

DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR

2SK4082

SWITCHING
N-CHANNEL POWER MOS FET

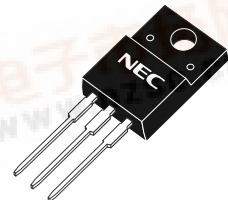
DESCRIPTION

The 2SK4082 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 on-state resistance
 $R_{DS(on)} = 2.2 \Omega$ MAX. ($V_{GS} = 10 \text{ V}$, $I_D = 1.8 \text{ A}$)
- Low gate charge
 $Q_G = 13 \text{ nC}$ TYP. ($V_{DD} = 450 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.5 \text{ A}$)
- Gate voltage rating: $\pm 30 \text{ V}$
- Avalanche capability ratings

(Isolated TO-220)



ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
2SK4082-S17-AY ^{Note}	Pure Sn (Tin)	Tube 50 p/tube	Isolated TO-220 (MP-45F) typ. 2.2 g

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

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}	± 30	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)}$	± 3.5	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 14	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	35	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_{T2}	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}	2	A
Single Avalanche Energy ^{Note2}	E_{AS}	240	mJ

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

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

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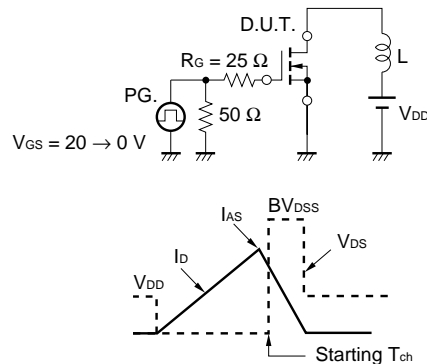


ELECTRICAL CHARACTERISTICS (T_A = 25°C)

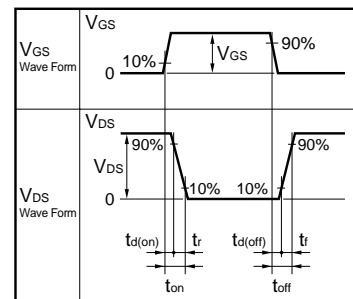
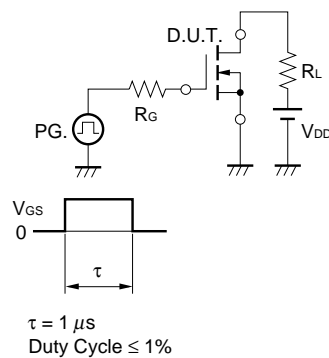
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 600 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30 V, V _{DS} = 0 V			±100	nA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	2.5	3.0	3.5	V
Forward Transfer Admittance Note	y _{fs}	V _{DS} = 10 V, I _D = 1.8 A	0.8			S
Drain to Source On-state Resistance Note	R _{DS(on)}	V _{GS} = 10 V, I _D = 1.8 A		1.7	2.2	Ω
Input Capacitance	C _{iss}	V _{DS} = 10 V,		550		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		250		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		49		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 150 V, I _D = 1.8 A,		13		ns
Rise Time	t _r	V _{GS} = 10 V,		10		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		26		ns
Fall Time	t _f			21		ns
Total Gate Charge	Q _G	V _{DD} = 450 V,		13		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V,		4.3		nC
Gate to Drain Charge	Q _{GD}	I _D = 3.5 A		5.2		nC
Body Diode Forward Voltage Note	V _{F(S-D)}	I _F = 3.5 A, V _{GS} = 0 V		0.87	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 3.5 A, V _{GS} = 0 V,		220		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		840		nC

