

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

# 2SK2837

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

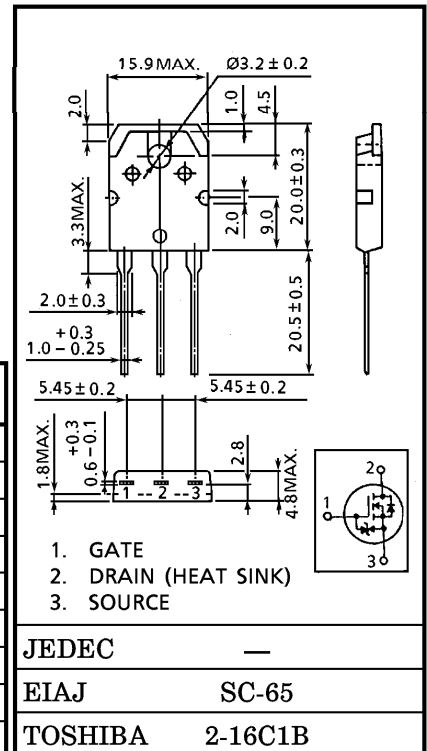
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.21\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 17S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DSS} = 500V$ )
- 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		$V_{DSS}$	500	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	500	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	20	A
	Pulse	$I_{DP}$	80	A
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	150	W
Single Pulse Avalanche Energy**		$E_{AS}$	960	mJ
Avalanche Current		$I_{AR}$	20	A
Repetitive Avalanche Energy*		$E_{AR}$	15	mJ
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 4.6g

**THERMAL CHARACTERISTICS**

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	0.833	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	50	$^\circ C/W$

Note ;

- \* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- \*\*  $V_{DD} = 90V, T_{ch} = 25^\circ C$  (initial),  $L = 4.08mH$   
 $R_G = 25\Omega, I_{AR} = 20A$

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

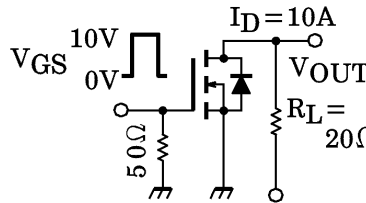
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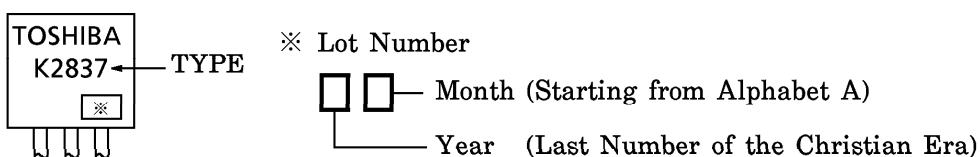
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

