

N-CHANNEL MOS FIELD EFFECT TRANSISTOR  
 FOR SWITCHING

DESCRIPTION

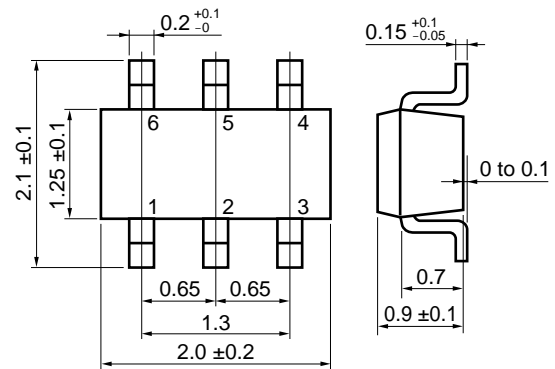
The  $\mu$ PA677TB is a switching device which can be driven directly by a 2.5 V power source.

The  $\mu$ 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

PACKAGE DRAWING (Unit: mm)



ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA677TB	SC-88 (SSP)

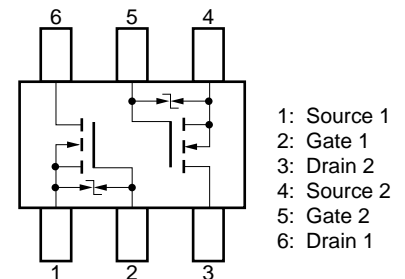
Marking: WA

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)	$V_{GS}$	$\pm 12$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 0.35$	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 1.40$	A
Total Power Dissipation(2units) <sup>Note2</sup>	$P_T$	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.

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.

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

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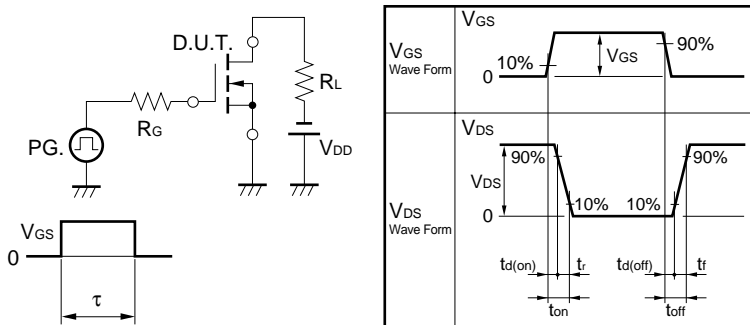
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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

