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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
INDUSTRIAL USE

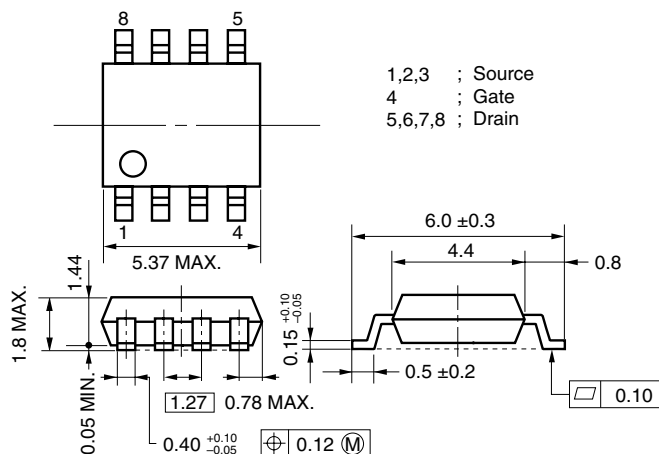
DESCRIPTION

The μPA1707 is N-Channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

FEATURES

- Low on-resistance
 $R_{DS(on)1} = 10.0\ m\Omega$ TYP. ($V_{GS} = 10\ V, I_D = 5.0\ A$)
 $R_{DS(on)2} = 12.5\ m\Omega$ TYP. ($V_{GS} = 4.5\ V, I_D = 5.0\ A$)
 $R_{DS(on)3} = 14.0\ m\Omega$ TYP. ($V_{GS} = 4.0\ V, I_D = 5.0\ A$)
- Low C_{iss} : $C_{iss} = 1400\ pF$ TYP.
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit: mm)



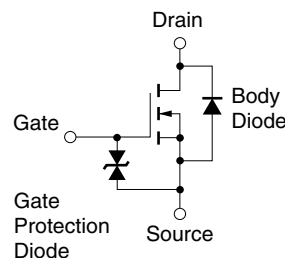
ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1707G	Power SOP8

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

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) ($T_C = 25^\circ C$)	$I_{D(DC)}$	±10	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	±40	A
Total Power Dissipation ($T_A = 25^\circ C$) ^{Note2}	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C

EQUIVALENT CIRCUIT



- Notes 1. $PW \leq 10\ \mu s$, Duty Cycle $\leq 1\%$
 2. Mounted on ceramic substrate of $1200\ mm^2 \times 1.7\ mm$

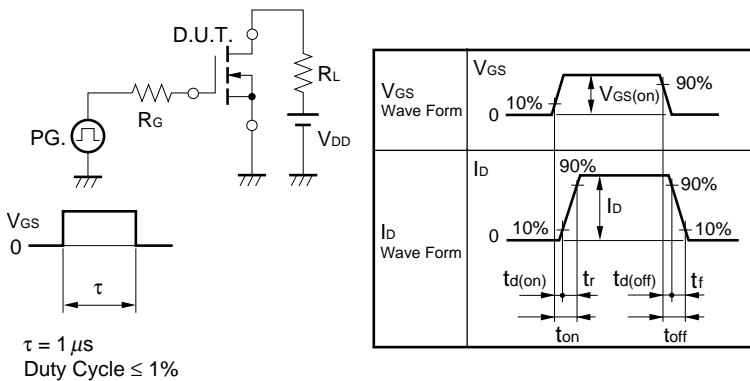
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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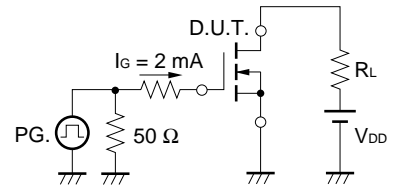
ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
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	2.0	2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 5.0 A	5.0	13		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 5.0 A		10.0	13.5	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 5.0 A		12.5	18	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 5.0 A		14.0	21	mΩ
Input Capacitance	C _{iSS}	V _{DS} = 10 V		1400		pF
Output Capacitance	C _{oSS}	V _{GS} = 0 V		450		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		180		pF
Turn-on Delay Time	t _{d(on)}	I _D = 5.0 A		20		ns
Rise Time	t _r	V _{GS(on)} = 10 V		185		ns
Turn-off Delay Time	t _{d(off)}	V _{DD} = 15 V		65		ns
Fall Time	t _f	R _G = 10 Ω		40		ns
Total Gate Charge	Q _G	I _D = 10 A		26		nC
Gate to Source Charge	Q _{GS}	V _{DD} = 24 V		4.2		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 10 V		6.5		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 10 A, V _{GS} = 0 V		0.8		V
Reverse Recovery Time	t _{rr}	I _F = 10 A, V _{GS} = 0 V		30		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		25		nC

