

# 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 ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS(AC)}$	$\pm 20$	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS(DC)}$	+20, -10	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 70$	A
Drain Current (Pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 280$	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 <sup>Note2</sup>	$I_{AS}$	70	A
Single Avalanche Energy <sup>Note2</sup>	$E_{AS}$	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

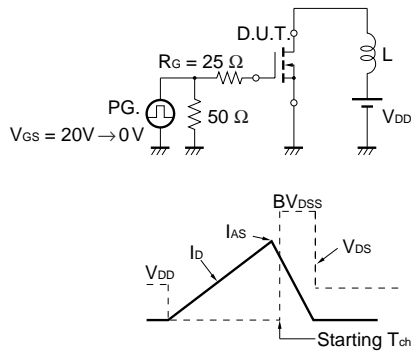
Channel to Case	$R_{th(ch-C)}$	1.25	$^\circ\text{C/W}$
Channel to Ambient	$R_{th(ch-A)}$	83.3	$^\circ\text{C/W}$

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

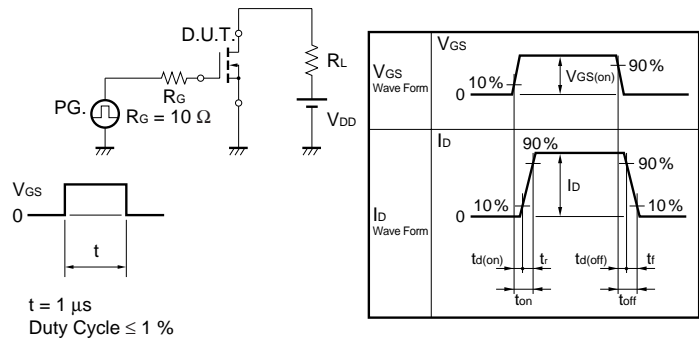
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

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

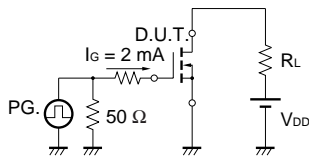
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



