

MOS FIELD EFFECT TRANSISTOR  
**2SK2515**

SWITCHING  
 N-CHANNEL POWER MOS FET  
 INDUSTRIAL USE

**DESCRIPTION**

The 2SK2515 is N-Channel MOS Field Effect Transistor designed for high current switching applications.

**FEATURES**

- Super Low On-Resistance  
 $R_{DS(on)1} = 9\text{ m}\Omega$  ( $V_{GS} = 10\text{ V}$ ,  $I_D = 25\text{ A}$ )  
 $R_{DS(on)2} = 14\text{ m}\Omega$  ( $V_{GS} = 4\text{ V}$ ,  $I_D = 25\text{ A}$ )
- Low  $C_{iss}$   $C_{iss} = 3\ 400\text{ pF TYP.}$
- Built-in G-S Protection Diode

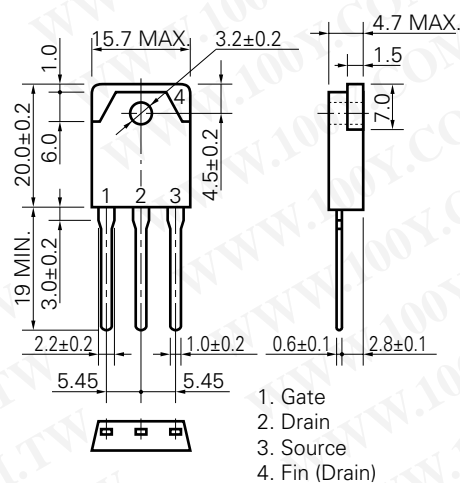
**ABSOLUTE MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ )**

Drain to Source Voltage	$V_{BSS}$	60	V
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_D$ (DC)	$\pm 50$	A
Drain Current (pulse)*	$I_D$ (pulse)	$\pm 200$	A
Total Power Dissipation ( $T_c = 25\text{ }^\circ\text{C}$ )	$P_{T1}$	150	W
Total Power Dissipation ( $T_A = 25\text{ }^\circ\text{C}$ )	$P_{T2}$	3.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

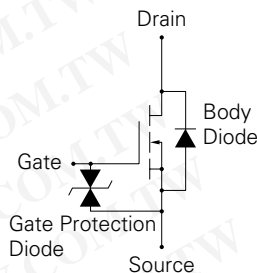
\*  $PW \leq 10\ \mu\text{s}$ , Duty Cycle  $\leq 1\ \%$

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**PACKAGE DIMENSIONS**  
 (in millimeter)



