

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
N-CHANNEL POWER MOS FET**

DESCRIPTION

The μPA2706GR is N-Channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

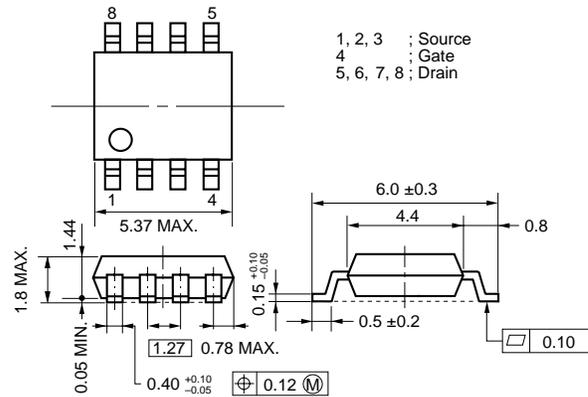
FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 15 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 5.5 \text{ A)}$
 $R_{DS(on)2} = 22.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 5.5 \text{ A)}$
- Low C_{iss} : $C_{iss} = 660 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Small and surface mount package (Power SOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA2706GR	Power SOP8

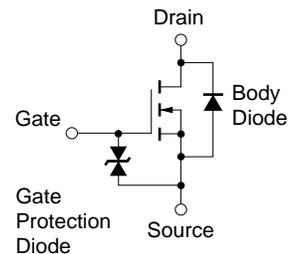
PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected)

Parameter	Symbol	Value	Unit
Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	30	V
Gate to Source Voltage (V _{DS} = 0 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°C) ^{Note2}	P _T	2.0	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to + 150	°C
Single Avalanche Current ^{Note3}	I _{AS}	11	A
Single Avalanche Energy ^{Note3}	E _{AS}	12.1	mJ

EQUIVALENT CIRCUIT



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

2. Mounted on ceramic substrate of 1200 mm² x 2.2 mm

3. Starting T_{ch} = 25°C, V_{DD} = 15 V, R_G = 25 Ω, L = 100 μH, V_{GS} = 20 → 0 V

Caution Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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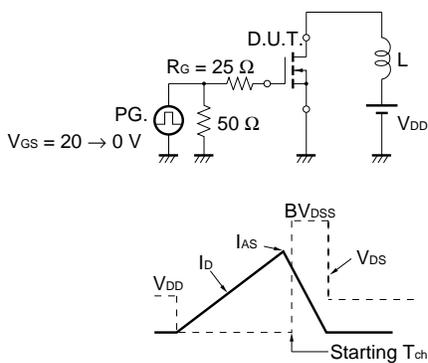
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ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

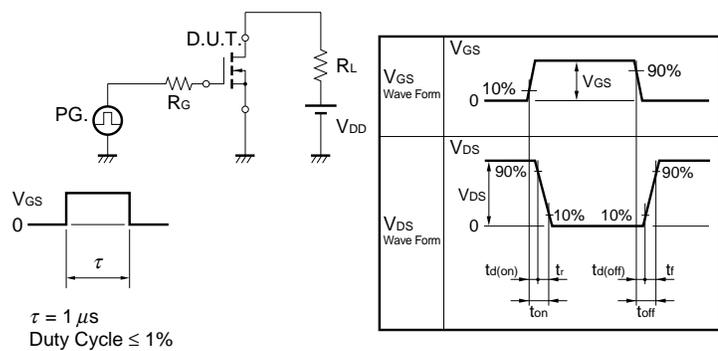
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5		2.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10 V, I _D = 5.5 A	4.5			S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 10 V, I _D = 5.5 A		11	15	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 5.5 A		16	22.5	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 5.5 A		19	29	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		660		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		270		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		83		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 5.5 A		9		ns
Rise Time	t _r	V _{GS} = 10 V		5		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		29		ns
Fall Time	t _f			6		ns
Total Gate Charge	Q _G	V _{DD} = 15 V		7.1		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 5 V		2.1		nC
Gate to Drain Charge	Q _{GD}	I _D = 11 A		3.1		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 11 A, V _{GS} = 0 V		0.84		V
Reverse Recovery Time	t _{rr}	I _F = 11 A, V _{GS} = 0 V		25		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		17		nC

