</sub> = 0V	—	—	100	μA	
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0V	900	—	—	V	
Gate Threshold Voltage	V <sub>th</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA	2.0	—	4.0	V	
Drain-Source ON Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.0A	—	2.3	2.5	Ω	
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 20V, I <sub>D</sub> = 3.0A	1.1	4.4	—	S	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1MHz	—	1200	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		—	20	—		
Output Capacitance	C <sub>oss</sub>		—	120	—		
Switching Time	Rise Time	t <sub>r</sub>		—	40	—	ns
	Turn-on Time	t <sub>on</sub>		—	90	—	
	Fall Time	t <sub>f</sub>		—	60	—	
	Turn-off Time	t <sub>off</sub>		V <sub>IN</sub> : t <sub>r</sub> , t <sub>f</sub> < 5ns Duty ≤ 1%, t <sub>w</sub> = 10μs	—	200	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q <sub>g</sub>	V <sub>DD</sub> ≈ 400V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A	—	45	—	nC	
Gate-Source Charge	Q <sub>gs</sub>		—	25	—		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>		—	20	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I <sub>DR</sub>	—	—	—	5	A
Pulse Drain Reverse Current	I <sub>DRP</sub>	—	—	—	15	A
Diode Forward Voltage	V <sub>DSF</sub>	I <sub>DR</sub> = 5A, V <sub>GS</sub> = 0V	—	—	-1.9	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 5A, V <sub>GS</sub> = 0V	—	1300	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>		dI <sub>DR</sub> / dt = 100A / μs	—	11	—

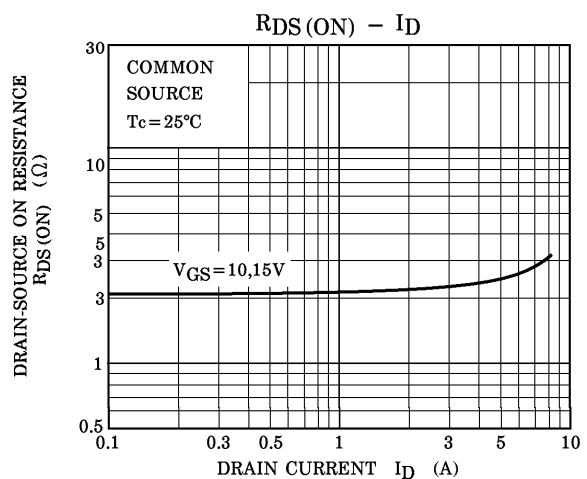
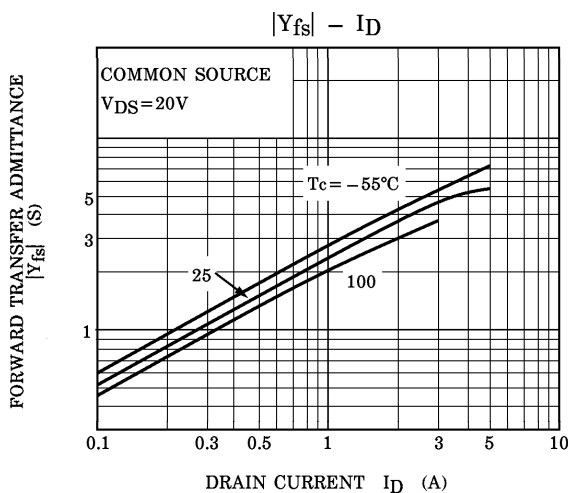
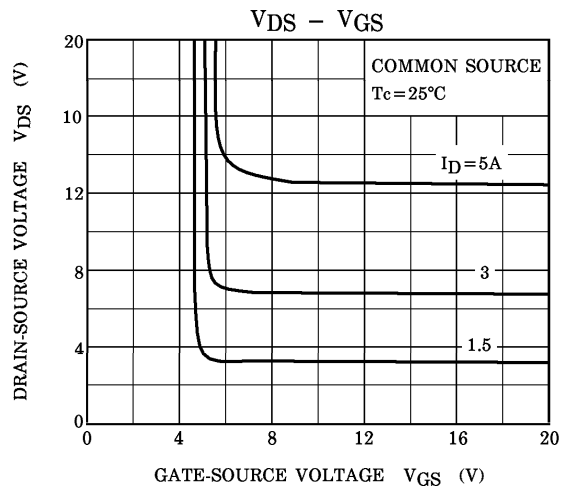
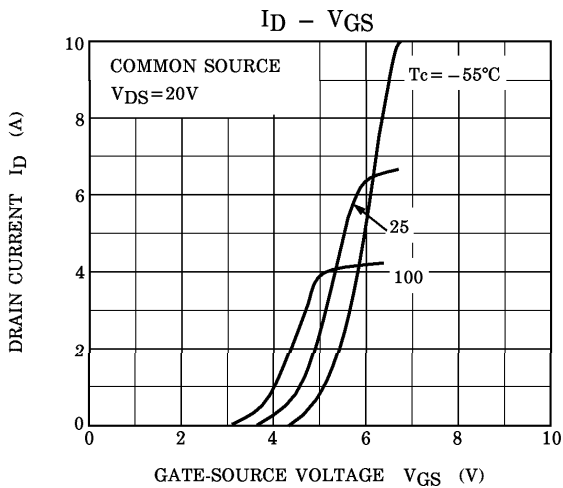
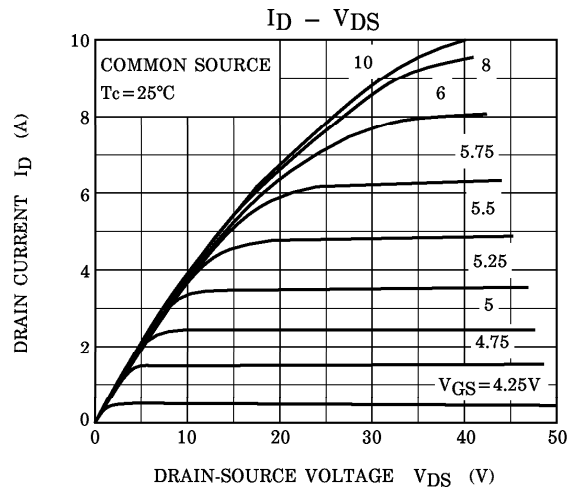
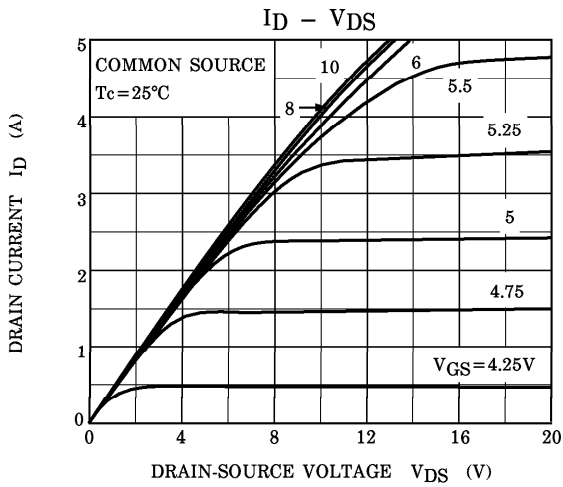
