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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 μ PA1914 is a switching device which can be driven directly by a 4 V power source.

The μ PA1914 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 V power source
- Low on-state resistance
 $R_{DS(on)1} = 57 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -2.5 \text{ A)}$
 $R_{DS(on)2} = 86 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -2.5 \text{ A)}$
 $R_{DS(on)3} = 96 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -2.5 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1914TE	SC-95 (Mini Mold Thin Type)

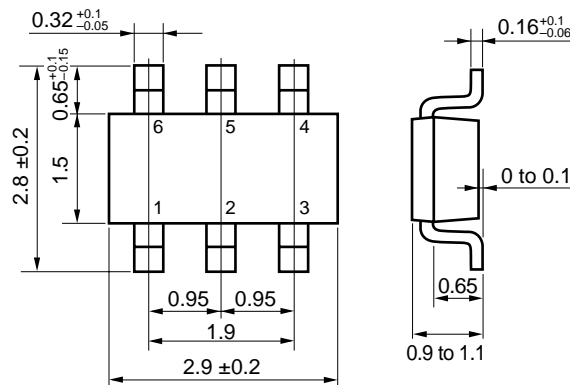
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage	V _{DSS}	-30	V
Gate to Source Voltage	V _{GSS}	±20	V
Drain Current (DC)	I _{D(DC)}	±4.5	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±18	A
Total Power Dissipation	P _{T1}	0.2	W
Total Power Dissipation ^{Note2}	P _{T2}	2	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 FR-4 Board, t ≤ 5 sec.

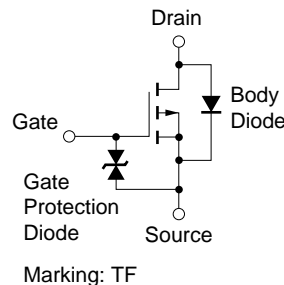
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

PACKAGE DRAWING (Unit : mm)



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

EQUIVALENT CIRCUIT

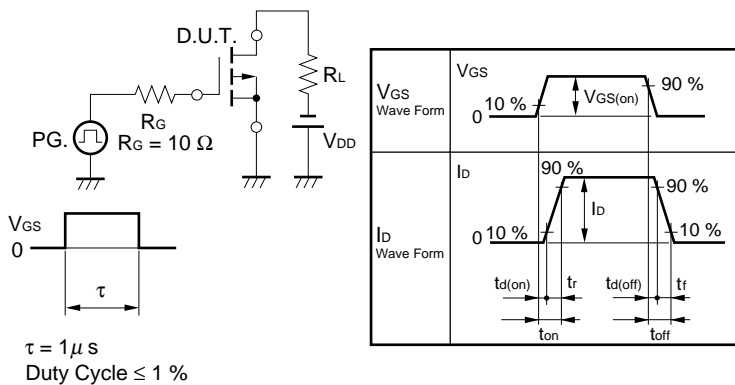


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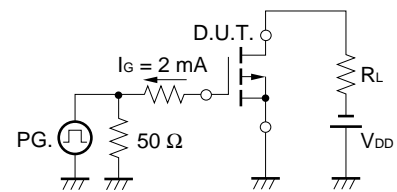
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V			-10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1 mA	-1.0	-1.6	-2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -2.5 A	1	7.1		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -10 V, I _D = -2.5 A		43	57	mΩ
	R _{DS(on)2}	V _{GS} = -4.5 V, I _D = -2.5 A		58	86	mΩ
	R _{DS(on)3}	V _{GS} = -4.0 V, I _D = -2.5 A		64	96	mΩ
Input Capacitance	C _{iSS}	V _{DS} = -10 V		589		pF
Output Capacitance	C _{oSS}	V _{GS} = 0 V		210		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		86		pF
Input Capacitance	C _{iSS}	V _{DS} = -25 V		546		pF
Output Capacitance	C _{oSS}	V _{GS} = 0 V		148		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		65		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15 V		16		ns
Rise Time	t _r	I _D = -2.5 A		57		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = -10 V		63		ns
Fall Time	t _f	R _G = 10 Ω		80		ns
Total Gate Charge	Q _G	V _{DD} = -24 V		11		nC
Gate to Source Charge	Q _{GS}	I _D = -4.5 A		1.5		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = -10 V		2.8		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 4.5 A, V _{GS} = 0 V		0.88		V
Reverse Recovery Time	t _{rr}	I _F = 4.5 A, V _{GS} = 0 V		22		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		11		nC

