

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

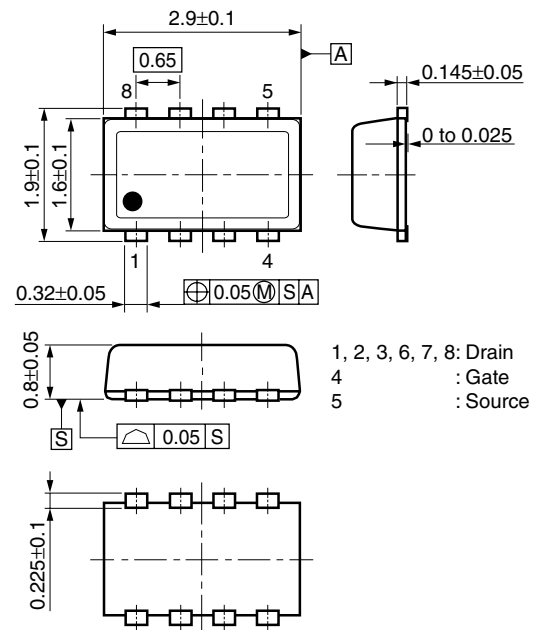
- Low on-state resistance
 $R_{DS(on)1} = 18.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 9 \text{ A)}$
 $R_{DS(on)2} = 27 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 4.5 \text{ A)}$
- Built-in gate protection diode
- 2.5 V Gate drive available

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)

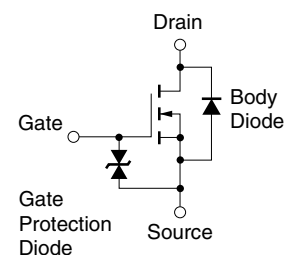


ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected.)

Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	20	V
Gate to Source Voltage (V _{DS} = 0 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 sec) ^{Note2}	P _{T2}	2.5	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 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.

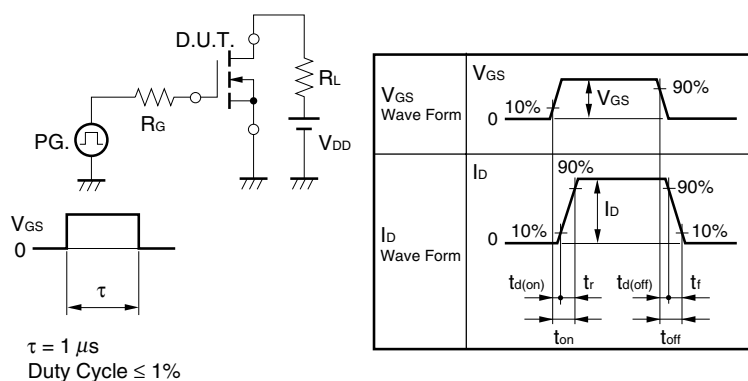
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ELECTRICAL CHARACTERISTICS (TA = 25°C, All terminals are connected.)

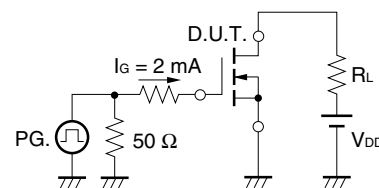
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	0.5		1.5	V
Forward Transfer Admittance ^{Note}	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 4.5\text{ A}$	4			S
Drain to Source On-state Resistance ^{Note}	$R_{DS(on)1}$	$V_{GS} = 4.5\text{ V}, I_D = 9\text{ A}$		16	18.5	mΩ
	$R_{DS(on)2}$	$V_{GS} = 2.5\text{ V}, I_D = 4.5\text{ A}$		21	27	mΩ
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V},$		920		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V},$		220		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		170		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}, I_D = 4.5\text{ A},$		11.7		ns
Rise Time	t_r	$V_{GS} = 4\text{ V},$		22.3		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		38.8		ns
Fall Time	t_f			18.2		ns
Total Gate Charge	Q_G	$V_{DD} = 16\text{ V},$		13.3		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 4.5\text{ V},$		2.0		nC
Gate to Drain Charge	Q_{GD}	$I_D = 9\text{ A}$		5.4		nC
Body Diode Forward Voltage ^{Note}	$V_{F(S-D)}$	$I_F = 9\text{ A}, V_{GS} = 0\text{ V}$		0.87	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 9\text{ A}, V_{GS} = 0\text{ V},$		28		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}$		19		nC

