

MOS FIELD EFFECT TRANSISTOR 2SK2826

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

This product is N-Channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Super Low On-State Resistance
 $R_{DS(on)1} = 6.5 \text{ m}\Omega$ (MAX.) ($V_{GS} = 10 \text{ V}$, $I_D = 35 \text{ A}$)
 $R_{DS(on)2} = 9.7 \text{ m}\Omega$ (MAX.) ($V_{GS} = 4.0 \text{ V}$, $I_D = 35 \text{ A}$)
- Low C_{iss} : $C_{iss} = 7200 \text{ pF}$ (TYP.)
- Built-in Gate Protection Diode

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|----------|
| 2SK2826 | TO-220AB |
| 2SK2826-S | TO-262 |
| 2SK2826-ZJ | TO-263 |

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

| | | | |
|--|----------------|--------------|------------------|
| Drain to Source Voltage ($V_{GS} = 0 \text{ V}$) | V_{DSS} | 60 | V |
| Gate to Source Voltage ($V_{DS} = 0 \text{ V}$) | $V_{GSS(AC)}$ | ± 20 | V |
| Gate to Source Voltage ($V_{DS} = 0 \text{ V}$) | $V_{GSS(DC)}$ | +20, -10 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ± 70 | A |
| Drain Current (Pulse) ^{Note1} | $I_{D(pulse)}$ | ± 280 | A |
| Total Power Dissipation ($T_C = 25^\circ\text{C}$) | P_T | 100 | W |
| Total Power Dissipation ($T_A = 25^\circ\text{C}$) | P_T | 1.5 | 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} | 70 | A |
| Single Avalanche Energy ^{Note2} | E_{AS} | 490 | mJ |

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

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

THERMAL RESISTANCE

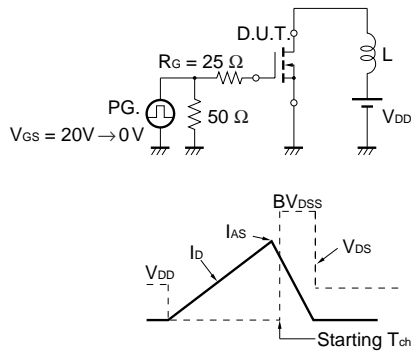
| | | | |
|--------------------|----------------|------|--------------------|
| Channel to Case | $R_{th(ch-C)}$ | 1.25 | $^\circ\text{C/W}$ |
| Channel to Ambient | $R_{th(ch-A)}$ | 83.3 | $^\circ\text{C/W}$ |

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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

