

## SWITCHING N-CHANNEL POWER MOS FET

### DESCRIPTION

The 2SK3479 is N-channel MOS Field Effect Transistor designed for high current switching applications.

### FEATURES

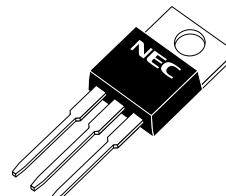
- Super low on-state resistance:  
 $R_{DS(on)1} = 11 \text{ m}\Omega \text{ MAX. (}V_{GS} = 10 \text{ V, } I_D = 42 \text{ A}\text{)}$   
 $R_{DS(on)2} = 13 \text{ m}\Omega \text{ MAX. (}V_{GS} = 4.5 \text{ V, } I_D = 42 \text{ A}\text{)}$
- Low  $C_{iss}$ :  $C_{iss} = 11000 \text{ pF TYP.}$
- Built-in gate protection diode

### ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3479	TO-220AB
2SK3479-S	TO-262
2SK3479-ZJ	TO-263
2SK3479-Z	TO-220SMD <sup>Note</sup>

**Note** TO-220SMD package is produced only in Japan.

(TO-220AB)

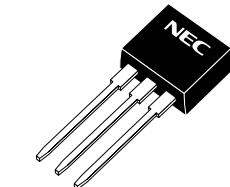


### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

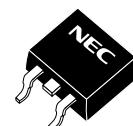
Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	100	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC) ( $T_c = 25^\circ\text{C}$ )	$I_D(\text{DC})$	$\pm 83$	A
Drain Current (pulse) <sup>Note1</sup>	$I_D(\text{pulse})$	$\pm 332$	A
Total Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_{T1}$	125	W
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_{T2}$	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>	$I_{AS}$	65	A
Single Avalanche Energy <sup>Note2</sup>	$E_{AS}$	422	mJ

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

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



(TO-263, TO-220SMD)

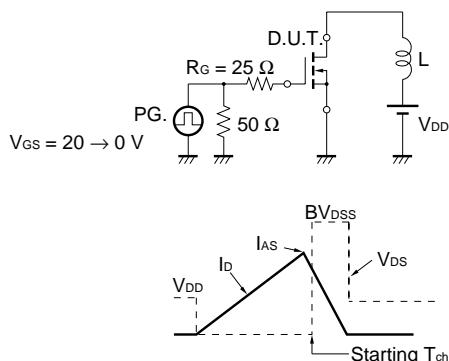


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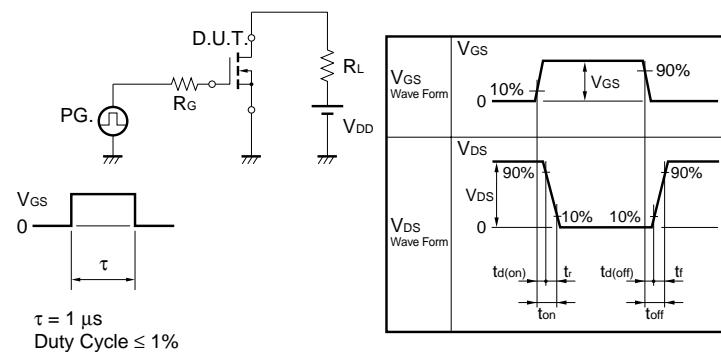
ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$ )

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 100 V, V_{GS} = 0 V$			10	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20 V, V_{DS} = 0 V$			$\pm 10$	$\mu A$
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10 V, I_D = 1 mA$	1.5		2.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10 V, I_D = 42 A$	37	74		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = 10 V, I_D = 42 A$		8.8	11	$m\Omega$
	$R_{DS(on)2}$	$V_{GS} = 4.5 V, I_D = 42 A$		10	13	$m\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = 10 V$ $V_{GS} = 0 V$ $f = 1 MHz$		11000		$pF$
Output Capacitance	$C_{oss}$			1100		$pF$
Reverse Transfer Capacitance	$C_{rss}$			540		$pF$
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 50 V, I_D = 42 A$ $V_{GS} = 10 V$ $R_G = 0 \Omega$		27		ns
Rise Time	$t_r$			18		ns
Turn-off Delay Time	$t_{d(off)}$			140		ns
Fall Time	$t_f$			13		ns
Total Gate Charge	$Q_G$	$V_{DD} = 80 V$ $V_{GS} = 10 V$ $I_D = 83 A$		210		nC
Gate to Source Charge	$Q_{GS}$			26		nC
Gate to Drain Charge	$Q_{GD}$			60		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	$I_F = 83 A, V_{GS} = 0 V$		1.0		V
Reverse Recovery Time	$t_{rr}$	$I_F = 83 A, V_{GS} = 0 V$ $di/dt = 100 A/\mu s$		85		ns
Reverse Recovery Charge	$Q_{rr}$			280		nC