Note Pulsed

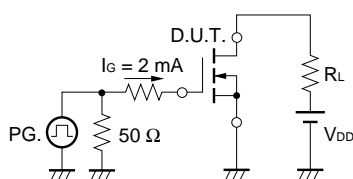
TEST CIRCUIT 1 AVALANCHE CAPABILITY



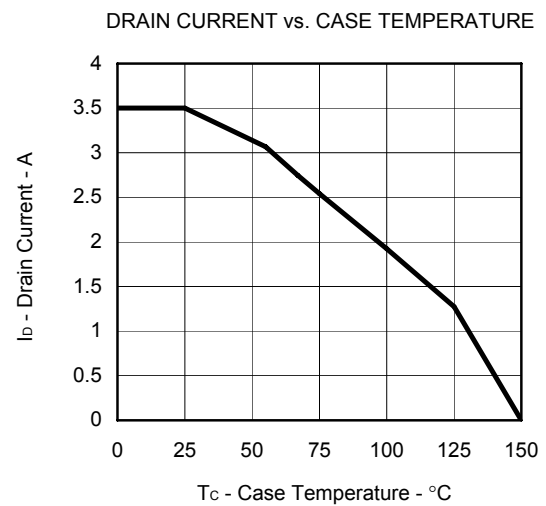
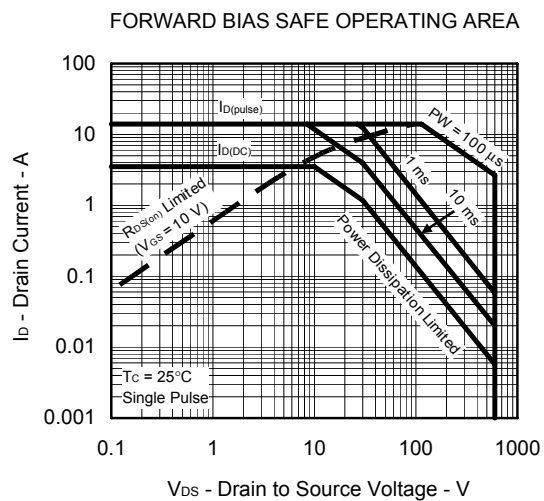
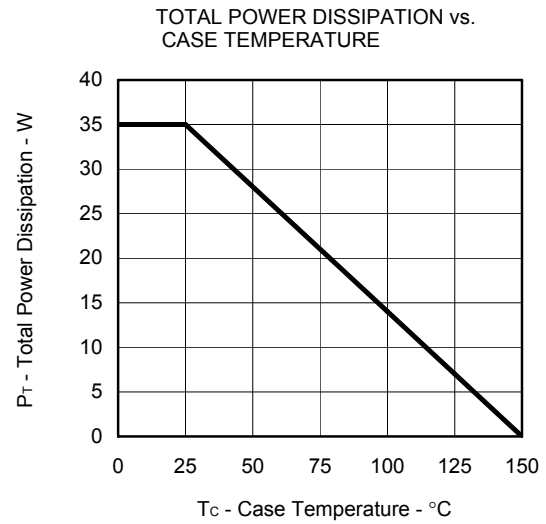
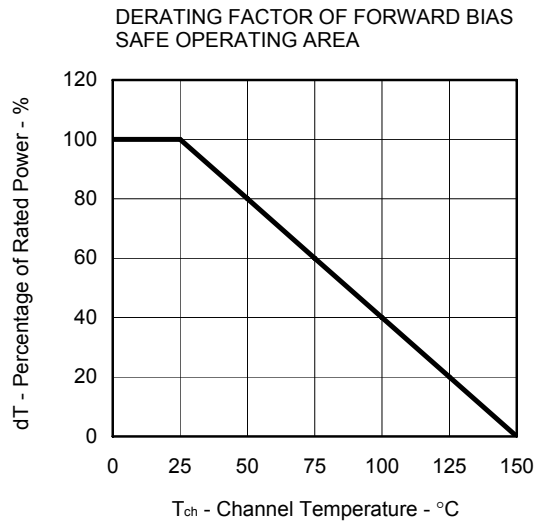
TEST CIRCUIT 2 SWITCHING TIME



