

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

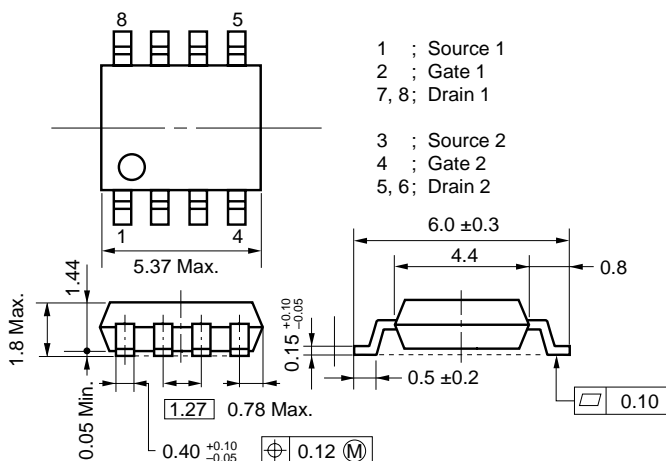
DESCRIPTION

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

FEATURES

- Dual chip type
- Low on-resistance  
 $R_{DS(on)1} = 32 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 3.5 \text{ A)}$   
 $R_{DS(on)2} = 53 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4 \text{ V, } I_D = 3.5 \text{ A)}$
- Low input capacitance  $C_{iss} = 780 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

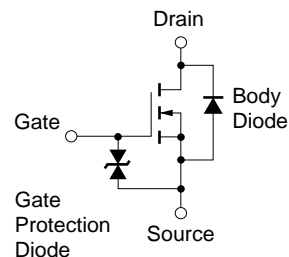
PACKAGE DRAWING (Unit : mm)



ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA1754G	Power SOP8

EQUIVALENT CIRCUIT  
(1/2 Circuit)



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

Drain to Source Voltage ( $V_{GS} = 0$ )	$V_{DSS}$	30	V
Gate to Source Voltage ( $V_{DS} = 0$ )	$V_{GSS}$	±20	V
Drain Current (DC)	$I_{D(DC)}$	±7.0	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	±28	A
Total Power Dissipation (1 unit) <sup>Note2</sup>	$P_T$	1.7	W
Total Power Dissipation (2 unit) <sup>Note2</sup>	$P_T$	2.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to + 150	$^\circ\text{C}$

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

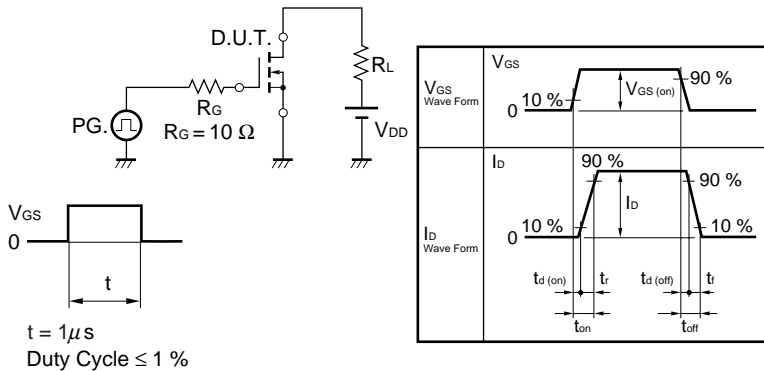
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

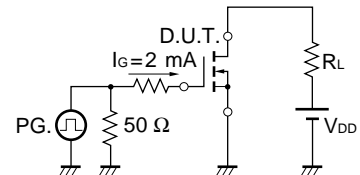
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, All terminals are connected.)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3.5 A		20	32	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4 V, I <sub>D</sub> = 3.5 A		29	53	mΩ
Gate to Source Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.0	1.6	2.0	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3.5 A	5.0	9.4		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> = ±20 V, V <sub>DS</sub> = 0			±10	μA
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		780		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0		310		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		110		pF
Turn-on Delay Time	t <sub>d(on)</sub>	I <sub>D</sub> = 3.5 A		7		ns
Rise Time	t <sub>r</sub>	V <sub>GS(on)</sub> = 10 V		103		ns
Turn-off Delay Time	t <sub>d(off)</sub>	V <sub>DD</sub> = 15 V		103		ns
Fall Time	t <sub>f</sub>	R <sub>G</sub> = 10 Ω		86		ns
Total Gate Charge	Q <sub>G</sub>	I <sub>D</sub> = 7.0 A		17.9		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>DD</sub> = 24 V		2.3		nC
Gate to Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = 10 V		4.3		nC
Body Diode forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 7.0 A, V <sub>GS</sub> = 0		0.80		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 7.0 A, V <sub>GS</sub> = 0		29		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		44		nC