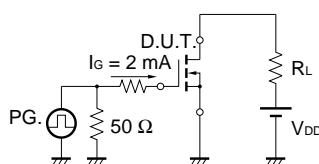
## TEST CIRCUIT 1 AVALANCHE CAPABILITY

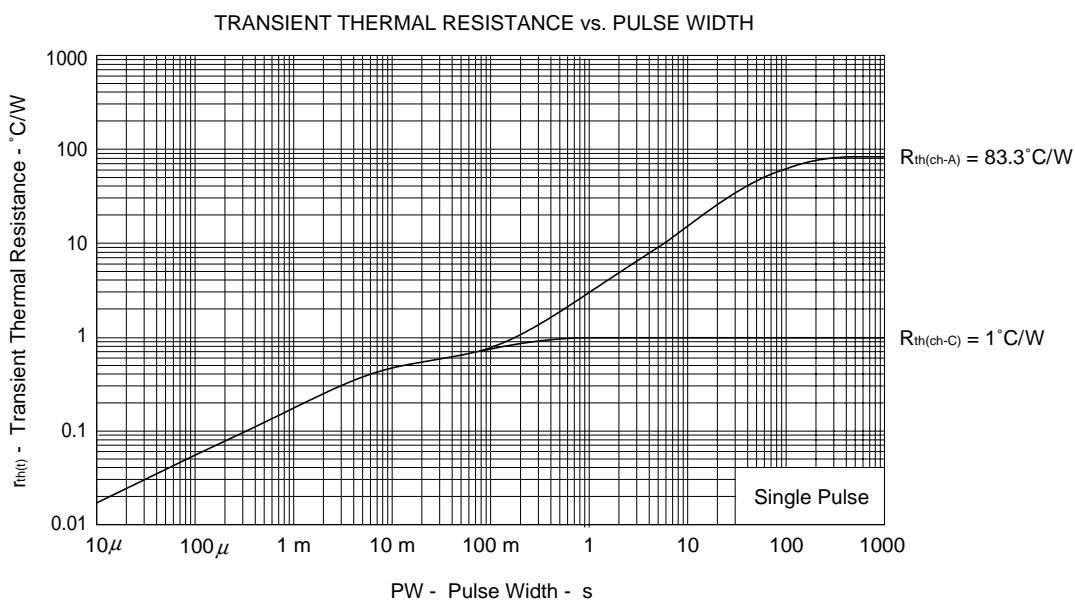
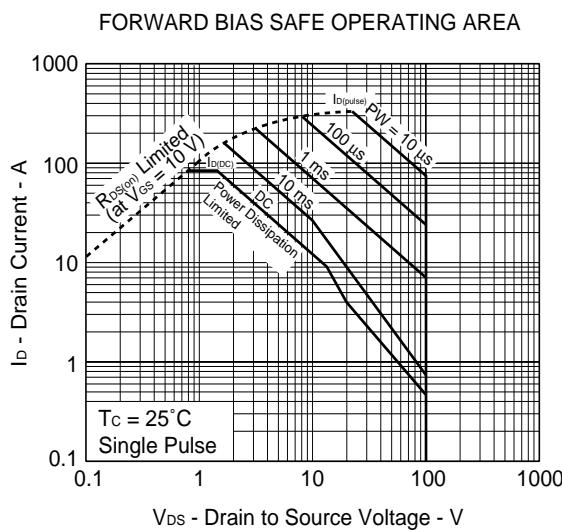
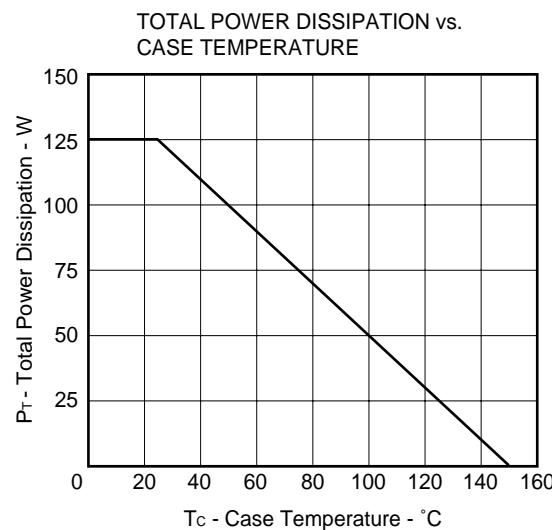
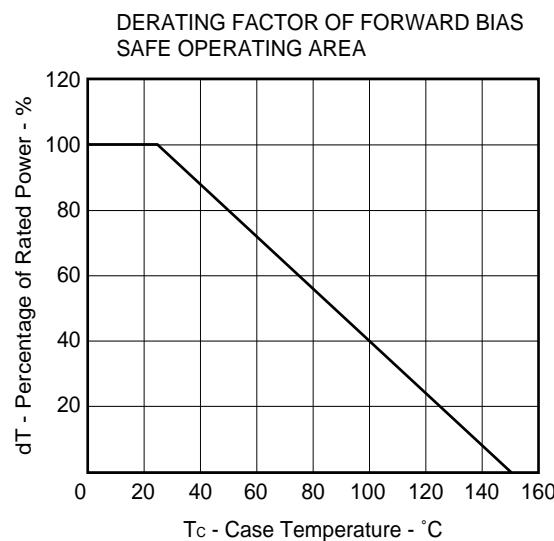


