

MOS FIELD EFFECT TRANSISTOR
2SK2511

**SWITCHING
 N-CHANNEL POWER MOS FET
 INDUSTRIAL USE**

DESCRIPTION

The 2SK2511 is N-Channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

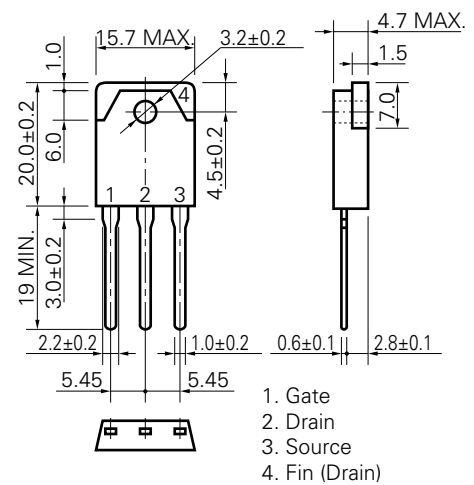
- Super Low On-Resistance
 $R_{DS(on)1} = 27\text{ m}\Omega$ ($V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$)
 $R_{DS(on)2} = 40\text{ m}\Omega$ ($V_{GS} = 4\text{ V}$, $I_D = 20\text{ A}$)
- Low C_{iss} $C_{iss} = 1\ 210\text{ pF TYP.}$
- Built-in G-S Protection Diode

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

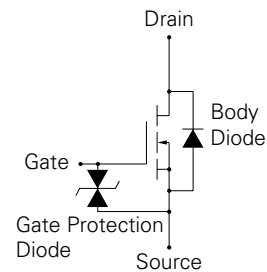
Drain to Source Voltage	V_{BSS}	60	V
Gate to Source Voltage	V_{GSS}	± 20	V
Drain Current (DC)	I_D (DC)	± 40	A
Drain Current (pulse)*	I_D (pulse)	± 160	A
Total Power Dissipation ($T_c = 25\text{ }^\circ\text{C}$)	P_{T1}	80	W
Total Power Dissipation ($T_A = 25\text{ }^\circ\text{C}$)	P_{T2}	3.0	W
Channel 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 $\leq 1\ \%$

