

MOS FIELD EFFECT TRANSISTOR

2SK3635

SWITCHING

N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3635 is N-channel MOS FET device that features a low on-state resistance and excellent switching characteristics, and designed for high voltage applications such as DC/DC converter.

★ ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3635	TO-251 (MP-3)
2SK3635-Z	TO-252 (MP-3Z)

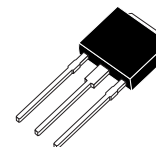
FEATURES

- High voltage: $V_{DS} = 200\text{ V}$
- Gate voltage rating: $\pm 30\text{ V}$
- Low on-state resistance
 $R_{DS(on)} = 0.43\ \Omega\text{ MAX.}$ ($V_{GS} = 10\text{ V}$, $I_D = 4.0\text{ A}$)
- Low C_{iss} : $C_{iss} = 390\text{ pF TYP.}$
- Built-in gate protection diode
- TO-251/TO-252 package
- Avalanche capability rated

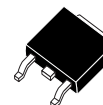
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage ($V_{GS} = 0\text{ V}$)	V_{DSS}	200	V
Gate to Source Voltage ($V_{DS} = 0\text{ V}$)	V_{GSS}	± 30	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)}$	± 8.0	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 24	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	24	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_{T2}	1.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55\text{ to }+150$	$^\circ\text{C}$
Single Avalanche Current ^{Note2}	I_{AS}	8	A
Single Avalanche Energy ^{Note2}	E_{AS}	6.4	mJ
Repetitive Avalanche Current ^{Note3}	I_{AR}	8	A
Repetitive Avalanche Energy ^{Note3}	E_{AR}	2.4	mJ

(TO-251)



(TO-252)



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

2. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 100\text{ V}$, $R_G = 25\ \Omega$, $V_{GS} = 20 \rightarrow 0\text{ V}$, $L = 100\ \mu\text{H}$

3. $T_{ch} \leq 125^\circ\text{C}$, $R_G = 25\ \Omega$, $V_{DD} = 100\text{ V}$

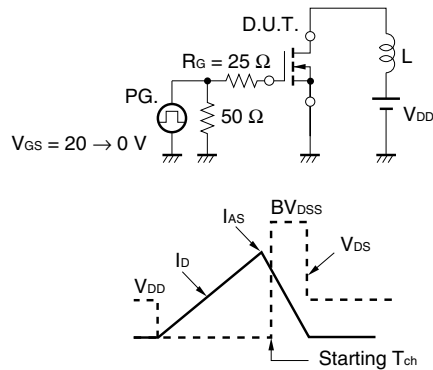
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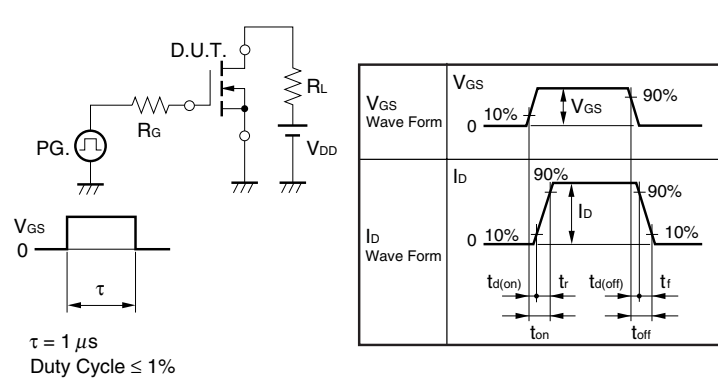
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 200 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	2.5	3.5	4.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 4.0 A	3	5		S
Drain to Source On-state Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 4.0 A		0.34	0.43	Ω
Input Capacitance	C _{iss}	V _{DS} = 10 V		390		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		95		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		45		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 100 V, I _D = 4.0 A		5		ns
Rise Time	t _r	V _{GS} = 10 V		7		ns
Turn-off Delay Time	t _{d(off)}	R _G = 0 Ω		19		ns
Fall Time	t _f			6		ns
Total Gate Charge	Q _G	V _{DD} = 160 V		12		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V		2		nC
Gate to Drain Charge	Q _{GD}	I _D = 8.0 A		6		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 8 A, V _{GS} = 0 V		1.0		V
Reverse Recovery Time	t _{rr}	I _F = 8 A, V _{GS} = 0 V		110		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		360		nC