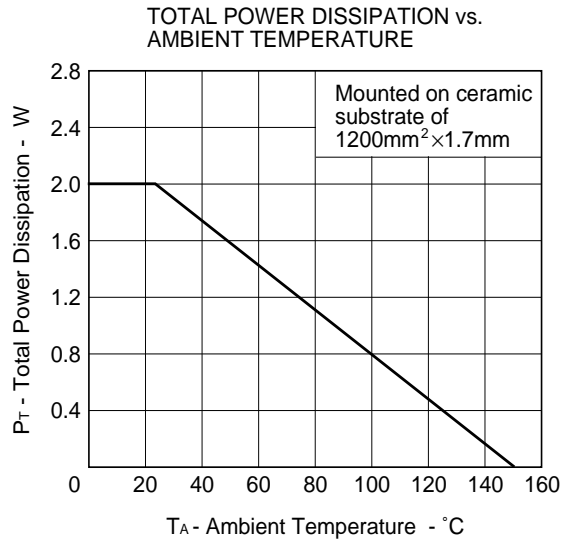
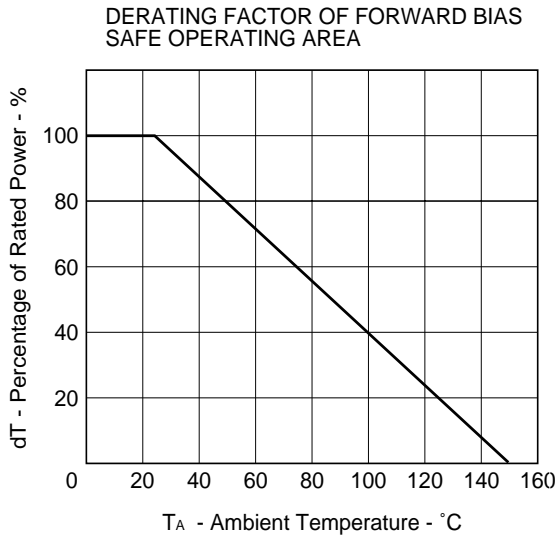
TEST CIRCUIT 1 SWITCHING TIME



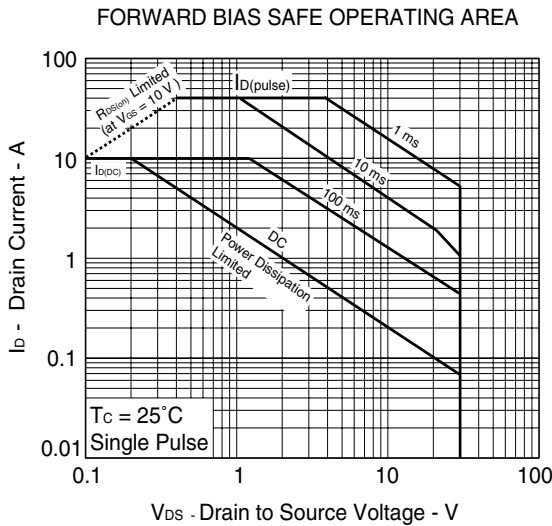
TEST CIRCUIT 2 GATE CHARGE



TYPICAL CHARACTERISTICS (T_A = 25°C)

