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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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**N-CHANNEL MOS FIELD EFFECT TRANSISTOR
FOR SWITCHING**

DESCRIPTION

The μPA1820 is a switching device which can be driven directly by a 2.5 V power source.

This device features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as DC/DC Converters and power management of notebook computers and so on.

FEATURES

- 2.5 V drive available
- Low on-state resistance
 $R_{DS(on)1} = 8.6 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 6.0 \text{ A)}$
 $R_{DS(on)2} = 8.8 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 6.0 \text{ A)}$
 $R_{DS(on)3} = 12 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 6.0 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1820GR-9JG	Power TSSOP8

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

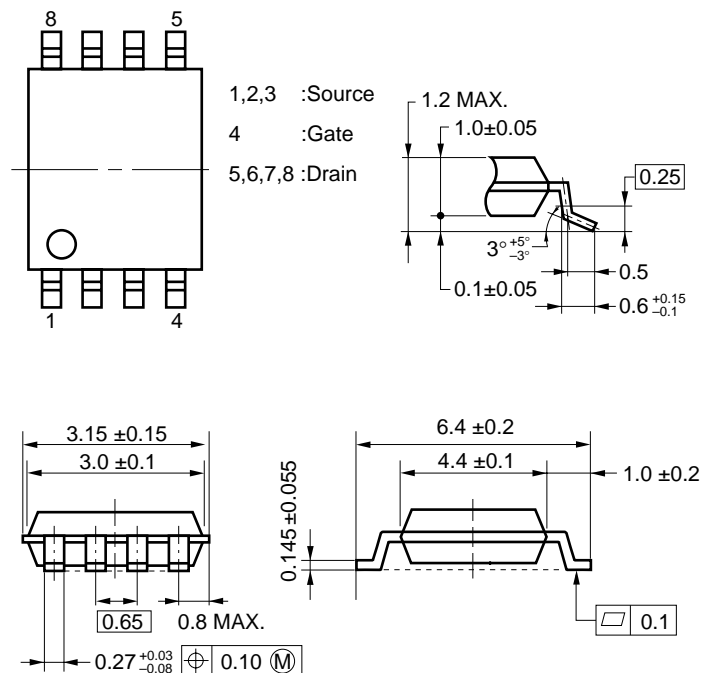
Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	20	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±12	V
Drain Current (DC)	I _{D(DC)}	±12	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±48	A
Total Power Dissipation ^{Note2}	P _T	2.0	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

- Notes 1.** PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on ceramic substrate of 5000 mm² x 1.1 mm

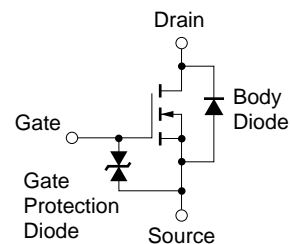
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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PACKAGE DRAWING (Unit: mm)