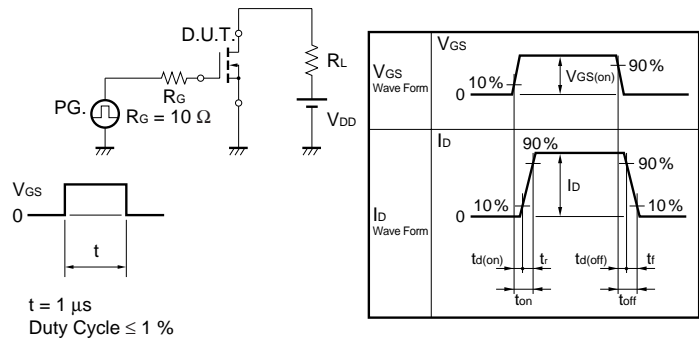
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------------------------------|----------------------|--|------|------|------|------|
| ★ Drain to Source On-state Resistance | R _{DS(on)1} | V _{GS} = 10 V, I _D = 35 A | | 5.5 | 6.5 | mΩ |
| | R _{DS(on)2} | V _{GS} = 4.0 V, I _D = 35 A | | 7.0 | 9.7 | mΩ |
| Gate to Source Cut-off Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 mA | 1.0 | 1.5 | 2.0 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = 10 V, I _D = 35 A | 20 | 94 | | S |
| Drain Leakage Current | I _{DSS} | V _{DS} = 60 V, V _{GS} = 0 V | | | 10 | μA |
| Gate to Source Leakage Current | I _{GSS} | V _{GS} = ±20 V, V _{DS} = 0 V | | | ±10 | μA |
| Input Capacitance | C _{iss} | V _{DS} = 10 V | | 7200 | | pF |
| Output Capacitance | C _{oss} | V _{GS} = 0 V | | 2000 | | pF |
| Reverse Transfer Capacitance | C _{rss} | f = 1 MHz | | 700 | | pF |
| ★ Turn-on Delay Time | t _{d(on)} | I _D = 35 A | | 100 | | ns |
| ★ Rise Time | t _r | V _{GS(on)} = 10 V | | 1200 | | ns |
| ★ Turn-off Delay Time | t _{d(off)} | V _{DD} = 30 V | | 440 | | ns |
| ★ Fall Time | t _f | R _G = 10 Ω | | 520 | | ns |
| Total Gate Charge | Q _G | I _D = 70 A | | 150 | | nC |
| Gate to Source Charge | Q _{GS} | V _{DD} = 48 V | | 20 | | nC |
| Gate to Drain Charge | Q _{GD} | V _{GS} = 10 V | | 40 | | nC |
| Body Diode Forward Voltage | V _{F(S-D)} | I _F = 70 A, V _{GS} = 0 V | | 0.97 | | V |
| Reverse Recovery Time | t _{rr} | I _F = 70 A, V _{GS} = 0 V | | 80 | | ns |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100A/μs | | 250 | | nC |

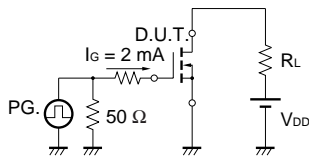
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

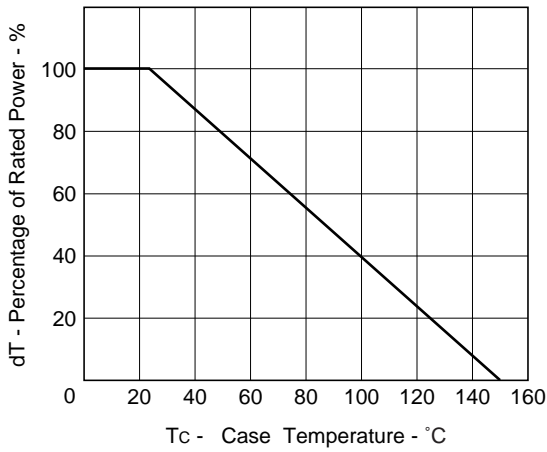


TEST CIRCUIT 3 GATE CHARGE

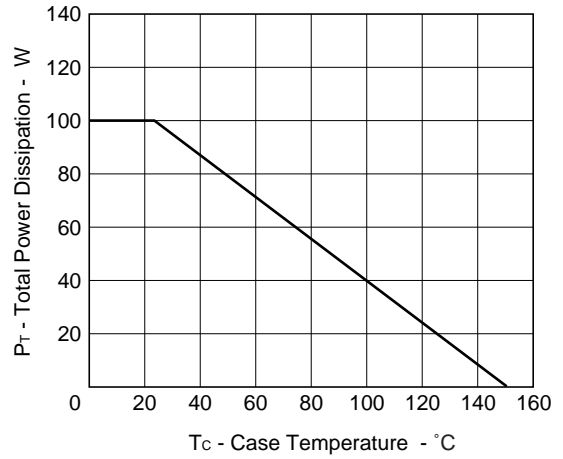


TYPICAL CHARACTERISTICS (T_A = 25 °C)

