

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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EOL announced Product

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MOS FIELD EFFECT TRANSISTOR
2SK3225

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3225 is N-Channel MOS Field Effect Transistors designed for high current switching applications.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 18 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 17 \text{ A)}$
 $R_{DS(on)2} = 27 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 17 \text{ A)}$
- Low input capacitance
 $C_{iss} = 2100 \text{ pF TYP.}$
- Built-in gate protection diode
- TO-251/TO-252 package

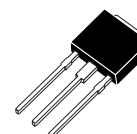
ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|----------------|
| 2SK3225 | TO-251 (MP-3) |
| 2SK3225-Z | TO-252 (MP-3Z) |

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

| | | | |
|---|-----------------------|-------------|----|
| Drain to Source Voltage | V _{DS} | 60 | V |
| Gate to Source Voltage | V _{GSS(AC)} | ±20 | V |
| Gate to Source Voltage | V _{GSS(DC)} | +20, -10 | V |
| Drain Current (DC) | I _{D(DC)} | ±34 | A |
| Drain Current (Pulse) ^{Note1} | I _{D(pulse)} | ±136 | A |
| Total Power Dissipation (T _c = 25°C) | P _{T1} | 40 | W |
| Total Power Dissipation (T _A = 25°C) | P _{T2} | 1.0 | W |
| Channel Temperature | T _{ch} | 150 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |
| Single Avalanche Current ^{Note2} | I _{AS} | 15 | A |
| Single Avalanche Energy ^{Note2} | E _{AS} | 22 | mJ |

(TO-251)



(TO-252)



Note1. PW ≤ 10 μs, Duty cycle ≤ 1%

2. Starting T_{ch} = 25°C, V_{DD} = 30 V, R_G = 25 Ω, V_{GS} = 20 → 0 V

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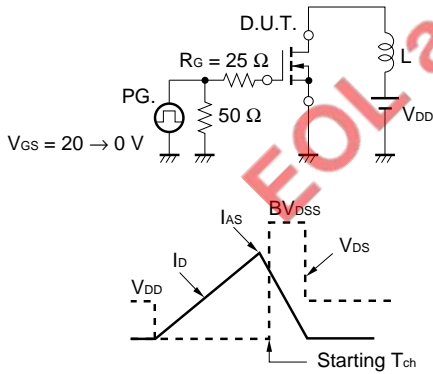
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ELECTRICAL CHARACTERISTICS (TA = 25°C)

