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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DATA SHEET

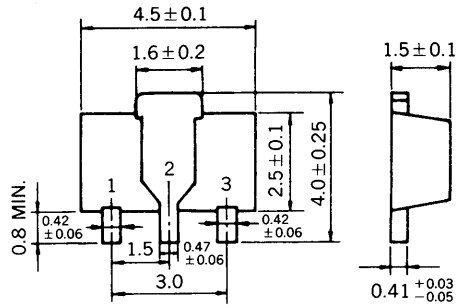
RENESAS

MOS FIELD EFFECT TRANSISTOR

2SJ206

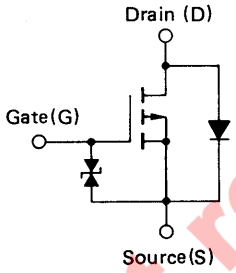
P-CHANNEL MOS FET FOR SWITCHING

PACKAGE DIMENSIONS (Unit: mm)



1. Source
2. Drain
3. Gate

MARK : PH



(Diode in the figure is the parasitic diode.)

The 2SJ206, P-channel vertical type MOS FET, is a switching device which can be driven directly by the output of ICs having a 5 V power source.

As the MOS FET has low on-state resistance and excellent switching characteristics, it is suitable for driving actuators such as motors, relays, and solenoids.

FEATURES

- Directly driven by ICs having a 5 V power supply.
- Has low on-state resistance
  $R_{DS(on)}$ = 4.0 Ω MAX. @V_{GS} = −4.0 V, I_D = −0.3 A
  $R_{DS(on)}$ = 3.0 Ω MAX. @V_{GS} = −10 V, I_D = −0.3 A

QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	V_{DSS}	−30	V	V_{GS} = 0
Gate to Source Voltage	V_{GSS}	∓20	V	V_{DS} = 0
Drain Current	$I_{D(DC)}$	∓500	mA	
Drain Current	$I_{D(pulse)}$	∓1.0	A	PW ≦ 10 ms, Duty Cycle ≦ 50 %
Total Power Dissipation	P_T	2.0	W	When using ceramic board of 16 cm² x 0.7 mm
Channel Temperature	T_{ch}	150	°C	
Storage Temperature	T_{stg}	−55 to +150	°C	

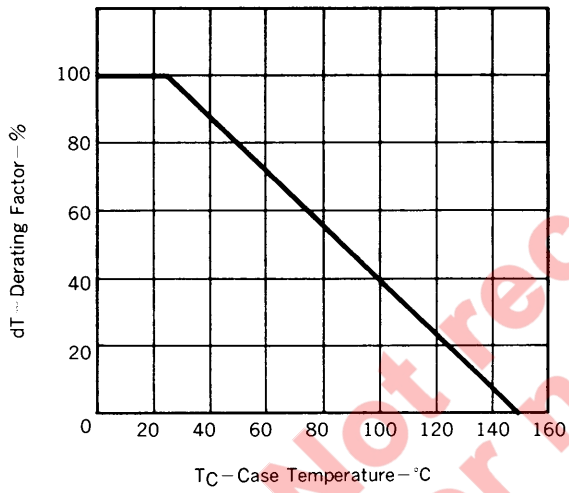
Document No. TC−2328A
(O.D.No. TC−7742B)
Date Published November 1994 M
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

