

MOS FIELD EFFECT TRANSISTOR

2SK3058

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
 $R_{DS(on)1} = 17 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 28 \text{ A)}$
 $R_{DS(on)2} = 27 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 28 \text{ A)}$
- Low C_{iss} : $C_{iss} = 2100 \text{ pF (TYP.)}$
- Built-in Gate Protection Diode

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3058	TO-220AB
2SK3058-S	TO-262
2SK3058-ZJ	TO-263
2SK3058-Z	TO-220SMD ^{Note}

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Note TO-220SND package is produced only in Japan.

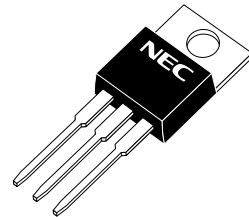
ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage (V _{GS} = 0)	V _{DSS}	60	V
Gate to Source Voltage (V _{DS} = 0)	V _{GSS(AC)}	±20	V
Gate to Source Voltage (V _{DS} = 0)	V _{GSS(DC)}	+20, -10	V
Drain Current (DC)	I _{D(DC)}	±55	A
Drain Current (Pulse) ^{Note1}	I _{D(pulse)}	±165	A
Total Power Dissipation (T _C = 25°C)	P _T	58	W
Total Power Dissipation (T _A = 25°C)	P _T	1.5	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to + 150	°C
Single Avalanche Current ^{Note2}	I _{AS}	27.5	A
Single Avalanche Energy ^{Note2}	E _{AS}	75.6	mJ

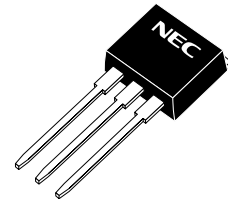
Notes 1. PW ≤ 10 μs, Duty cycle ≤ 1 %

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

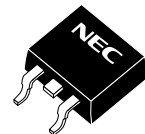
(TO-220AB)



(TO-262)



(TO-263, TO-220SMD)



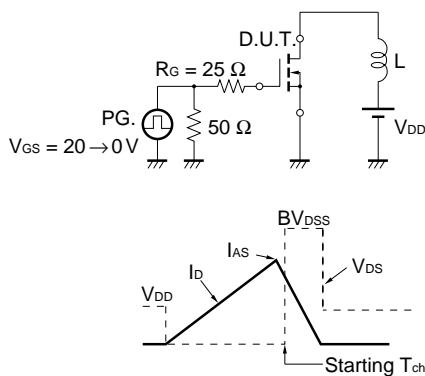
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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

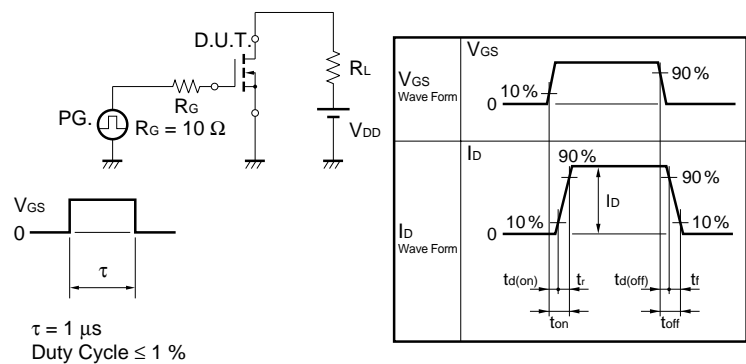
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 28 A		12	17	mΩ
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 28 A		19	27	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.0	1.6	2.0	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 28 A	13	42		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		2100		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		550		pF
Reverse Transfer Capacitance	C _{rss}	F = 1 MHz		220		pF
Turn-on Delay Time	t _{d(on)}	I _D = 28 A		36		ns
Rise Time	t _r	V _{GS} = 10 V		410		ns
Turn-off Delay Time	t _{d(off)}	V _{DD} = 30 V		130		ns
Fall Time	t _f	R _G = 10 Ω		260		ns
Total Gate Charge	Q _G	I _D = 55 A		45		nC
Gate to Source Charge	Q _{GS}	V _{DD} = 48 V		7		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 10 V		13		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 55 A, V _{GS} = 0 V		1.0		V
Reverse Recovery Time	t _{rr}	I _F = 55 A, V _{GS} = 0 V		60		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs		100		nC

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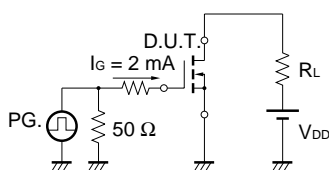
TEST CIRCUIT 1 AVALANCHE CAPABILITY