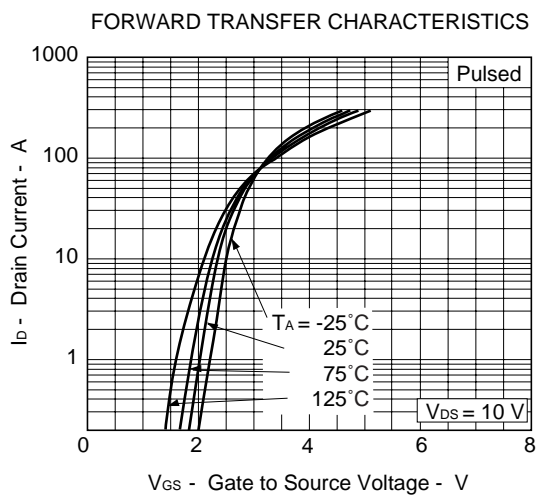
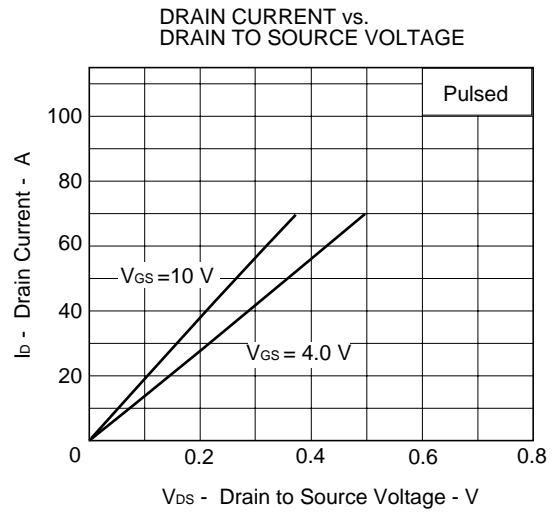
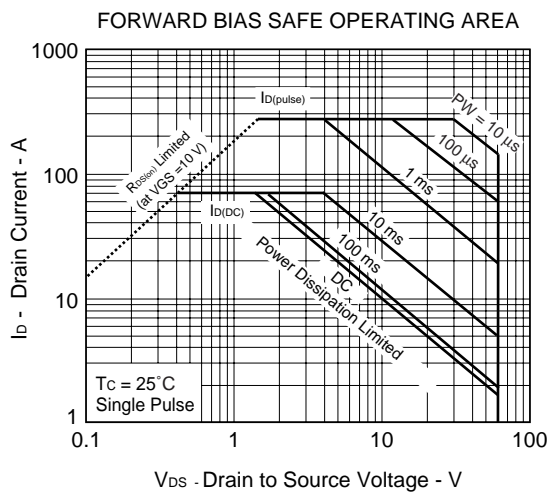
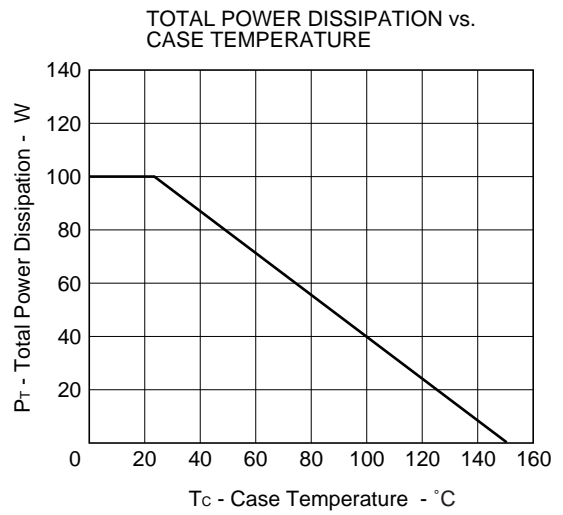
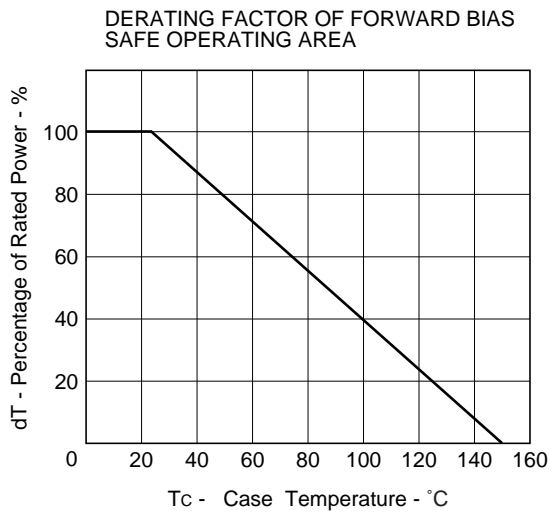
**TEST CIRCUIT 2 SWITCHING TIME**



