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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 PA652TT is a switching device, which can be driven directly by a 2.5 V power source.

This device 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

- 2.5 V drive available
- Low on-state resistance
 $R_{DS(on)1} = 294 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -1.0 \text{ A)}$
 $R_{DS(on)2} = 336 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -1.0 \text{ A)}$
 $R_{DS(on)3} = 514 \text{ m}\Omega \text{ MAX. (} V_{GS} = -2.5 \text{ V, } I_D = -0.5 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA652TT	6pinWSOF (1620)

Marking: WF

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

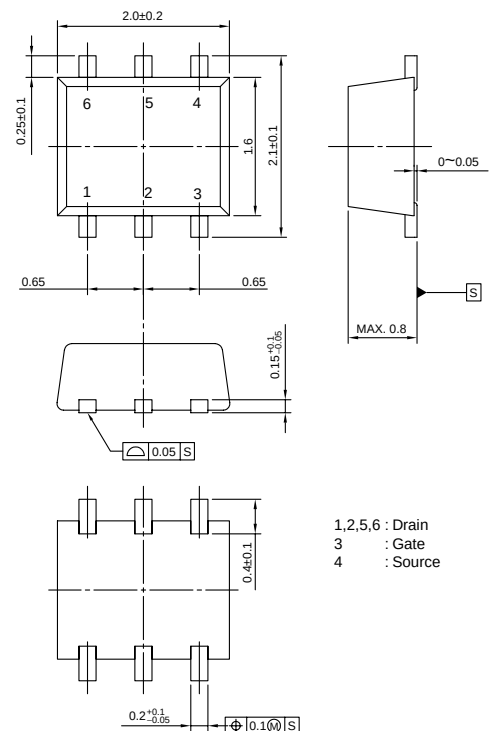
Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	-20	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 12	V
Drain Current (DC)	$I_{D(DC)}$	± 2.0	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 8.0	A
Total Power Dissipation	P_{T1}	0.2	W
Total Power Dissipation ^{Note2}	P_{T2}	1.3	W
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 $\leq 1\%$

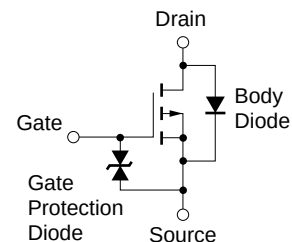
2. Mounted on FR-4 board of $5000 \text{ mm}^2 \times 1.1 \text{ mm}$, $t \leq 5 \text{ sec.}$

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.

PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

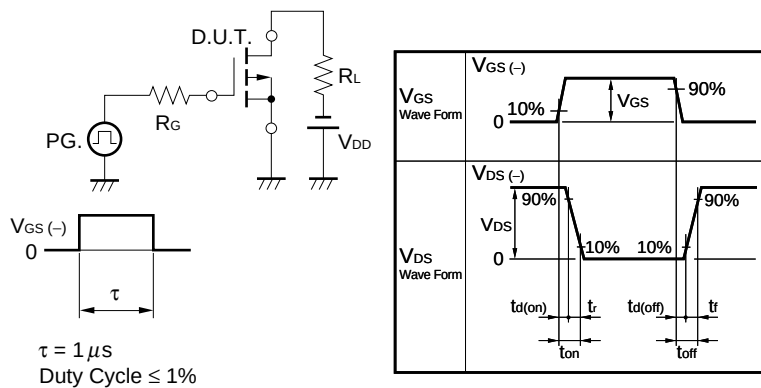


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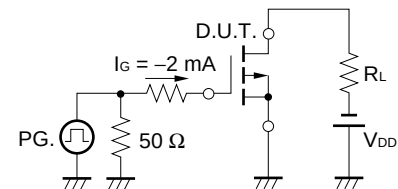
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -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 = -250 μA	-0.5	-1.1	-1.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -1.0 A	1.0	2.4		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -4.5 V, I _D = -1.0 A		235	294	mΩ
	R _{DS(on)2}	V _{GS} = -4.0 V, I _D = -1.0 A		252	336	mΩ
	R _{DS(on)3}	V _{GS} = -2.5 V, I _D = -0.5 A		385	514	mΩ
Input Capacitance	C _{iss}	V _{DS} = -10 V		126		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		47		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		17		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10 V, I _D = -1.0 A		28		ns
Rise Time	t _r	V _{GS} = -4.0 V		101		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		80		ns
Fall Time	t _f			85		ns
Total Gate Charge	Q _G	V _{DD} = -16 V		1.1		nC
Gate to Source Charge	Q _{GS}	V _{GS} = -4.0 V		0.4		nC
Gate to Drain Charge	Q _{GD}	I _D = -2.0 A		0.5		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 2.0 A, V _{GS} = 0 V		0.93		V

