

MOS FIELD EFFECT TRANSISTOR
2SK2498

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

2SK2498 is N-Channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Super Low On-State Resistance
 $R_{DS(on)1} \leq 9 \text{ m}\Omega$ ($V_{GS} = 10 \text{ V}$, $I_D = 25 \text{ A}$)
 $R_{DS(on)2} \leq 14 \text{ m}\Omega$ ($V_{GS} = 4 \text{ V}$, $I_D = 25 \text{ A}$)
- Low C_{iss} $C_{iss} = 3400 \text{ pF TYP.}$
- High Avalanche Capability Ratings
- Isolate TO-220 Package
- Built-in G-S Protection Diode

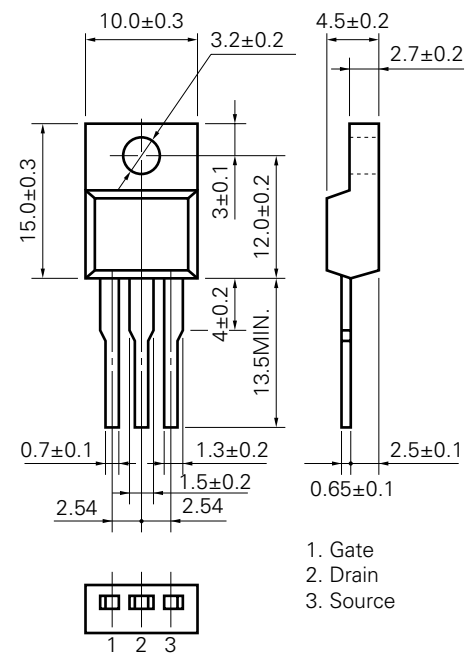
ABSOLUTE MAXIMUM RATINGS ($T_A = 25 \text{ }^\circ\text{C}$)

| | | | |
|---|----------------|-------------|------------------|
| Drain to Source Voltage | V_{DSS} | 60 | V |
| Gate to Source Voltage | V_{GSS} | ± 20 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ± 50 | A |
| Drain Current (pulse)* | $I_{D(pulse)}$ | ± 200 | A |
| Total Power Dissipation ($T_c = 25 \text{ }^\circ\text{C}$) | P_{T1} | 35 | W |
| Total Power Dissipation ($T_A = 25 \text{ }^\circ\text{C}$) | P_{T2} | 2.0 | W |
| Channel Temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |
| Single Avalanche Current** | I_{AS} | 50 | A |
| Single Avalanche Energy** | E_{AS} | 250 | mJ |

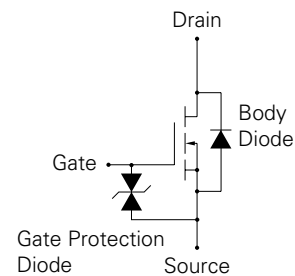
* $PW \leq 10 \text{ }\mu\text{s}$, Duty Cycle $\leq 1 \%$

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

PACKAGE DIMENSIONS
(in millimeter)



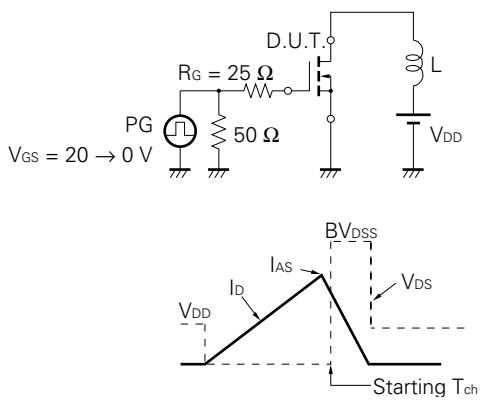
MP-45F (ISOLATED TO-220)