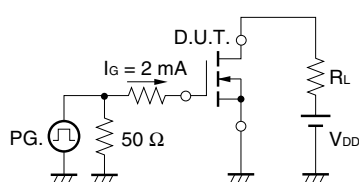
TEST CIRCUIT 1 AVALANCHE CAPABILITY



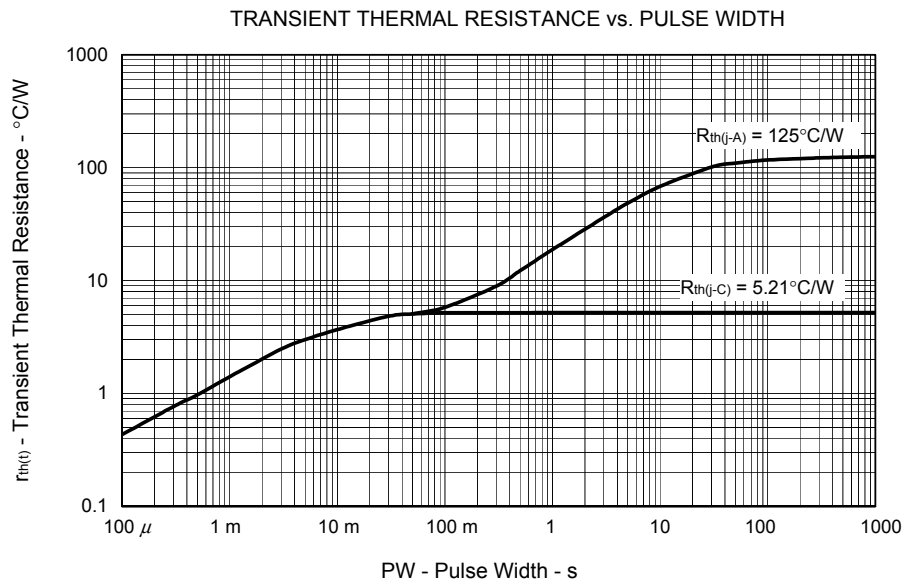
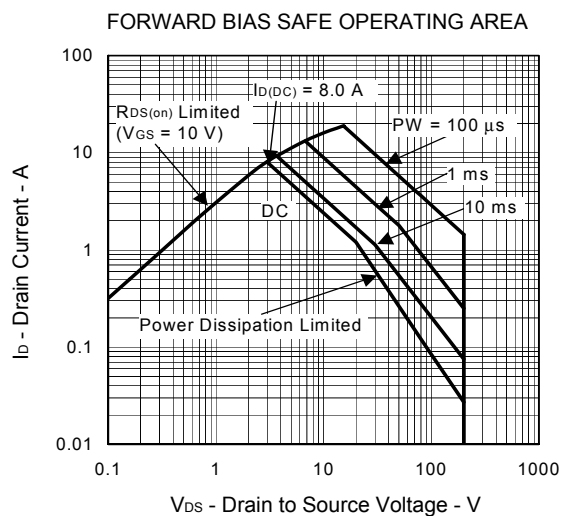
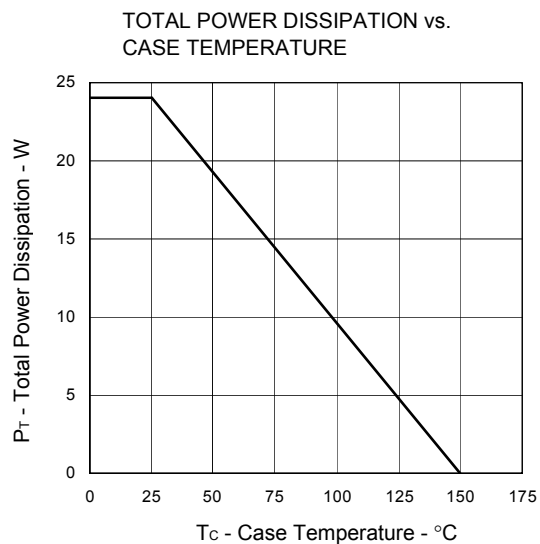
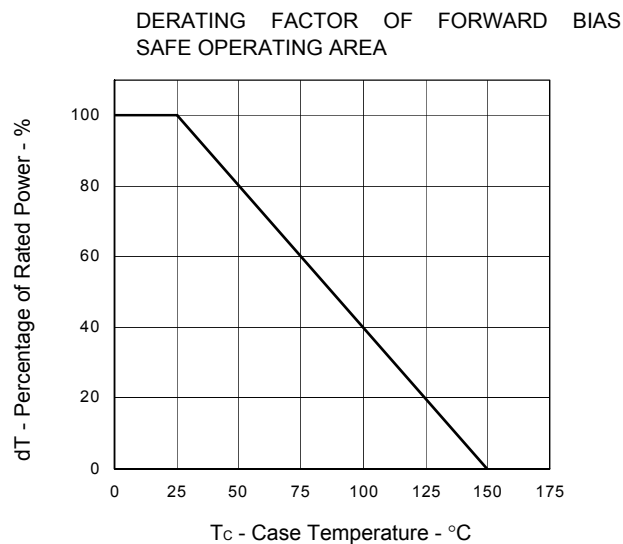
TEST CIRCUIT 2 SWITCHING TIME