## TEST CIRCUIT 2 SWITCHING TIME

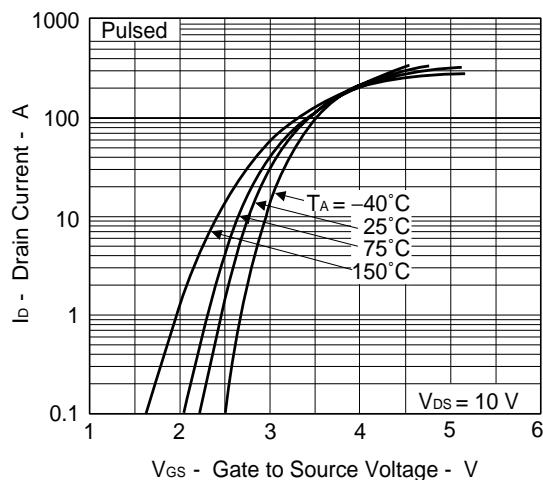


## TEST CIRCUIT 3 GATE CHARGE

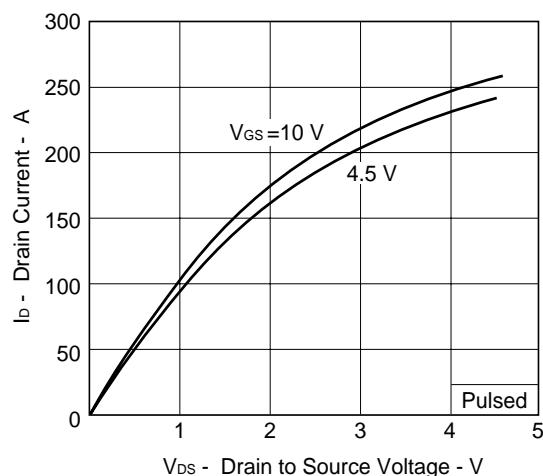


TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

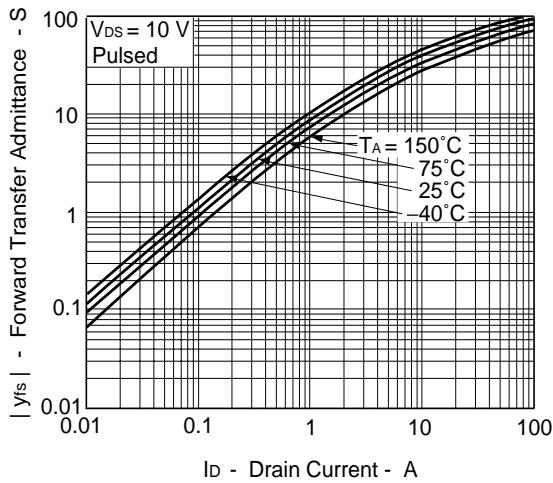
## FORWARD TRANSFER CHARACTERISTICS



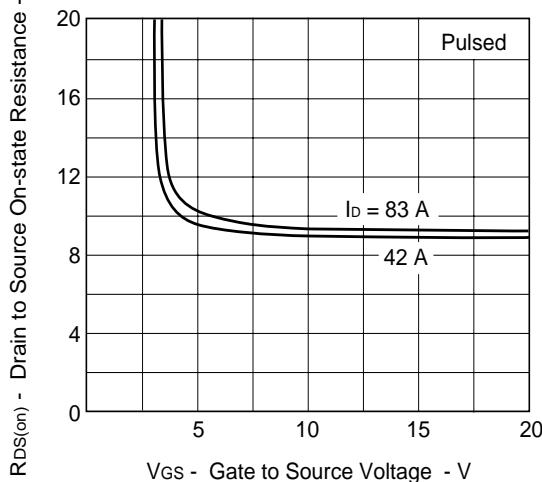
## DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



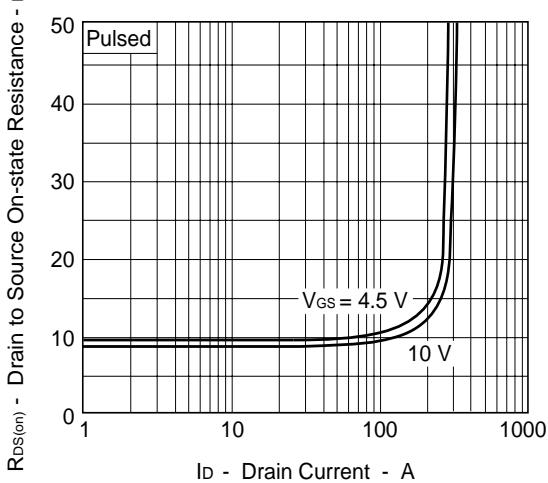
## FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



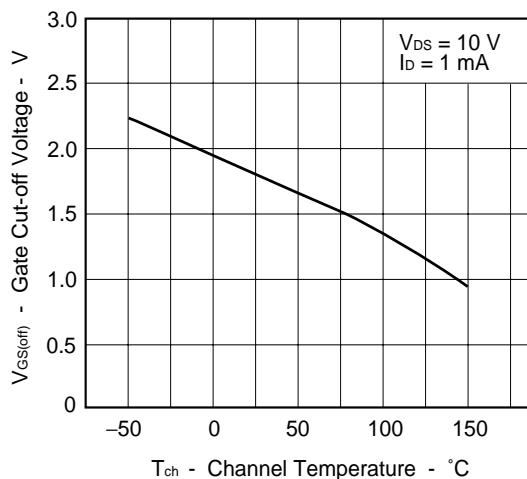
## DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