**TEST CIRCUIT 1 SWITCHING TIME**

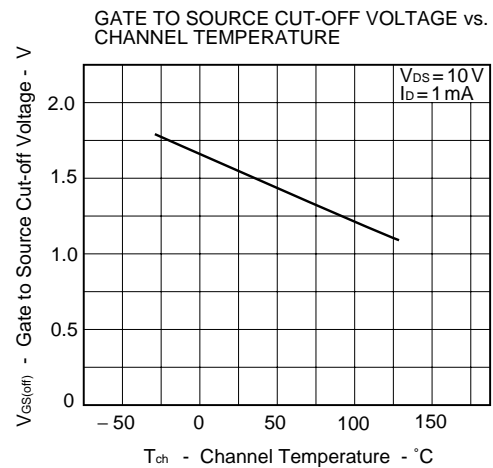
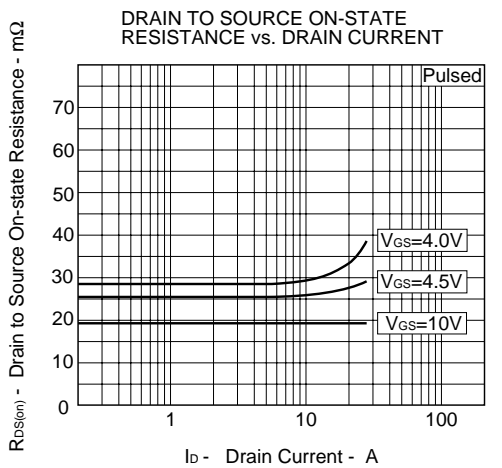
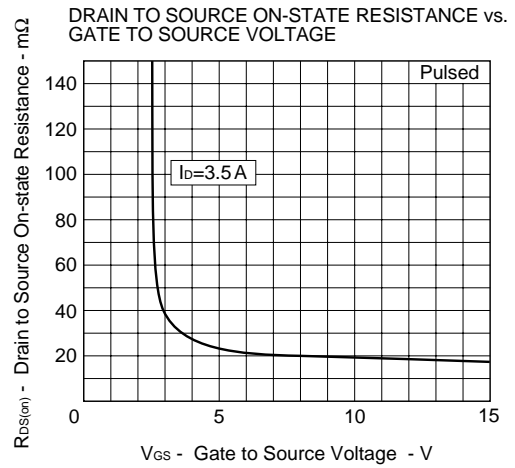
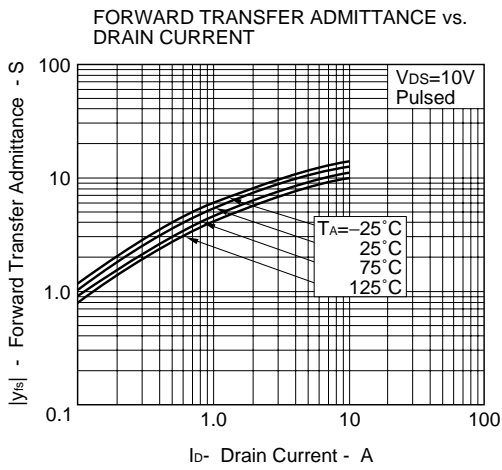
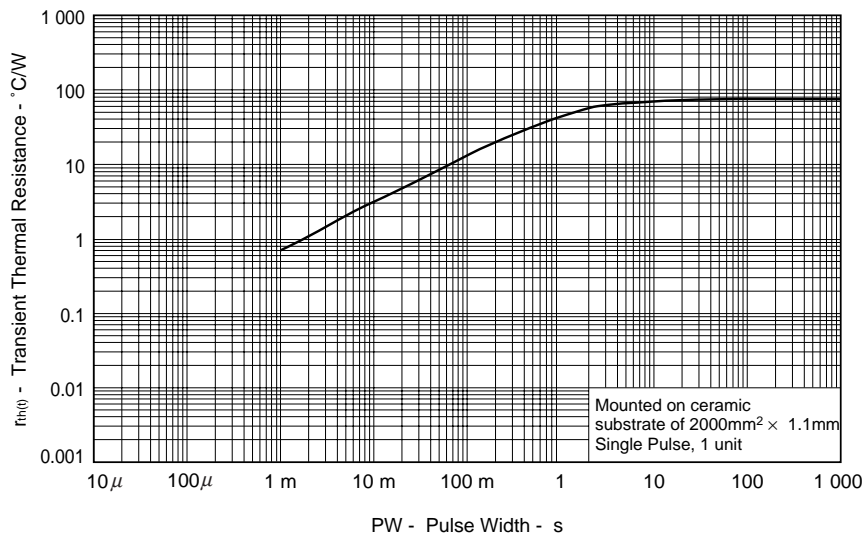