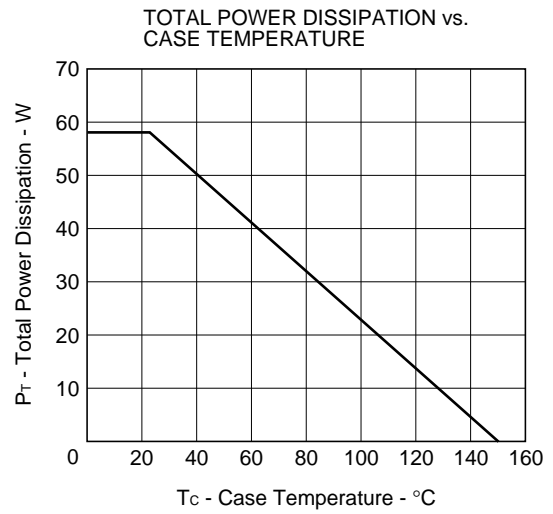
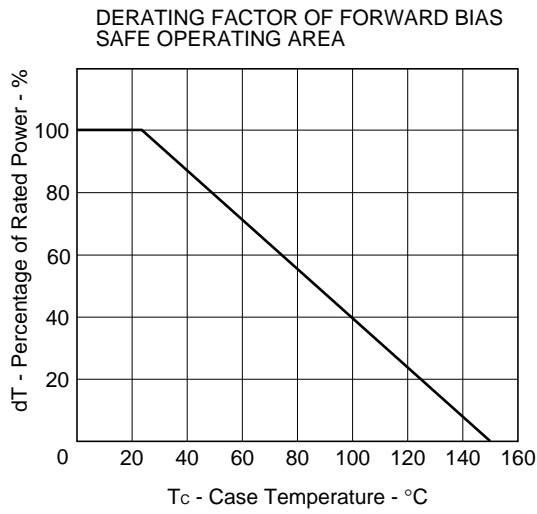
★ **TEST CIRCUIT 2 SWITCHING TIME**



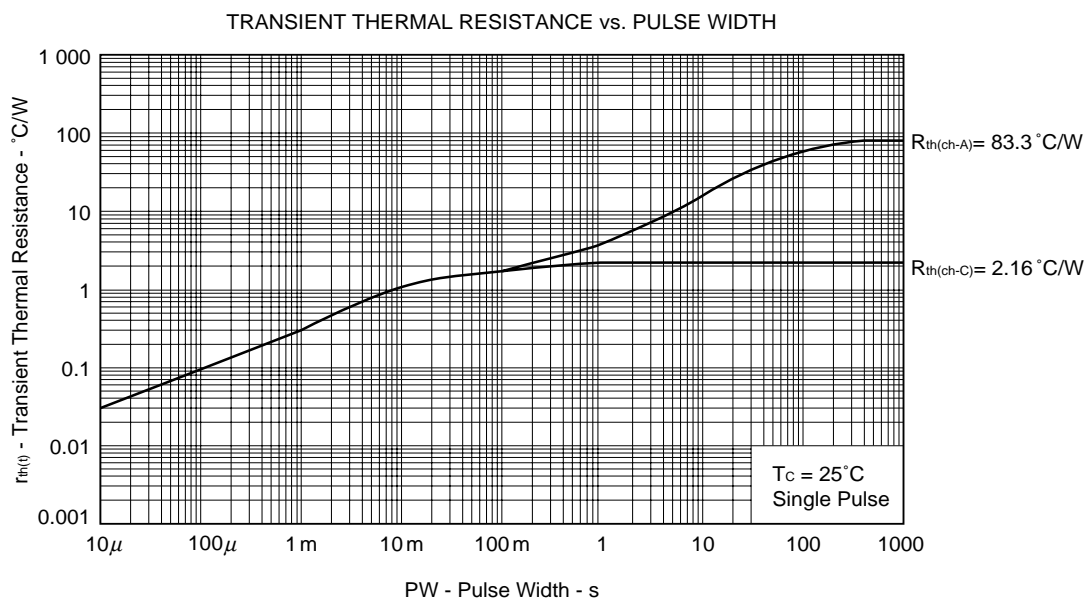
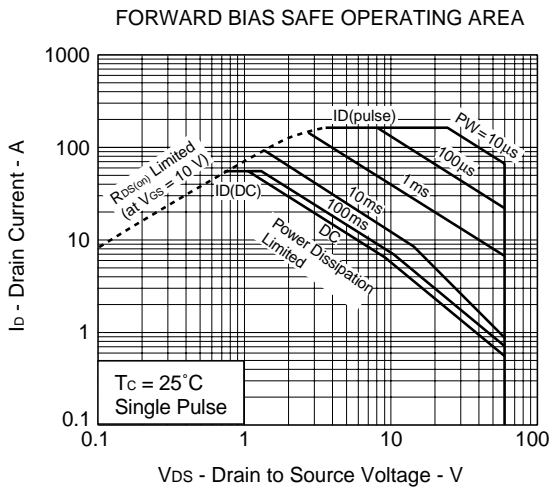
TEST CIRCUIT 3 GATE CHARGE