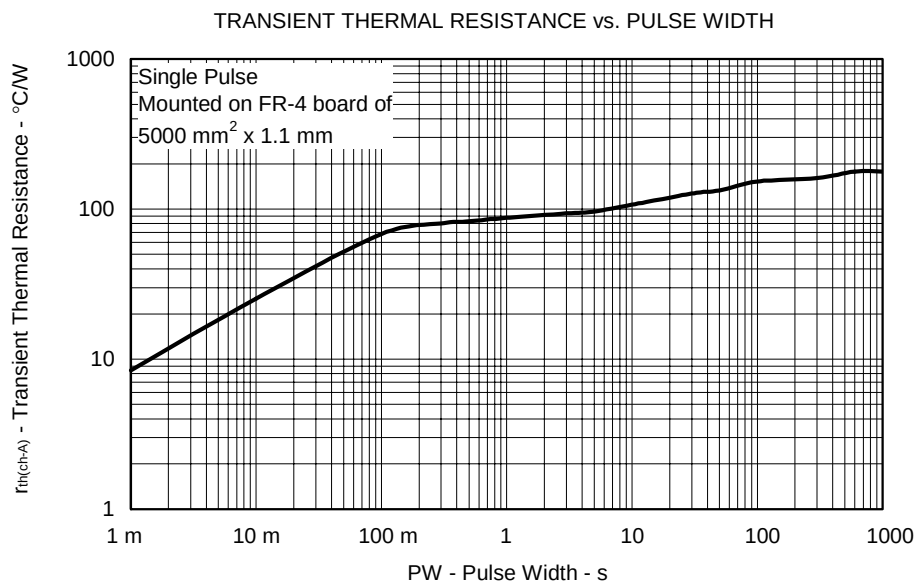
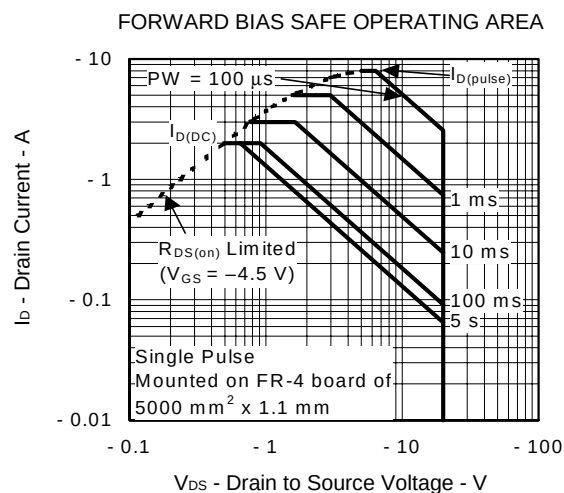
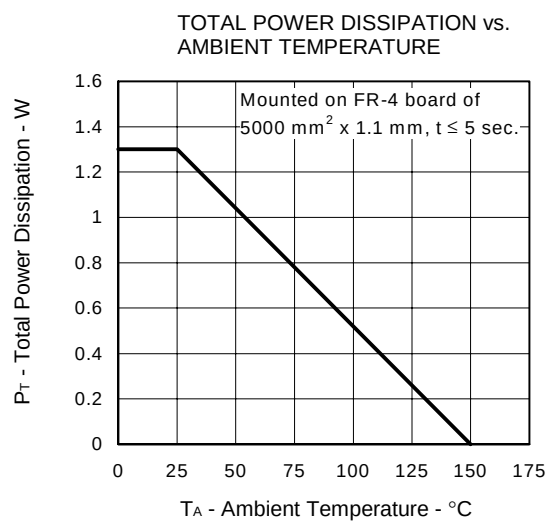
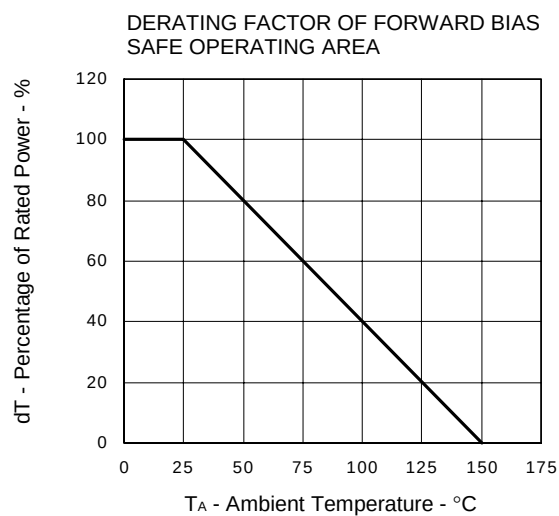
TEST CIRCUIT 1 SWITCHING TIME