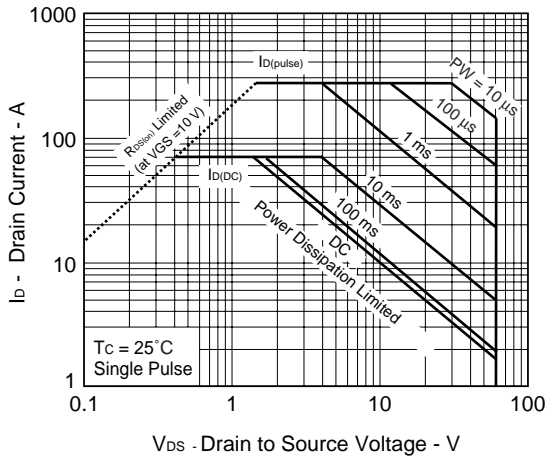
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



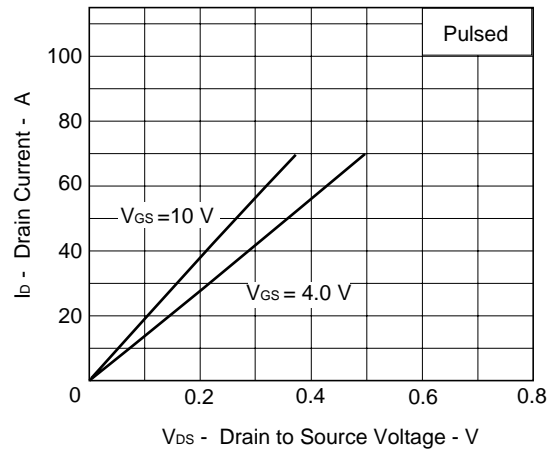
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



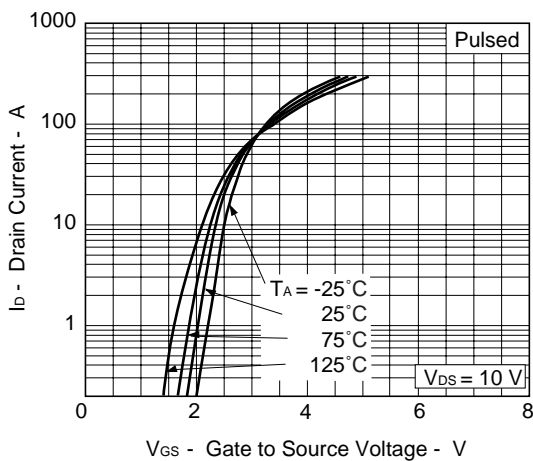
FORWARD BIAS SAFE OPERATING AREA



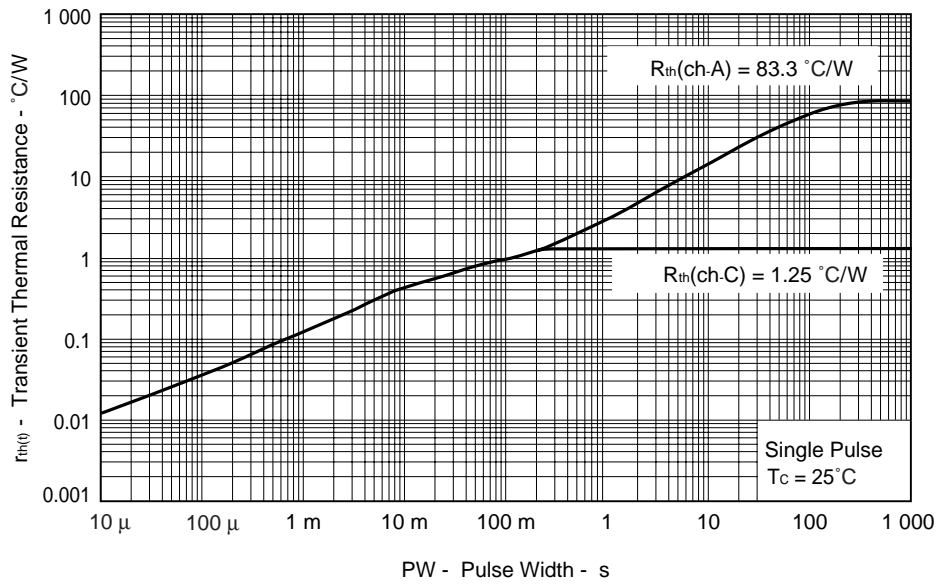
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



