

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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N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μPA1800 is a switching device which can be driven directly by a 4.0-V power source.

The μPA1800 features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

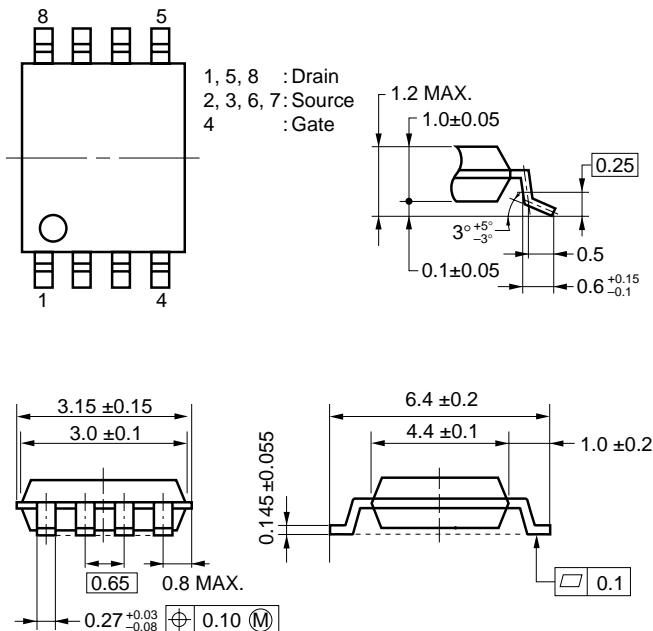
FEATURES

- Can be driven by a 4.0-V power source
 - Low on-state resistance
- $R_{DS(on)1} = 27 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)2} = 39 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)3} = 45 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 3.0 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1800GR-9JG	Power TSSOP8

PACKAGE DRAWING (Unit : mm)



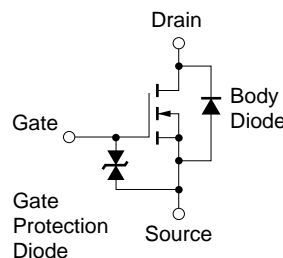
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage	V _{DSS}	30	V
Gate to Source Voltage	V _{GSS}	±20	V
Drain Current (DC)	I _{D(DC)}	±5.0	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±20	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. $PW \leq 10 \mu s$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of $50 \text{ cm}^2 \times 1.1 \text{ mm}$

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.

EQUIVALENT CIRCUIT

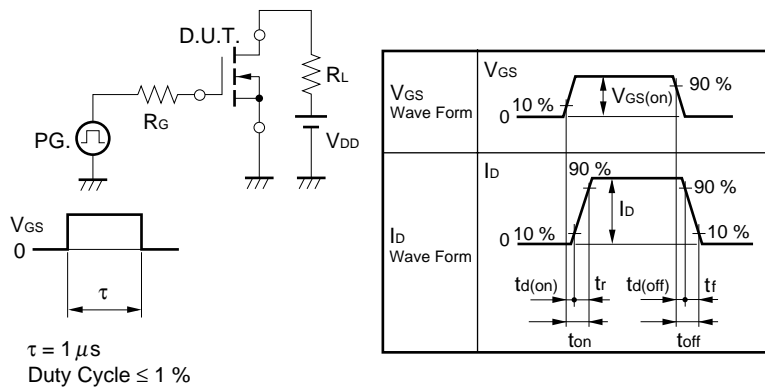


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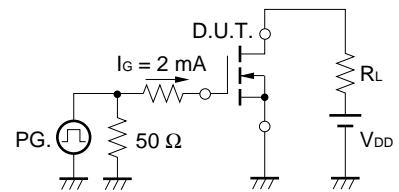
★ ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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	1.0	1.41	2.0	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 3.0 A	3.0	7.0		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 3.0 A		20	27	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 3.0 A		29	39	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 3.0 A		32	45	mΩ
Input Capacitance	C _{iSS}	V _{DS} = 10 V		680		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		470		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		170		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V		18		ns
Rise Time	t _r	I _D = 3.0 A		70		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = 10 V		60		ns
Fall Time	t _f	R _G = 10 Ω		26		ns
Total Gate Charge	Q _G	V _{DD} = 24 V		23		nC
Gate to Source Charge	Q _{GS}	I _D = 5.0 A		2		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 10 V		7		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 5.0 A, V _{GS} = 0 V		0.74		V
Reverse Recovery Time	t _{rr}	I _F = 5.0 A, V _{GS} = 0 V		60		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		80		nC

