

To our customers,

Old Company Name in Catalogs and Other Documents

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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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SWITCHING
P-CHANNEL MOS FET
INDUSTRIAL USE

DESCRIPTION

This product is P-Channel MOS Field Effect Transistor designed for power management applications of notebook computers and Li-ion battery protection circuit.

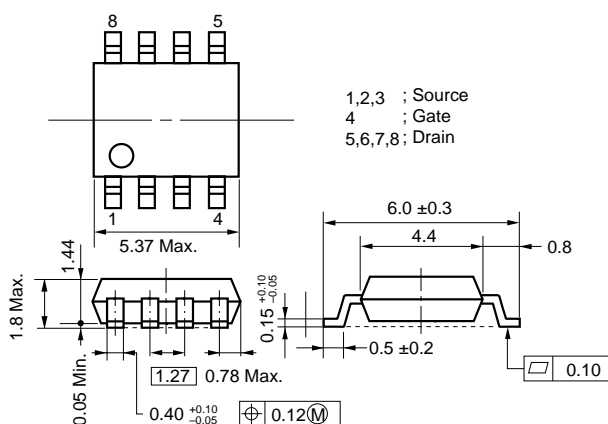
FEATURES

- Low on-resistance
 $R_{DS(on)1} = 8.5 \text{ m}\Omega \text{ TYP. (} V_{GS} = -10 \text{ V, } I_D = -6.0 \text{ A)}$
 $R_{DS(on)2} = 11.0 \text{ m}\Omega \text{ TYP. (} V_{GS} = -4.5 \text{ V, } I_D = -6.0 \text{ A)}$
 $R_{DS(on)3} = 12.0 \text{ m}\Omega \text{ TYP. (} V_{GS} = -4.0 \text{ V, } I_D = -6.0 \text{ A)}$
- Low C_{iss} : $C_{iss} = 3800 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1715G	Power SOP8

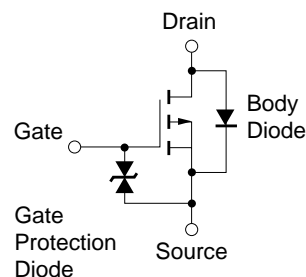
PACKAGE DRAWING (Unit : mm)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	-30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±11	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	±44	A
Total Power Dissipation ($T_A = 25^\circ\text{C}$) ^{Note2}	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C

EQUIVALENT CIRCUIT



- Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of $1200 \text{ mm}^2 \times 0.7 \text{ mm}$

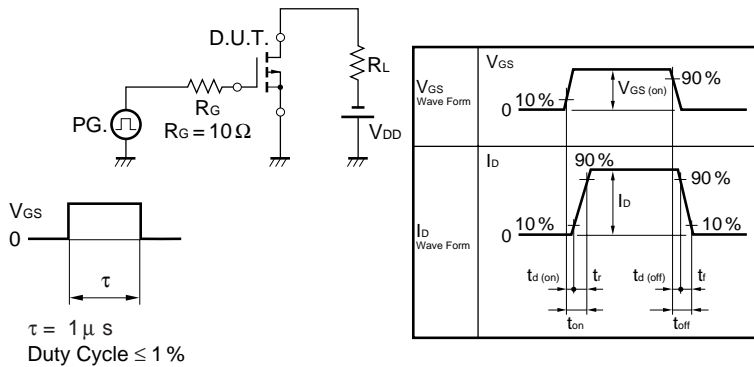
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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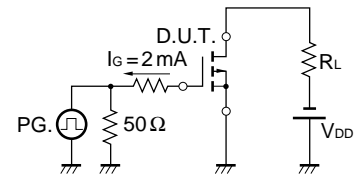
ELECTRICAL CHARACTERISTICS (T_A = 25 °C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -10 V, I _D = -6.0 A		8.5	11.5	mΩ
	R _{DS(on)2}	V _{GS} = -4.5 V, I _D = -6.0 A		11	16	mΩ
	R _{DS(on)3}	V _{GS} = -4.0 V, I _D = -6.0 A		12	17.5	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1 mA	-1.0	-1.6	-2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -6.0 A	10	23		S
Drain Leakage Current	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V			-1	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Input Capacitance	C _{iss}	V _{DS} = -10 V		3800		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		1200		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		500		pF
Turn-on Delay Time	t _{d(on)}	I _D = -6.0 A		40		ns
Rise Time	t _r	V _{GS(on)} = -10 V		240		ns
Turn-off Delay Time	t _{d(off)}	V _{DD} = -15 V		230		ns
Fall Time	t _f	R _G = 10 Ω		160		ns
Total Gate Charge	Q _G	I _D = -11 A		70		nC
Gate to Source Charge	Q _{GS}	V _{DD} = -24 V		9		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = -10 V		17		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 11 A, V _{GS} = 0 V		0.8		V
Reverse Recovery Time	t _{rr}	I _F = 11 A, V _{GS} = 0 V		53		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		57		nC

