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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

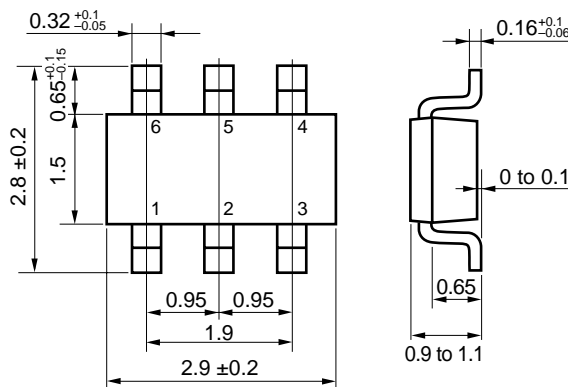
The μ PA1900 is a switching device which can be driven directly by a 2.5 V power source.

The μ PA1900 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
 $R_{DS(on)1} = 35 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)2} = 38 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)3} = 45 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 3.0 \text{ A)}$

PACKAGE DRAWING (Unit: mm)



1, 2, 5, 6 : Drain
3 : Gate
4 : Source

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1900TE	6-pin Mini Mold (Thin Type)

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

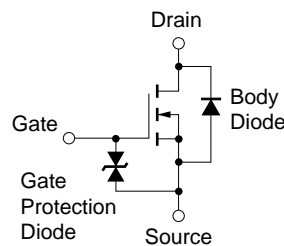
Drain to Source Voltage	V_{DSS}	20	V
Gate to Source Voltage	V_{GSS}	± 12	V
Drain Current (DC)	$I_{D(DC)}$	± 5.5	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 22	A
Total Power Dissipation	P_{T1}	0.2	W
Total Power Dissipation ^{Note2}	P_{T2}	2	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$
 2. Mounted on FR-4 Board, $t \leq 5 \text{ sec.}$

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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EQUIVALENT CIRCUIT

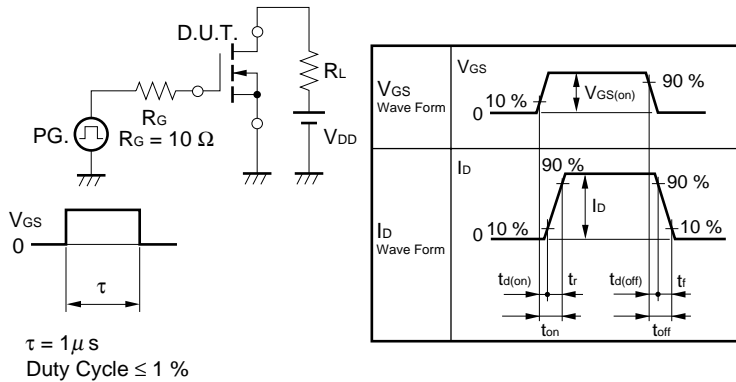


Marking: TG

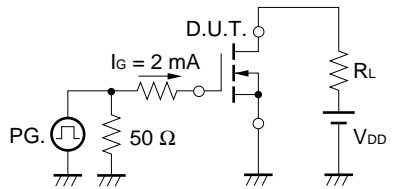
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			10	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 mA	0.5	0.93	1.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 3.0 A	3	9.2		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 3.0 A		28	35	mΩ
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 3.0 A		29	38	mΩ
	R _{DS(on)3}	V _{GS} = 2.5 V, I _D = 3.0 A		37	45	mΩ
Input Capacitance	C _{iSS}	V _{DS} = 10 V		595		pF
Output Capacitance	C _{oSS}	V _{GS} = 0 V		222		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		133		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V		61		ns
Rise Time	t _r	I _D = 3.0 A		172		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = 4.0 V		220		ns
Fall Time	t _f	R _G = 10 Ω		293		ns
Total Gate Charge	Q _G	V _{DS} = 16 V		6.7		nC
Gate to Source Charge	Q _{GS}	I _D = 5.5 A		1.2		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 4.0 V		3.1		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 5.5 A, V _{GS} = 0 V		0.87		V