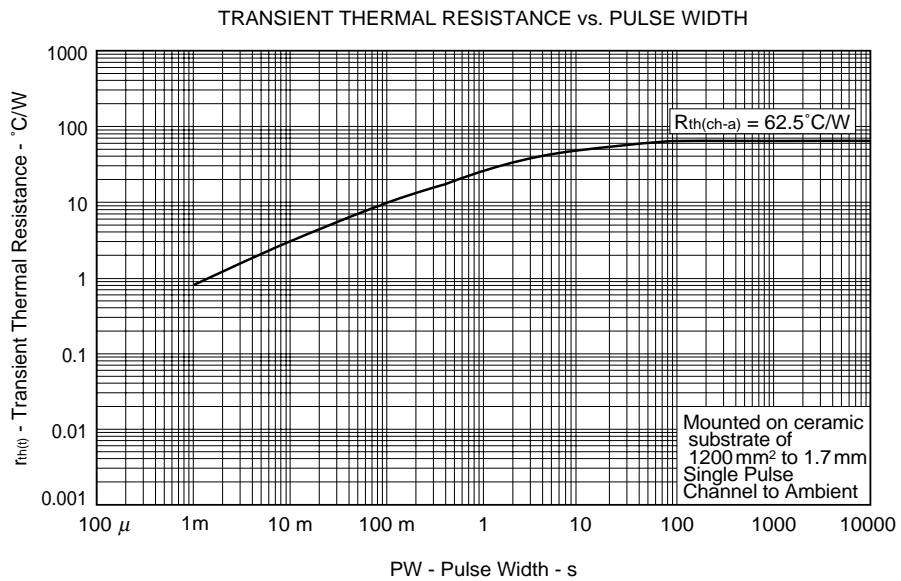


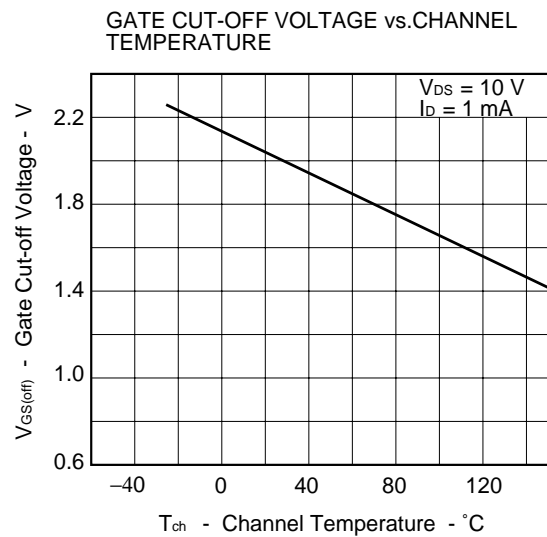
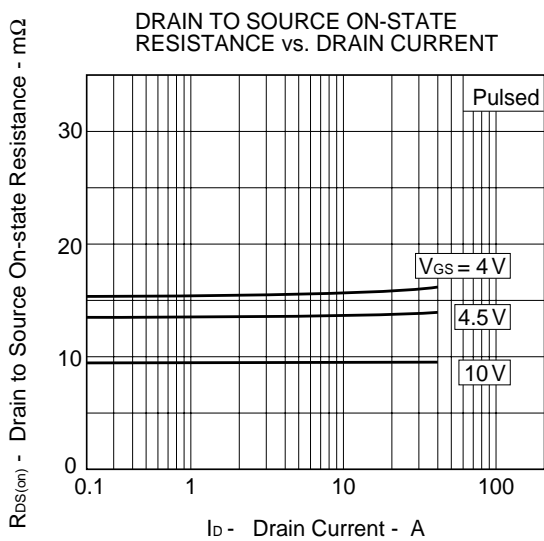
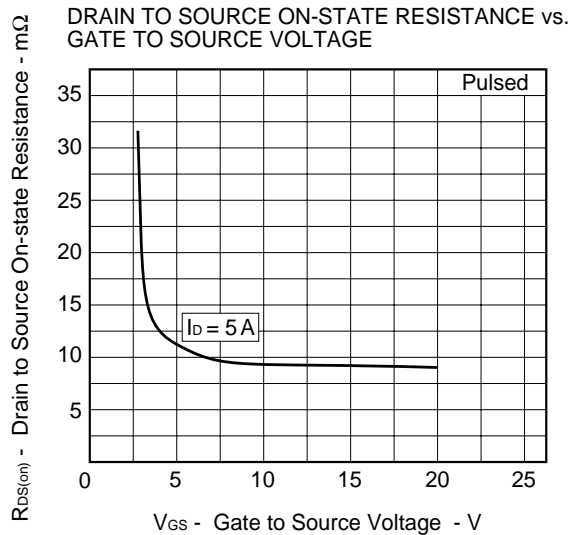
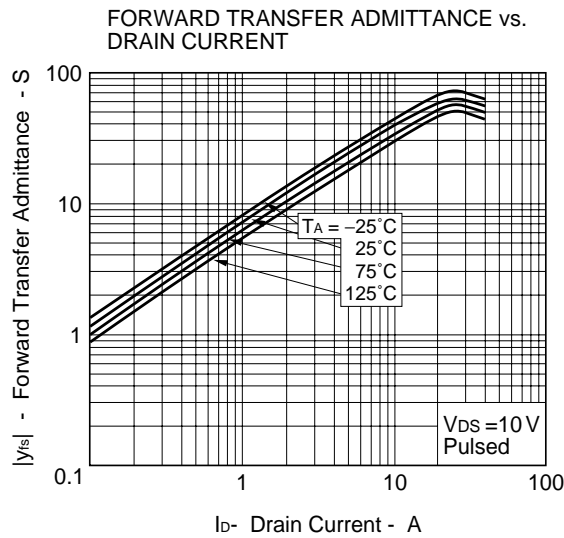
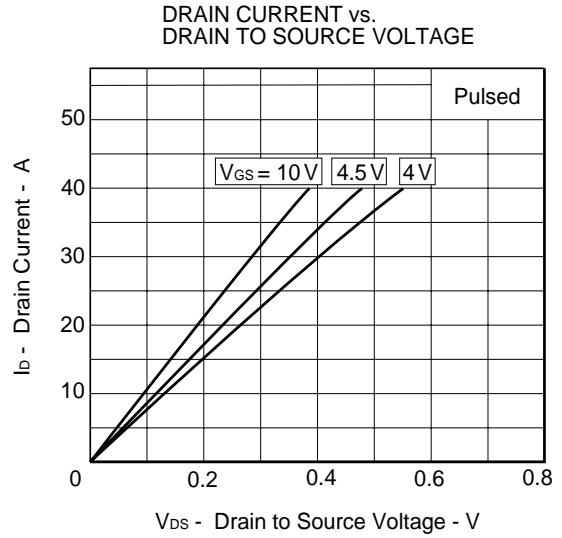