TEST CIRCUIT 1 SWITCHING TIME

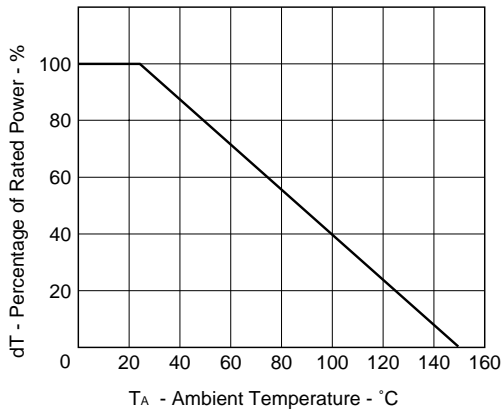


TEST CIRCUIT 2 GATE CHARGE

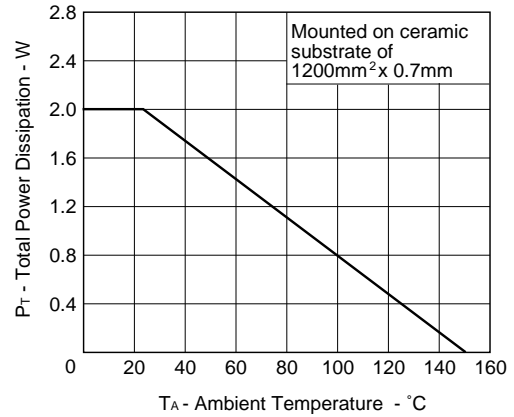


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

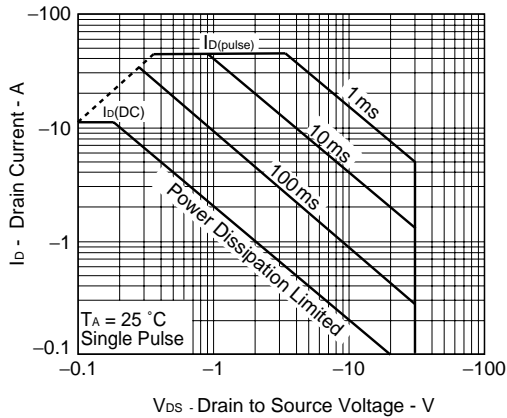
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

