

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 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 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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## Notice

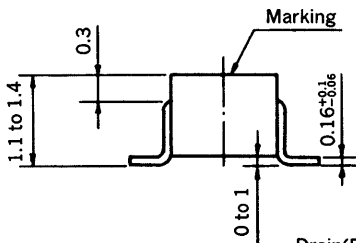
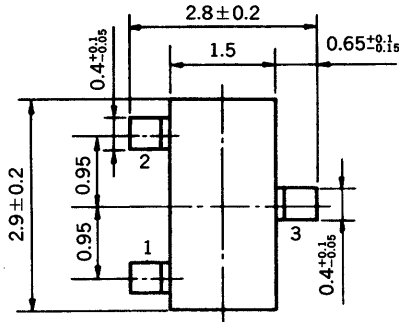
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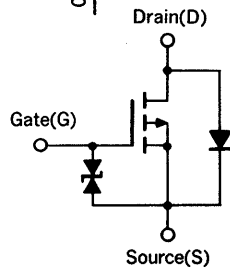
(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

P-CHANNEL MOS FET  
FOR HIGH SPEED SWITCHING

PACKAGE DIMENSIONS (Unit : mm)



- 1. Source
  - 2. Gate
  - 3. Drain
- MARK : H11



(Diode in the figure is the parasitic diode.)

The 2SJ166, 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.

The MOS FET has excellent switching characteristics and is suitable as a high-speed switching device in digital circuits.

FEATURES

- Directly driven by the output of ICs having a 5 V power source.
- Not necessary to consider driving current because of its high input impedance.
- Possible to reduce the number of parts by omitting the bias resistor.
- Complementary to 2SK1132.

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.

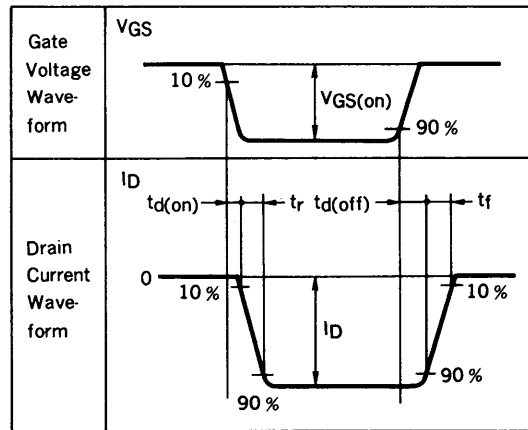
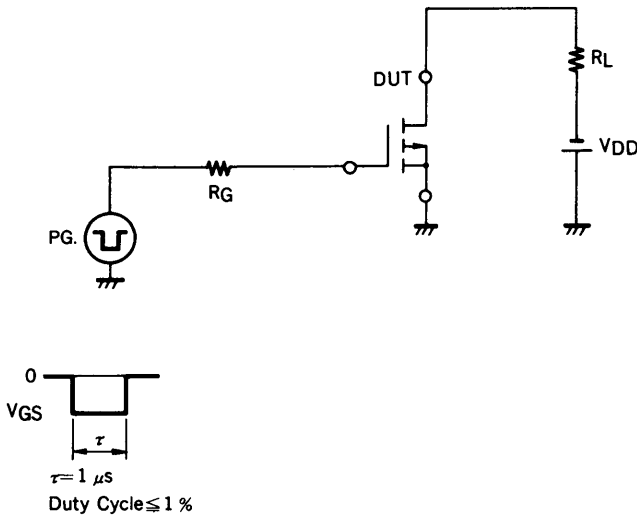
ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	$V_{DSS}$	-50	V	$V_{GS} = 0$
Gate to Source Voltage	$V_{GSS}$	$\pm 7.0$	V	$V_{DS} = 0$
Drain Current	$I_D(\text{DC})$	$\pm 100$	mA	
Drain Current	$I_D(\text{pulse})$	$\pm 200$	mA	$PW \leq 10 \text{ ms}$ , Duty Cycle $\leq 50 \%$
Total Power Dissipation	$P_T$	200	mW	
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$	
Storage Temperature	$T_{stg}$	-50 to +150	$^\circ\text{C}$	