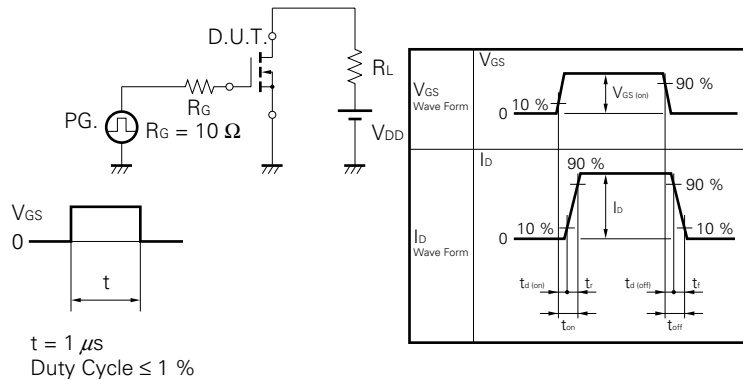
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| 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 V, I _D = 25 A |
| | R _{DS (on)2} | | 11 | 14 | mΩ | V _{GS} = 4 V, I _D = 25 A |
| Gate to Source Cutoff Voltage | V _{GS (off)} | 1.0 | 1.5 | 2.0 | V | V _{DS} = 10 V, I _D = 1 mA |
| Forward Transfer Admittance | y _{fs} | 20 | 58 | | S | V _{DS} = 10 V, I _D = 25 A |
| Drain Leakage Current | I _{DSS} | | | 10 | μA | V _{DS} = 60 V, V _{GS} = 0 |
| Gate to Source Leakage Current | I _{GSS} | | | ±10 | nA | V _{GS} = ±20 V, V _{DS} = 0 |
| Input Capacitance | C _{iss} | | 3400 | | pF | V _{DS} = 10 V |
| Output Capacitance | C _{oss} | | 1600 | | pF | V _{GS} = 0 |
| Reverse Transfer Capacitance | C _{rss} | | 770 | | pF | f = 1 MHz |
| Turn-On Delay Time | t _{d (on)} | | 55 | | ns | I _D = 25 A |
| Rise Time | t _r | | 360 | | ns | V _{GS(on)} = 10 V |
| Turn-Off Delay Time | t _{d (off)} | | 480 | | ns | V _{DD} = 30 V |
| Fall Time | t _f | | 360 | | ns | R _G = 10 Ω |
| Total Gate Charge | Q _G | | 152 | | nC | I _D = 50 A |
| Gate to Source Charge | Q _{GS} | | 11 | | nC | V _{DD} = 48 V |
| Gate to Drain Charge | Q _{GD} | | 60 | | nC | V _{GS} = 10 V |
| Body Diode Forward Voltage | V _{F (S-D)} | | 0.92 | | V | I _F = 50 A, V _{GS} = 0 |
| Reverse Recovery Time | t _{rr} | | 105 | | ns | I _F = 50 A, V _{GS} = 0 |
| Reverse Recovery Charge | Q _{rr} | | 265 | | μC | di/dt = 100 A/μs |