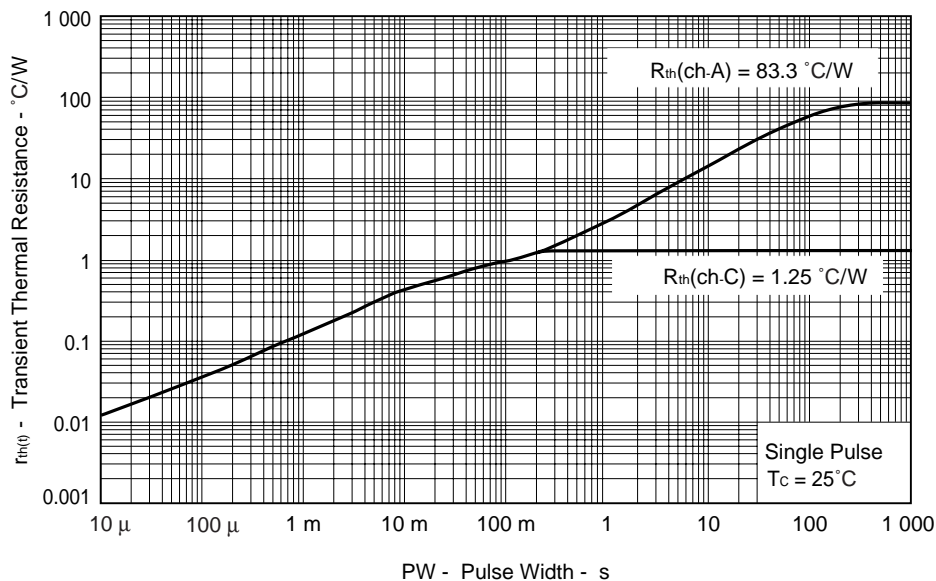
**TEST CIRCUIT 3 GATE CHARGE**



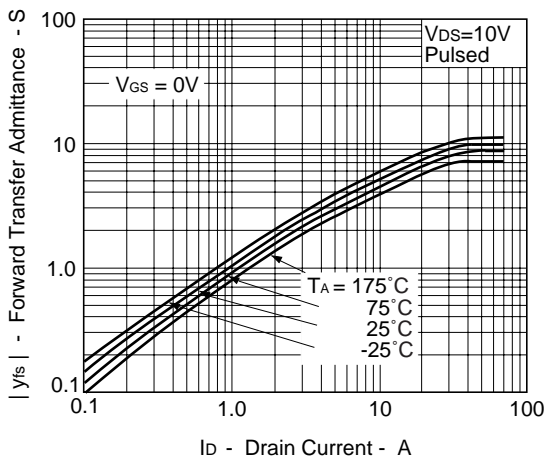
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)



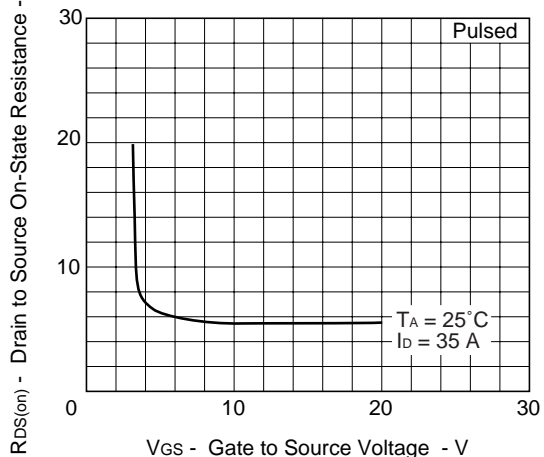
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



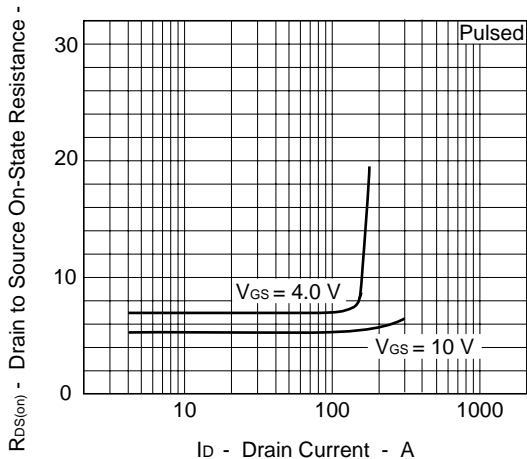
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



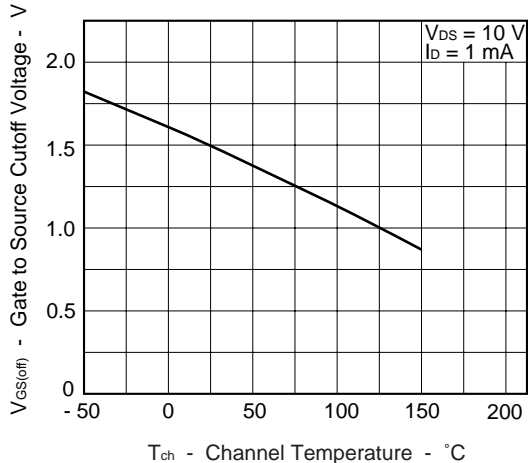
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