Note Pulsed: PW ≤ 350 μs, Duty Cycle ≤ 2%

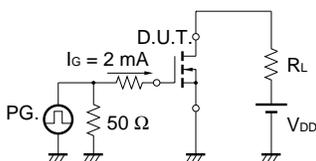
TEST CIRCUIT 1 AVALANCHE CAPABILITY



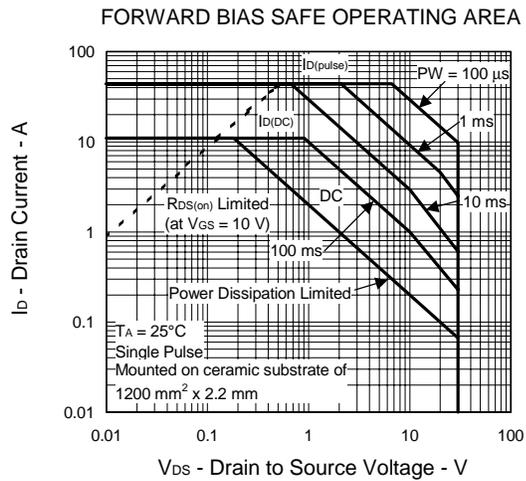
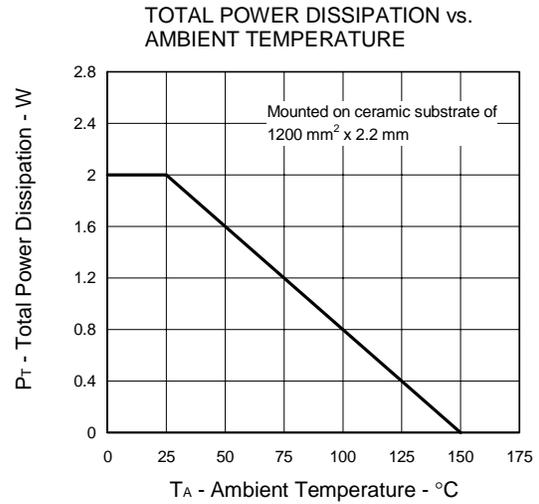
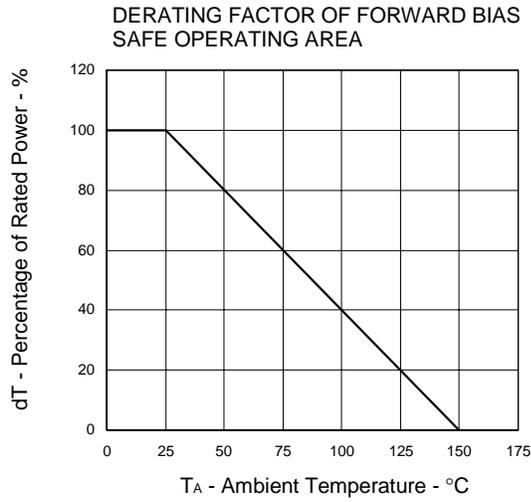
TEST CIRCUIT 2 SWITCHING TIME



