

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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MOS FIELD EFFECT TRANSISTOR

μ PA2201T1M

N-CHANNEL MOS FET FOR SWITCHING

DESCRIPTION

The μ PA2201T1M is N-channel MOS Field Effect Transistor designed for power management applications of portable equipments, such as load switch.

FEATURES

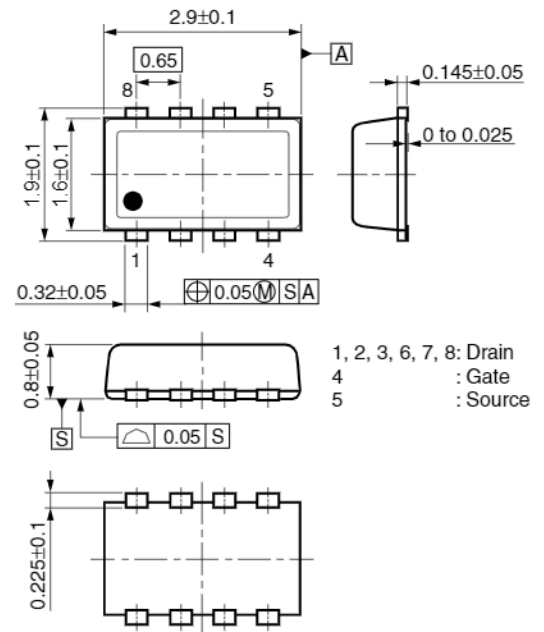
- Low on-state resistance
 $R_{DS(on)1} = 18.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 9 \text{ A)}$
 $R_{DS(on)2} = 27 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 4.5 \text{ A)}$
- Built-in gate protection diode
- 2.5 V Gate drive available

ORDERING INFORMATION

PART NUMBER	PACKING	PACKAGE
μ PA2201T1M-T1-AT ^{Note}	8 mm embossed taping	8-pin VSOF (1629)
μ PA2201T1M-T2-AT ^{Note}	3000 p/reel	0.011 g TYP.

Note Pb-free (This product does not contain Pb in external electrode and other parts.)

PACKAGE DRAWING (Unit: mm)



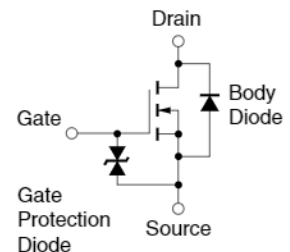
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	20	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 12	V
Drain Current (DC)	$I_{D(DC)}$	± 9	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 36	A
Total Power Dissipation ^{Note2}	P_{T1}	1.1	W
Total Power Dissipation ($PW = 5 \text{ sec}$) ^{Note2}	P_{T2}	2.5	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 glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

EQUIVALENT CIRCUIT



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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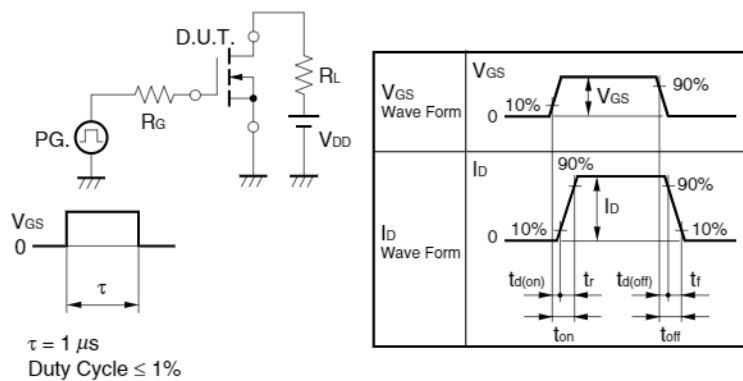
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ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

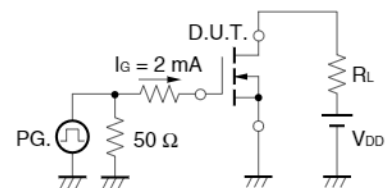
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{oss}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
Gate Leakage Current	I _{gss}	V _{GS} = ±12 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	0.5		1.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10 V, I _D = 4.5 A	4			S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 9 A		16	18.5	mΩ
	R _{DS(on)2}	V _{GS} = 2.5 V, I _D = 4.5 A		21	27	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V,		920		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		220		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		170		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V, I _D = 4.5 A,		11.7		ns
Rise Time	t _r	V _{GS} = 4 V,		22.3		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		38.8		ns
Fall Time	t _f			18.2		ns
Total Gate Charge	Q _G	V _{DD} = 16 V,		13.3		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 4.5 V,		2.0		nC
Gate to Drain Charge	Q _{GD}	I _D = 9 A		5.4		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 9 A, V _{GS} = 0 V		0.87	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 9 A, V _{GS} = 0 V,		28		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		19		nC

