

P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μPA651TT is a switching device, which can be driven directly by a 1.8 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

- 1.8 V drive available
- Low on-state resistance
 $R_{DS(on)1} = 69 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -2.5 \text{ A)}$
 $R_{DS(on)2} = 88 \text{ m}\Omega \text{ MAX. (} V_{GS} = -2.5 \text{ V, } I_D = -2.5 \text{ A)}$
 $R_{DS(on)3} = 142 \text{ m}\Omega \text{ MAX. (} V_{GS} = -1.8 \text{ V, } I_D = -1.5 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA651TT	6pinWSOF (1620)

Marking: WE

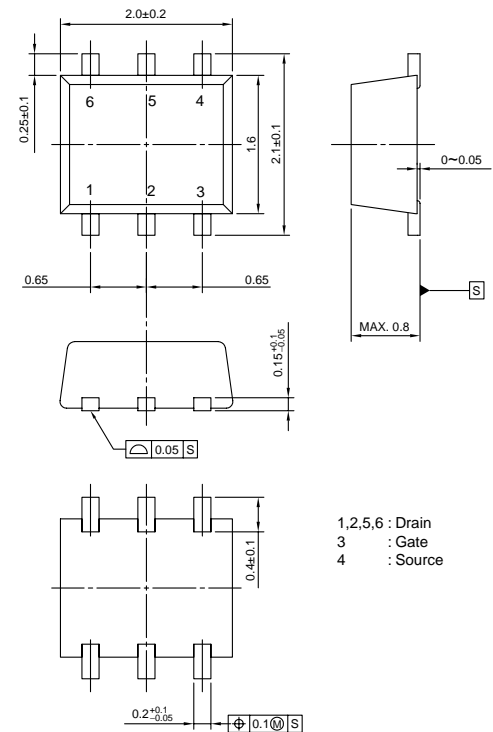
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	-20	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±8.0	V
Drain Current (DC) (T _A = 25°C)	I _{D(DC)}	±5.0	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±20	A
Total Power Dissipation (T _A = 25°C)	P _{T1}	0.2	W
Total Power Dissipation (T _A = 25°C) ^{Note2}	P _{T2}	1.4	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

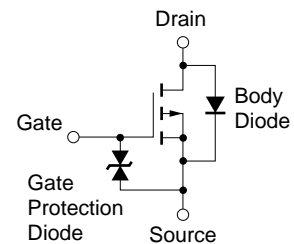
- Notes**
1. PW ≤ 10 μs, Duty Cycle ≤ 1%
 2. Mounted on FR-4 board, t ≤ 5 sec.

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

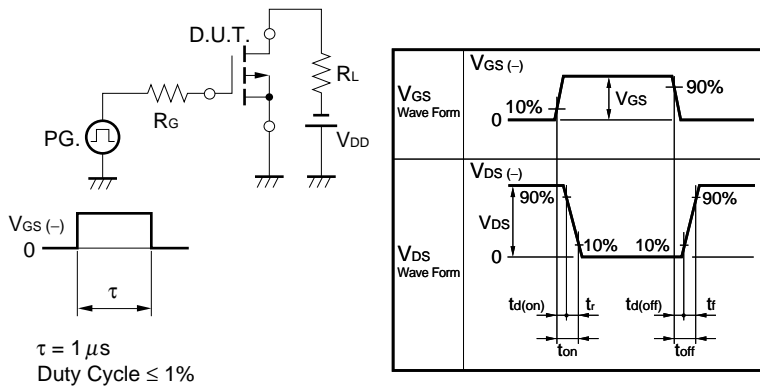


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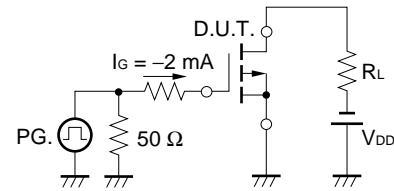
ELECTRICAL CHARACTERISTICS (TA = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \mp 8.0\text{ V}, V_{DS} = 0\text{ V}$			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = -10\text{ V}, I_D = -1.0\text{ mA}$	-0.45		-1.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -2.5\text{ A}$	4.0			S
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = -4.5\text{ V}, I_D = -2.5\text{ A}$		55	69	mΩ
	$R_{DS(on)2}$	$V_{GS} = -2.5\text{ V}, I_D = -2.5\text{ A}$		66	88	mΩ
	$R_{DS(on)3}$	$V_{GS} = -1.8\text{ V}, I_D = -1.5\text{ A}$		85	142	mΩ
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}$		600		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V}$		120		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1.0\text{ MHz}$		75		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, I_D = -2.5\text{ A}$		45		ns
Rise Time	t_r	$V_{GS} = -4.0\text{ V}$		200		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10\ \Omega$		435		ns
Fall Time	t_f			345		ns
Total Gate Charge	Q_G	$V_{DD} = -16\text{ V}$		5.5		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = -4.0\text{ V}$		1.2		nC
Gate to Drain Charge	Q_{GD}	$I_D = -5.0\text{ A}$		2.1		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	$I_F = 5.0\text{ A}, V_{GS} = 0\text{ V}$		0.94		V