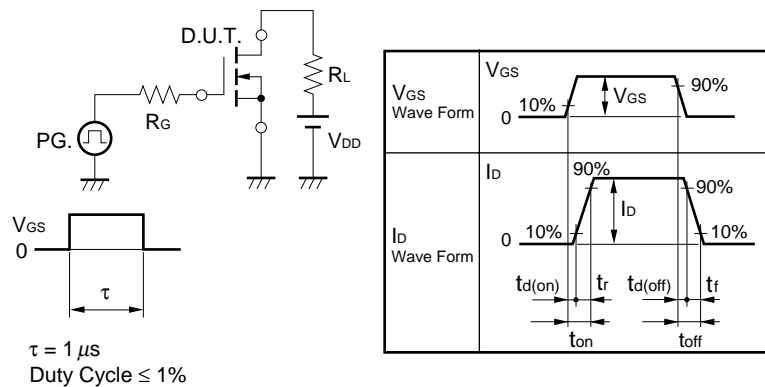
EQUIVALENT CIRCUIT



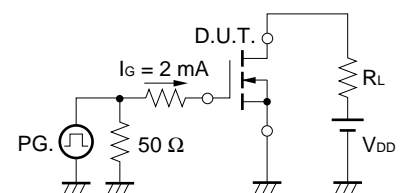
ELECTRICAL CHARACTERISTICS (TA = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1.0	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 6.0 A	11	21.5		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 6.0 A		6.8	8.6	mΩ
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 6.0 A		7.0	8.8	mΩ
	R _{DS(on)3}	V _{GS} = 2.5 V, I _D = 6.0 A		8.7	12	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		2020		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		600		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		430		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V, I _D = 6.0 A		18		ns