**PACKAGE DIMENSIONS
 (in millimeter)**



MP-88

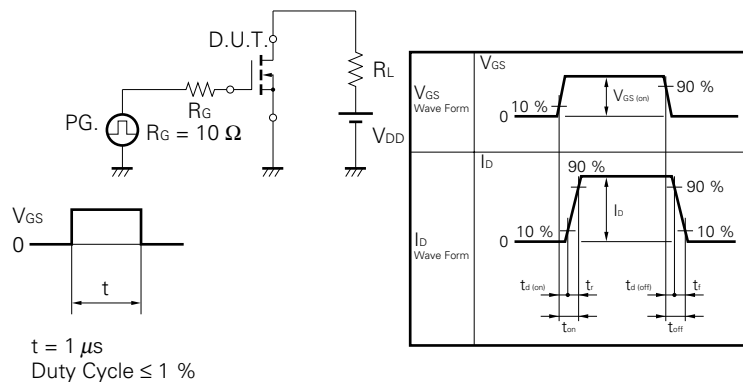


The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

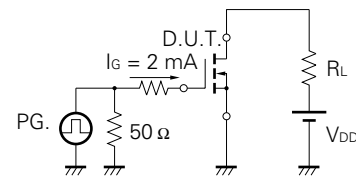
ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-Resistance	$R_{DS(on)1}$		22	27	mΩ	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$
Drain to Source On-Resistance	$R_{DS(on)2}$		32	40	mΩ	$V_{GS} = 4\text{ V}, I_D = 20\text{ A}$
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} $	10			S	$V_{DS} = 10\text{ V}, I_D = 20\text{ A}$
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}		1 210		pF	$V_{DS} = 10\text{ V}$
Output Capacitance	C_{oss}		610		pF	$V_{GS} = 0$
Reverse Transfer Capacitance	C_{rss}		270		pF	$f = 1\text{ MHz}$
Turn-On Delay Time	$t_{d(on)}$		32		ns	$I_D = 20\text{ A}$
Rise Time	t_r		300		ns	$V_{GS} = 10\text{ V}$
Turn-Off Delay Time	$t_{d(off)}$		160		ns	$V_{DD} = 30\text{ V}$
Fall Time	t_f		220		ns	$R_G = 10\ \Omega$
Total Gate Charge	Q_G		50		nC	$I_D = 40\text{ A}$
Gate to Source Charge	Q_{GS}		4.5		nC	$V_{DD} = 48\text{ V}$
Gate to Drain Charge	Q_{GD}		21		nC	$V_{GS} = 10\text{ V}$
Body Diode Forward Voltage	$V_F(S-D)$		1.0		V	$I_F = 40\text{ A}, V_{GS} = 0$
Reverse Recovery Time	t_{rr}		70		ns	$I_F = 40\text{ A}, V_{GS} = 0$
Reverse Recovery Charge	Q_{rr}		140		nC	$di/dt = 100\text{ A}/\mu\text{s}$

Test Circuit 1 Switching Time

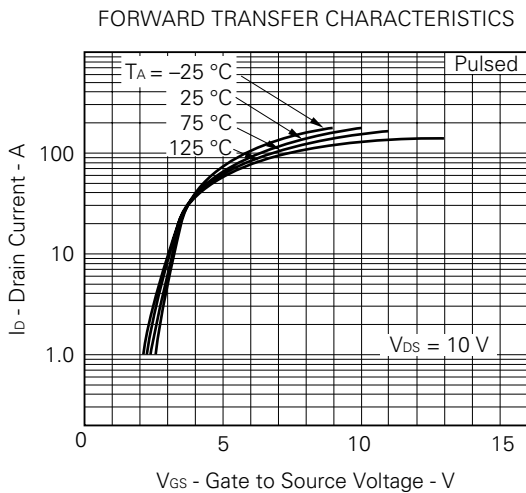
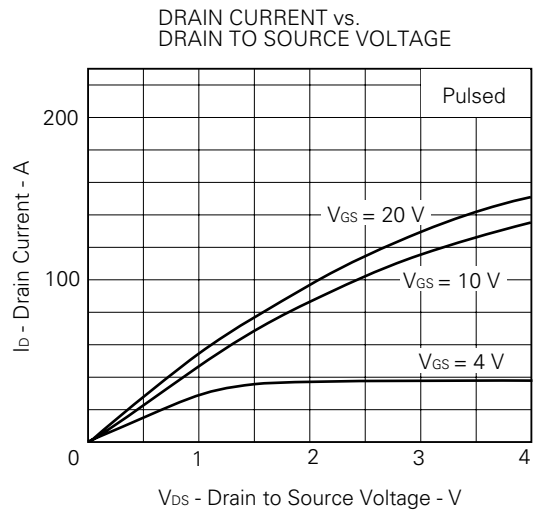
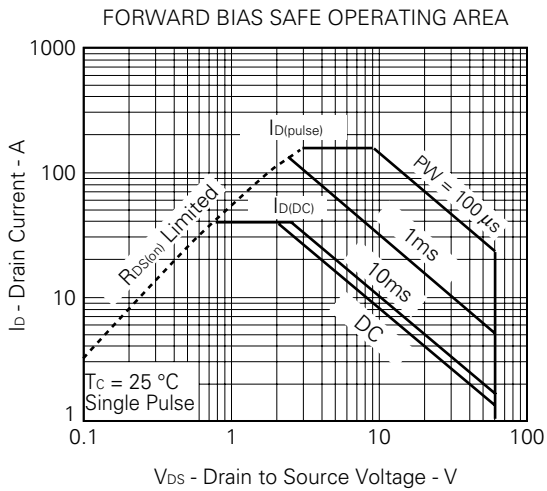
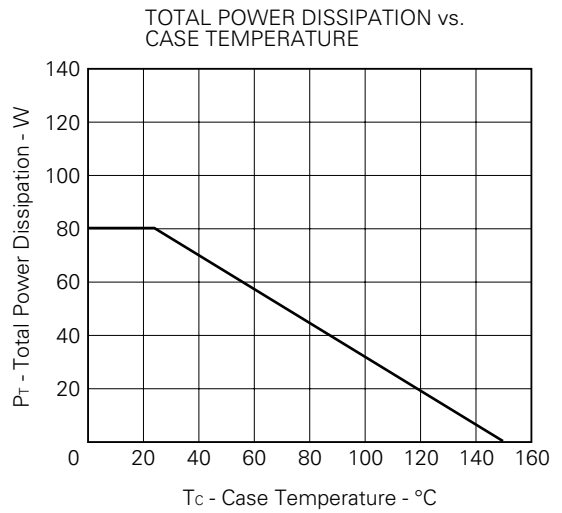
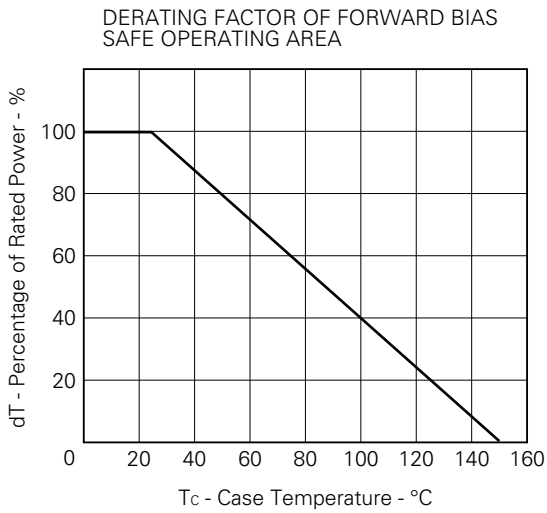