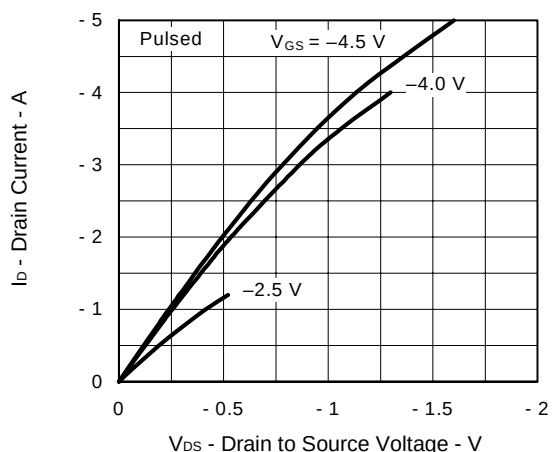
TEST CIRCUIT 2 GATE CHARGE



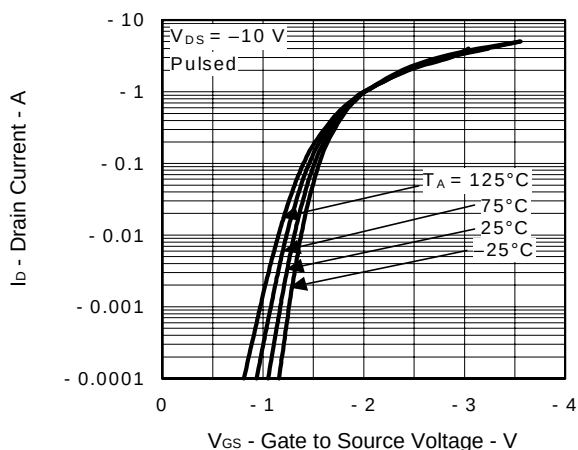
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



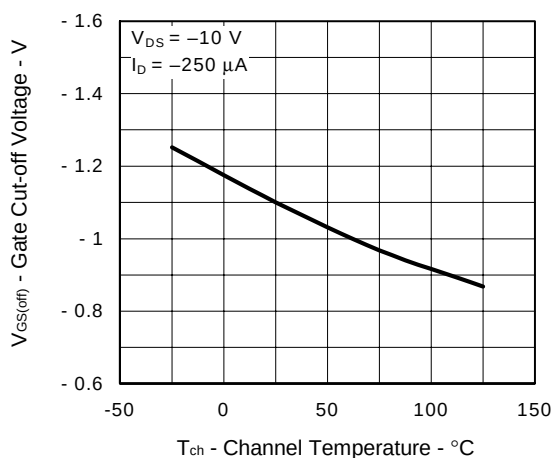
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