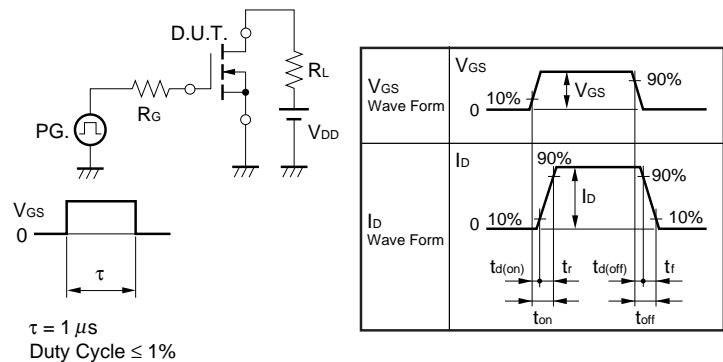
| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---------------|---|------|------|----------|------------------|
| Drain Leakage Current | I_{DSS} | $V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$ | | | 10 | μA |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ | | | ± 10 | μA |
| Gate to Source Cut-off Voltage | $V_{GS(off)}$ | $V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$ | 1.0 | 1.5 | 2.0 | V |
| Forward Transfer Admittance ^{Note} | $ y_{fs} $ | $V_{DS} = 10\text{ V}, I_D = 17\text{ A}$ | 13 | 27 | | S |
| Drain to Source On-state Resistance ^{Note} | $R_{DS(on)1}$ | $V_{GS} = 10\text{ V}, I_D = 17\text{ A}$ | | 13 | 18 | $\text{m}\Omega$ |
| | $R_{DS(on)2}$ | $V_{GS} = 4.0\text{ V}, I_D = 17\text{ A}$ | | 18 | 27 | $\text{m}\Omega$ |
| Input Capacitance | C_{iss} | $V_{DS} = 10\text{ V}$ | | 2100 | | pF |
| Output Capacitance | C_{oss} | $V_{GS} = 0\text{ V}$ | | 550 | | pF |
| Reverse Transfer Capacitance | C_{rss} | $f = 1\text{ MHz}$ | | 220 | | pF |
| Turn-on Delay Time | $t_{d(on)}$ | $I_D = 17\text{ A}$ | | 32 | | ns |
| Rise Time | t_r | $V_{GS} = 10\text{ V}$ | | 300 | | ns |
| Turn-off Delay Time | $t_{d(off)}$ | $V_{DD} = 30\text{ V}$ | | 110 | | ns |
| Fall Time | t_f | $R_G = 10\ \Omega$ | | 140 | | ns |
| Total Gate Charge | Q_G | $I_D = 34\text{ A}$ | | 45 | | nC |
| Gate to Source Charge | Q_{GS} | $V_{DD} = 48\text{ V}$ | | 7 | | nC |
| Gate to Drain Charge | Q_{GD} | $V_{GS} = 10\text{ V}$ | | 13 | | nC |
| Body Diode Forward Voltage ^{Note} | $V_{F(S-D)}$ | $I_F = 34\text{ A}, V_{GS} = 0\text{ V}$ | | 0.94 | | V |
| Reverse Recovery Time | t_{rr} | $I_F = 34\text{ A}, V_{GS} = 0\text{ V}$ | | 60 | | ns |
| Reverse Recovery Charge | Q_{rr} | $di/dt = 100\text{ A}/\mu\text{s}$ | | 95 | | nC |