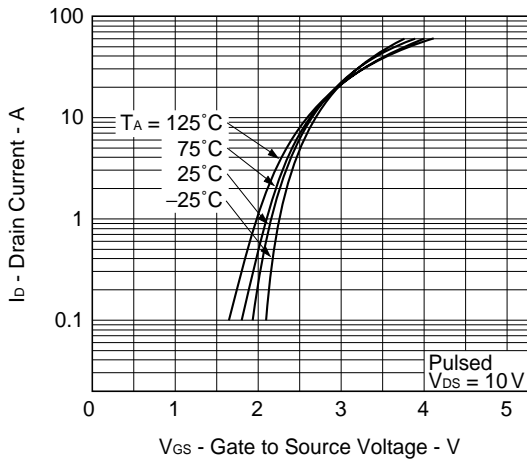
TYPICAL CHARACTERISTICS (T_A = 25 °C)



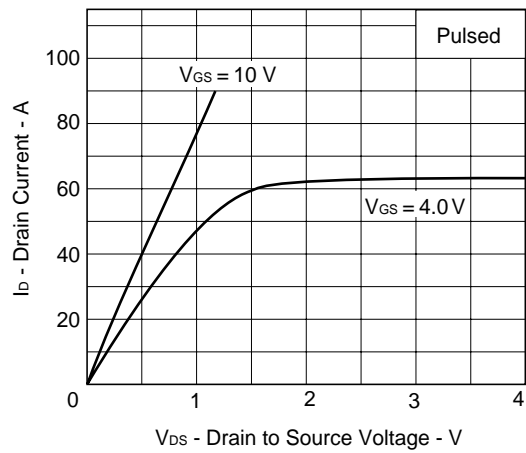
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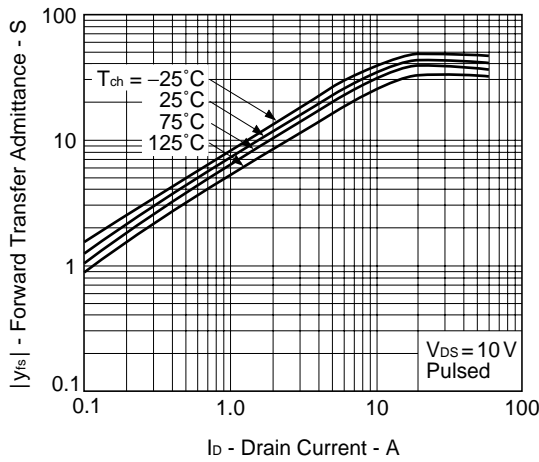
FORWARD TRANSFER CHARACTERISTICS



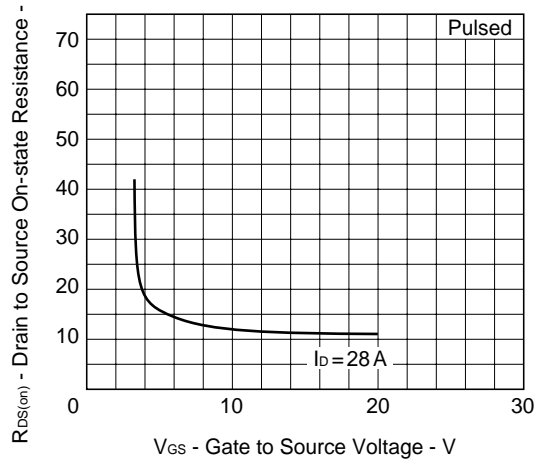
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