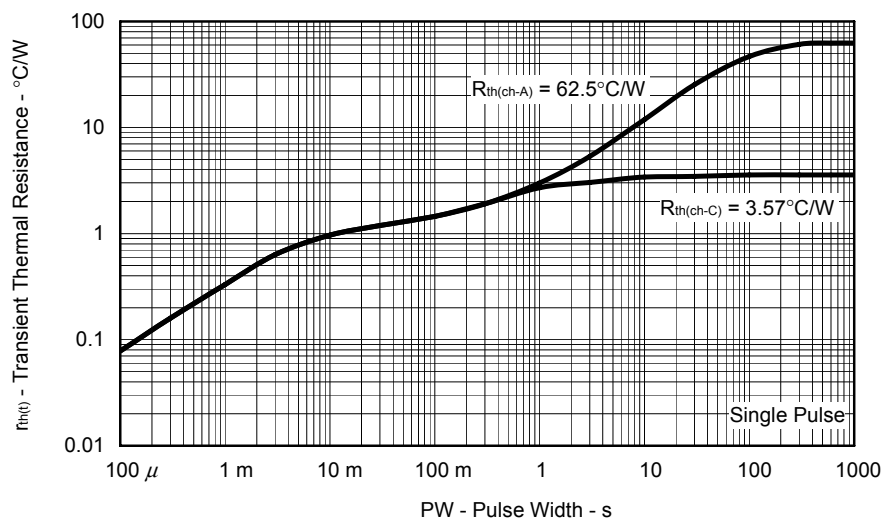
TEST CIRCUIT 3 GATE CHARGE



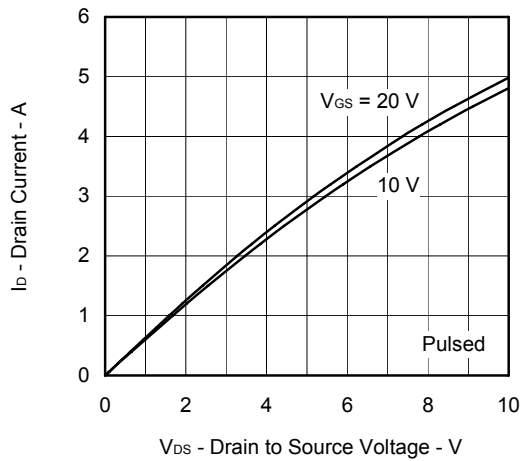
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



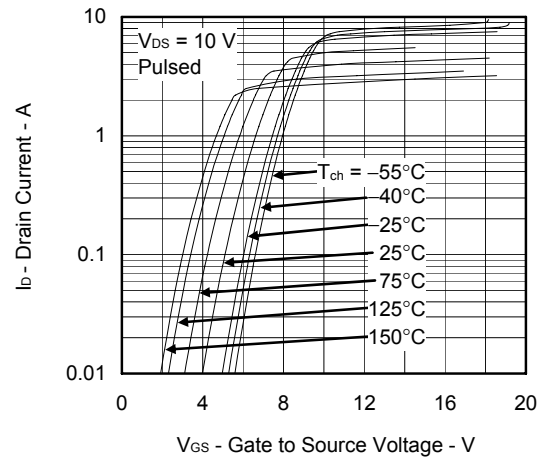
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



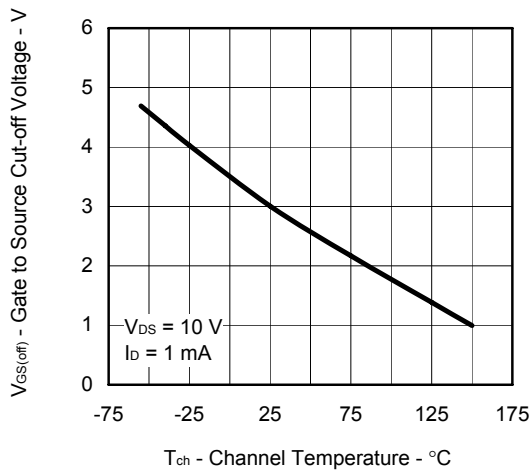
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



