

To our customers,

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## Old Company Name in Catalogs and Other Documents

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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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SWITCHING  
N-CHANNEL POWER MOS FET  
INDUSTRIAL USE

DESCRIPTION

This product is Dual N-Channel MOS Field Effect Transistor designed for power management application of notebook computers, and Li-ion battery application.

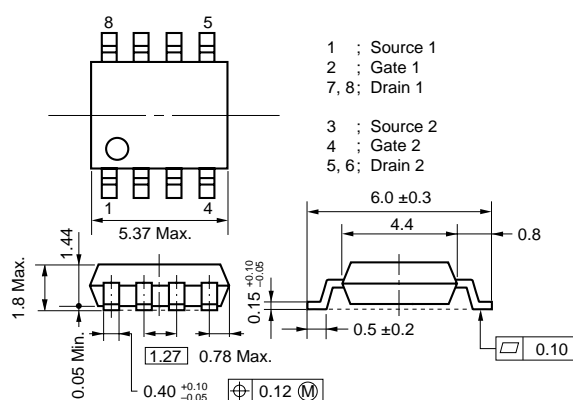
FEATURES

- Dual MOS FET chips in small package
- 2.5 V gate drive type low on-state resistance  
 $R_{DS(on)1} = 30 \text{ m}\Omega$  (MAX.) ( $V_{GS} = 4.5 \text{ V}$ ,  $I_D = 3.0 \text{ A}$ )  
 $R_{DS(on)2} = 40 \text{ m}\Omega$  (MAX.) ( $V_{GS} = 2.5 \text{ V}$ ,  $I_D = 3.0 \text{ A}$ )
- Low  $C_{iss}$  :  $C_{iss} = 1100 \text{ pF}$  (TYP.)
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1758G	Power SOP8

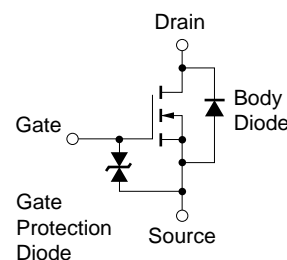
PACKAGE DRAWING (Unit : mm)



ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C)

Drain to Source Voltage (V <sub>GS</sub> = 0)	V <sub>DSS</sub>	30	V
Gate to Source Voltage (V <sub>DS</sub> = 0)	V <sub>GSS</sub>	±12.0	V
Drain Current (DC)	I <sub>D(DC)</sub>	±6.0	A
Drain Current (Pulse) <sup>Note1</sup>	I <sub>D(pulse)</sub>	±24	A
Total Power Dissipation (1 unit) <sup>Note2</sup>	P <sub>T</sub>	1.7	W
Total Power Dissipation (2 unit) <sup>Note2</sup>	P <sub>T</sub>	2.0	W
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to + 150	°C

EQUIVALENT CIRCUIT



- Notes**
1.  $PW \leq 10 \mu s$ , Duty cycle  $\leq 1 \%$
  2. Mounted on ceramic substrate of  $2000 \text{ mm}^2 \times 1.1 \text{ mm}$