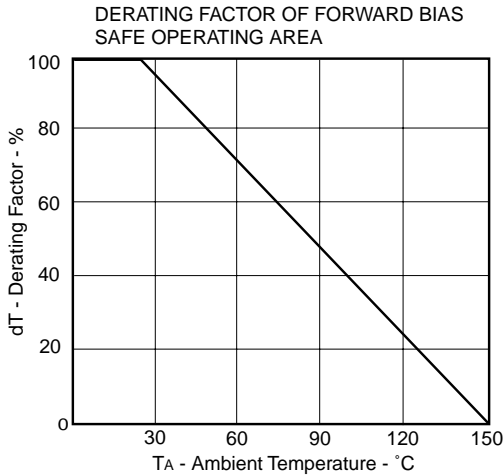
TEST CIRCUIT 1 SWITCHING TIME



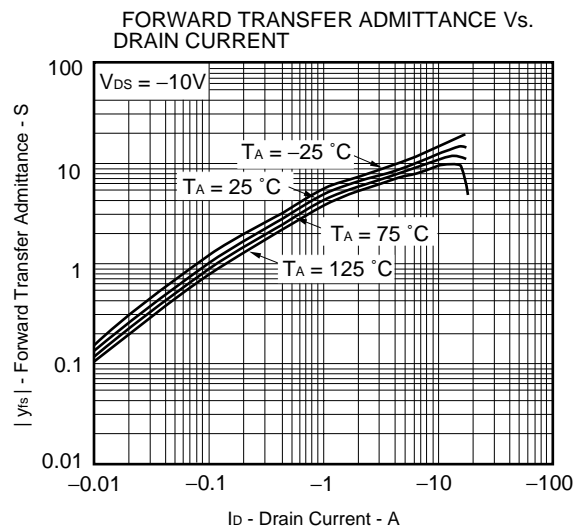
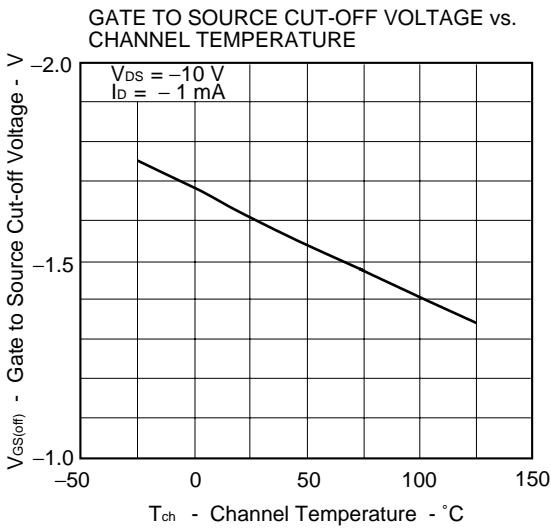
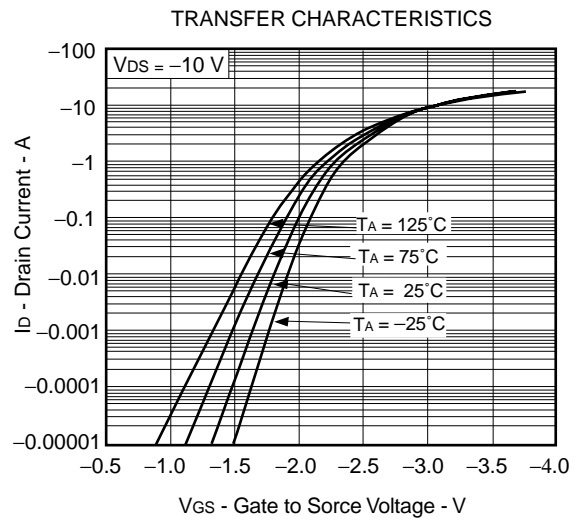
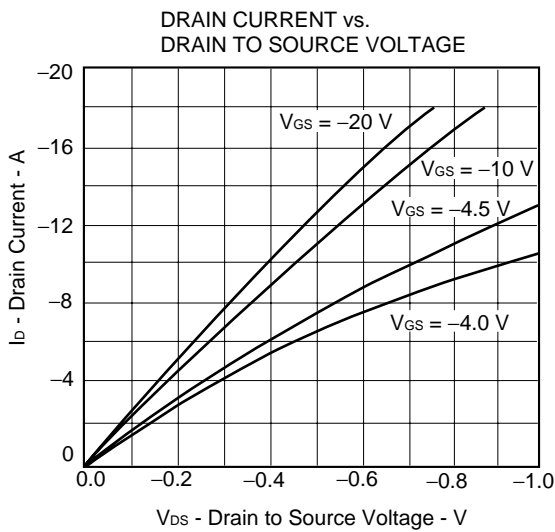
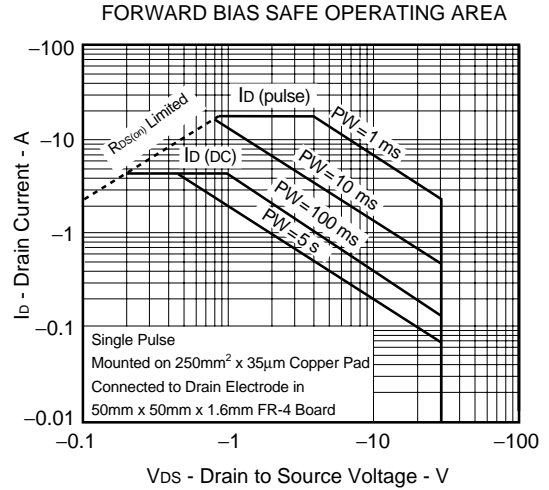
TEST CIRCUIT 2 GATE CHARGE



