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

-CHANNEL MOS FIELD EFFECT POWER TRANSISTOR

Phase-out/Discontinued

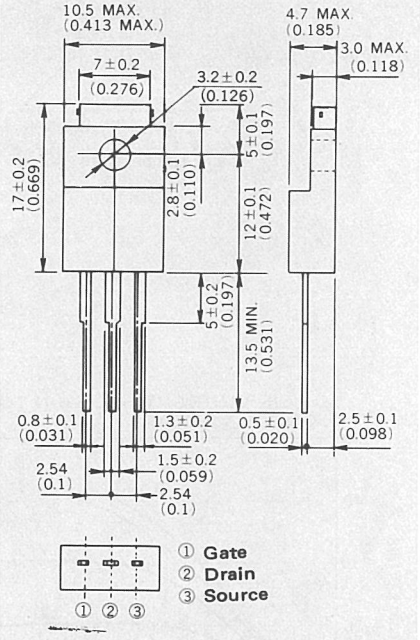
2SJ139

DESCRIPTION The 2SJ139 is P-Channel MOS Field Effect Power Transistor designed for solenoid, motor and lamp driver.

FEATURES

- 4 V Gate Drive – Logic level –
- Low $R_{DS(on)}$
- No Second Breakdown
- High Sustaining Energy

PACKAGE DIMENSIONS
in millimeters (inches)



ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

- Storage Temperature . . . . . –55 to +150 °C
- Channel Temperature . . . . . 150 °C Maximum

Maximum Power Dissipations

- Total Power Dissipation . . . . . 2.0 W
- Total Power Dissipation (T_C = 25 °C) . . . . . 35 W

Maximum Voltages and Currents (T_a = 25 °C)

- V_{DSS} Drain to Source Voltage . . . . . –100 V
- V_{GSS} Gate to Source Voltage. . . . . ∓20 V
- $I_{D(DC)}$ Drain Current (DC)* . . . . . ∓10 A
- $I_{D(pulse)}$ Drain Current (pulse)** . . . . . ∓40 A

* T_C = 25 °C

**PW ≦ 100 μs, Duty Cycle ≦ 2 %

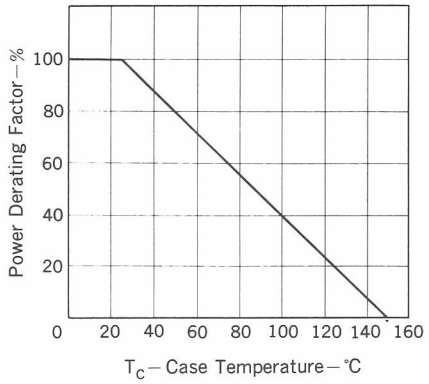
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
$R_{DS(on)}$	Drain to Source On-State Resistance		0.18	0.3	Ω	V_{GS} = –10 V, I_D = –6.5 A
$R_{DS(on)}$	Drain to Source On-State Resistance		0.3	0.45	Ω	V_{GS} = –4 V, I_D = –6.5 A
V_{SD}	Body Diode Forward Voltage Drop		0.9		V	I_{SD} = 10 A, V_{GS} = 0
I_{DL}	Unclamped Sustaining Energy			–10	A	V_{DD} = –50 V, $V_{GS(off)}$ = 0 L ≦ 100 μH, R_G ≧ 100 Ω Unclamped See Test Circuit 1
$V_{GS(off)}$	Gate to Source Cutoff Voltage	–1.0	–2.0	–3.0	V	V_{DS} = –10 V, I_D = –1 mA
$\lvert y_{fs} \rvert$	Forward Transfer Admittance	2.0	7.0		S	V_{DS} = –10 V, I_D = –6.5 A
I_{DSS}	Drain Leakage Current			–10	μA	V_{DS} = –100 V, V_{GS} = 0
I_{GSS}	Gate to Source Leakage Current			∓100	nA	V_{GS} = ∓20 V, V_{DS} = 0
C_{iss}	Input Capacitance		2700		pF	V_{DS} = –10 V V_{GS} = 0 f = 1 MHz
C_{oss}	Output Capacitance		600		pF	
C_{rss}	Reverse Transfer Capacitance		110		pF	
$t_{d(on)}$	Turn-On Delay Time		15		ns	I_D = –6.5 A, V_{DD} = –50 V $V_{GS(on)}$ = –10 V R_L = 8 Ω R_{in} = 10 Ω See Test Circuit 2
t_r	Rise Time		70		ns	
$t_{d(off)}$	Turn-Off Delay Time		85		ns	
t_f	Fall Time		70		ns	