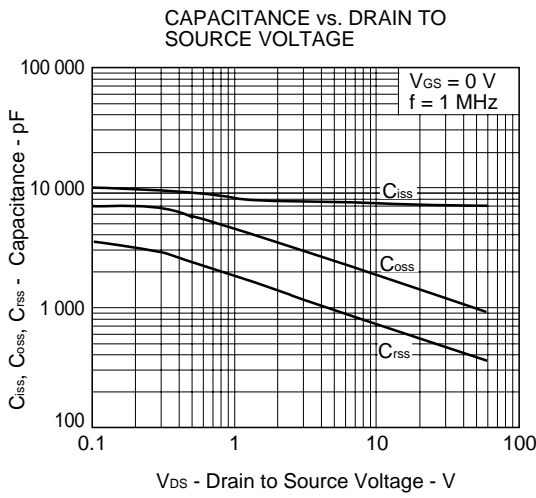
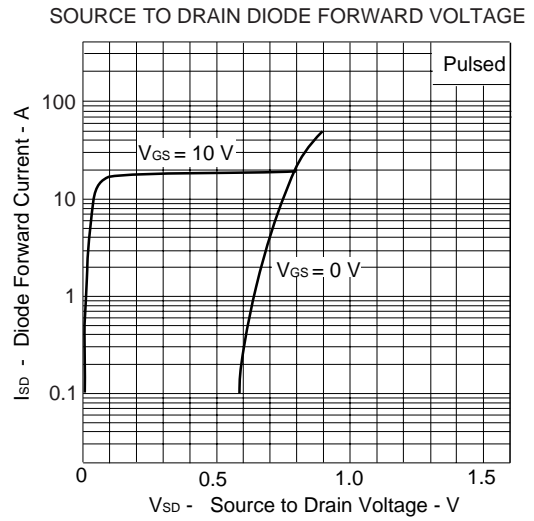
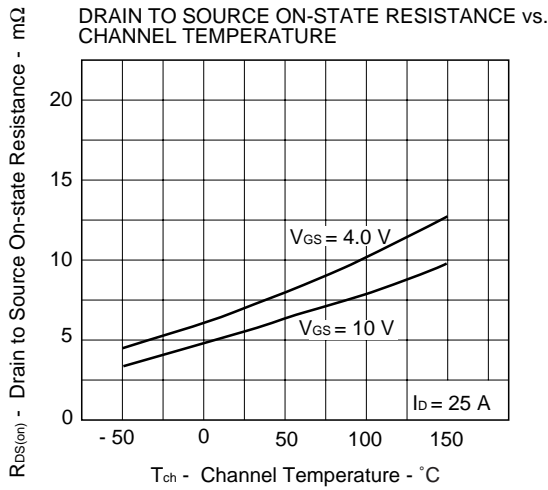