Test Circuit 2 Gate Charge

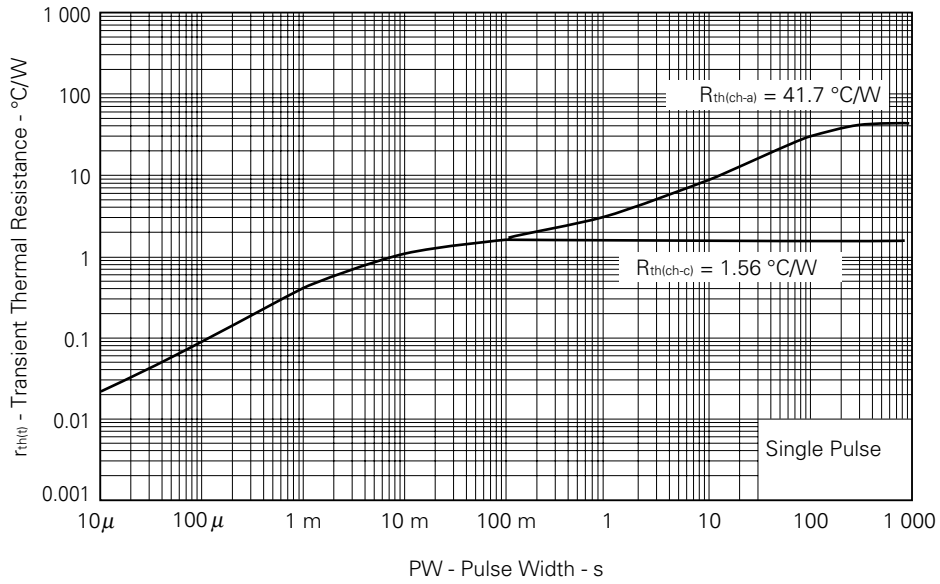


The application circuits and their parameters are for references only and are not intended for use in actual design-in's.

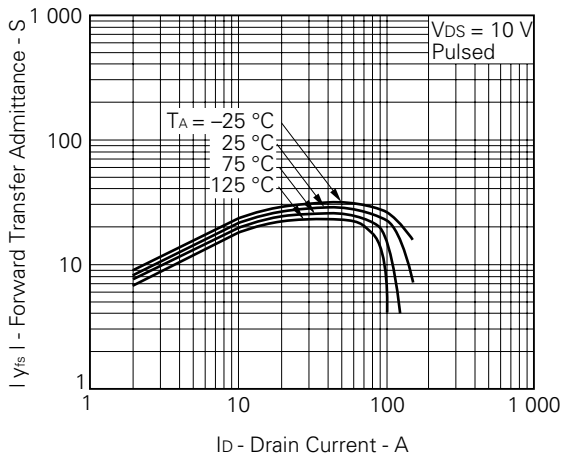
TYPICAL CHARACTERISTICS (T_A = 25 °C)