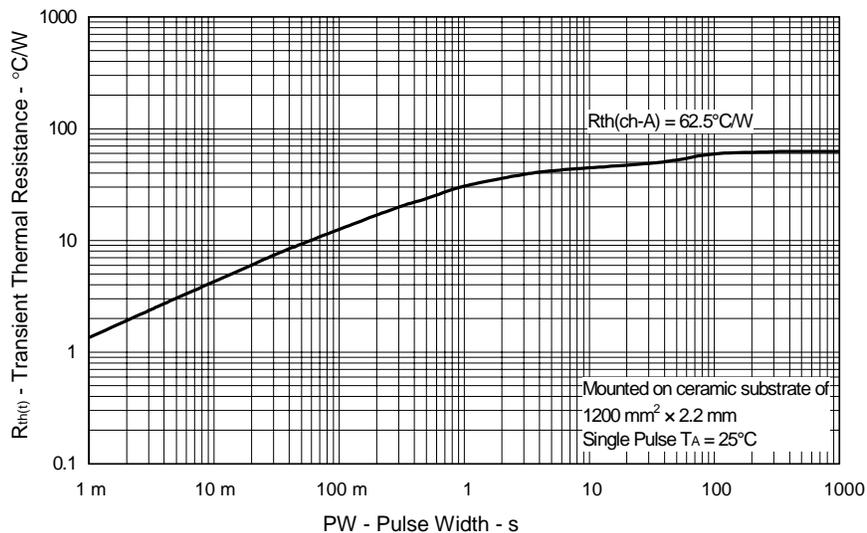
TEST CIRCUIT 3 GATE CHARGE



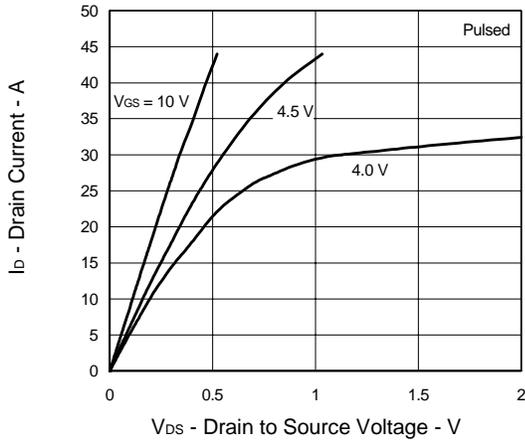
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



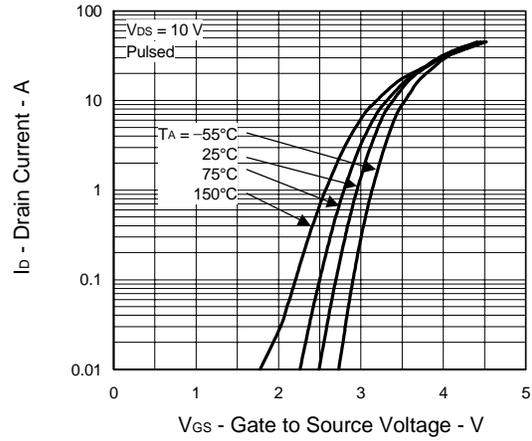
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



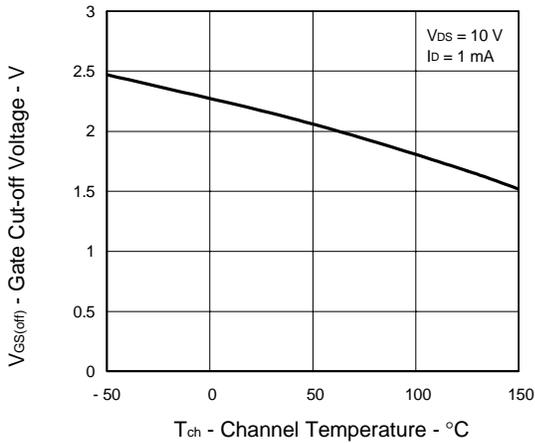
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



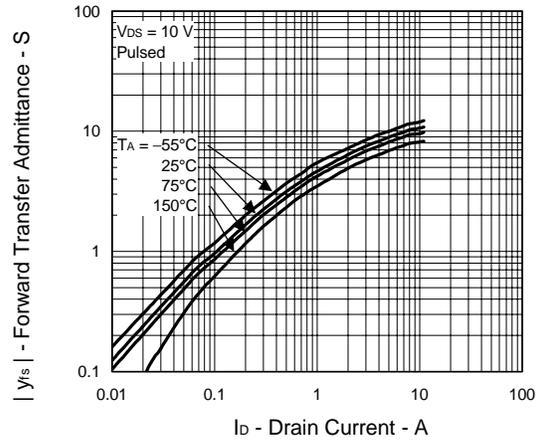
FORWARD TRANSFER CHARACTERISTICS



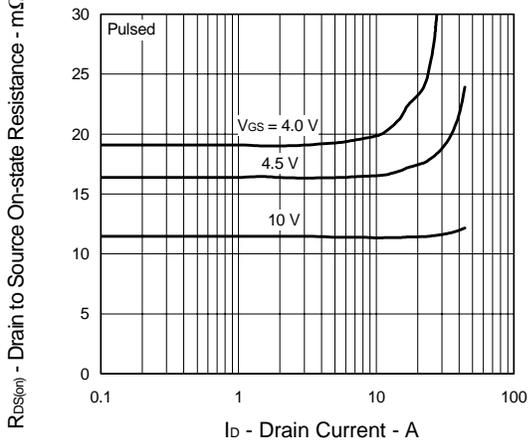
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



