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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RENESAS

MOS FIELD EFFECT TRANSISTOR

μPA677TB

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

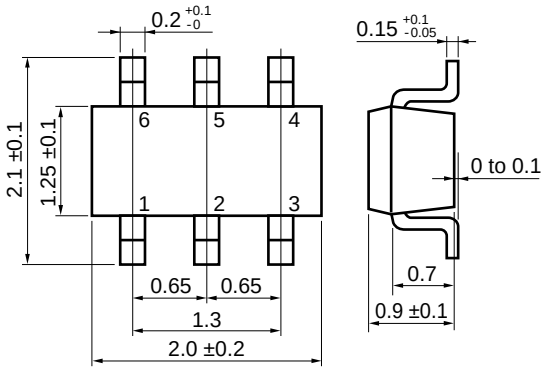
The μPA677TB is a switching device which can be driven directly by a 2.5 V power source.

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 Ω MAX. (V_{GS} = 4.5 V, I_D = 0.30 A)
  $R_{DS(on)2}$ = 0.60 Ω MAX. (V_{GS} = 4.0 V, I_D = 0.30 A)
  $R_{DS(on)3}$ = 0.88 Ω MAX. (V_{GS} = 2.5 V, I_D = 0.15 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

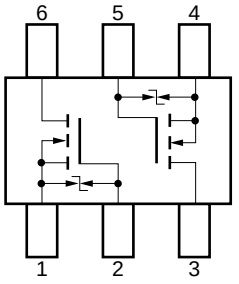
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	20	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±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 mm^2 x 1.1 mm 2units total.

PIN CONNECTUON (Top View)



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

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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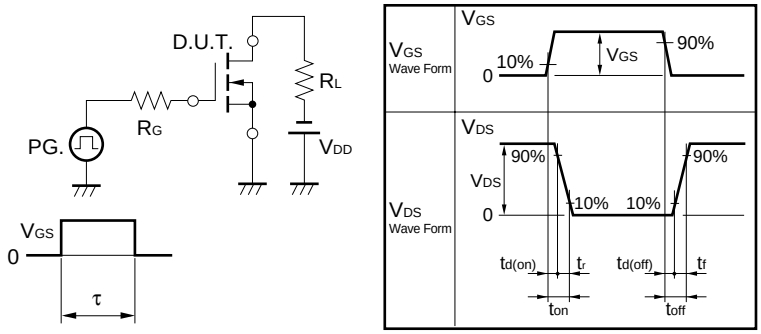
Date Published March 2003 NS CP(K)
Printed in Japan

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%

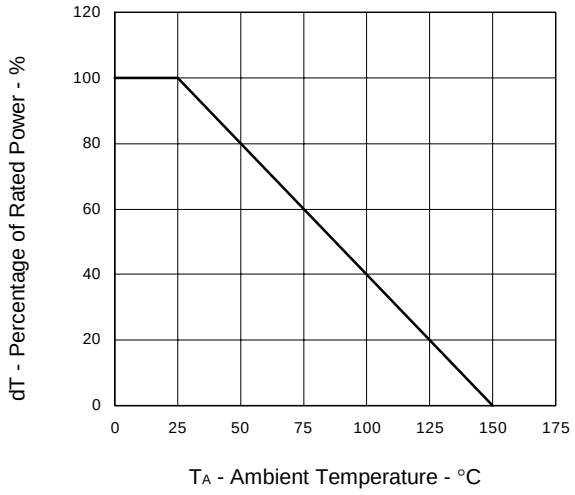
TEST CIRCUIT SWITCHING TIME



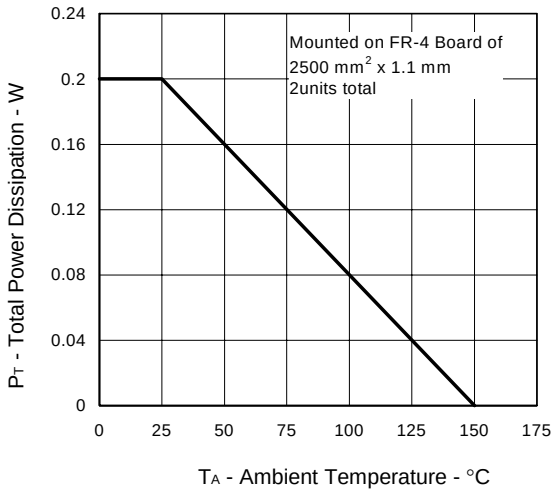
τ = 1 μs
Duty Cycle ≤ 1%

TYPICAL CHARACTERISTICS (T_A = 25°C)

