

# MOS FIELD EFFECT TRANSISTOR 2SK3297

## SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

### DESCRIPTION

The 2SK3297 is N-channel DMOS FET device that features a low gate charge and excellent switching characteristics, and designed for high voltage applications such as switching power supply, AC adapter.

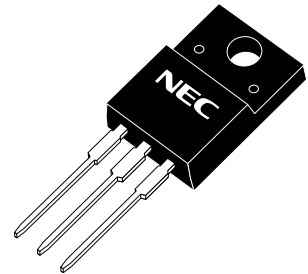
### ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3297	Isolated TO-220

### FEATURES

- Low gate charge  
 $Q_G = 18 \text{ nC TYP. (} V_{DD} = 450 \text{ V, } V_{GS} = 10 \text{ V, } I_D = 5.0 \text{ A)}$
- Gate voltage rating  $\pm 30 \text{ V}$
- Low on-state resistance  
 $R_{DS(ON)} = 1.6 \Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 2.5 \text{ V)}$
- Avalanche capability ratings
- Isolated TO-220 package

(Isolated TO-220)



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	600	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 30$	V
Drain Current(DC) ( $T_C = 25^\circ\text{C}$ )	$I_{D(DC)}$	$\pm 5.0$	A
Drain Current(pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 20$	A
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_{T1}$	2.0	W
Total Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_{T2}$	35	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$
Single Avalanche Current <sup>Note2</sup>	$I_{AS}$	5.0	A
Single Avalanche Energy <sup>Note2</sup>	$E_{AS}$	16.7	mJ

**Notes1.**  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$

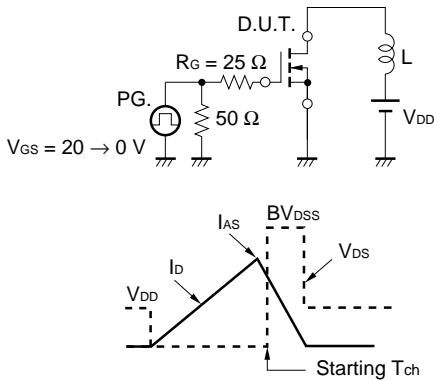
**2.** Starting  $T_{ch} = 25^\circ\text{C}$ ,  $V_{DD} = 150 \text{ V}$ ,  $R_G = 25 \Omega$ ,  $V_{GS} = 20 \rightarrow 0 \text{ V}$

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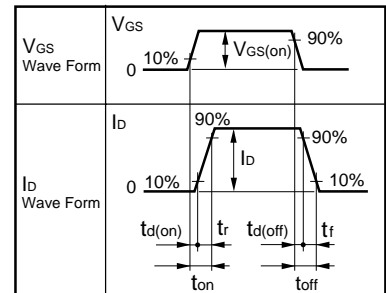
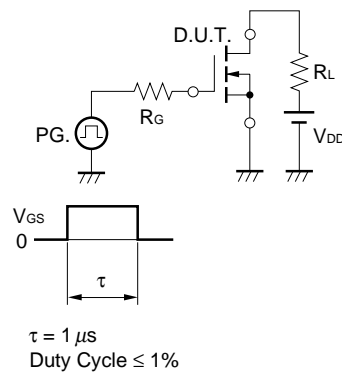
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

Characteristics	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 600 V, V <sub>GS</sub> = 0 V			100	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0 V			±100	nA
Gate to Source Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	2.5		3.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2.5 A	1.5			S
Drain to Source On-state Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.5 A		1.3	1.6	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		750		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		130		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		9.7		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 150 V, I <sub>D</sub> = 2.5 A		17		ns
Rise Time	t <sub>r</sub>	V <sub>GS(on)</sub> = 10 V		3		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		37		ns
Fall Time	t <sub>f</sub>			10		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = 450 V		18		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = 10 V		4		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = 5.0 A		7		nC
Body Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 5.0 A, V <sub>GS</sub> = 0 V		0.9		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 5.0 A, V <sub>GS</sub> = 0 V		1.4		μs
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 50 A/μs		5.3		μC

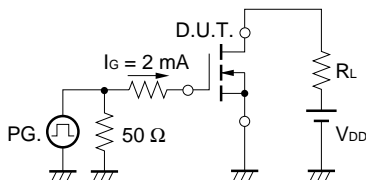
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