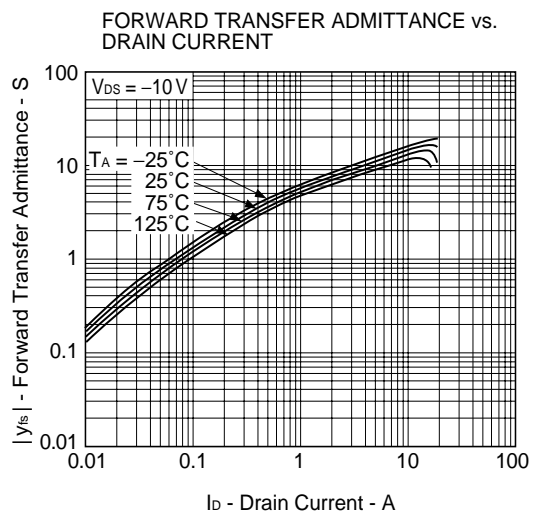
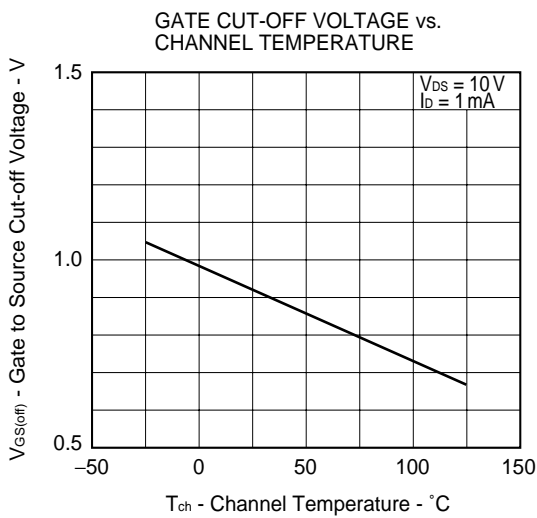
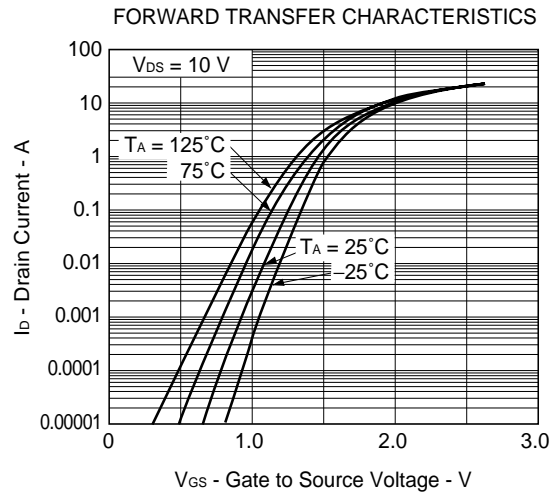
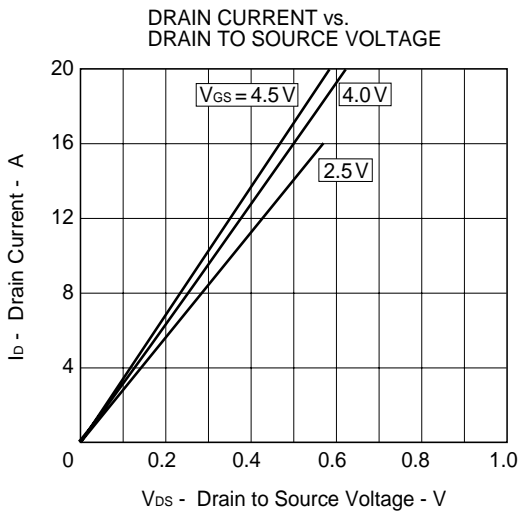
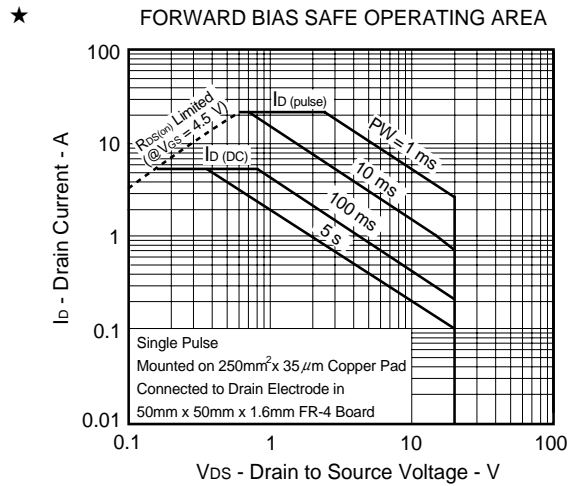
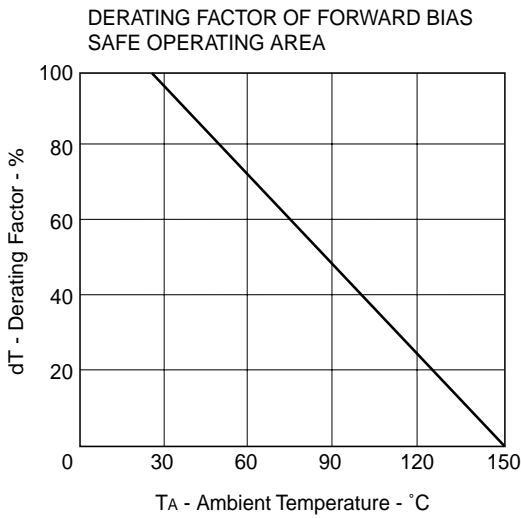
TEST CIRCUIT 1 SWITCHING TIME