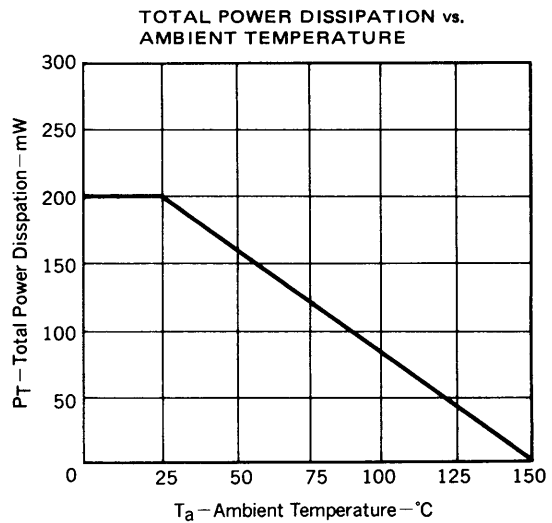
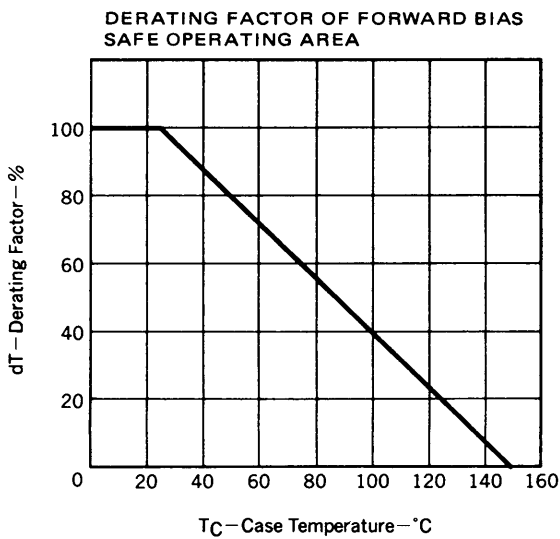
ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