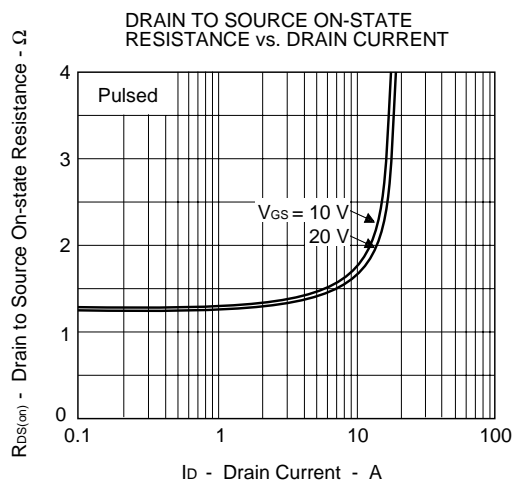
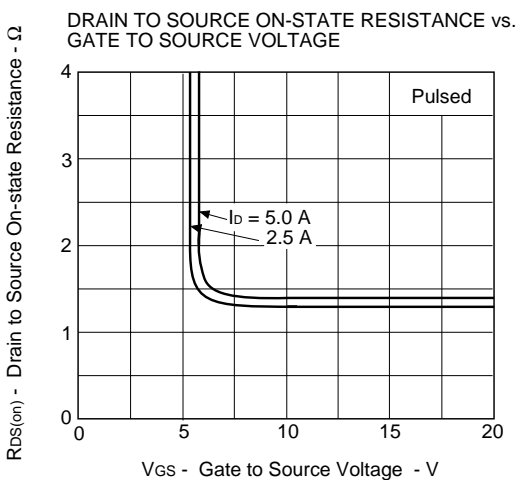
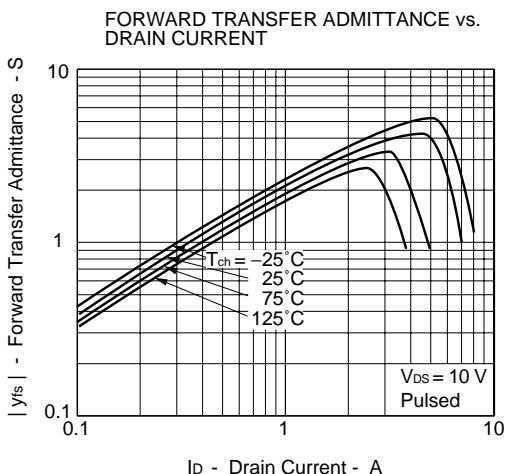
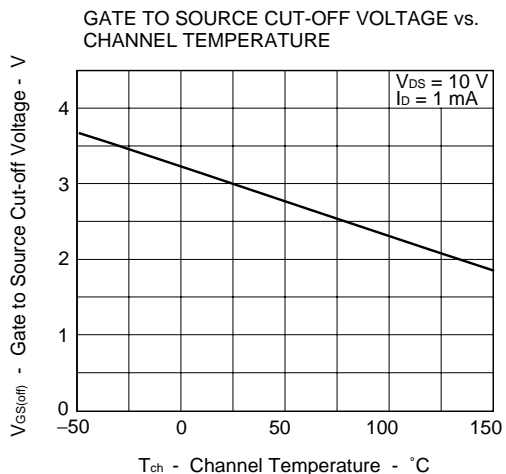
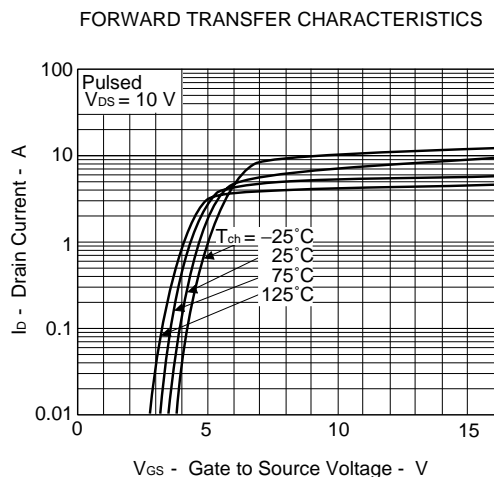
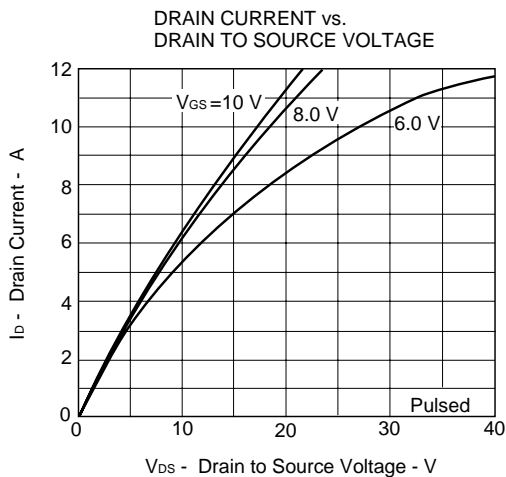
**TEST CIRCUIT 2 SWITCHING TIME**