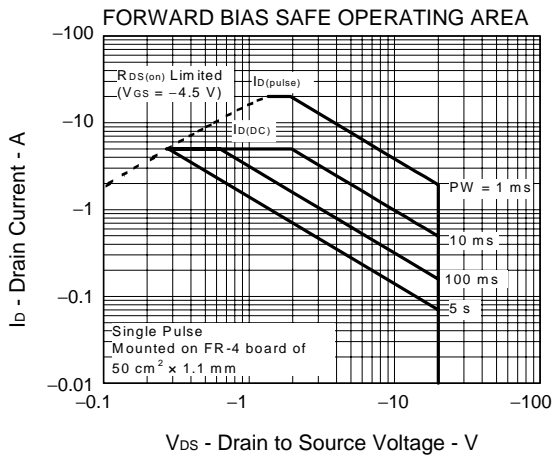
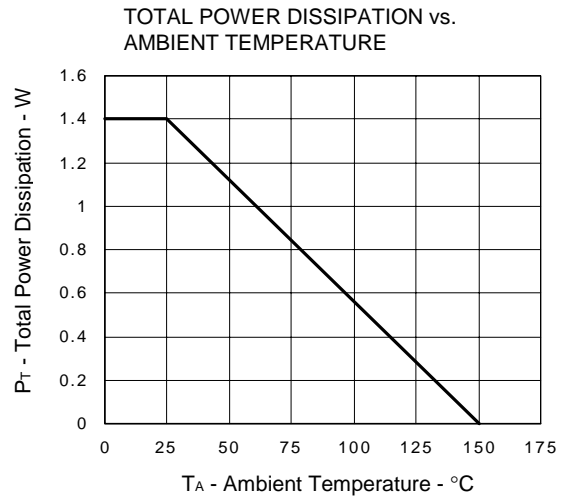
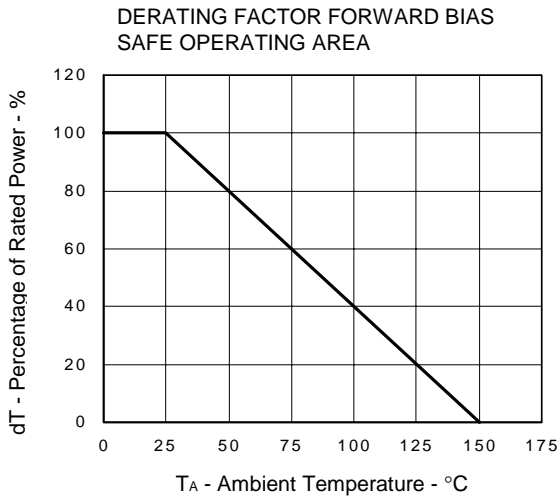
TEST CIRCUIT 1 SWITCHING TIME