Rise Time	t _r	V _{GS} = 4.0 V		56		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		75		ns
Fall Time	t _f			52		ns
Total Gate Charge	Q _G	V _{DD} = 16 V		27		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 4.0 V		2.6		nC
Gate to Drain Charge	Q _{GD}	I _D = 12 A		13		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 12 A, V _{GS} = 0 V		0.81		V
Reverse Recovery Time	t _{rr}	I _F = 12 A, V _{GS} = 0 V		61		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		40		nC

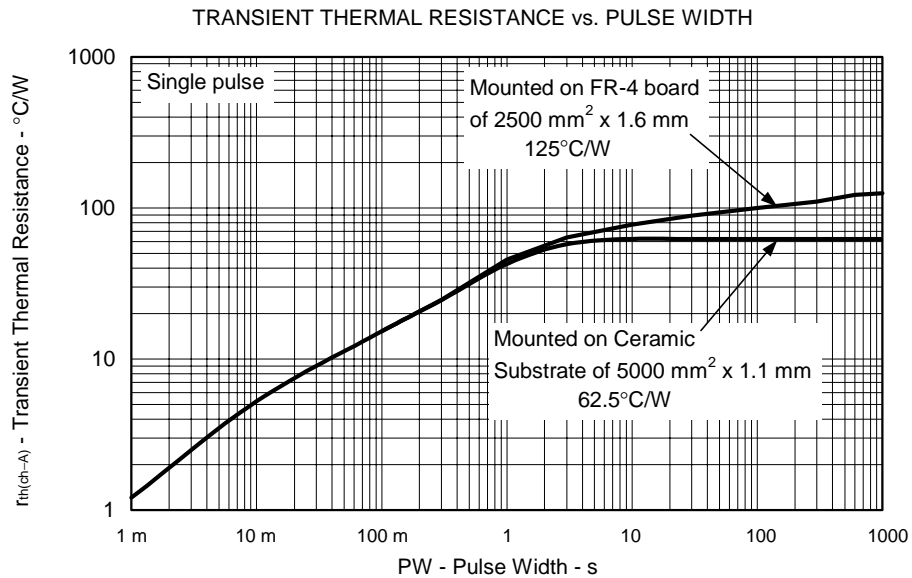
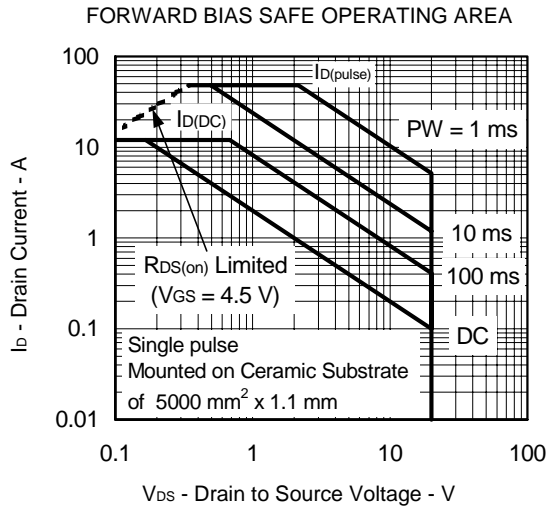
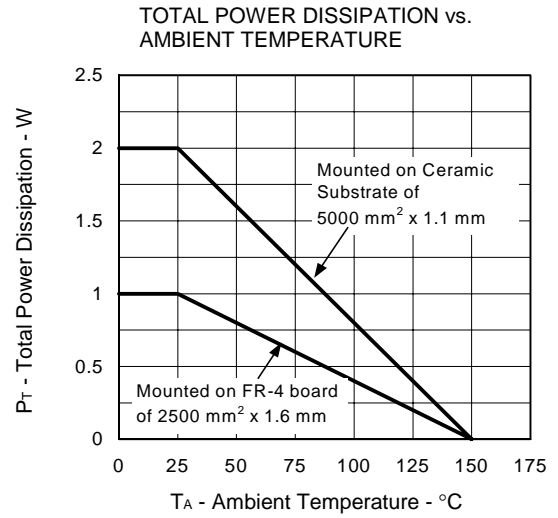
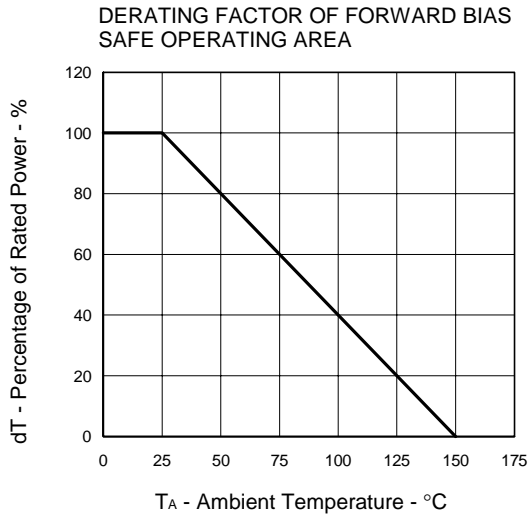
TEST CIRCUIT 1 SWITCHING TIME

