

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

# 2SK2417

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS  
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

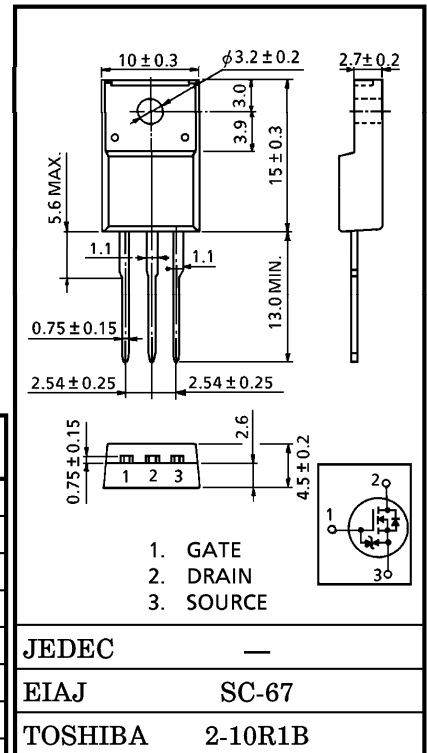
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.42\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 7.5S$  (Typ.)
- Low Leakage Current  
 :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 250V$ )
- Enhancement-Mode  
 :  $V_{th} = 1.5 \sim 3.5V$  ( $V_{DS} = 10V, I_D = 1mA$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	250	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )	$V_{DGR}$	250	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	7.5
	Pulse	$I_{DP}$	30
Drain Power Dissipation ( $T_c = 25^\circ C$ )	$P_D$	30	W
Single Pulse Avalanche Energy**	$E_{AS}$	110	mJ
Avalanche Current	$I_{AR}$	7.5	A
Repetitive Avalanche Energy*	$E_{AR}$	3	mJ
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 1.9g

HERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	4.16	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ C/W$

Note ;

- \* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- \*\*  $V_{DD} = 50V, T_{ch} = 25^\circ C$  (initial),  $L = 3.3mH, R_G = 25\Omega, I_{AR} = 7.5A$

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

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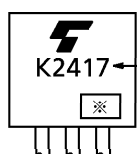
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V	—	—	±10	μA
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> = 250V, V <sub>GS</sub> = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0V	250	—	—	V
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA	1.5	—	3.5	V
Drain-Source ON Resistance		R <sub>DS (ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.5A	—	0.42	0.5	Ω
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.5A	4	7.5	—	S
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz	—	700	—	pF
Reverse Transfer Capacitance		C <sub>rss</sub>		—	80	—	
Output Capacitance		C <sub>oss</sub>		—	270	—	
Switching Time	Rise Time	t <sub>r</sub>	<p>V<sub>GS</sub> 10V 0V, I<sub>D</sub> = 3.5A, R<sub>L</sub> = 28.6Ω, V<sub>DD</sub> = 100V</p>	—	10	—	ns
	Turn-on Time	t <sub>on</sub>		—	20	—	
	Fall Time	t <sub>f</sub>		—	10	—	
	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	—	70	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q <sub>g</sub>	V <sub>DD</sub> = 200V, V <sub>GS</sub> = 10V	—	20	—	nC
Gate-Source Charge		Q <sub>gs</sub>	I <sub>D</sub> = 7.5A	—	13	—	
Gate-Drain ("Miller") Charge		Q <sub>gd</sub>		—	7	—	

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>	—	—	—	7.5	A
Pulse Drain Reverse Current	I <sub>DRP</sub>	—	—	—	30	A
Diode Forward Voltage	V <sub>DSF</sub>	I <sub>DR</sub> = 7.5A, V <sub>GS</sub> = 0V	—	—	-2.0	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 7.5A, V <sub>GS</sub> = 0V	—	180	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 100A / μs	—	1.1	—	μC