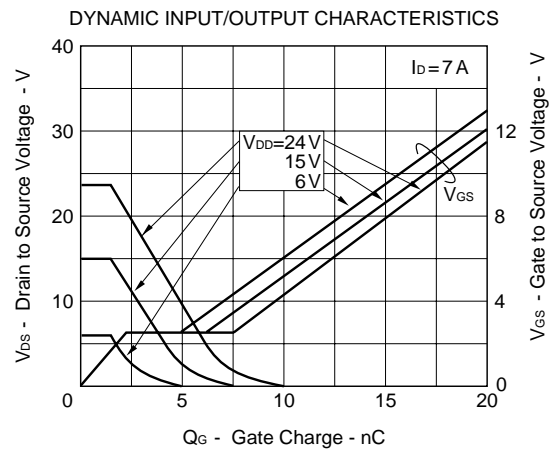
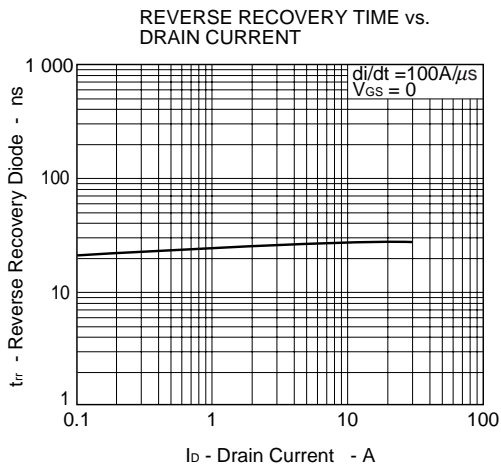
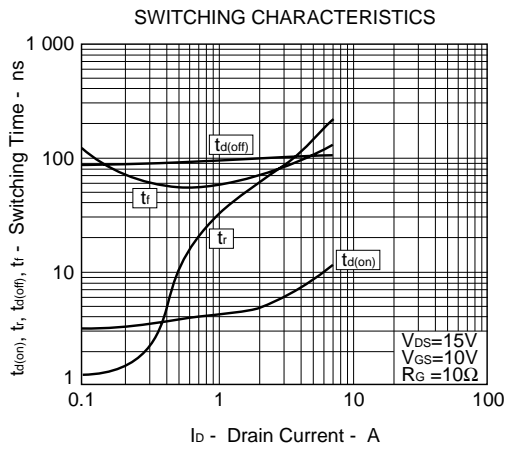
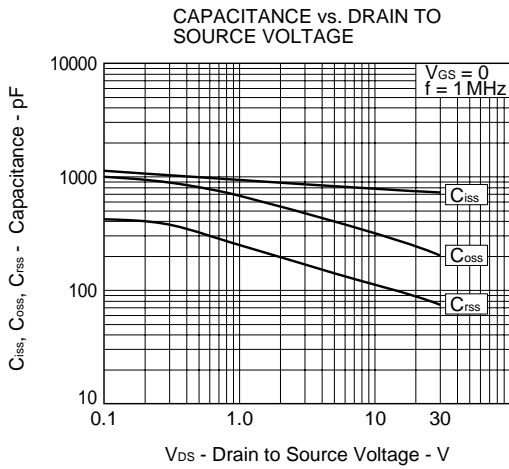
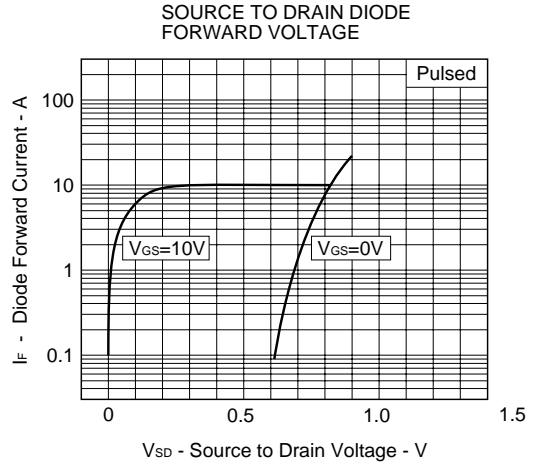
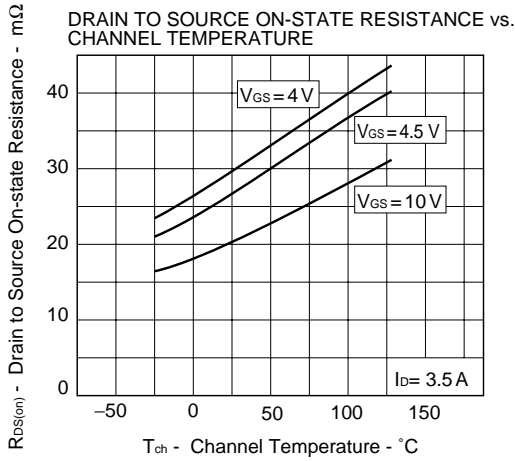
**TEST CIRCUIT 2 GATE CHARGE**



