

MOS FIELD EFFECT TRANSISTOR

2SK3306

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

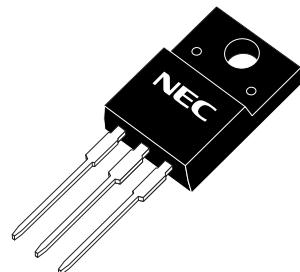
The 2SK3306 is N-Channel DMOS FET device that features a low gate charge and excellent switching characteristics, and designed for high voltage applications such as switching power supply, AC adapter.

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3306	Isolated TO-220 (MP-45F)

FEATURES

(Isolated TO-220)



- Low gate charge :
- ★ $Q_g = 13 \text{ nC TYP.}$ ($V_{DD} = 400 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 5.0 \text{ A}$)
- Gate voltage rating : $\pm 30 \text{ V}$
- Low on-state resistance :
- $R_{DS(on)} = 1.5 \Omega \text{ MAX.}$ ($V_{GS} = 10 \text{ V}$, $I_D = 2.5 \text{ A}$)
- Avalanche capability ratings
- Isolated TO-220(MP-45F) package

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

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	500	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	$V_{GSS(AC)}$	± 30	V
Drain Current (DC)	$I_{D(DC)}$	± 5	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 20	A
Total Power Dissipation ($T_c = 25^\circ\text{C}$)	P_T	35	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_T	2.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
Single Avalanche Current ^{Note2}	I_{AS}	5.0	A
Single Avalanche Energy ^{Note2}	E_{AS}	125	mJ

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

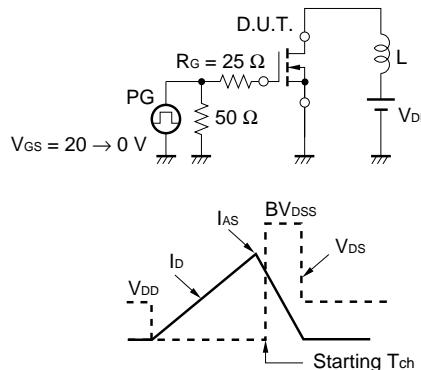
2. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 150 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 20 \text{ V} \rightarrow 0 \text{ V}$

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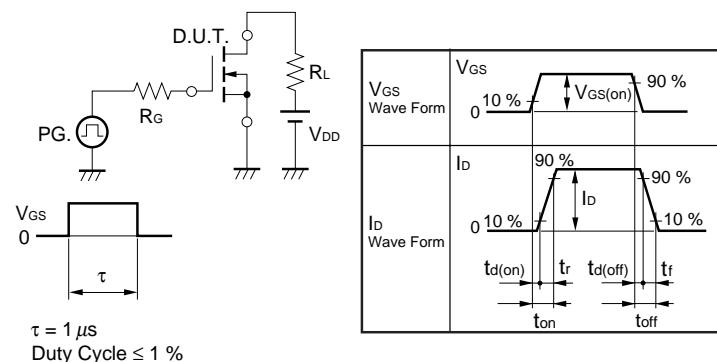
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ C$)

CHARACTERISTICS		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
★	Drain Leakage Current	I_{DSS}			100	μA	$V_{DS} = 500 V, V_{GS} = 0 V$
★	Gate to Source Leakage Current	I_{GSS}			± 100	nA	$V_{GS} = \pm 30 V, V_{DS} = 0 V$
★	Gate to Source Cut-off Voltage	$V_{GS(off)}$	2.5		3.5	V	$V_{DS} = 10 V, I_D = 1 mA$
★	Forward Transfer Admittance	$ y_{fs} $	1.0	3.0		S	$V_{DS} = 10 V, I_D = 2.5 A$
★	Drain to Source On-state Resistance	$R_{DS(on)}$		1.35	1.5	Ω	$V_{GS} = 10 V, I_D = 2.5 A$
★	Input Capacitance	C_{iss}		700		pF	$V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz$
★	Output Capacitance	C_{oss}		115		pF	
★	Reverse Transfer Capacitance	C_{rss}		6		pF	
★	Turn-on Delay Time	$t_{d(on)}$		16		ns	
★	Rise Time	t_r		3		ns	$V_{DD} = 150 V, I_D = 2.5 A, V_{GS(on)} = 10 V, R_G = 10 \Omega, R_L = 60 \Omega$
★	Turn-off Delay Time	$t_{d(off)}$		33		ns	
★	Fall Time	t_f		5.5		ns	
★	Total Gate Charge	Q_G		13		nC	
★	Gate to Source Charge	Q_{GS}		4		nC	$V_{DD} = 400 V, V_{GS(on)} = 10 V, I_D = 5.0 A$
★	Gate to Drain Charge	Q_{GD}		4.5		nC	
★	Body Diode Forward Voltage	$V_{F(S-D)}$		1.0		V	
★	Reverse Recovery Time	t_{rr}		0.7		μs	
★	Reverse Recovery Charge	Q_{rr}		3.3		μC	