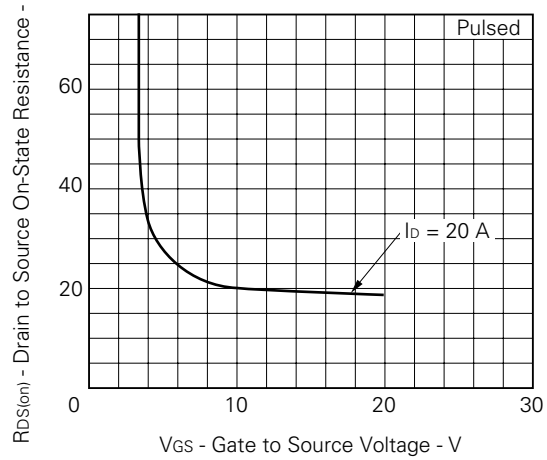
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



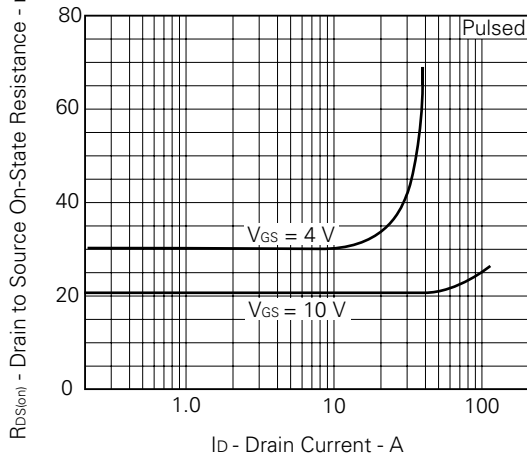
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



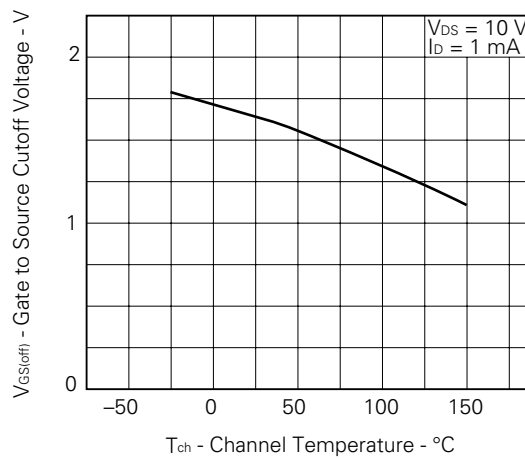
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



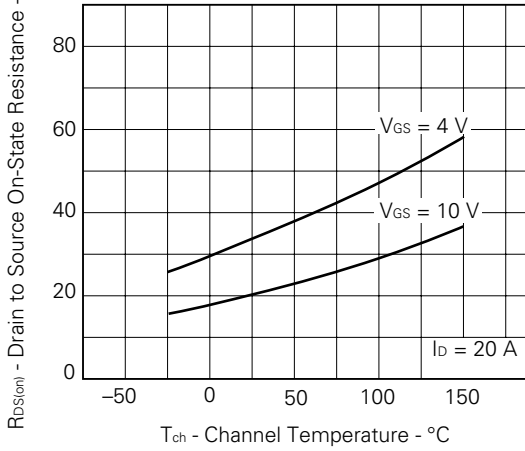
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



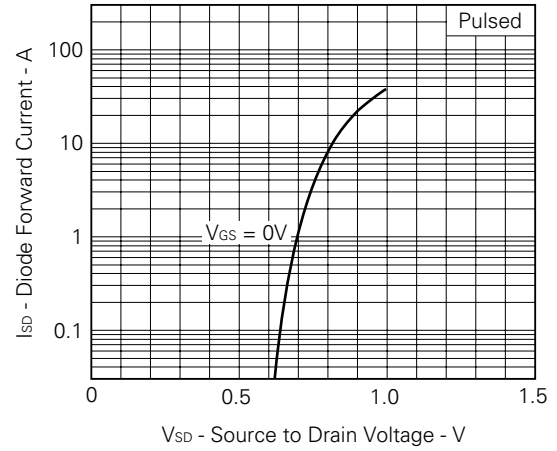
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