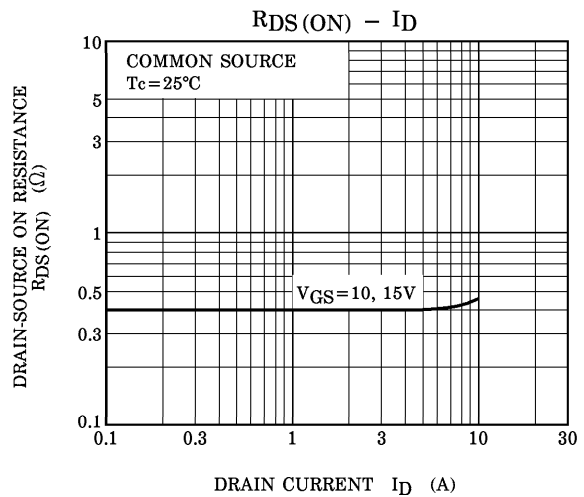
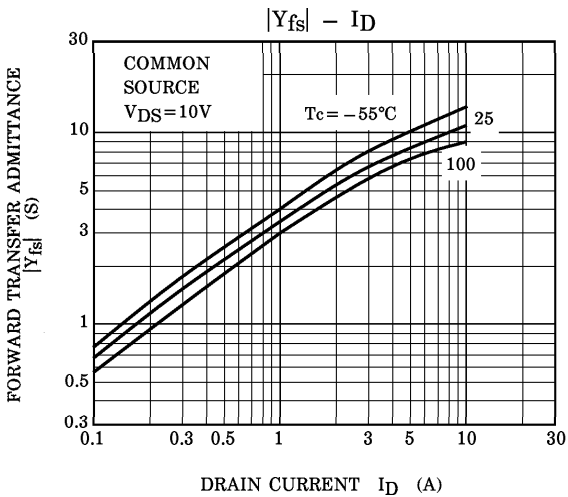
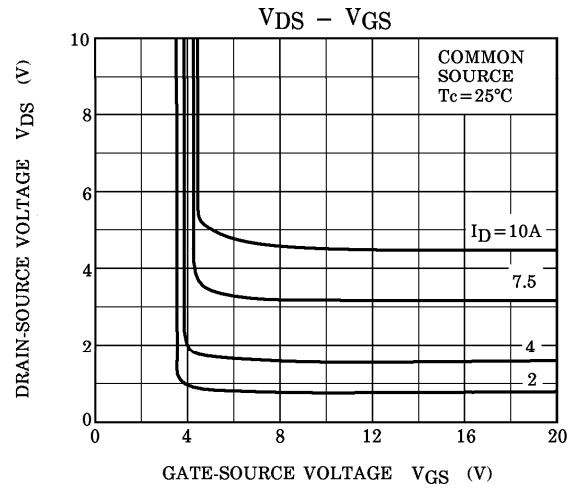
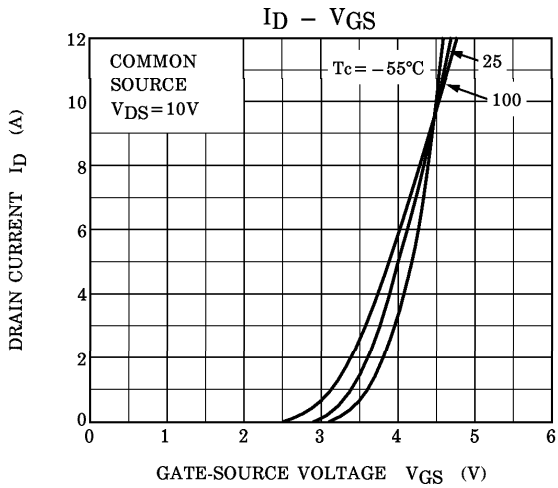
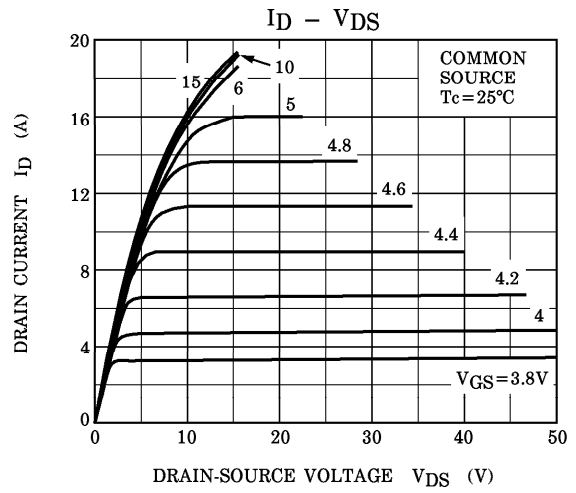
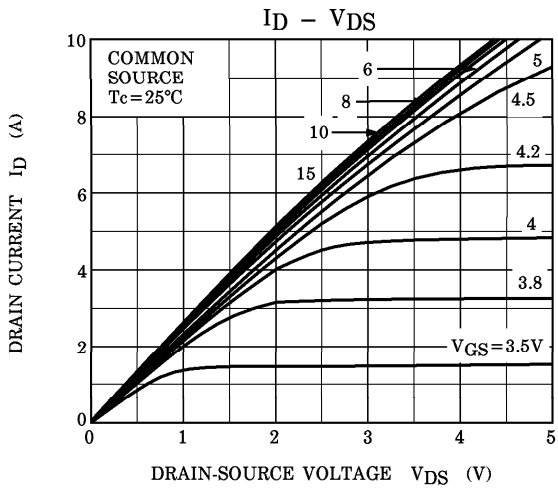
MARKING

