

To our customers,

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## 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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Not recommended  
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SWITCHING  
 P-CHANNEL POWER MOS FET

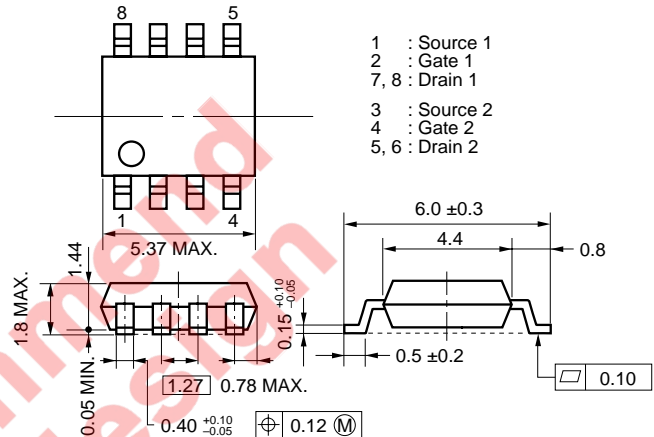
DESCRIPTION

The  $\mu$ PA1772 is Dual P-Channel MOS Field Effect Transistor designed for power management applications of portable machines.

FEATURES

- Dual chip type
- Low on-state resistance  
 $R_{DS(on)1} = 20.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -4 \text{ A)}$   
 $R_{DS(on)2} = 29.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -4 \text{ A)}$   
 $R_{DS(on)3} = 34.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -4 \text{ A)}$
- Low  $C_{iss}$ :  $C_{iss} = 1500 \text{ pF TYP. (} V_{DS} = -10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit : mm)



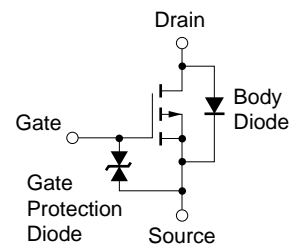
ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA1772G	Power SOP8

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

Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DS}$	-30	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GS}$	$\mp 20$	V
Drain Current (DC)	$I_{D(DC)}$	$\mp 8$	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\mp 32$	A
Total Power Dissipation (2 unit) <sup>Note2</sup>	$P_T$	2.0	W
Total Power Dissipation (1 unit) <sup>Note2</sup>	$P_T$	1.7	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to + 150	$^\circ\text{C}$

EQUIVALENT CIRCUIT  
 (1/2 circuit)



Notes 1.  $PW \leq 10 \mu\text{s}$ , Duty cycle  $\leq 1\%$

2.  $T_A = 25^\circ\text{C}$ , Mounted on ceramic substrate of  $2000 \text{ mm}^2 \times 2.2 \text{ mm}$

**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..

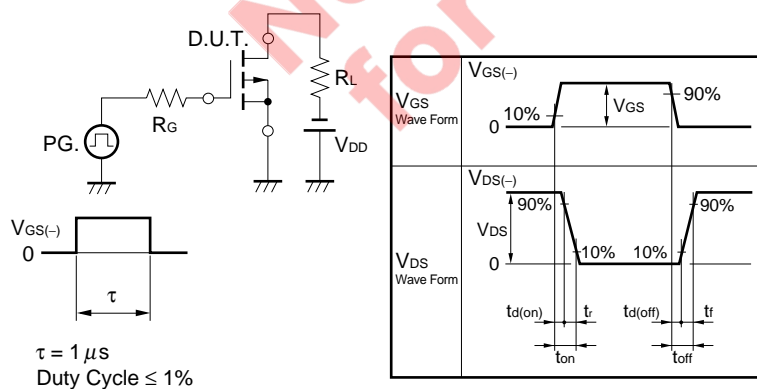
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**ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)**