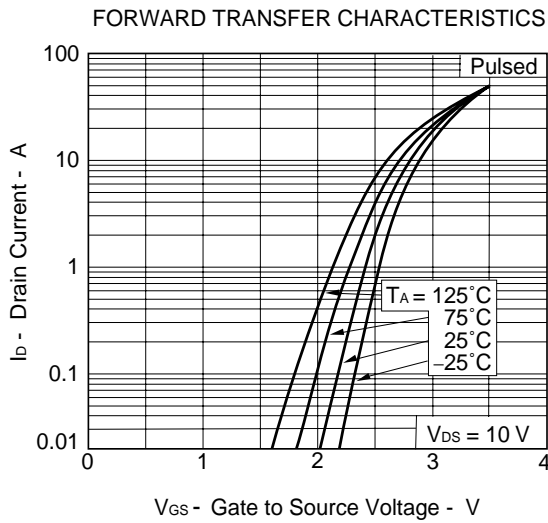
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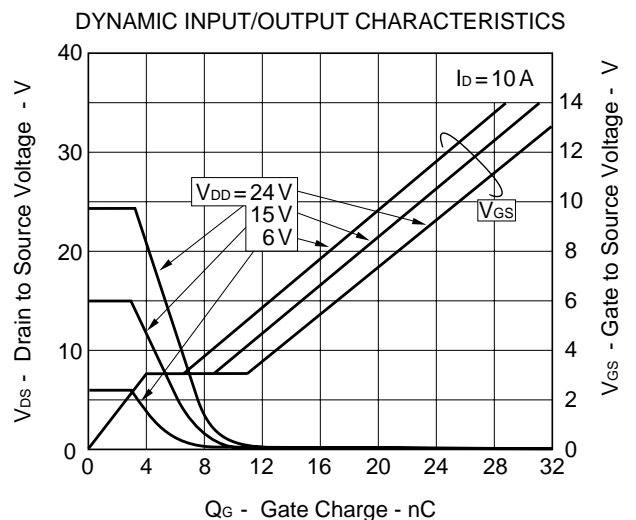
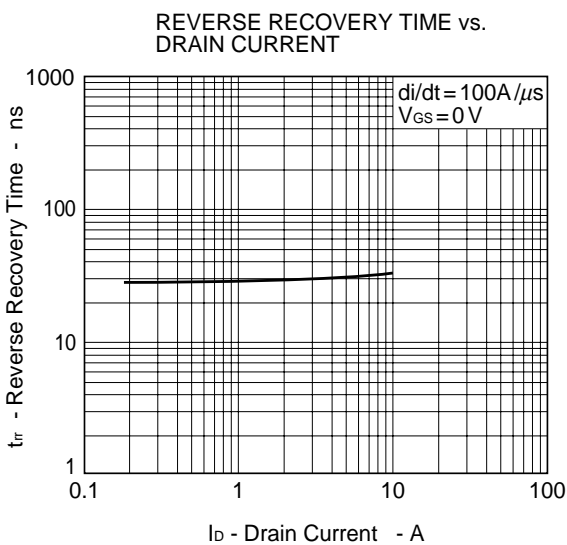
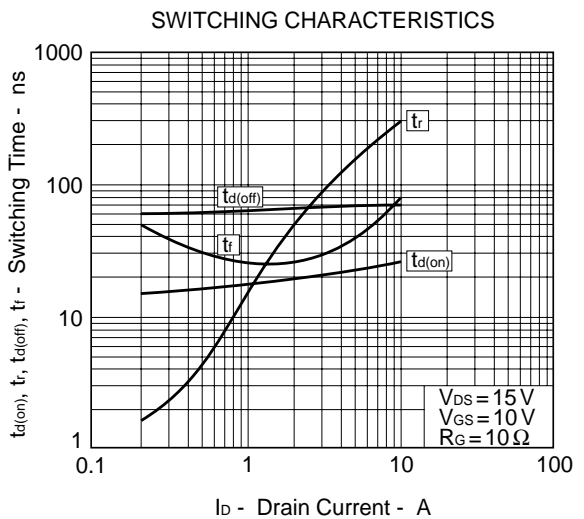