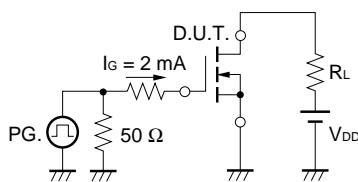
TEST CIRCUIT 1 AVALANCHE CAPABILITY

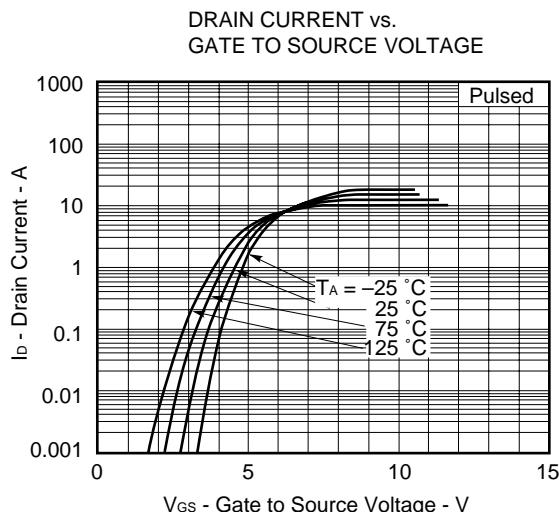
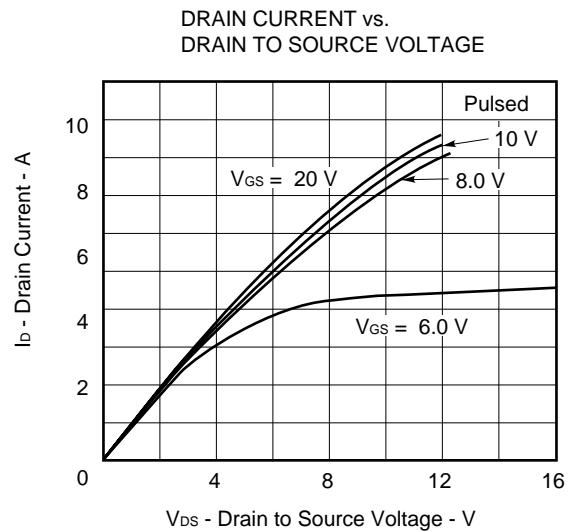
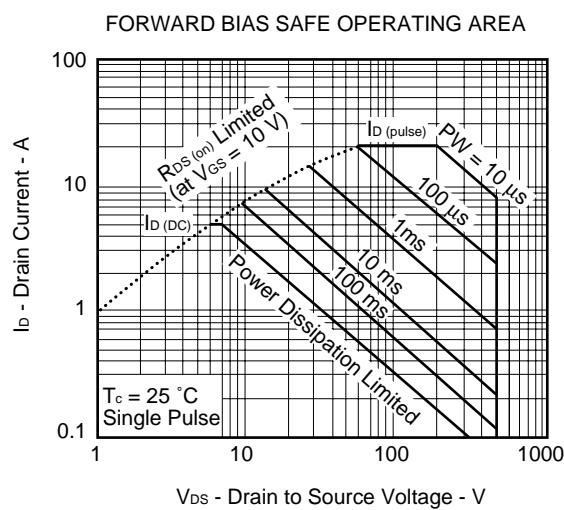
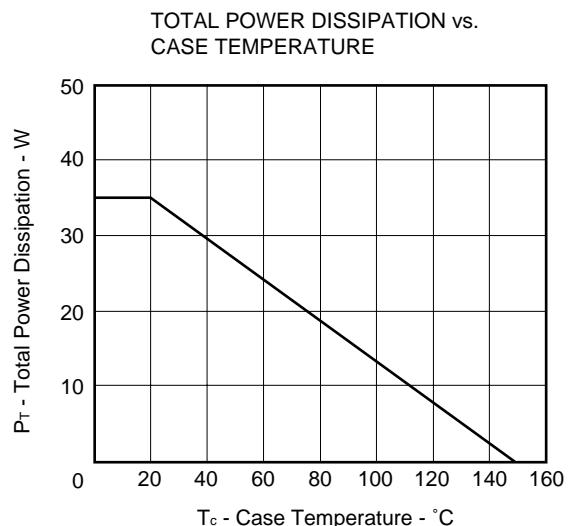
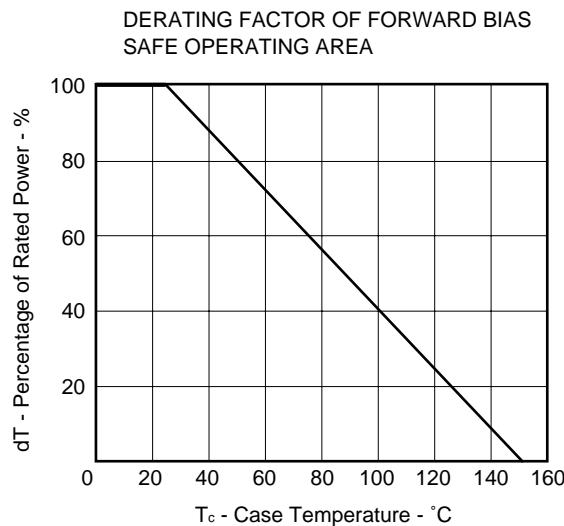