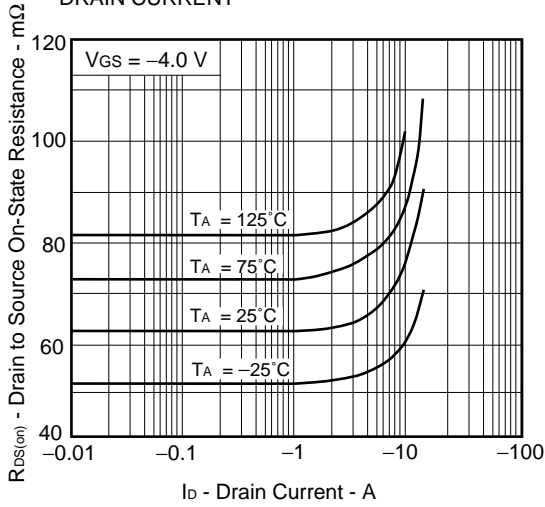
TYPICAL CHARACTERISTICS (TA = 25°C)



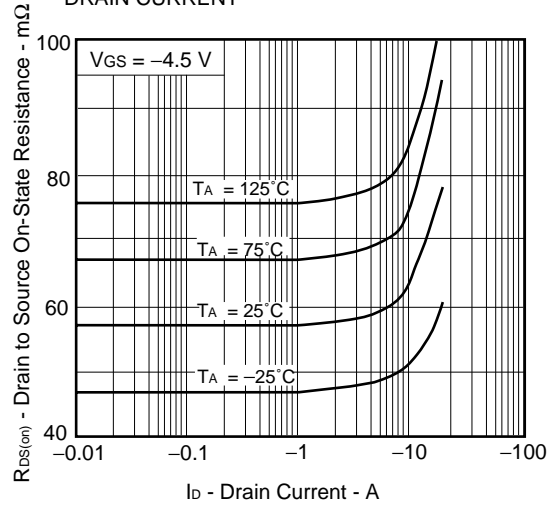
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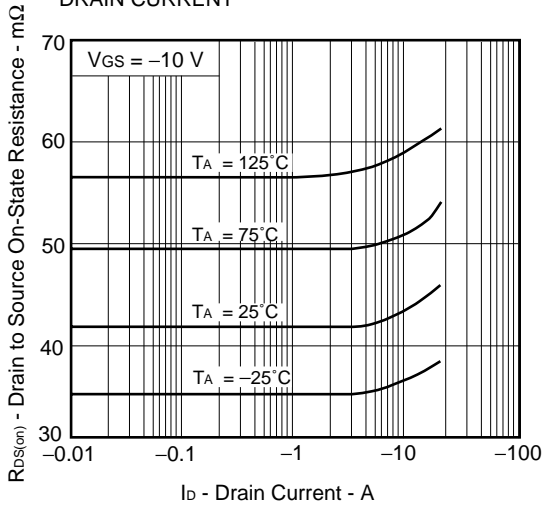
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



