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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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P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μPA1813 is a switching device which can be driven directly by a 2.5-V power source.

The μPA1813 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.

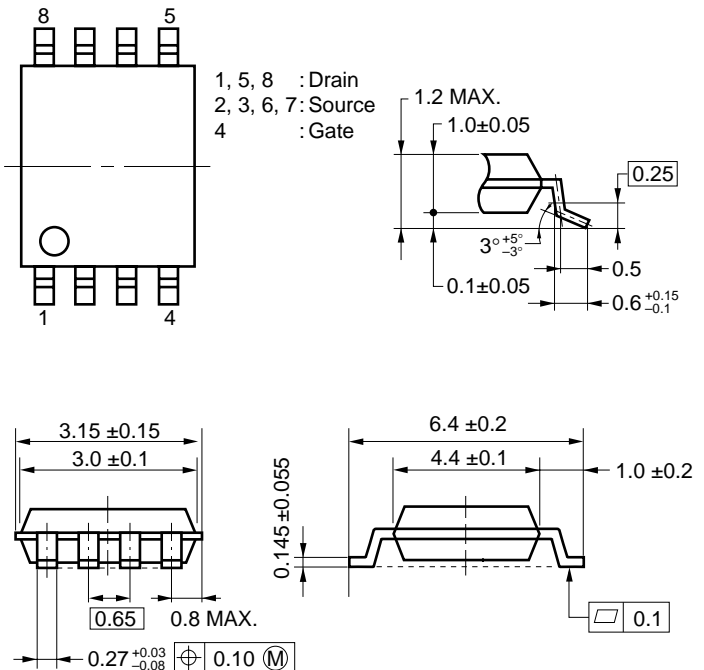
FEATURES

- Can be driven by a 2.5-V power source
- Low on-state resistance
 $R_{DS(on)1} = 25 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -2.5 \text{ A)}$
 $R_{DS(on)2} = 30 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -2.5 \text{ A)}$
 $R_{DS(on)3} = 40 \text{ m}\Omega \text{ MAX. (} V_{GS} = -2.5 \text{ V, } I_D = -2.5 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1813GR-9JG	Power TSSOP8

PACKAGE DRAWING (Unit : mm)



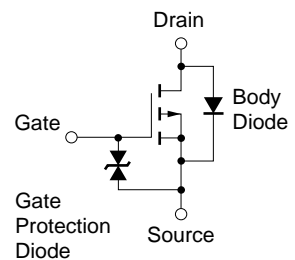
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage	V _{DSS}	-12	V
Gate to Source Voltage	V _{GSS}	-10/+5	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 ≤ 10 μs, Duty Cycle ≤ 1 %
 2. Mounted on ceramic substrate of 5000mm² 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.