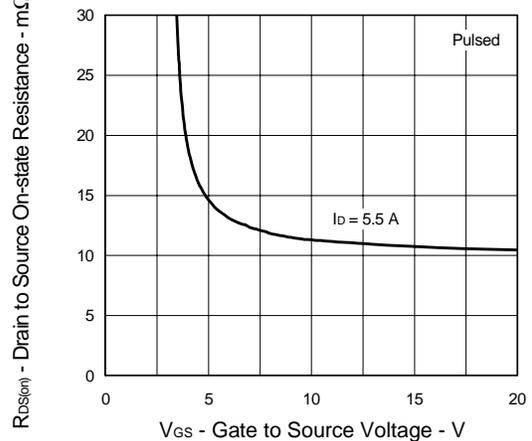
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



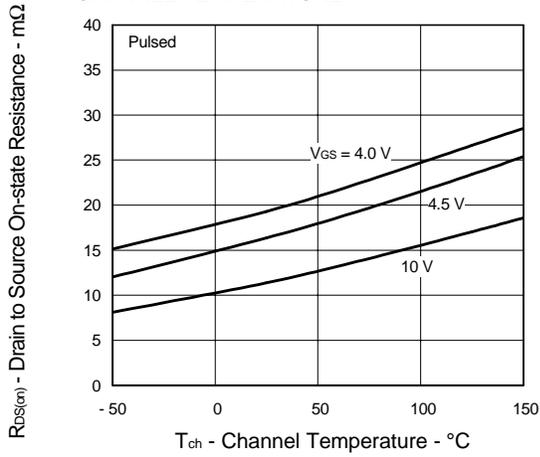
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



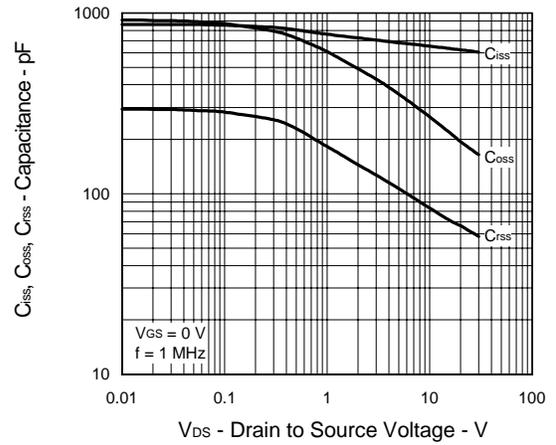
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



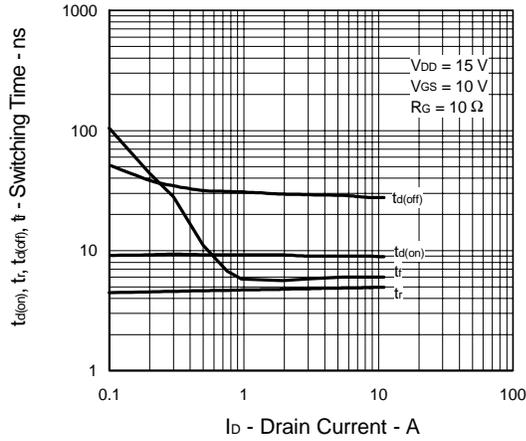
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



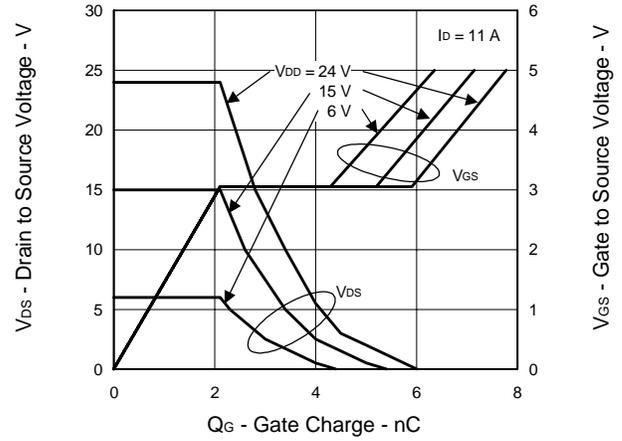
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