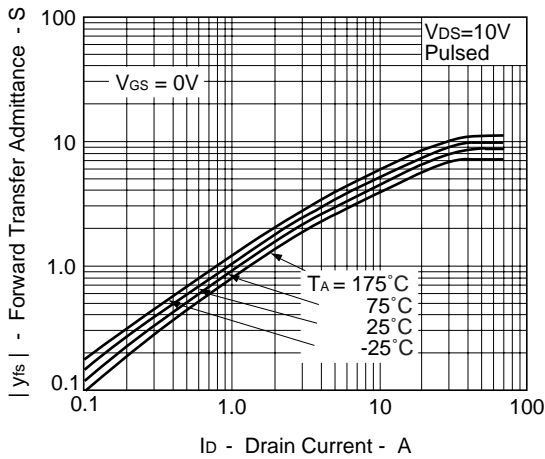
FORWARD TRANSFER CHARACTERISTICS



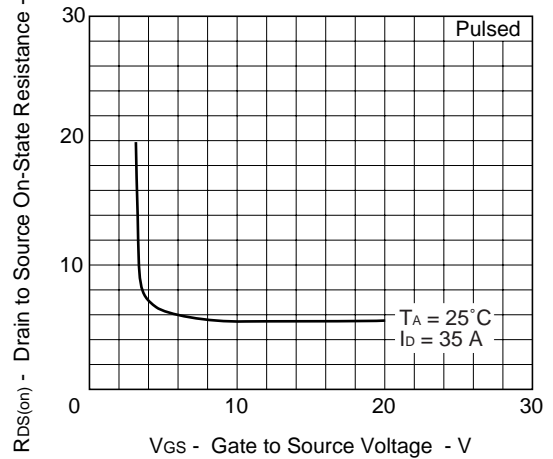
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



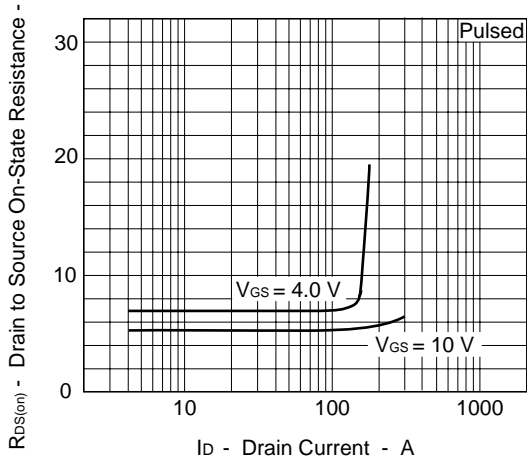
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



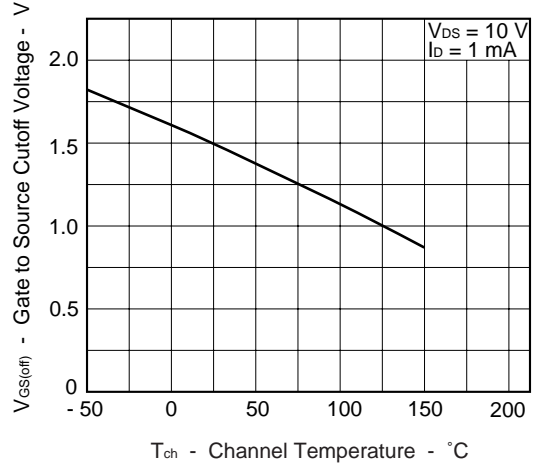
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