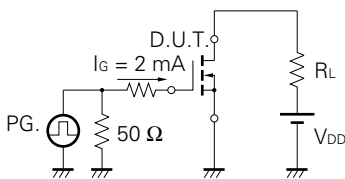
Test Circuit 1 Avalanche Capability



Test Circuit 2 Switching Time

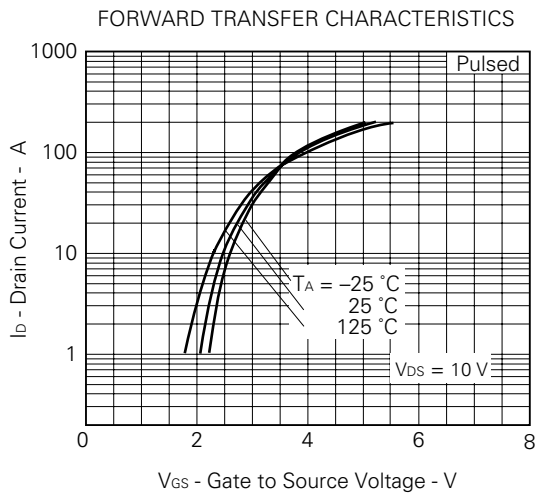
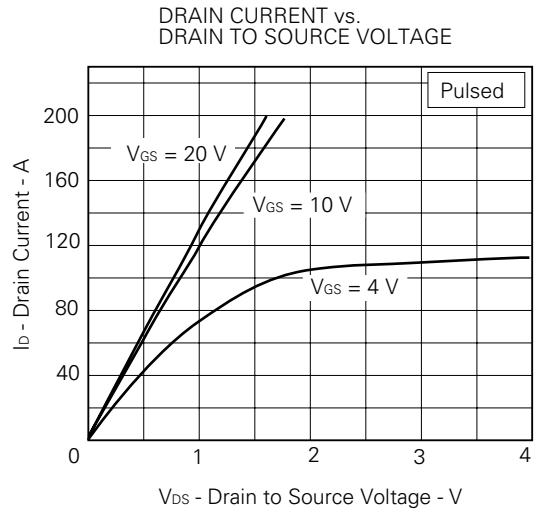
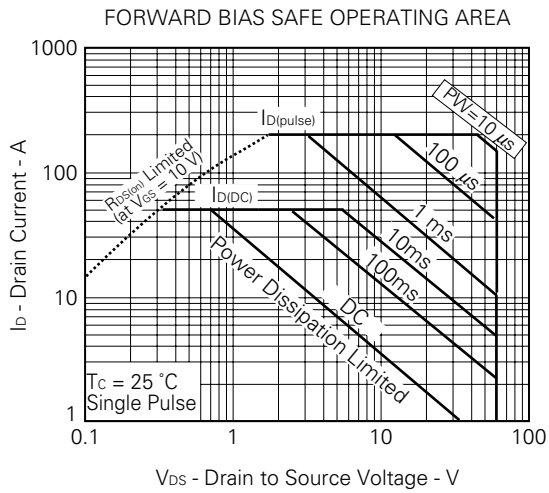
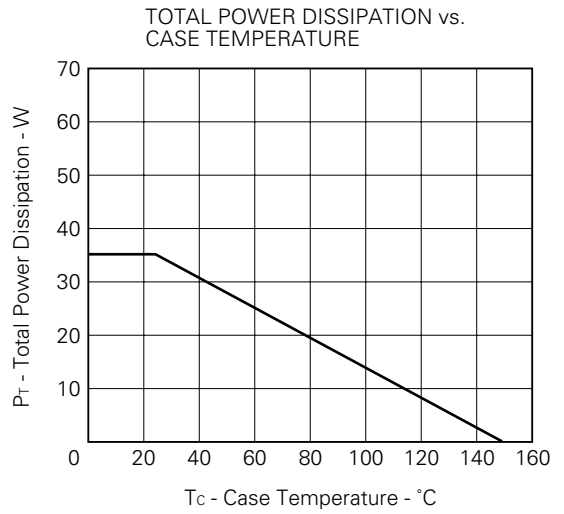
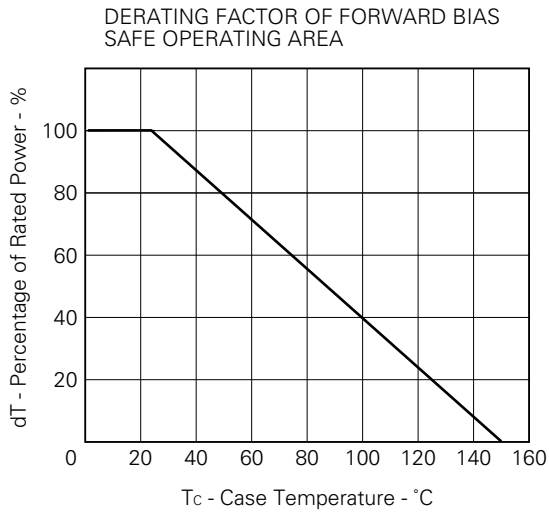


