

MOS FIELD EFFECT TRANSISTOR

2SK3455B

SWITCHING  
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3455B is N-channel MOS 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.

FEATURES

- Low gate charge  
 $Q_G = 30 \text{ nC TYP. (} V_{DD} = 400 \text{ V, } V_{GS} = 10 \text{ V, } I_D = 12 \text{ A)}$
- Gate voltage rating :  $\pm 30 \text{ V}$
- Low on-state resistance  
 $R_{DS(on)} = 0.60 \Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 6.0 \text{ A)}$
- Avalanche capability ratings
- Isolated TO-220 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 ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 30$	V
Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )	$I_{D(DC)}$	$\pm 12$	A
Drain Current (Pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 36$	A
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_{T1}$	2.0	W
Total Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_{T2}$	50	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>	$I_{AS}$	12	A
Single Avalanche Energy <sup>Note2</sup>	$E_{AS}$	103	mJ

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

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

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3455B-S17-AY <sup>Note</sup>	Isolated TO-220

Note Pb-free (This product does not contain Pb in External electrode.)

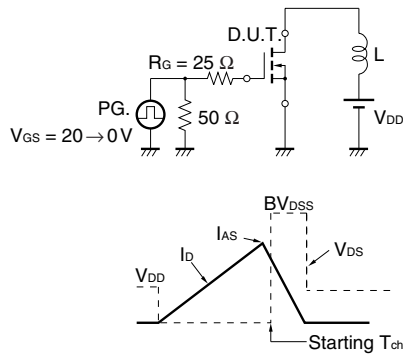
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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

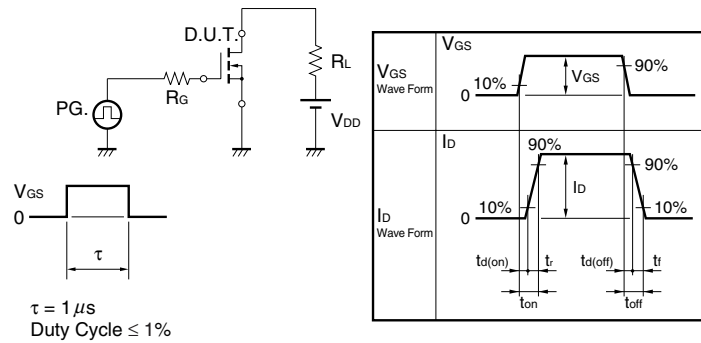
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>bss</sub>	V <sub>DS</sub> = 500 V, V <sub>GS</sub> = 0 V			100	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0 V			±100	nA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	2.5		3.5	V
Forward Transfer Admittance <sup>Note</sup>	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 6.0 A	2.0			S
Drain to Source On-state Resistance <sup>Note</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 6.0 A		0.50	0.60	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		1800		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		280		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		8		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 150 V, I <sub>D</sub> = 6.0 A		24		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 10 V		14		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		36		ns
Fall Time	t <sub>f</sub>			7		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = 400 V		30		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = 10 V		10		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = 12 A		11		nC
Body Diode Forward Voltage <sup>Note</sup>	V <sub>F(S-D)</sub>	I <sub>F</sub> = 12 A, V <sub>GS</sub> = 0 V		0.9		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 12 A, V <sub>GS</sub> = 0 V		440		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		2.6		μC

**Note** Pulsed

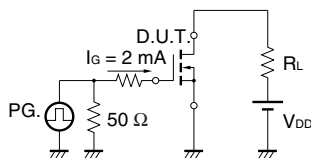
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