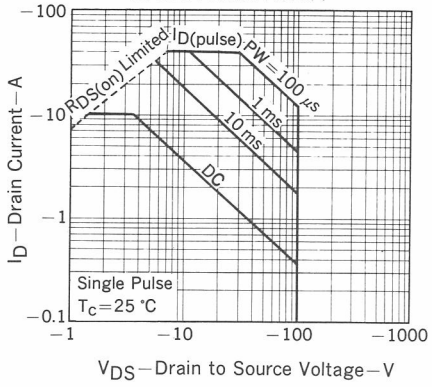
Phase-out/Discontinued

TYPICAL CHARACTERISTICS (T_a = 25 °C)

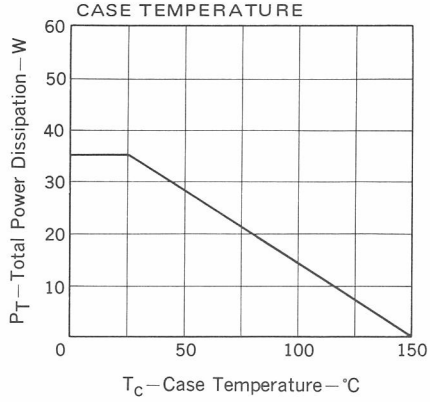
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



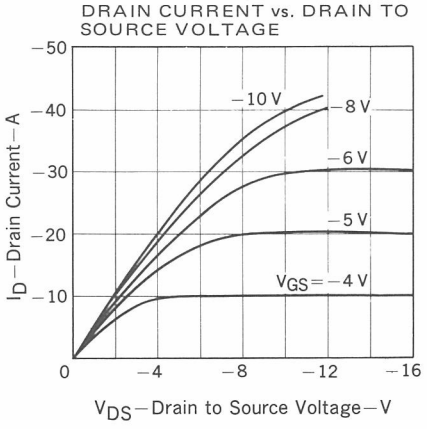
FORWARD BIAS SAFE OPERATING AREA



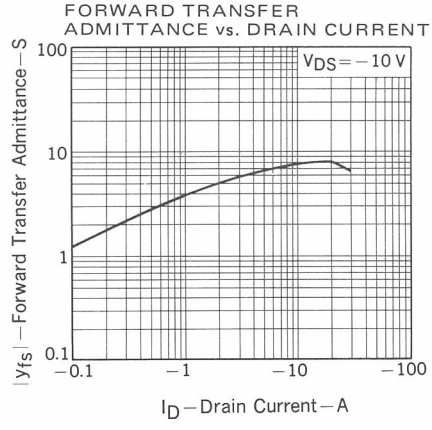
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



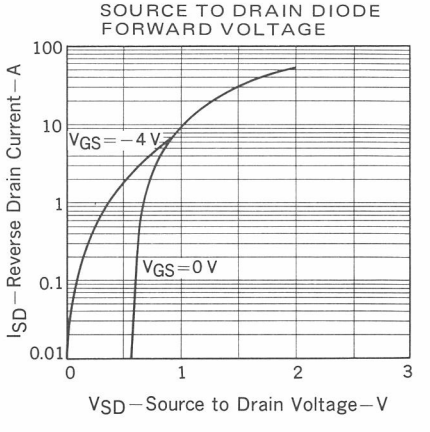
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



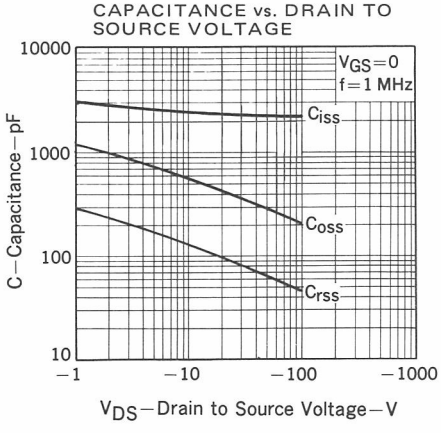
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