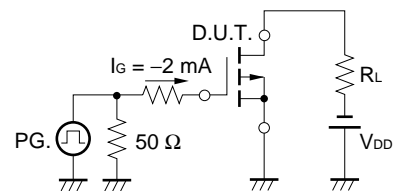
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0 V			-1	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V			±10	μA
Gate Cut-off Voltage <sup>Note</sup>	V <sub>GS(off)</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA	-1.0	-1.7	-2.5	V
Forward Transfer Admittance <sup>Note</sup>	y <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -4 A	6	12		S
Drain to Source On-state Resistance <sup>Note</sup>	R <sub>DS(on)1</sub>	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -4 A		17.4	20.0	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -4 A		23.5	29.5	mΩ
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -4 A		25.8	34.0	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -10 V		1500		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		550		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		240		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -15 V, I <sub>D</sub> = -4 A		13		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = -10 V		11		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		120		ns
Fall Time	t <sub>f</sub>			70		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = -24 V		34		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = -10 V		5		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = -8 A		9		nC
Body Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 8 A, V <sub>GS</sub> = 0 V		0.84	1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 8 A, V <sub>GS</sub> = 0 V		50		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		37		nC

**Note** Pulsed: PW ≤ 350 μs, Duty cycle ≤ 2%

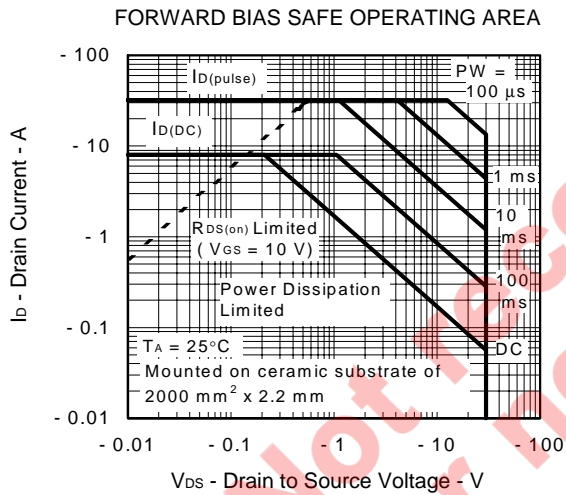
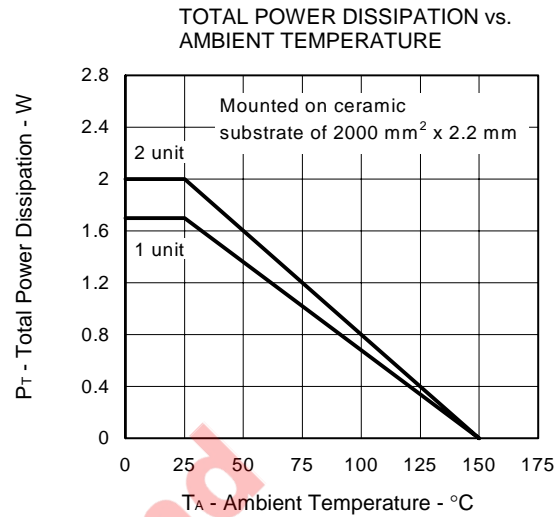
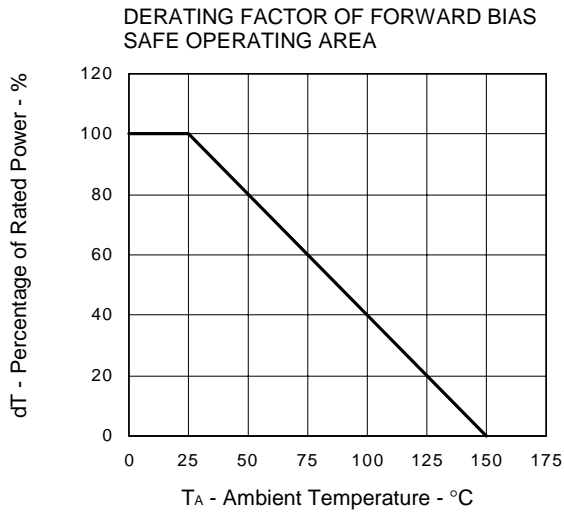
**TEST CIRCUIT 1 SWITCHING TIME**