**MP-88**

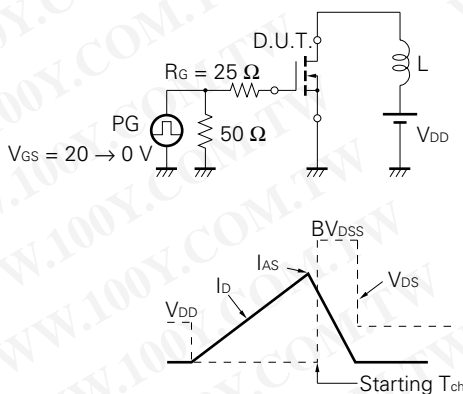


The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

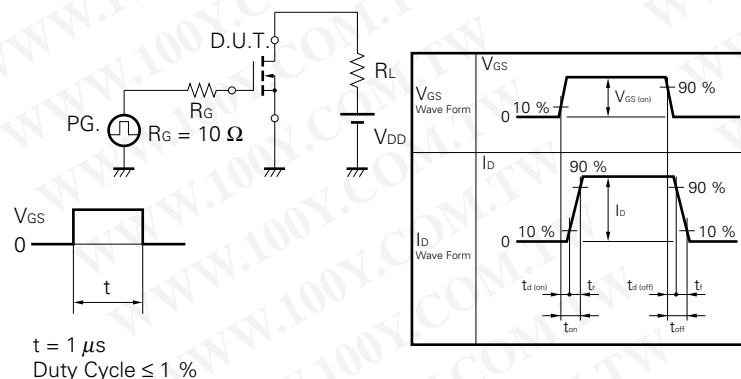
**ELECTRICAL CHARACTERISTICS (TA = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-Resistance	$R_{DS(on)1}$		7.3	9.0	mΩ	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}$
Drain to Source On-Resistance	$R_{DS(on)2}$		11	14	mΩ	$V_{GS} = 4\text{ V}, I_D = 25\text{ A}$
Gate to Source Cutoff Voltage	$V_{GS(off)}$	1.0	1.5	2.0	V	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$
Forward Transfer Admittance	$ y_{fs} $	20	58		S	$V_{DS} = 10\text{ V}, I_D = 25\text{ A}$
Drain Leakage Current	$I_{bss}$			10	μA	$V_{DS} = V_{DSS}, V_{GS} = 0$
Gate to Source Leakage Current	$I_{gss}$			±10	μA	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0$
Input Capacitance	$C_{iss}$		3 400		pF	$V_{DS} = 10\text{ V}$
Output Capacitance	$C_{oss}$		1 600		pF	$V_{GS} = 0$
Reverse Transfer Capacitance	$C_{rss}$		770		pF	$f = 1\text{ MHz}$
Turn-On Delay Time	$t_{d(on)}$		55		ns	$I_D = 25\text{ A}$
Rise Time	$t_r$		360		ns	$V_{GS(on)} = 10\text{ V}$
Turn-Off Delay Time	$t_{d(off)}$		480		ns	$V_{DD} = 30\text{ V}$
Fall Time	$t_f$		360		ns	$R_G = 10\text{ }\Omega$
Total Gate Charge	$Q_G$		152		nC	$I_D = 50\text{ A}$
Gate to Source Charge	$Q_{GS}$		11		nC	$V_{DD} = 48\text{ V}$
Gate to Drain Charge	$Q_{GD}$		60		nC	$V_{GS} = 10\text{ V}$
Body Diode Forward Voltage	$V_F(S-D)$		0.92		V	$I_F = 50\text{ A}, V_{GS} = 0$
Reverse Recovery Time	$t_{rr}$		105		ns	$I_F = 50\text{ A}, V_{GS} = 0$
Reverse Recovery Charge	$Q_{rr}$		265		nC	$di/dt = 100\text{ A}/\mu\text{s}$