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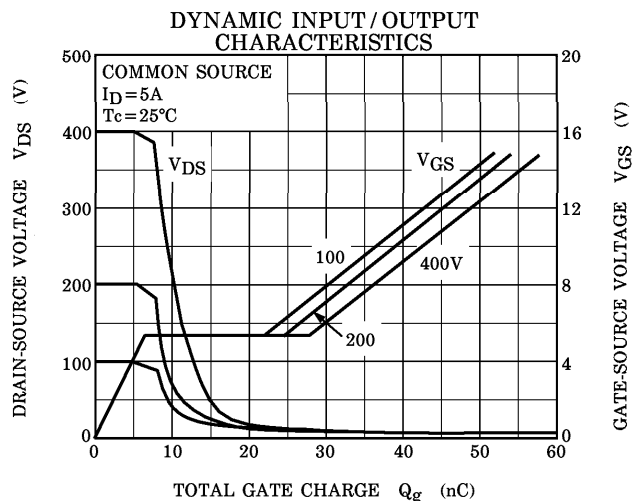
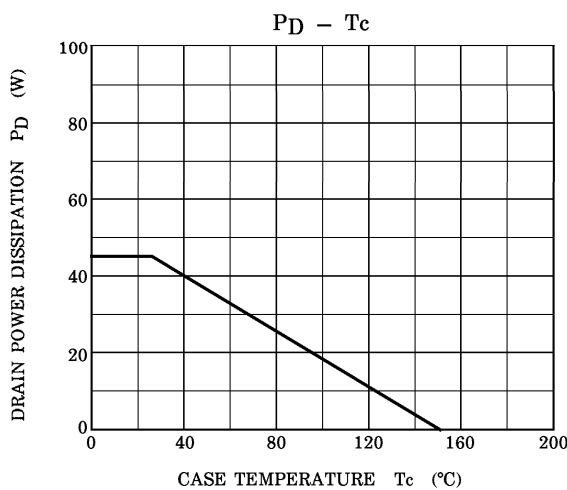
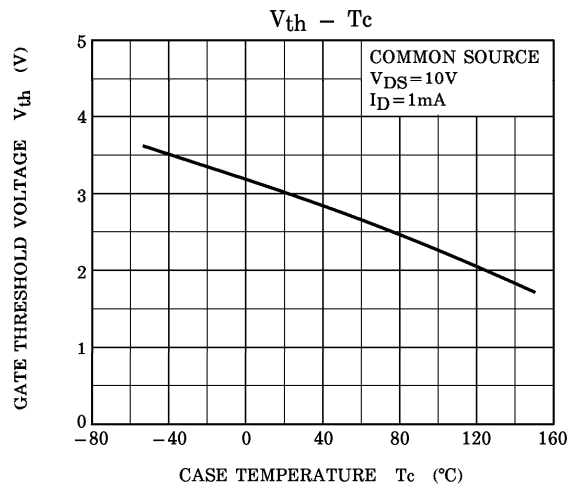
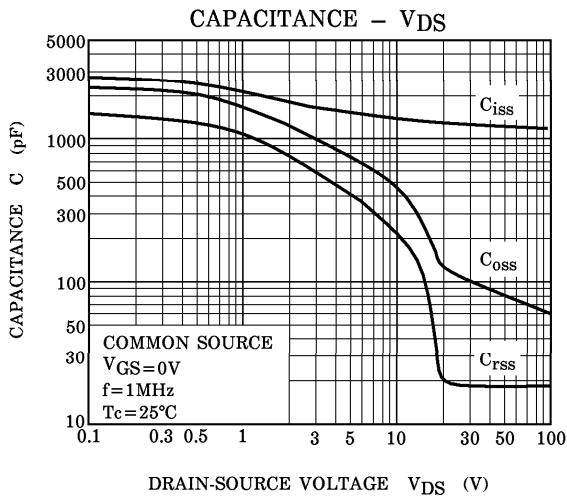
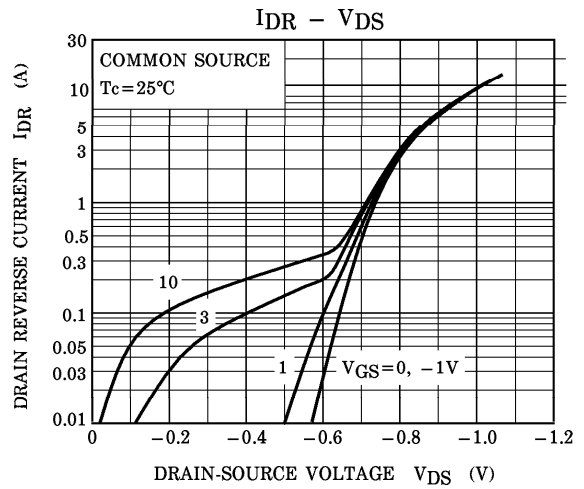
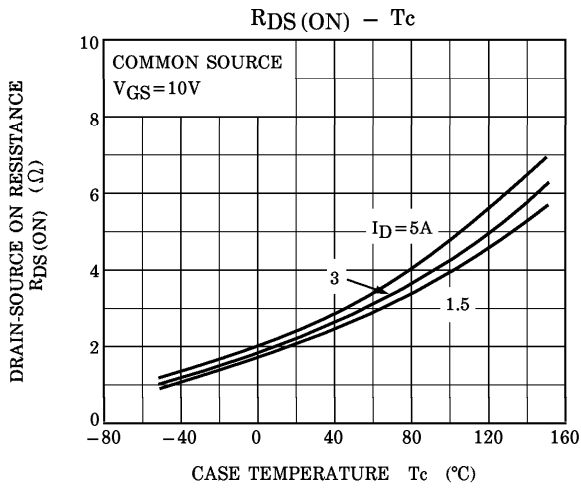


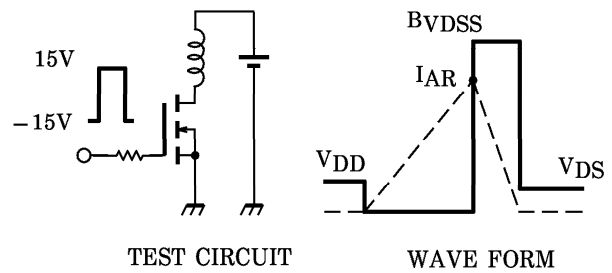
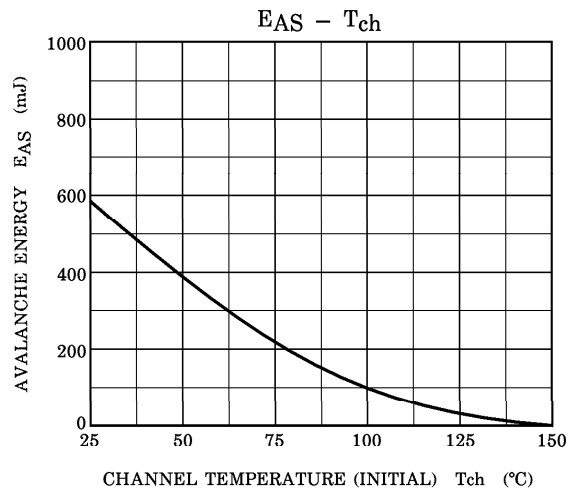
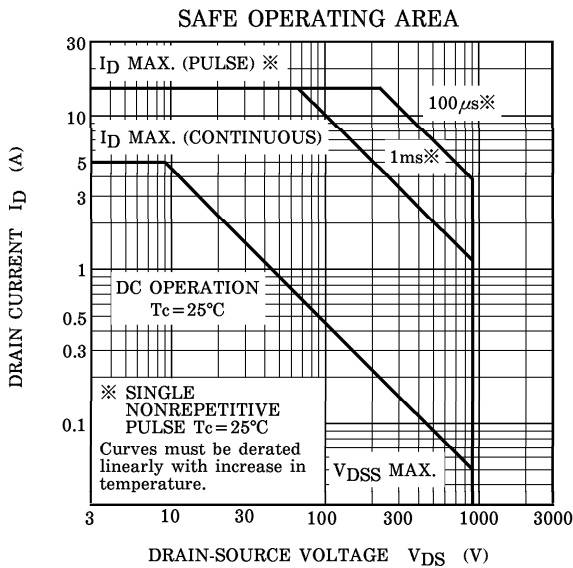
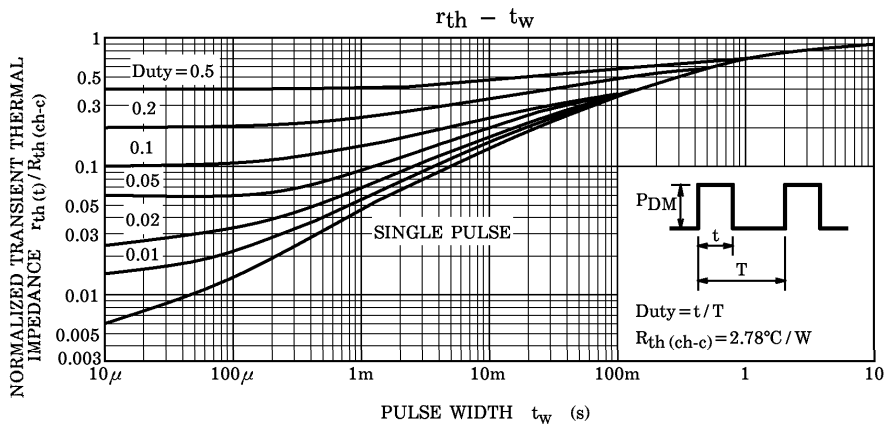
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 5A$ ,  $R_G = 25\Omega$ ,  $V_{DD} = 90V$ ,  $L = 43.6mH$

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