

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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N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μ PA677TB is a switching device which can be driven directly by a 2.5 V power source.

The μ PA677TB 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
 - $R_{DS(on)1} = 0.57 \Omega$ MAX. ($V_{GS} = 4.5$ V, $I_D = 0.30$ A)
 - $R_{DS(on)2} = 0.60 \Omega$ MAX. ($V_{GS} = 4.0$ V, $I_D = 0.30$ A)
 - $R_{DS(on)3} = 0.88 \Omega$ MAX. ($V_{GS} = 2.5$ V, $I_D = 0.15$ A)
- Two MOS FET circuits in same size package as SC-70

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA677TB	SC-88 (SSP)

Marking: WA

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

Drain to Source Voltage ($V_{GS} = 0$ V)	V_{DS}	20	V
Gate to Source Voltage ($V_{DS} = 0$ V)	V_{GS}	± 12	V
Drain Current (DC)	$I_{D(DC)}$	± 0.35	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 1.40	A
Total Power Dissipation(2units) ^{Note2}	P_T	0.2	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 of $2500 \text{ mm}^2 \times 1.1 \text{ mm}$ 2units total.

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.

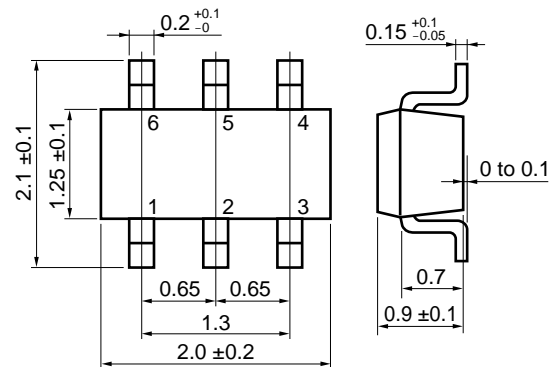
Caution This product is electrostatic-sensitive device due to low ESD capability and should be handled with caution for electrostatic discharge.

$V_{ESD} = \pm 200$ V TYP. (C = 200 pF, R = 0 Ω , Single pulse)

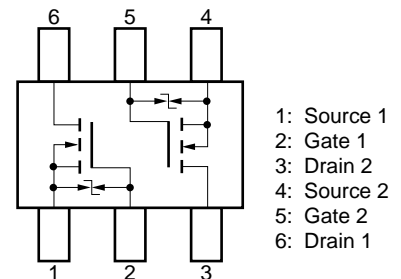
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PACKAGE DRAWING (Unit: mm)



PIN CONNECTUON (Top View)



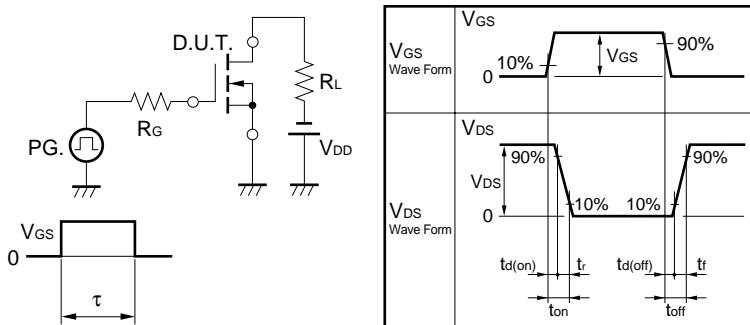
- 1: Source 1
- 2: Gate 1
- 3: Source 2
- 4: Source 2
- 5: Gate 2
- 6: Drain 1

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20.0 V, V _{GS} = 0 V			1.0	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12.0 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10.0 V, I _D = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10.0 V, I _D = 0.30 A	0.25	0.75		S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 0.30 A		0.38	0.57	Ω
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 0.30 A		0.41	0.60	Ω
	R _{DS(on)3}	V _{GS} = 2.5 V, I _D = 0.15 A		0.60	0.88	Ω
Input Capacitance	C _{iss}	V _{DS} = 10.0 V		28		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		11		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		7		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10.0 V, I _D = 0.30 A		20		ns
Rise Time	t _r	V _{GS} = 4.0 V		51		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		94		ns
Fall Time	t _f			87		ns
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 0.35 A, V _{GS} = 0 V		0.84		V

