

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

# 2SK2232

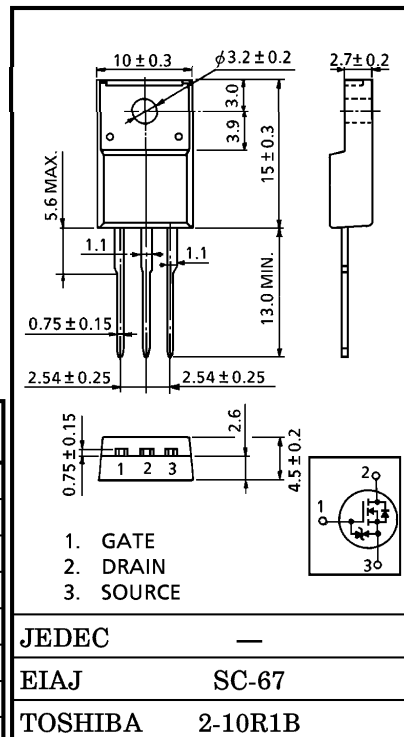
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS  
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS  
 Unit in mm

- 4V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 36m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 16S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 60V$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0V$  ( $V_{DS} = 10V, I_D = 1mA$ )

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )	$V_{DGR}$	60	V
Gate-Source Voltage	$V_{GSS}$	±20	V
Drain Current	DC	$I_D$	25
	Pulse	$I_{DP}$	100
Drain Power Dissipation (Tc = 25°C)	$P_D$	35	W
Single Pulse Avalanche Energy**	$E_{AS}$	156	mJ
Avalanche Current	$I_{AR}$	25	A
Repetitive Avalanche Energy*	$E_{AR}$	3.5	mJ
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature Range	$T_{stg}$	-55~150	°C



Weight : 1.9g

Thermal Characteristics

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

Note ;

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

\*\*  $V_{DD} = 25V$ , Starting  $T_{ch} = 25°C$ ,  $L = 339\mu H$ ,  $R_G = 25\Omega$ ,  $I_{AR} = 25A$

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

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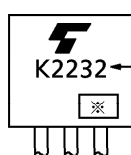
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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> = 60V, V <sub>GS</sub> = 0V	—	—	100	μA	
Drain-Source Breakdown Voltage	V (BR) DSS	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0V	60	—	—	V	
Gate Threshold Voltage	V <sub>th</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA	0.8	—	2.0	V	
Drain-Source ON Resistance	R <sub>DS (ON)</sub>	V <sub>GS</sub> = 4V, I <sub>D</sub> = 12A	—	0.057	0.08	Ω	
		V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A	—	0.036	0.046		
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 12A	10	16	—	S	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V f = 1MHz	—	1000	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		—	200	—		
Output Capacitance	C <sub>oss</sub>		—	550	—		
Switching Time	Rise Time	t <sub>r</sub>		—	20	—	ns
	Turn-on Time	t <sub>on</sub>		—	30	—	
	Fall Time	t <sub>f</sub>		—	55	—	
	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	—	130	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q <sub>g</sub>	V <sub>DD</sub> ≐ 48V, V <sub>GS</sub> = 10V I <sub>D</sub> = 25A	—	38	—	nC	
Gate-Source Charge	Q <sub>gs</sub>		—	25	—		
Gate-Drain (“Miller”) Charge	Q <sub>gd</sub>		—	13	—		