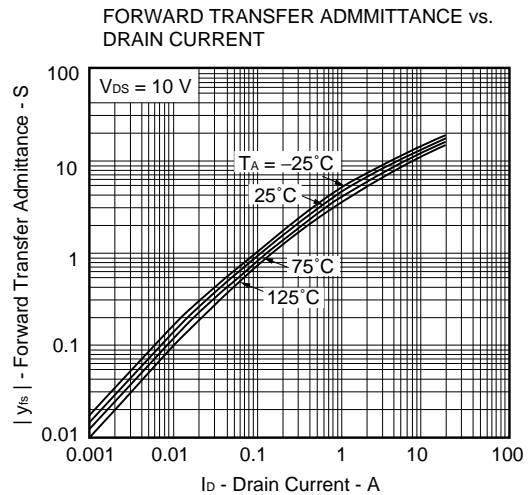
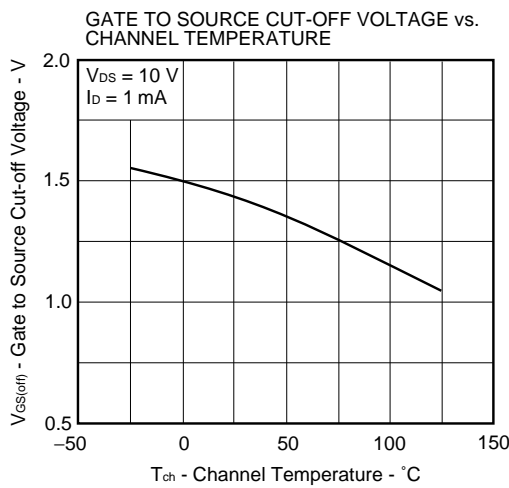
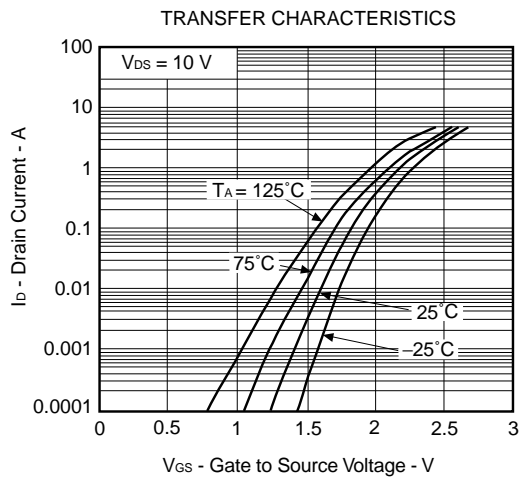
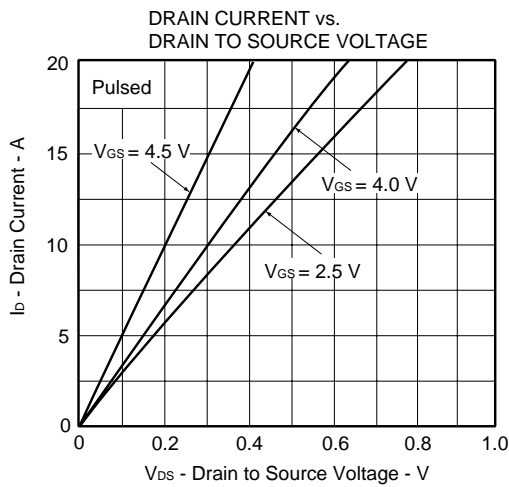
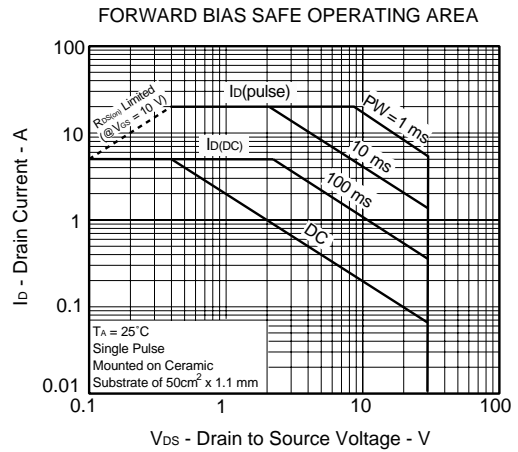
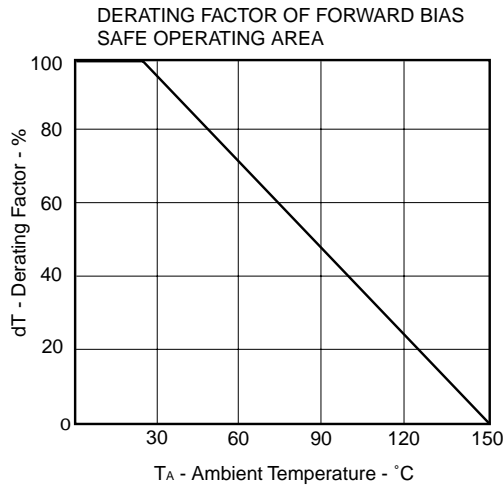
TEST CIRCUIT 1 SWITCHING TIME