TEST CIRCUIT 2 SWITCHING TIME

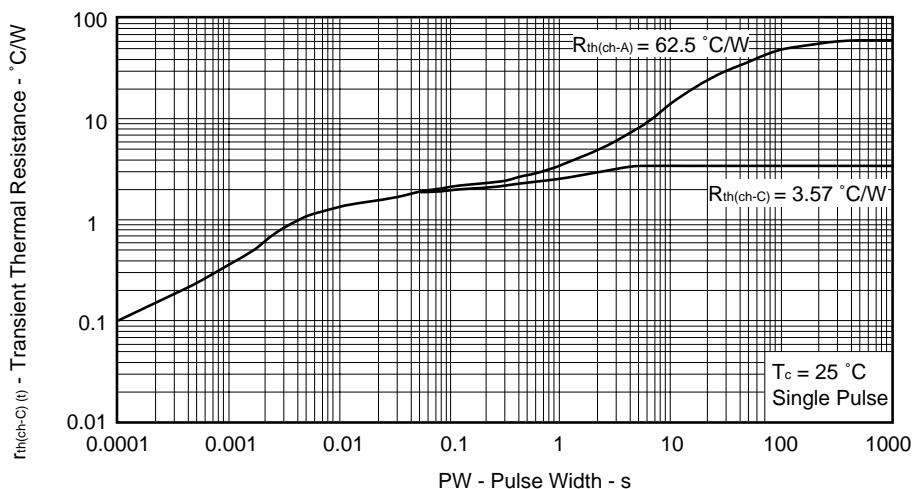


TEST CIRCUIT 3 GATE CHARGE

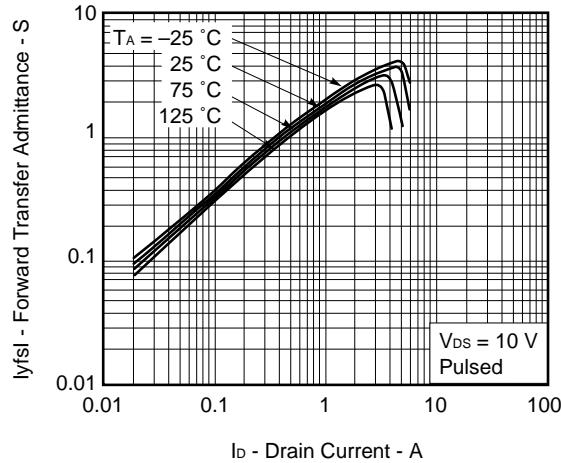


TYPICAL CHARACTERISTICS($T_A = 25^\circ\text{C}$)