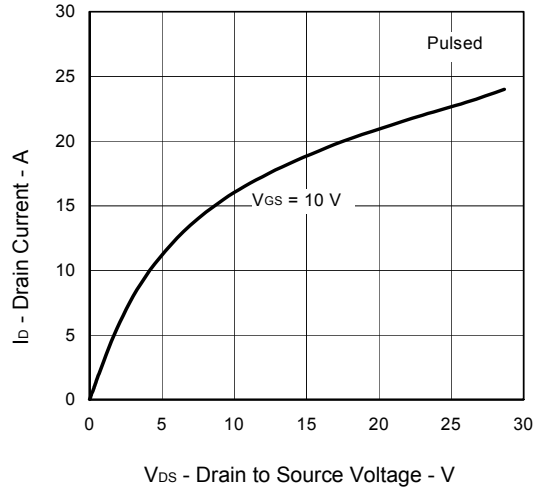
TEST CIRCUIT 3 GATE CHARGE



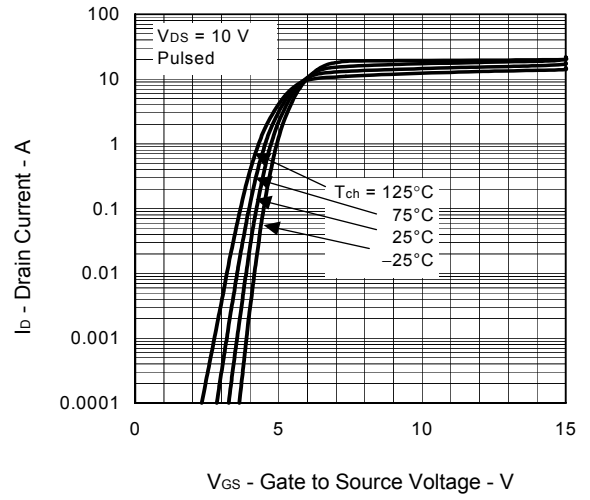
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



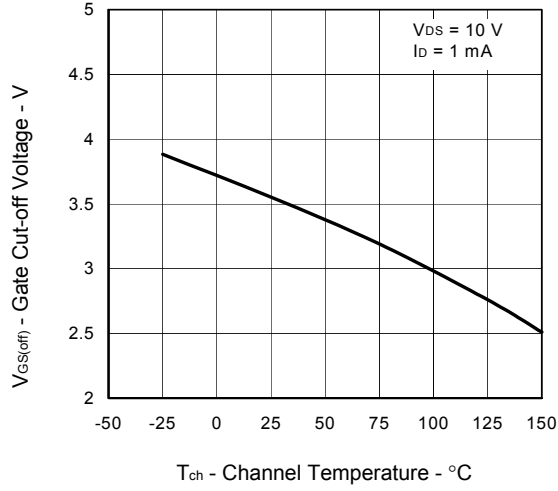
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