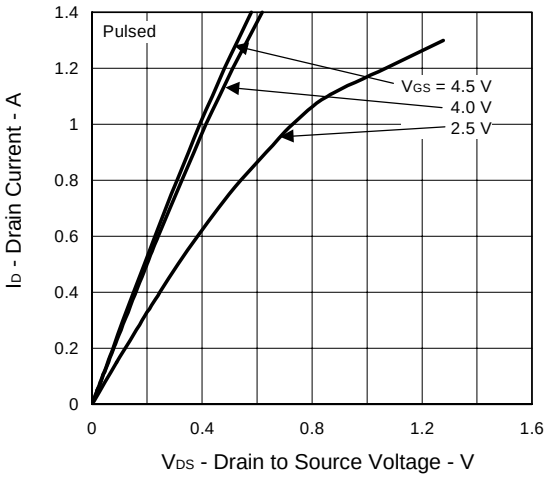
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



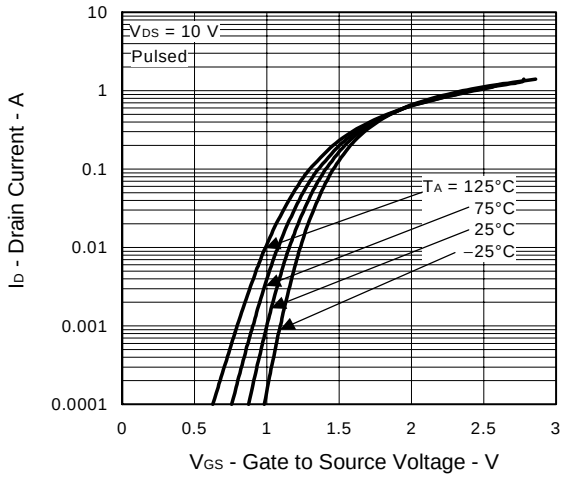
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



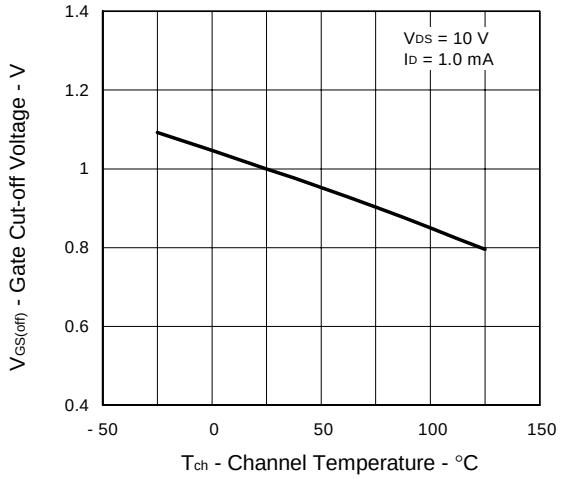
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