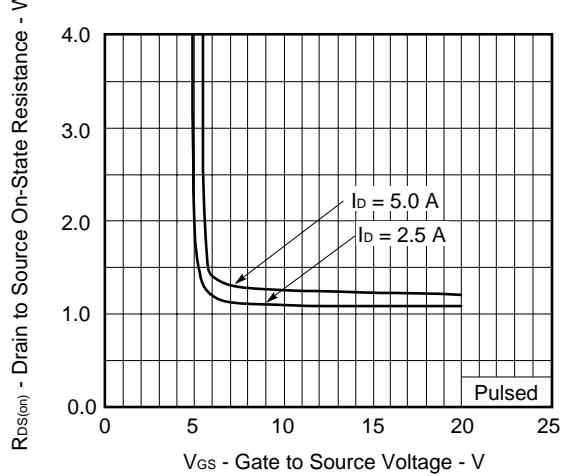
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



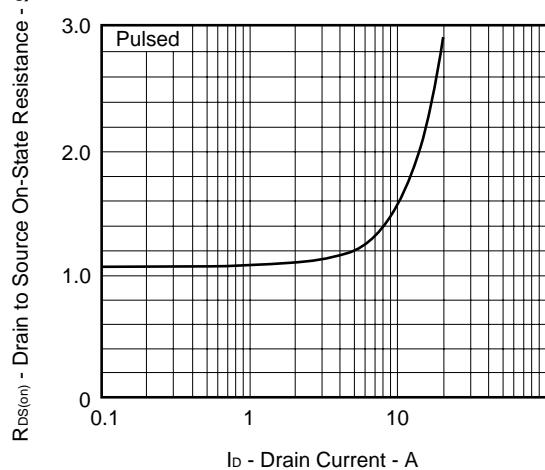
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



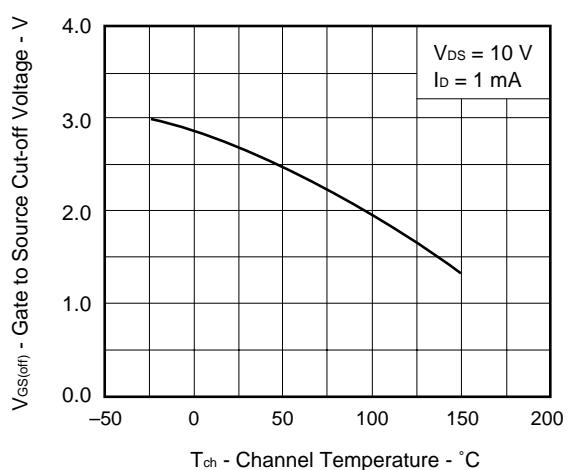
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