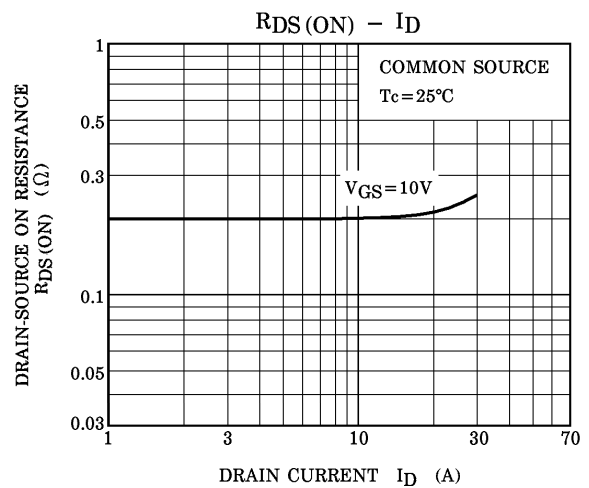
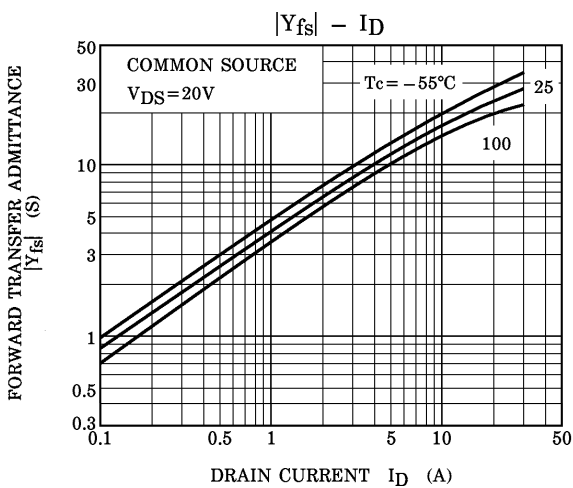
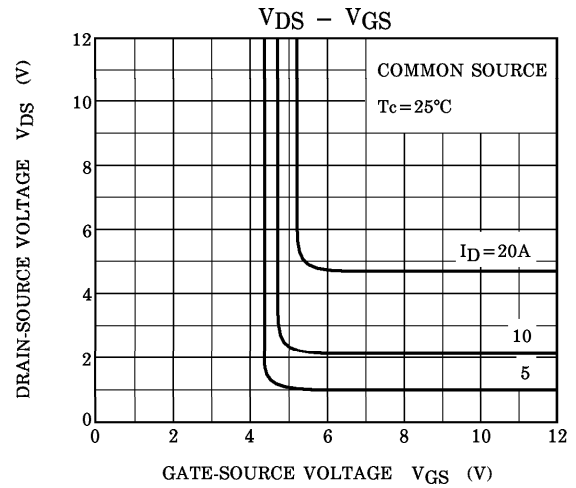
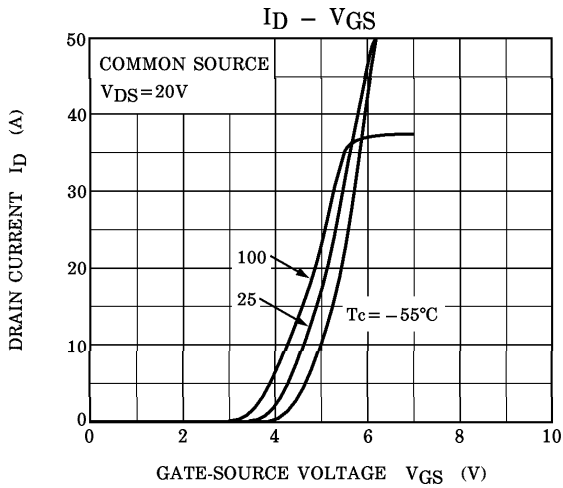
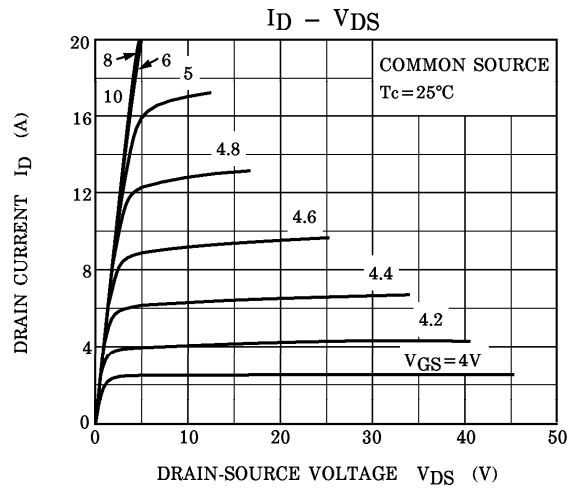
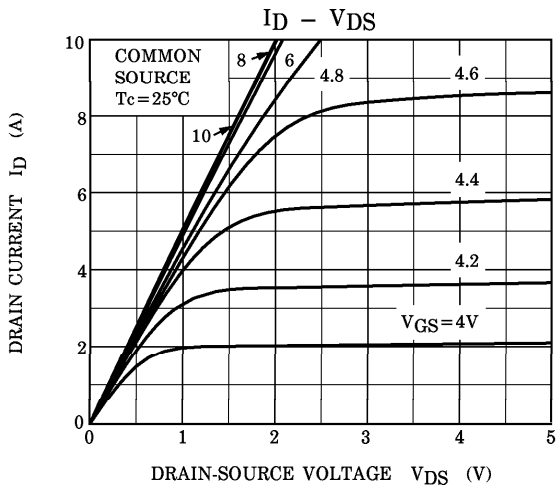
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V	—	—	±10	μA	
Gate-Source Breakdown Voltage	V (BR) GSS	I <sub>G</sub> = ±10μA, V <sub>DS</sub> = 0V	±30	—	—	V	
Drain Cut-off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V	—	—	100	μA	
Drain-Source Breakdown Voltage	V (BR) DSS	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0V	500	—	—	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>D(S) ON</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A	—	0.21	0.27	Ω	
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 10A	10	17	—	S	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz	—	3720	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		—	340	—		
Output Capacitance	C <sub>oss</sub>		—	1165	—		
Switching Time	Rise Time	t <sub>r</sub>		—	30	—	ns
	Turn-on Time	t <sub>on</sub>		—	70	—	
	Fall Time	t <sub>f</sub>		—	50	—	
	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	—	290	
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> = 6A	—	80	—	nC	
Gate-Source Charge	Q <sub>gs</sub>		—	48	—		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>		—	32	—		