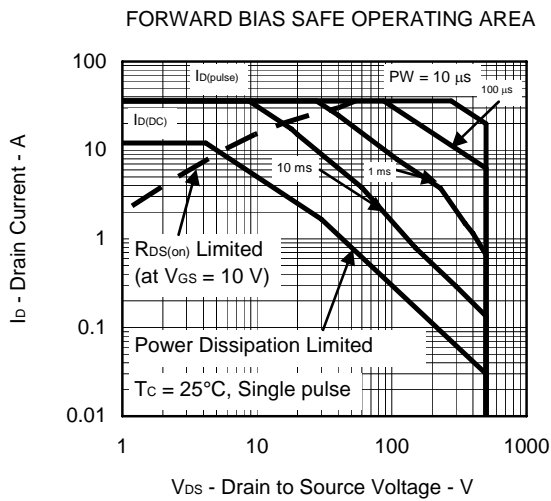
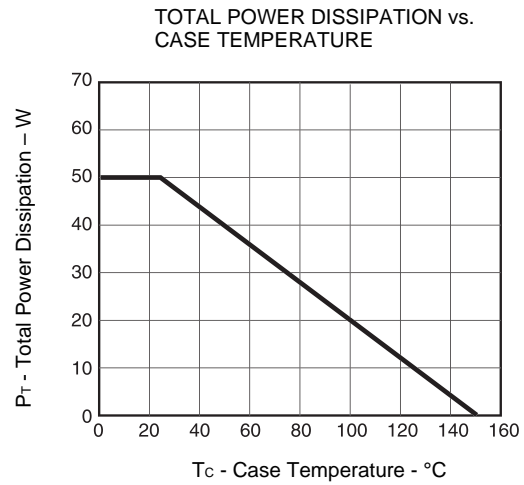
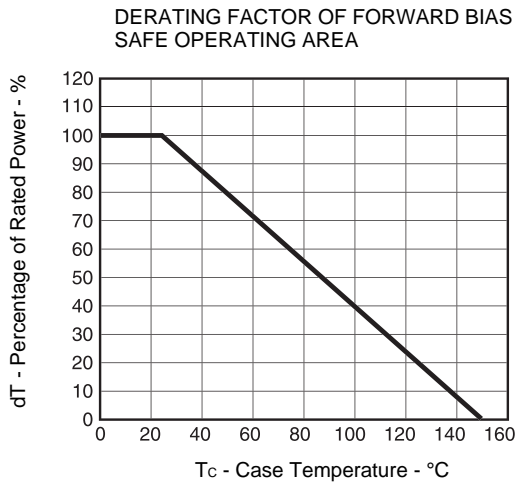
**TEST CIRCUIT 2 SWITCHING TIME**



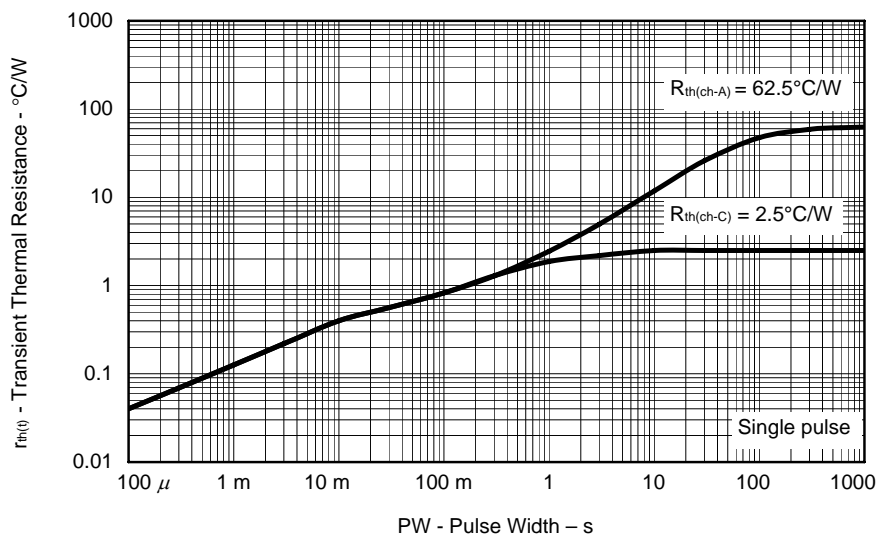
**TEST CIRCUIT 3 GATE CHARGE**



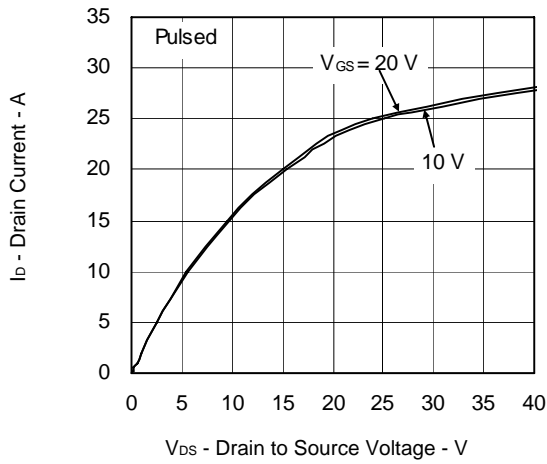
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