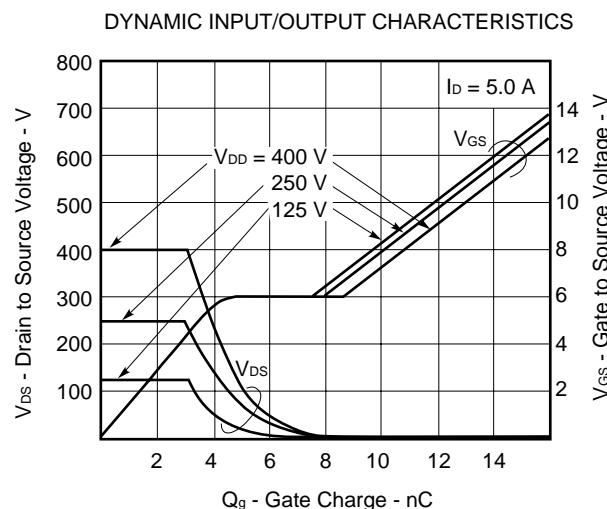
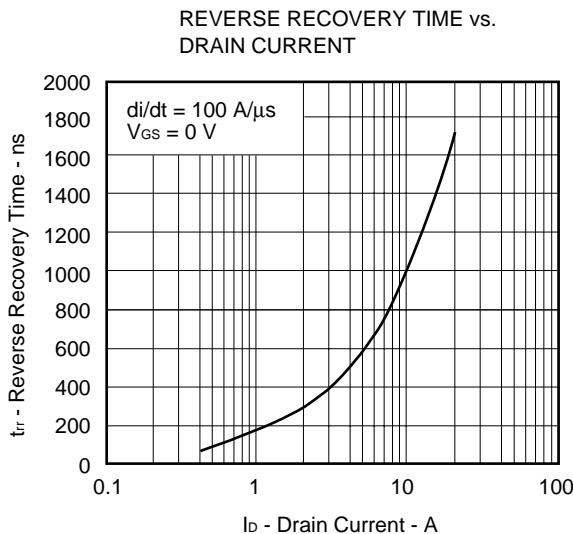
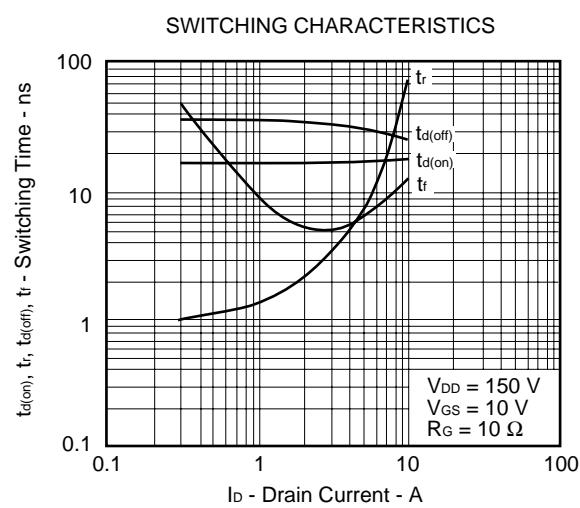
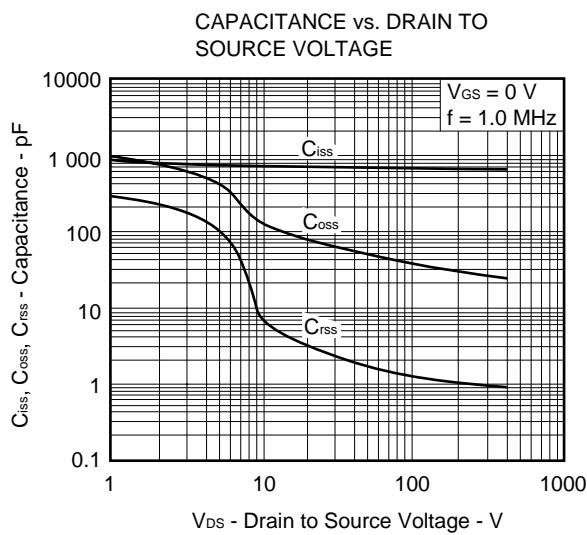
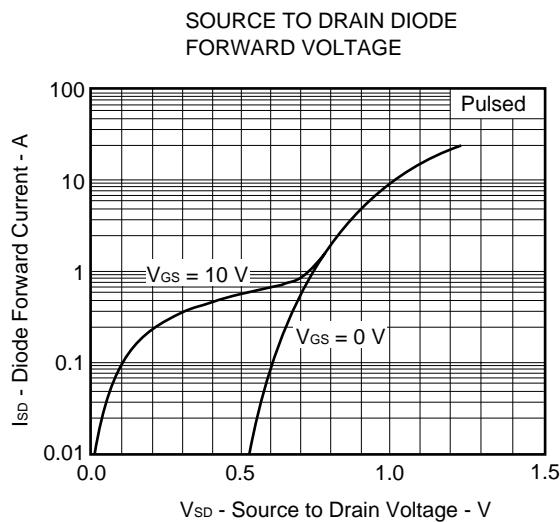
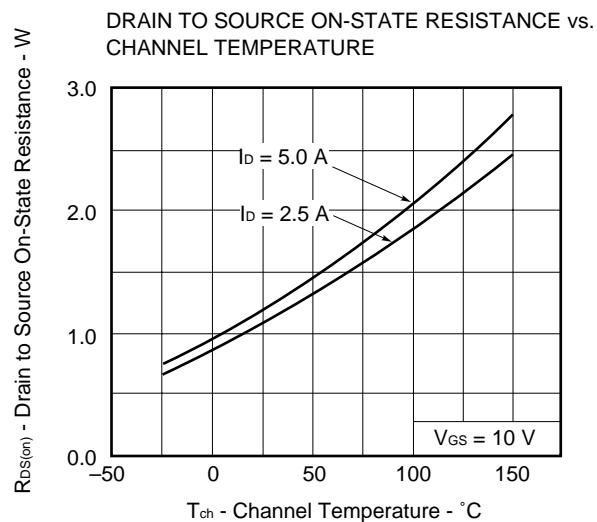