Note Pulsed

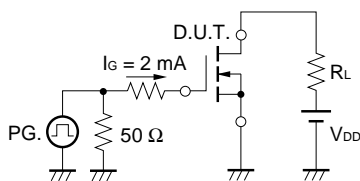
TEST CIRCUIT 1 AVALANCHE CAPABILITY



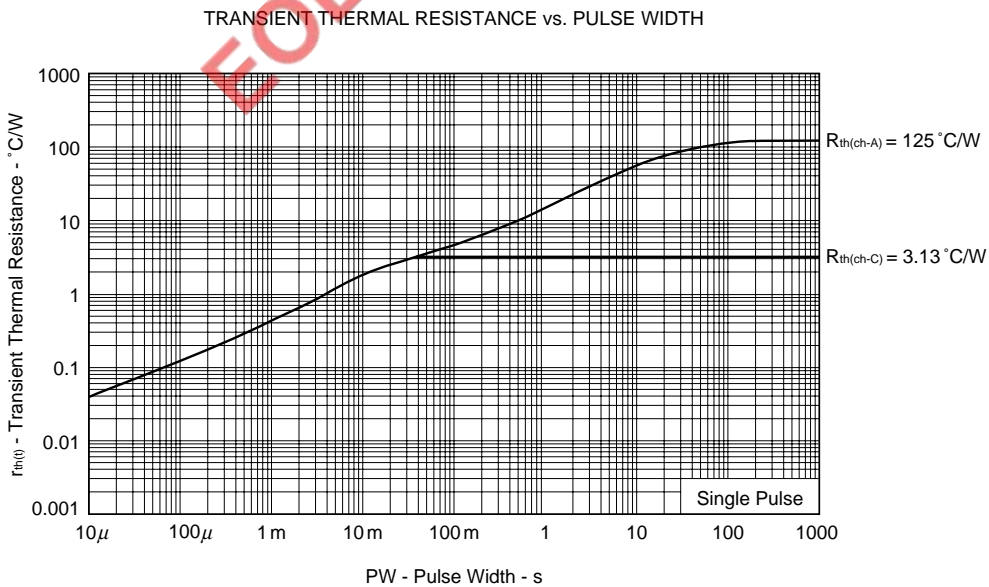
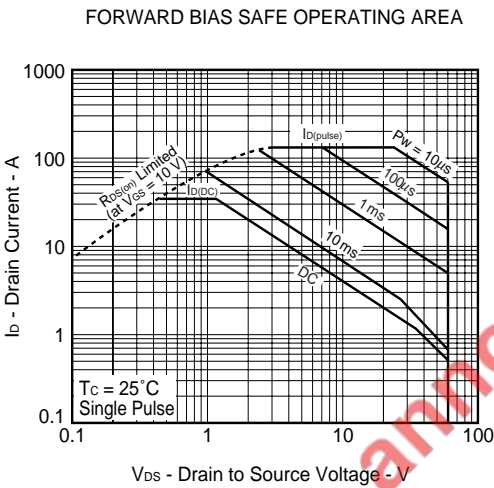
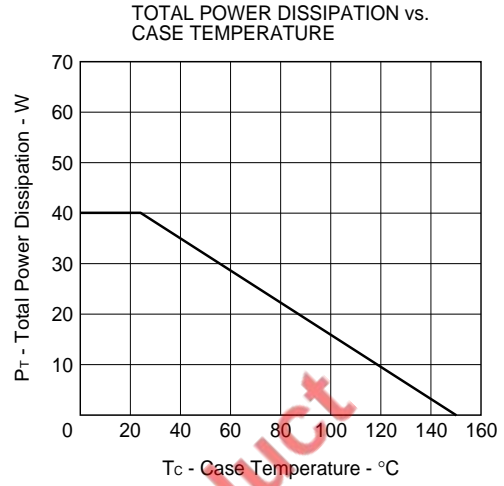
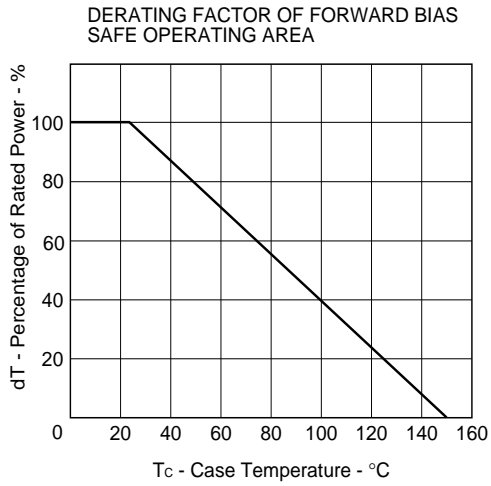
TEST CIRCUIT 2 SWITCHING TIME



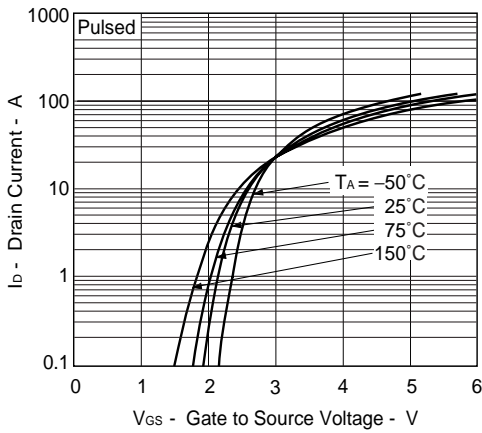
TEST CIRCUIT 3 GATE CHARGE



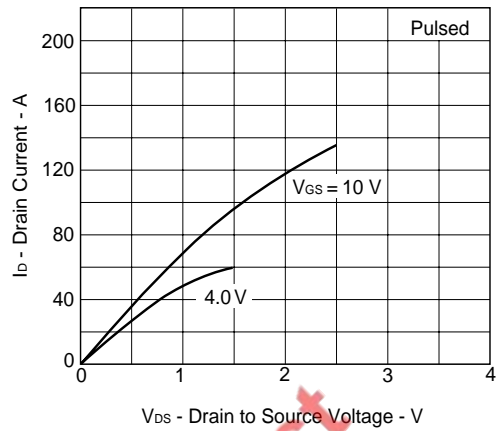
TYPICAL CHARACTERISTICS (T_A = 25°C)