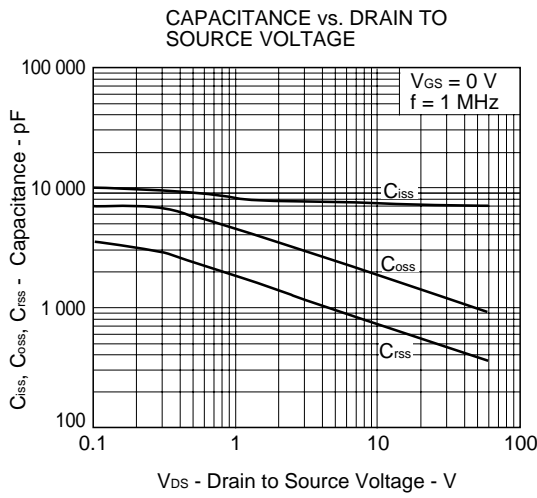
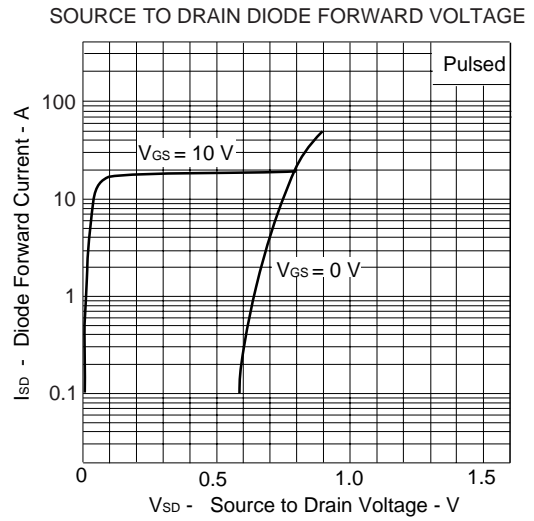
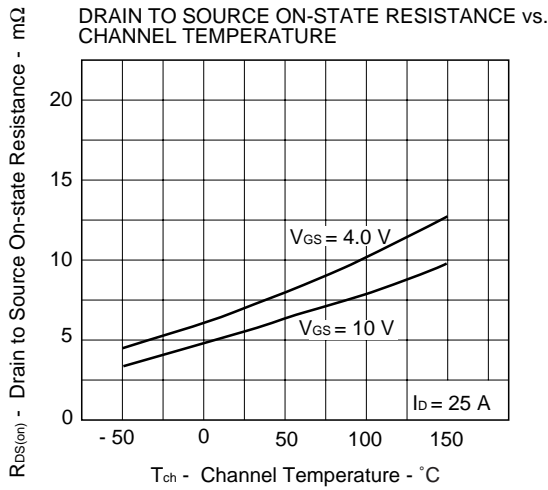