EQUIVALENT CIRCUIT

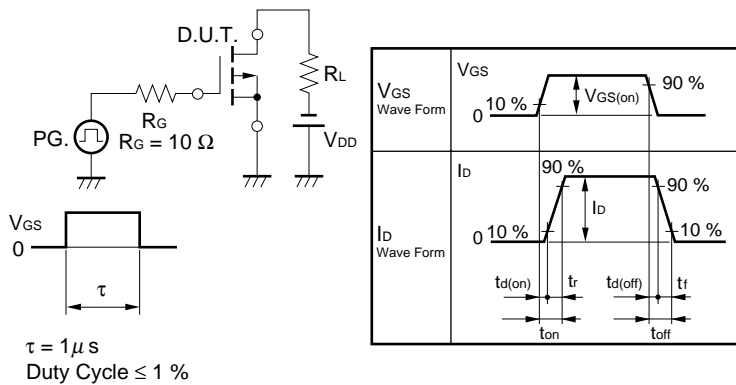


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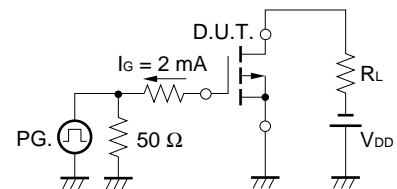
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -12 V, V _{GS} = 0 V			-10	μ A
Gate Leakage Current	I _{GSS}	V _{GS} = \pm 10 V, V _{DS} = 0 V			\pm 10	μ A
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1 mA	-0.5	-0.92	-1.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -2.5 A	1	13		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -4.5 V, I _D = -2.5 A		19	25	m Ω
	R _{DS(on)2}	V _{GS} = -4.0 V, I _D = -2.5 A		21	30	m Ω
	R _{DS(on)3}	V _{GS} = -2.5 V, I _D = -2.5 A		28	40	m Ω
Input Capacitance	C _{iss}	V _{DS} = -10 V		1130		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		1045		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		350		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10 V		29		ns
Rise Time	t _r	I _D = -2.5 A		180		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = -4.0 V		665		ns
Fall Time	t _f	R _G = 10 Ω		1255		ns
Total Gate Charge	Q _G	V _{DS} = -10 V		24		nC
Gate to Source Charge	Q _{GS}	I _D = -5.0 A		5.1		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = -4.0 V		10		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 5.0 A, V _{GS} = 0 V		0.77		V
Reverse Recovery Time	t _{rr}	I _F = 5.0 A, V _{GS} = 0 V		45		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 10 A/ μ s		6.2		nC

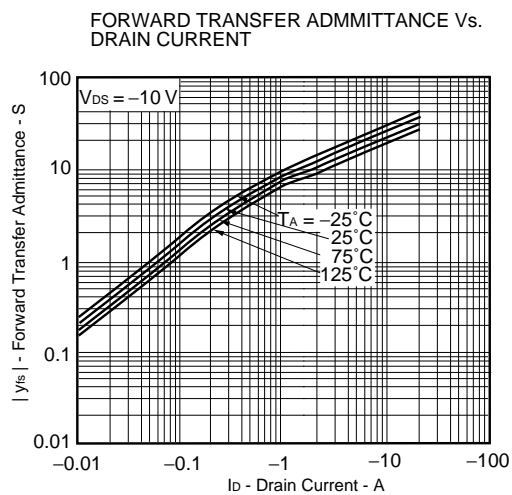
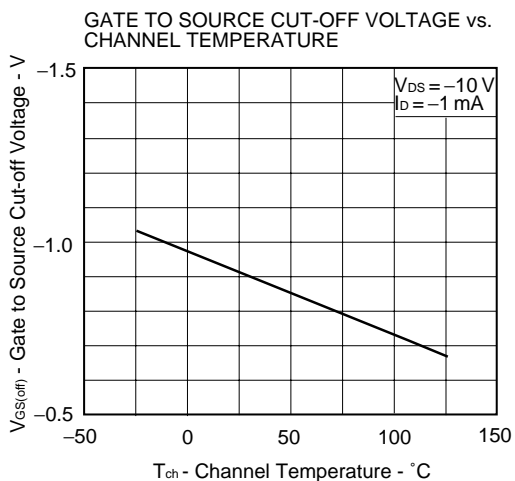
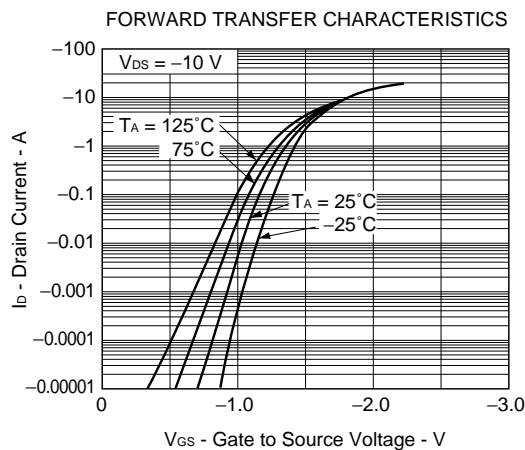
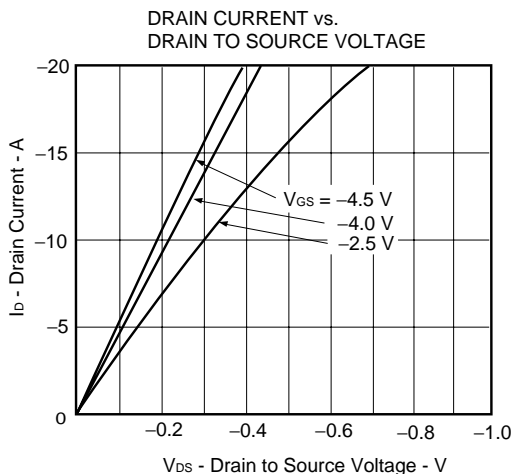
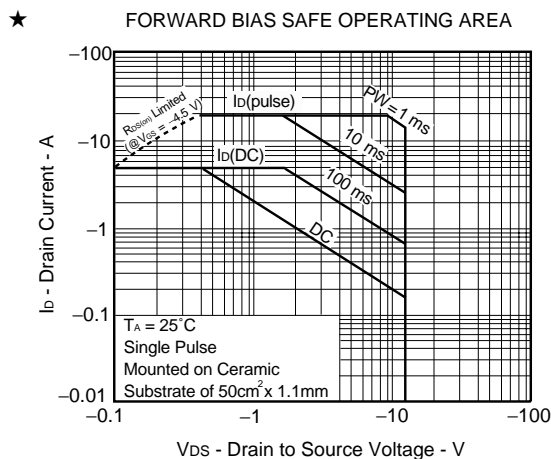
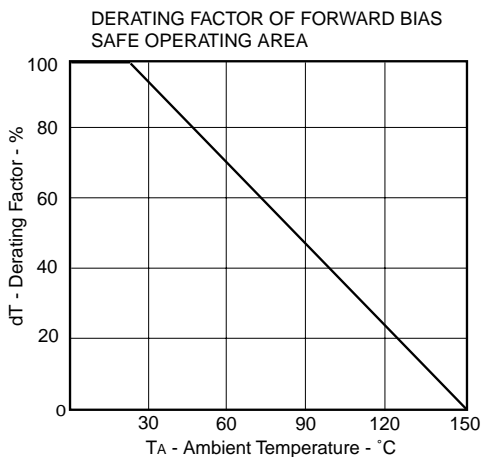
TEST CIRCUIT 1 SWITCHING TIME

