### Old Company Name in Catalogs and Other Documents

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

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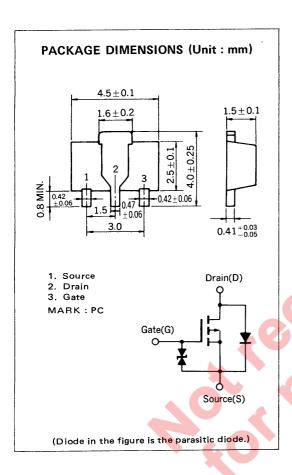
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# MOS FIELD EFFECT TRANSISTOR **2SJ199**

# P-CHANNEL MOS FET FOR SWITCHING



The 2SJ199, 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  $R_{DS(on)} = 2.5 \Omega MAX$ . @V<sub>GS</sub> = -4.0 V,  $I_D = -0.5 A$   $R_{DS(on)} = 2.0 \Omega MAX$ . @V<sub>GS</sub> = -10 V,  $I_D = -0.5 A$
- Complementary to 2SK1485

#### **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)

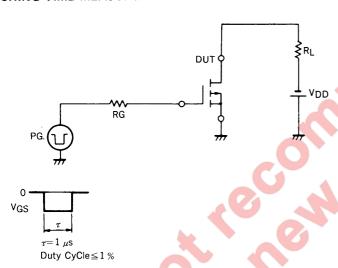
PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	V <sub>DSS</sub>	-100	V	V <sub>GS</sub> = 0
Gate to Source Voltage	V <sub>GSS</sub>	∓20	V	V <sub>DS</sub> = 0
Drain Current	I <sub>D(DC)</sub>	∓1.0	Α	
Drain Current	I <sub>D</sub> (pulse)	∓2.0	Α	PW ≤ 10 ms, Duty Cycle ≤ 50 %
Total Power Dissipation	PT	2.0	w	when using ceramic board of 16 cm <sup>2</sup> x 0.7 mm
Channel Temperature	T <sub>ch</sub>	150	°C	
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C	

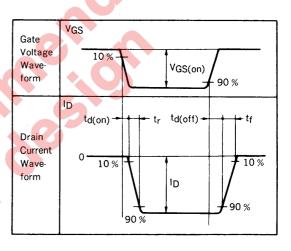


#### ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

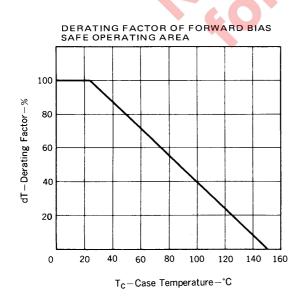
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
Drain Cut-off Current	IDSS			-10	μА	V <sub>DS</sub> = -100 V, V <sub>GS</sub> = 0	
Gate Leakage Current	IGSS			∓10	μА	V <sub>GS</sub> = ∓20 V, V <sub>DS</sub> = 0	
Gate Cut-off Voltage	VGS(off)	-1.0	-2.1	-3.0	V	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA	
Forward Transfer Admittance	ly <sub>fs</sub> l	0.4	0.9		S	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -0.5 A	
Drain to Source On-State Resistance	RDS(on)1		1.5	2.5	Ω	V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -0.5 A	
Drain to Source On-State Resistance	R <sub>DS(on)2</sub>		1.1	2.0	Ω	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -0.5 A	
Input Capacitance	C <sub>iss</sub>		220		pF	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = 0, f = 1 MHz	
Output Capacitance	Coss		85		pF		
Feedback Capacitance	C <sub>rss</sub>		8		pF		
Turn-On Delay Time	<sup>t</sup> d(on)		45		ns	$V_{GS(on)} = -10 \text{ V}, R_G = 10 \Omega, V_{DD} = -25 \text{ V},$ $I_D = -0.5 \text{ A}, R_L = 50 \Omega$	
Rise Time	t <sub>r</sub>		36		ns		
Turn-Off Delay Time	<sup>t</sup> d(off)		360		ns		
Fall Time	tf		90		ns		