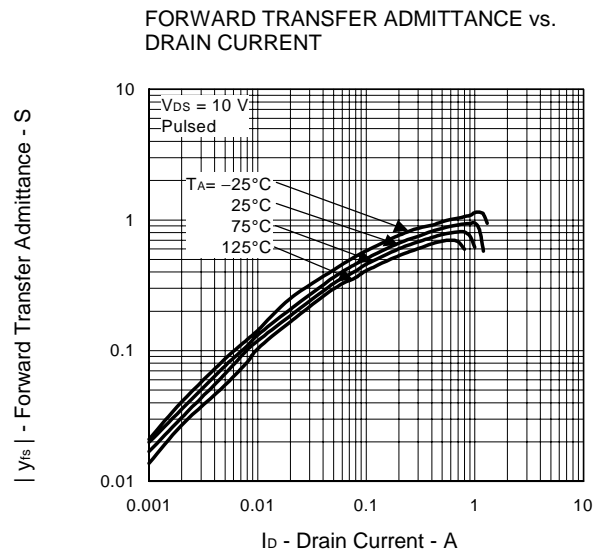
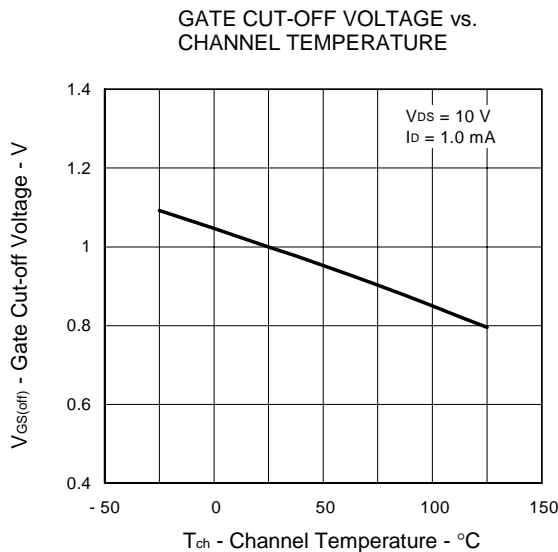
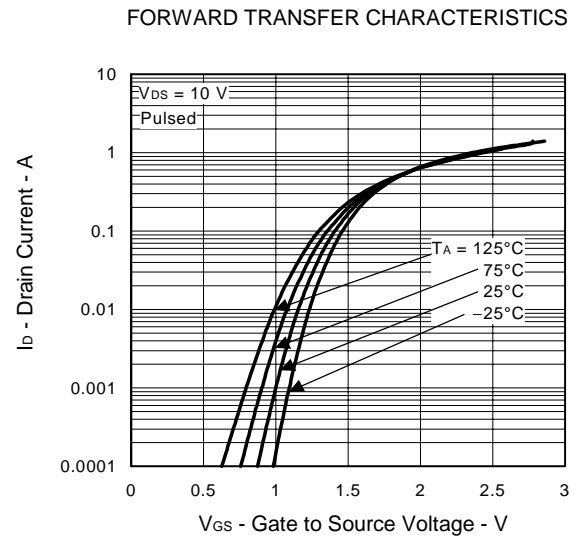
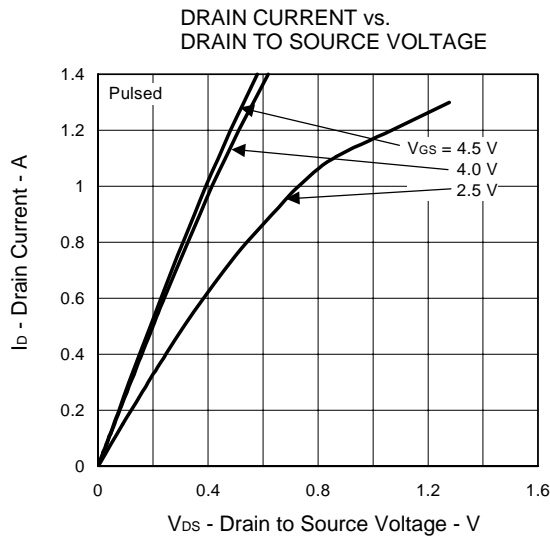
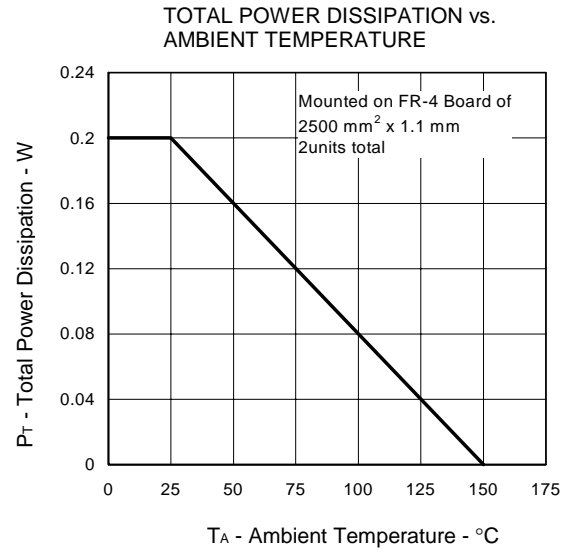
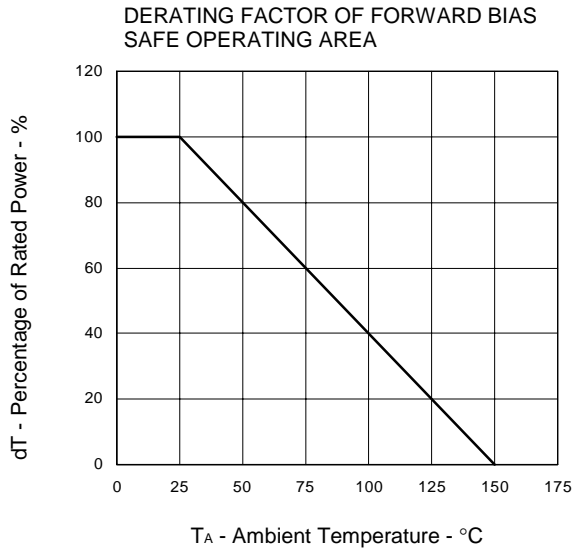
Note Pulsed PW≤350 μs, Duty Cycle≤2%