Test Circuit 3 Gate Charge

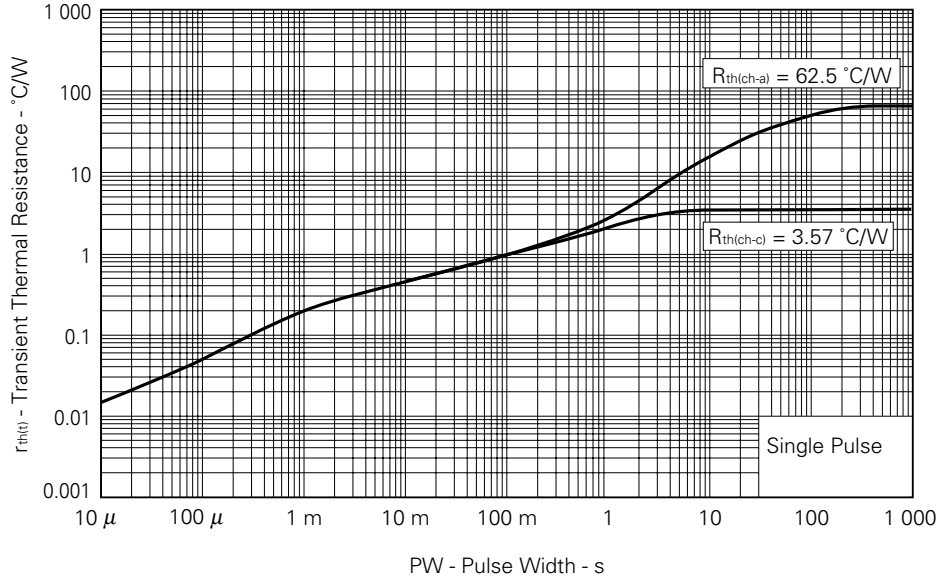


The application circuits and their parameters are for references only and are not intended for use in actual design-in's.

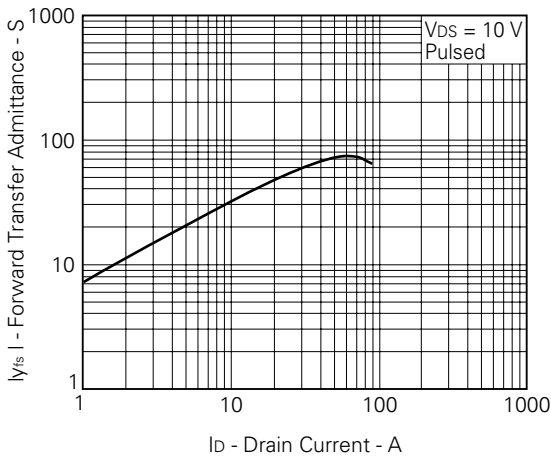
TYPICAL CHARACTERISTICS (T_A = 25 °C)



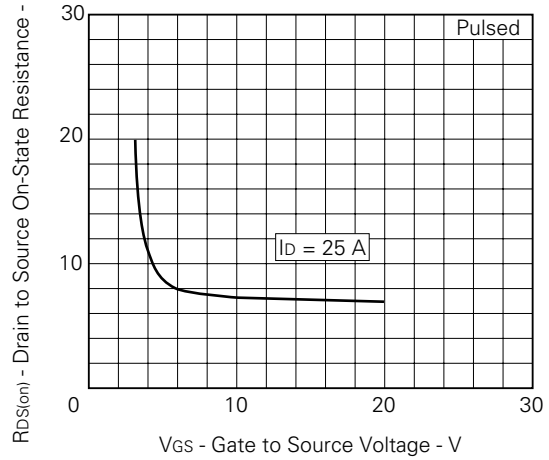
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



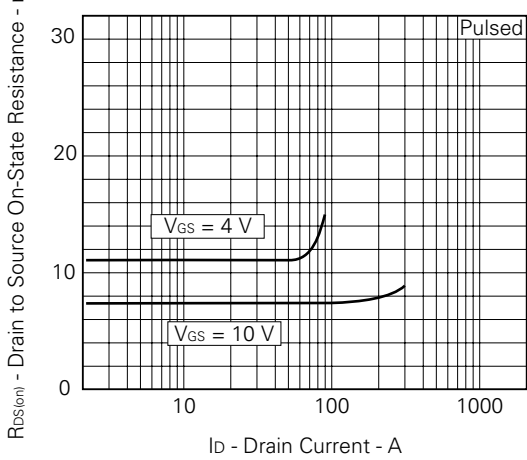
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