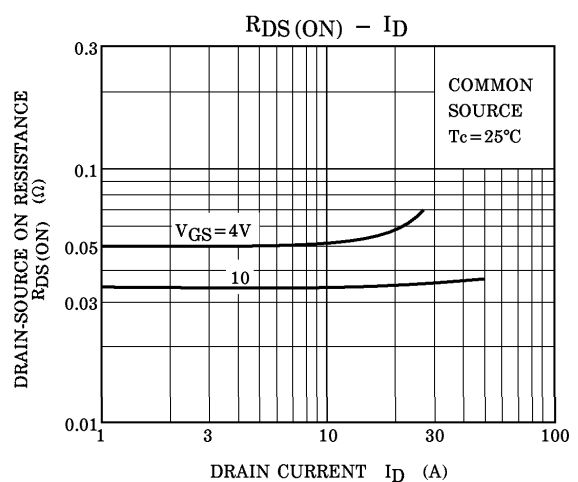
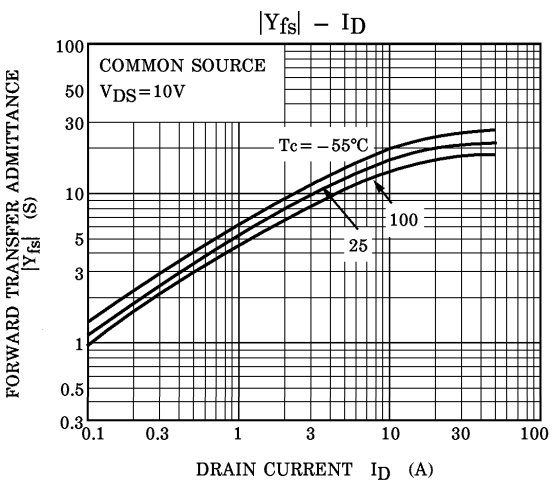
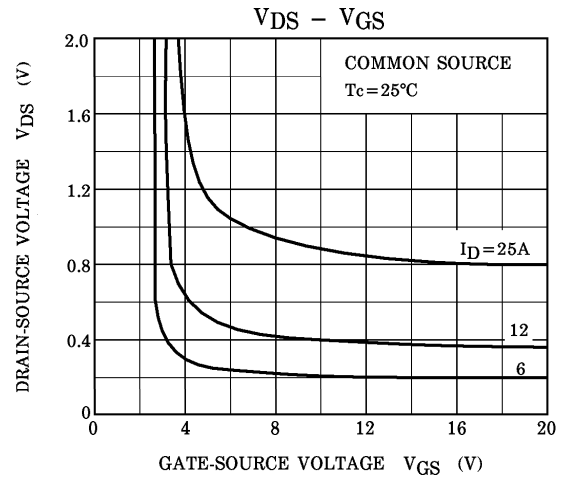
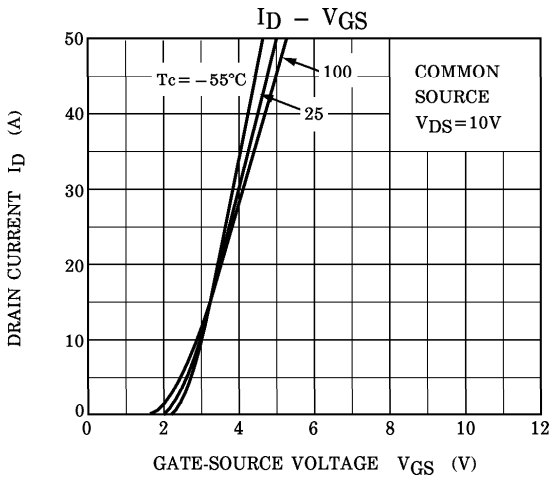
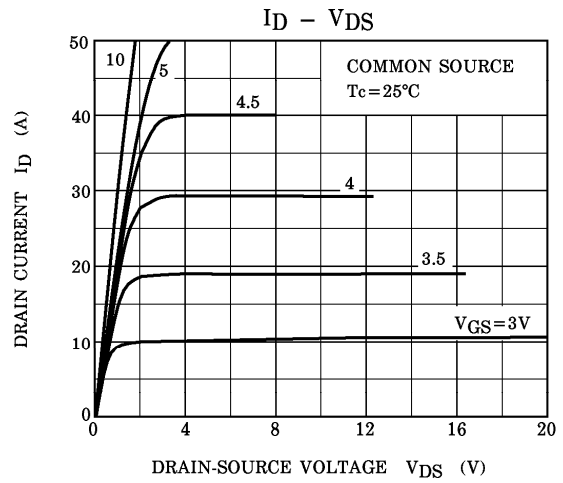
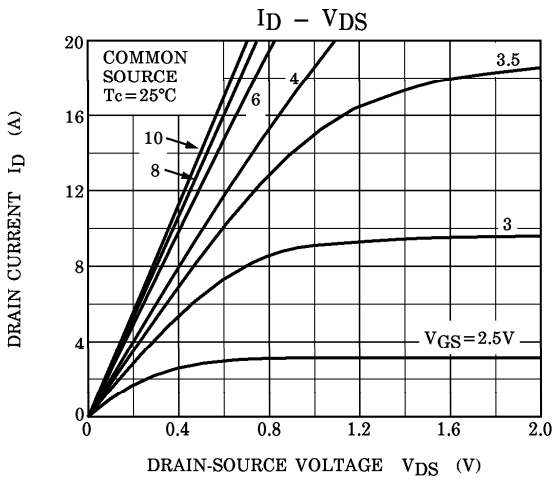
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