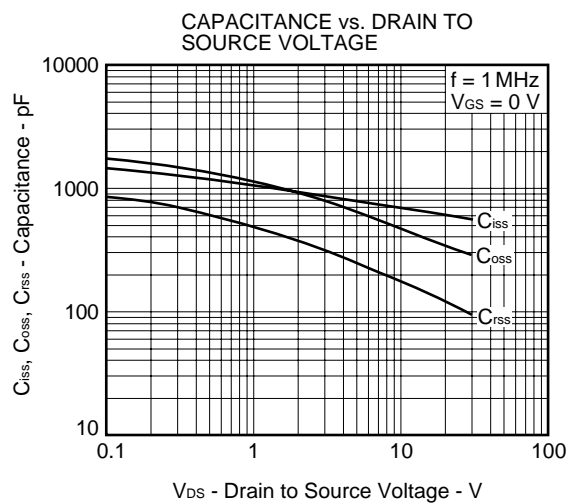
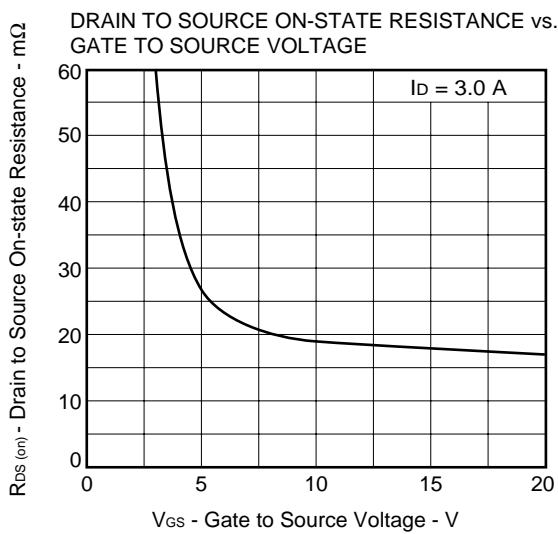
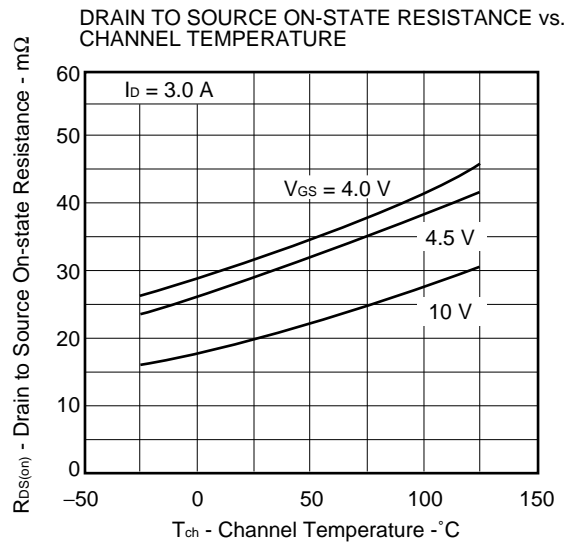