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

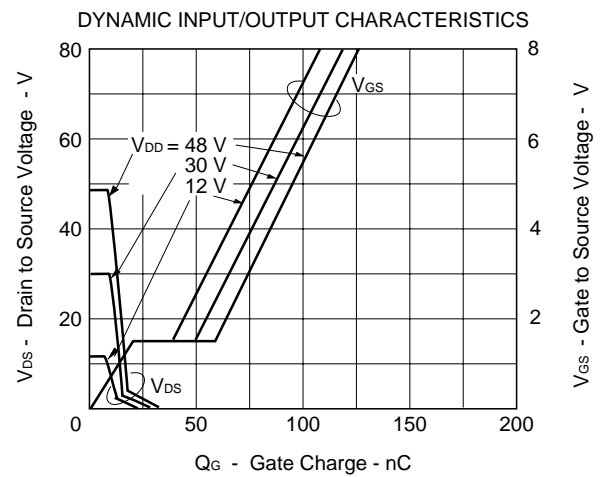
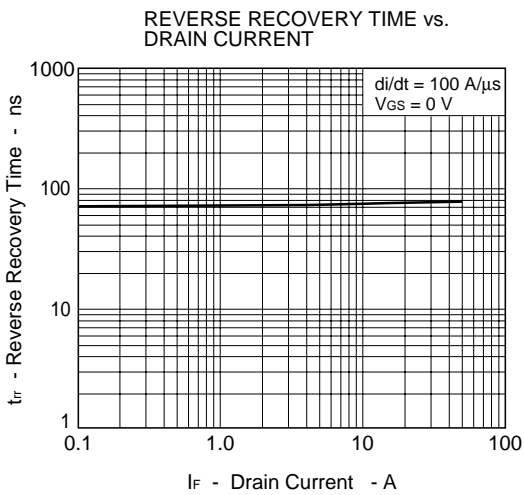
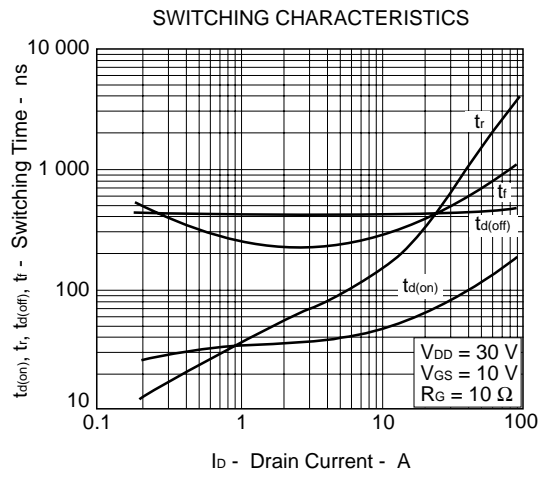


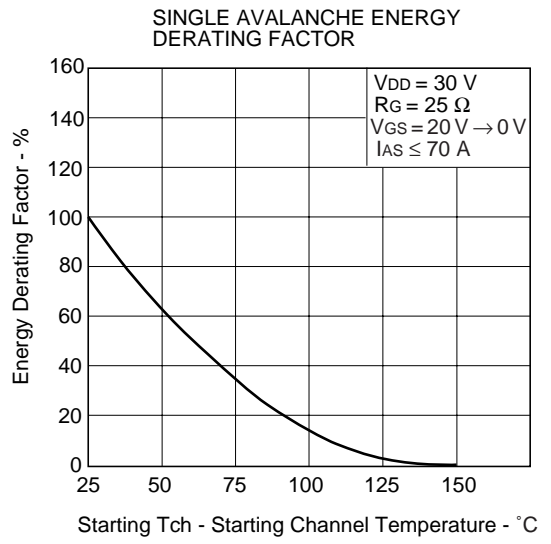
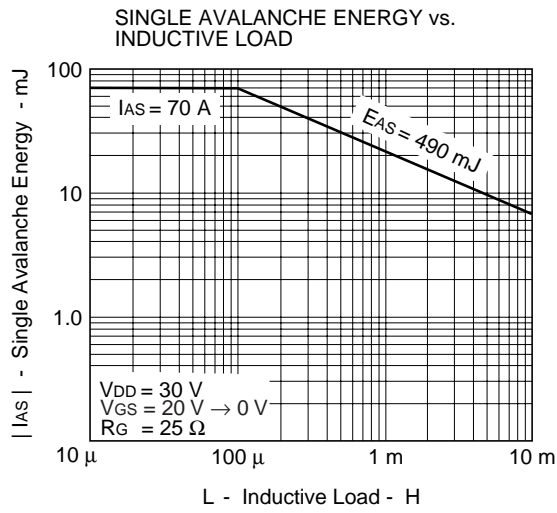
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE





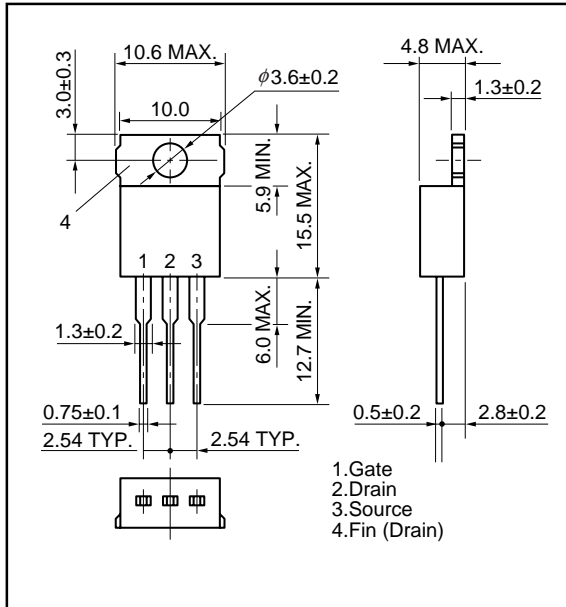
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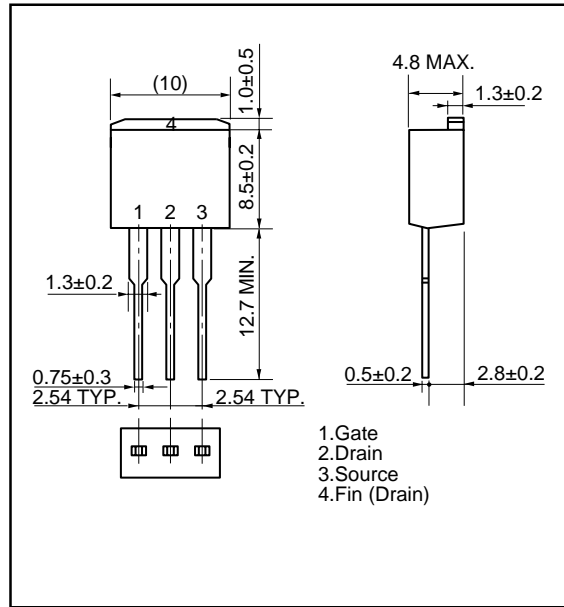


PACKAGE DRAWINGS (Unit : mm)

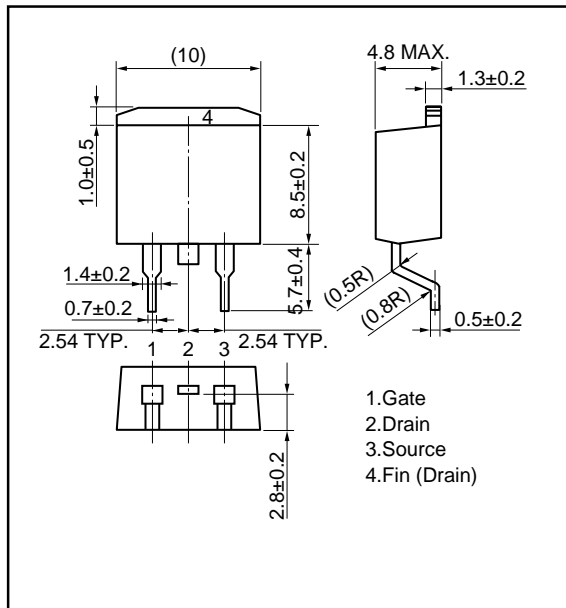
1)TO-220AB (MP-25)



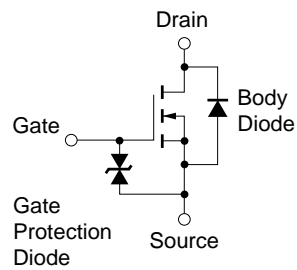
2)TO-262 (MP-25 Fin Cut)



3)TO-263 (MP-25ZJ)



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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