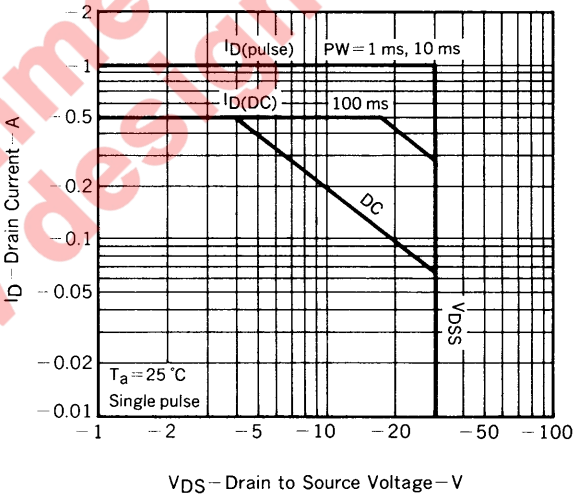
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Cut-off Current	I_{DSS}			−1.0	μA	V_{DS} = −30 V, V_{GS} = 0
Gate Leakage Current	I_{GSS}			∓5	μA	V_{GS} = ∓16 V, V_{DS} = 0
Gate Cut-off Voltage	$V_{GS(off)}$	−1.0	−2.3	−3.0	V	V_{DS} = −5 V, I_D = −1 mA
Forward Transfer Admittance	$\|y_{fs}\|$	0.4			S	V_{DS} = −5 V I_D = −0.3 A
Drain to Source On-State Resistance	$R_{DS(on)1}$		2.0	4.0	Ω	V_{GS} = −4.0 V, I_D = −0.3 A
Drain to Source On-State Resistance	$R_{DS(on)2}$		0.8	3.0	Ω	V_{GS} = −10 V, I_D = −0.3 A
Input Capacitance	C_{iss}		100		pF	V_{DS} = −5 V, V_{GS} = 0, f = 1 MHz
Output Capacitance	C_{oss}		80		pF	
Feedback Capacitance	C_{rss}		15		pF	
Turn-On Delay Time	$t_{d(on)}$		120		ns	$V_{GS(on)}$ = −4 V, R_G = 10 Ω, V_{DD} = −5 V, I_D = −0.3 A, R_L = 17 Ω
Rise Time	t_r		420		ns	
Turn-Off Delay Time	$t_{d(off)}$		75		ns	
Fall Time	t_f		140		ns	

TYPICAL CHARACTERISTICS (T_a = 25 °C)

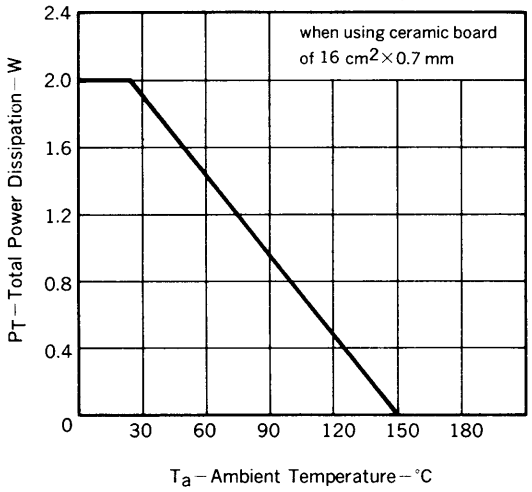
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