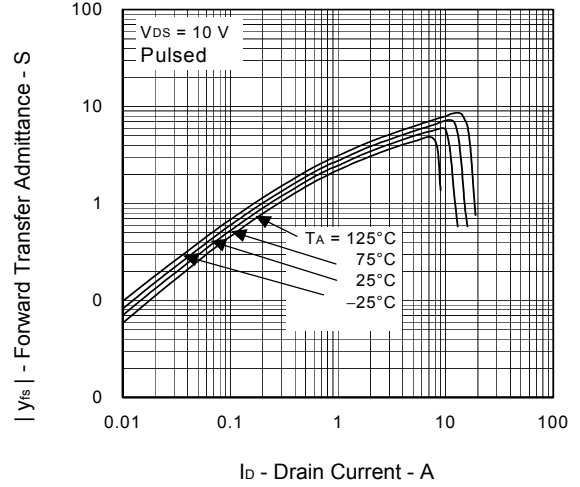
FORWARD TRANSFER CHARACTERISTICS



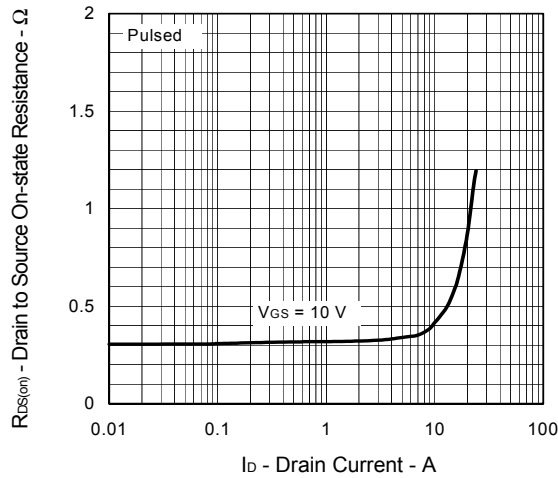
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



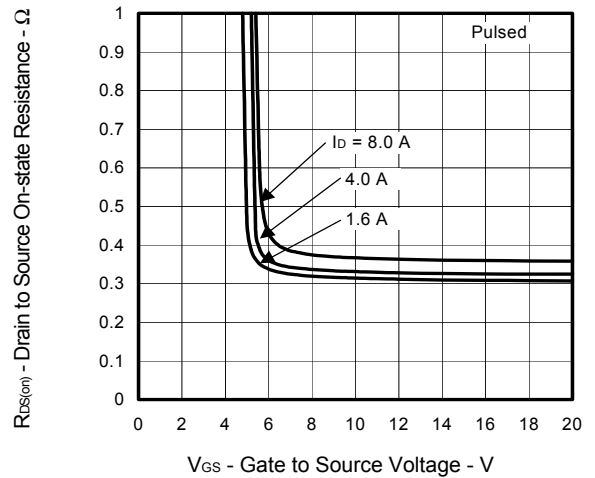
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



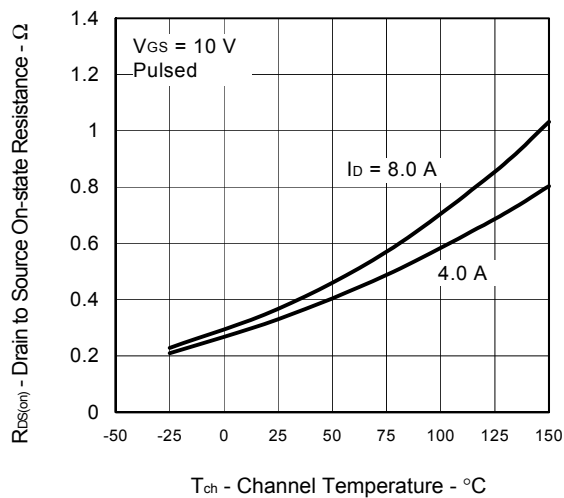
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



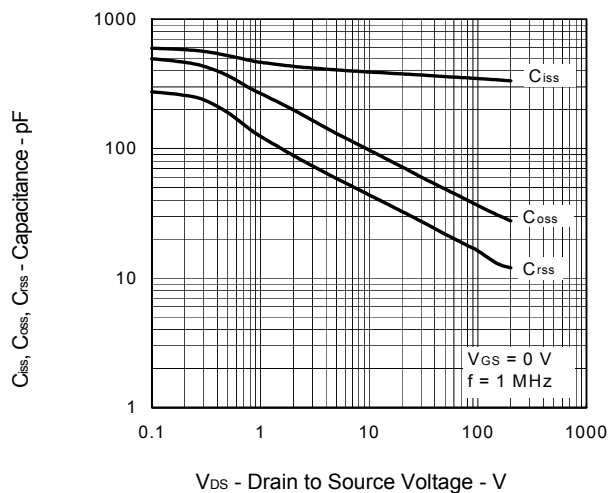
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