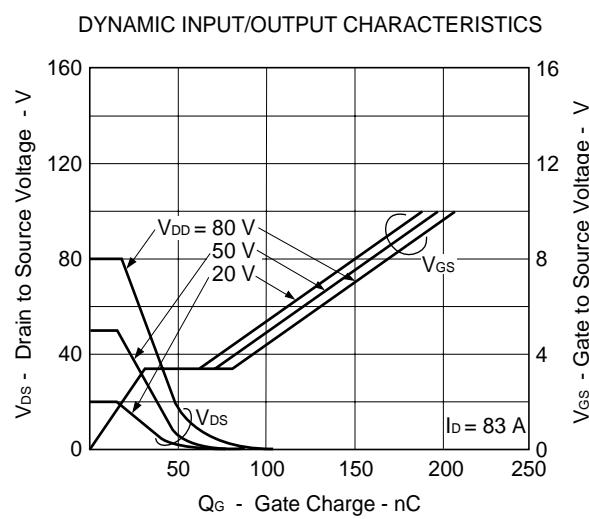
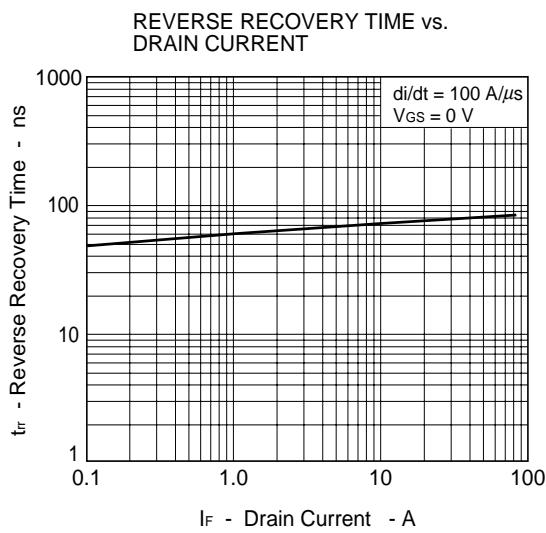
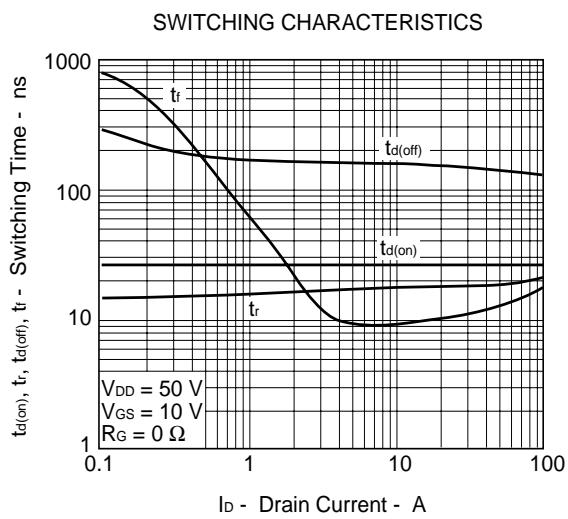
