

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

# 2SK2382

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

SWITCHING REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

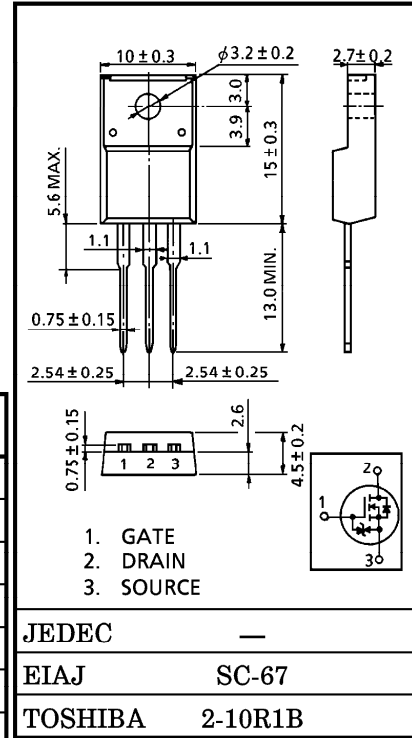
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)}=0.13\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}|=17S$  (Typ.)
- Low Leakage Current :  $I_{DSS}=100\mu A$  (Max.) ( $V_{DS}=200V$ )
- 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		$V_{DSS}$	200	V
Drain-Gate Voltage ( $R_{GS}=20k\Omega$ )		$V_{DGR}$	200	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	15	A
	Pulse	$I_{DP}$	45	A
Drain Power Dissipation ( $T_c=25^\circ C$ )		$P_D$	45	W
Single Pulse Avalanche Energy**		$E_{AS}$	166	mJ
Avalanche Current		$I_{AR}$	15	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

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.
- \*\*  $V_{DD}=50V, T_{ch}=25^\circ C, L=1.2mH, R_G=25\Omega, I_{AR}=15A$

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE. PLEASE HANDLE WITH CAUTION.

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**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