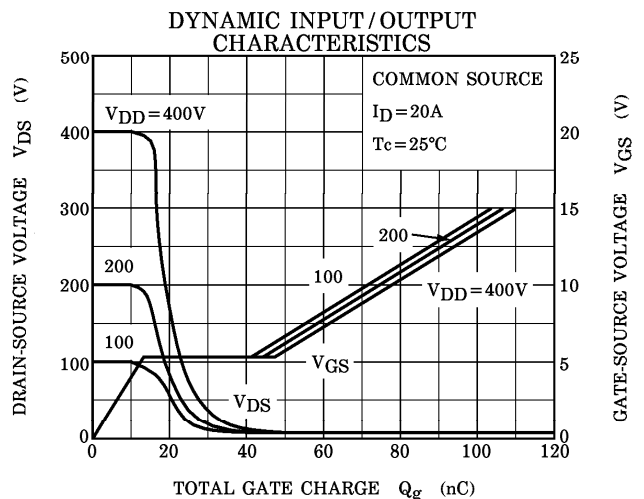
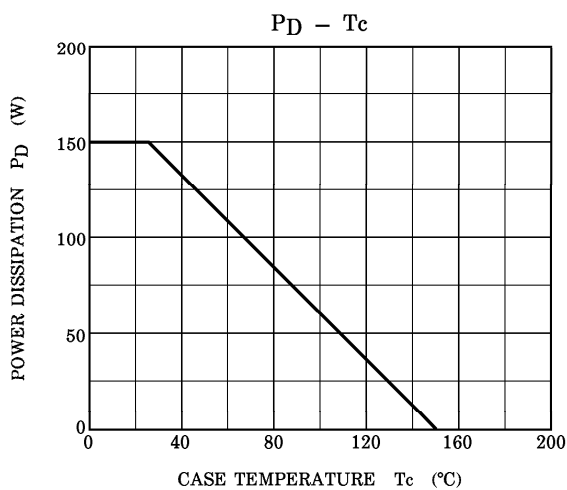
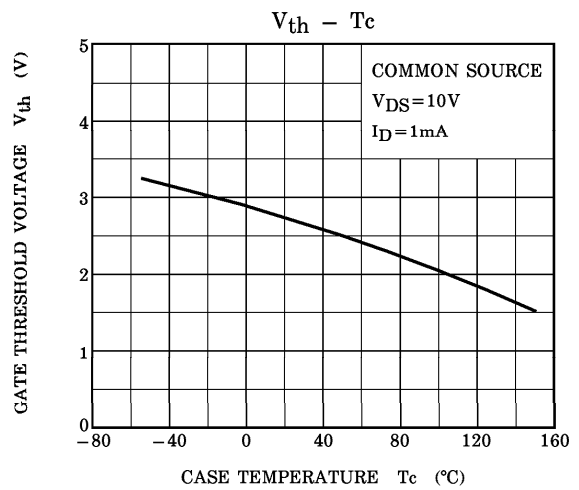
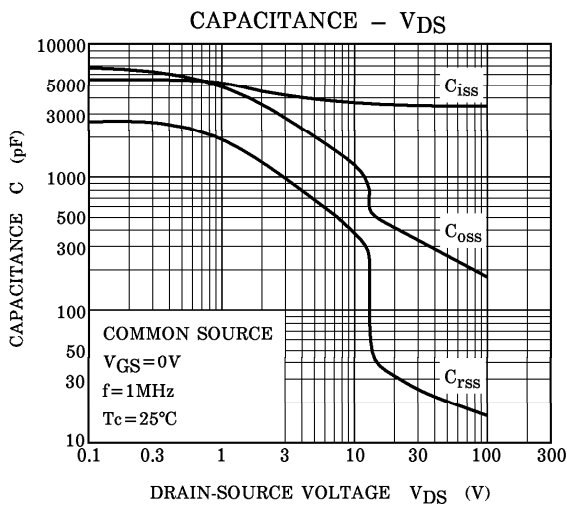
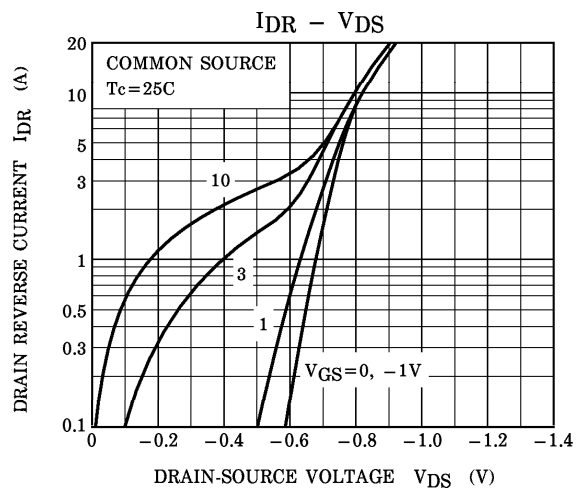
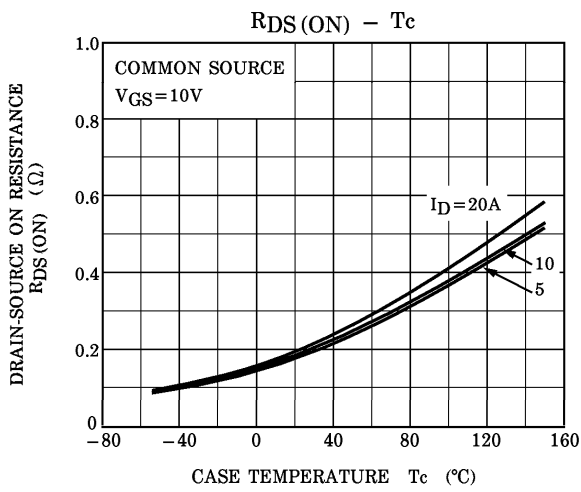
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