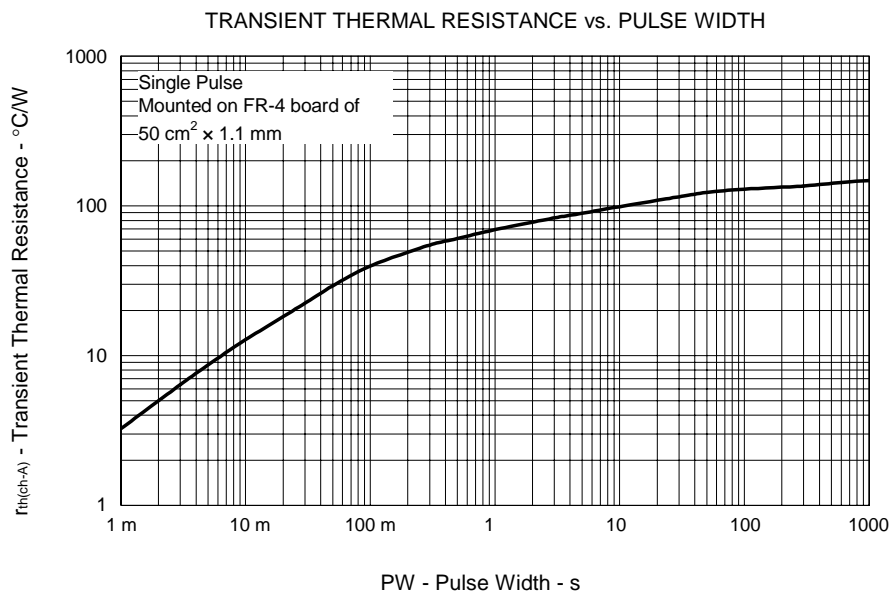
TEST CIRCUIT 2 GATE CHARGE



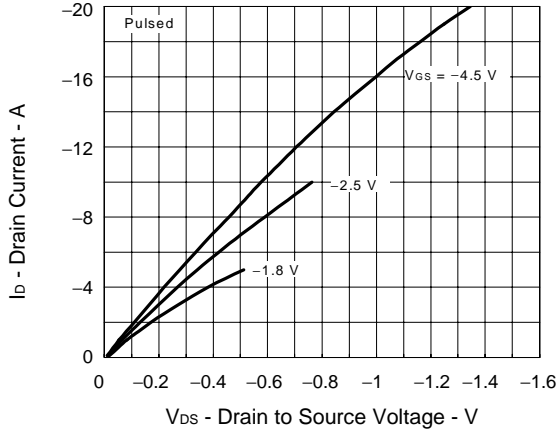
TYPICAL CHARACTERISTICS (T_A = 25°C)



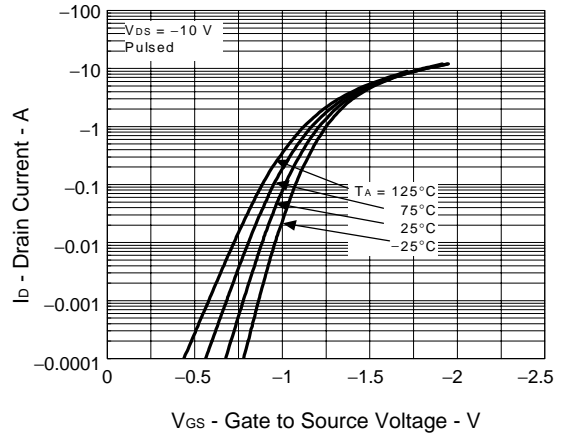
V_{DS} - Drain to Source Voltage - V



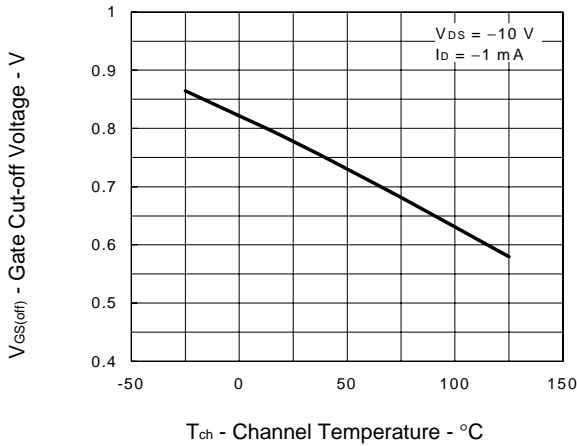
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