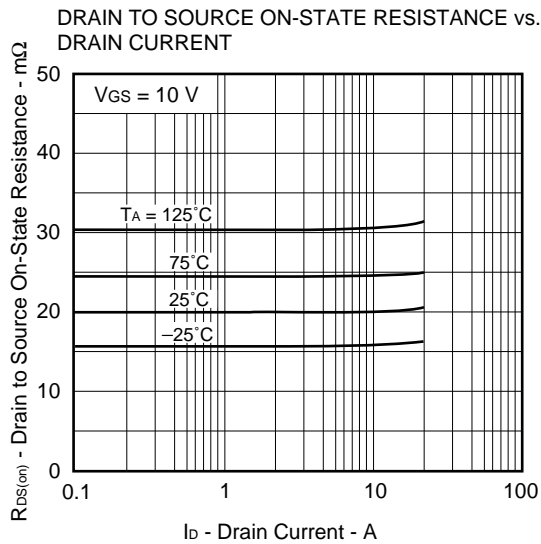
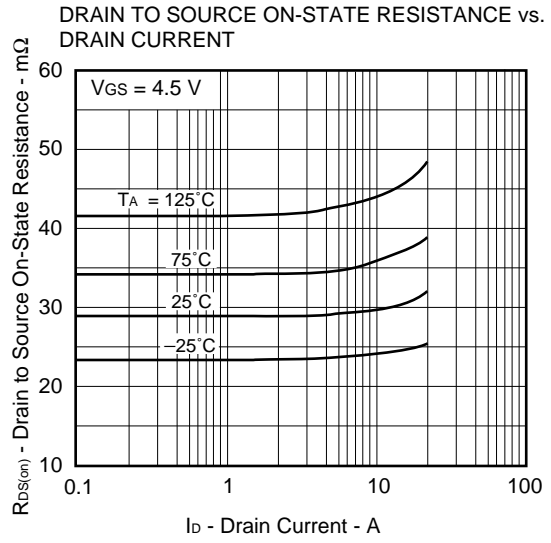
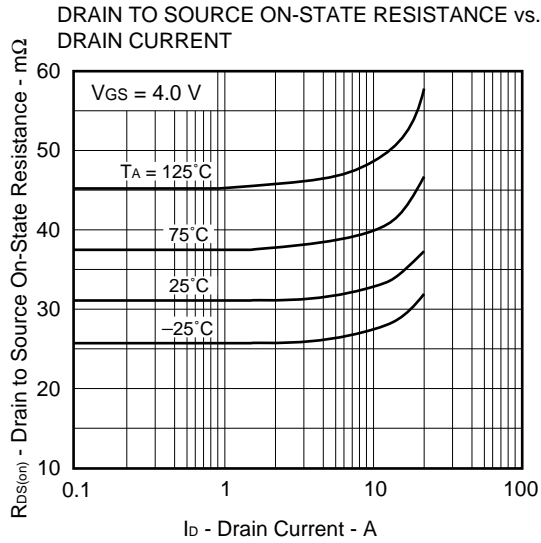