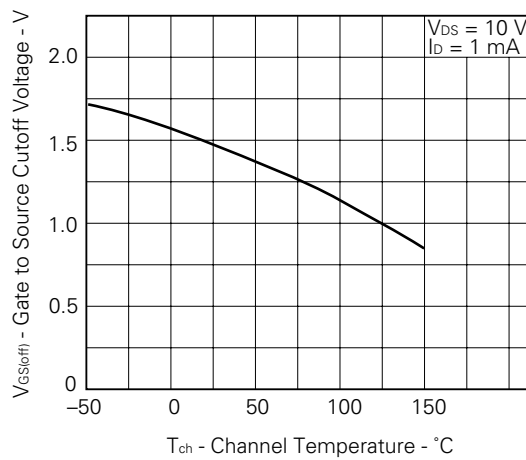
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

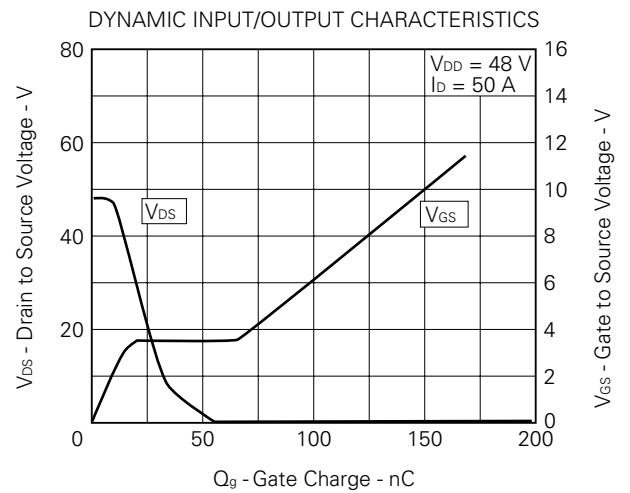
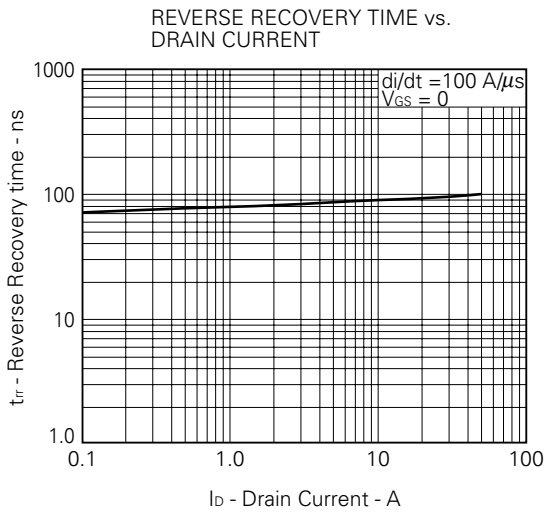
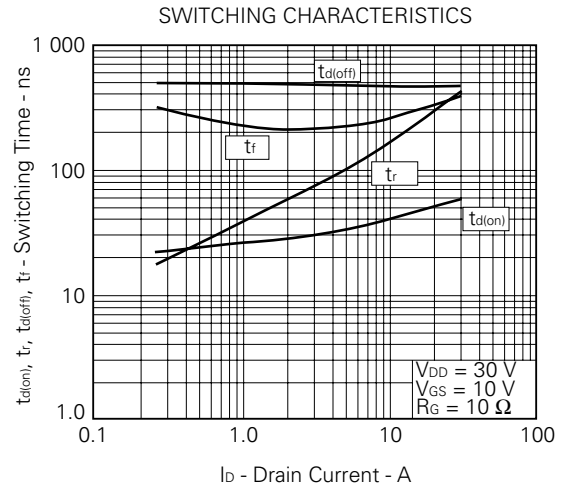
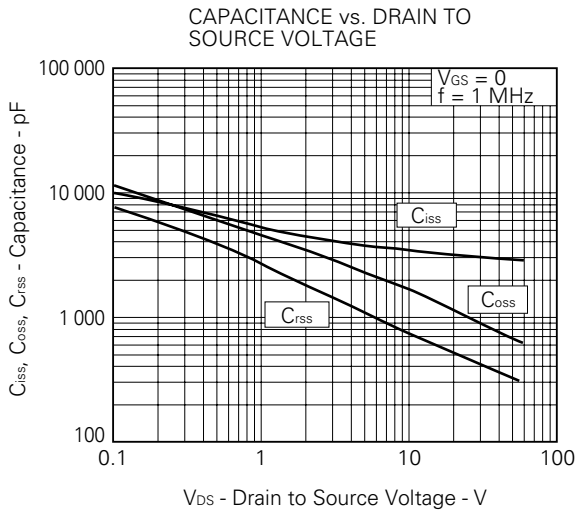
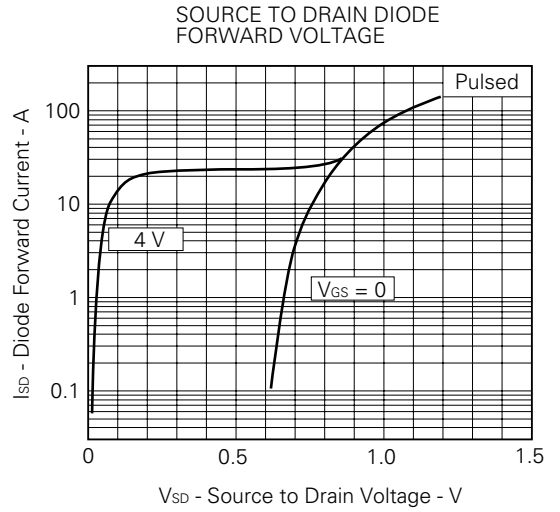
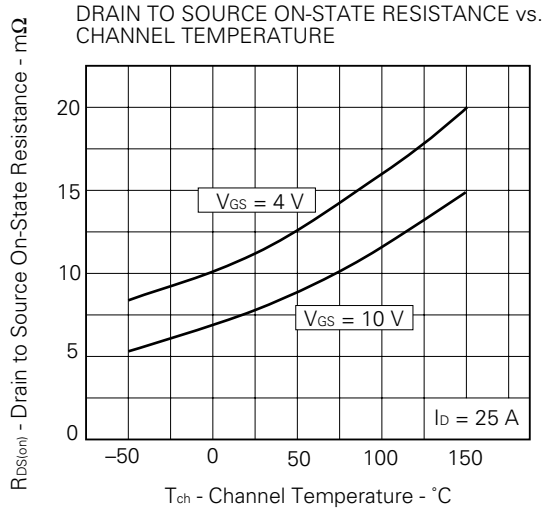