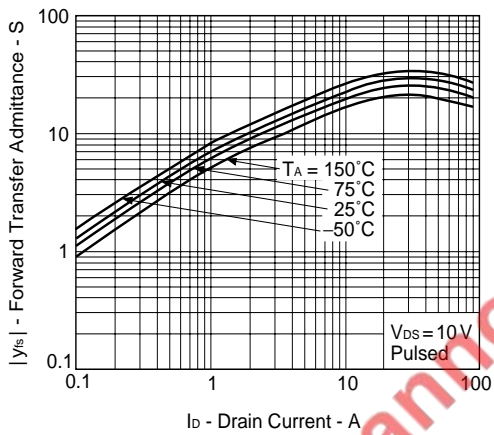
FORWARD TRANSFER CHARACTERISTICS



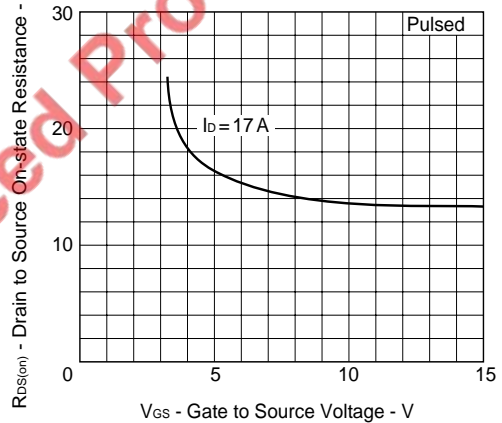
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



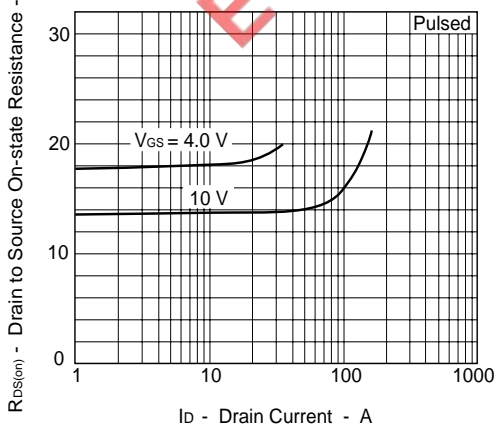
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



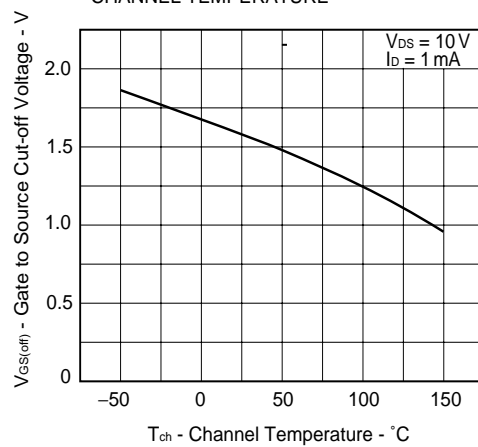
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



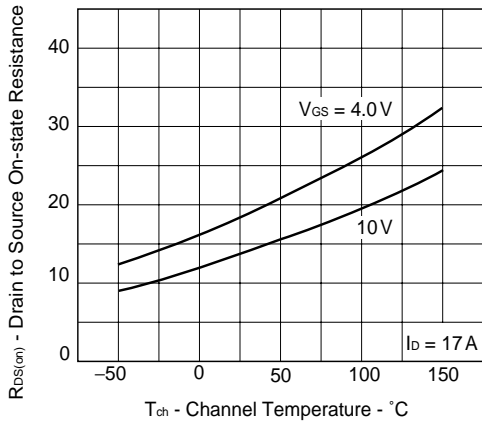
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