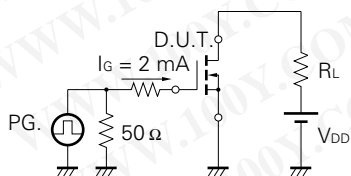
**Test Circuit 1 Avalanche Capability**



**Test Circuit 2 Switching Time**



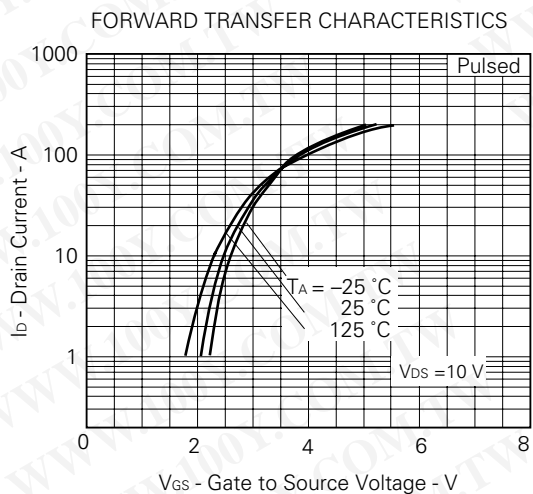
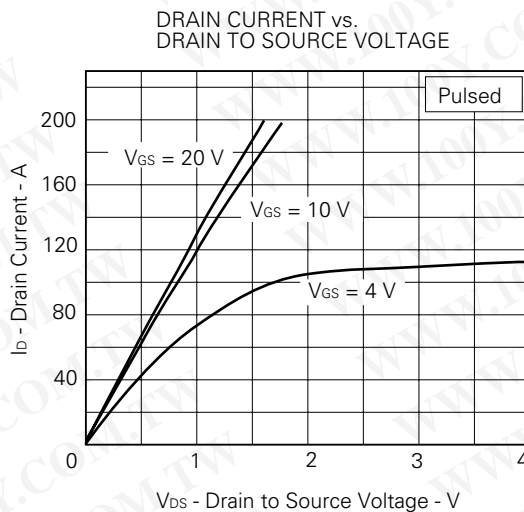
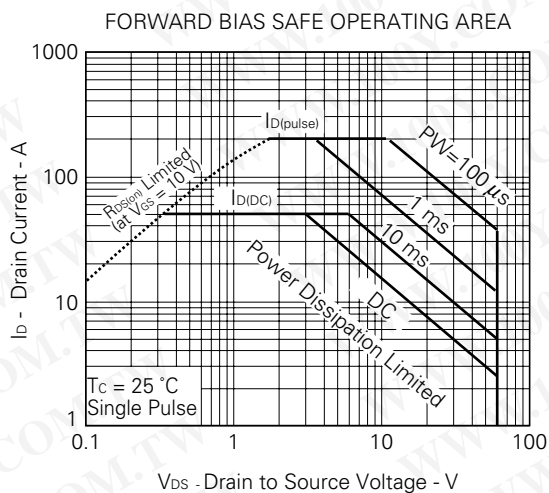
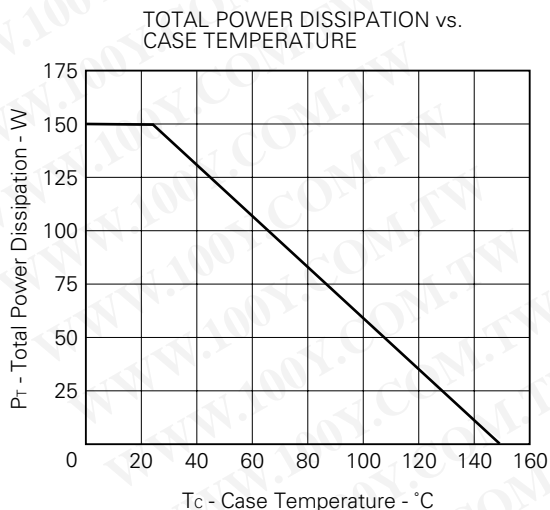
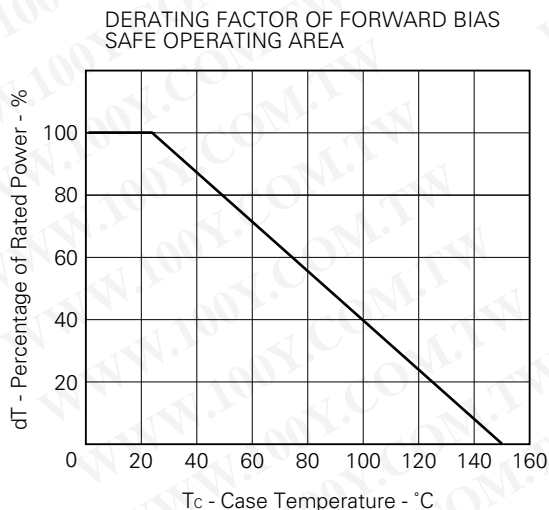
**Test Circuit 3 Gate Charge**