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

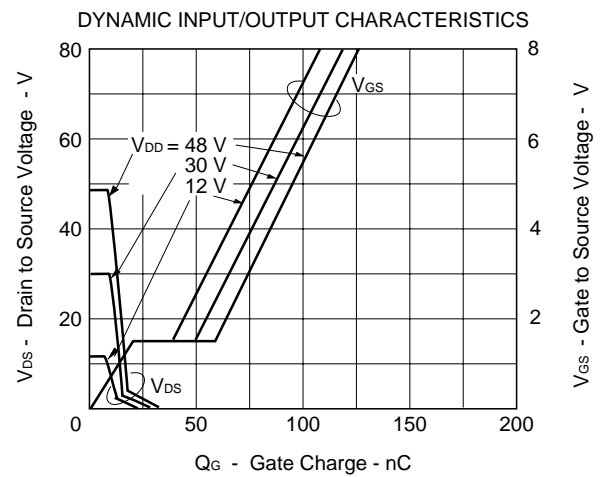
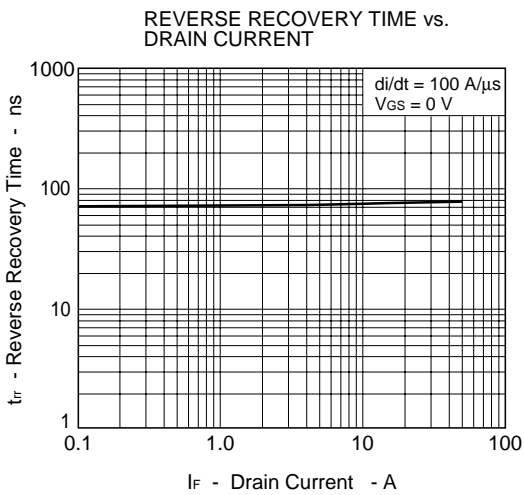
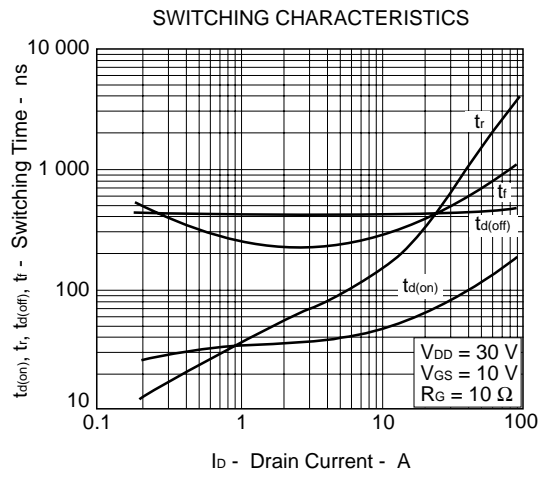


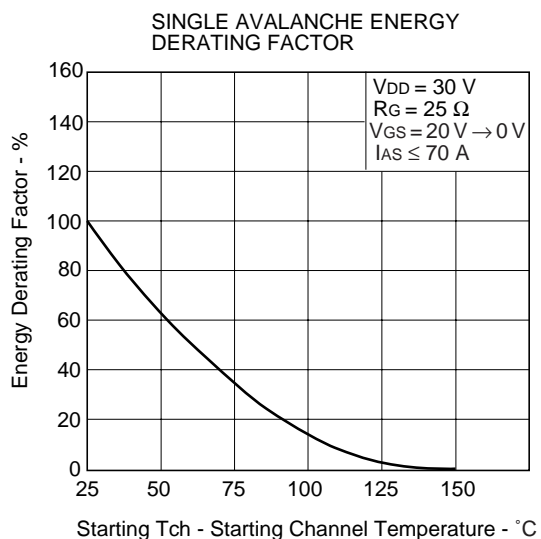
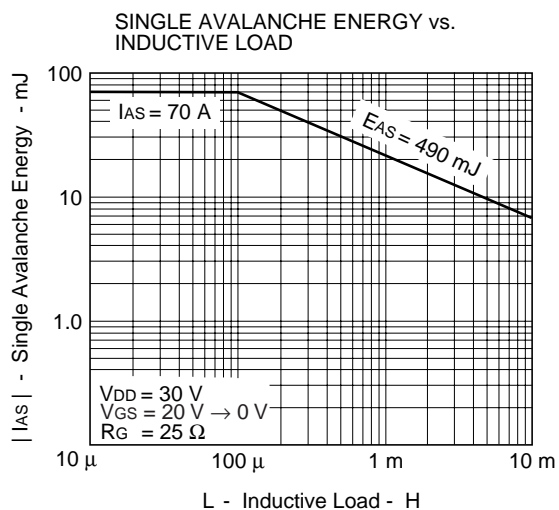
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE





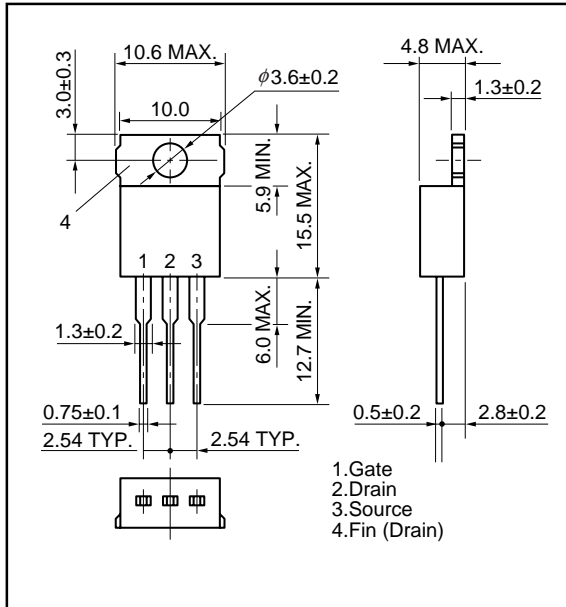
★



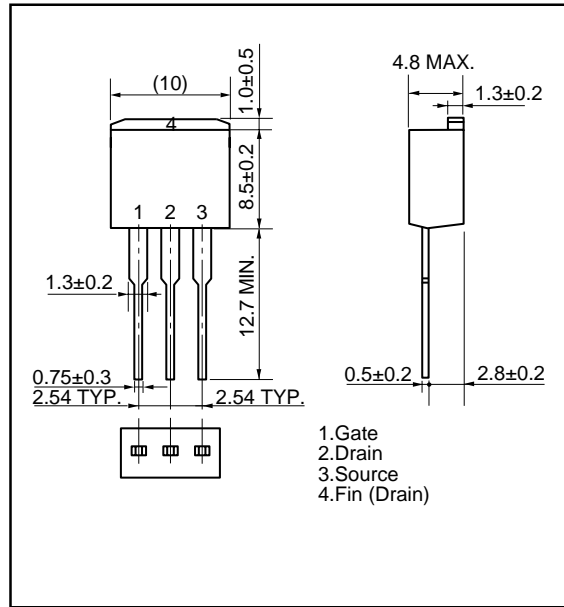


PACKAGE DRAWINGS (Unit : mm)

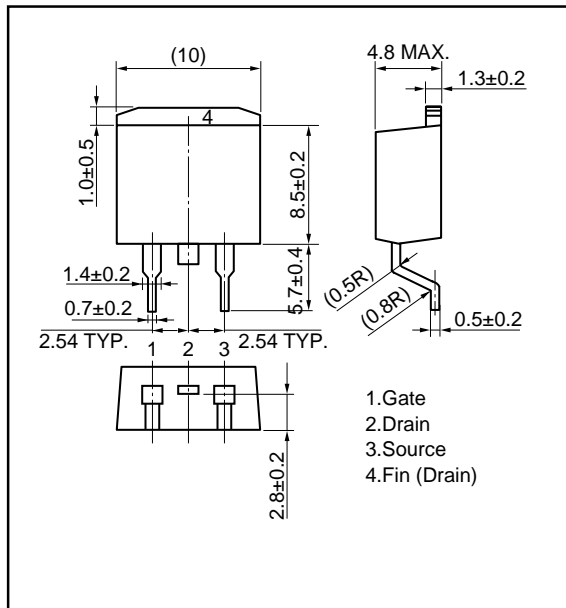
1)TO-220AB (MP-25)



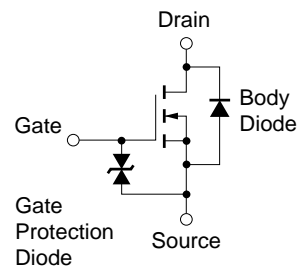
2)TO-262 (MP-25 Fin Cut)



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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