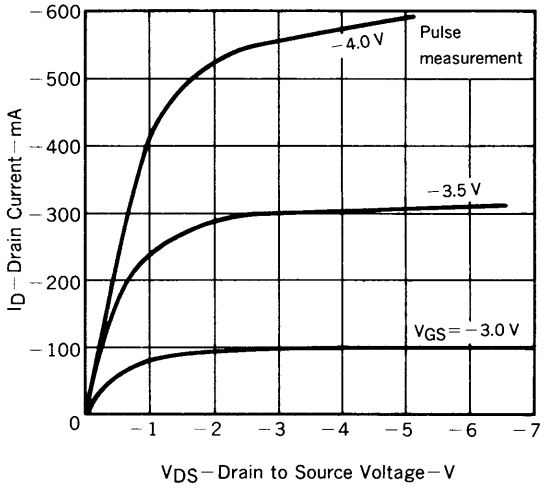
FORWARD BIAS SAFE OPERATING AREA



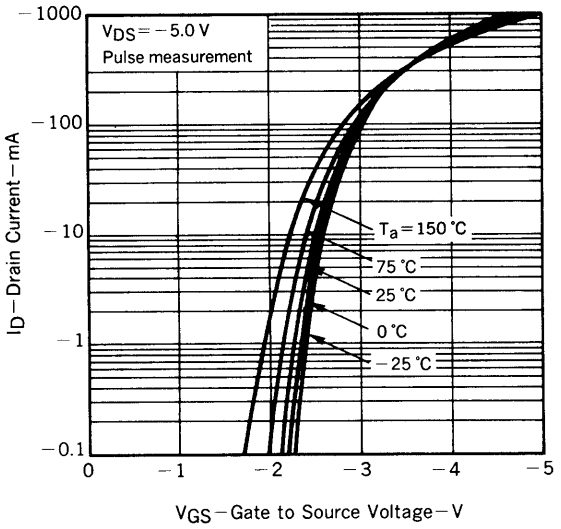
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



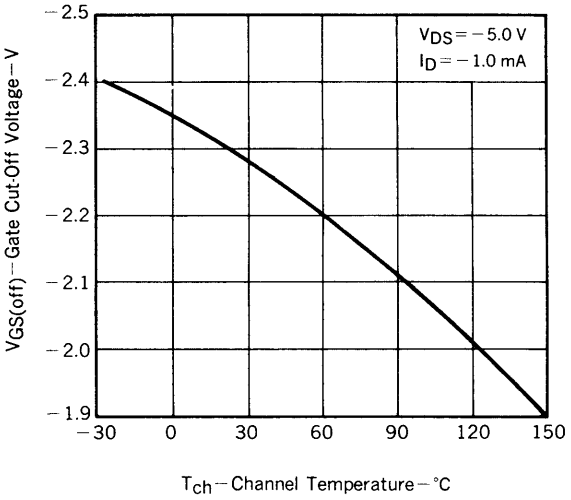
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



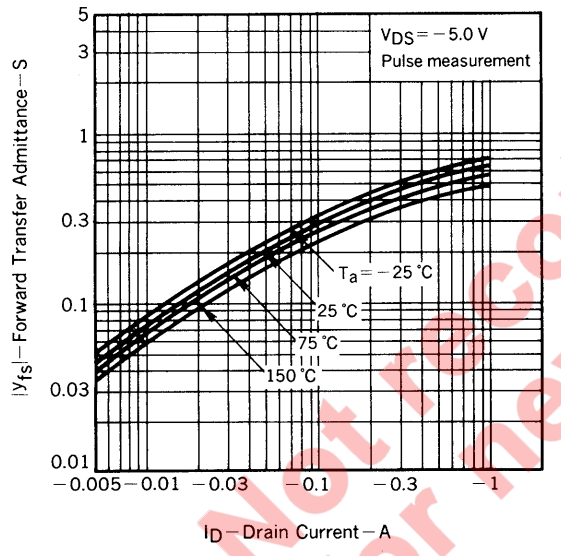
TRANSFER CHARACTERISTICS



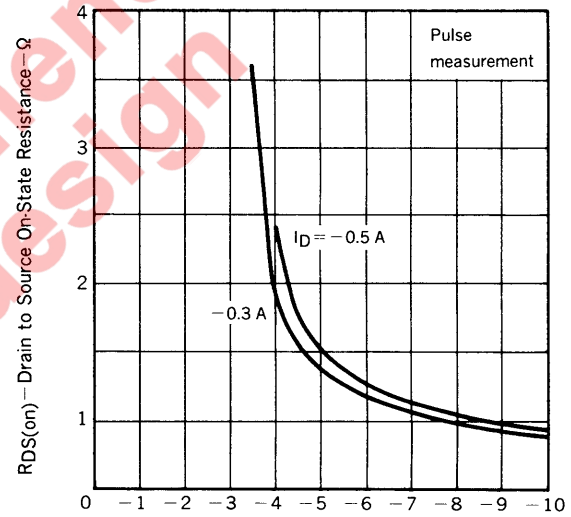
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



