To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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

N-CHANNEL MOS FIELD EFFECT POWER TRANSISTOR
2SK1285

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK1285 is N-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

FEATURES

- Low on-state resistance
  $R_{DS(on)}$ = 0.32 Ω MAX. (V_{GS} = 10 V, I_D = 2 A)
  $R_{DS(on)}$ = 0.40 Ω MAX. (V_{GS} = 4 V, I_D = 2 A)
- Low C_{iss} C_{iss} = 500 pF TYP.
- Built-in G-S gate protection diodes

QUALITY GRADE

Standard

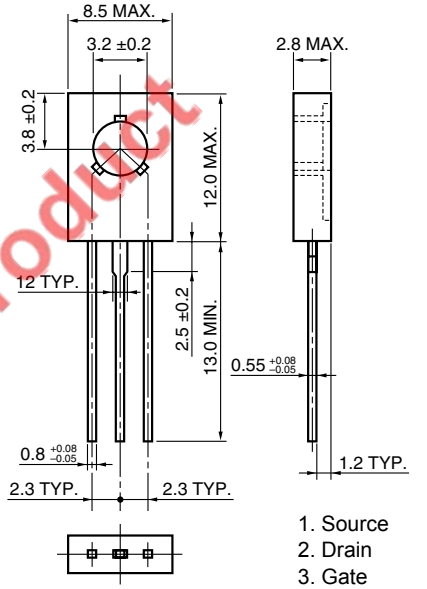
Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Electronics Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures			
Storage Temperature		−55 to +150	°C
Channel Temperature		150	°C MAX.
Maximum Power Dissipation			
Total Power Dissipation (T_A = 25°C)		1.3	W
Total Power Dissipation (T_C = 25°C)		20	W
Maximum Voltages and Currents (T_A = 25°C)			
V_{DSS}	Drain to Source Voltage	100	V
$V_{GSS(AC)}$	Gate to Source Voltage	±20	V
$I_{D(DC)}$	Drain Current (DC)	±3.0	A
$I_{D(pulse)}$ Note	Drain Current (pulse)	±12	A

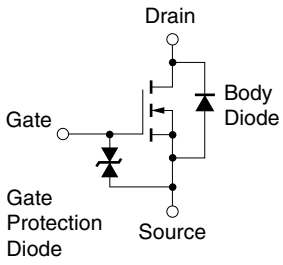
Note PW ≤ 10 μs, Duty Cycle ≤ 1%

★ PACKAGE DRAWING (Unit: mm)



1. Source
2. Drain
3. Gate
4. Fin (Drain)

EQUIVALENT CIRCUIT



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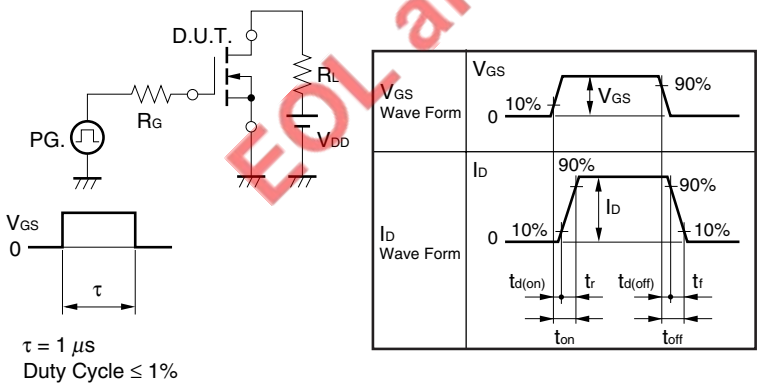
Date Published March 2004 N CP(K)
Printed in Japan