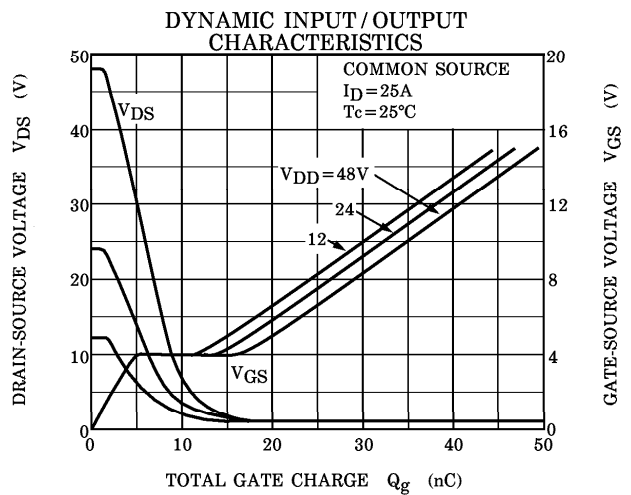
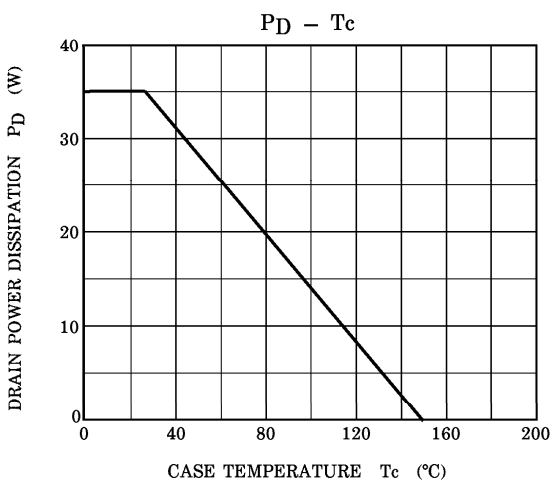
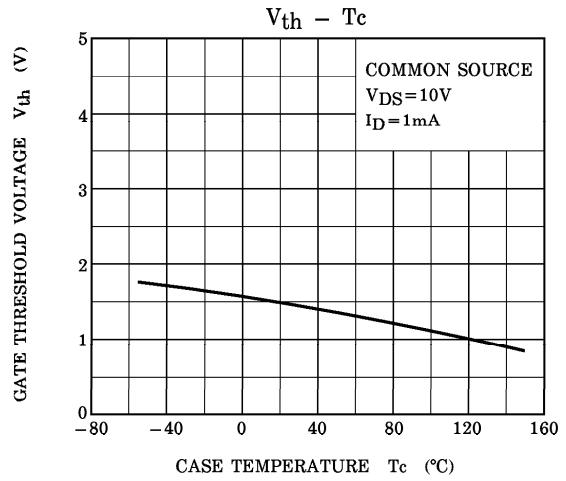
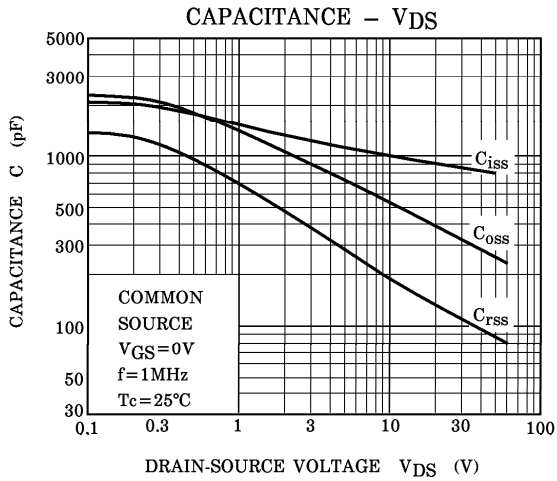
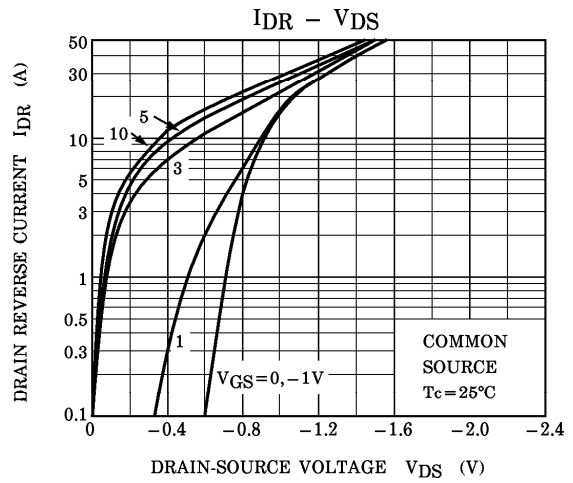
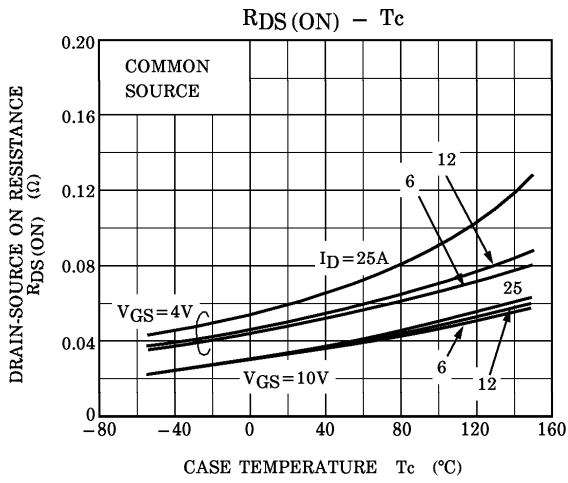
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I <sub>DR</sub>	—	—	—	25	A
Pulse Drain Reverse Current	I <sub>D RP</sub>	—	—	—	100	A
Diode Forward Voltage	V <sub>DSF</sub>	I <sub>DR</sub> = 25A, V <sub>GS</sub> = 0V	—	—	-1.8	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 25A, V <sub>GS</sub> = 0V	—	50	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 50A / μs	—	35	—	nC