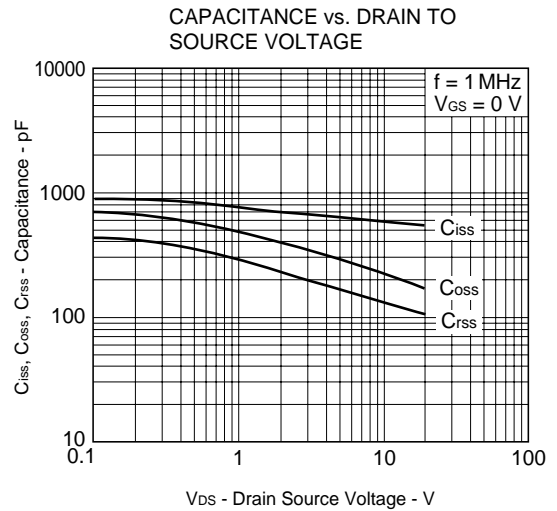
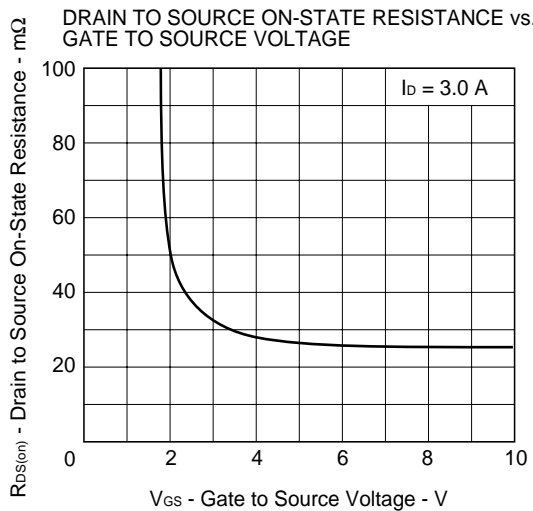
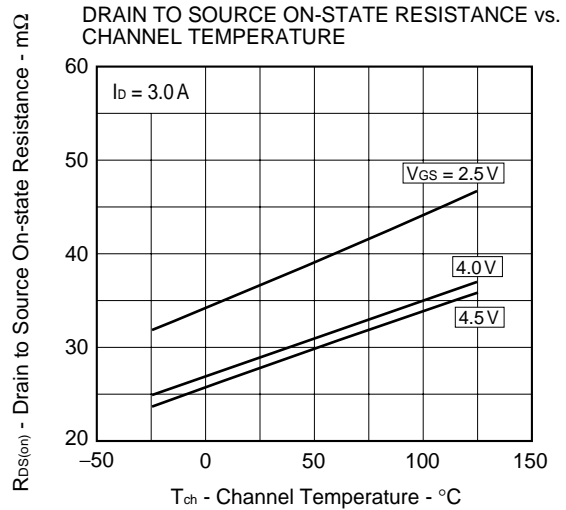
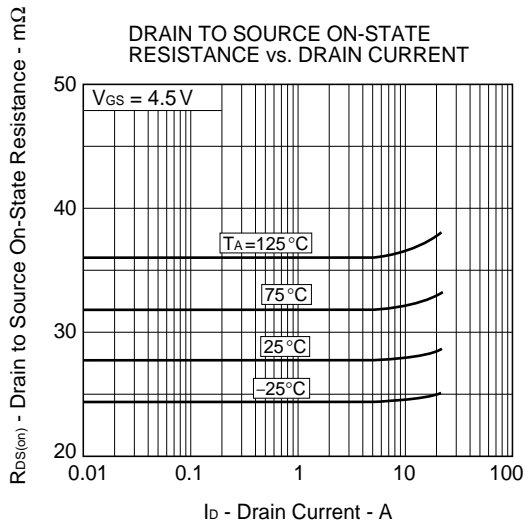
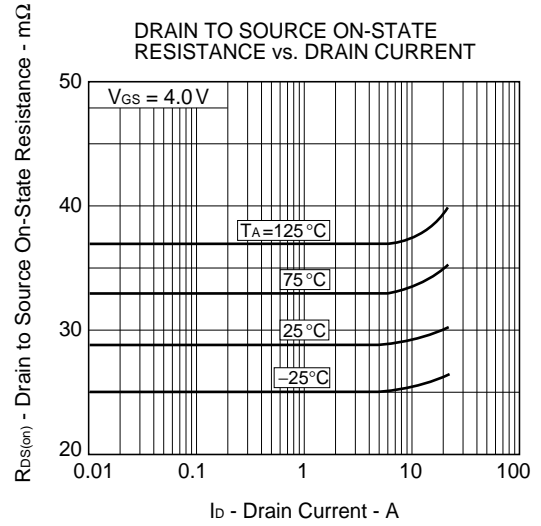
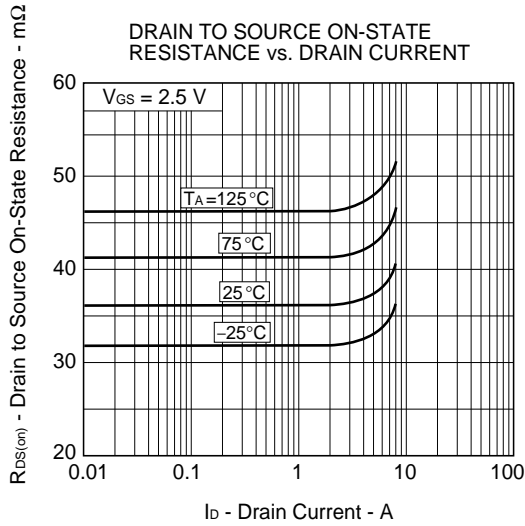


