

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

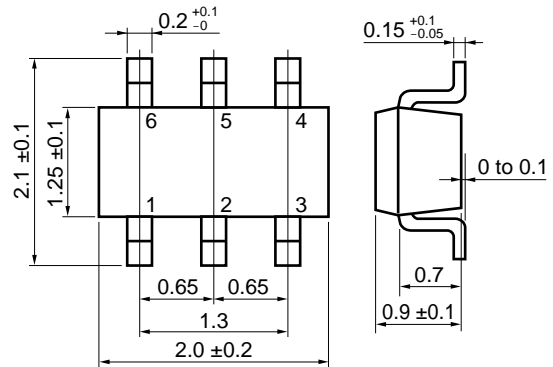
The μPA677TB is a switching device which can be driven directly by a 2.5 V power source.

The μPA677TB 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
 $R_{DS(on)1} = 0.57 \Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 0.30 \text{ A)}$
 $R_{DS(on)2} = 0.60 \Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 0.30 \text{ A)}$
 $R_{DS(on)3} = 0.88 \Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 0.15 \text{ A)}$
- Two MOS FET circuits in same size package as SC-70

PACKAGE DRAWING (Unit: mm)



ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA677TB	SC-88 (SSP)

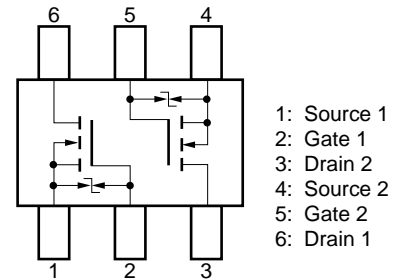
Marking: WA

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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	°C
Storage Temperature	T _{stg}	-55 to +150	°C

- Notes**
1. PW ≤ 10 μs, Duty Cycle ≤ 1%
 2. Mounted on FR-4 Board of 2500 mm² x 1.1 mm 2units total.

PIN CONNECTUON (Top View)



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} = ±200 V TYP. (C = 200 pF, R = 0 Ω, Single pulse)

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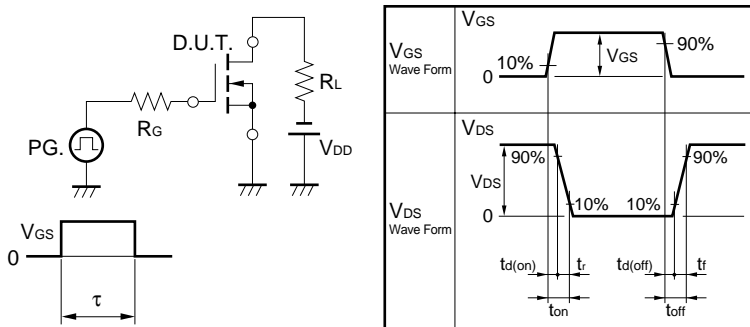
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20.0 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