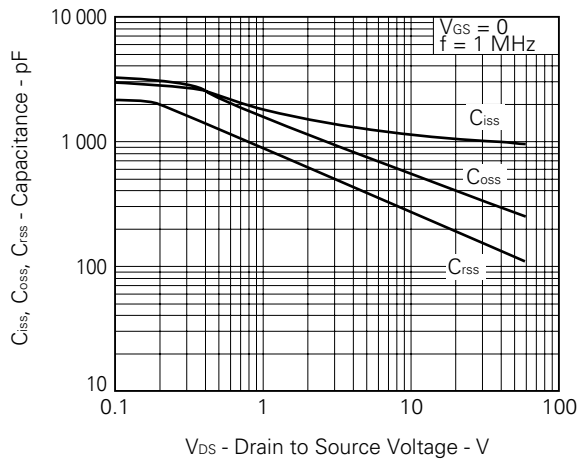
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



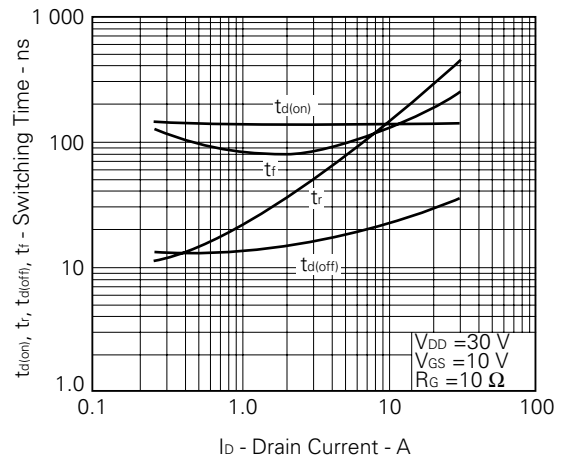
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



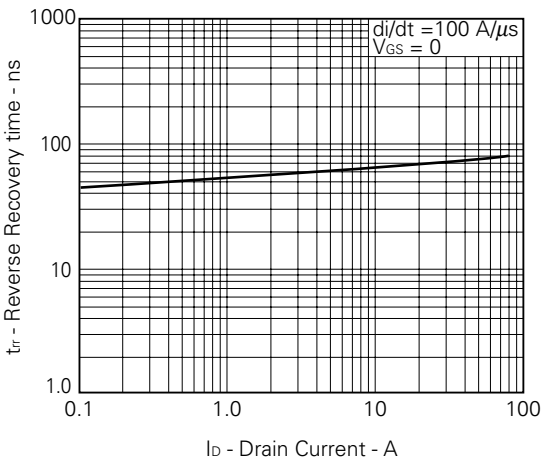
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



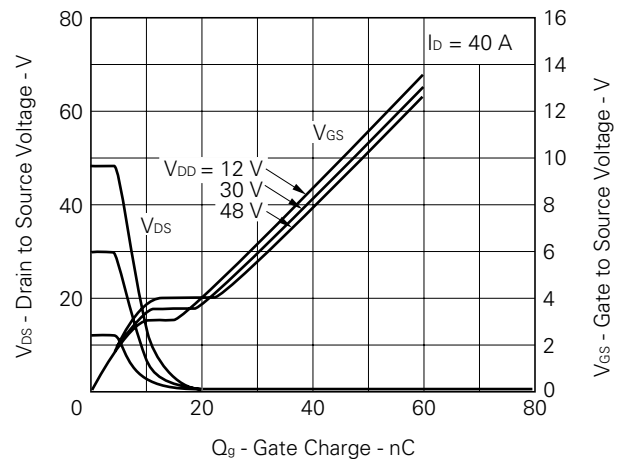
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DRAIN CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



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

[MEMO]

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Anti-radioactive design is not implemented in this product.