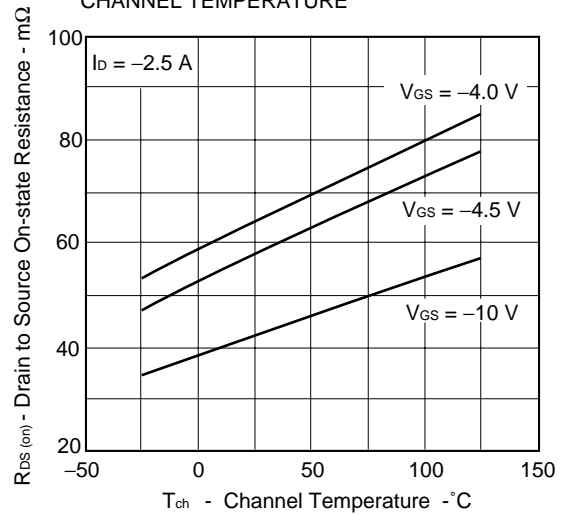
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



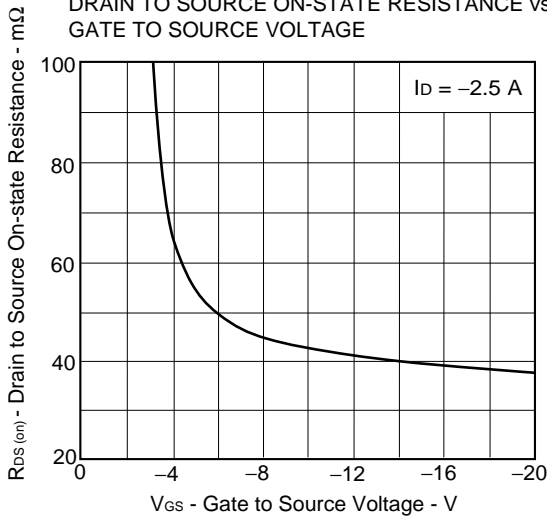
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



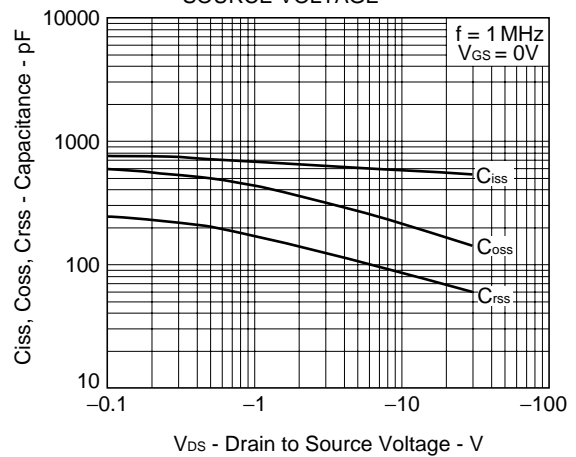
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



