To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

MOS FIELD EFFECT TRANSISTOR

Phase-out/Discontinued

2SK2514

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK2514 is N-Channel MOS Field Effect Transistors designed for high current switching applications.

FEATURES

- Super Low on-state resistance
  $R_{DS(on)1}$ ≤ 15 mΩ MAX. (V_{GS} = 10 V, I_D = 25 A)
  $R_{DS(on)2}$ ≤ 23 mΩ MAX. (V_{GS} = 4 V, I_D = 25 A)
- Low input capacitance
  C_{iss} = 2 100 pF TYP.
- Built-in G-S Protection Diode

ABSOLUTE MAXIMUM RATINGS (T_A = 25 ˚C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	60	V
Gate to Source Voltage (V_{DS} = 0 V)	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 ˚C)	P_{T1}	150	W
Total Power Dissipation (T_A = 25 ˚C)	P_{T2}	3.0	W
Channel Temperature	T_{ch}	150	˚C
Storage Temperature	T_{stg}	–55 to +150	˚C

* PW ≤ 10 μs, Duty Cycle ≤ 1 %

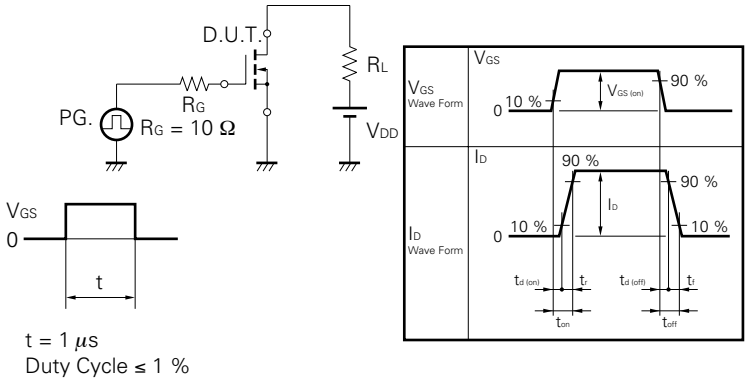
Document No. D10296EJ2V0DS00 (2nd edition)
Date Published November 2006 N CP(K)
Printed in Japan

The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what." field.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

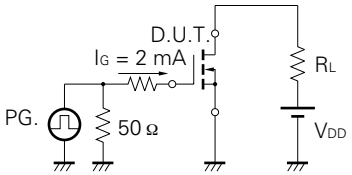
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-Resistance	$R_{DS(on)1}$		11	15	mΩ	V_{GS} = 10 V, I_D = 25 A
Drain to Source On-Resistance	$R_{DS(on)2}$		16	23	mΩ	V_{GS} = 4 V, I_D = 25 A
Gate to Source Cutoff Voltage	$V_{GS(off)}$	1.0	1.5	2.0	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance	$\|y_{fs}\|$	15			S	V_{DS} = 10 V, I_D = 25 A
Drain Leakage Current	I_{DSS}			10	μA	V_{DS} = V_{DSS}, V_{GS} = 0
Gate to Source Leakage Current	I_{GSS}			±10	μA	V_{GS} = ±20 V, V_{DS} = 0
Input Capacitance	C_{iss}		2 100		pF	V_{DS} = 10 V
Output Capacitance	C_{oss}		1 100		pF	V_{GS} = 0
Reverse Transfer Capacitance	C_{rss}		500		pF	f = 1 MHz
Turn-On Delay Time	$t_{d(on)}$		45		ns	I_D = 25 A
Rise Time	t_r		390		ns	$V_{GS(on)}$ = 10 V
Turn-Off Delay Time	$t_{d(off)}$		320		ns	V_{DD} = 30 V
Fall Time	t_f		360		ns	R_G = 10 Ω
Total Gate Charge	Q_G		92		nC	I_D = 50 A
Gate to Source Charge	Q_{GS}		6.0		nC	V_{DD} = 48 V
Gate to Drain Charge	Q_{GD}		37		nC	V_{GS} = 10 V
Body Diode Forward Voltage	$V_{F(S-D)}$		1.0		V	I_F = 50 A, V_{GS} = 0
Reverse Recovery Time	t_{rr}		90		ns	I_F = 50 A, V_{GS} = 0
Reverse Recovery Charge	Q_{rr}		175		nC	di/dt = 100 A/μs

