

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

# 2SK2842

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

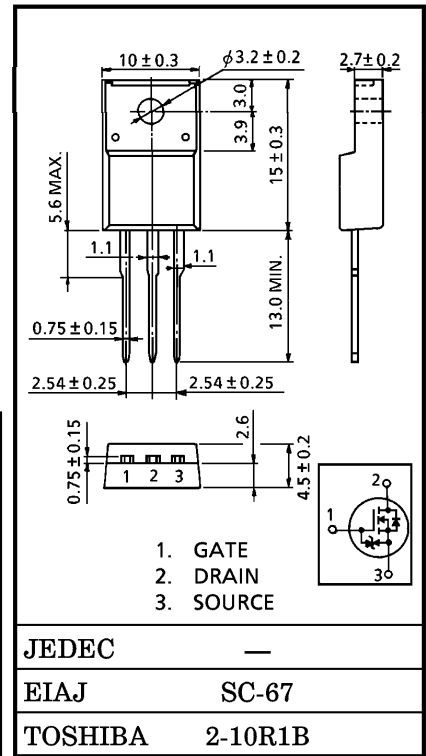
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.4 \Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 9.0 S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \mu A$  (Max.) ( $V_{DS} = 500 V$ )
- 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	$V_{DSS}$	500	V
Drain-Gate Voltage ( $R_{GS} = 20 k\Omega$ )	$V_{DGR}$	500	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	12 A
	Pulse	$I_{DP}$	48 A
Drain Power Dissipation ( $T_c = 25^\circ C$ )	$P_D$	40	W
Single Pulse Avalanche Energy**	$E_{AS}$	364	mJ
Avalanche Current	$I_{AR}$	12	A
Repetitive Avalanche Energy*	$E_{AR}$	4.0	mJ
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 1.9 g (Typ.)

HERMAL 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),  $L = 4.3 mH, R_G = 25 \Omega, I_{AR} = 12 A$

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

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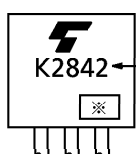
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±25 V, V <sub>DS</sub> = 0 V	—	—	±10	μA
Gate-Source Breakdown Voltage	V <sub>(BR)GSS</sub>	I <sub>G</sub> = ±10 μA, V <sub>DS</sub> = 0 V	±30	—	—	V
Drain Cut-off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 500 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	500	—	—	V
Gate Threshold Voltage	V <sub>th</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	2.0	—	4.0	V
Drain-Source ON Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 6 A	—	0.4	0.52	Ω
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 6 A	4.0	9.0	—	S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz	—	2040	—	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		—	200	—	
Output Capacitance	C <sub>oss</sub>		—	640	—	
Switching Time	Rise Time	t <sub>r</sub>		—	22	ns
	Turn-on Time	t <sub>on</sub>		—	58	
	Fall Time	t <sub>f</sub>		—	36	
	Turn-off Time	t <sub>off</sub>		—	180	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q <sub>g</sub>	V <sub>DD</sub> ≐ 400 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 12 A	—	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>IDR</sub>	—	—	—	12	A
Pulse Drain Reverse Current	I <sub>IDRP</sub>	—	—	—	48	A
Diode Forward Voltage	V <sub>DVSF</sub>	I <sub>IDR</sub> = 12 A, V <sub>GS</sub> = 0 V	—	—	-1.7	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>IDR</sub> = 12 A, V <sub>GS</sub> = 0 V dI <sub>IDR</sub> /dt = 100 A/μs	—	370	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>		—	3.5	—	μC