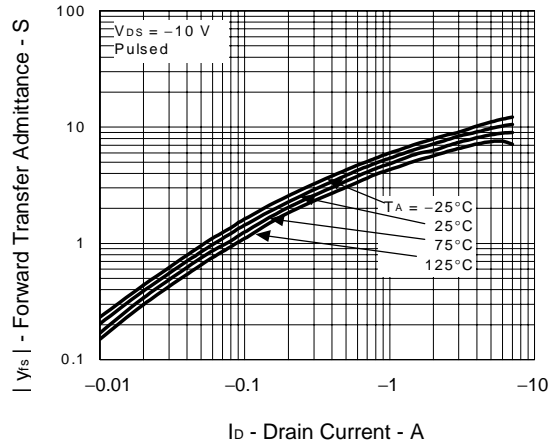
FORWARD TRANSFER CHARACTERISTICS



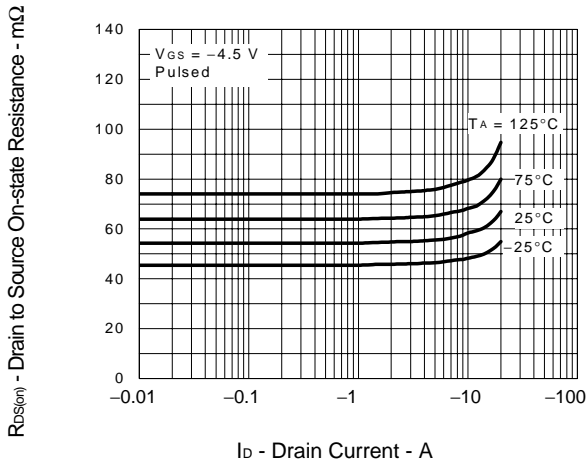
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



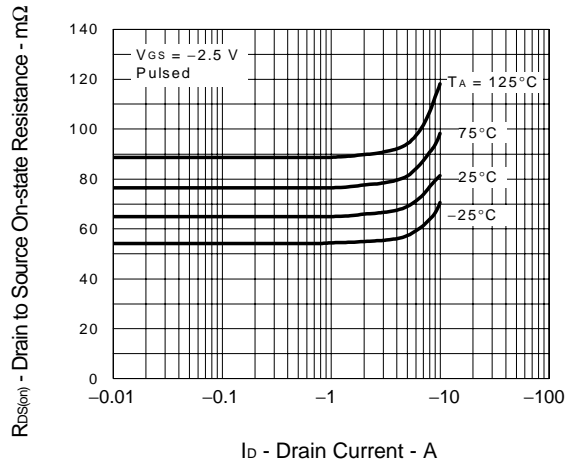
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