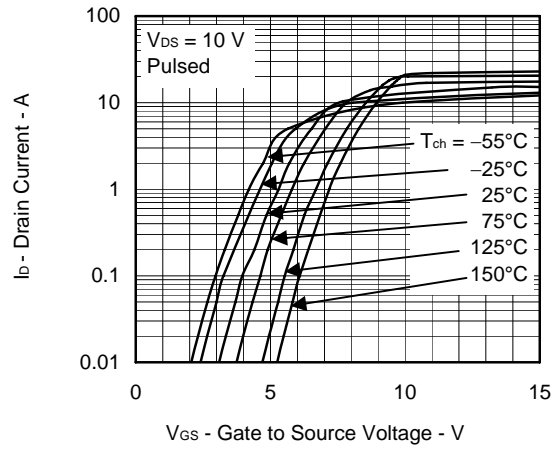
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



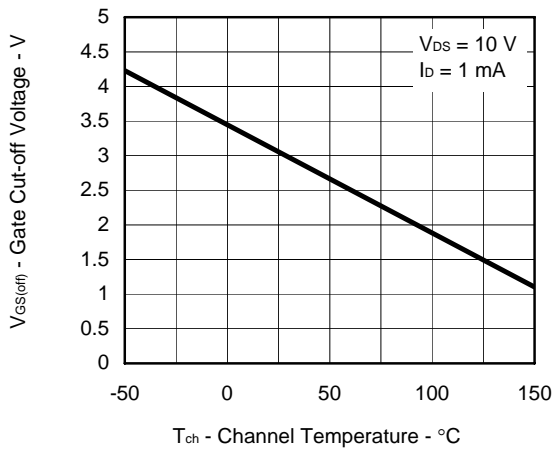
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



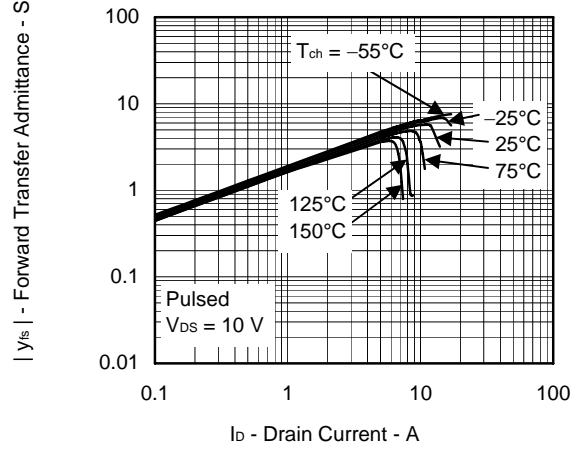
FORWARD TRANSFER CHARACTERISTICS



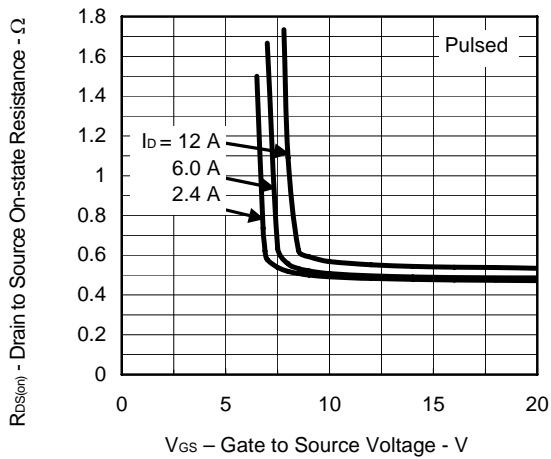
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



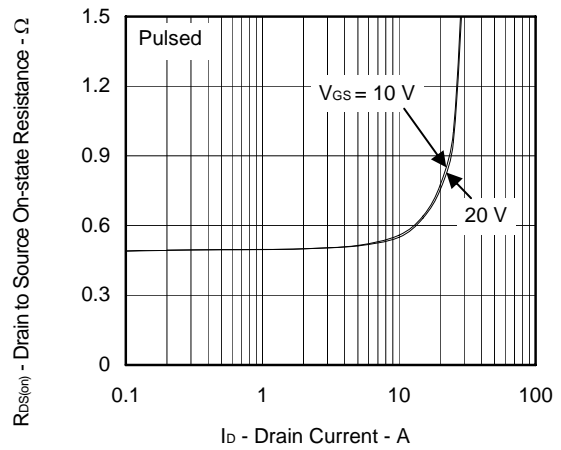
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