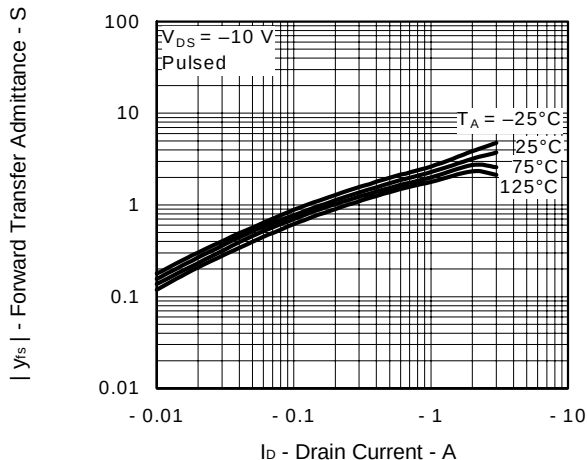
FORWARD TRANSFER CHARACTERISTICS



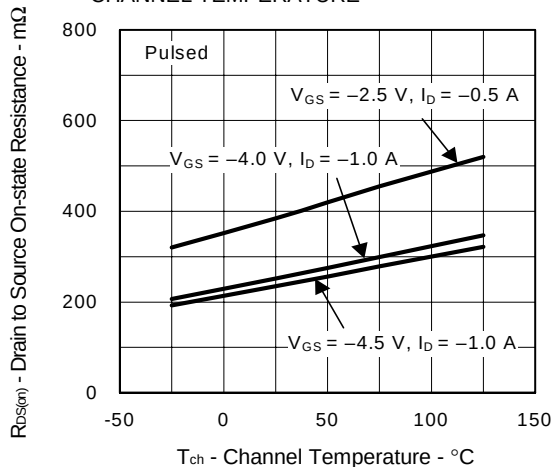
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



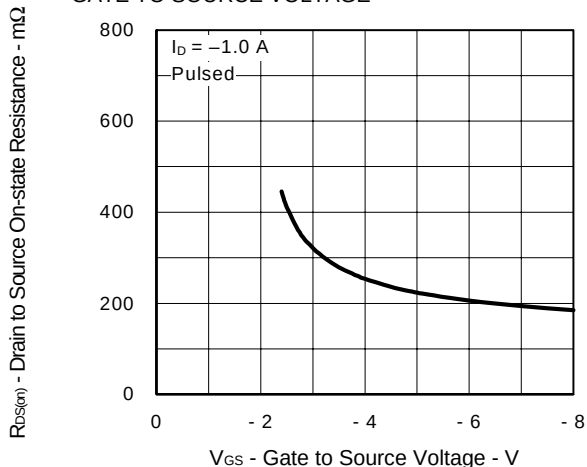
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



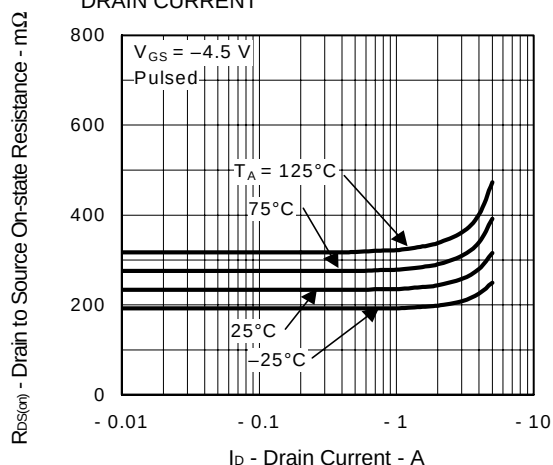
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



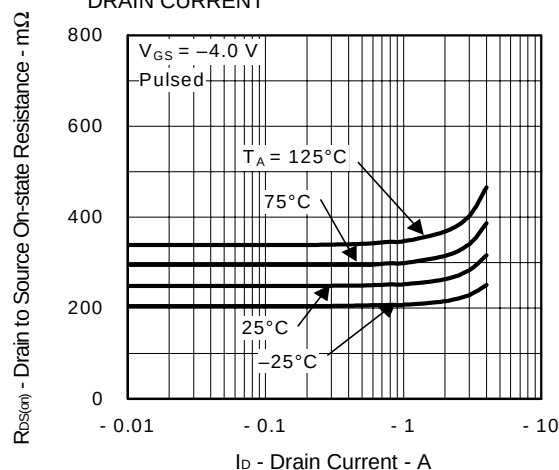
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