TEST CIRCUIT SWITCHING TIME

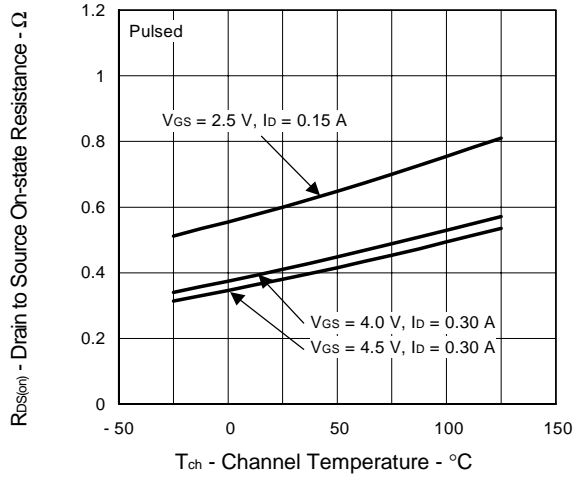


τ = 1 μs
Duty Cycle ≤ 1%

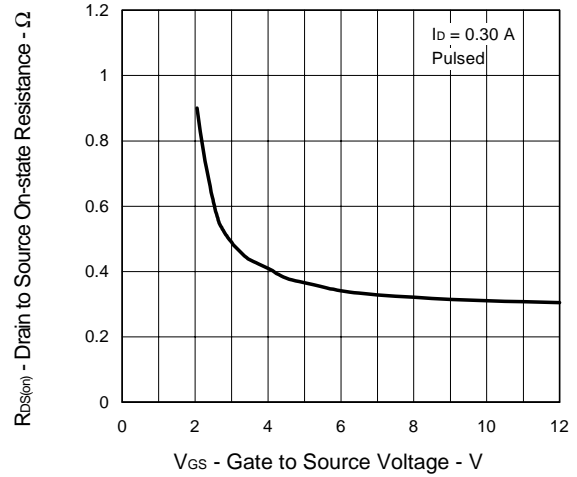
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



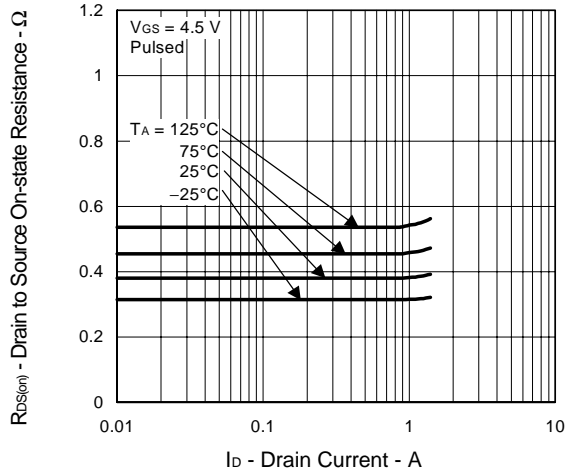
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