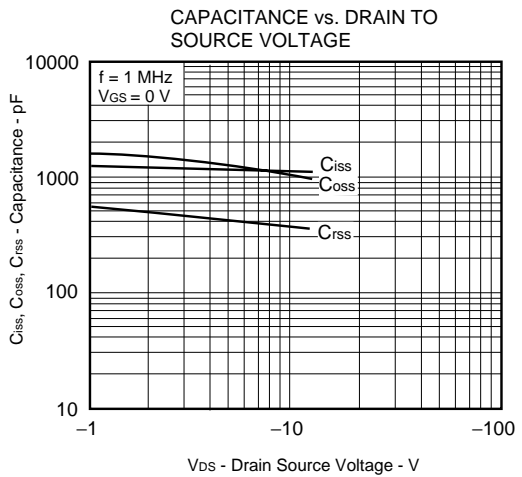
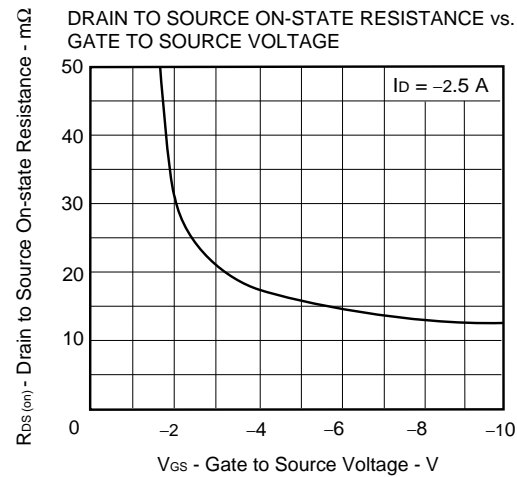
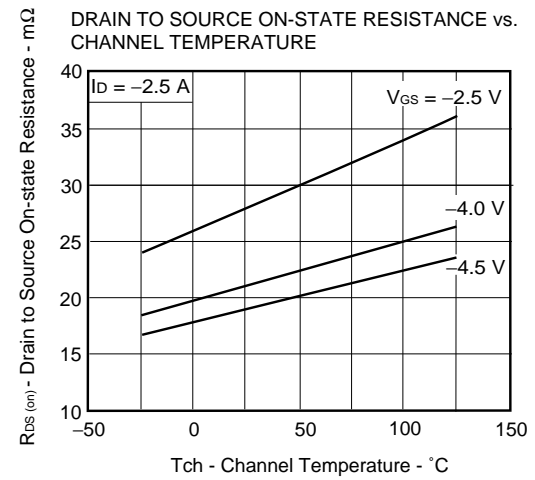
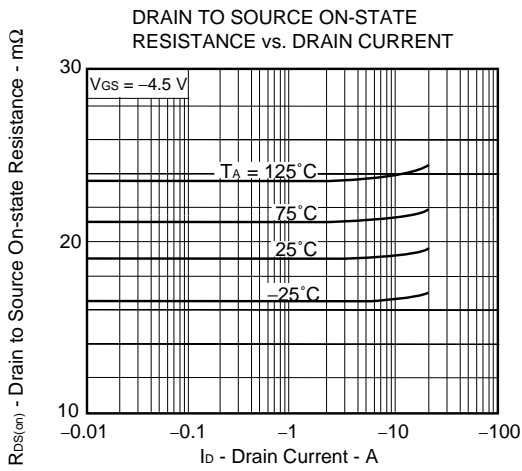
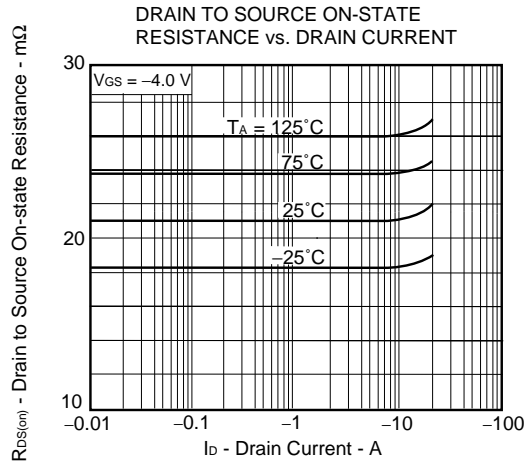
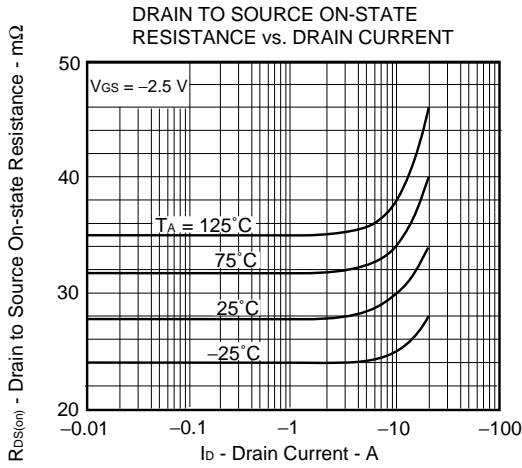