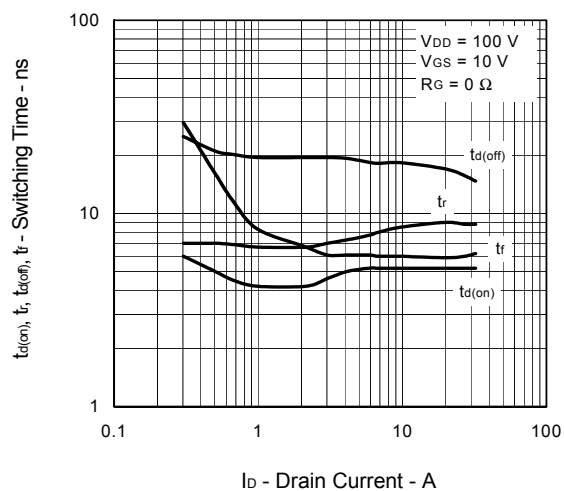
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



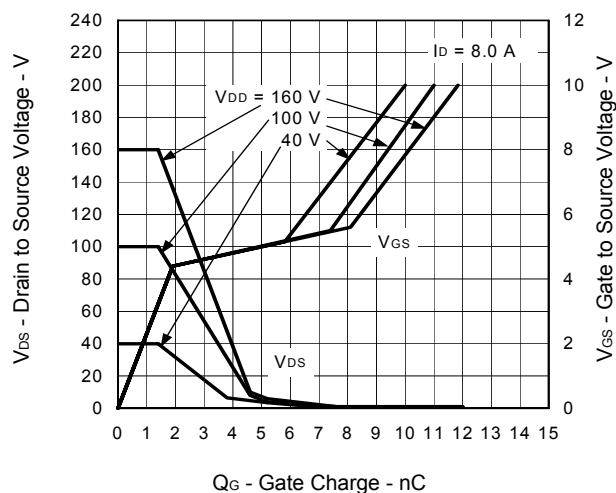
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



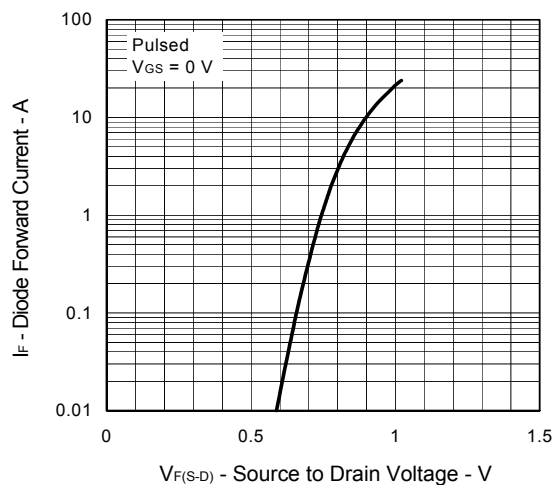
SWITCHING CHARACTERISTICS



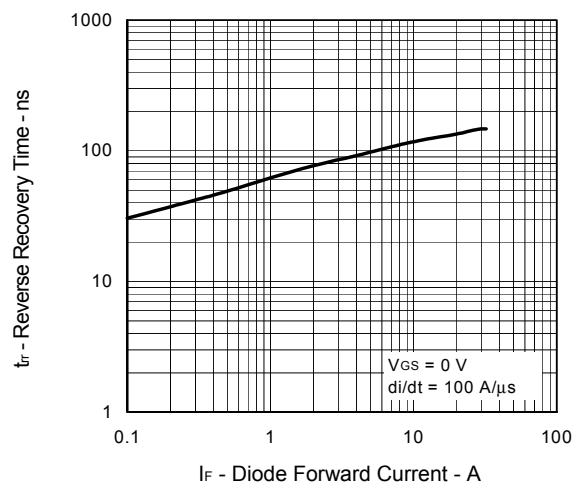
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

