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April 1st, 2010 Renesas Electronics Corporation

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MOS FIELD EFFECT TRANSISTOR μ PA1803

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μ PA1803 is a switching device which can be driven directly by a 4.5 V power source.

The μ PA1803 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 4.5 V power source
- · Low on-state resistance

 $R_{DS(on)1}$ = 12 $m\Omega$ MAX. (V_{GS} = 10 V, I_D = 4.0 A)

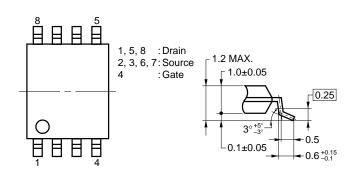
 $R_{DS(on)2} = 16 \text{ m}\Omega \text{ MAX.} (V_{GS} = 4.5 \text{ V}, I_D = 4.0 \text{ A})$

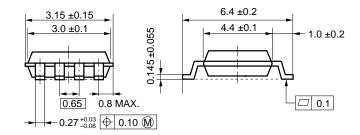
• Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE		
μPA1803GR-9JG	Power TSSOP8		

PACKAGE DRAWING (Unit: mm)

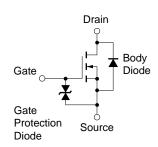




ABSOLUTE MAXIMUM RATINGS ($T_A = 25^{\circ}C$)

Drain to Source Voltage	VDSS	30	V
Gate to Source Voltage	Vgss	±20	V
Drain Current (DC)	I _{D(DC)}	±8.0	Α
Drain Current (pulse) Note1	I _{D(pulse)}	±32	Α
Total Power Dissipation Note2	Рт	2.0	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C

EQUIVALENT CIRCUIT



Notes 1. PW \leq 10 μ s, Duty Cycle \leq 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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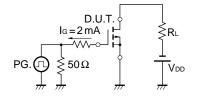
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ELECTRICAL CHARACTERISTICS (TA = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	Ipss	V _{DS} = 30 V, V _{GS} = 0 V			10	μΑ
Gate Leakage Current	Igss	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μΑ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5	1.9	2.5	٧
Forward Transfer Admittance	y fs	V _{DS} = 10 V, I _D = 4.0 A	3	14		S
Drain to Source On-state Resistance	RDS(on)1	V _{GS} = 10 V, I _D = 4.0 A		8.6	12	mΩ
	RDS(on)2	V _{GS} = 4.5 V, I _D = 4.0 A		11	16	mΩ
Input Capacitance	Ciss	V _{DS} = 10 V,		1880		pF
Output Capacitance	Coss	V _{GS} = 0 V,		571		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		214		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V,		27		ns
Rise Time	tr	I _D = 4.0 A,		77		ns
Turn-off Delay Time	td(off)	V _{GS} = 10 V,		72		ns
Fall Time	tr	R _G = 10 Ω		47		ns
Total Gate Charge	Q _G	V _{DD} = 24 V,		36		nC
Gate to Source Charge	Qgs	I _D = 8.0 A,		5.1		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 10 V		8.7		nC
Diode Forward Voltage	VF(S-D)	I _F = 8.0 A, V _{GS} = 0 V		0.78		V
Reverse Recovery Time	trr	I _F = 8.0 A, V _{GS} = 0 V,		37		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A / μs		35		nC