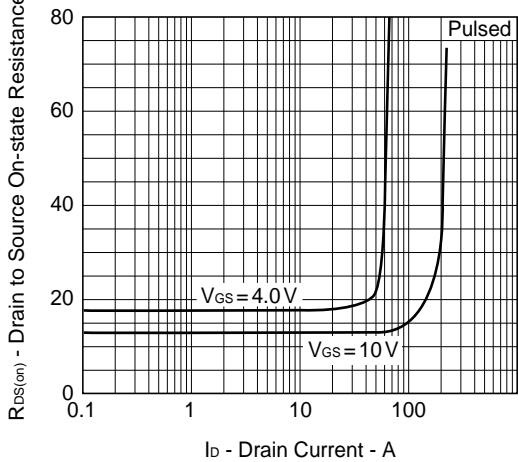
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



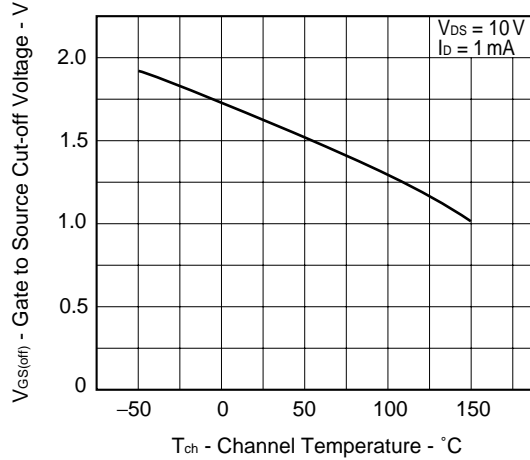
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



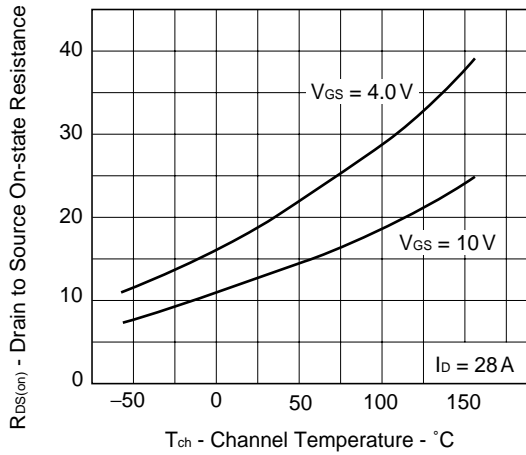
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE

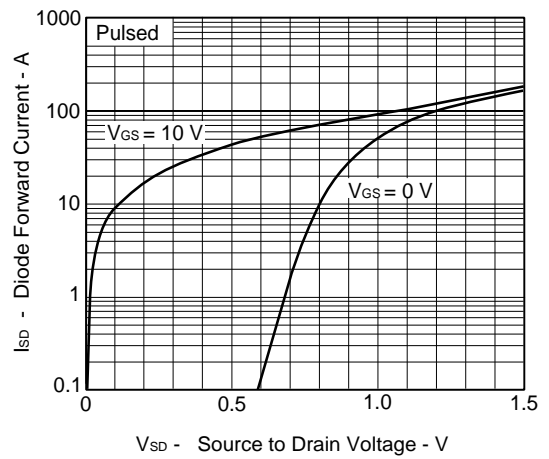


DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE

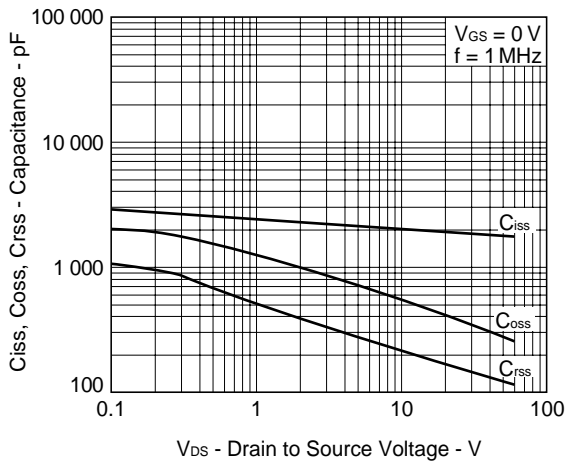


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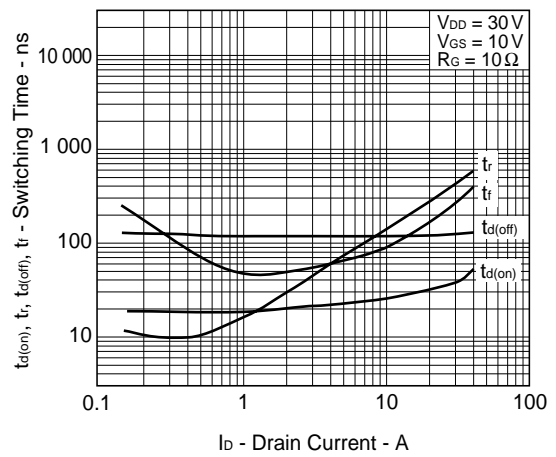
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