Note Pulsed

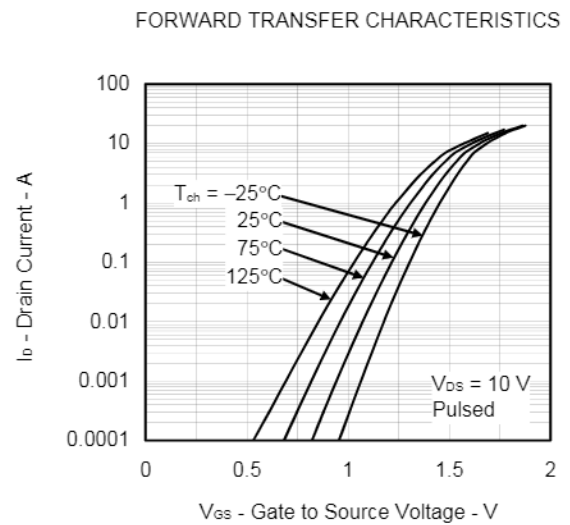
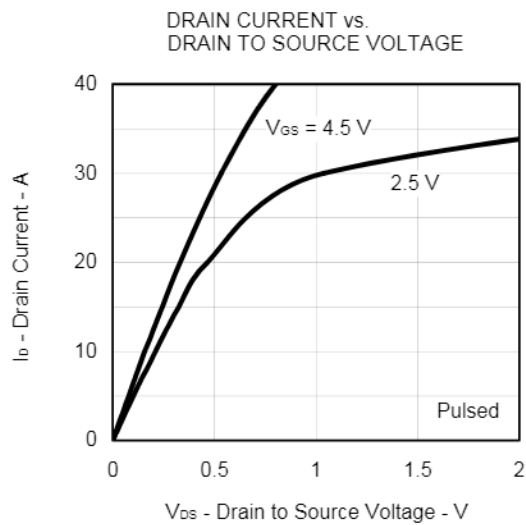
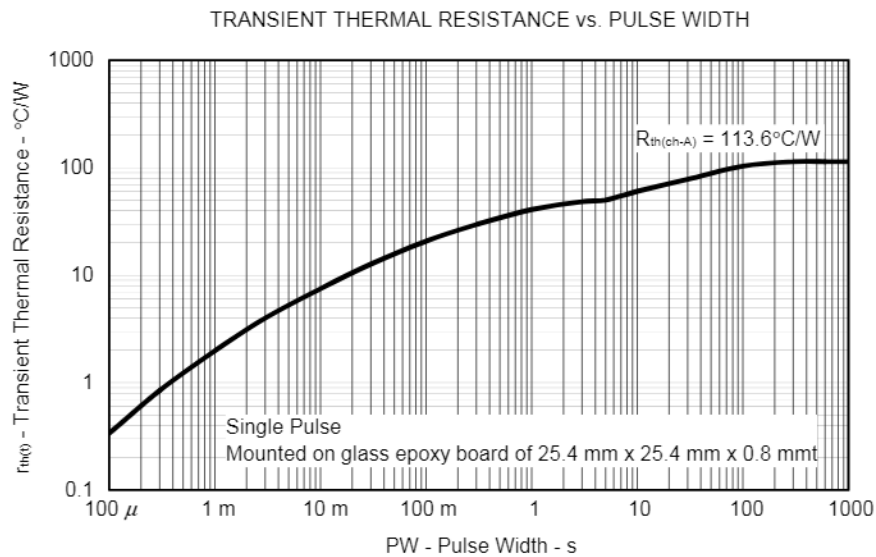
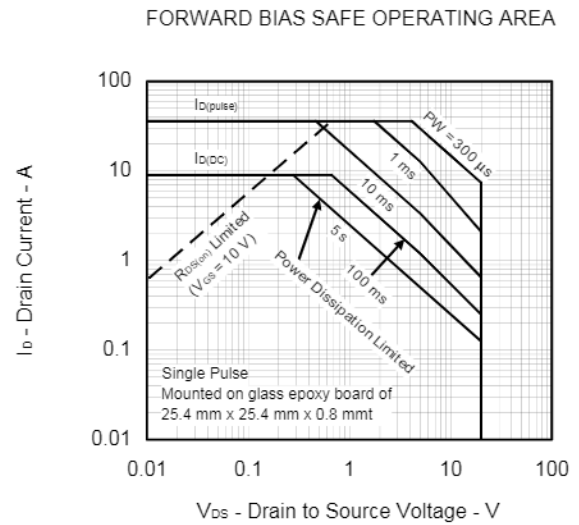
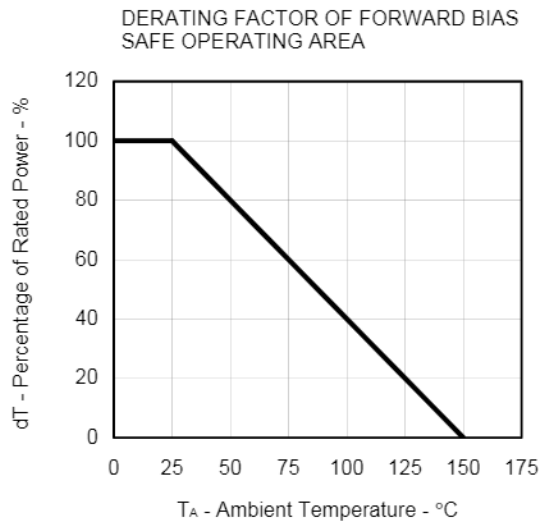
TEST CIRCUIT 1 SWITCHING TIME