Note Pulsed

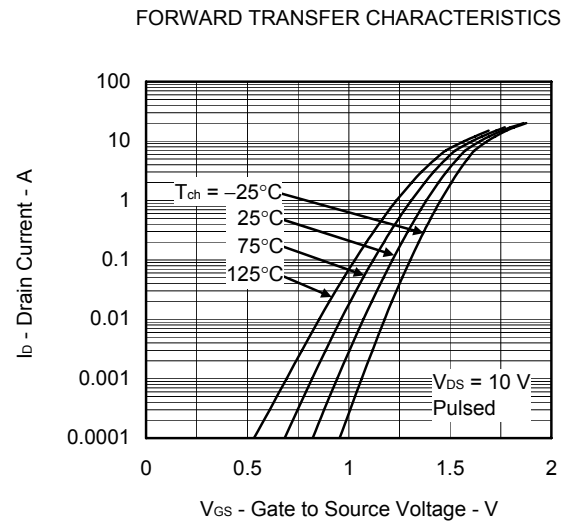
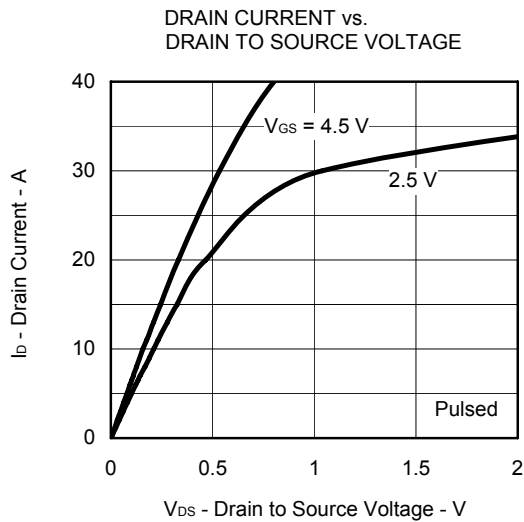
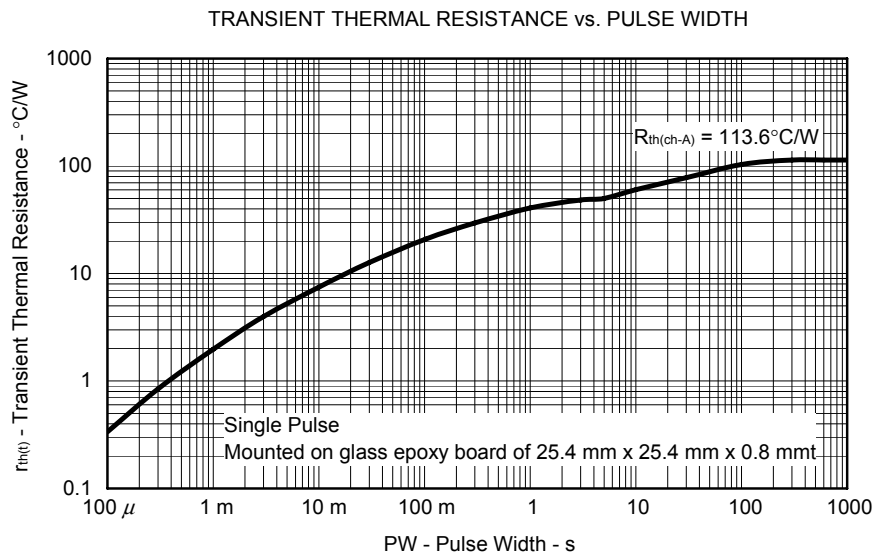
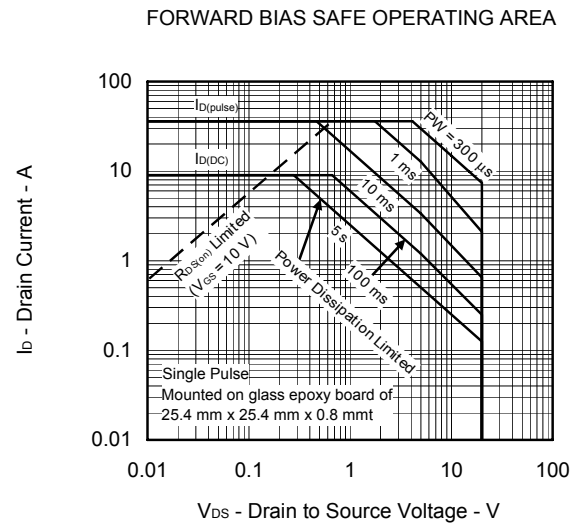
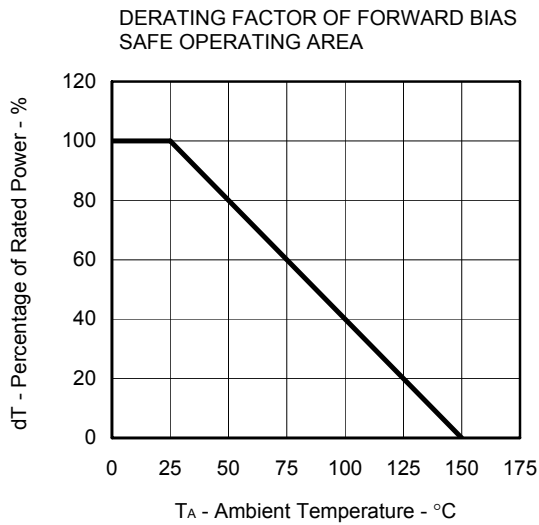
TEST CIRCUIT 1 SWITCHING TIME