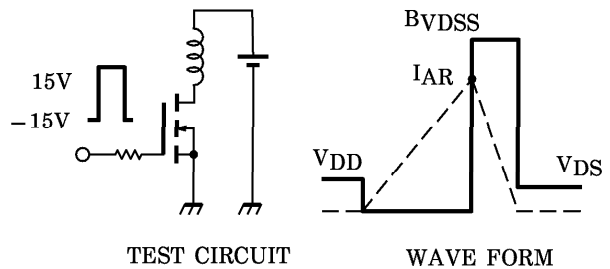
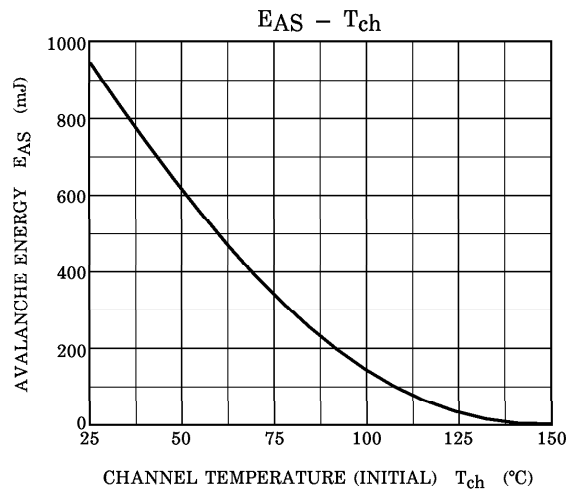
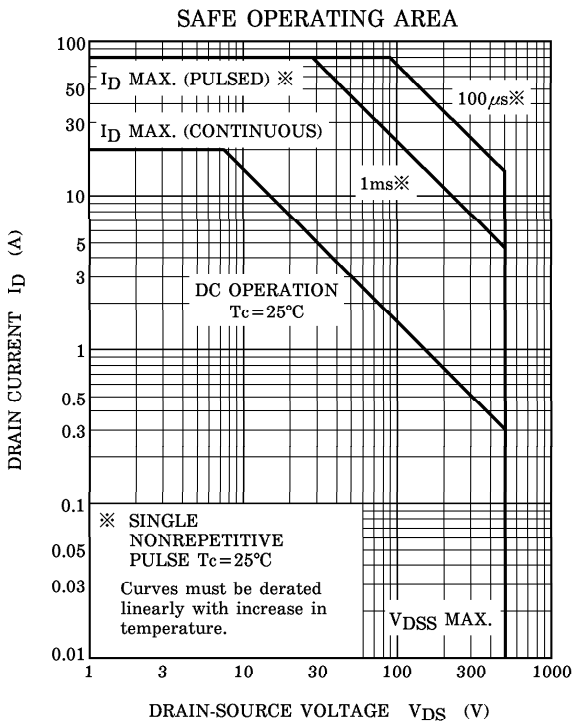
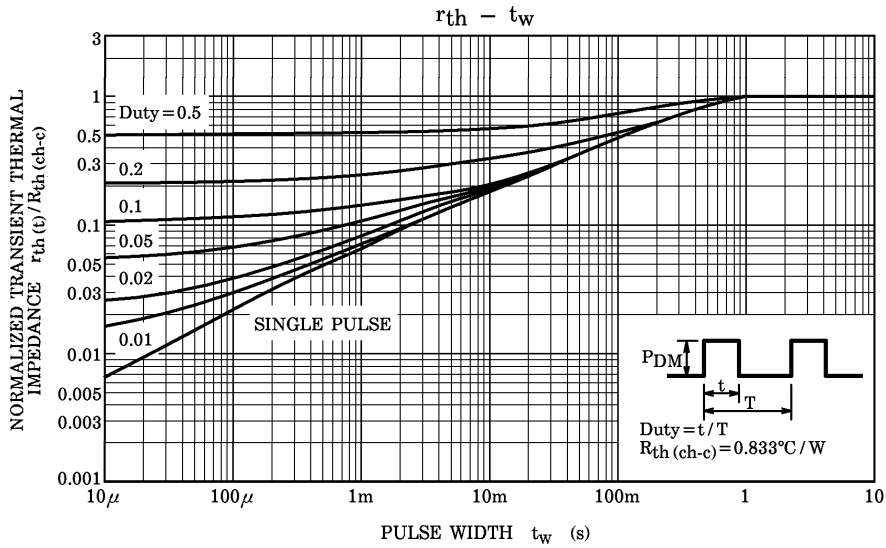
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I <sub>DR</sub>	—	—	—	20	A
Pulse Drain Reverse Current	I <sub>DRP</sub>	—	—	—	80	A
Diode Forward Voltage	V <sub>D(S)F</sub>	I <sub>DR</sub> = 20A, V <sub>GS</sub> = 0V	—	—	-1.7	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 20A, V <sub>GS</sub> = 0V	—	540	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 100A / μs	—	5.4	—	μC

MARKING









Peak  $I_{AR} = 20A$ ,  $R_G = 25\Omega$ ,  $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$   
 $V_{DD} = 90V$ ,  $L = 4.08mH$