The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

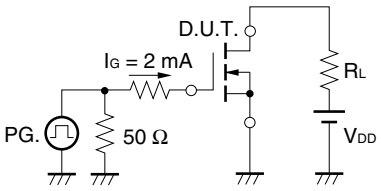
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 2 A		0.26	0.32	Ω
		V_{GS} = 4.0 V, I_D = 2 A		0.32	0.40	Ω
Gate to Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	1.0		2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 2 A	2.4			S
Drain Leakage Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{DS} = ±20 V, V_{DS} = 0 V			±10	μA
Input Capacitance	C_{iss}	V_{DS} = 10 V V_{GS} = 0 V f = 1 MHz		500		pF
Output Capacitance	C_{oss}			160		pF
Reverse Transfer Capacitance	C_{rss}			20		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{GS(on)}$ = 10 V V_{DD} = 50 V I_D = 2 A, R_G = 10 Ω R_L = 15 Ω		40		ns
Rise Time	t_r			55		ns
Turn-off Delay Time	$t_{d(off)}$			500		ns
Fall Time	t_f			120		ns
Total Gate Charge	Q_G	V_{GS} = 10 V I_D = 3 V V_{DD} = 80 V		13		nC
Gate to Source Charge	Q_{GS}			3		nC
Gate to Drain Charge	Q_{GD}			2		nC
Diode Forward Voltage	V_{SD}	I_{SD} = 3 A, V_{GS} = 0 V		0.9		V
Reverse Recovery Time	t_{rr}	IF = 3A, V_{GS} = 0 di/dt = 50 A/μs		140		ns
Reverse Recovery Charge	Q_{rr}			250		nC

TEST CIRCUIT 1 SWITCHING TIME



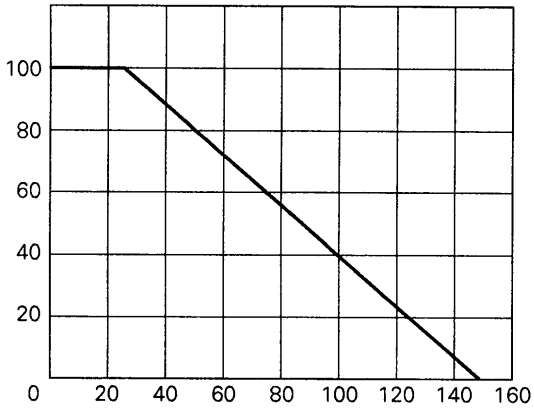
τ = 1 μs
Duty Cycle ≤ 1%

TEST CIRCUIT 2 GATE CHARGE

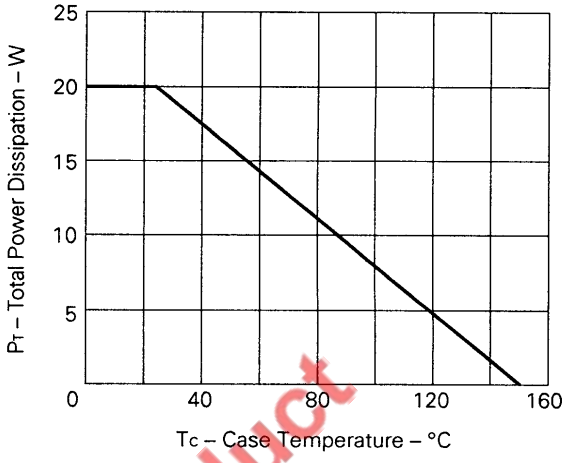


TYPICAL CHARACTERISTICS (T_A = 25°C)

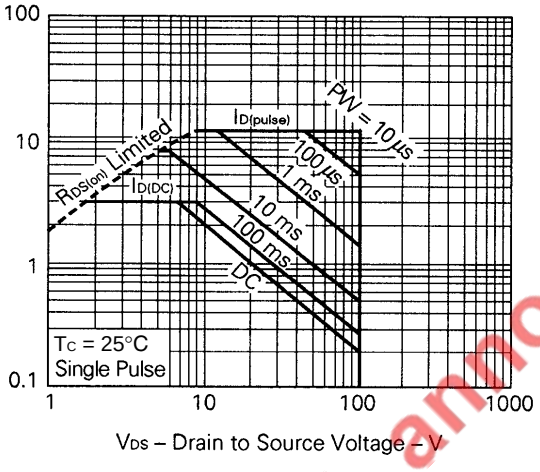
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