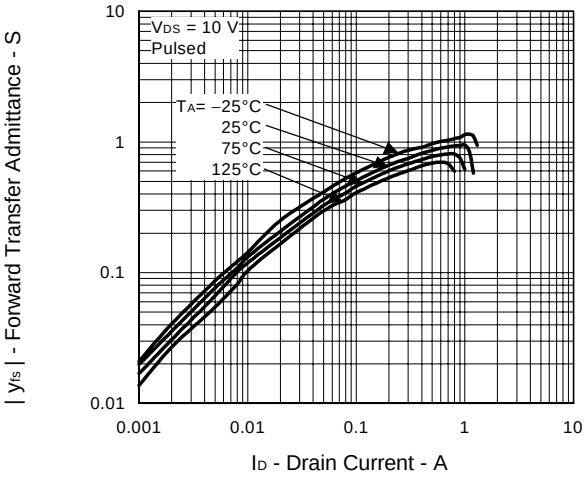
FORWARD TRANSFER CHARACTERISTICS



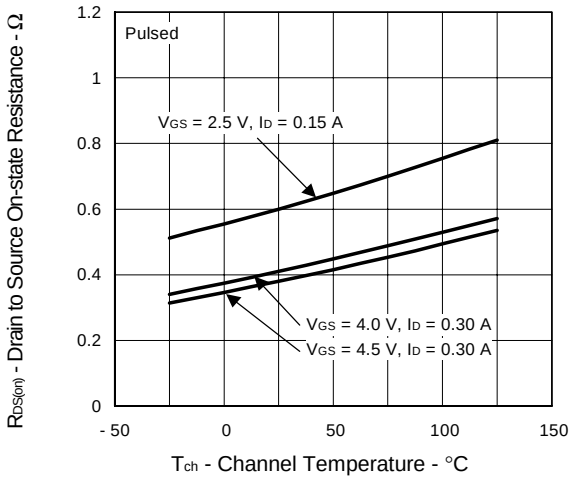
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



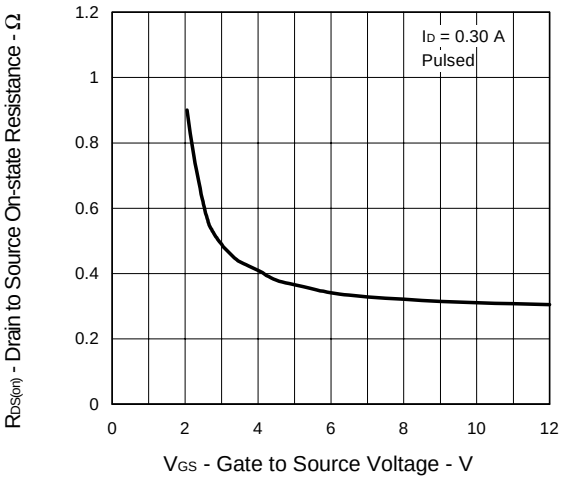
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



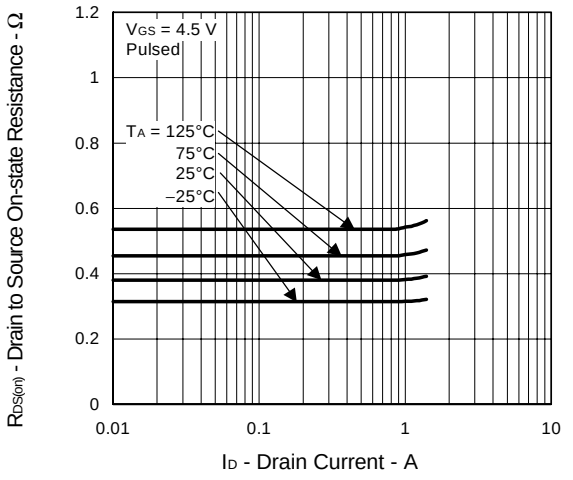
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



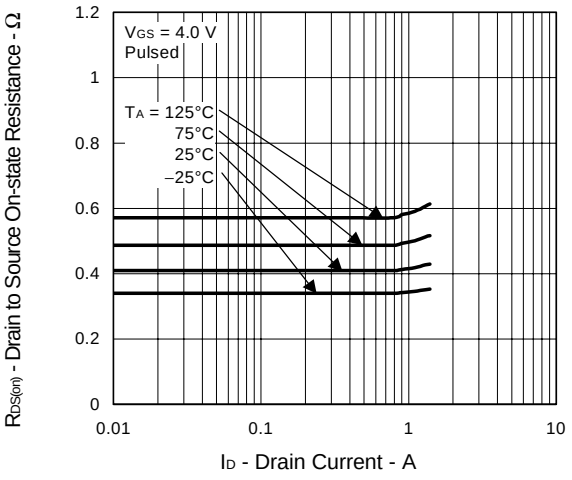
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