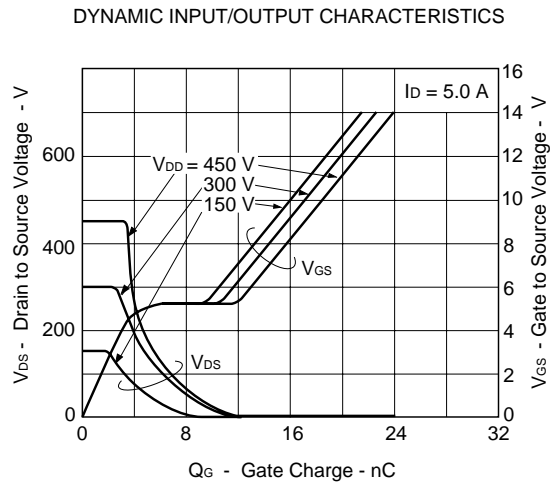
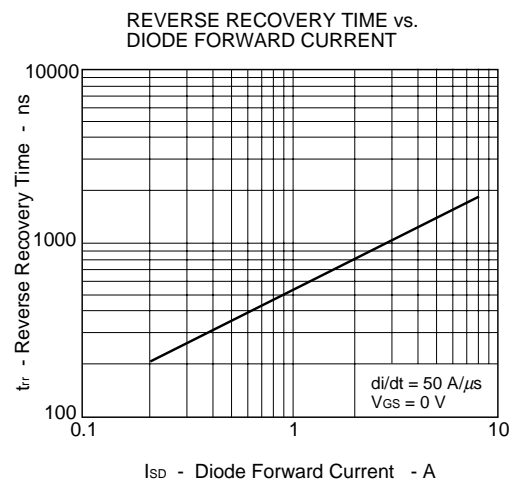
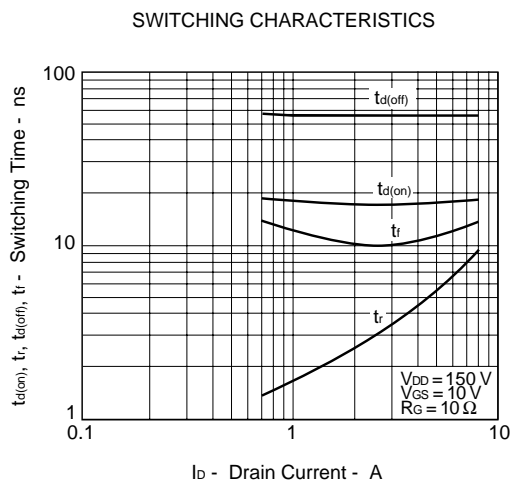
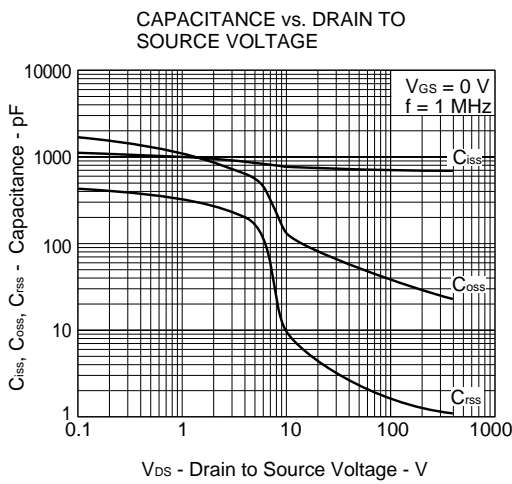
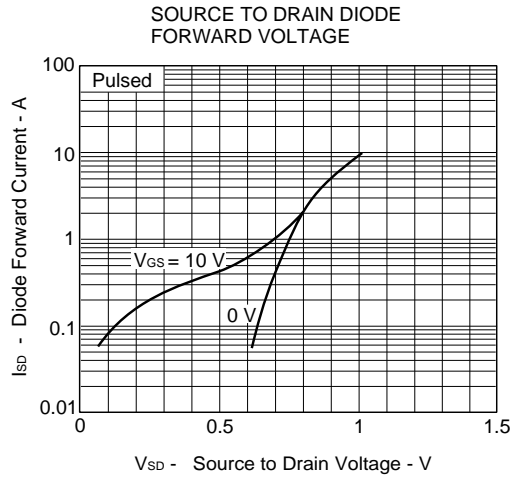
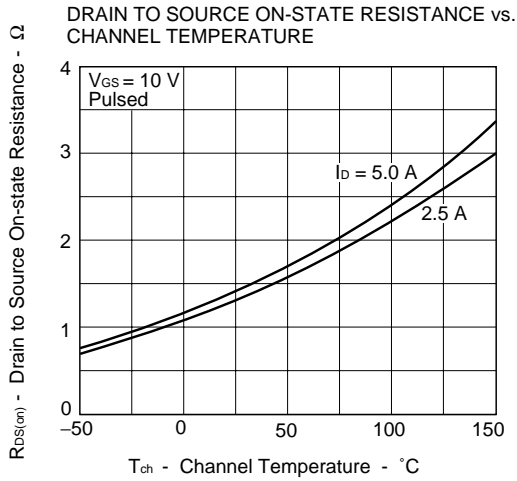