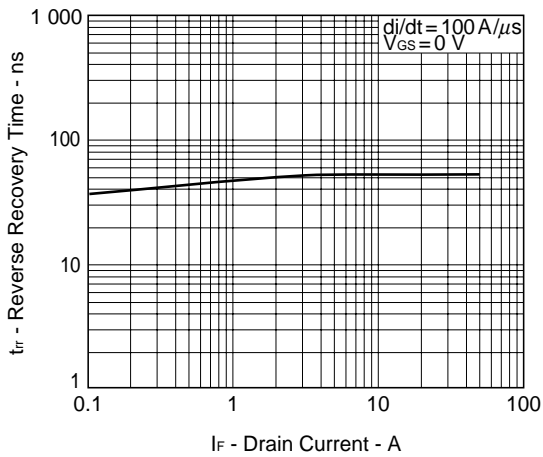
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



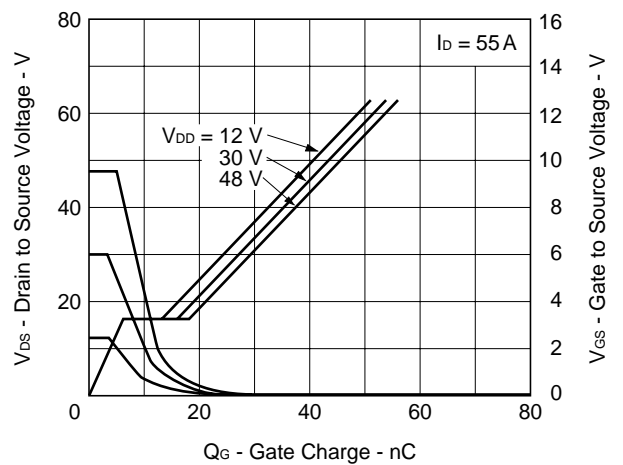
SWITCHING CHARACTERISTICS



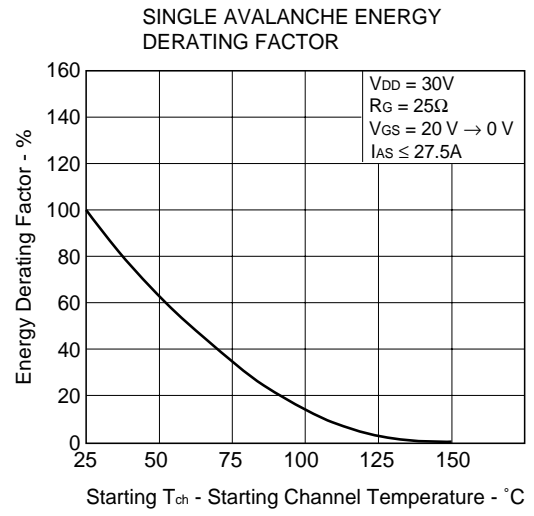
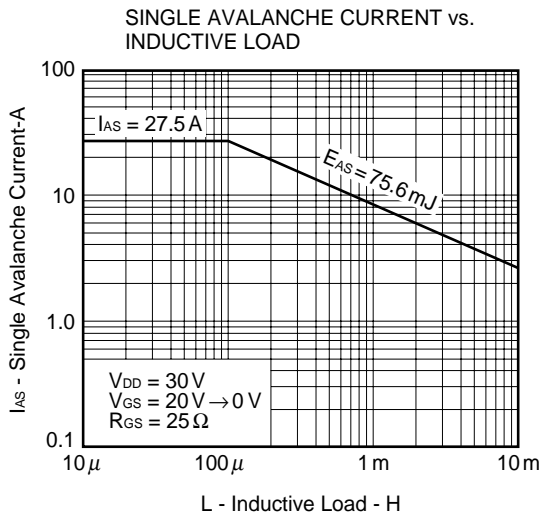
REVERSE RECOVERY TIME vs. DRAIN CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS