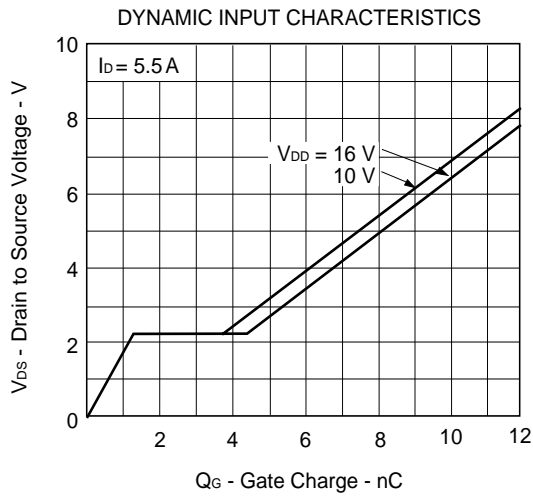
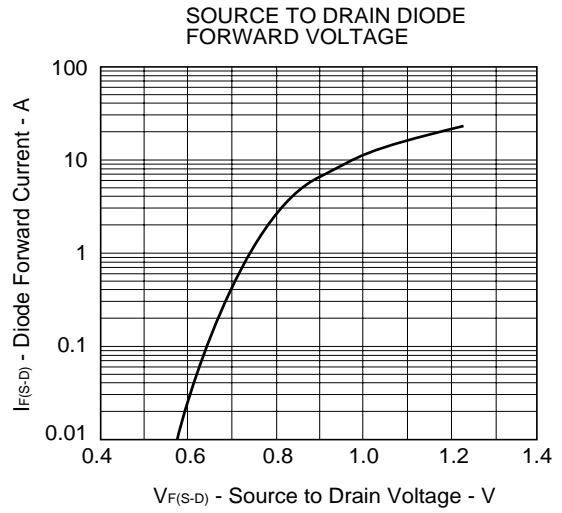
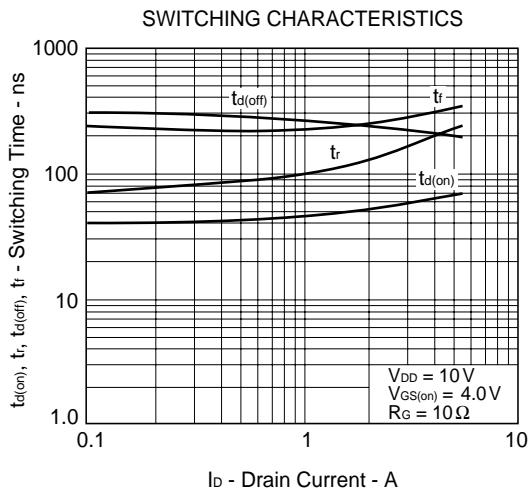
TEST CIRCUIT 2 GATE CHARGE