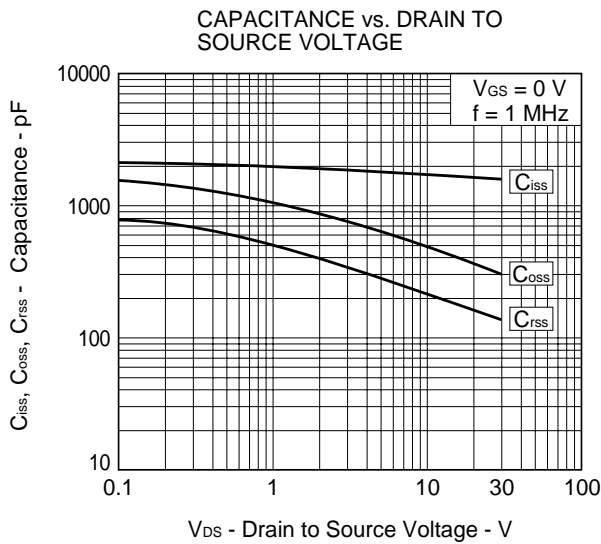
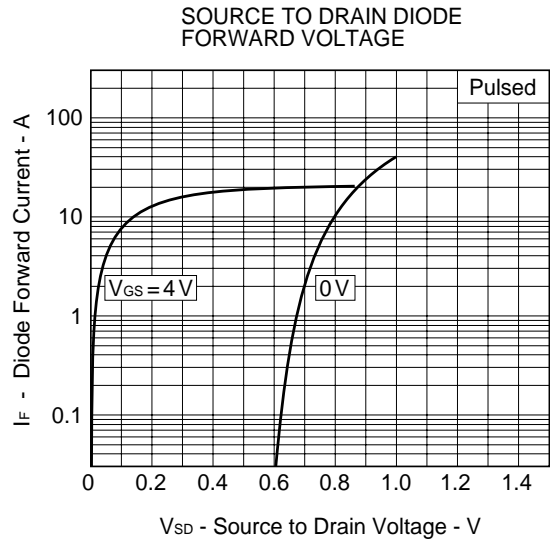
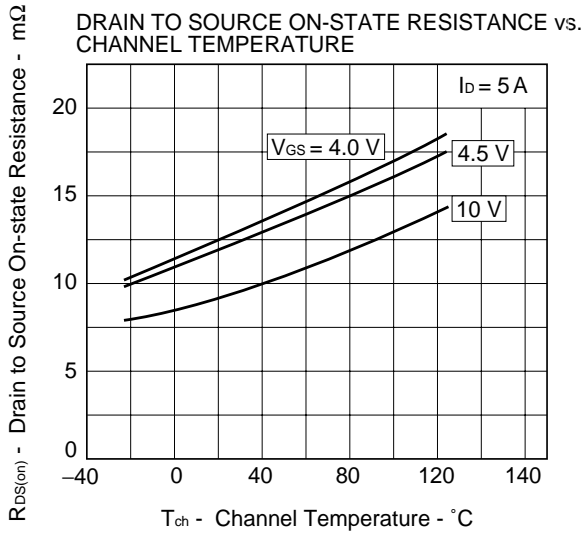


Remark

Mounted on ceramic substrate of 1200 mm² × 1.7 mm







[MEMO]

[MEMO]

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