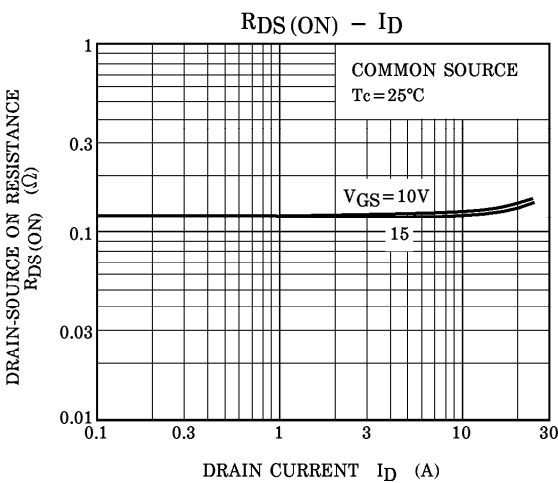
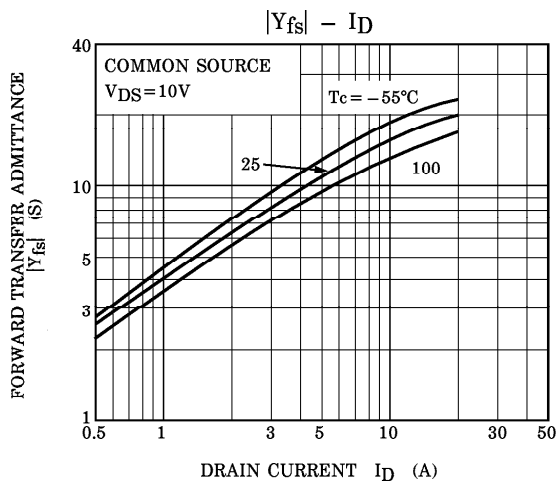
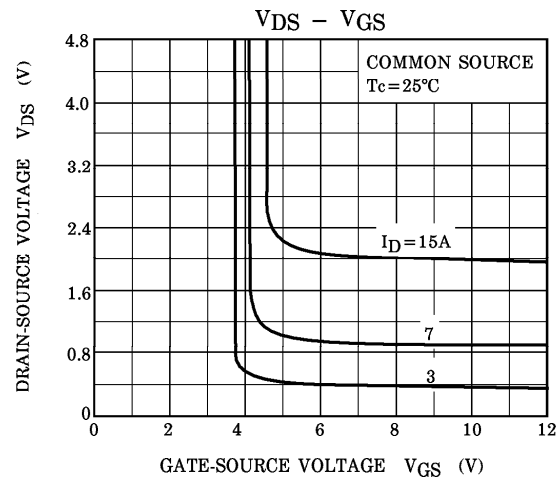
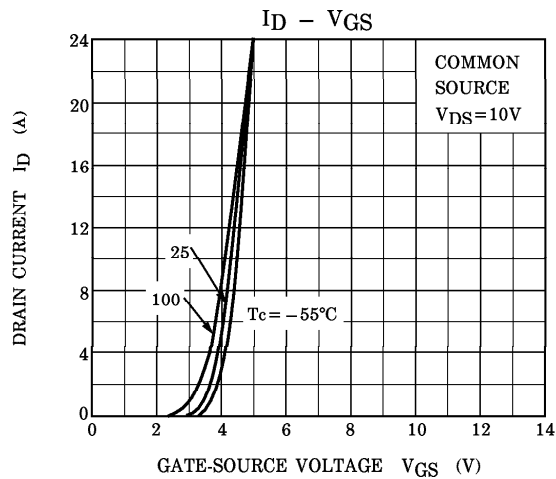
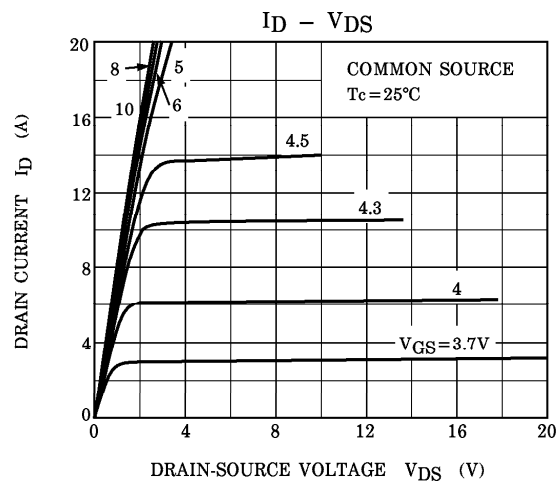
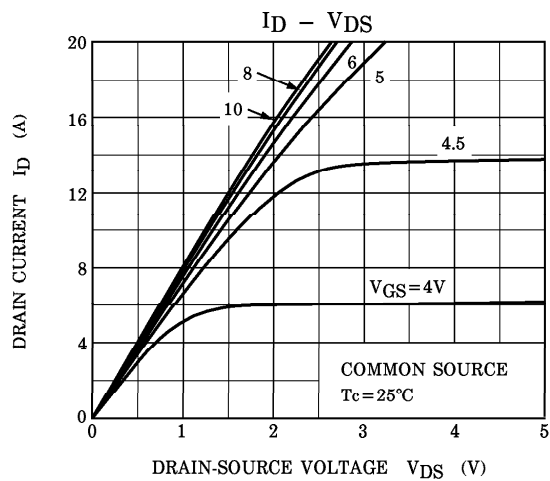
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±16V, VDS = 0V	—	—	±10	μA
Drain Cut-off Current		IDSS	VDS = 200V, VGS = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10mA, VGS = 0V	200	—	—	V
Gate Threshold Voltage		Vth	VDS = 10V, ID = 1mA	1.5	—	3.5	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10V, ID = 10A	—	0.13	0.18	Ω
Forward Transfer Admittance		Yfs	VDS = 10V, ID = 10A	10	17	—	S
Input Capacitance		Ciss	VDS = 10V, VGS = 0V, f = 1MHz	—	2000	—	pF
Reverse Transfer Capacitance		Crss		—	200	—	
Output Capacitance		Coss		—	600	—	
Switching Time	Rise Time	tr		—	35	—	ns
	Turn-on Time	ton		—	50	—	
	Fall Time	tf		—	10	—	
	Turn-off Time	t <sub>off</sub>		—	66	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≐ 100V, VGS = 10V ID = 15A	—	40	—	nC
Gate-Source Charge		Qgs		—	25	—	
Gate-Drain (“Miller”) Charge		Qgd		—	15	—	