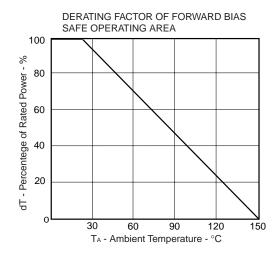
TEST CIRCUIT 1 SWITCHING TIME

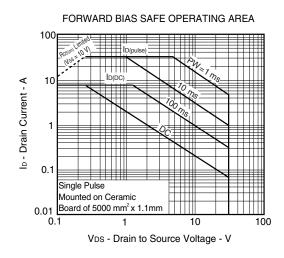
TEST CIRCUIT 2 GATE CHARGE

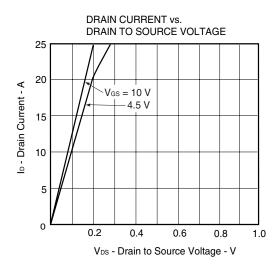


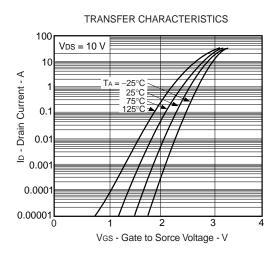
 $\begin{array}{ll} \tau = \ 1 \, \mu \, s \\ \text{Duty Cycle} \leq 1 \, \% \end{array}$

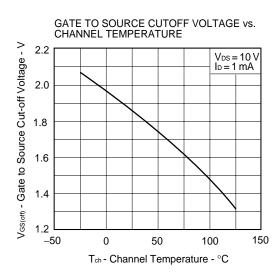
TYPICAL CHARACTERISTICS (TA = 25°C)

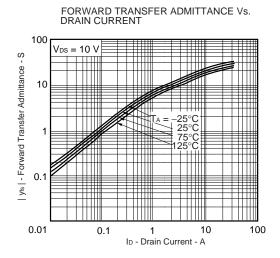




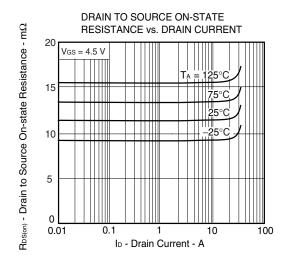


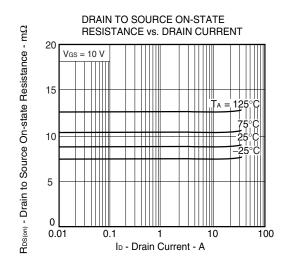


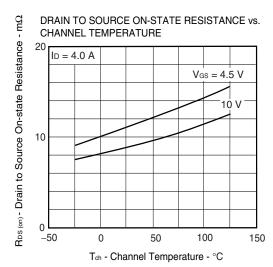


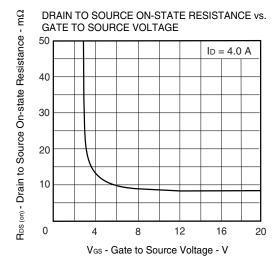


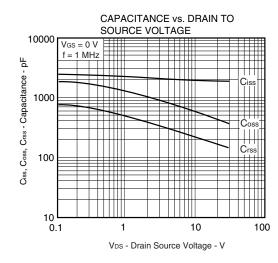
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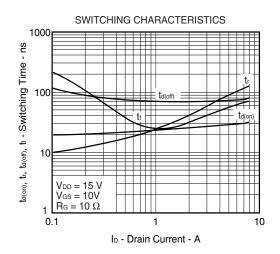




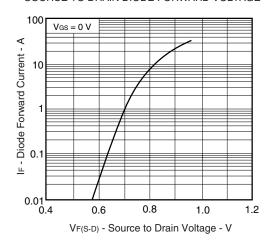


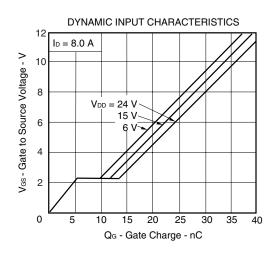




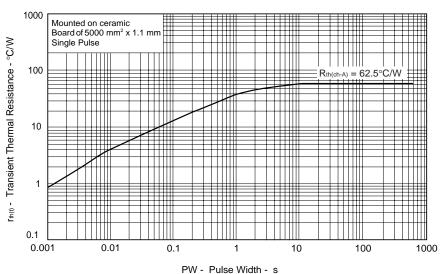


SOURCE TO DRAIN DIODE FORWARD VOLTAGE





TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



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