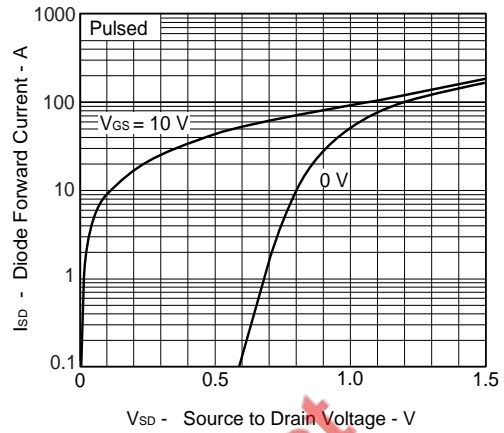
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



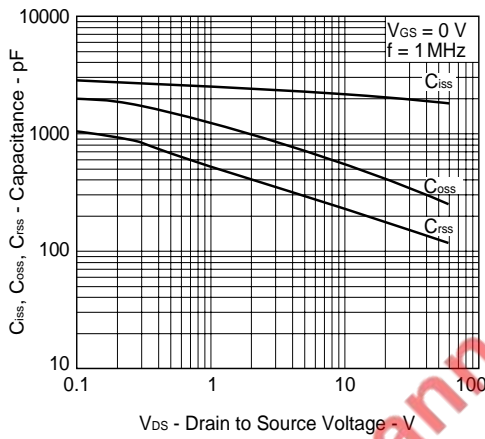
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



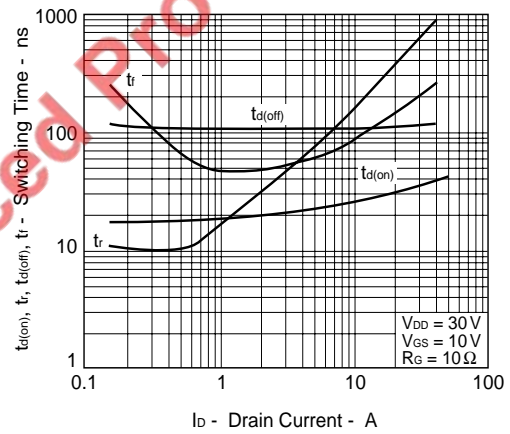
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



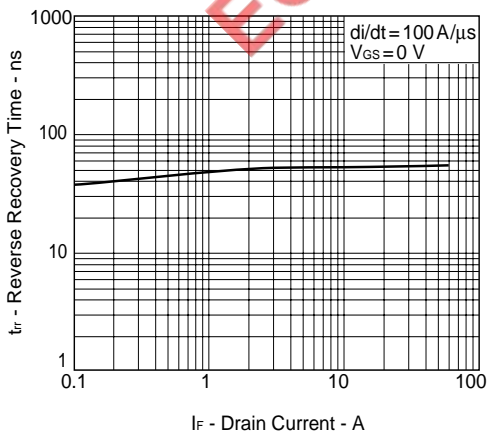
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