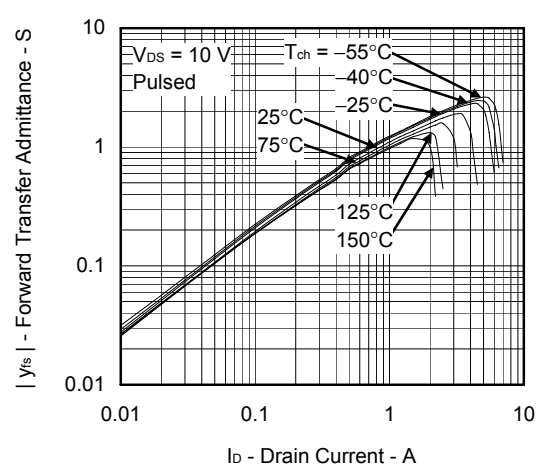
FORWARD TRANSFER CHARACTERISTICS



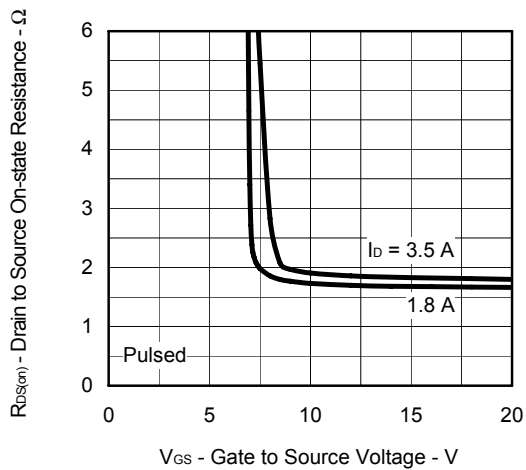
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



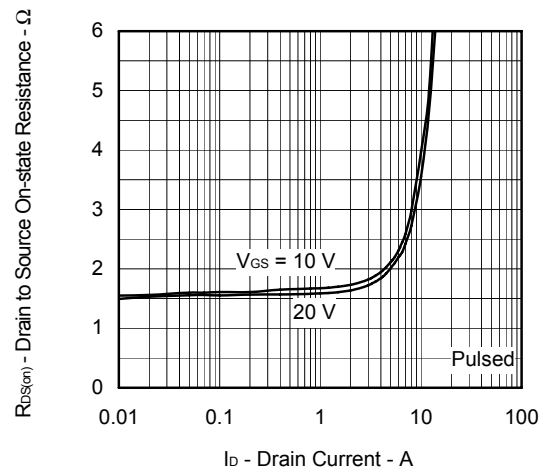
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



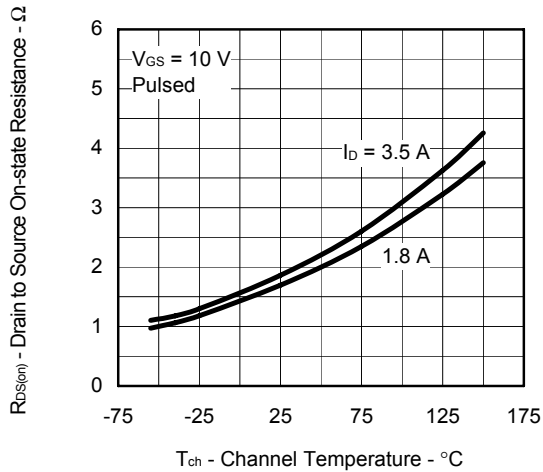
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



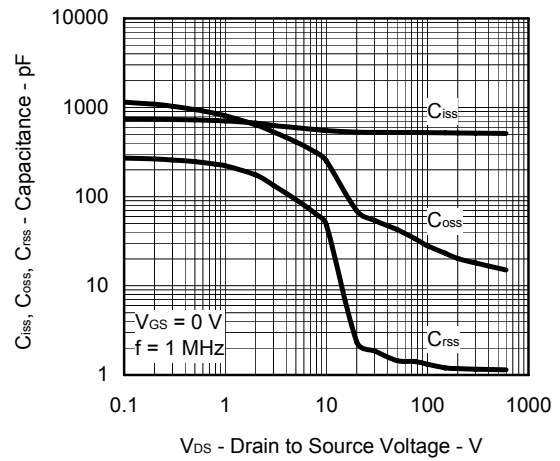
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