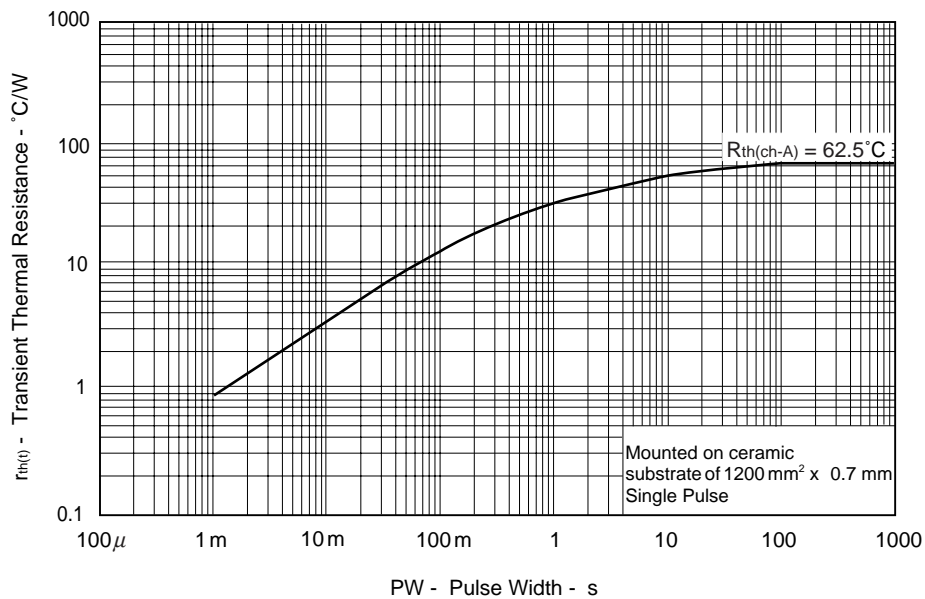


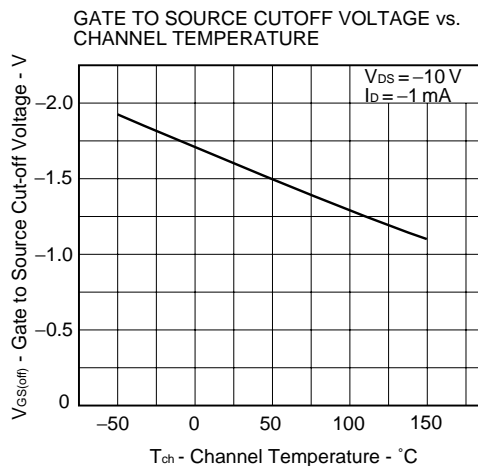
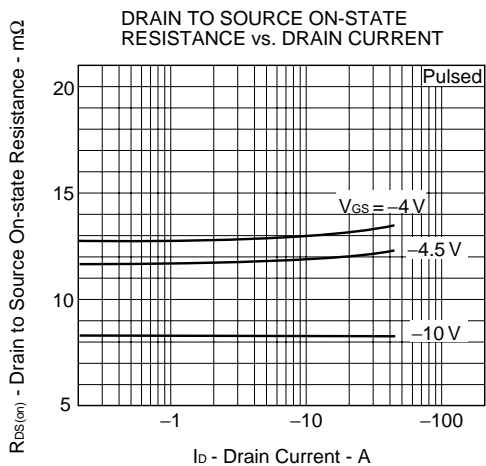
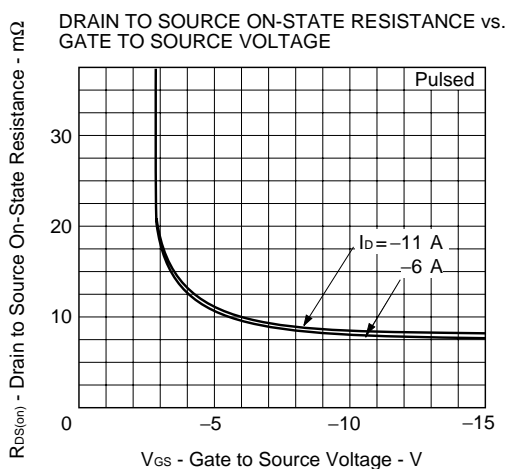
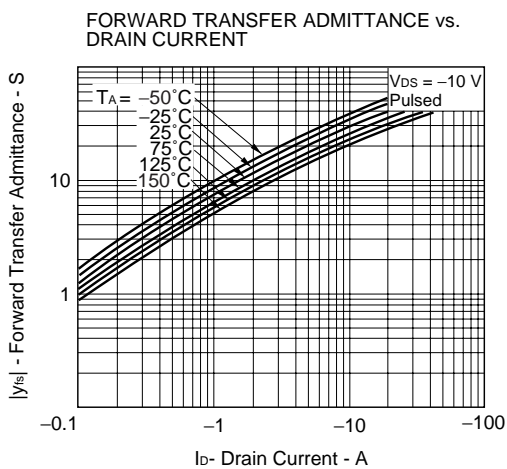
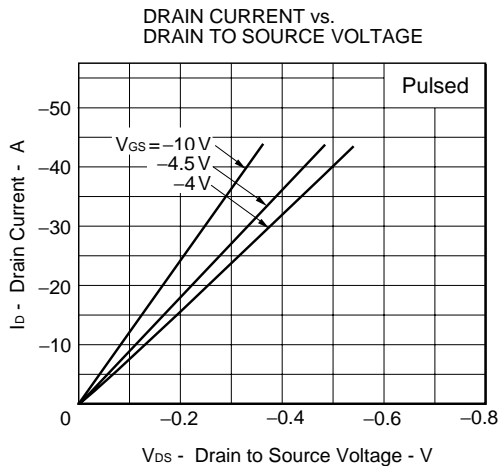
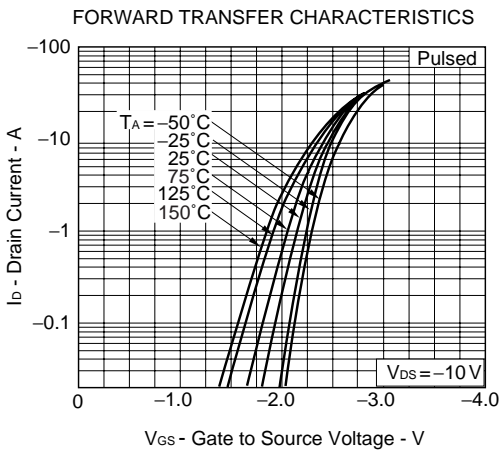
FORWARD BIAS SAFE OPERATING AREA