Test Circuit 1 Switching Time



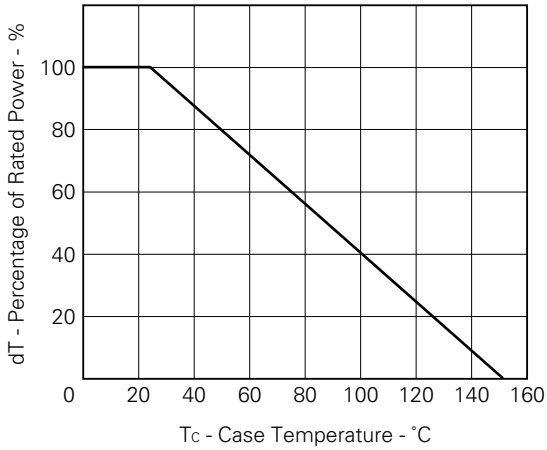
t = 1 μs
Duty Cycle ≤ 1 %

Test Circuit 2 Gate Charge

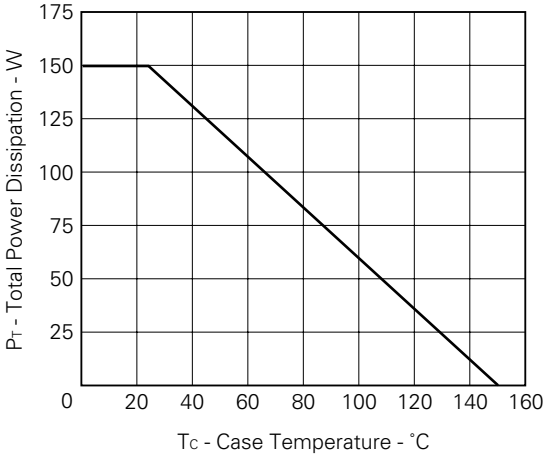


TYPICAL CHARACTERISTICS (T_A = 25 °C)

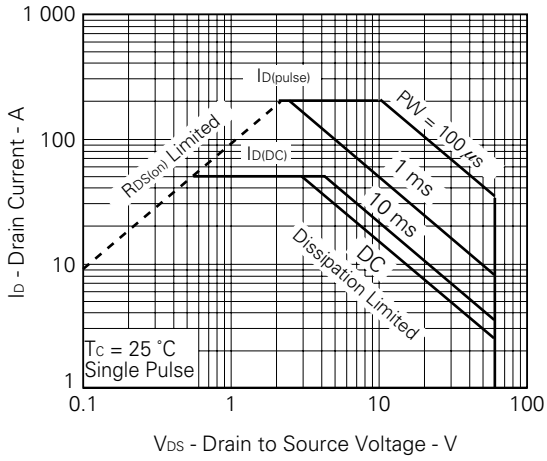
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



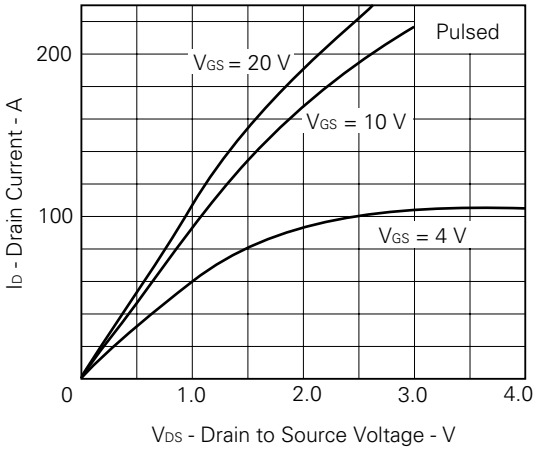
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