**TEST CIRCUIT 3 GATE CHARGE**

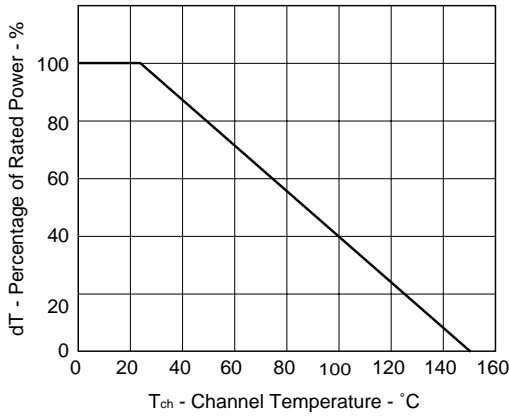


TYPICAL CHARACTERISTICS

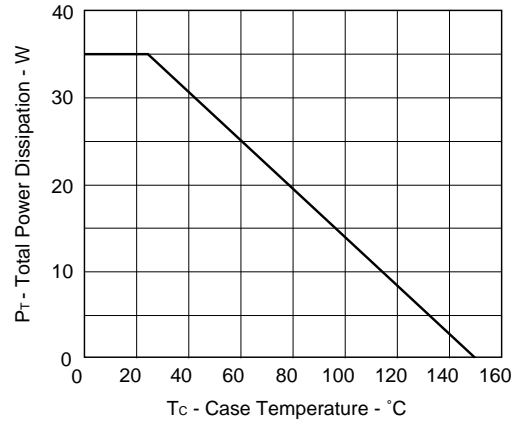




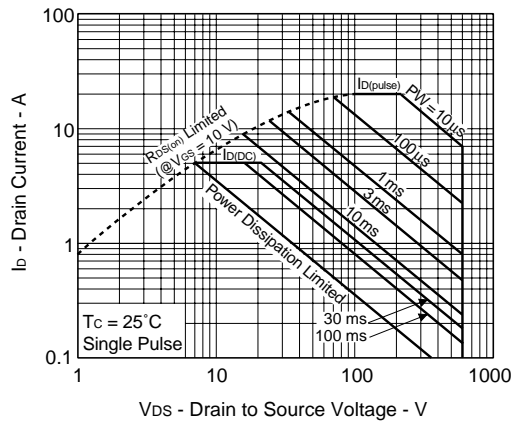
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



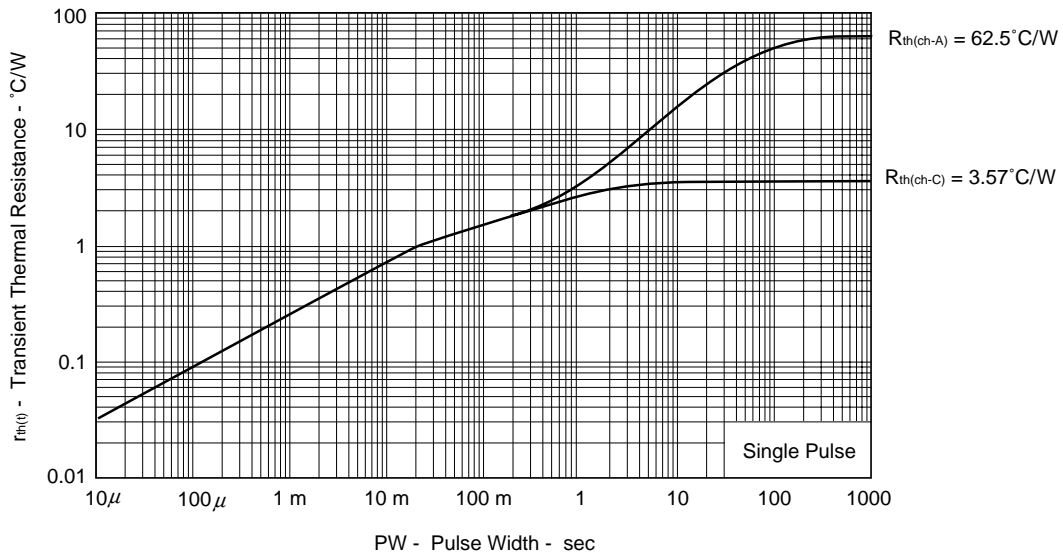
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE