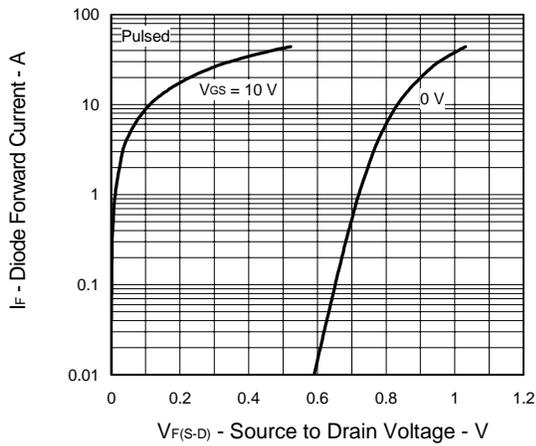
SWITCHING CHARACTERISTICS



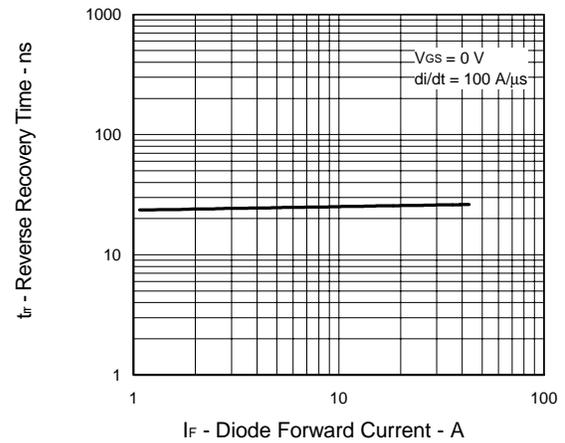
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

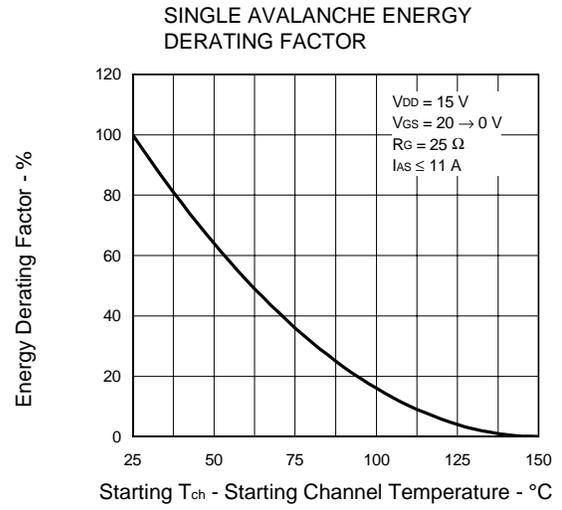
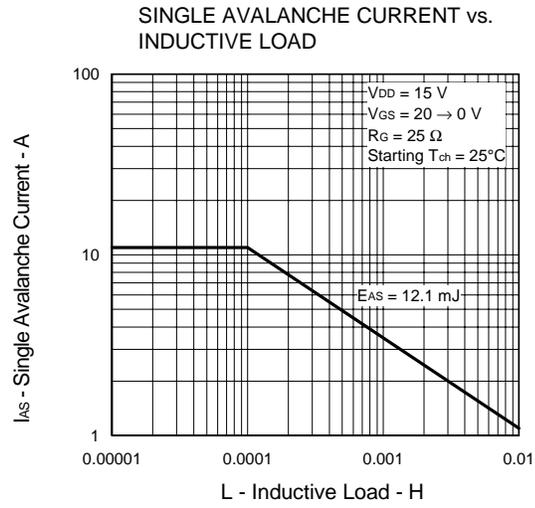


SOURCE TO DRAIN DIODE FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT





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