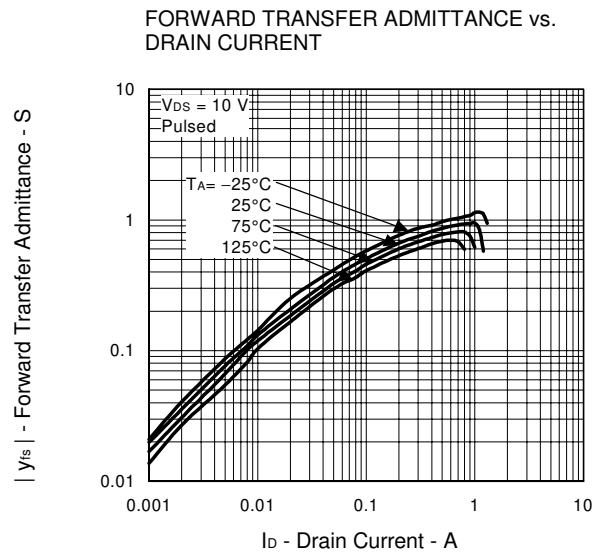
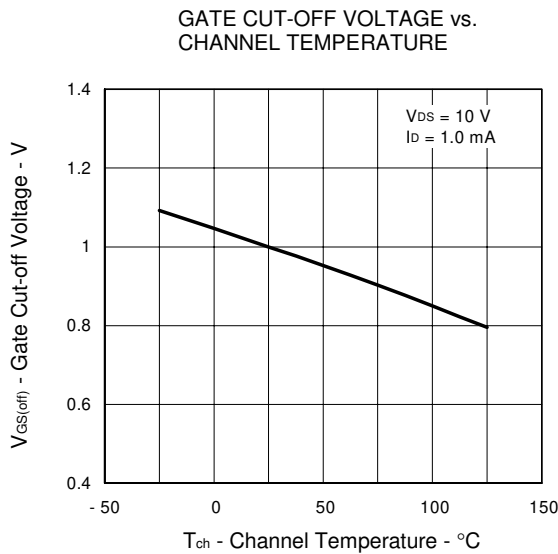
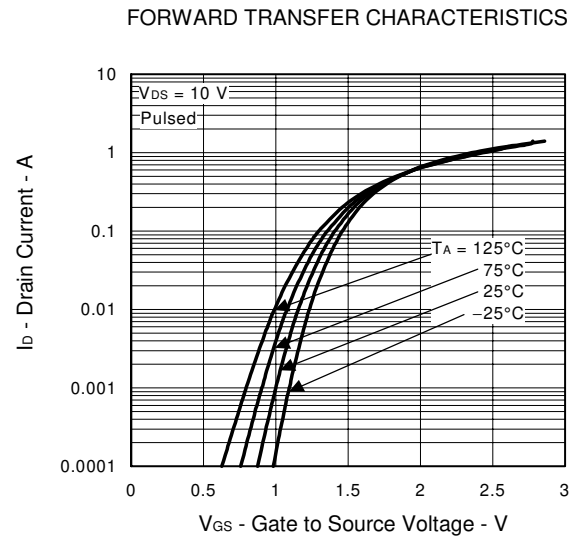
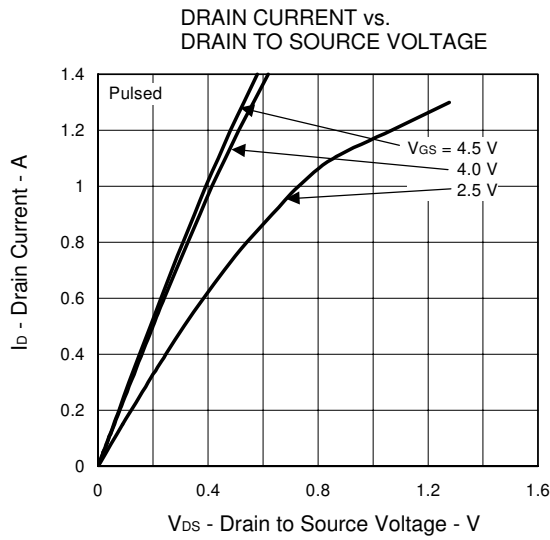
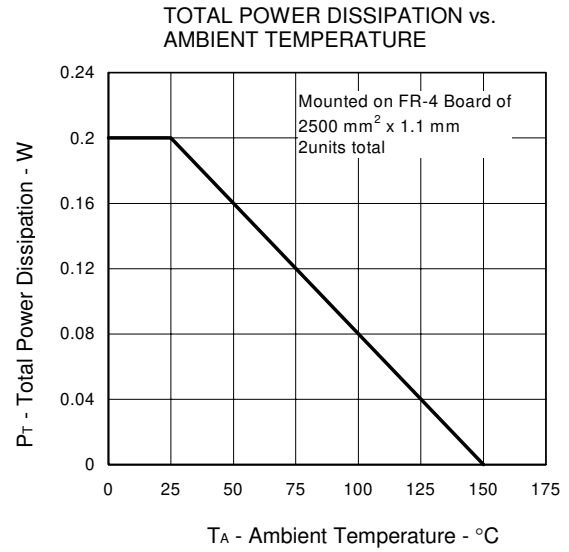
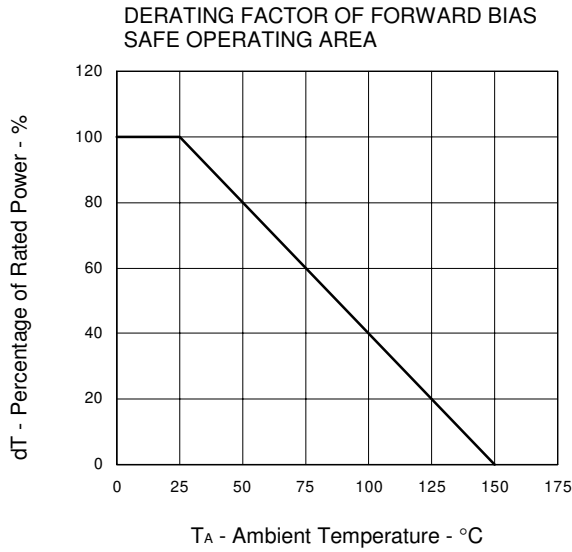
Note Pulsed PW≤350 μs, Duty Cycle≤2%