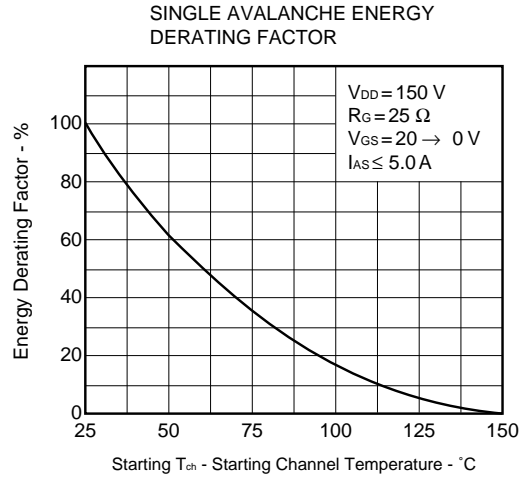
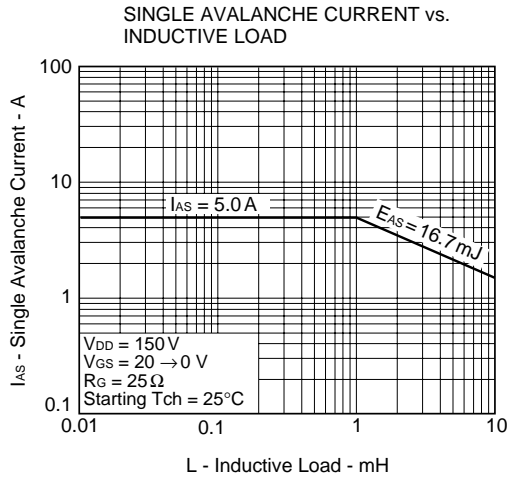


FORWARD BIAS SAFE OPERATING AREA



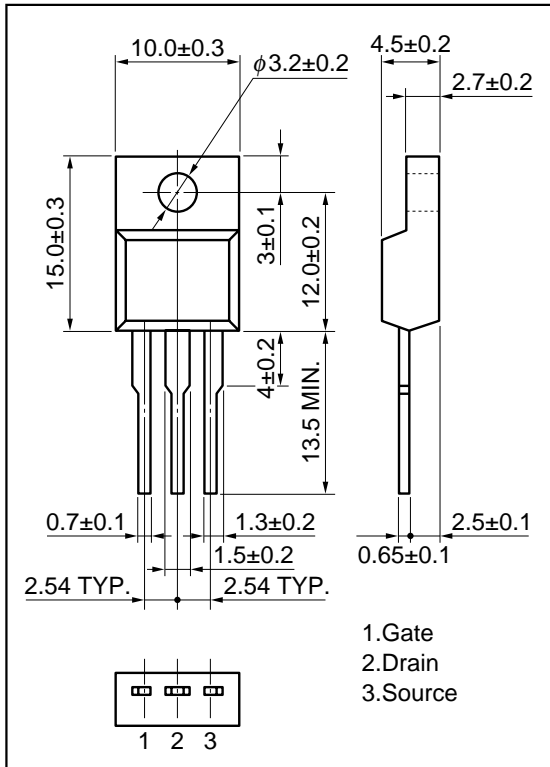
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



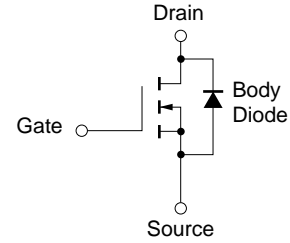


PACKAGE DRAWING(Unit: mm)

Isolated TO-220 (MP-45F)



EQUIVALENT CIRCUIT



**Remark** Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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