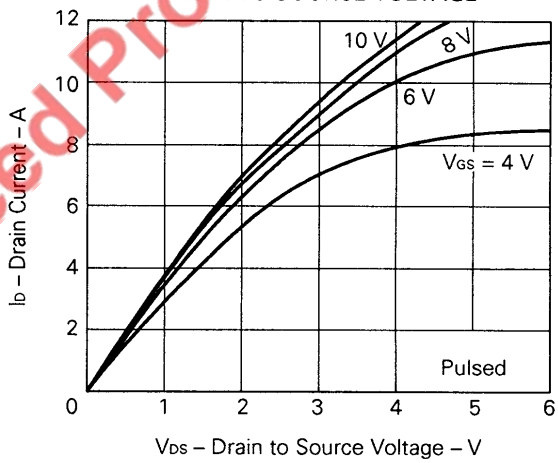
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



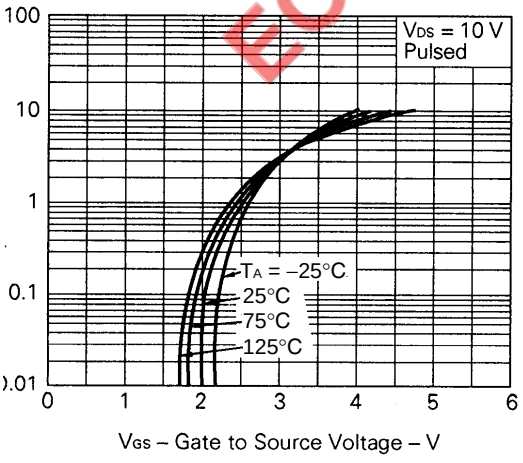
FORWARD BIAS SAFE OPERATING AREA



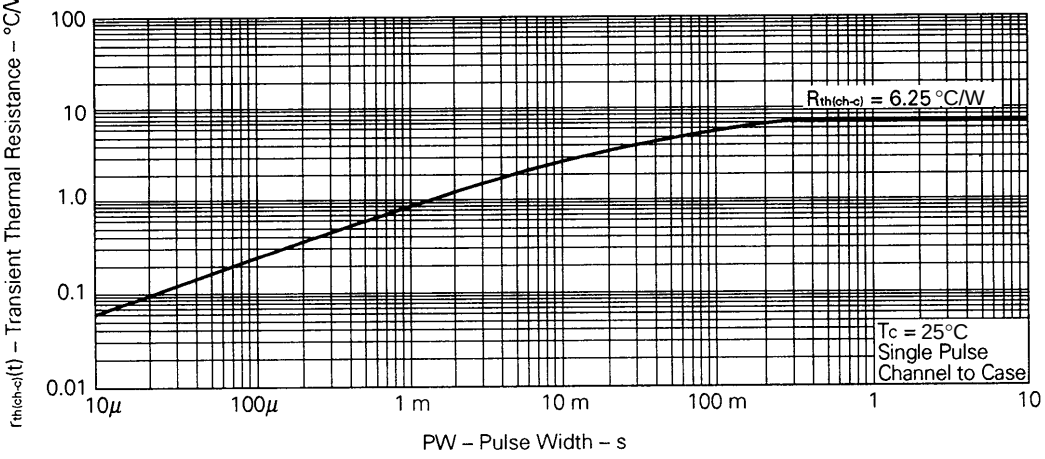
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