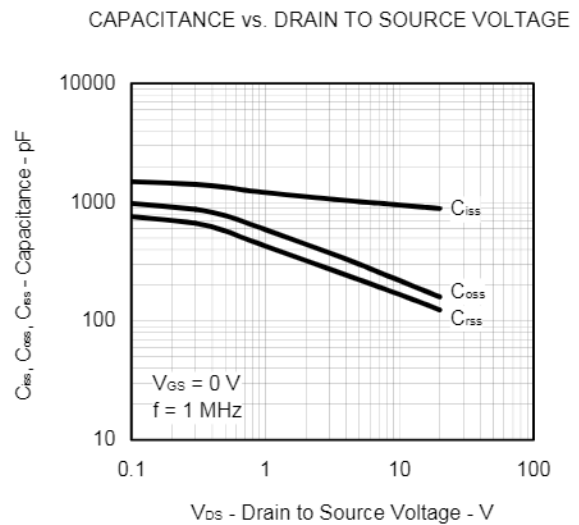
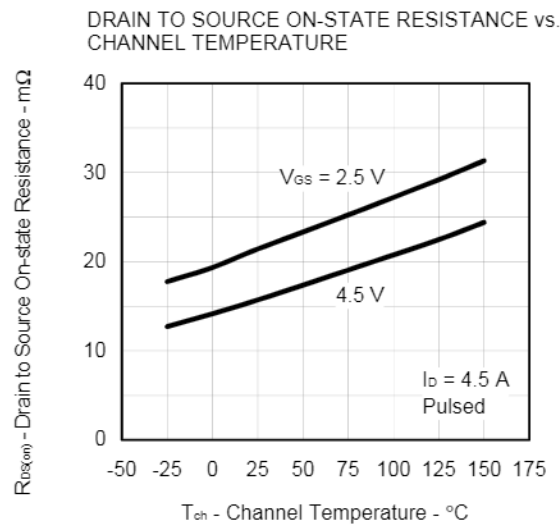
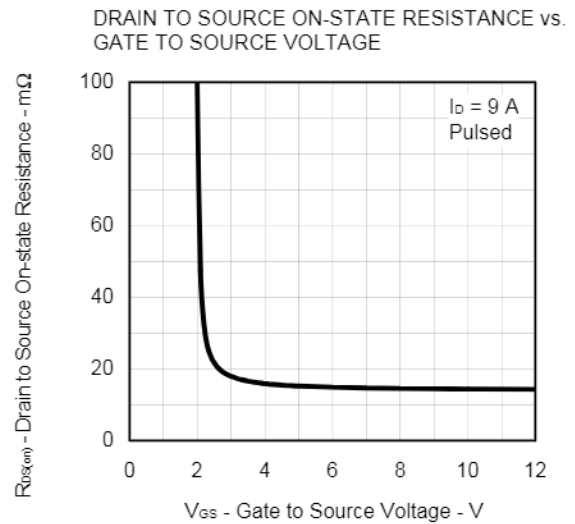
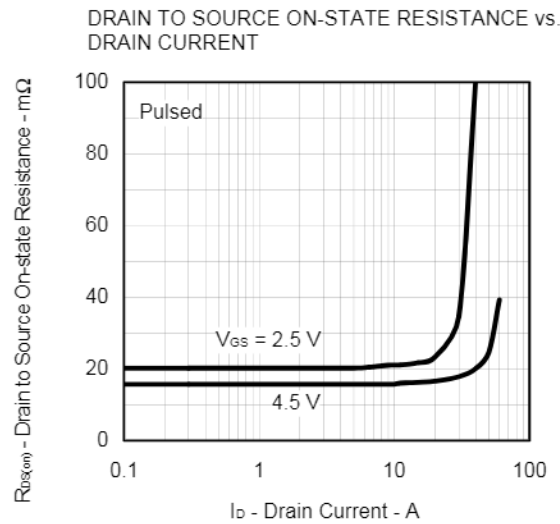
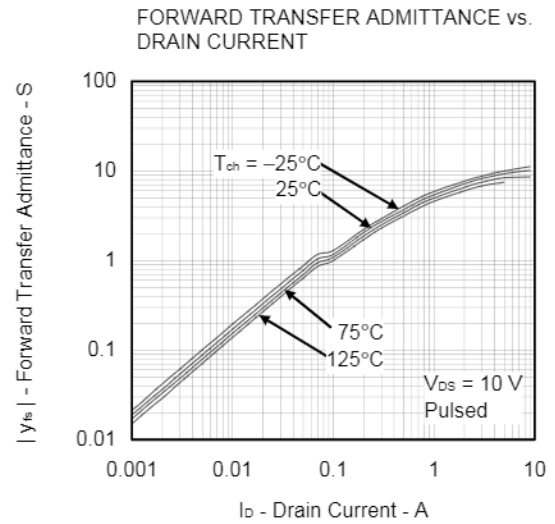
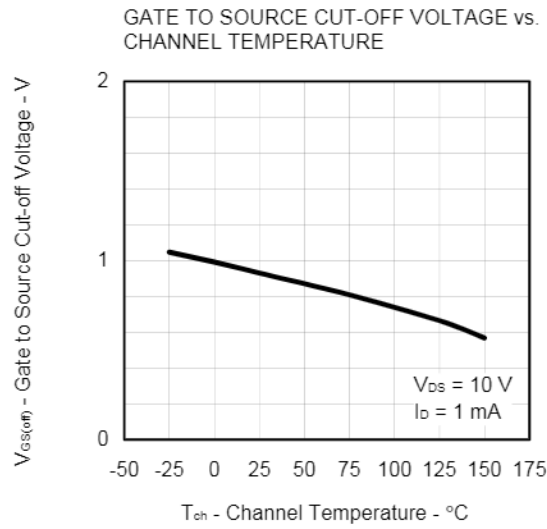