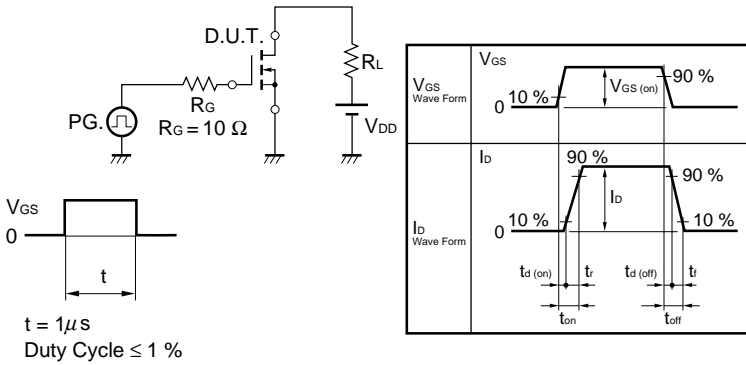
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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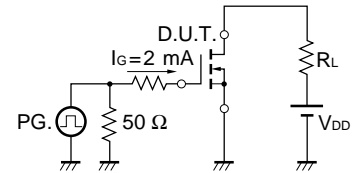
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3.5 A		20	30	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 3.5 A		25	40	mΩ
Gate to Source Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.0 mA	0.5	0.8	1.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3.5 A	5.0	13		S
Drain Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0			10	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±12.0 V, V <sub>DS</sub> = 0			±10	μA
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0, f = 1 MHz		1100		pF
Output Capacitance	C <sub>oss</sub>			370		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			170		pF
Turn-on Delay Time	t <sub>d(on)</sub>	I <sub>D</sub> = 3.0 A, V <sub>GS(on)</sub> = 4.0 V, V <sub>DD</sub> = 15 V R <sub>G</sub> = 10 Ω		50		ns
Rise Time	t <sub>r</sub>			190		ns
Turn-off Delay Time	t <sub>d(off)</sub>			550		ns
Fall Time	t <sub>f</sub>			490		ns
Total Gate Charge	Q <sub>G</sub>	I <sub>D</sub> = 6.0 A, V <sub>DD</sub> = 24 V, V <sub>GS</sub> = 4.0 V		15.0		nC
Gate to Source Charge	Q <sub>GS</sub>			2.0		nC
Gate to Drain Charge	Q <sub>GD</sub>			6.5		nC
Body Diode forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 6.0 A, V <sub>GS</sub> = 0		0.8		V