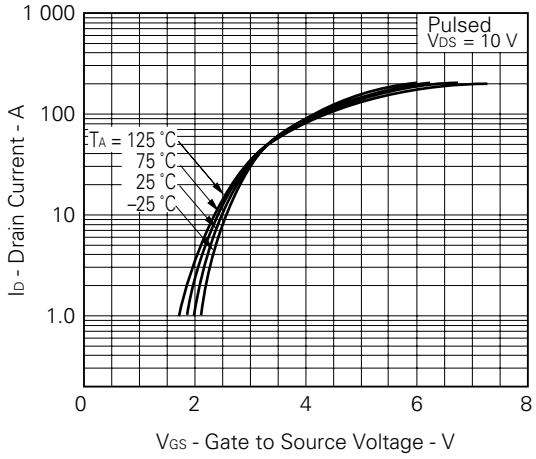
FORWARD BIAS SAFE OPERATING AREA



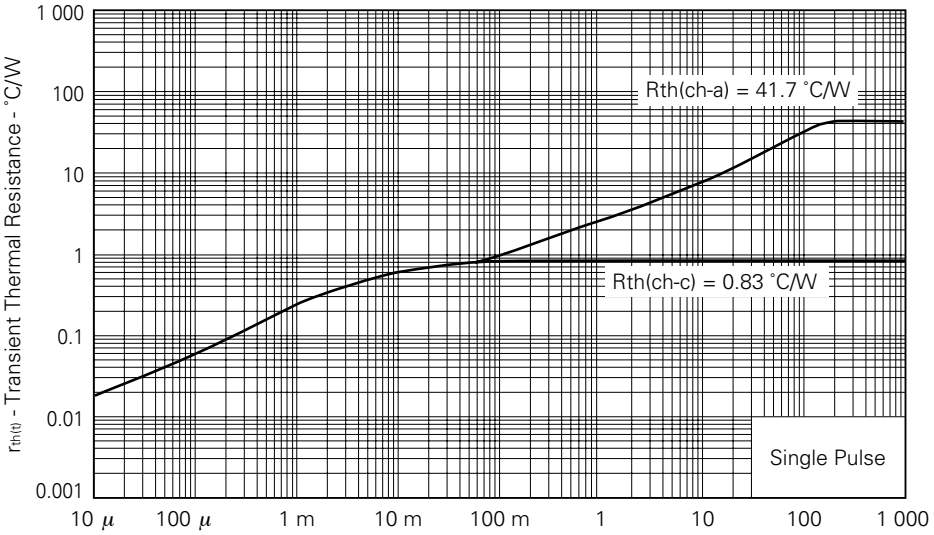
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



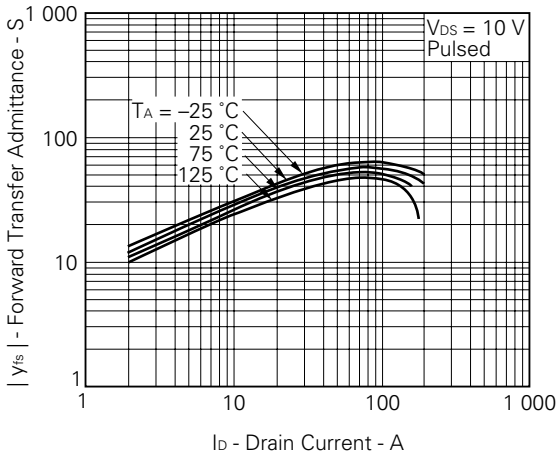
FORWARD TRANSFER CHARACTERISTICS



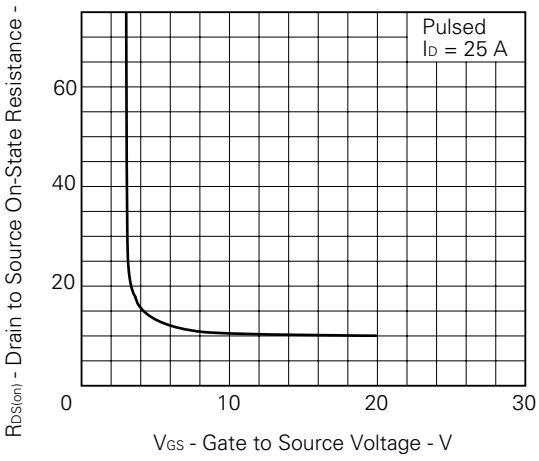
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



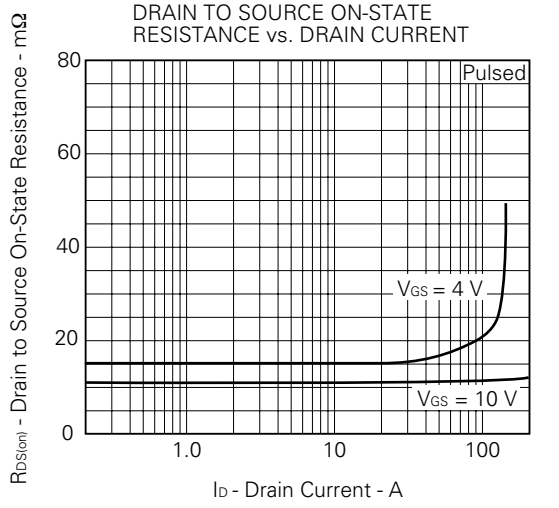
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