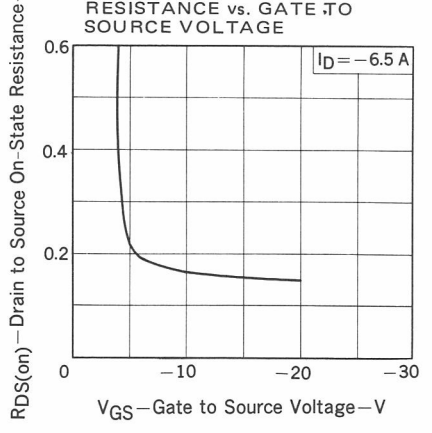
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



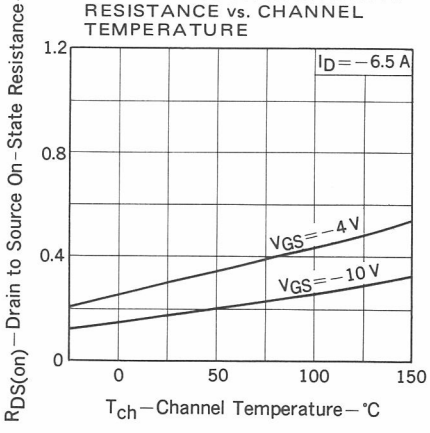
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



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

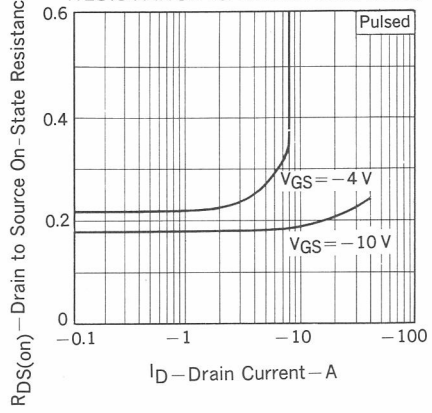


DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE

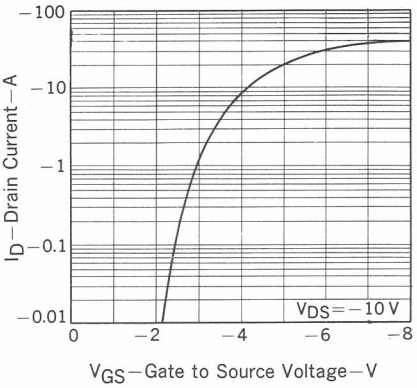


Phase-out/Discontinued

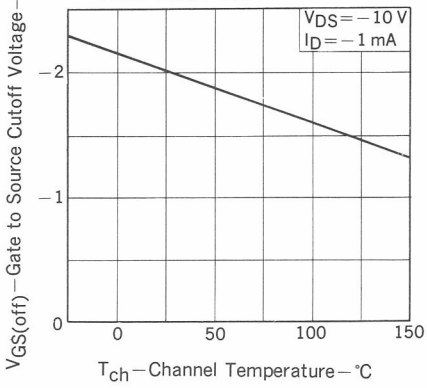
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