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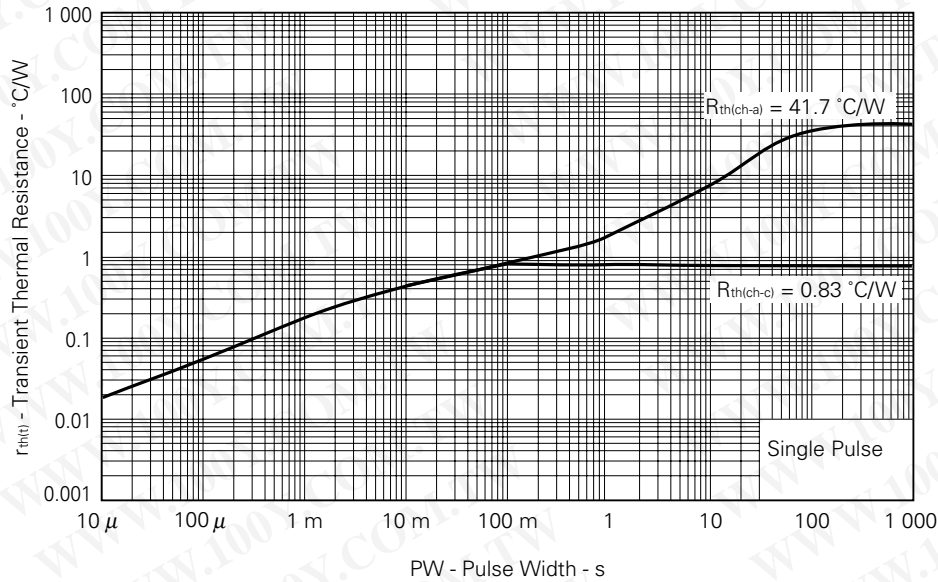
The application circuits and their parameters are for references only and are not intended for use in actual design-in's.

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

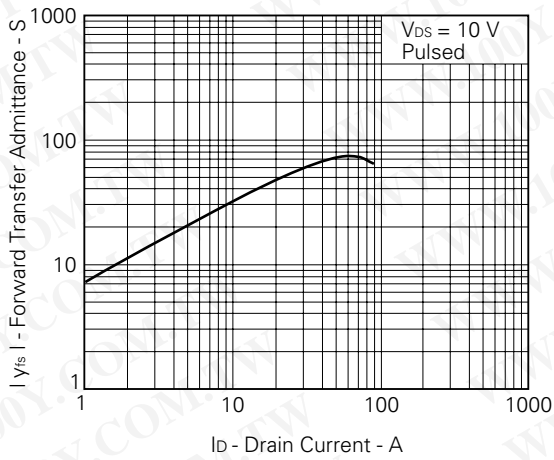


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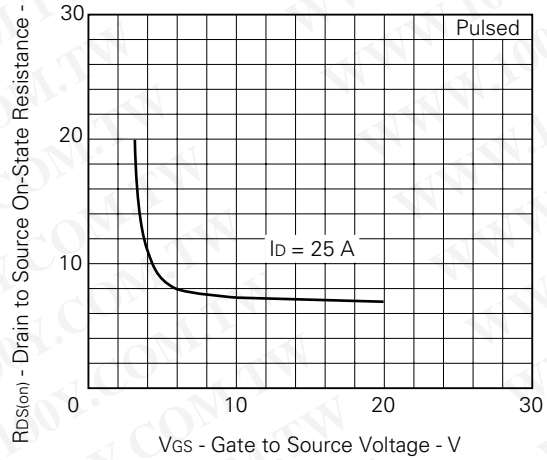
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



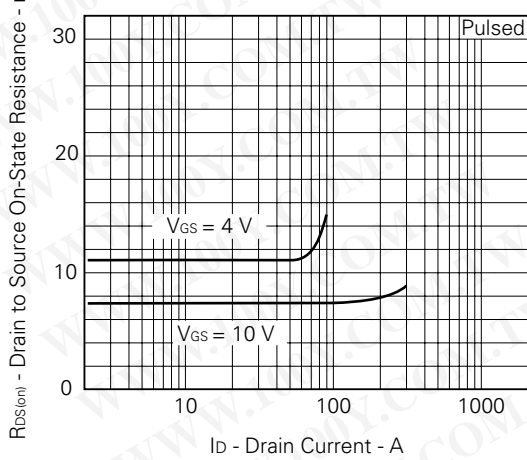
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



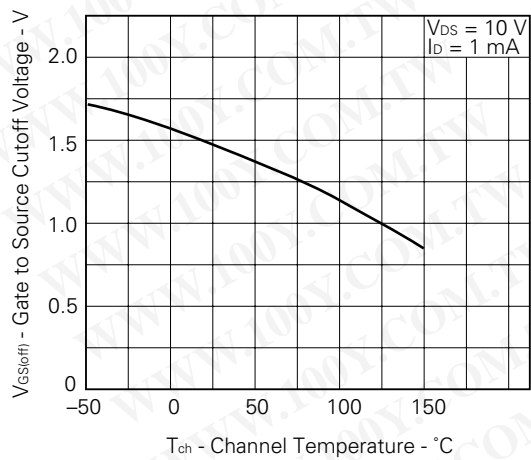
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