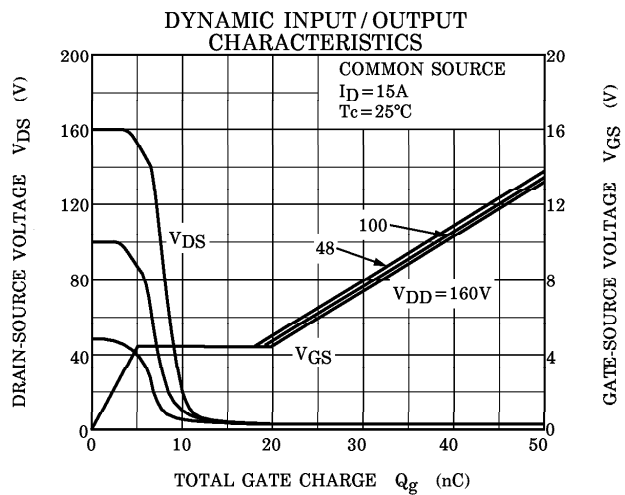
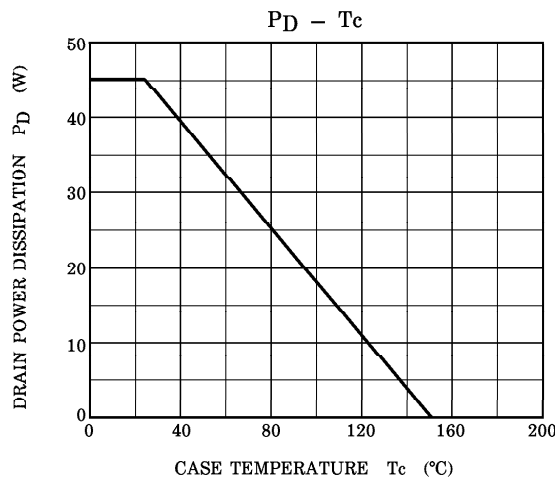
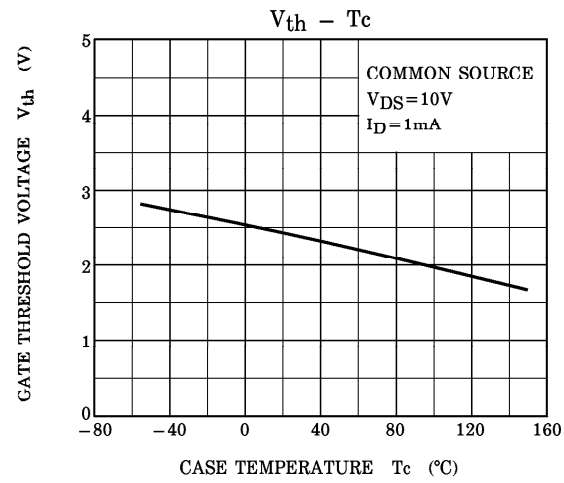
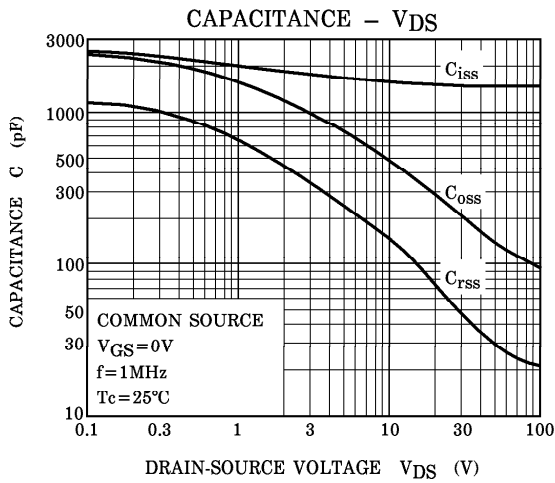
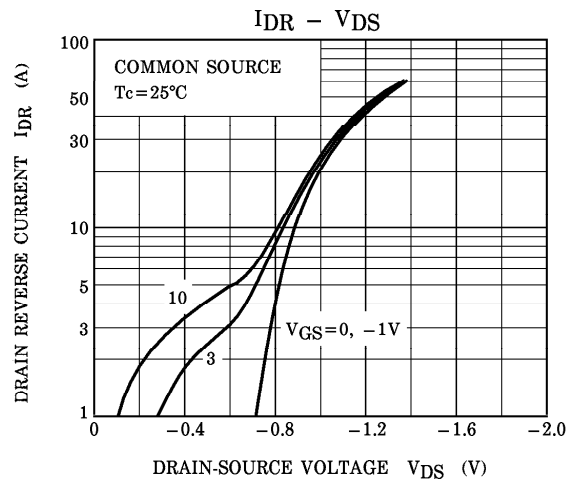
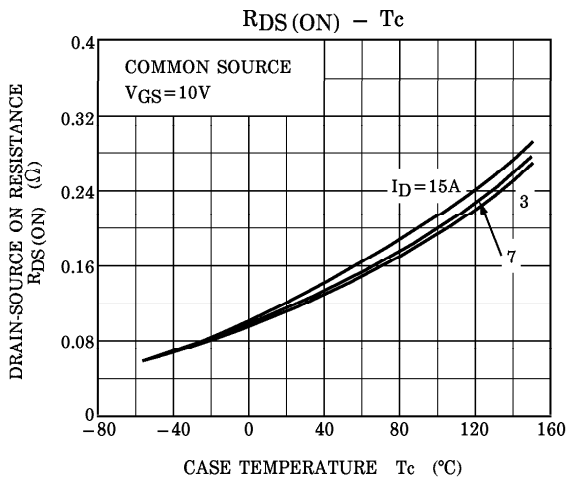
**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)**