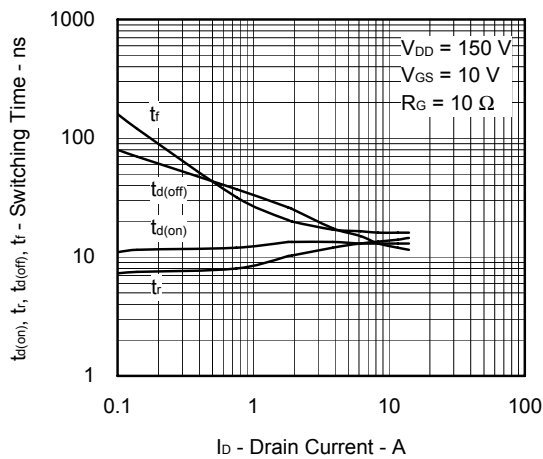
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



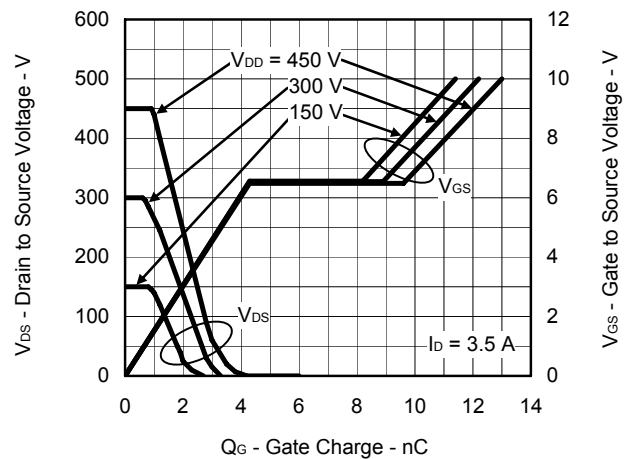
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



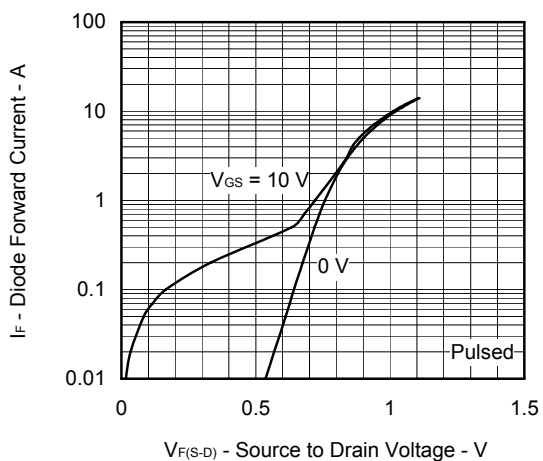
SWITCHING CHARACTERISTICS



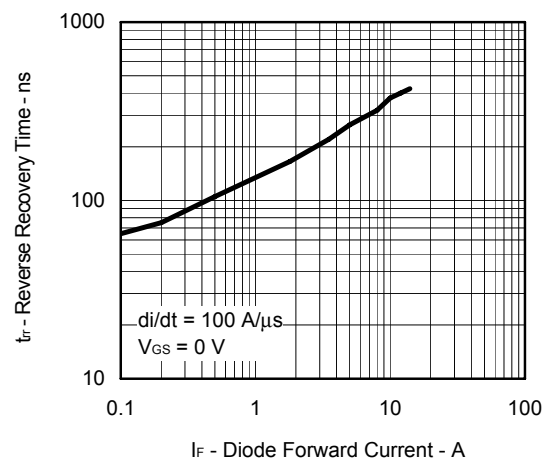
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