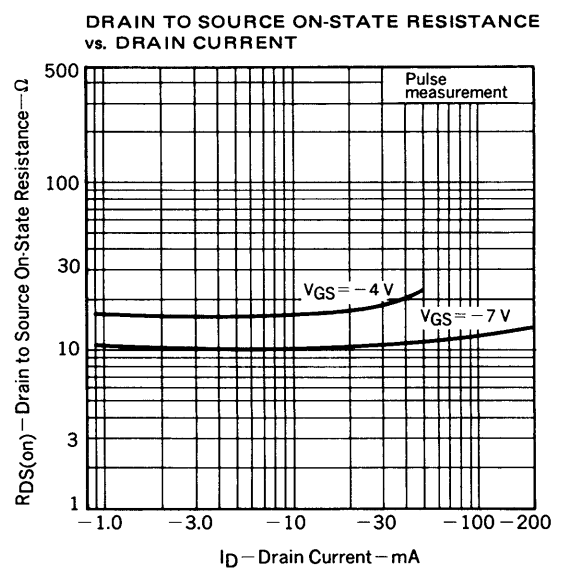
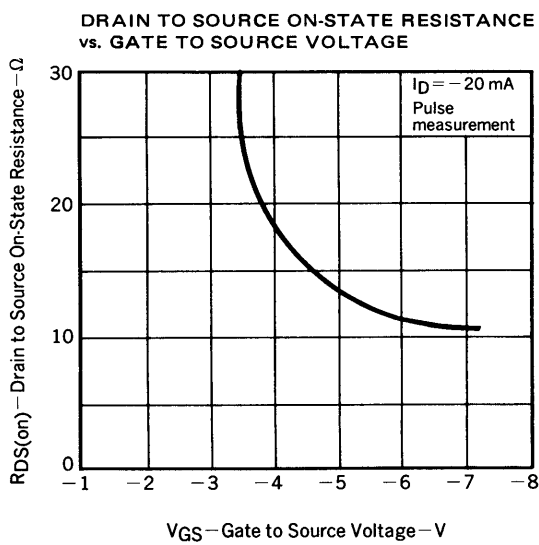
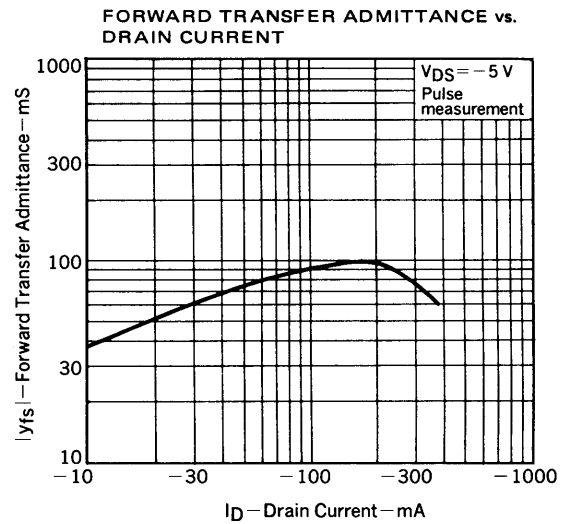
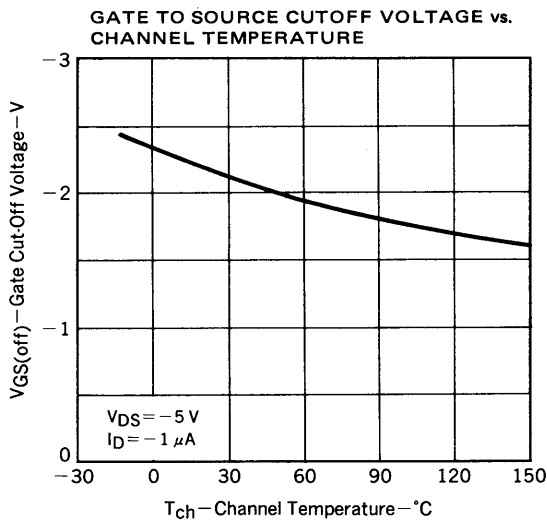
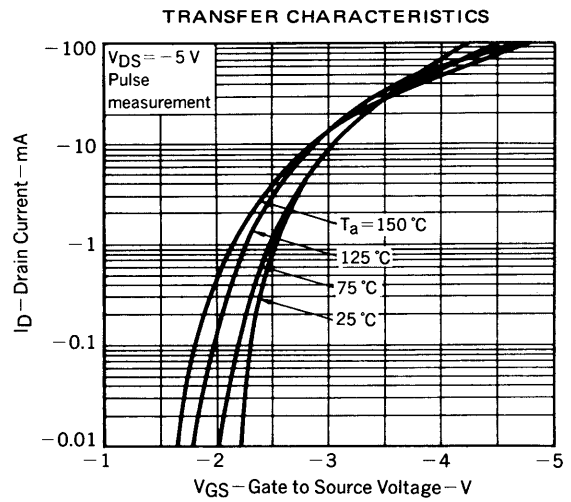
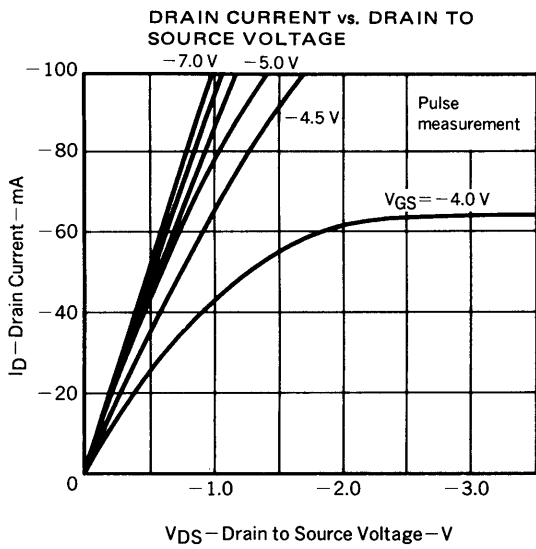
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Cut-off Current	I <sub>DSS</sub>			-10	μA	V <sub>DS</sub> = -5.0 V, V <sub>GS</sub> = 0
Gate Leakage Current	I <sub>GSS</sub>			±1.0	μA	V <sub>GS</sub> = ±7.0 V, V <sub>DS</sub> = 0
Gate Cut-off Voltage	V <sub>GS(off)</sub>	-1.0	-2.1	-3.0	V	V <sub>DS</sub> = -5.0 V, I <sub>D</sub> = -1.0 μA
Forward Transfer Admittance	y <sub>fs</sub>	30	50		mS	V <sub>DS</sub> = -5.0 V, I <sub>D</sub> = -20 mA
Drain to Source On-State Resistance	R <sub>DS(on)</sub>		18	50	Ω	V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -20 mA
Input Capacitance	C <sub>iss</sub>		18		pF	V <sub>DS</sub> = -5.0 V, V <sub>GS</sub> = 0, f = 1 MHz
Output Capacitance	C <sub>oss</sub>		11		pF	
Feedback Capacitance	C <sub>rss</sub>		3		pF	
Turn-On Delay Time	t <sub>d(on)</sub>		40		ns	V <sub>DD</sub> = -5.0 V, I <sub>D</sub> = -20 mA V <sub>GS(on)</sub> = -5.0 V, R <sub>G</sub> = 10 Ω R <sub>L</sub> = 250 Ω
Rise Time	t <sub>r</sub>		58		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		62		ns	
Fall Time	t <sub>f</sub>		62		ns	