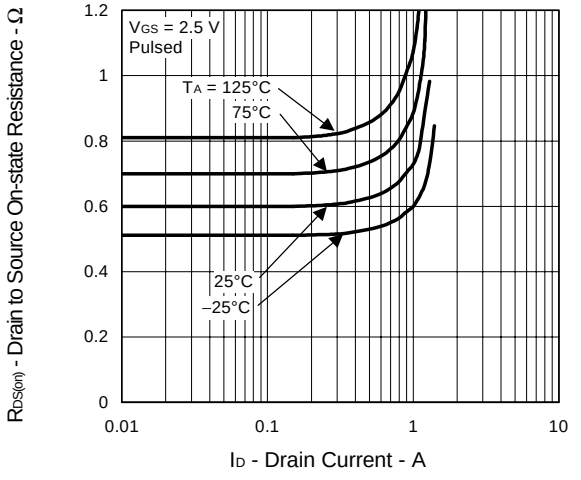
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



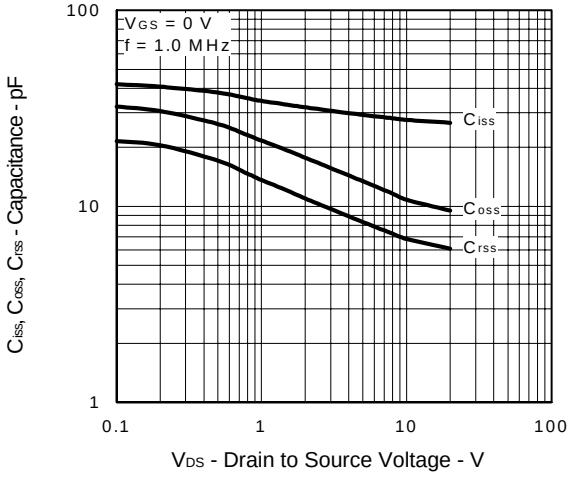
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



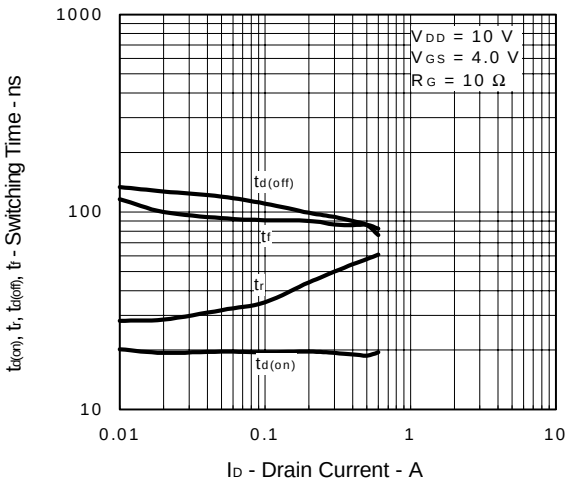
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



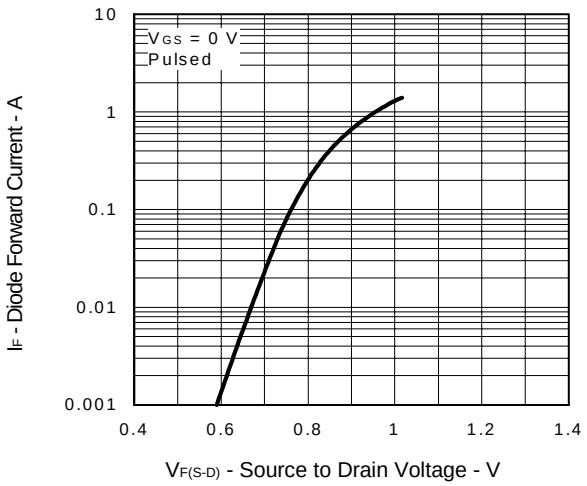
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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