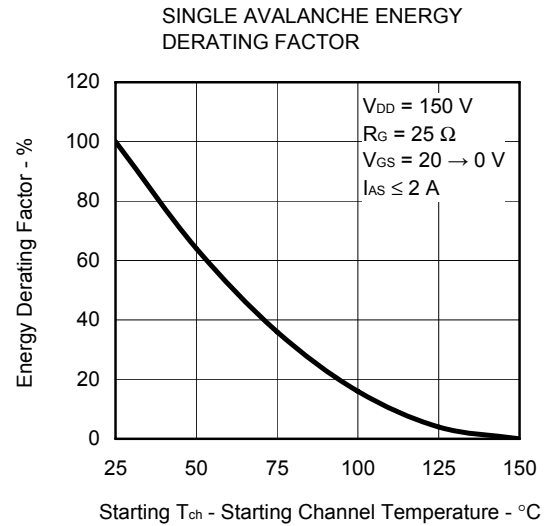
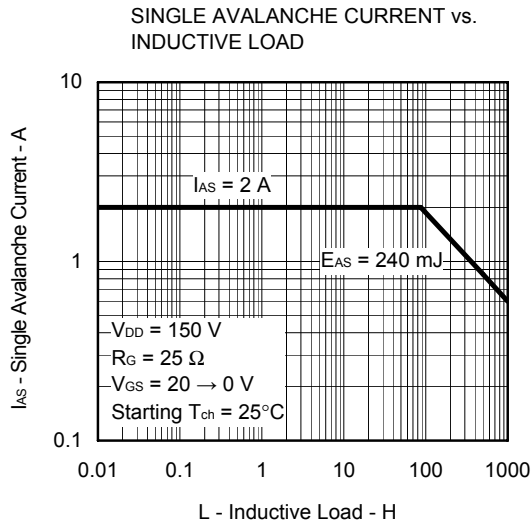


SOURCE TO DRAIN DIODE FORWARD VOLTAGE



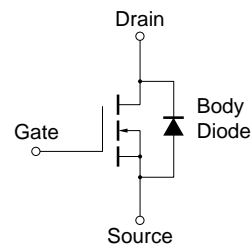
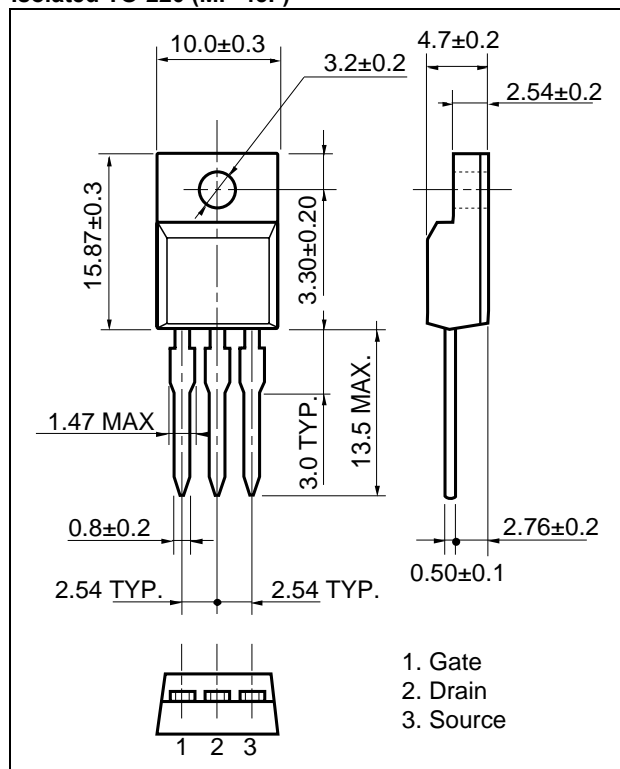
REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT





PACKAGE DRAWING (Unit: mm)

Isolated TO-220 (MP-45F)



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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