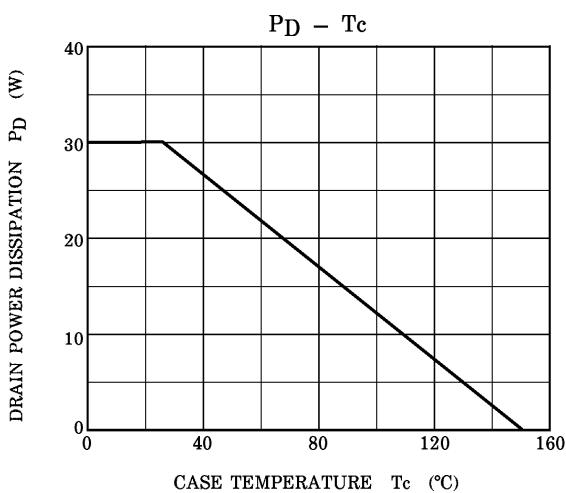
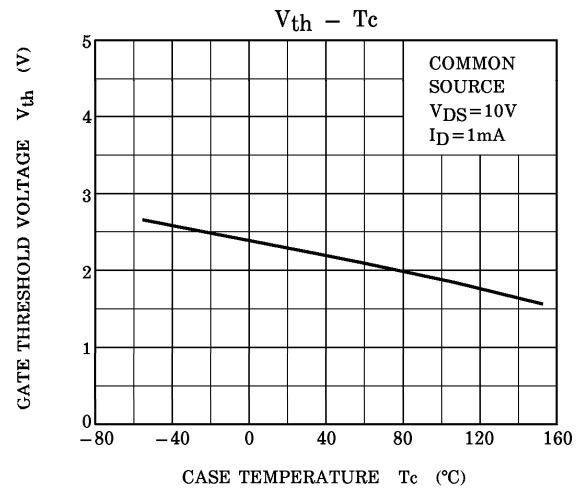
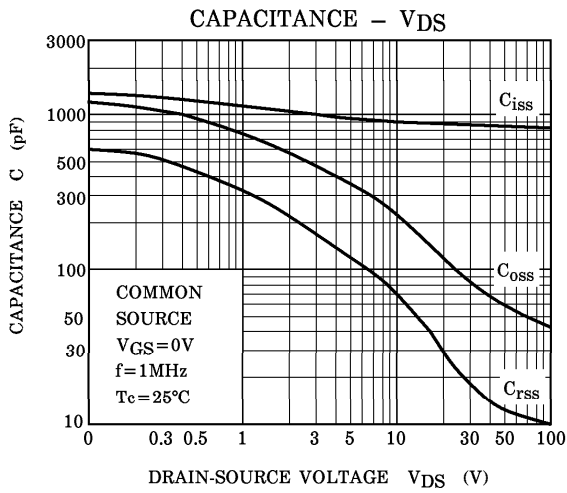
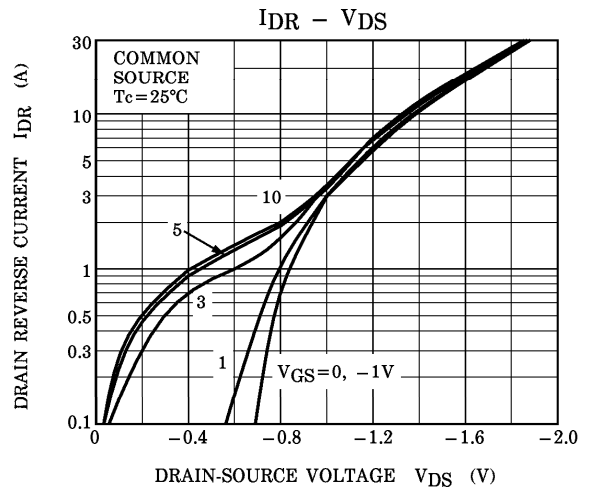
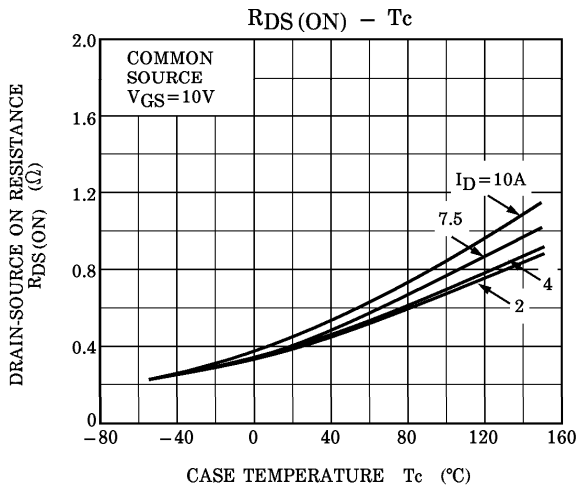