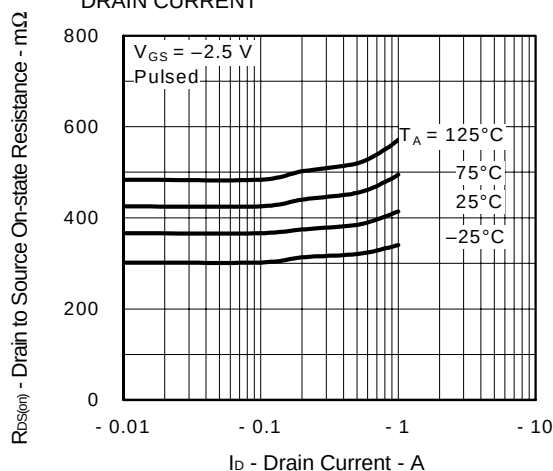
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



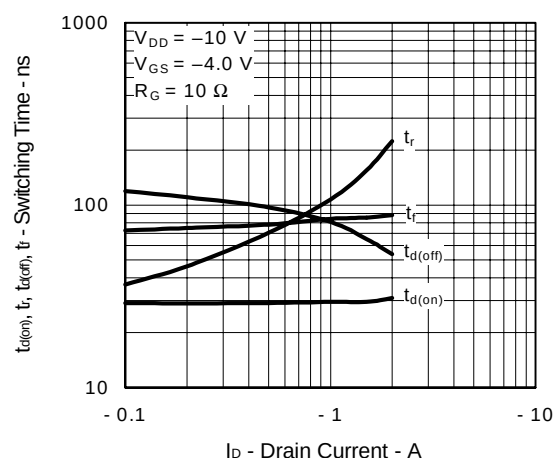
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



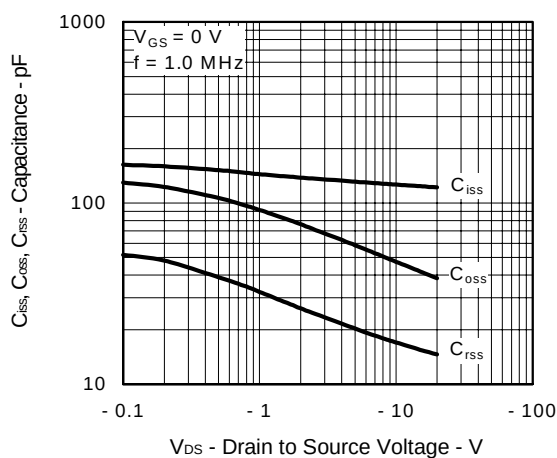
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



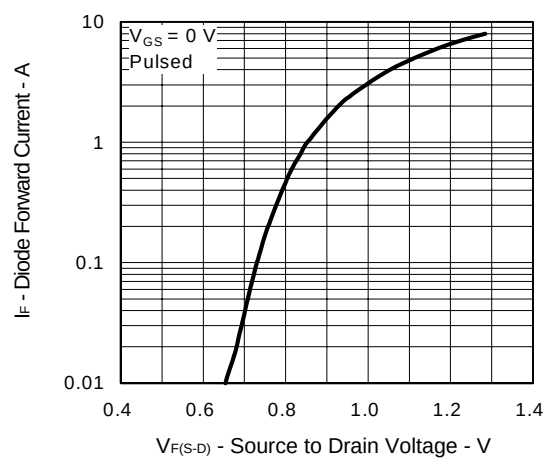
SWITCHING CHARACTERISTICS



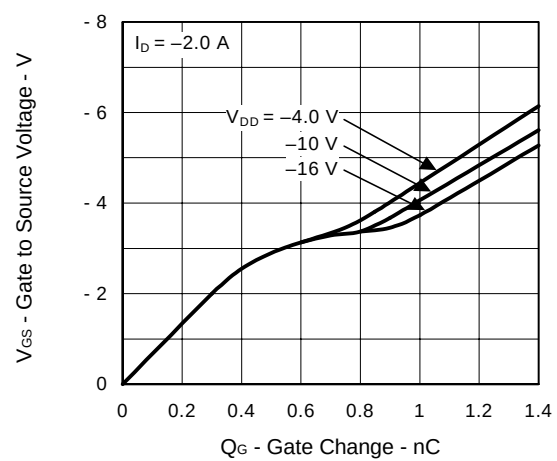
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

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