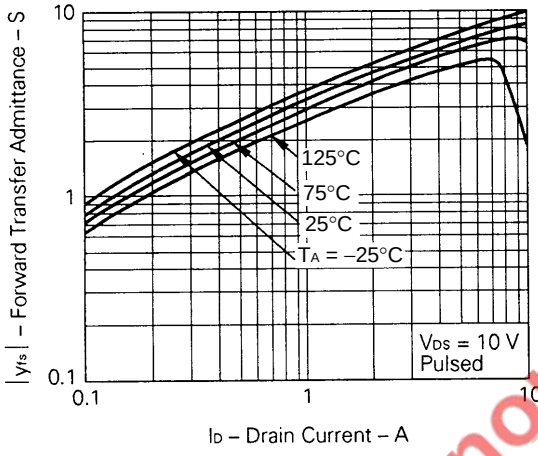
TRANSFER CHARACTERISTICS



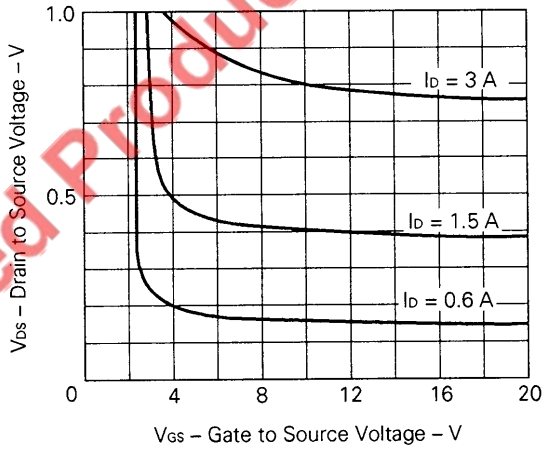
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



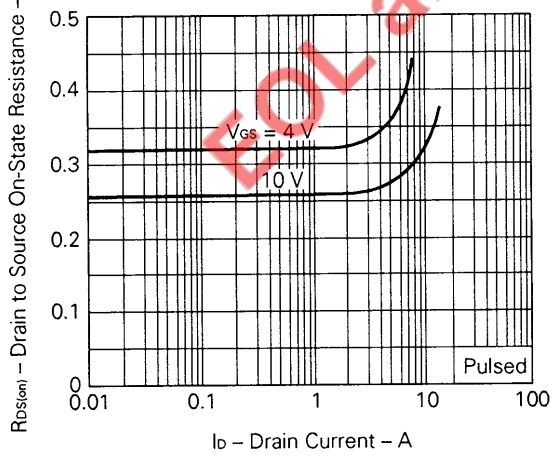
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



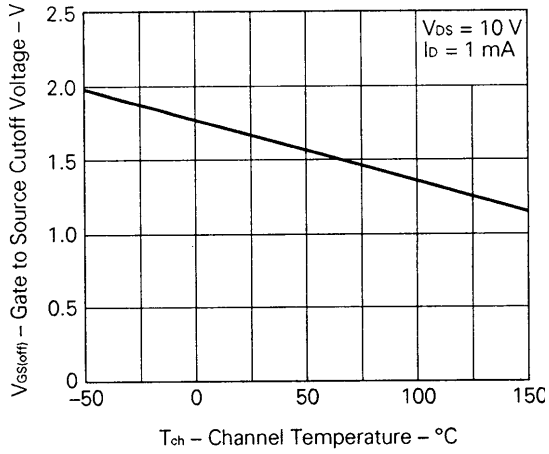
DRAIN TO SOURCE VOLTAGE vs. GATE TO SOURCE VOLTAGE



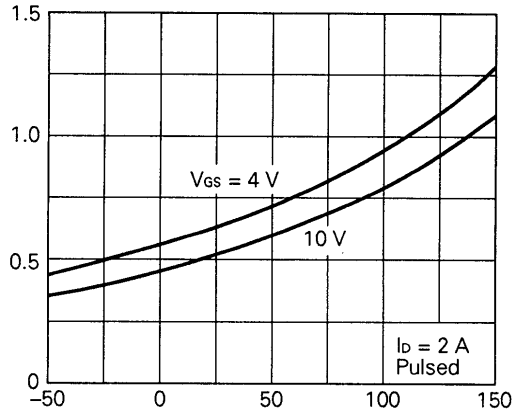
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