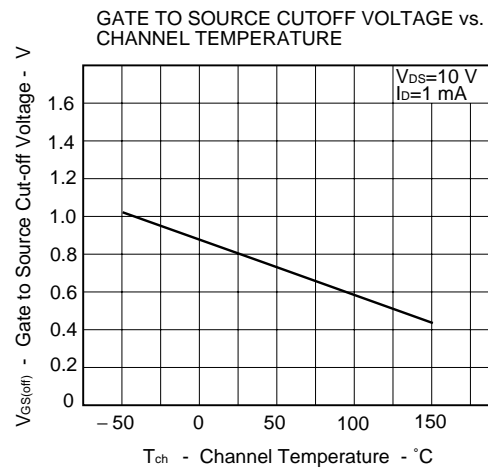
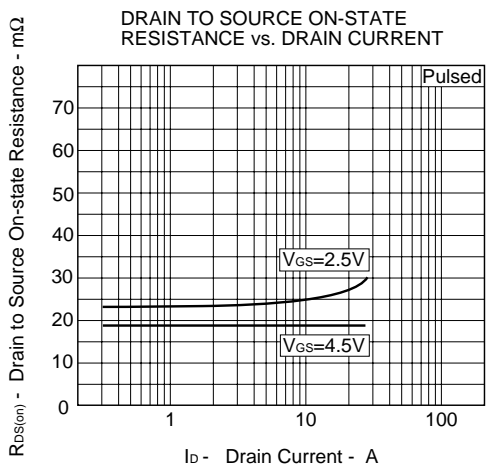
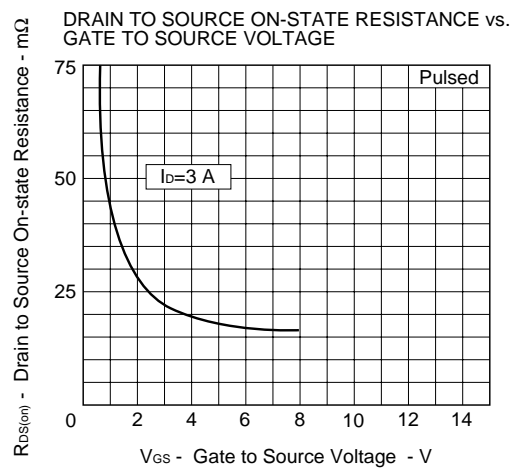
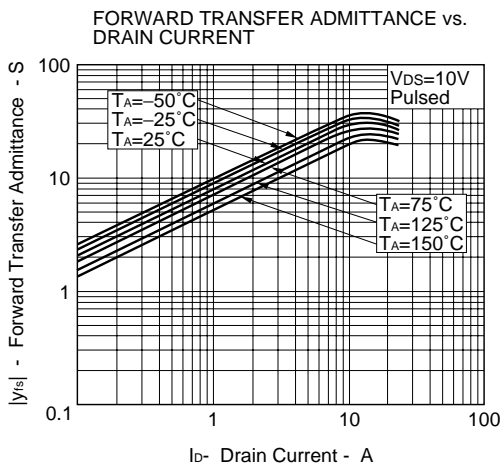
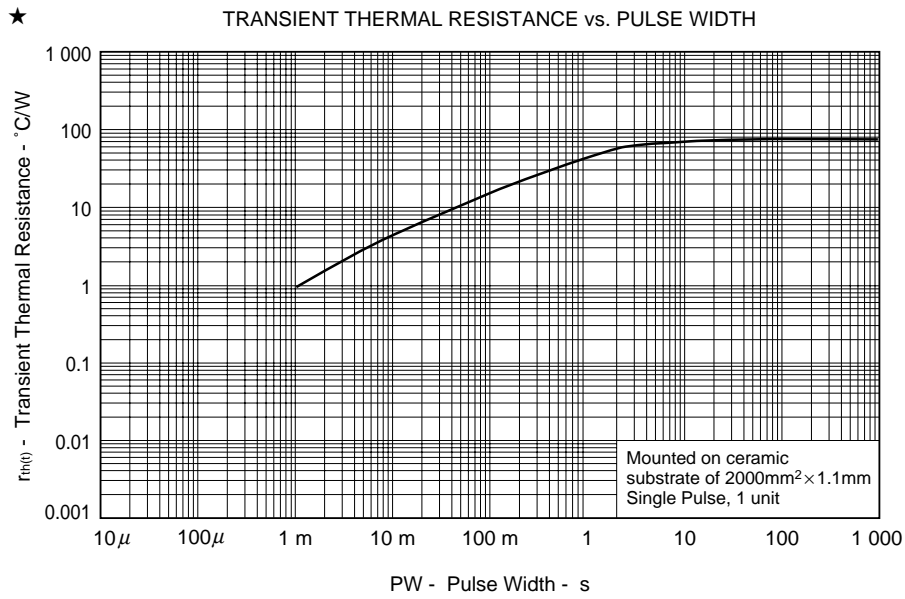
**TEST CIRCUIT 1 SWITCHING TIME**