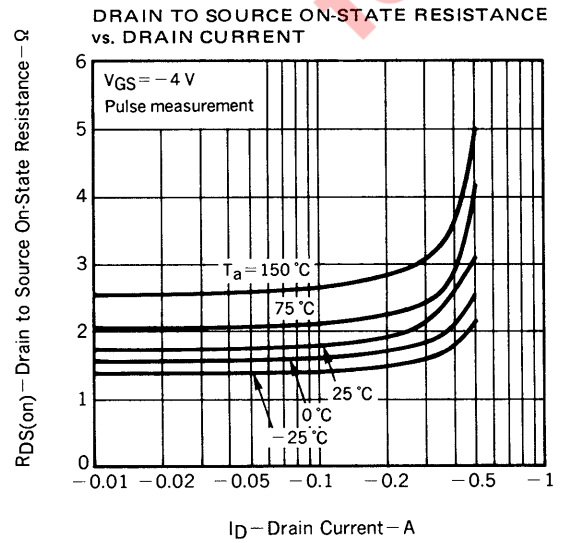
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



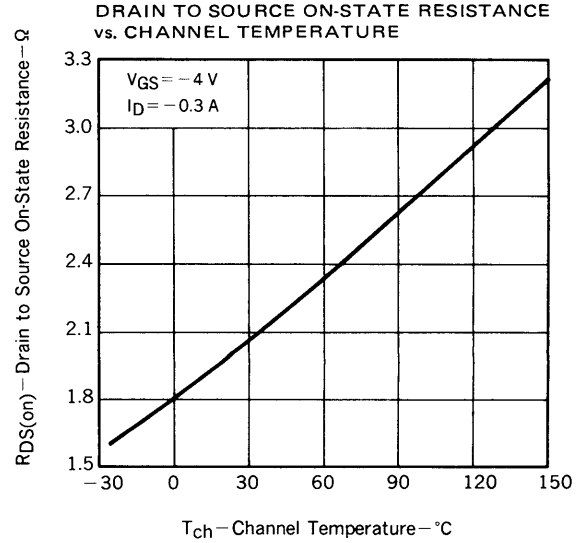
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



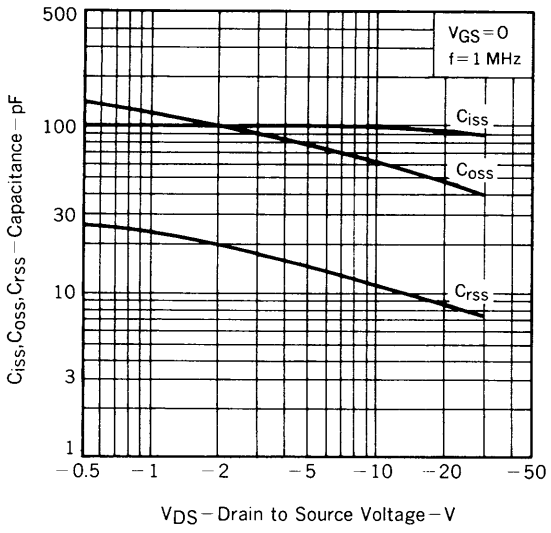
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



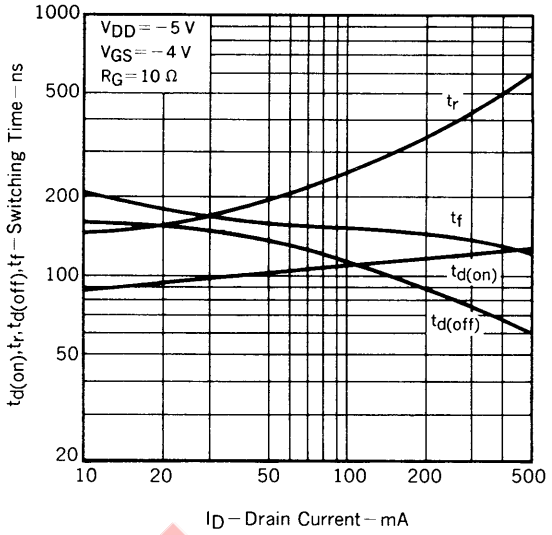
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