TEST CIRCUIT 2 GATE CHARGE

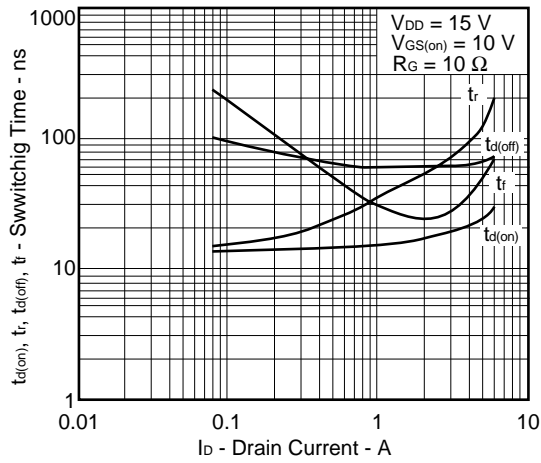


★ TYPICAL CHARACTERISTICS (T_A = 25 °C)

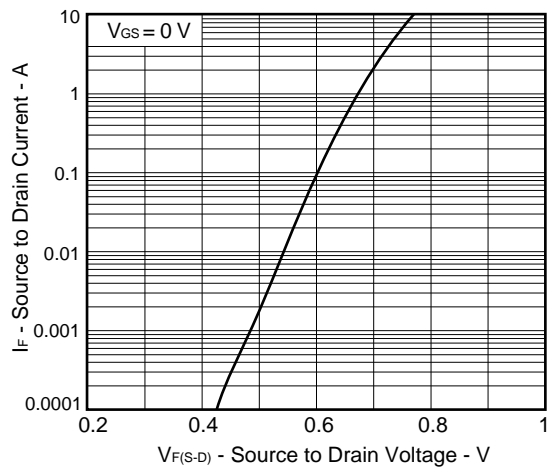




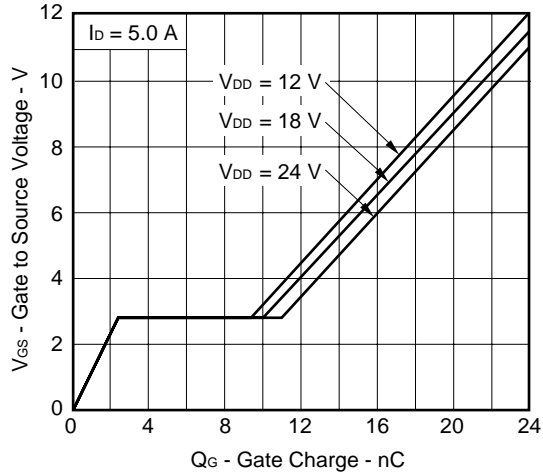
SWITCHING CHARACTERISTICS



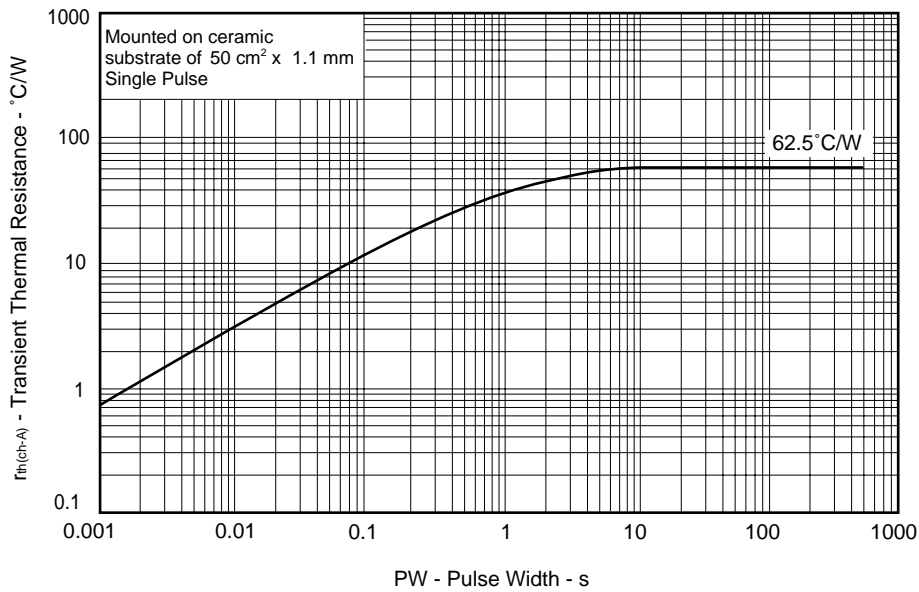
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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 - Specific: Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.
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