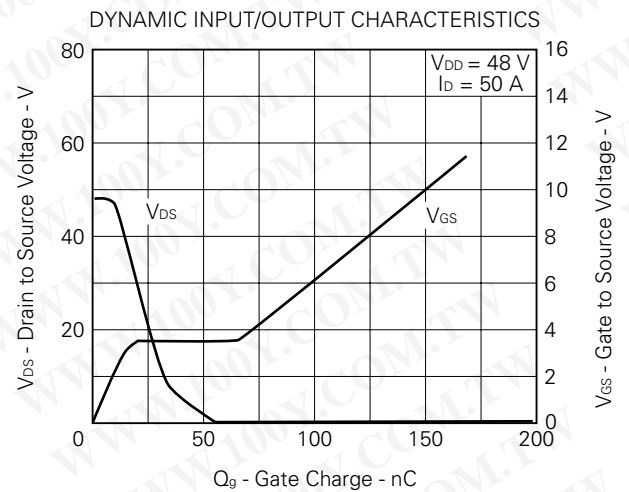
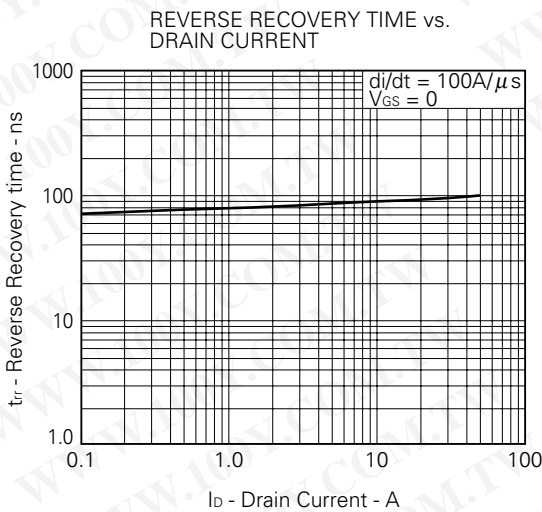
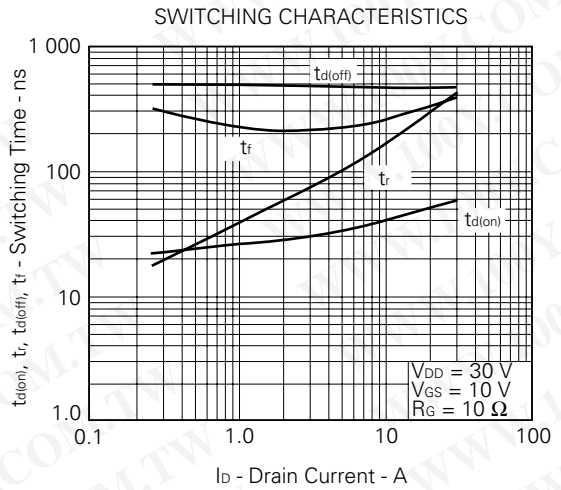
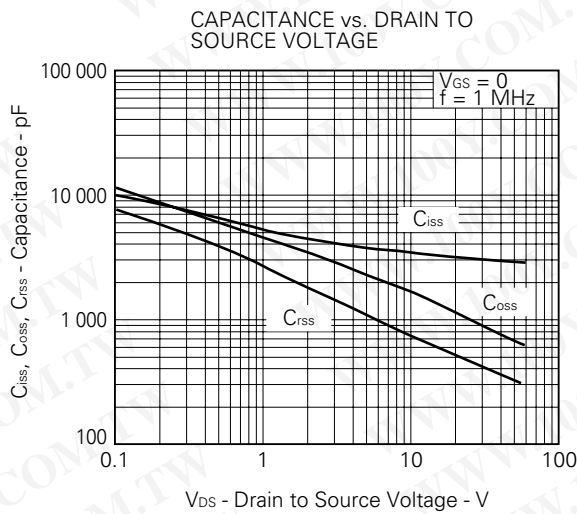
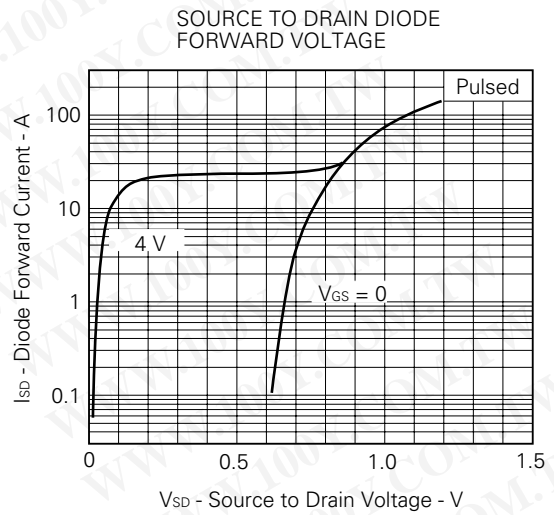
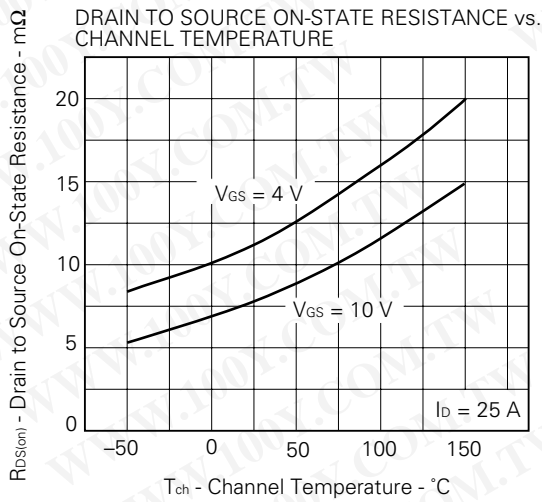
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE