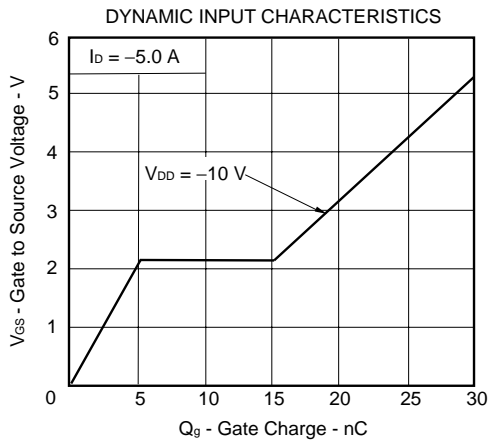
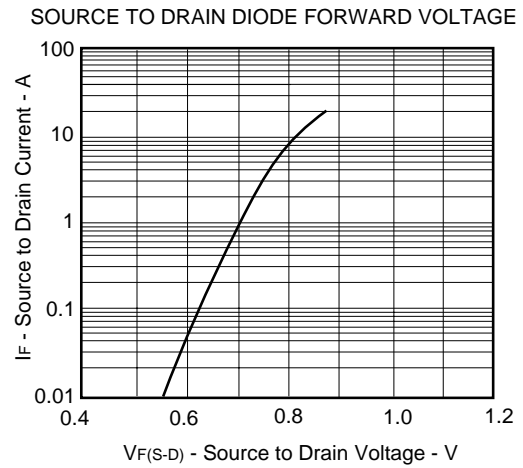
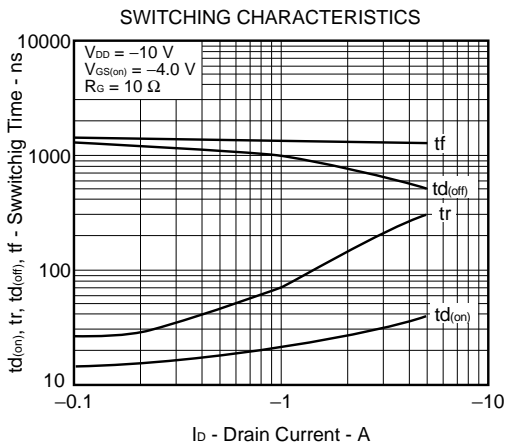
TEST CIRCUIT 2 GATE CHARGE