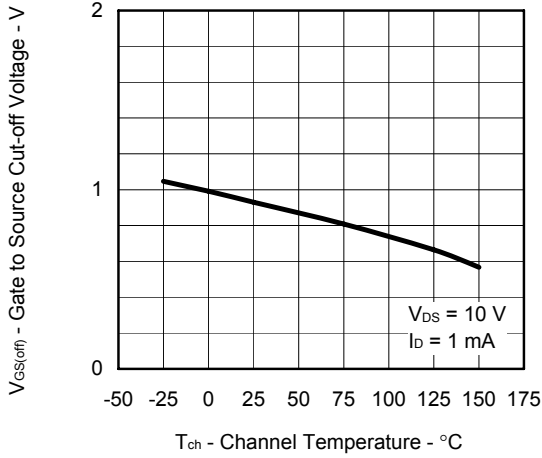
TEST CIRCUIT 2 GATE CHARGE



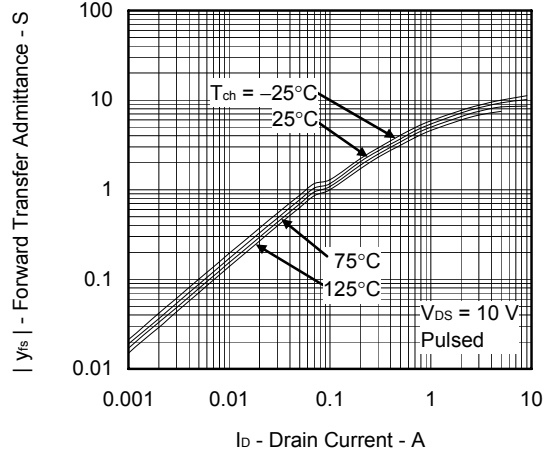
TYPICAL CHARACTERISTICS (T_A = 25°C)



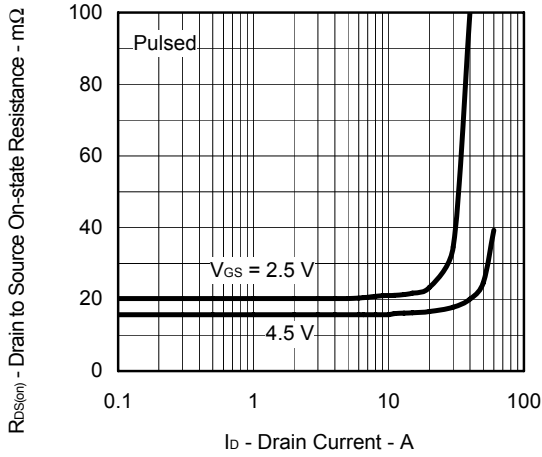
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