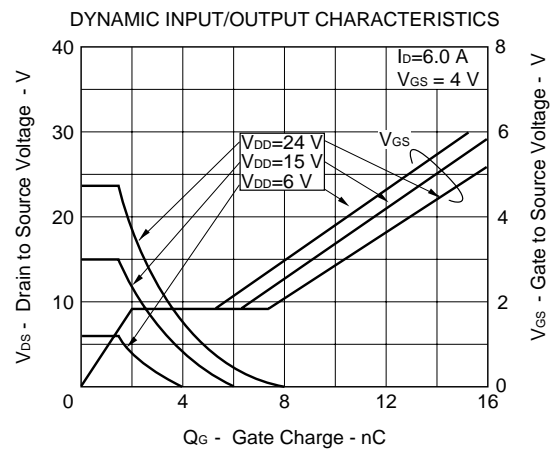
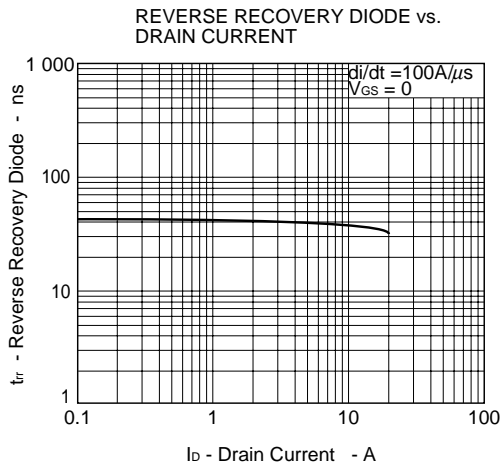
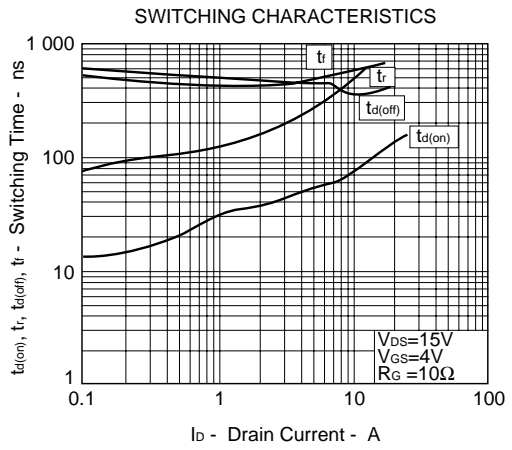
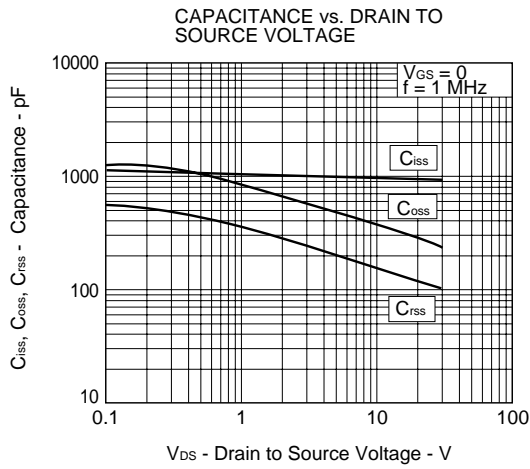
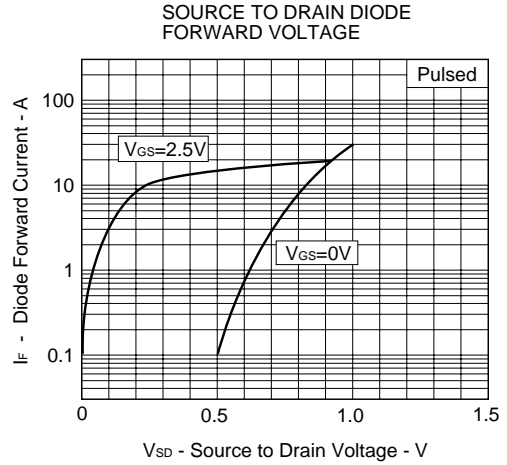
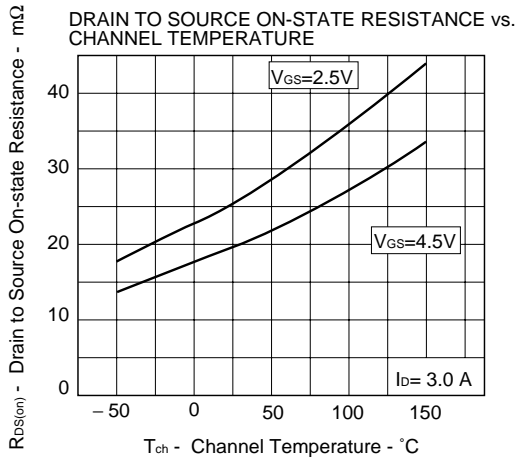