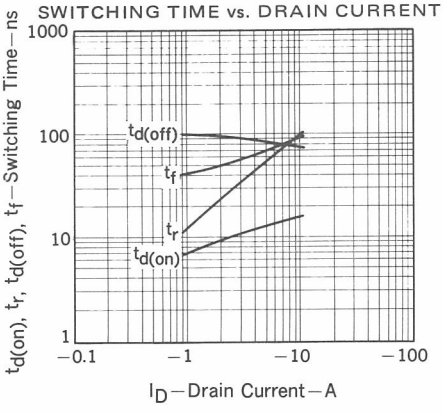
TRANSFER CHARACTERISTIC



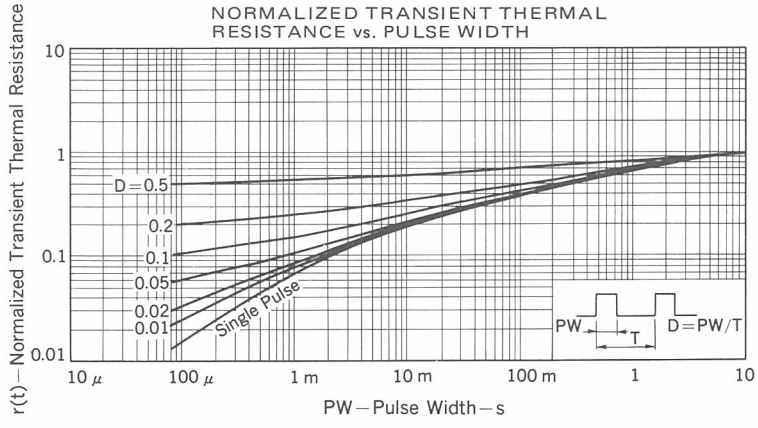
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



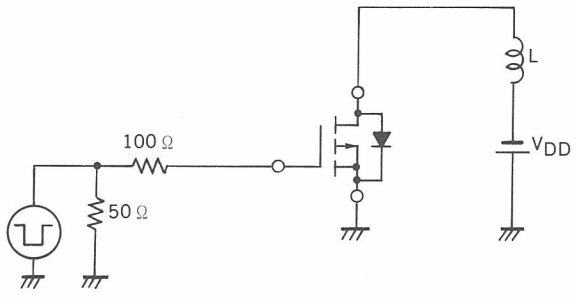
SWITCHING TIME vs. DRAIN CURRENT

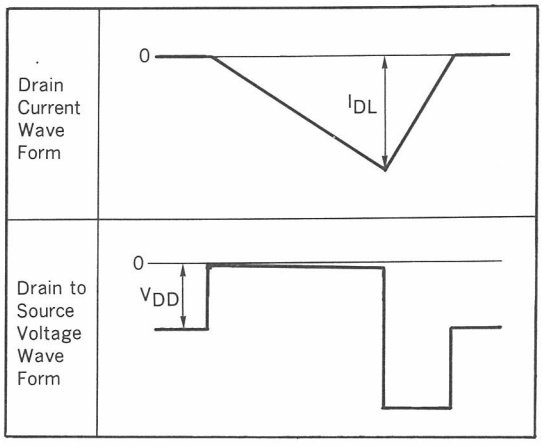


NORMALIZED TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

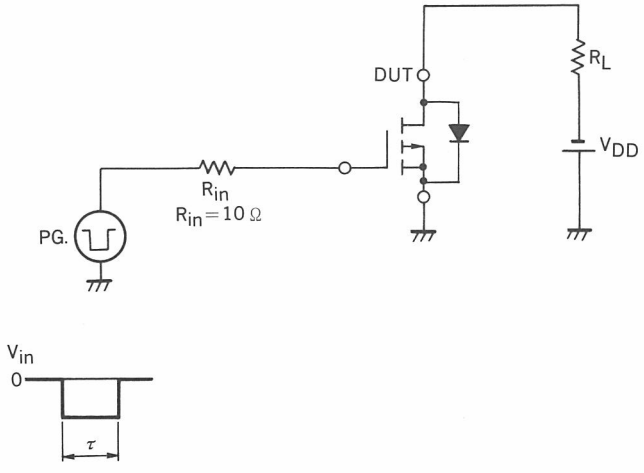


TEST CIRCUIT 1 : UNCLAMPED SUSTAINING ENERGY

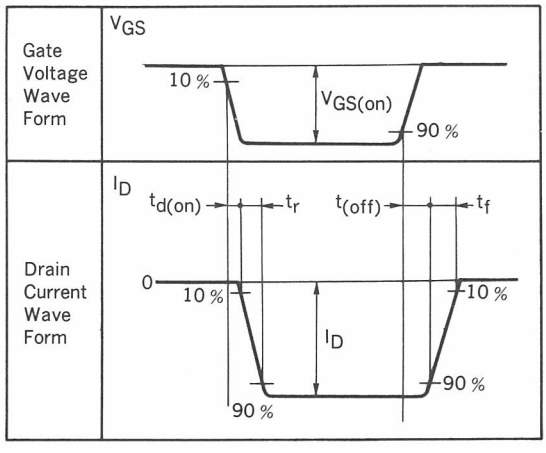




TEST CIRCUIT 2 : SWITCHING CHARACTERISTICS



τ = 1 μs
Duty Cycle ≦ 1 %



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