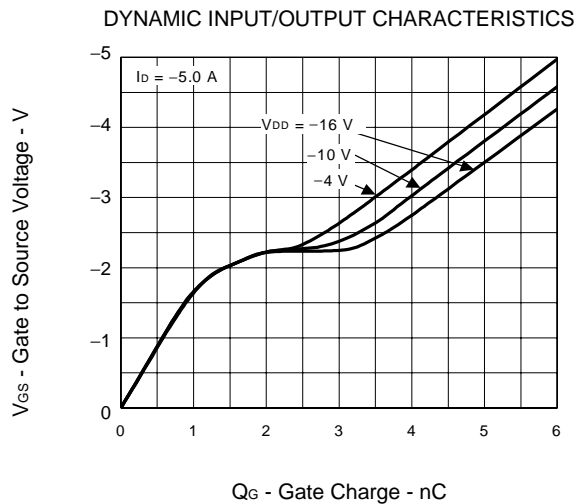
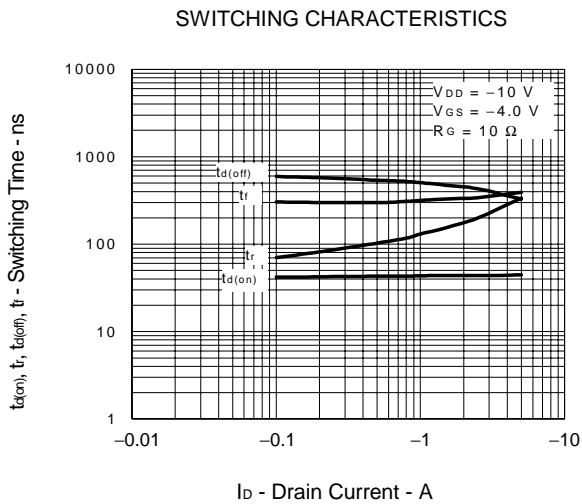
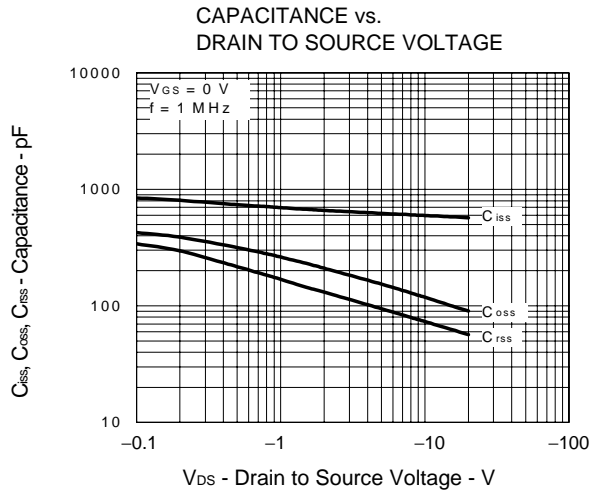
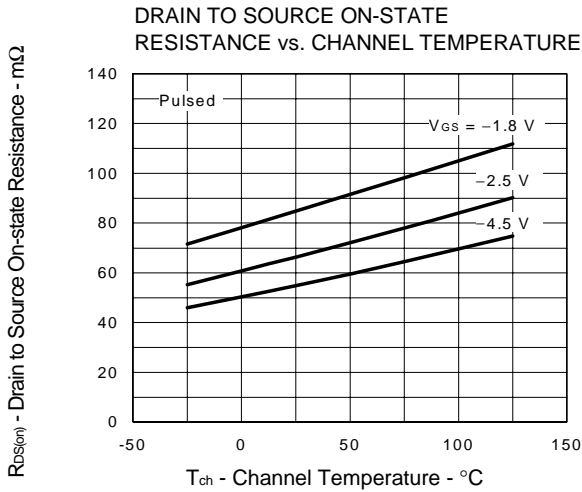
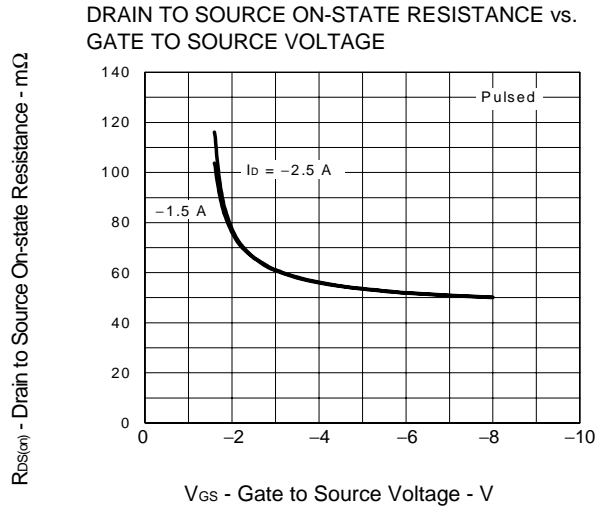
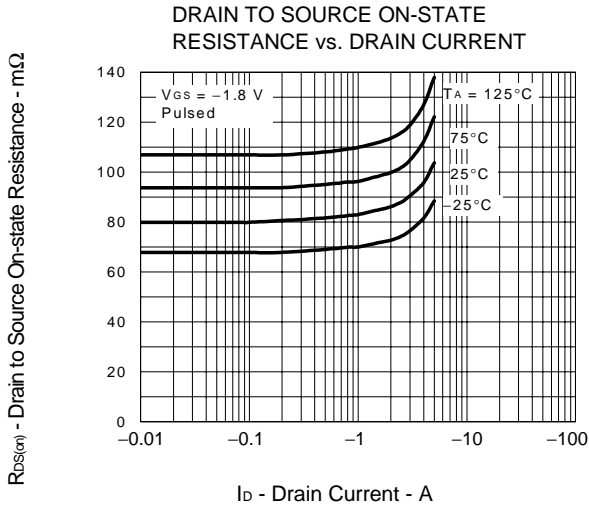


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

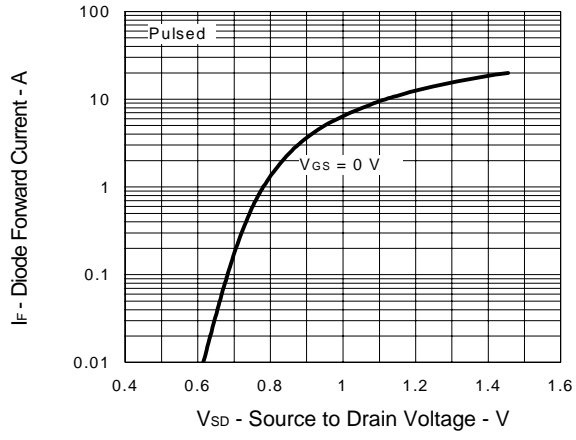


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT





SOURCE TO DRAIN DIODE FORWARD VOLTAGE



[MEMO]

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