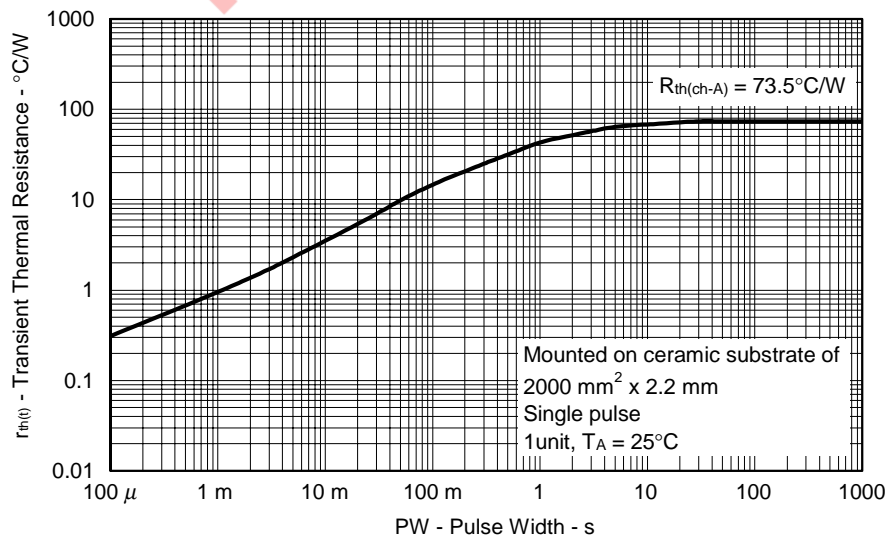
**TEST CIRCUIT 2 GATE CHARGE**



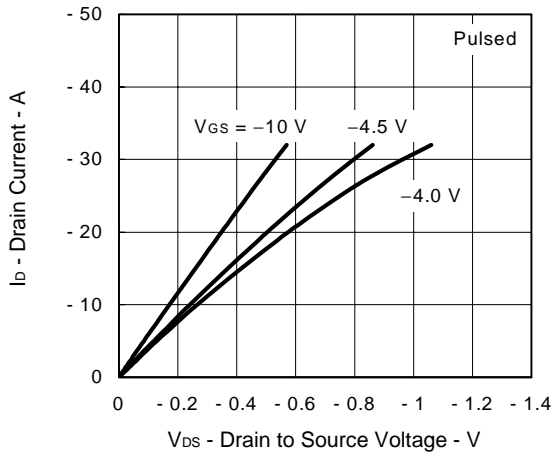
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



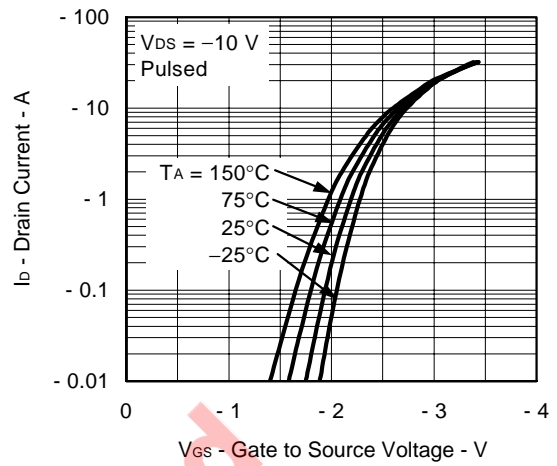
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



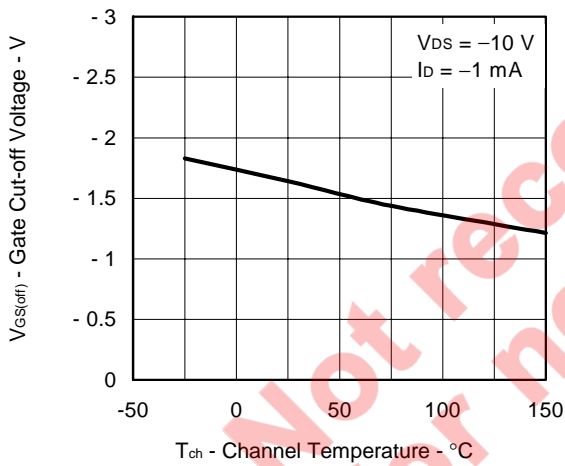
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