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

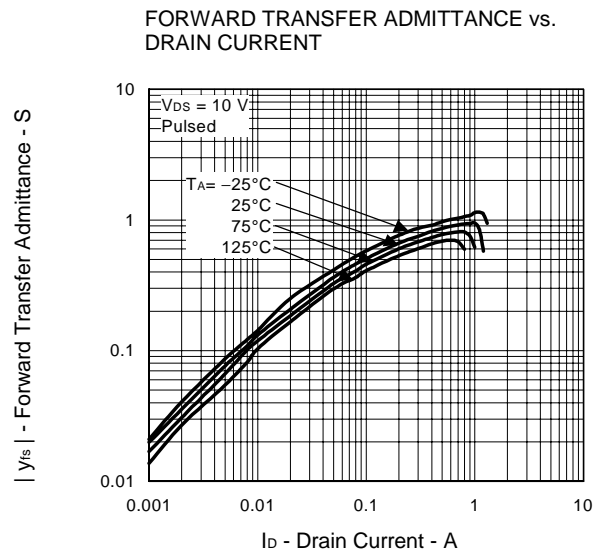
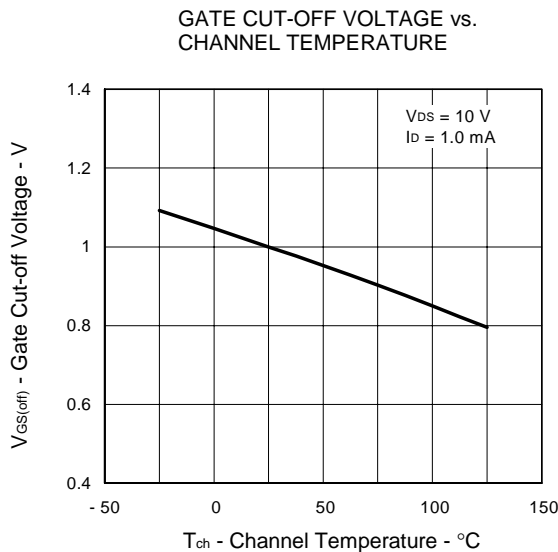
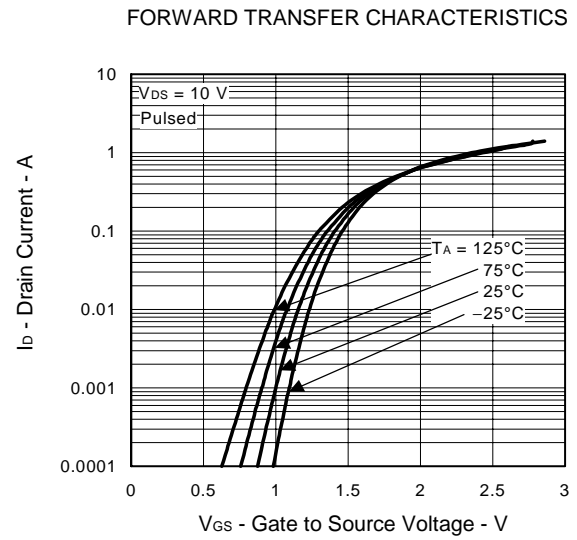
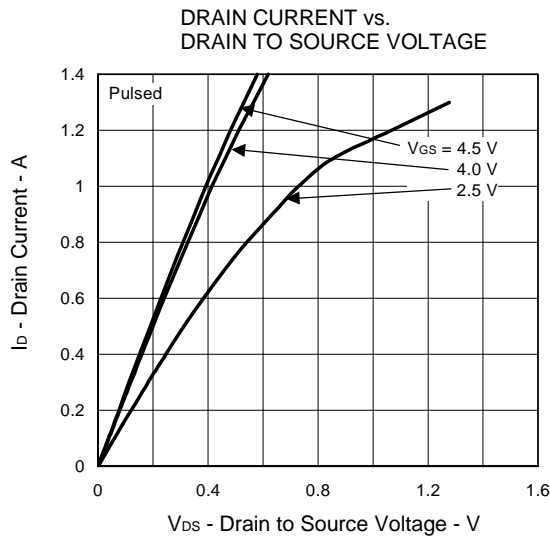
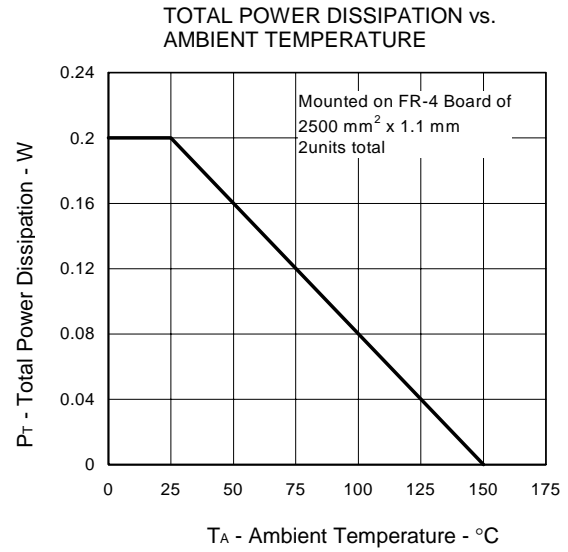
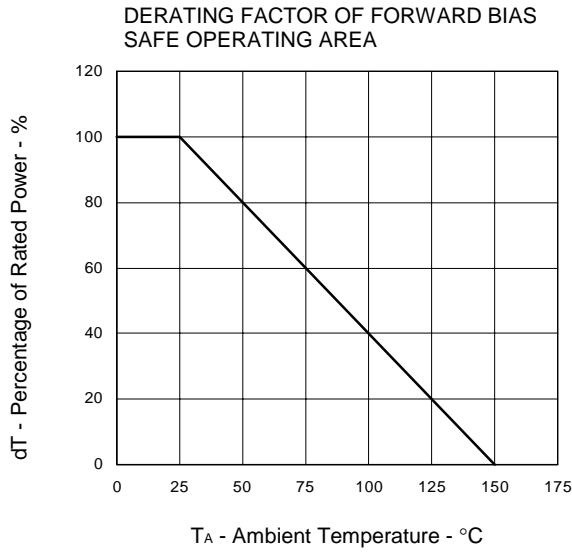
**Note** Pulsed PW≤350 μs, Duty Cycle≤2%