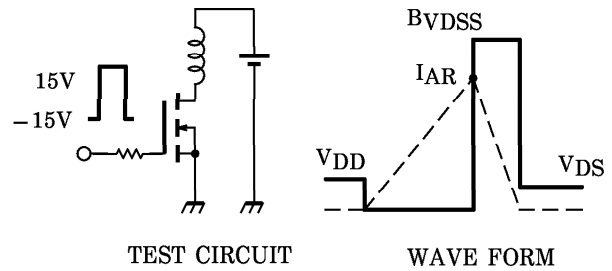
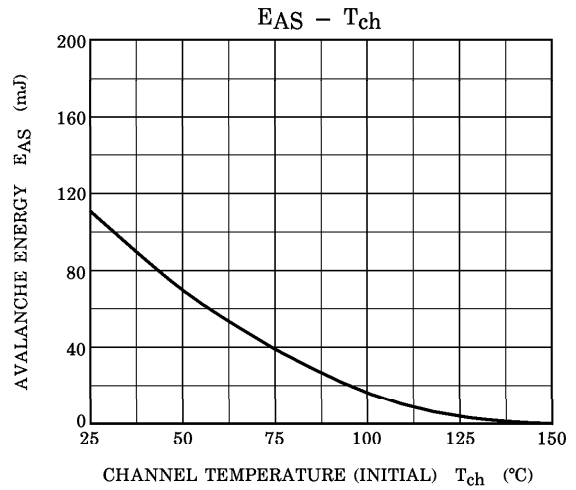
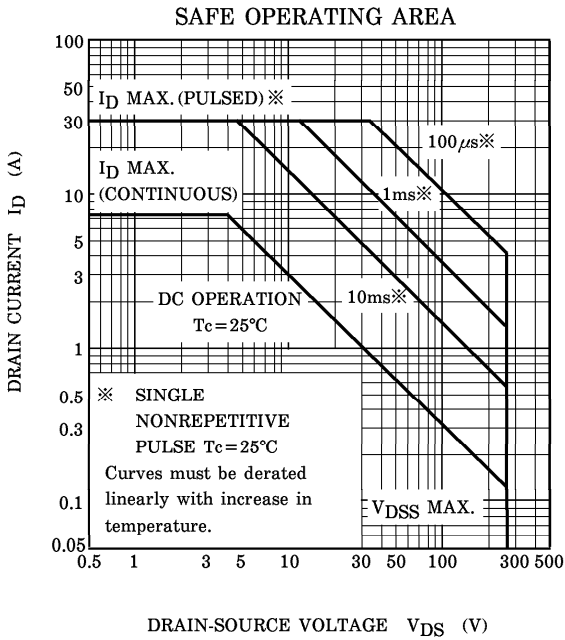
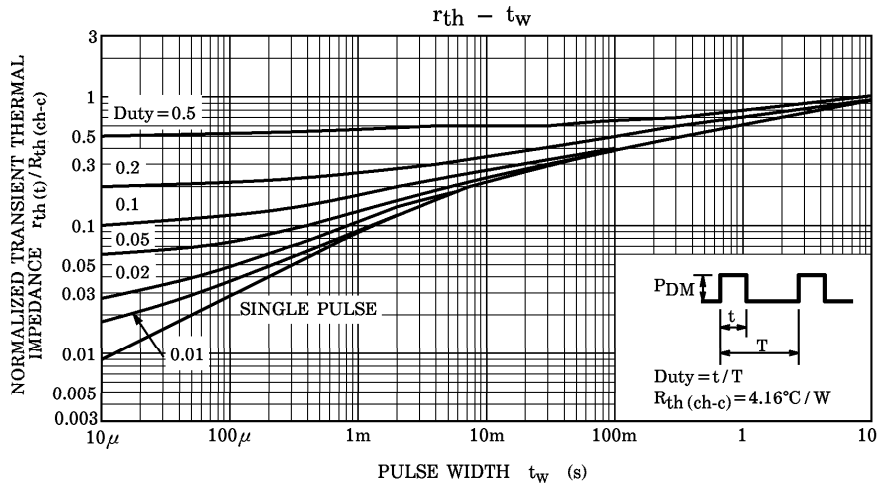
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 7.5A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 50V$ ,  $L = 3.3mH$

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