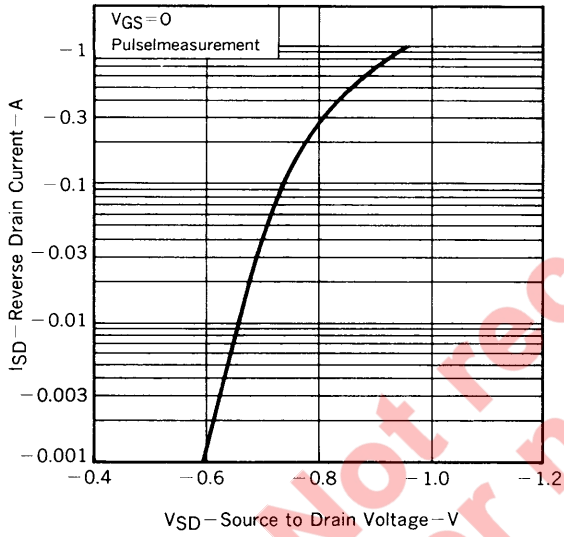
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



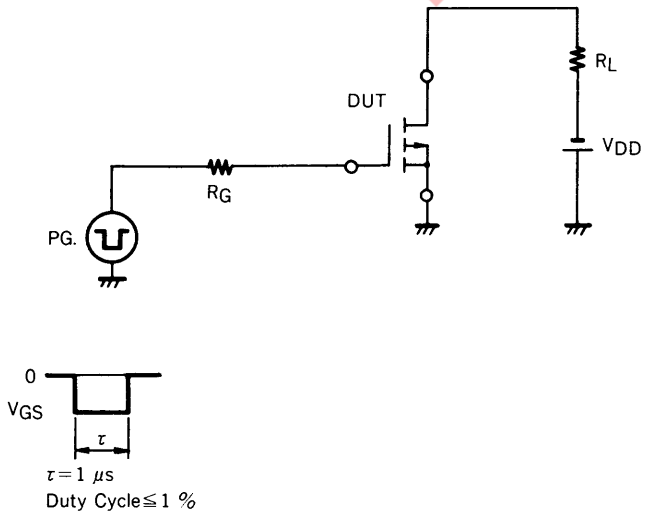
SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE

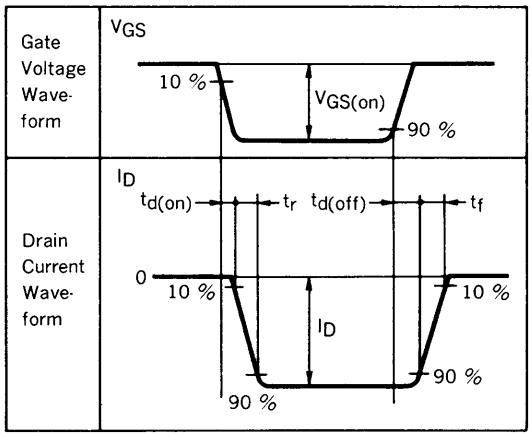


SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS



$\tau = 1\ \mu s$

Duty Cycle ≦ 1 %



RECOMMENDED SOLDERING CONDITIONS

Mounting of this product by soldering should be done under the following conditions.
Please consult with our representatives about soldering methods and conditions other than these recommended.

SURFACE MOUNT TYPE

For details of the recommended soldering conditions, see the information document.
"Device Mounting Manual for Surface Mounting (IEI-1207)."

Soldering Method	Soldering Conditions	Symbol for Recommended Conditions
Infrared Reflow	Package peak temp.: 230 °C Soldering time: within 30 sec (above 210 °C) Soldering times: 1, Days limitation: none*	IR30-00
Vapor Phase Soldering	Package peak temp.: 215 °C Soldering time: within 40 sec (above 200 °C) Soldering times: 1, Days limitation: none*	VP15-00
Wave Soldering	Soldering bath temp.: below 260 °C Soldering time: within 10 sec Soldering times: 1, Days limitation: none*	WS60-00

* Stored days under storage conditions at 25 °C and below 65 % R.H. after dry-pack opened.

Note 1: Combination of soldering methods should be avoided.

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

(MEMO)

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