**TEST CIRCUIT 2 GATE CHARGE**

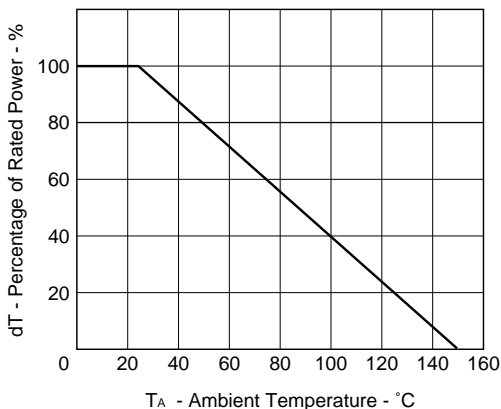


TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

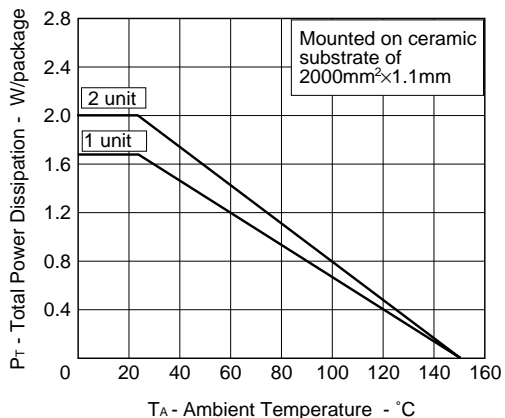




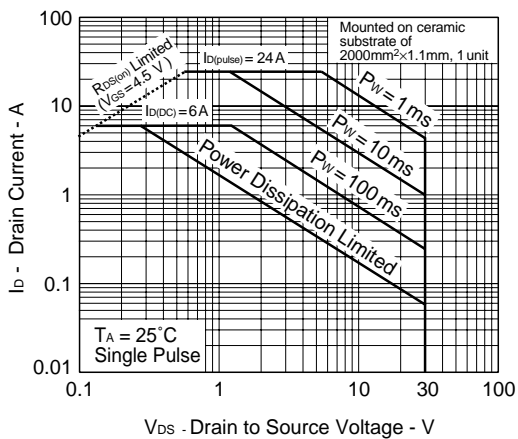
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



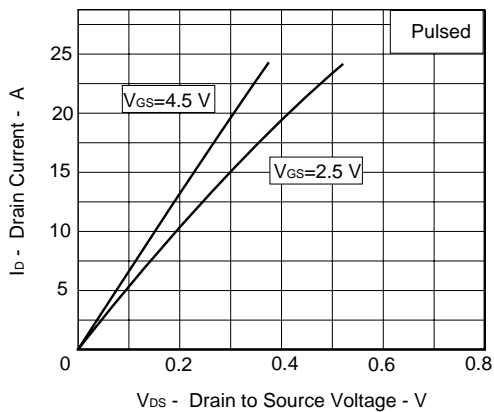
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



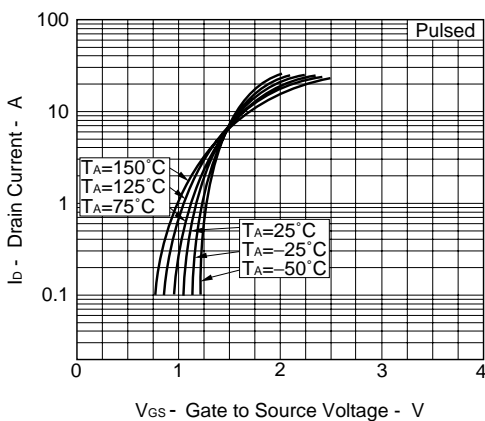
★ FORWARD BIAS SAFE OPERATING AREA



DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



FORWARD TRANSFER CHARACTERISTICS



[MEMO]



[MEMO]

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