**TEST CIRCUIT SWITCHING TIME**

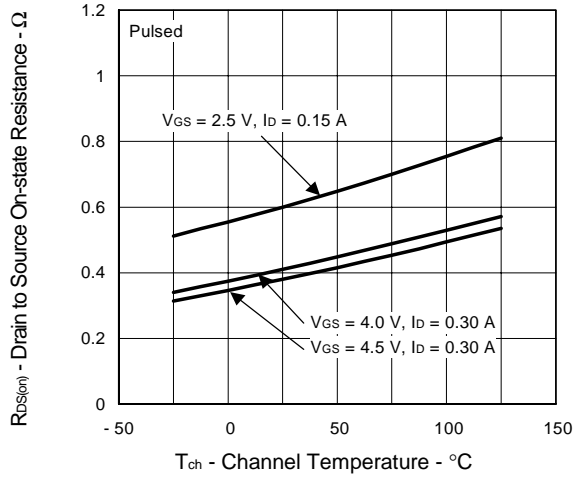


τ = 1 μs  
Duty Cycle ≤ 1%

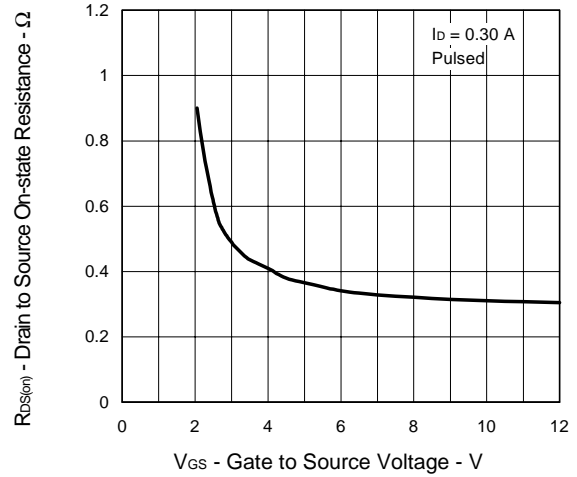
TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )



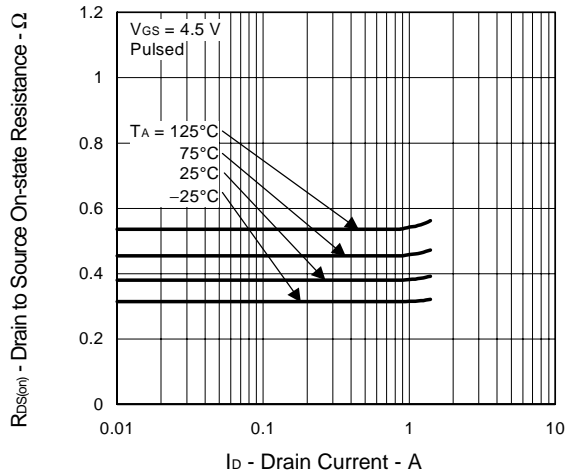
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



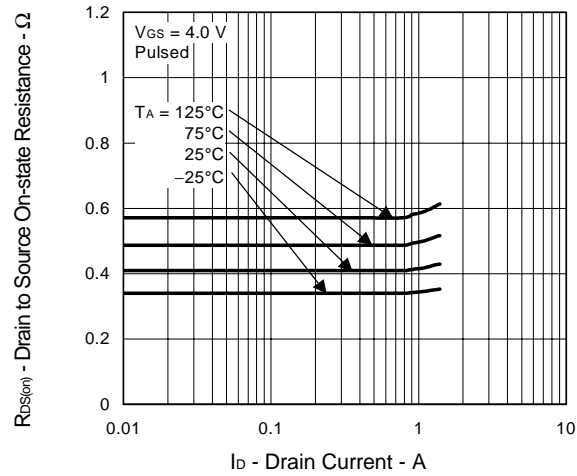
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