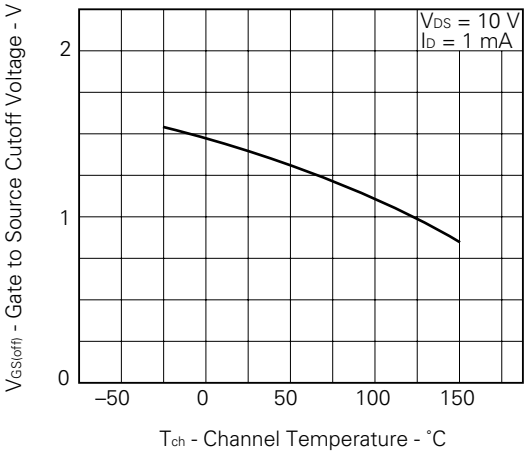
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



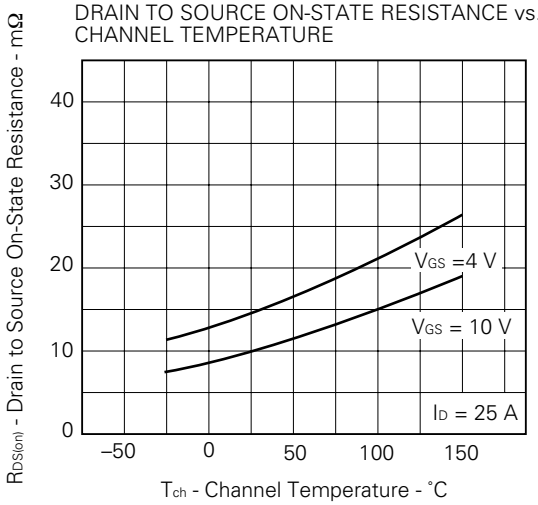
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



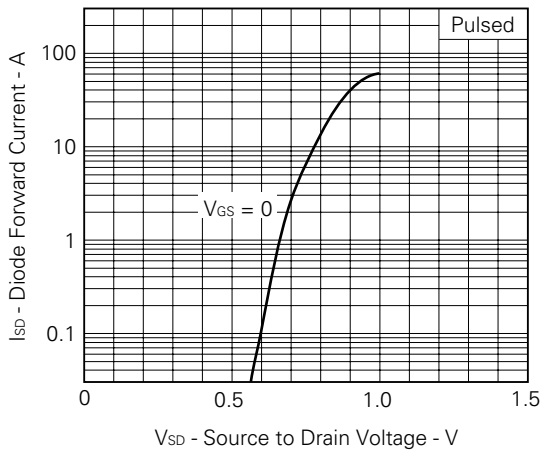
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



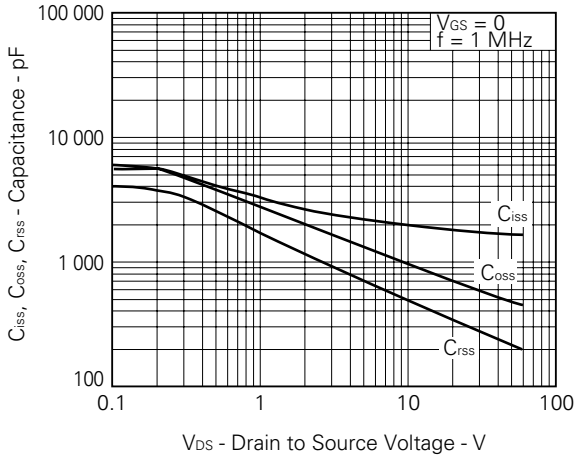
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



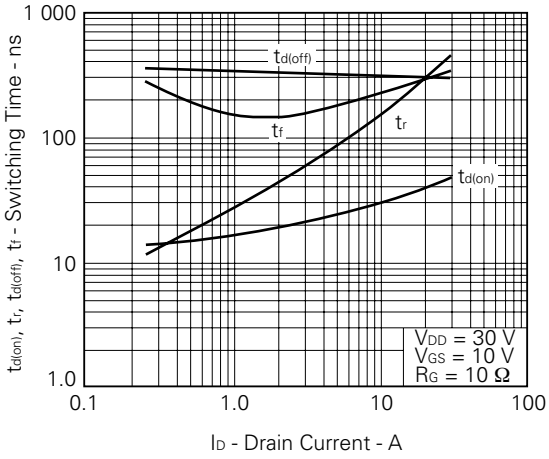
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