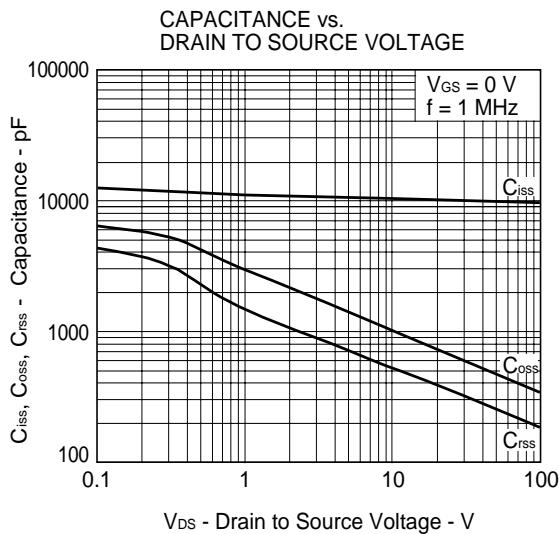
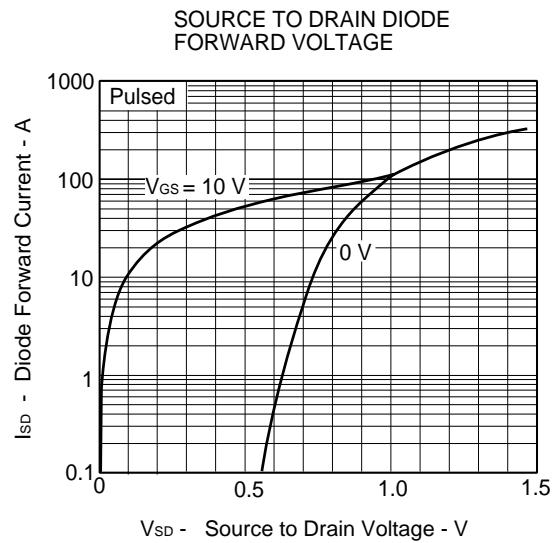
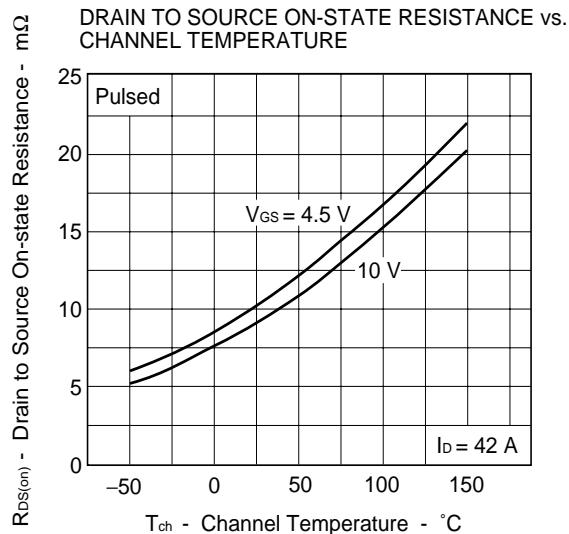