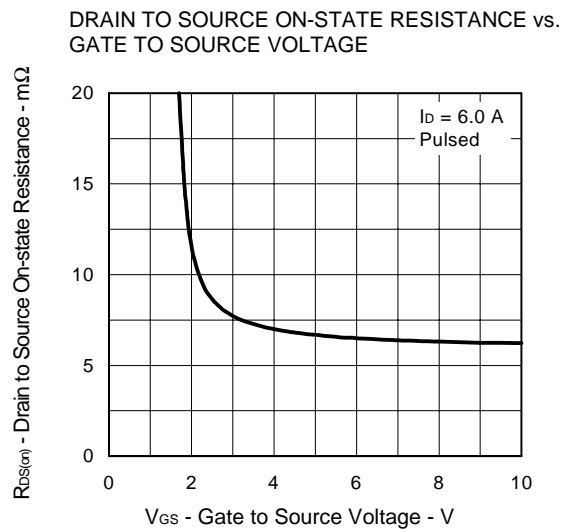
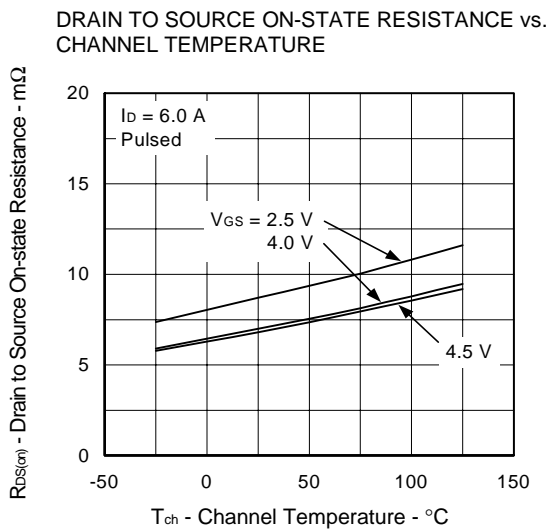
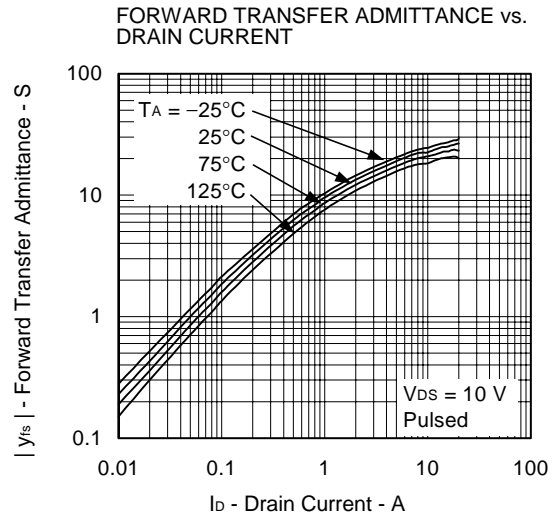
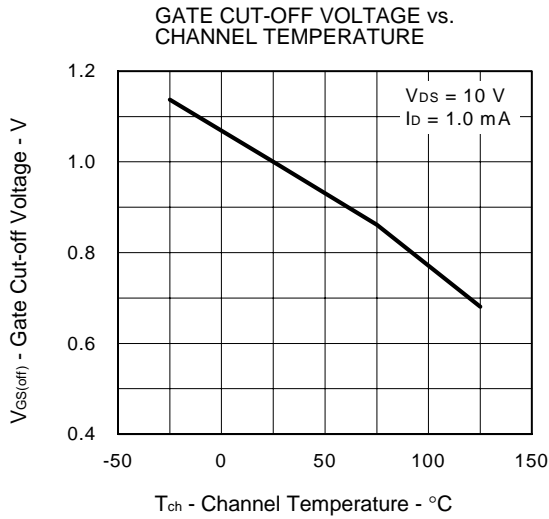
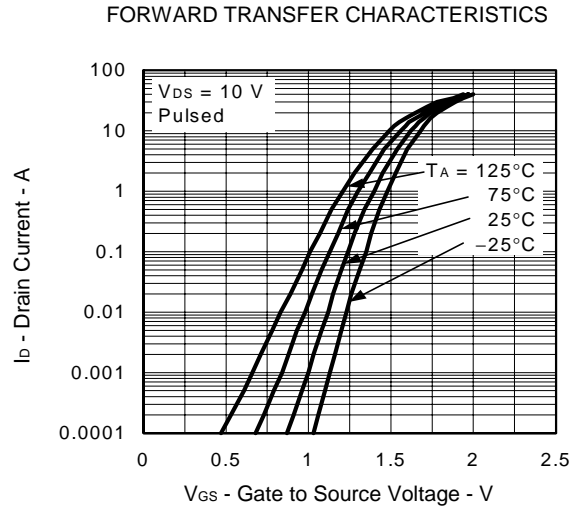
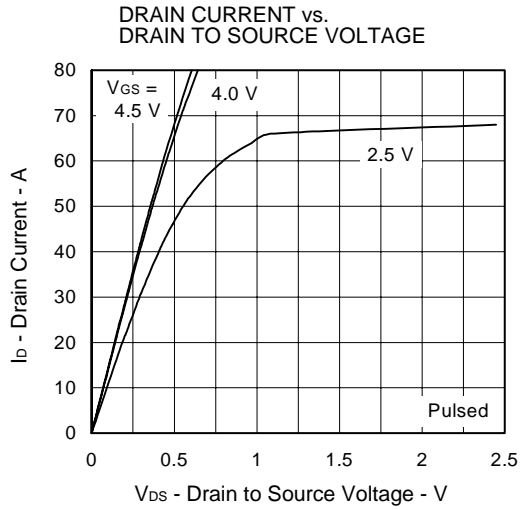