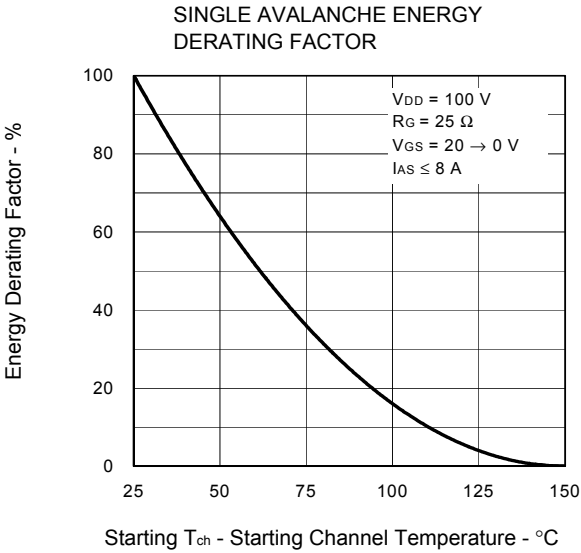
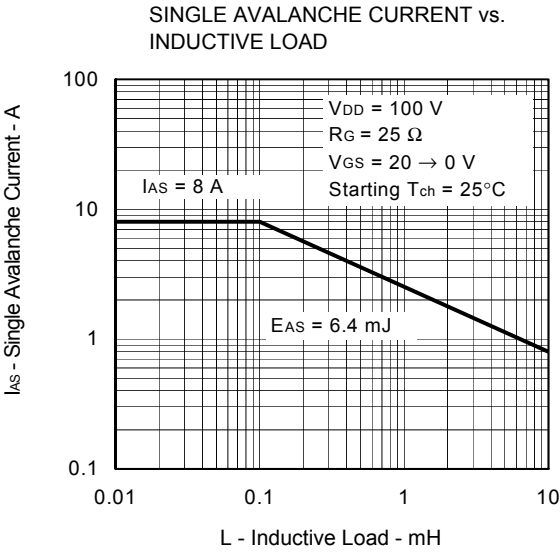


SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



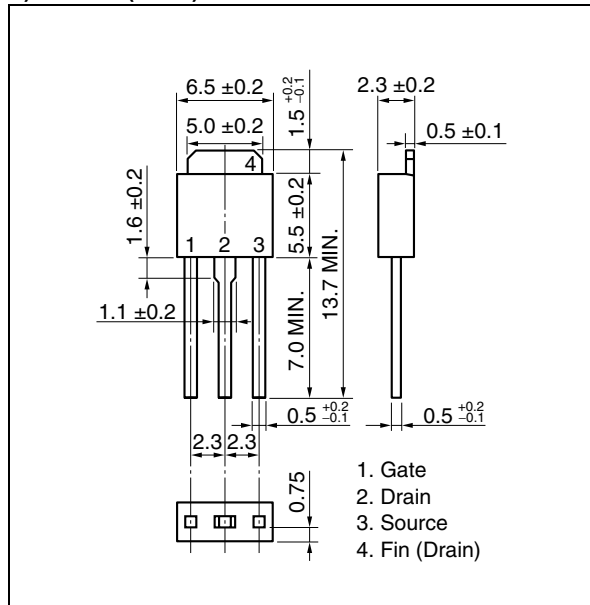
REVERSE RECOVERY TIME vs.
DIODE FORWARD CURRENT



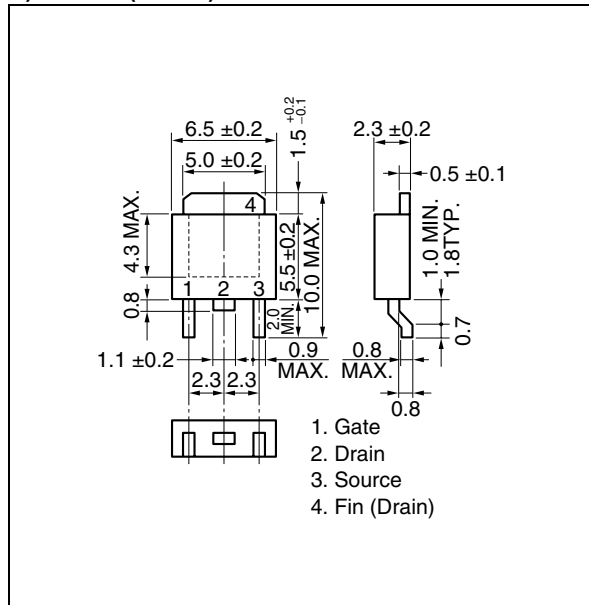


★ PACKAGE DRAWINGS (Unit: mm)

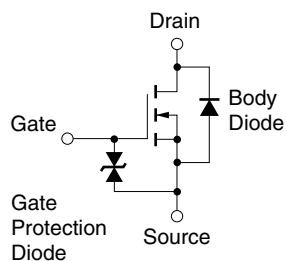
1) TO-251 (MP-3)



2) TO-252 (MP-3Z)



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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