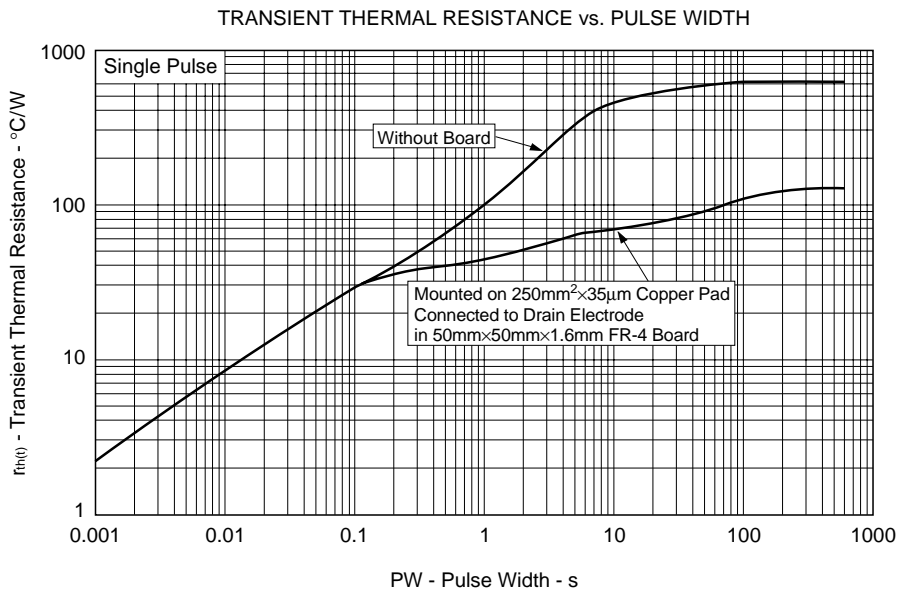
TYPICAL CHARACTERISTICS (T_A = 25°C)







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[MEMO]

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