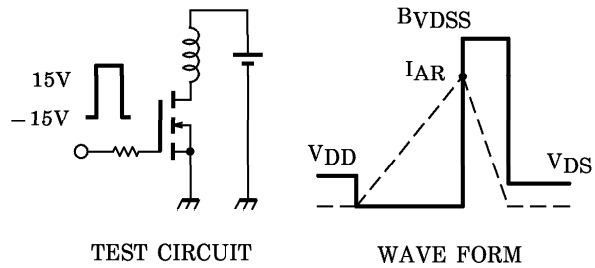
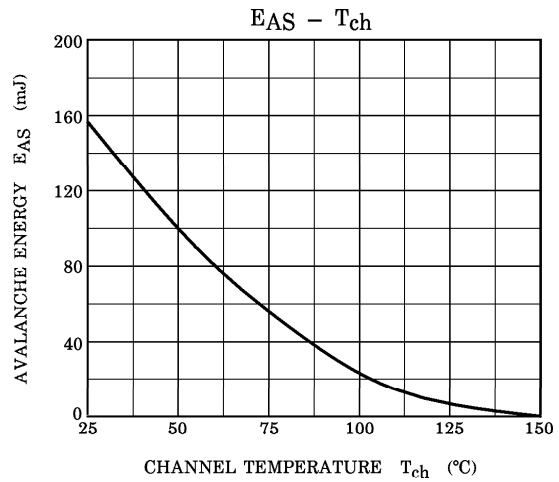
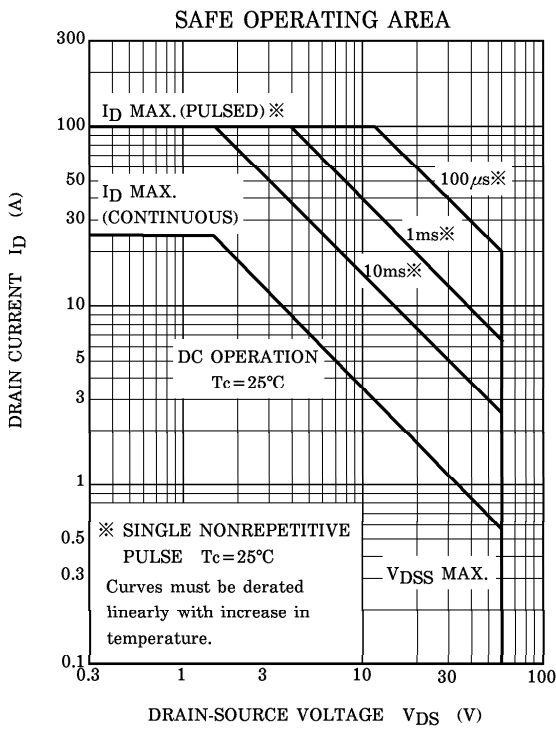
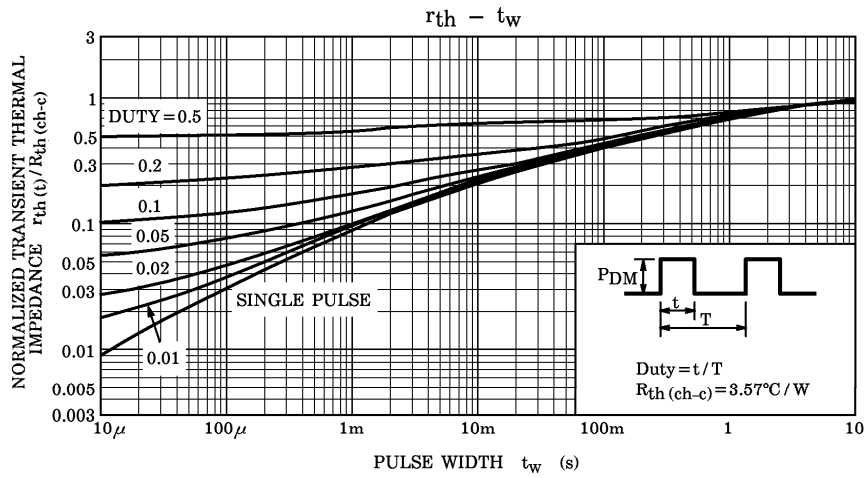
MARKING



TYPE ← K2232  
 ※ Lot Number  
 □ □ — Month (Starting from Alphabet A)  
 — Year (Last Number of the Christian Era)







Peak  $I_{AR} = 25A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 25V$ ,  $L = 339\mu H$

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