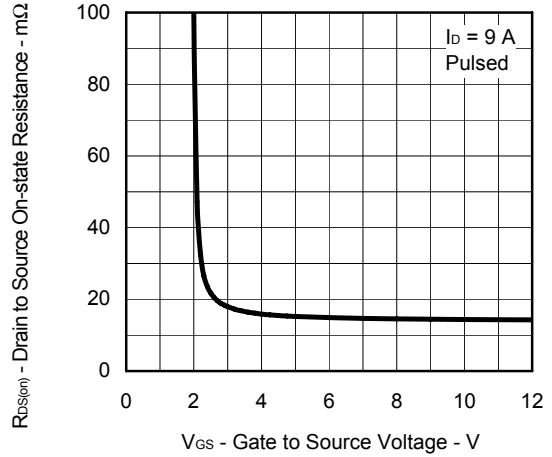
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



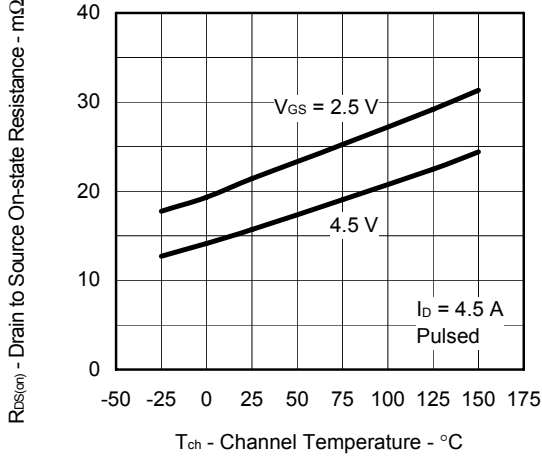
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



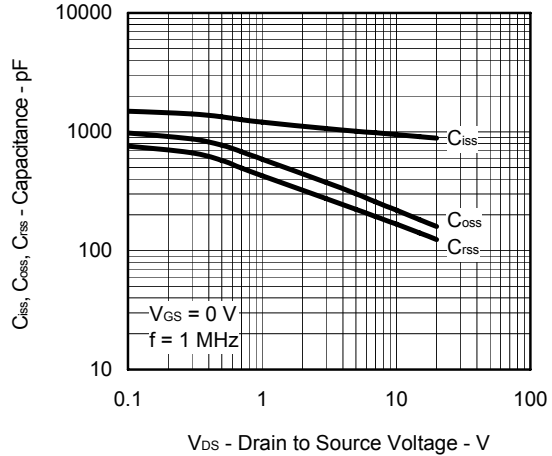
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



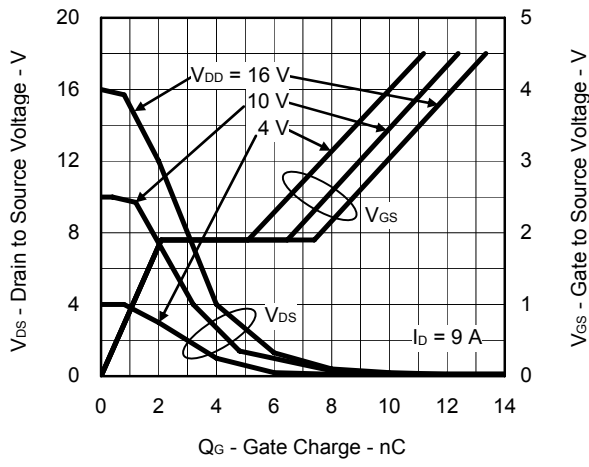
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



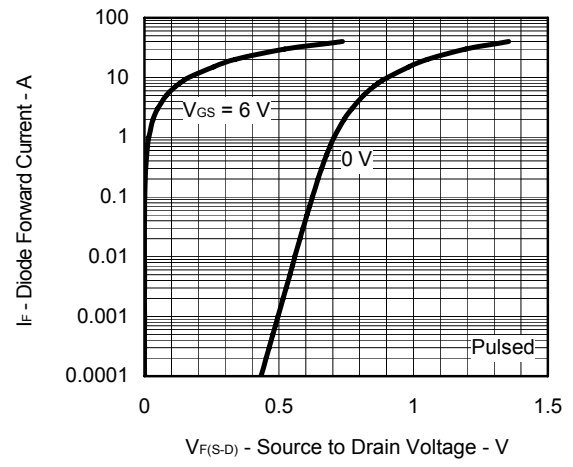
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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