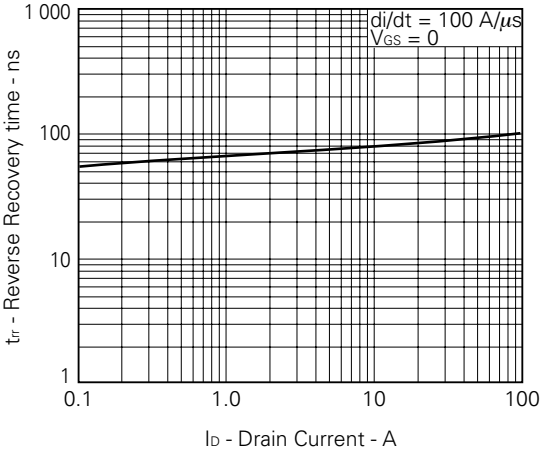
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



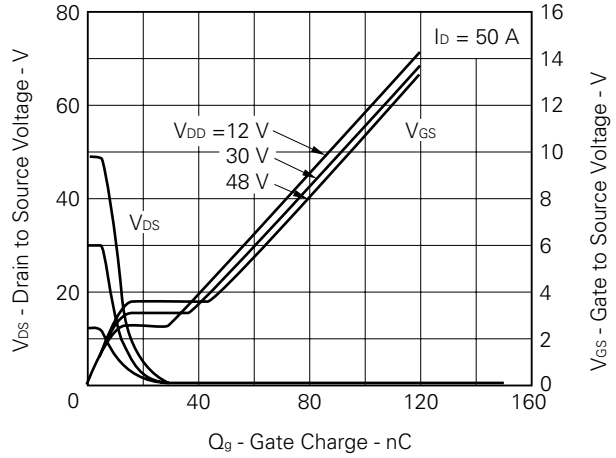
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DRAIN CURRENT

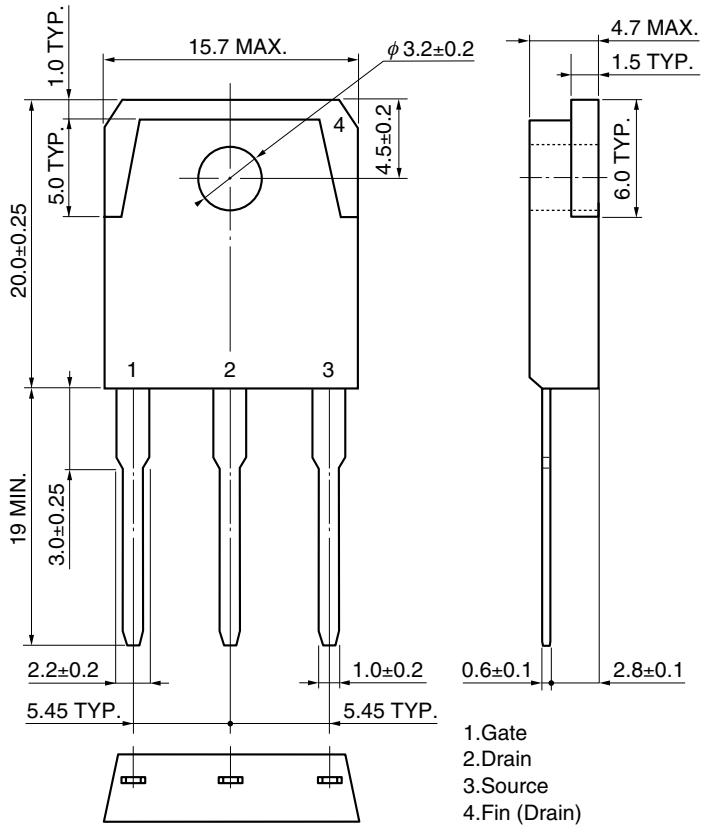


DYNAMIC INPUT/OUTPUT CHARACTERISTICS

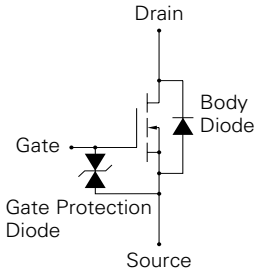


PACKAGE DRAWING (Unit: mm)

<R> TO-3P (MP-88)



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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