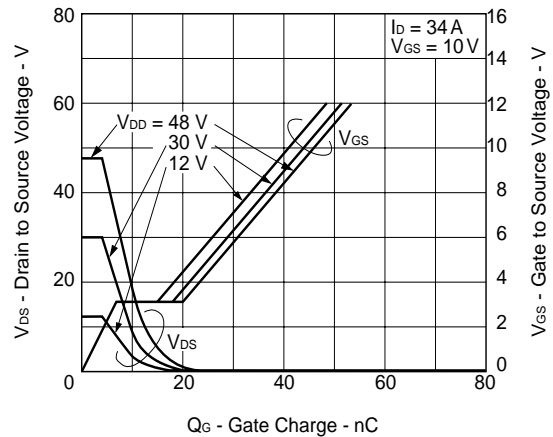
SWITCHING CHARACTERISTICS

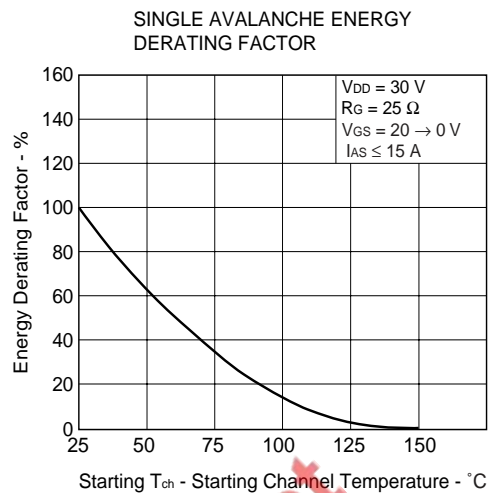
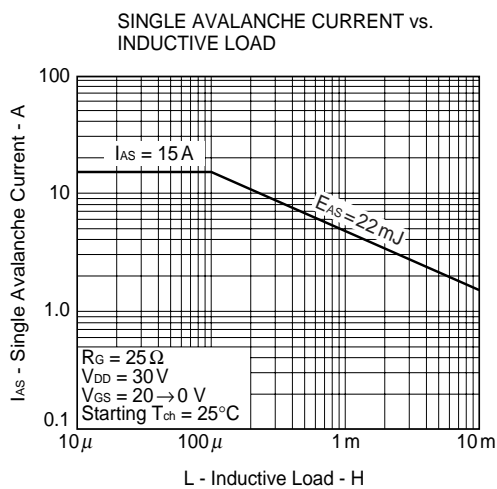


REVERSE RECOVERY TIME vs. DRAIN CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS

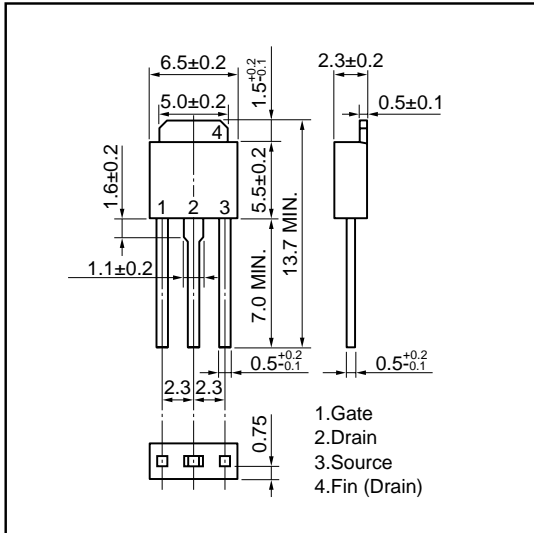




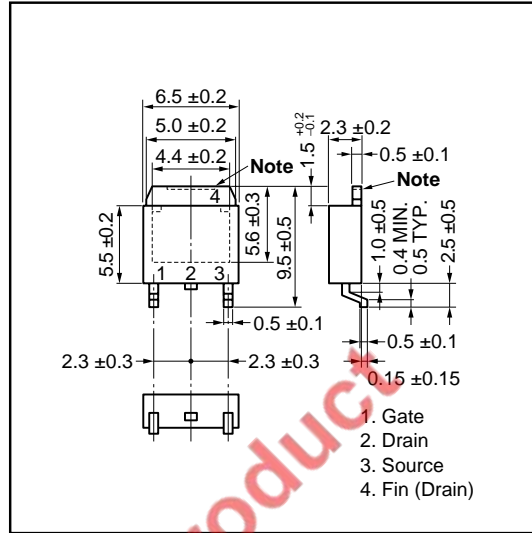
EOL announced Product

PACKAGE DRAWINGS (Unit : mm)

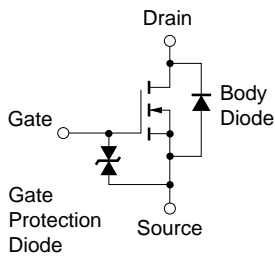
1)TO-251 (MP-3)



<R> 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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