TEST CIRCUIT 2 GATE CHARGE

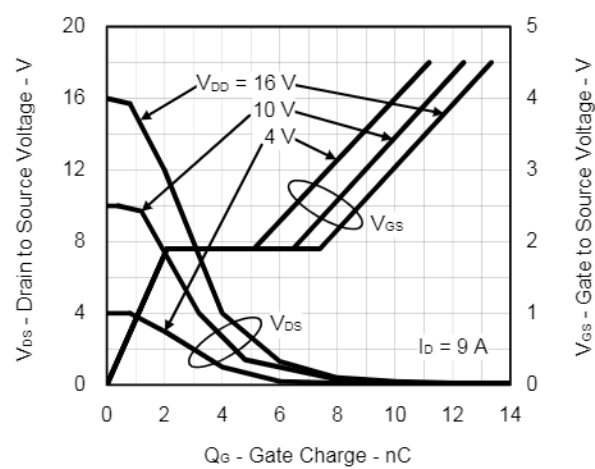


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

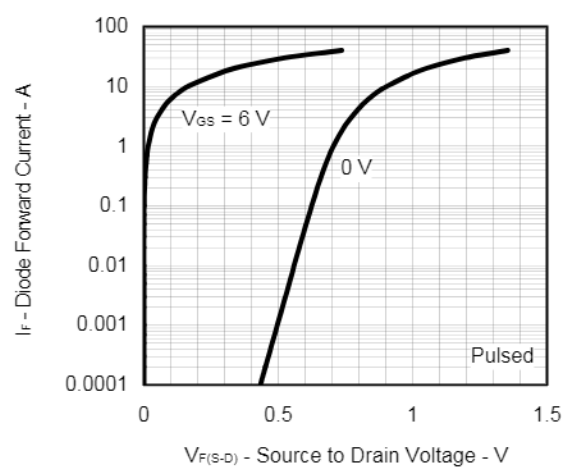




DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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