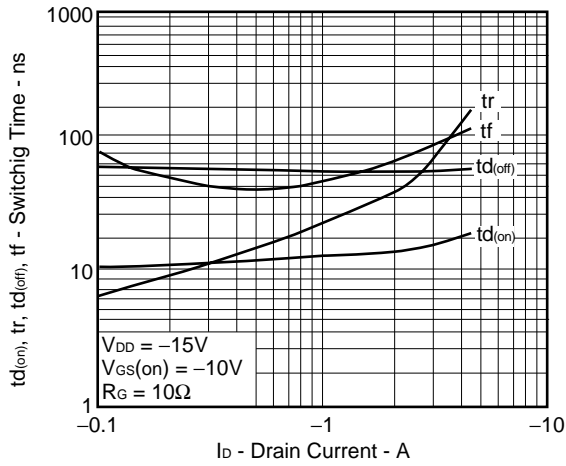
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



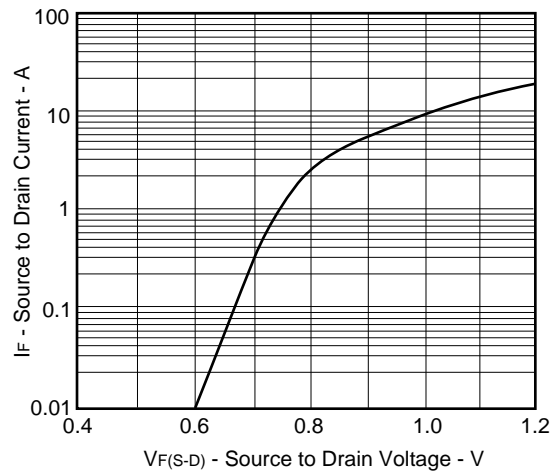
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



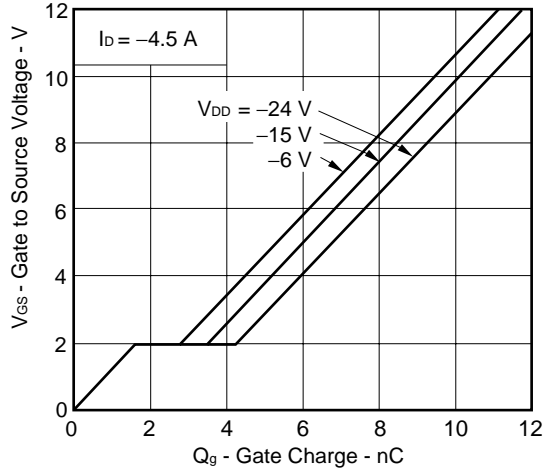
SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE

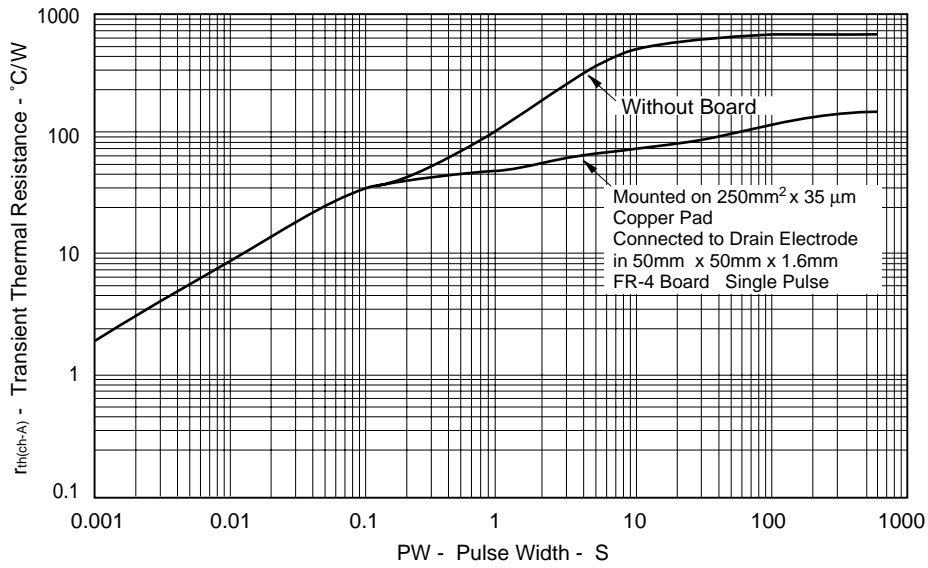


DYNAMIC INPUT CHARACTERISTICS



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TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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