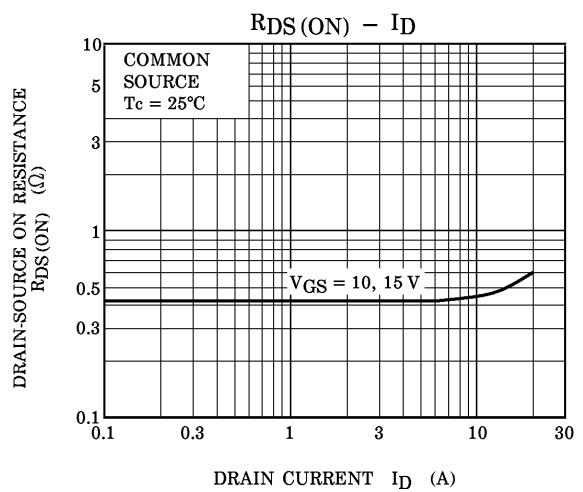
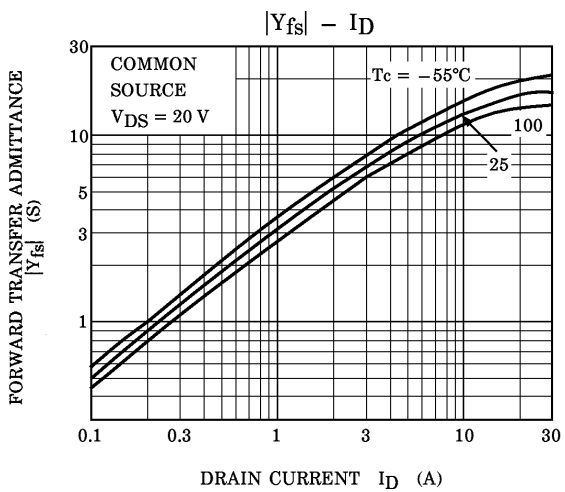
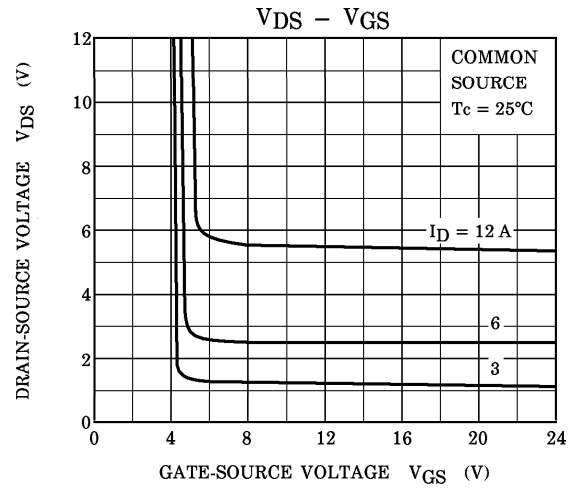
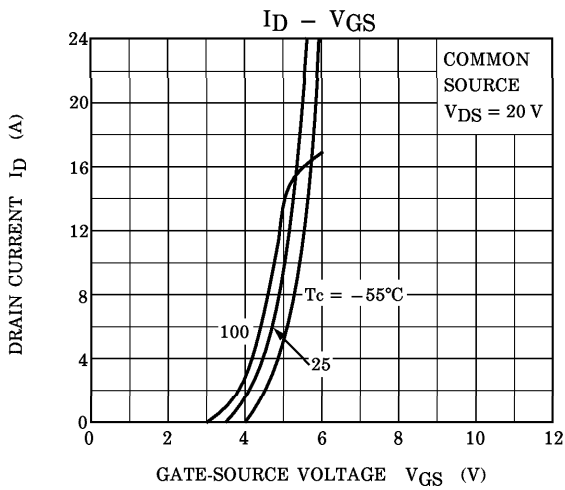