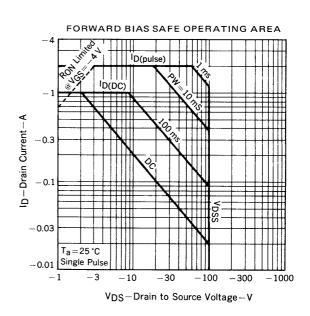
#### SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS

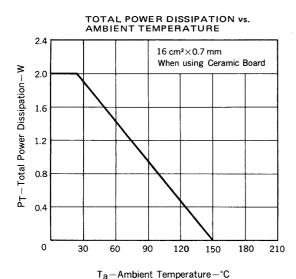


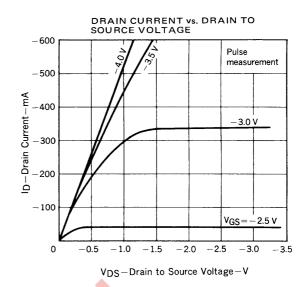


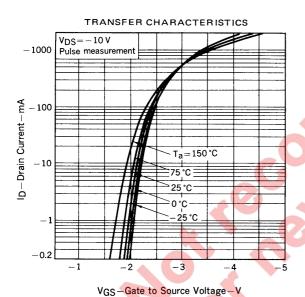
#### TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

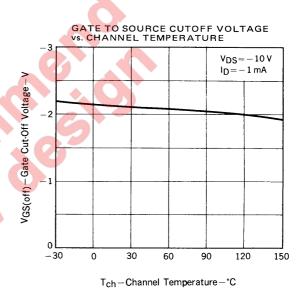


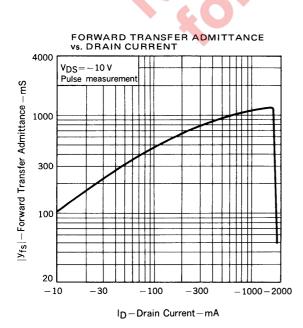


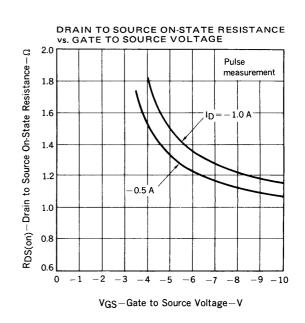




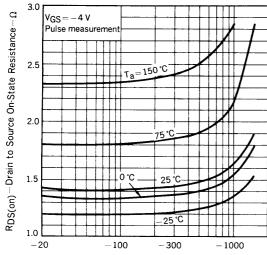




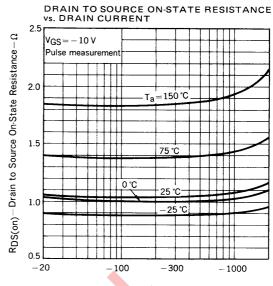




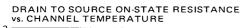
## DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

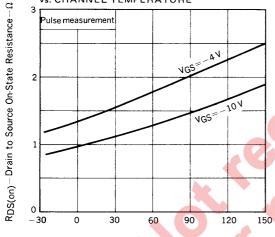


#### ID - Drain Current - mA

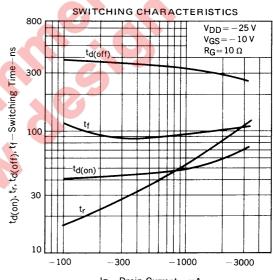


ID-Drain Current-mA

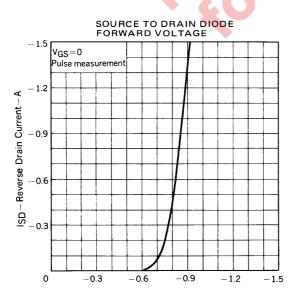




T<sub>ch</sub>-Channel Temperature - °C



ID-Drain Current-mA



 $V_{\mbox{SD}}\!-\!\mbox{Source to Drain Voltage}\!-\!\mbox{V}$ 



#### 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	

<sup>\*</sup> 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

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