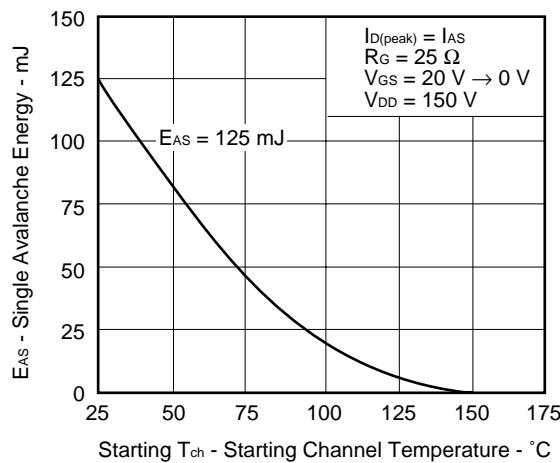
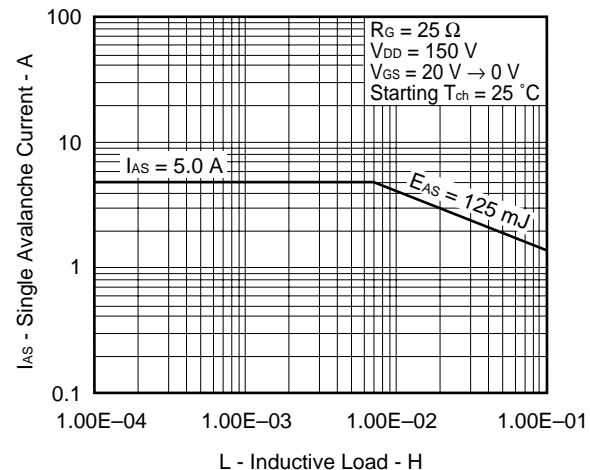
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE

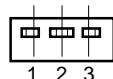
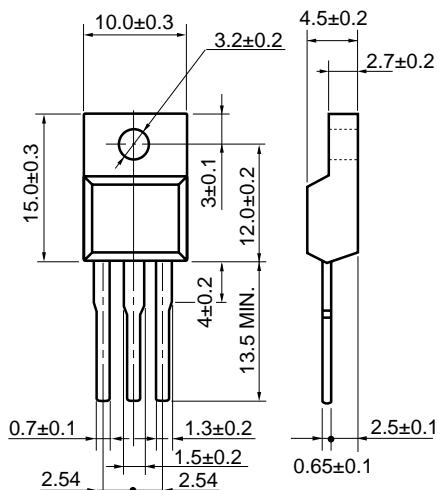




SINGLE AVALANCHE ENERGY vs
STARTING CHANNEL TEMPERATURESINGLE AVALANCHE CURRENT vs
INDUCTIVE LOAD

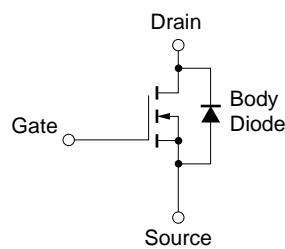
PACKAGE DRAWING (Unit: mm)

Isolated TO-220(MP-45F)



1. Gate
2. Drain
3. Source

EQUIVALENT CIRCUIT



★ **Remark** Strong electric field, when exposed to this device, 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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