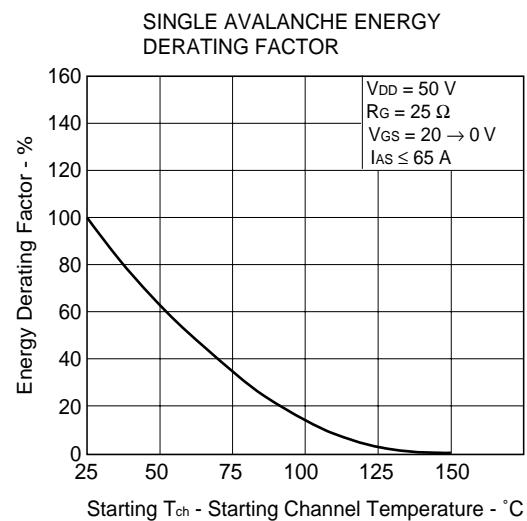
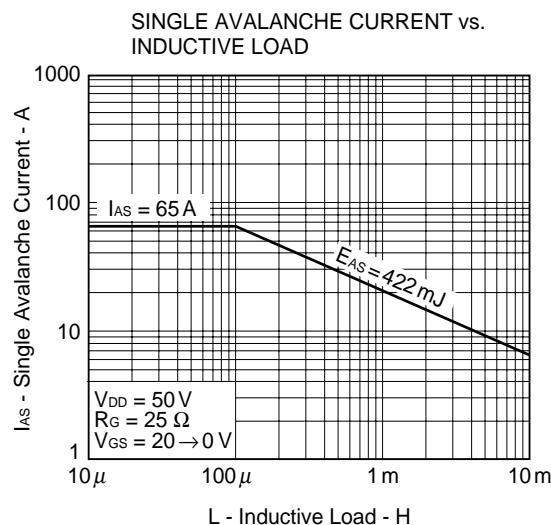
## DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



## GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE

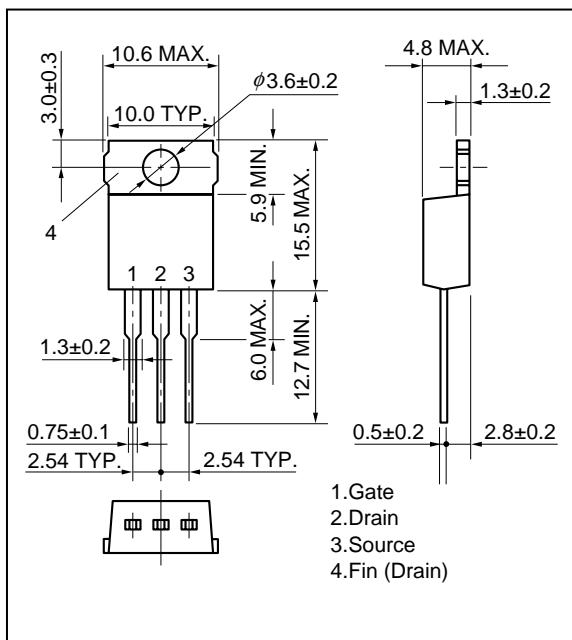




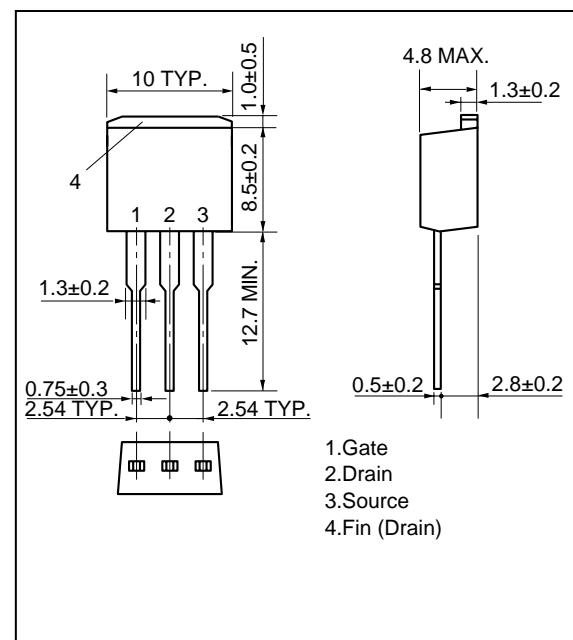


## PACKAGE DRAWINGS (Unit: mm)

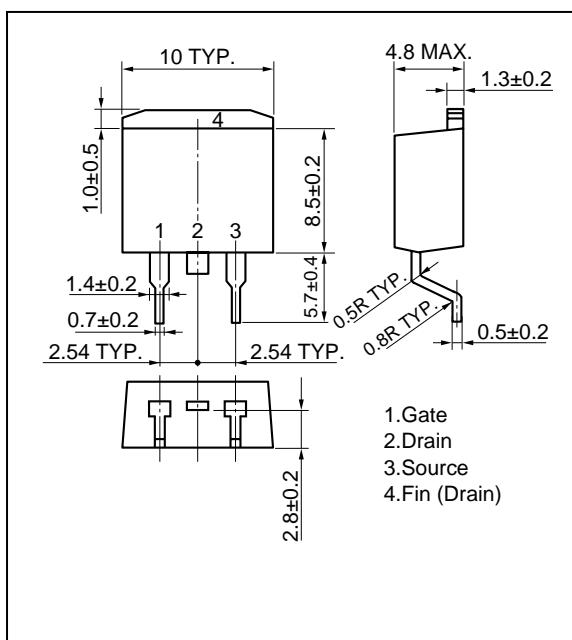
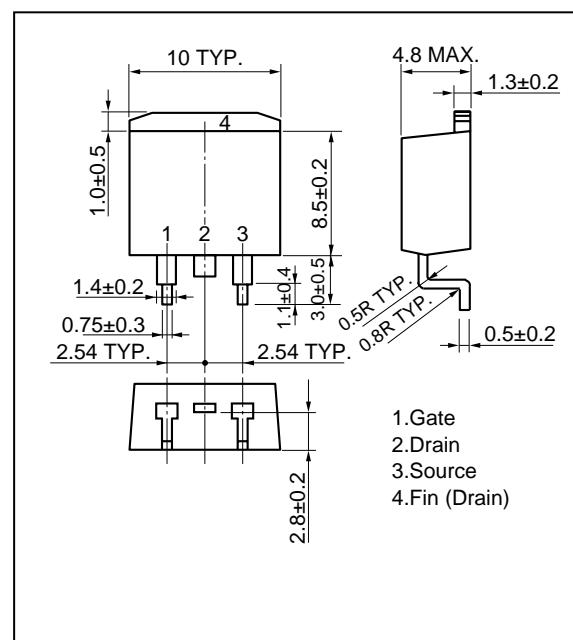
## 1) TO-220AB(MP-25)



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

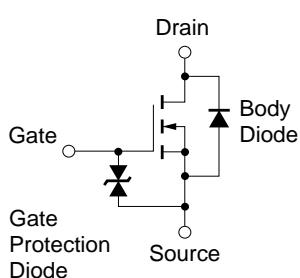


## 3) TO-263 (MP-25ZJ)

4) TO-220SMD(MP-25Z)<sup>Note</sup>

**Note** This package is produced only in Japan.

## 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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