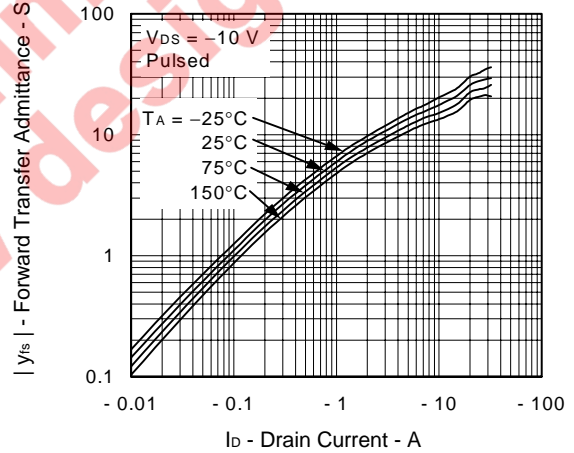
FORWARD TRANSFER CHARACTERISTICS



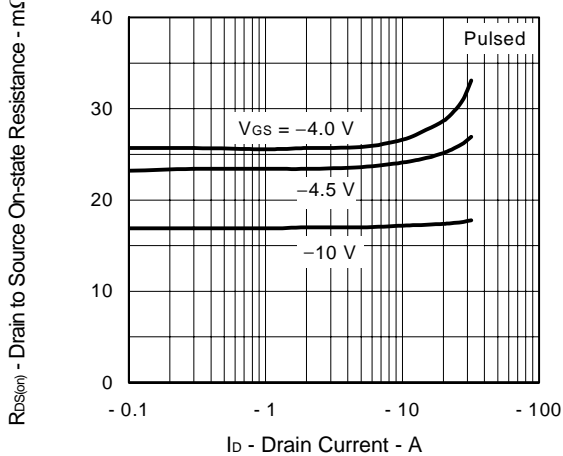
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



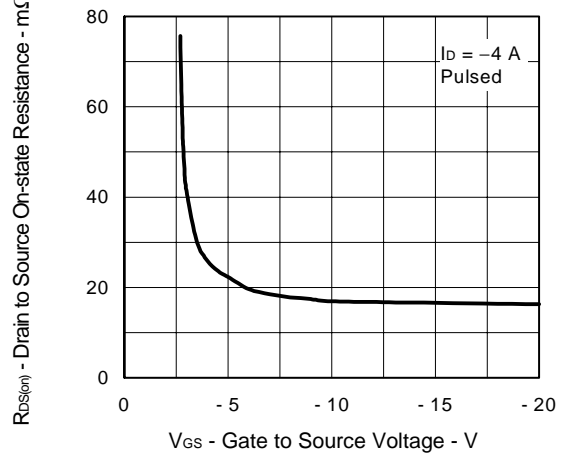
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



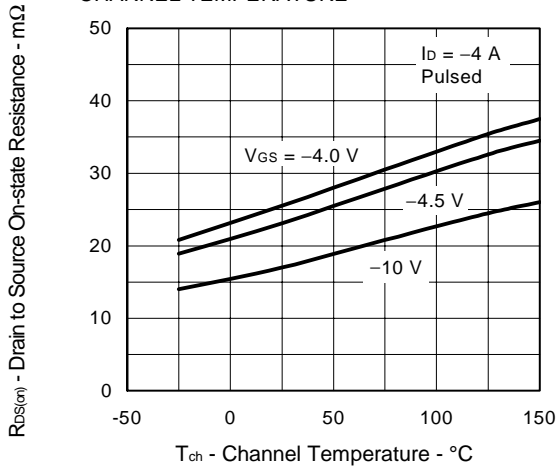
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



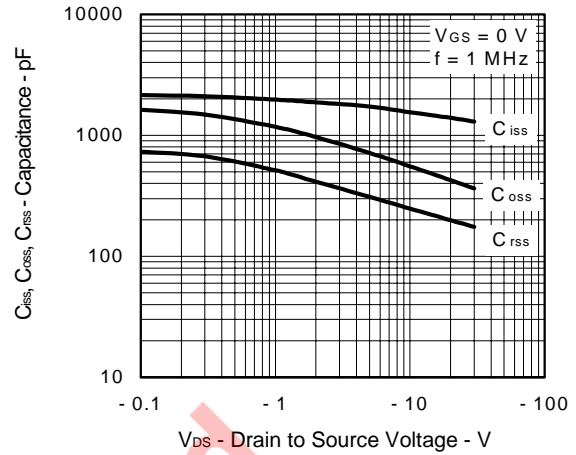
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