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

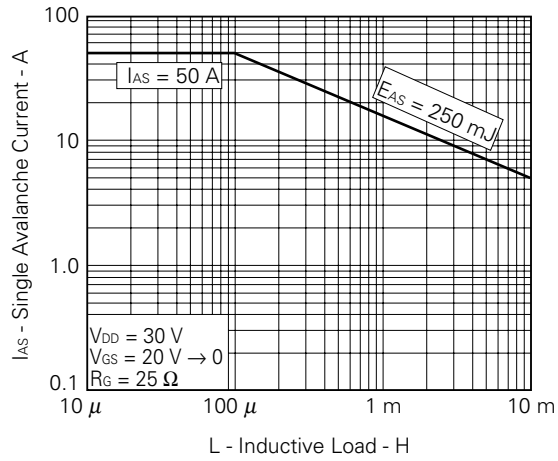


GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE

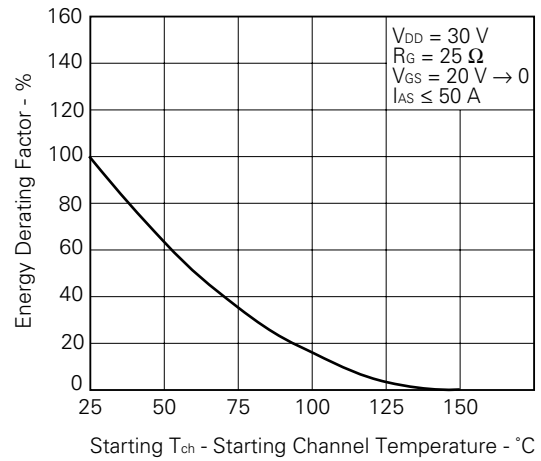




SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY DERATING FACTOR



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 |

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.

[MEMO]

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Anti-radioactive design is not implemented in this product.