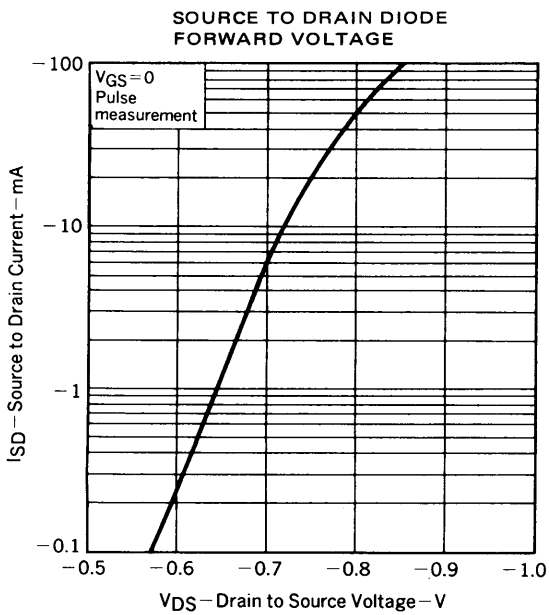
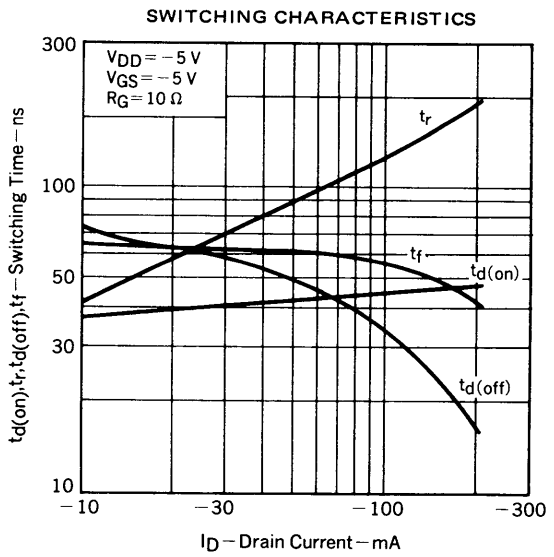
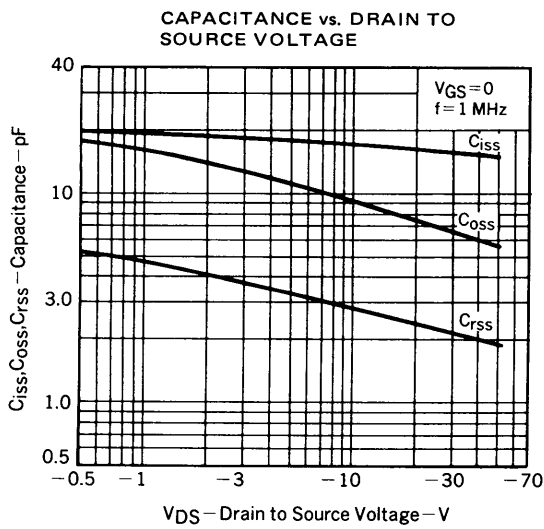
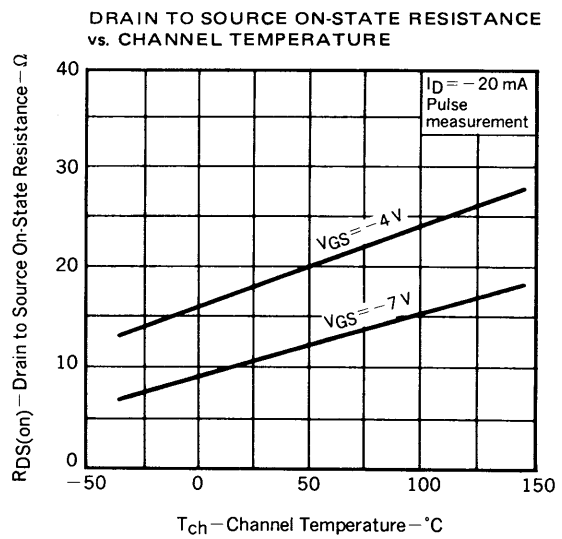
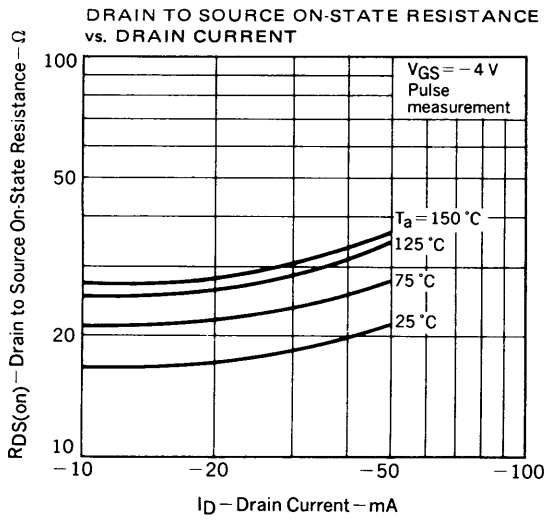
SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS



TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)







**RECOMMENDED SOLDERING CONDITIONS**

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

**SURFACE MOUNT TYPE**

For details of the recommended soldering conditions, see the information document "SMT MANUAL" (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 the dry-pack has been opened.

**Note 1** Combination of soldering methods should be avoided.

[MEMO]

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Application examples recommended by NEC Corporation

Standard: Data processing and office equipment, Communication equipment (terminal, mobile), Test and Measurement equipment, Audio and Video equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Communication equipment (trunk line), Train and Traffic control devices, industrial robots, Burning control systems, antidisaster systems, anticrime systems etc.