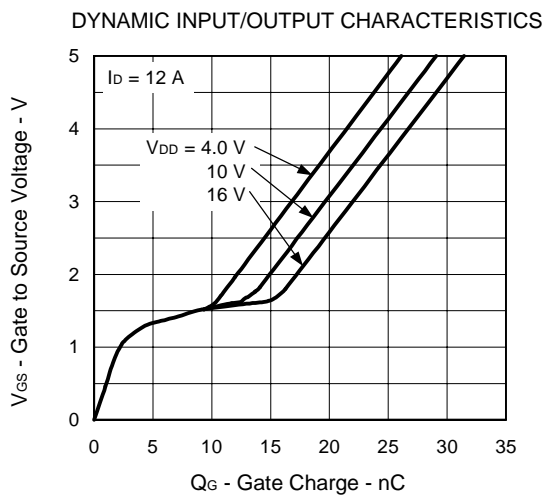
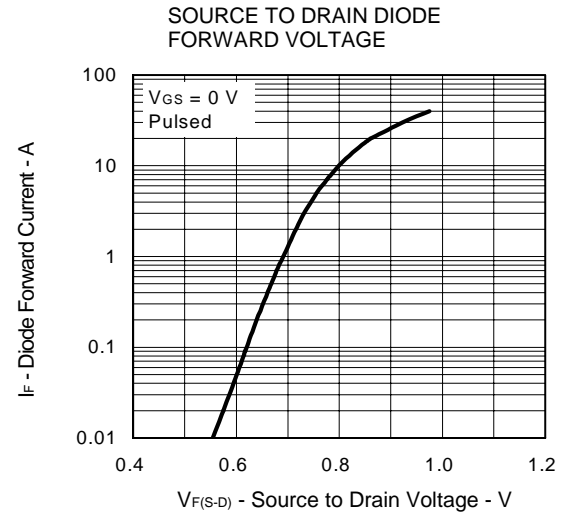
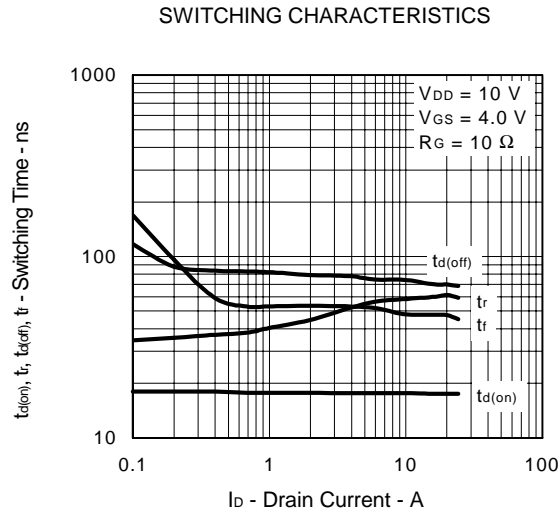
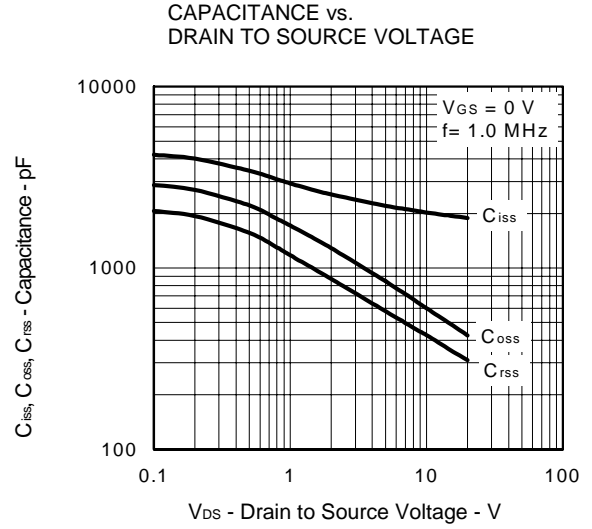
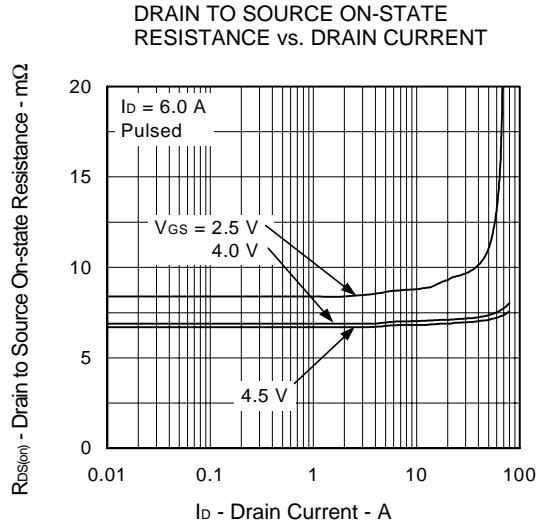
TEST CIRCUIT 2 GATE CHARGE



TYPICAL CHARACTERISTICS (T_A = 25°C)







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