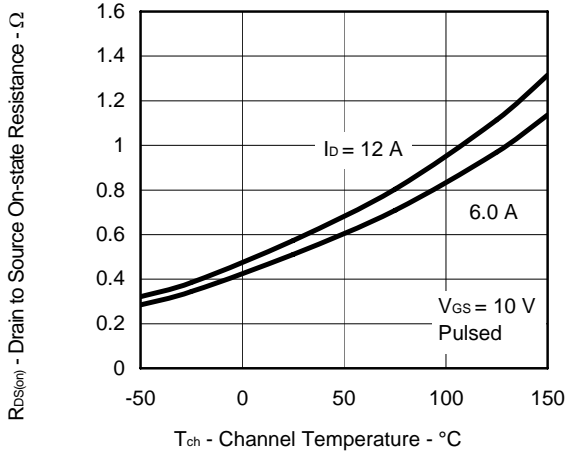
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



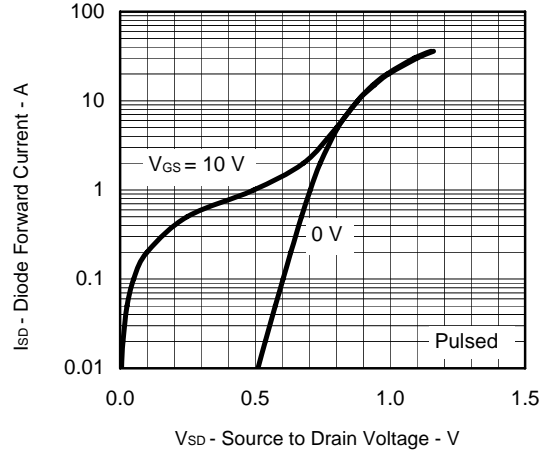
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



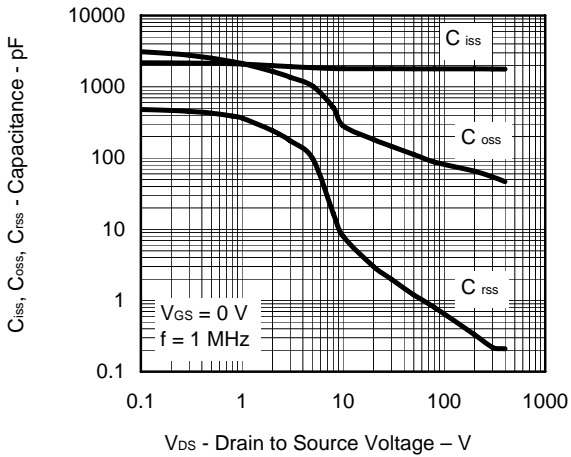
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



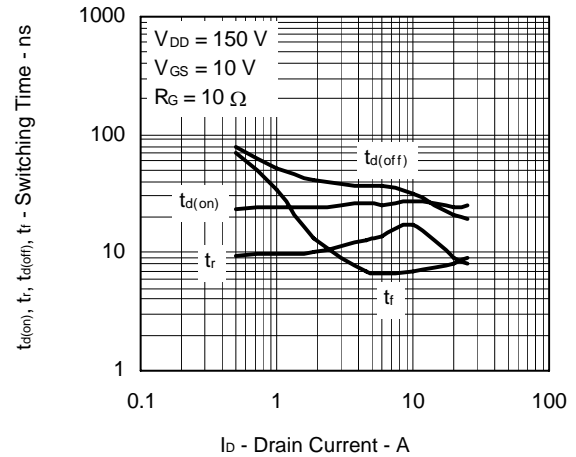
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



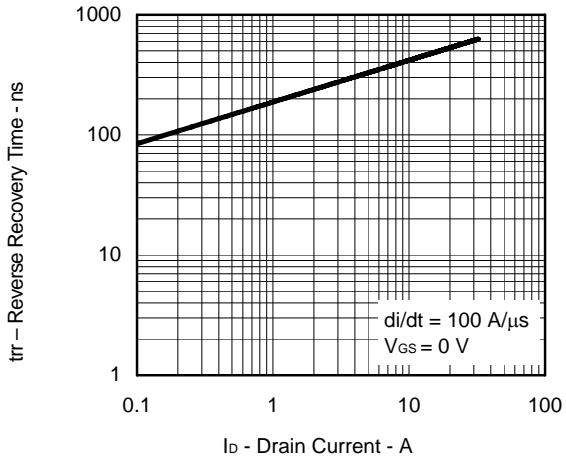
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