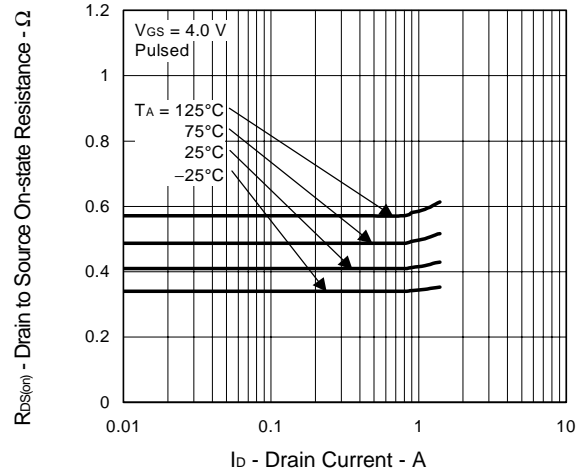
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



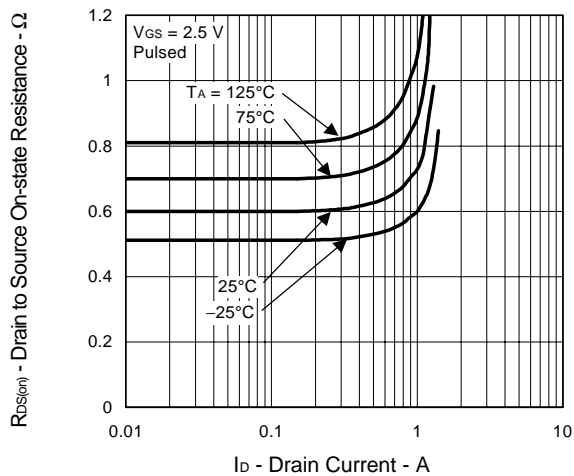
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



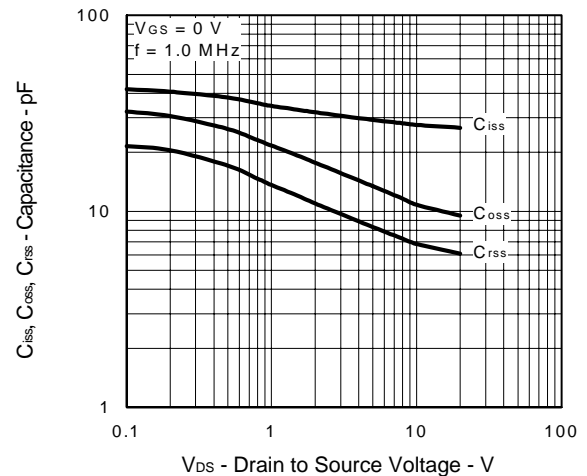
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

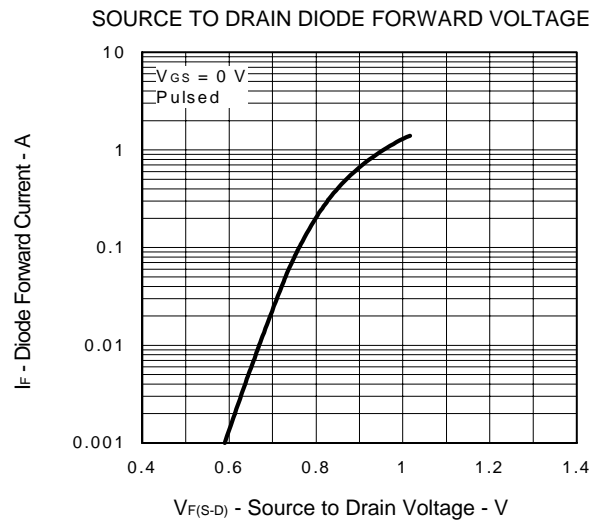
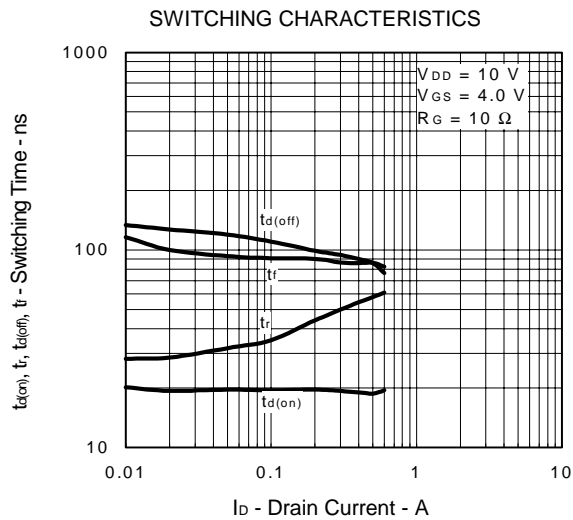


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE





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