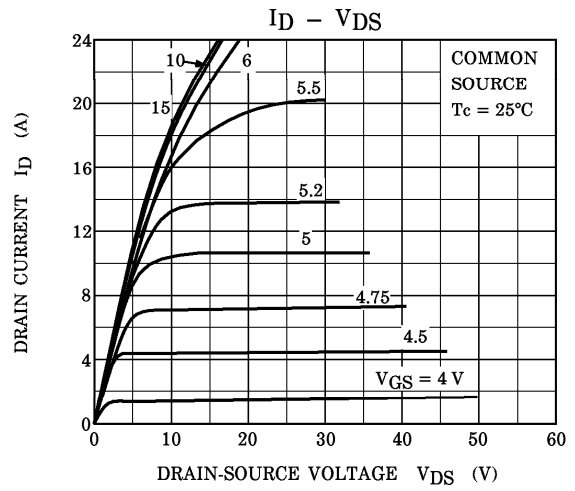
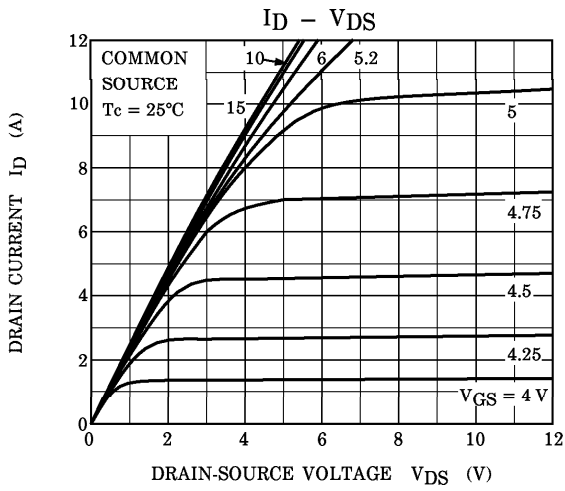
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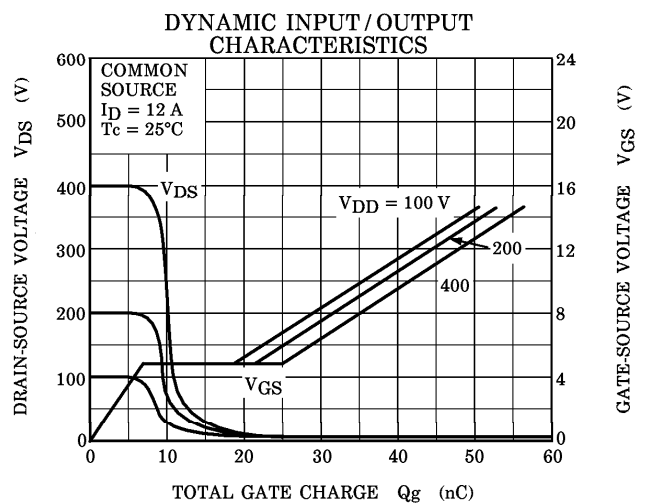
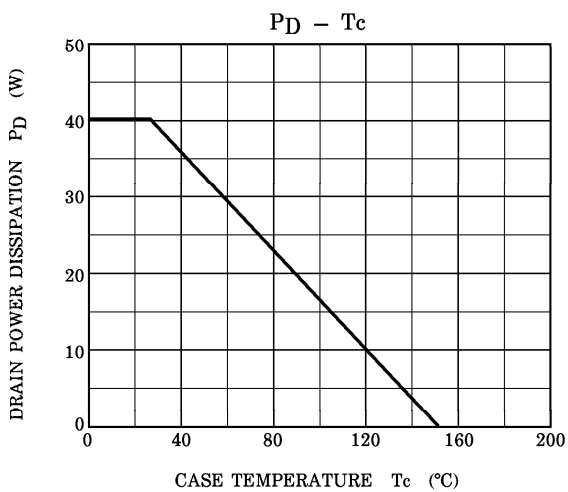