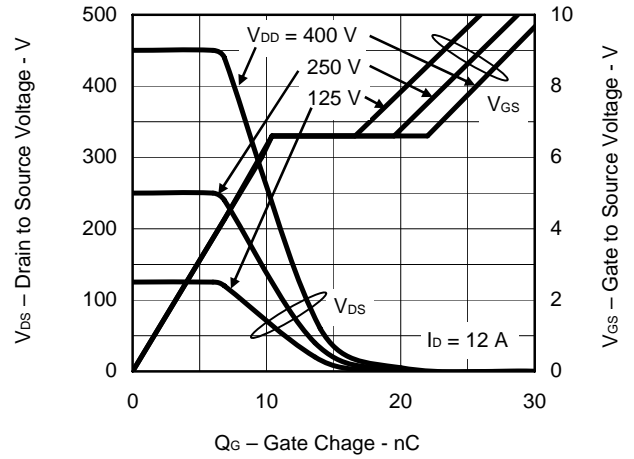
SWITCHING CHARACTERISTICS



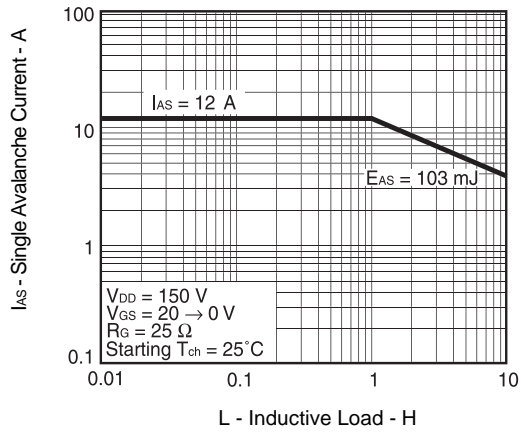
REVERSE RECOVERY TIME vs. DRAIN CURRENT



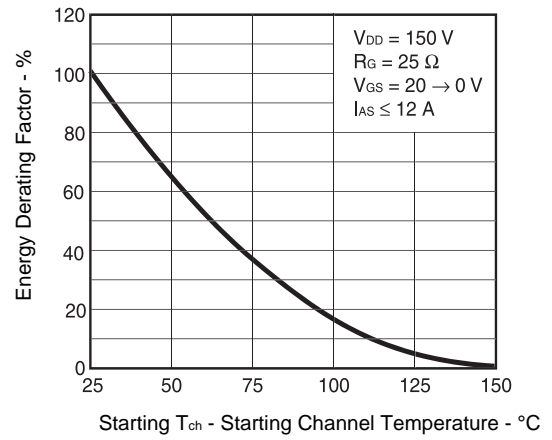
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD

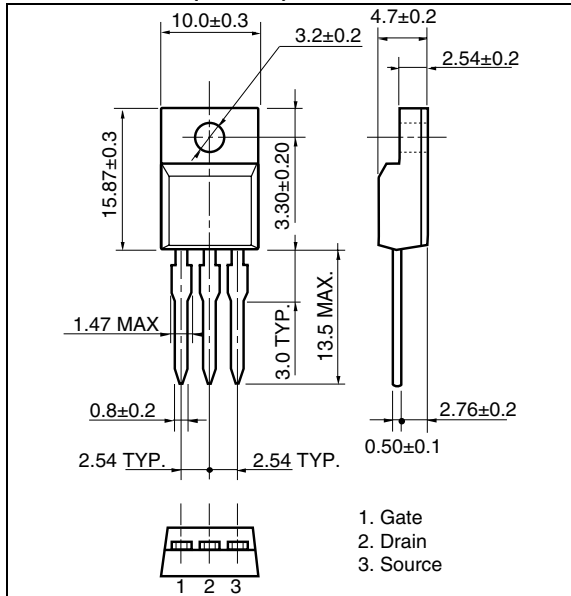


SINGLE AVALANCHE ENERGY DERATING FACTOR

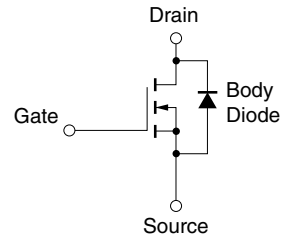


PACKAGE DRAWING (Unit: mm)

Isolated TO-220 (MP-45F)



EQUIVALENT CIRCUIT



**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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