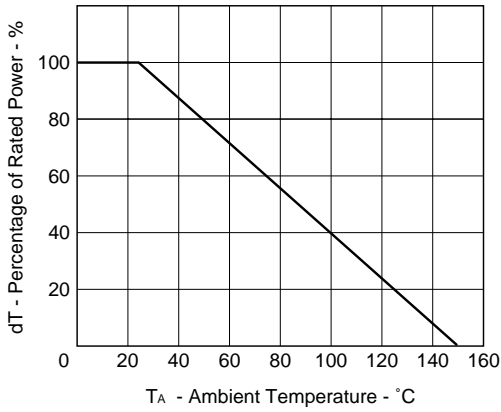
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

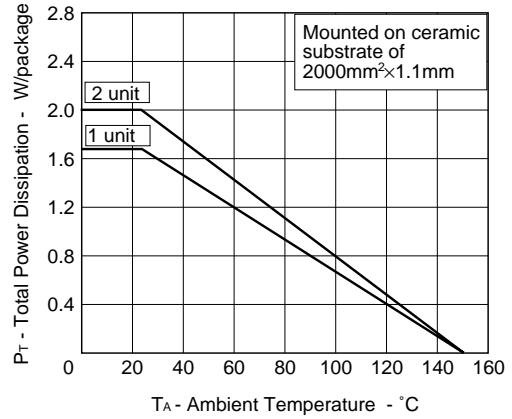




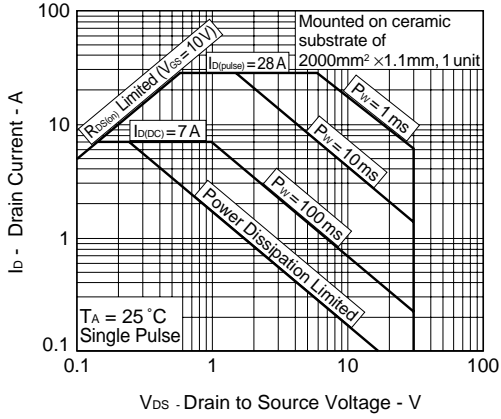
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



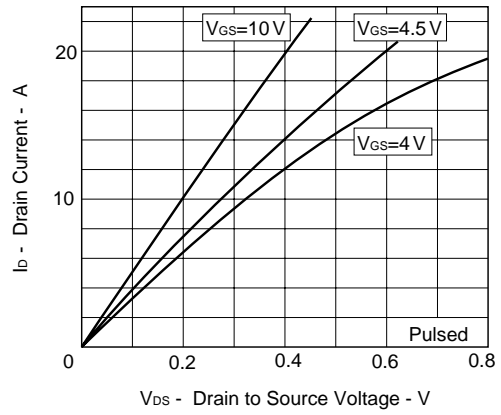
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



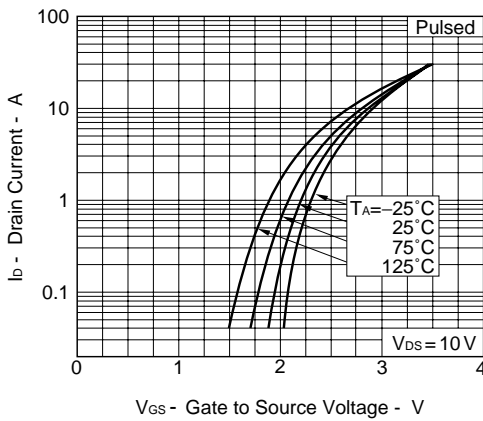
FORWARD BIAS SAFE OPERATING AREA



DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



FORWARD TRANSFER CHARACTERISTICS



[MEMO]



[MEMO]

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