TEST CIRCUIT SWITCHING TIME

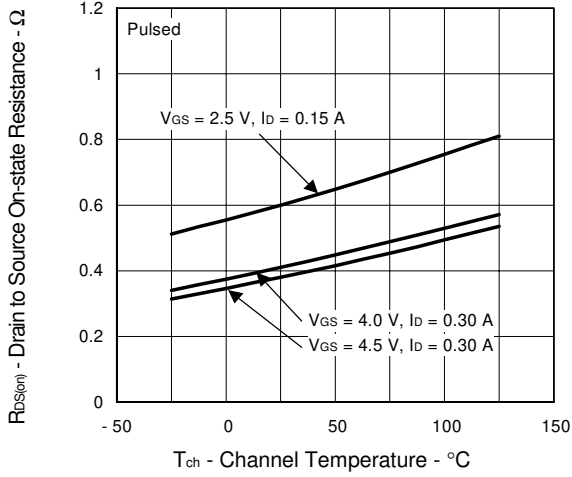


τ = 1 μs
Duty Cycle ≤ 1%

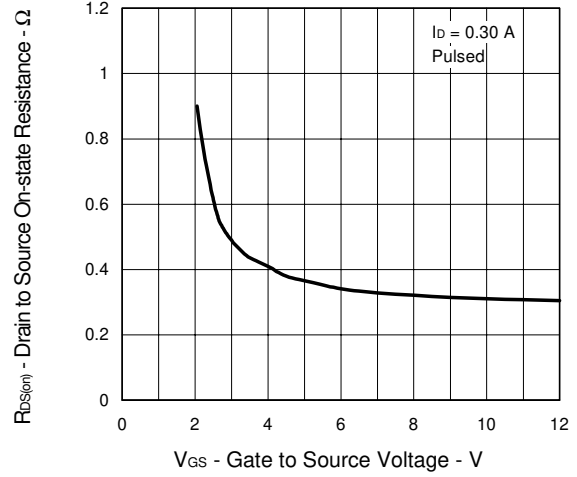
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



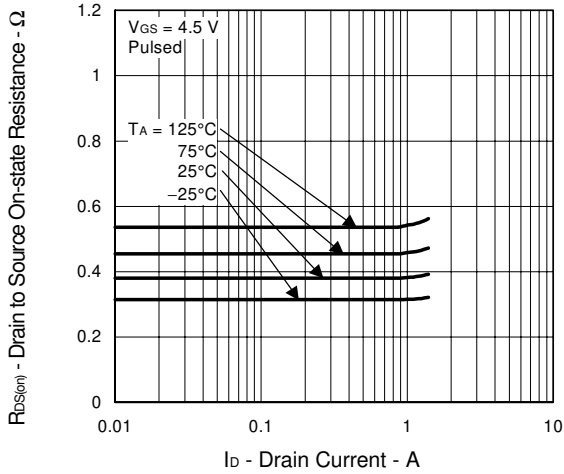
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



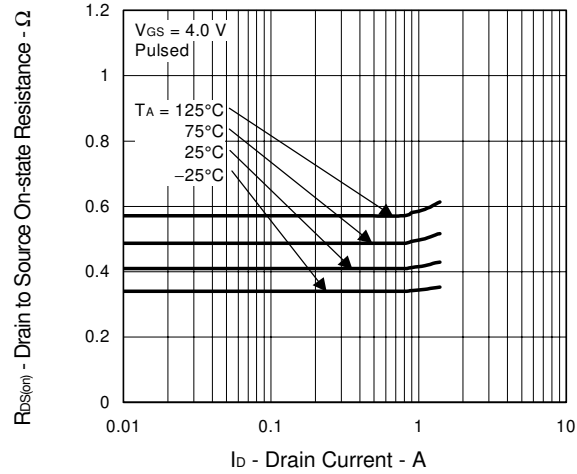
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