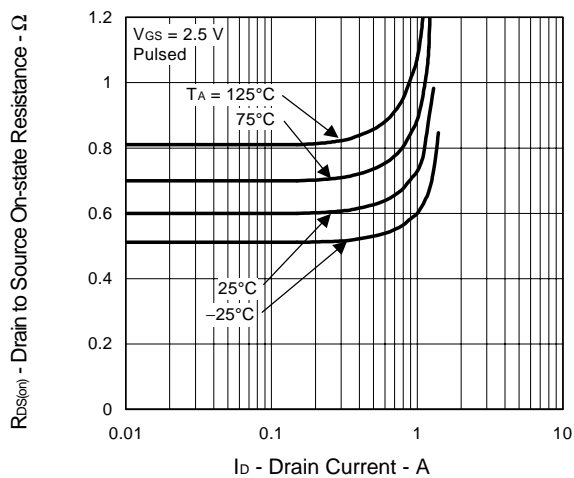
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



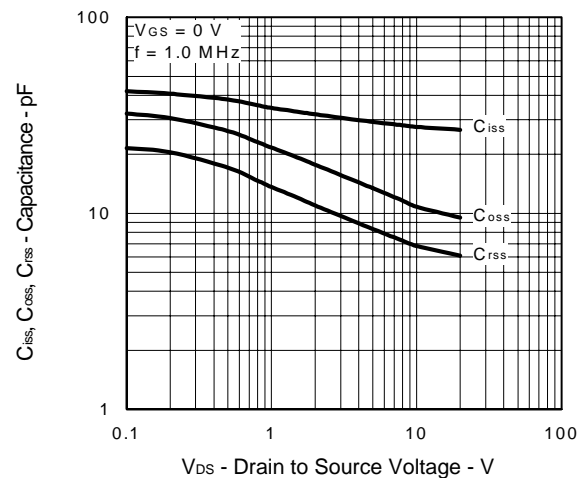
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

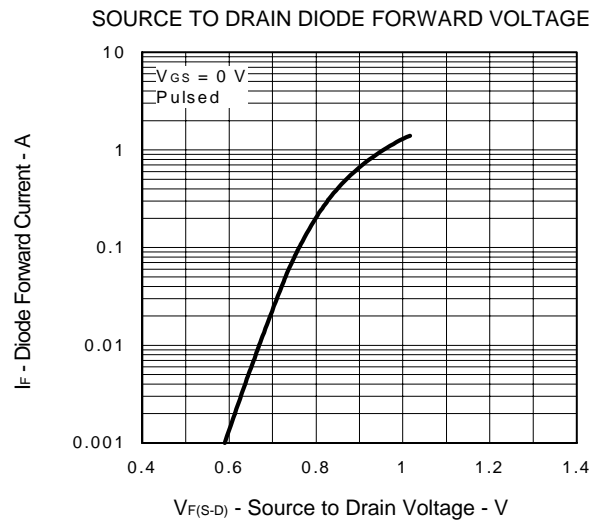
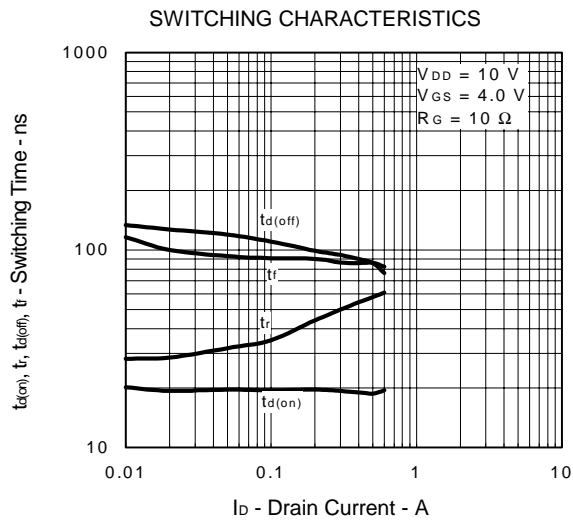


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE





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