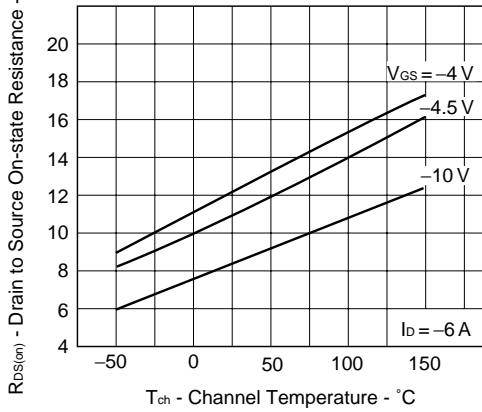
Remark Mounted on ceramic substrate of $1200\text{ mm}^2 \times 0.7\text{ mm}$

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

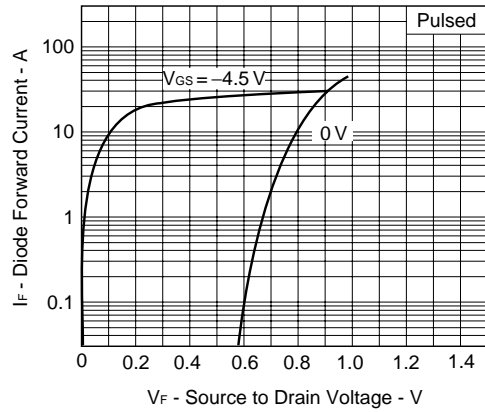




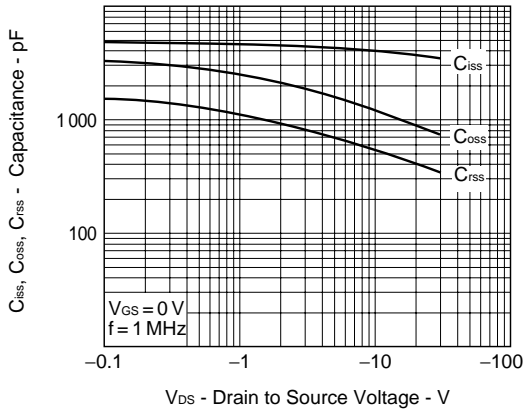
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



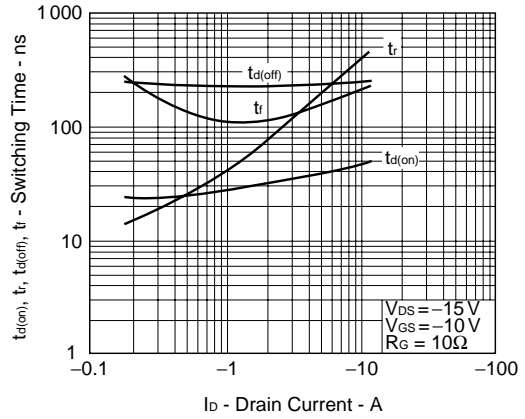
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



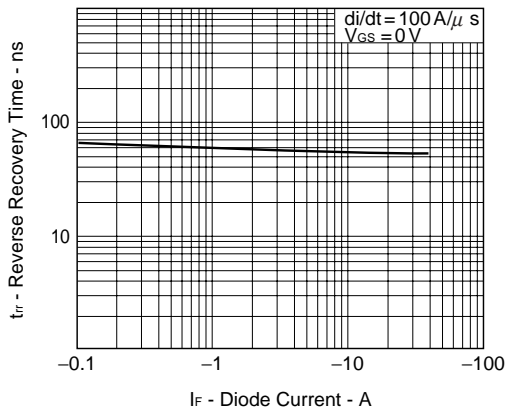
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



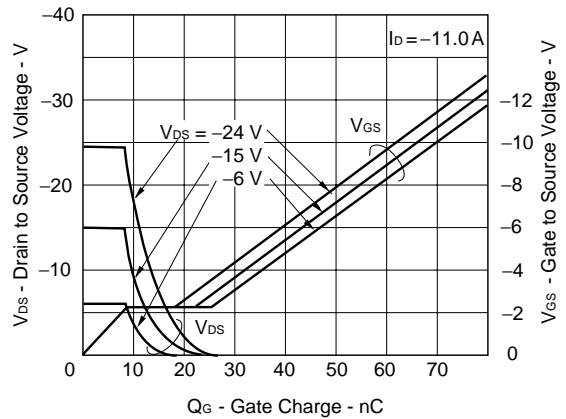
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

[MEMO]

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