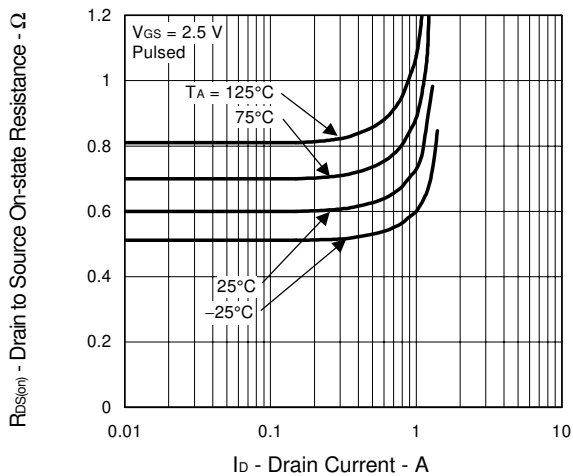
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



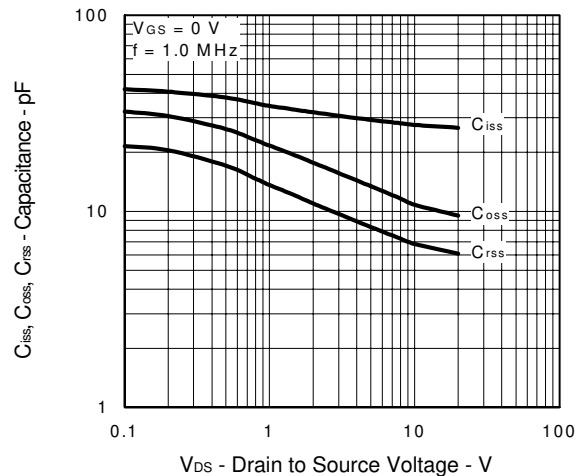
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

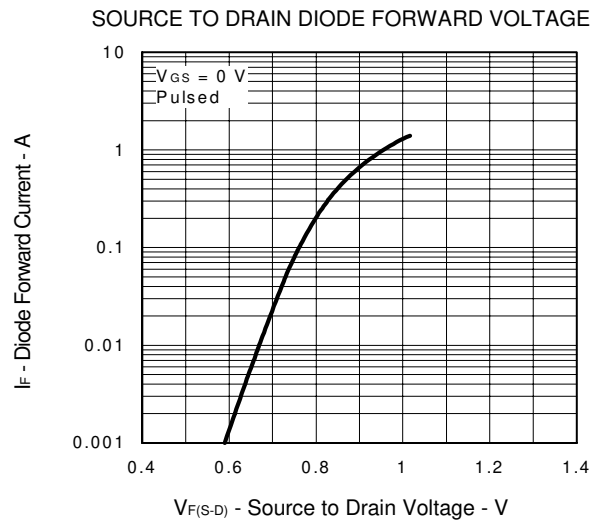
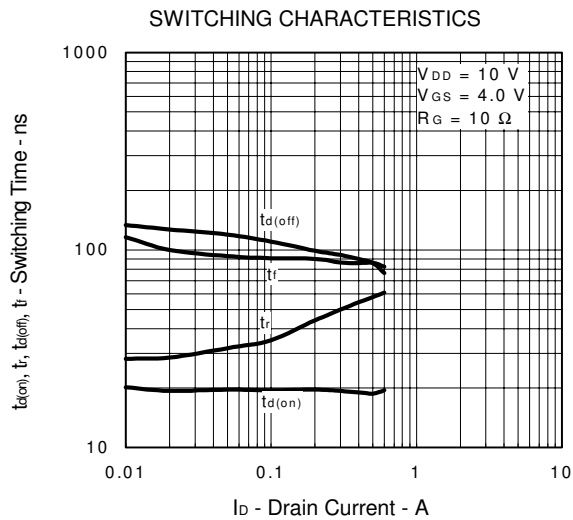


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE





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