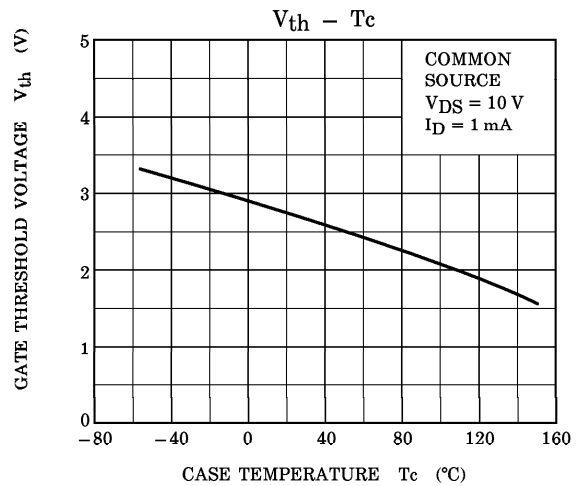
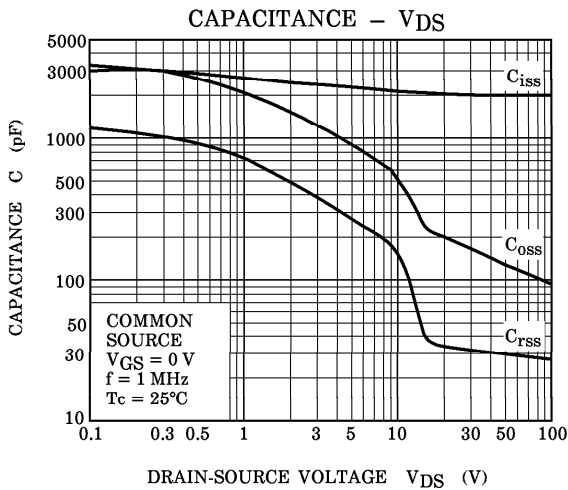
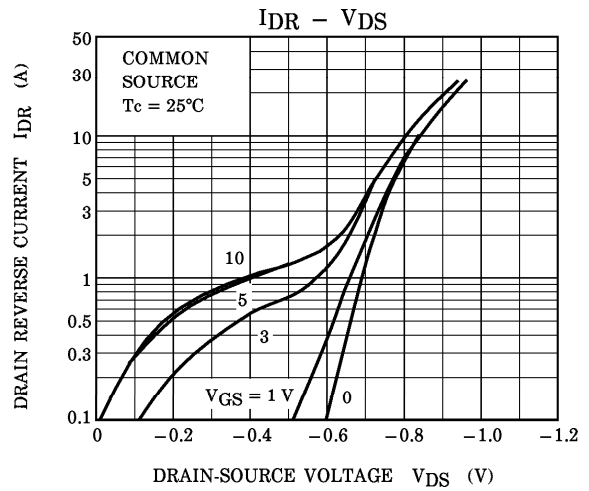
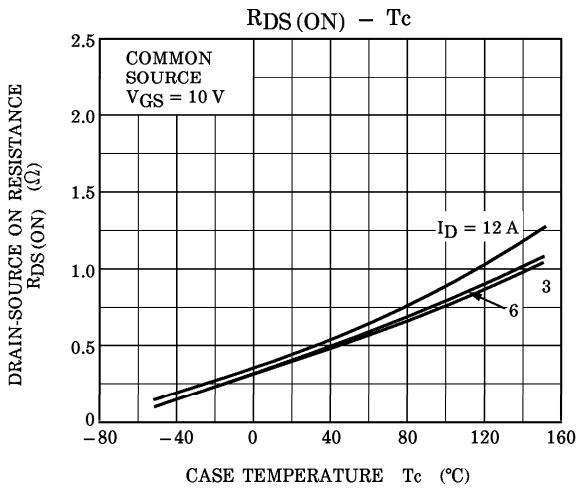