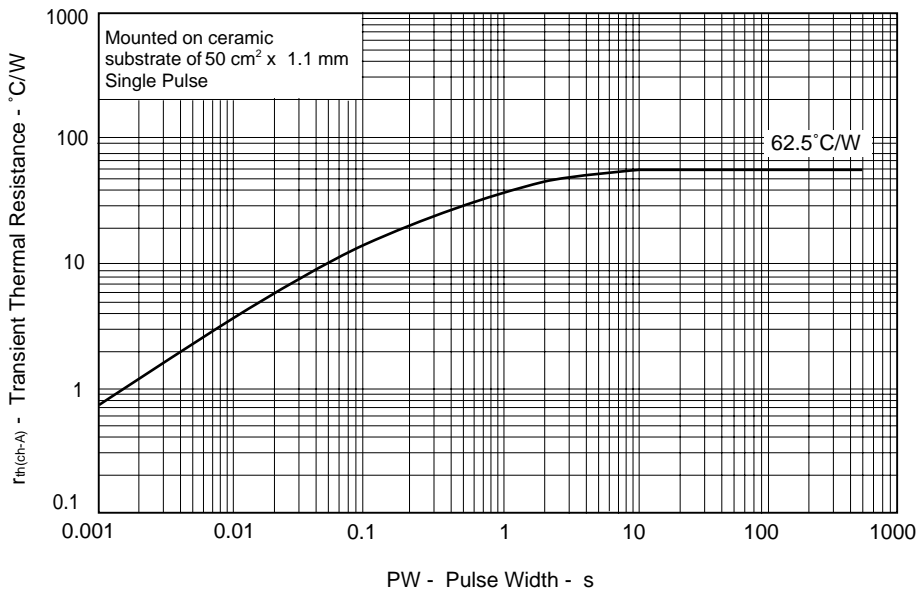
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)







★ **TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH**



[MEMO]

[MEMO]

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