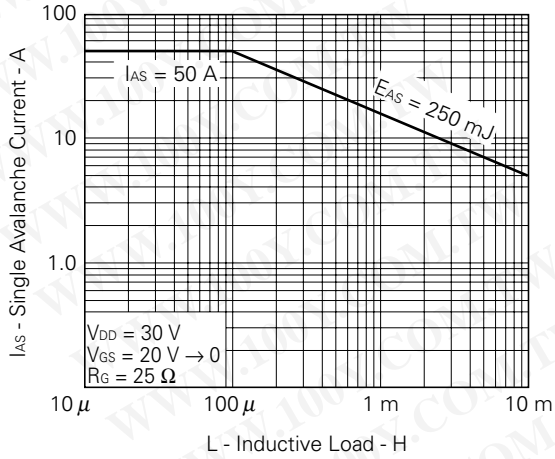


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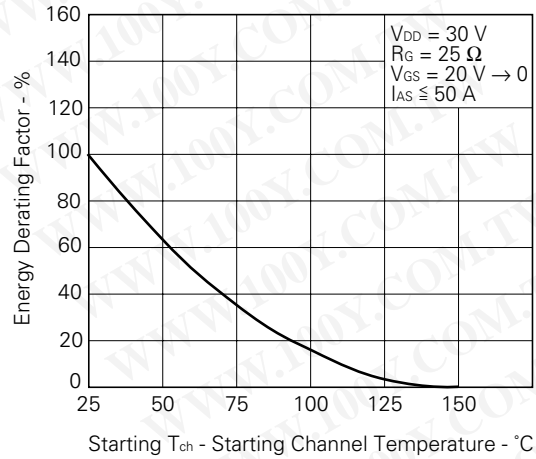


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SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY DERATING FACTOR



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**REFERENCE**

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	IEI-1209
Semiconductor device mounting technology manual.	IEI-1207
Semiconductor device package manual.	IEI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134
Power MOS FET features and application switching power supply.	TEA-1034
Application circuits using Power MOS FET.	TEA-1035
Safe operating area of Power MOS FET.	TEA-1037

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