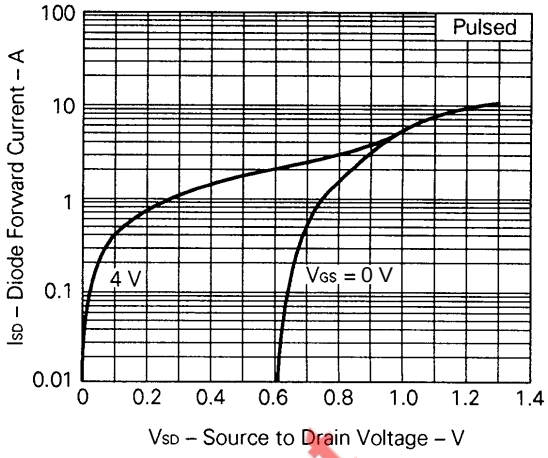
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



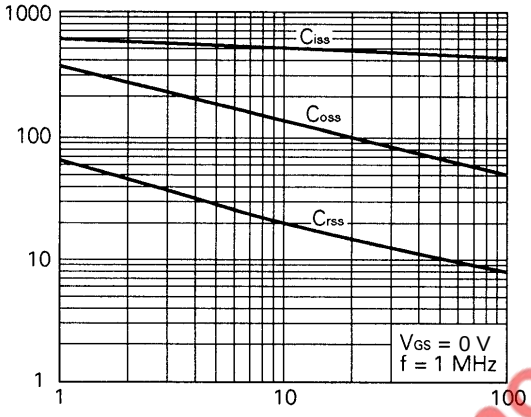
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



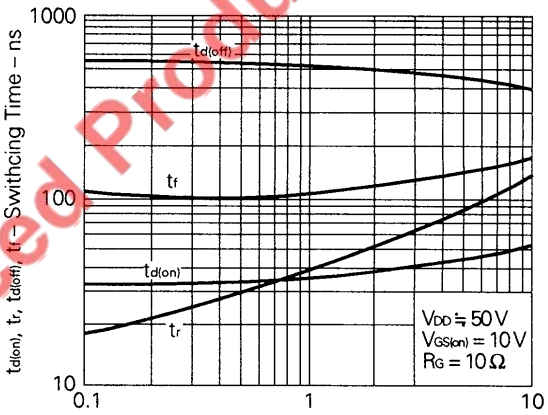
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



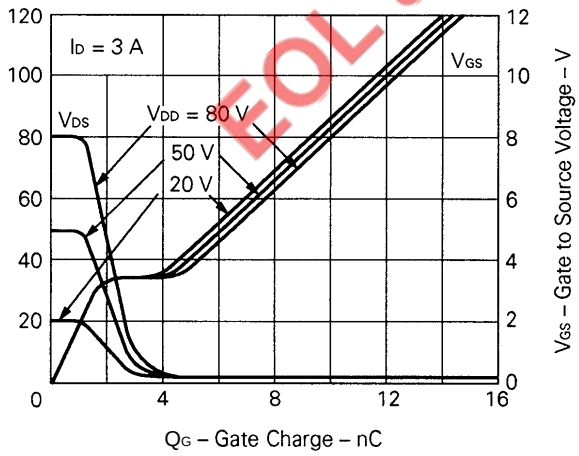
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



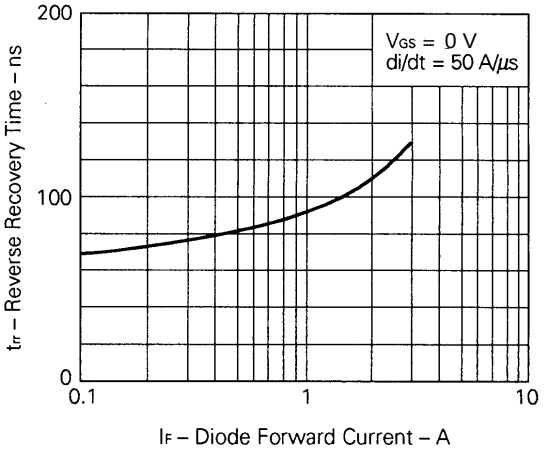
SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



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