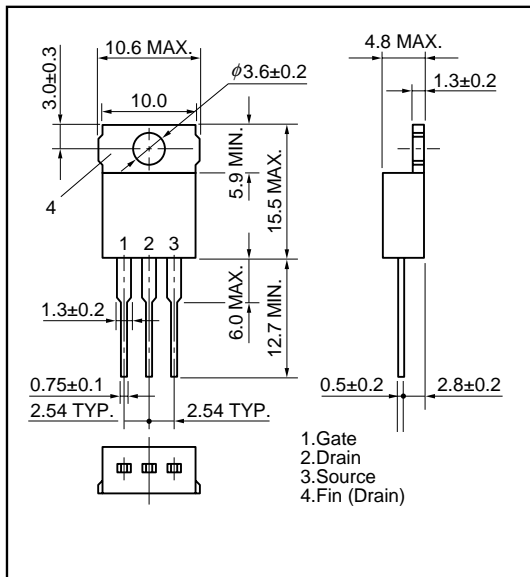


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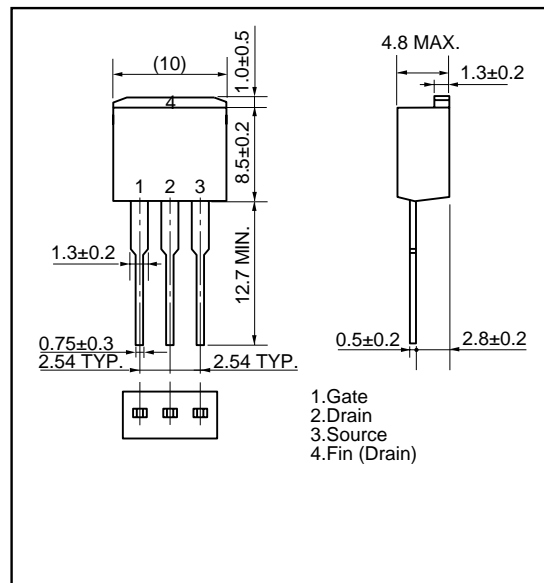


PACKAGE DRAWINGS (Unit : mm)

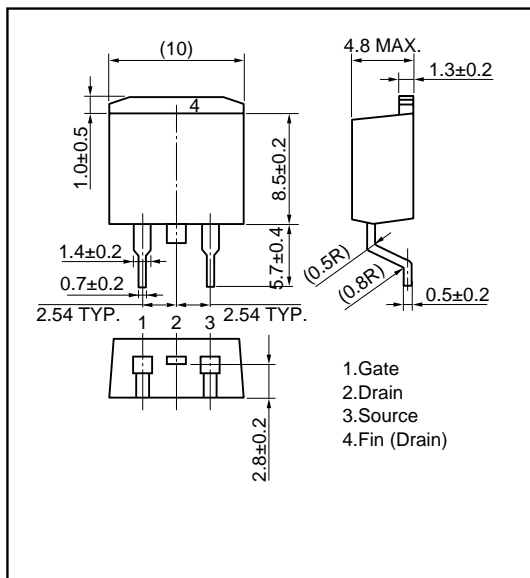
1)TO-220AB (MP-25)



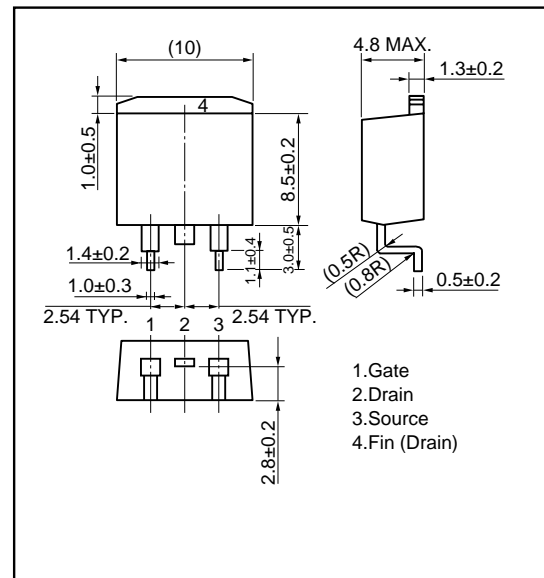
2)TO-262 (MP-25 Fin Cut)



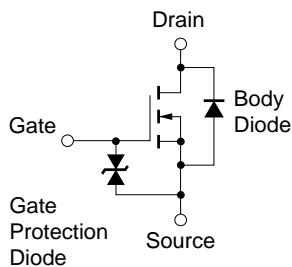
3)TO-263 (MP-25ZJ)



★ 3)TO-220SMD (MP-25Z)^{Note}



EQUIVALENT CIRCUIT



Note This package is produced only in Jaman.

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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