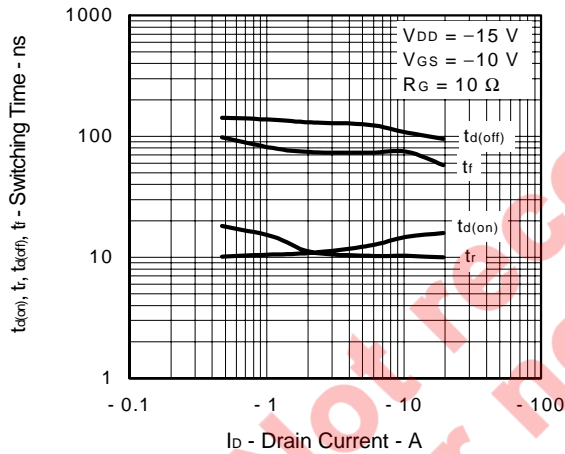
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



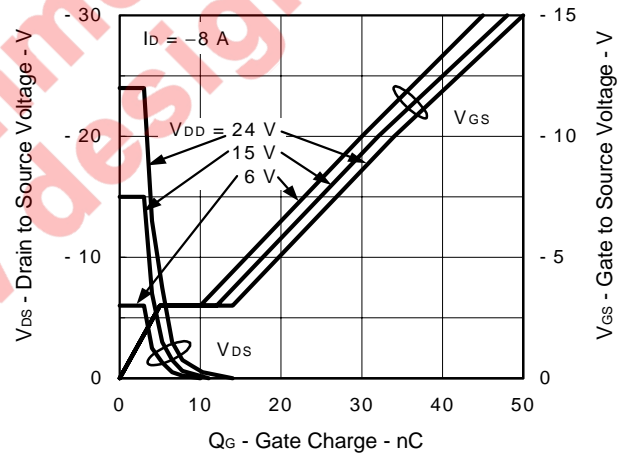
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



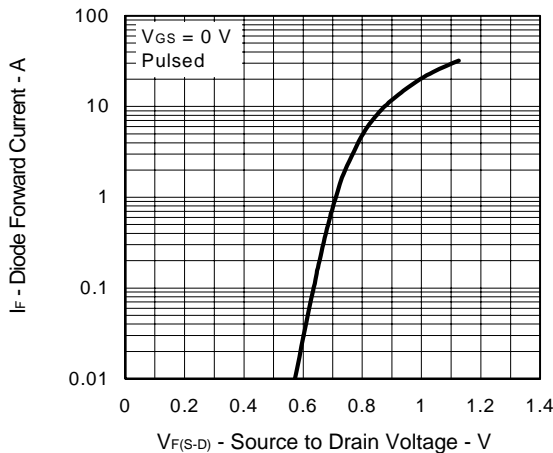
SWITCHING CHARACTERISTICS



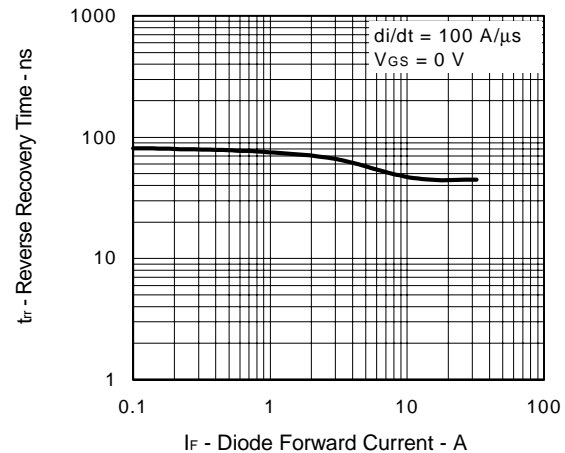
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



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