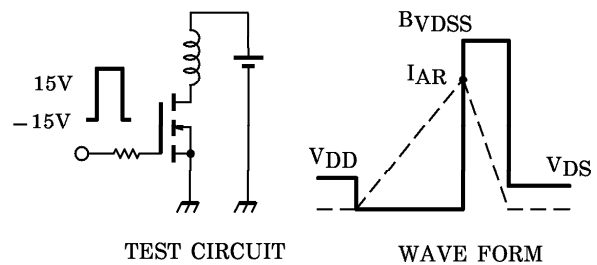
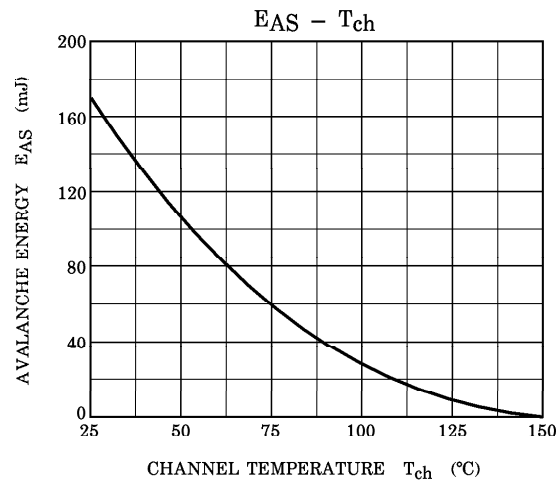
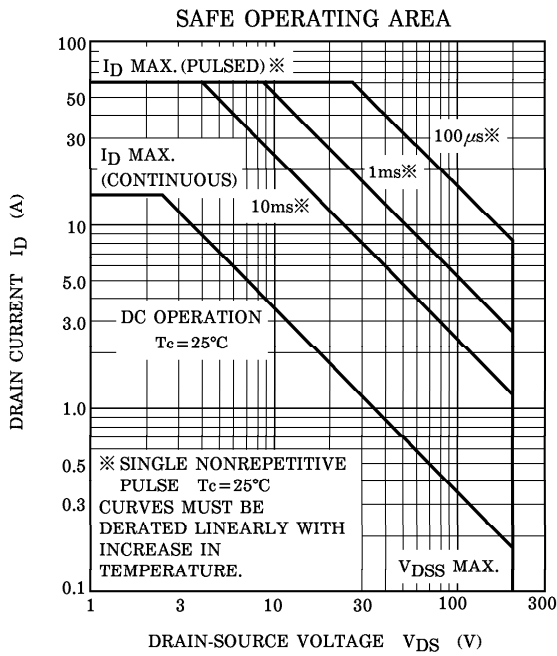
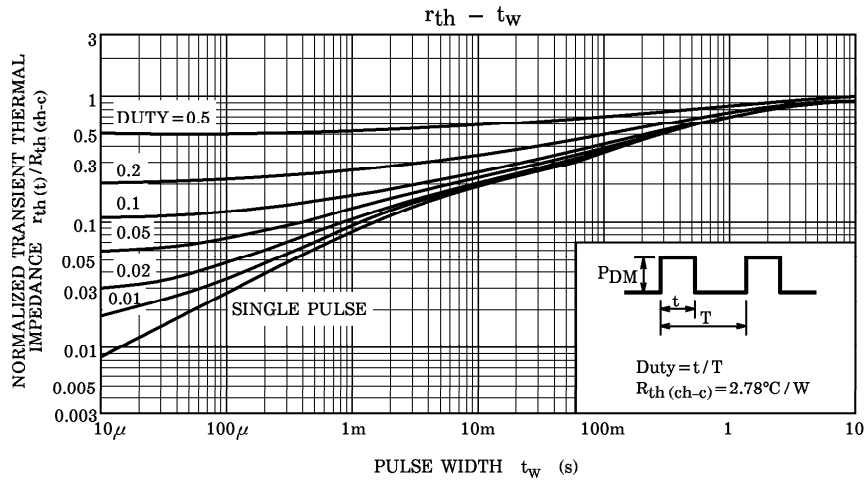
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	15	A
Pulse Drain Reverse Current	IDRP	—	—	—	45	A
Diode Forward Voltage	VDSF	IDR = 15A, VGS = 0V	—	—	−2.0	V
Reverse Recovery Time	t <sub>rr</sub>	IDR = 15A, VGS = 0V	—	180	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dIDR / dt = 100A / μs	—	1.13	—	μC

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Peak  $I_{AR} = 15A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 50V$ ,  $L = 1.2mH$

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