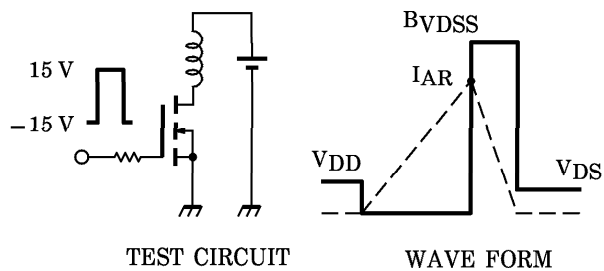
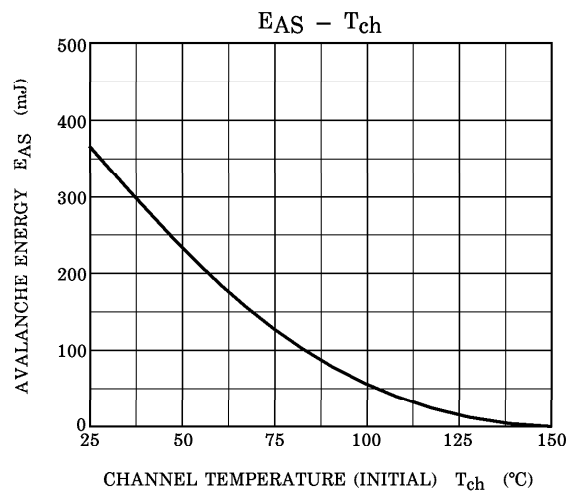
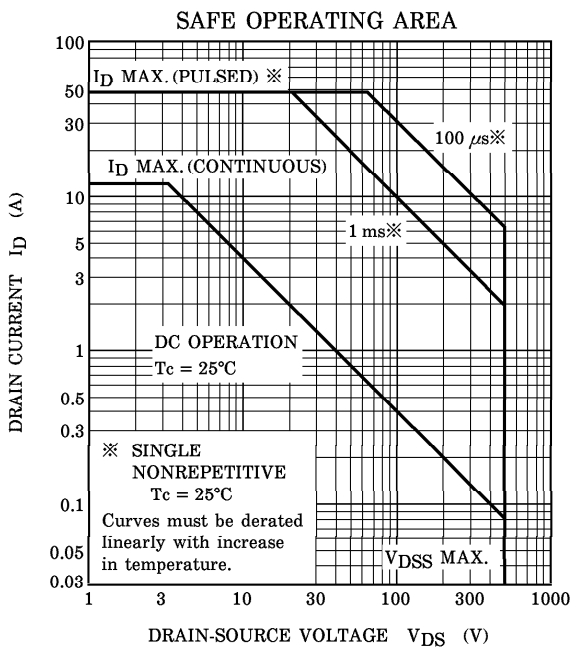
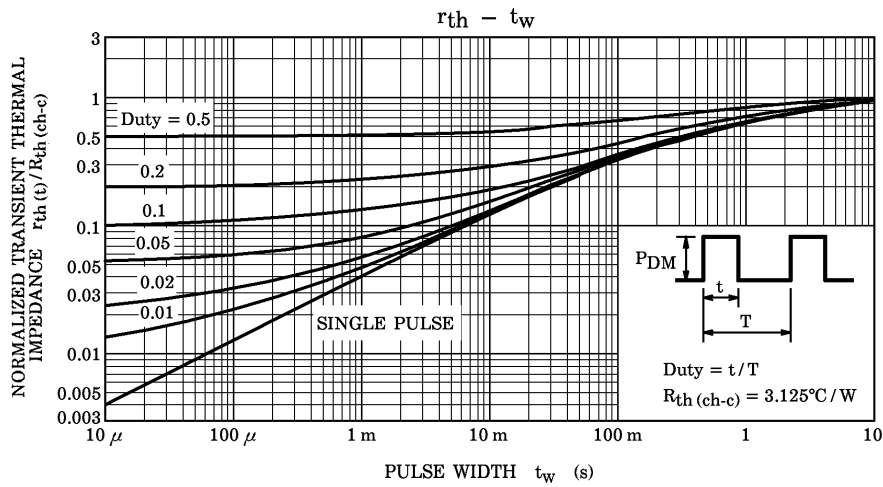
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 12$  A,  $R_G = 25 \Omega$ ,  $V_{DD} = 90$  V,  $L = 4.3$  mH

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