

**SWITCHING
N-CHANNEL POWER MOS FET**

DESCRIPTION

The μPA2701TP, which has a heat spreader, is N-Channel MOS Field Effect Transistor designed for DC/DC converter and power management applications of notebook computers.

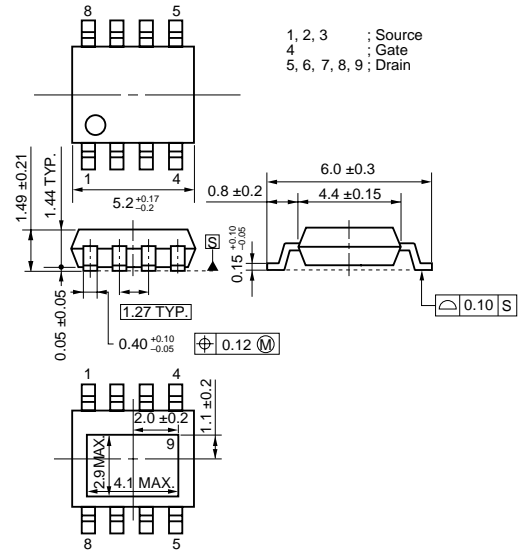
FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 7.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 7.0 \text{ A)}$
 $R_{DS(on)2} = 11.6 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 7.0 \text{ A)}$
- Low C_{iss} : $C_{iss} = 1200 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Small and surface mount package (Power HSOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA2701TP	Power HSOP8

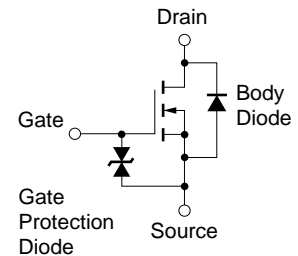
PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS (TA = 25°C, Unless otherwise noted, All terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	±20	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)1}$	±35	A
Drain Current (DC) ($T_A = 25^\circ\text{C}$) ^{Note1}	$I_{D(DC)2}$	±16	A
Drain Current (pulse) ^{Note2}	$I_{D(pulse)}$	±80	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	28	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$) ^{Note1}	P_{T2}	3	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C
Single Avalanche Current ^{Note3}	I_{AS}	18	A
Single Avalanche Energy ^{Note3}	E_{AS}	32.4	mJ

EQUIVALENT CIRCUIT



- Notes**
1. Mounted on a glass epoxy board (1 inch x 1 inch x 0.8 mm), $PW = 10 \text{ sec}$
 2. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$
 3. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 15 \text{ V}$, $R_G = 25 \Omega$, $L = 100 \mu\text{H}$, $V_{GS} = 20 \rightarrow 0 \text{ V}$

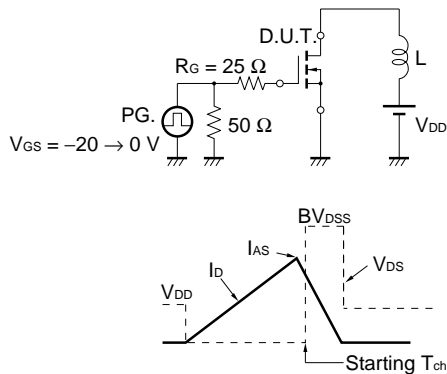
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

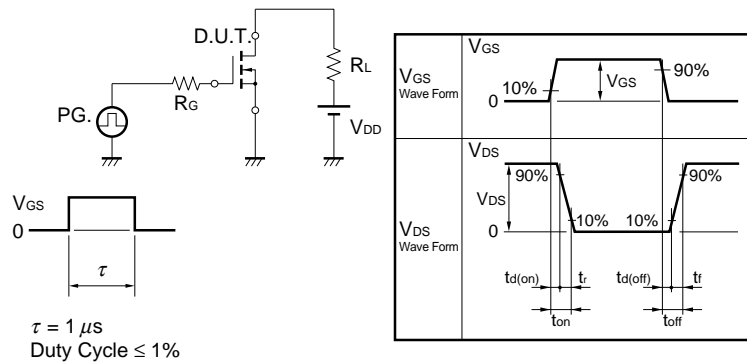
ELECTRICAL CHARACTERISTICS (T_A = 25°C, Unless otherwise noted, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 7.0 A	7	14		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 7.0 A		6.2	7.5	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 7.0 A		8.7	11.6	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 7.0 A		10.3	13.7	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		1200		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		500		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		160		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 7.0 A		10		ns
Rise Time	t _r	V _{GS} = 10 V		13		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		44		ns
Fall Time	t _f			11		ns
Total Gate Charge	Q _G	V _{DD} = 15 V		12		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 5 V		4		nC
Gate to Drain Charge	Q _{GD}	I _D = 14 A		6		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 14 A, V _{GS} = 0 V		0.8	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 14 A, V _{GS} = 0 V		32		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		27		nC

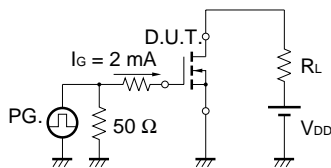
TEST CIRCUIT 1 AVALANCHE CAPABILITY



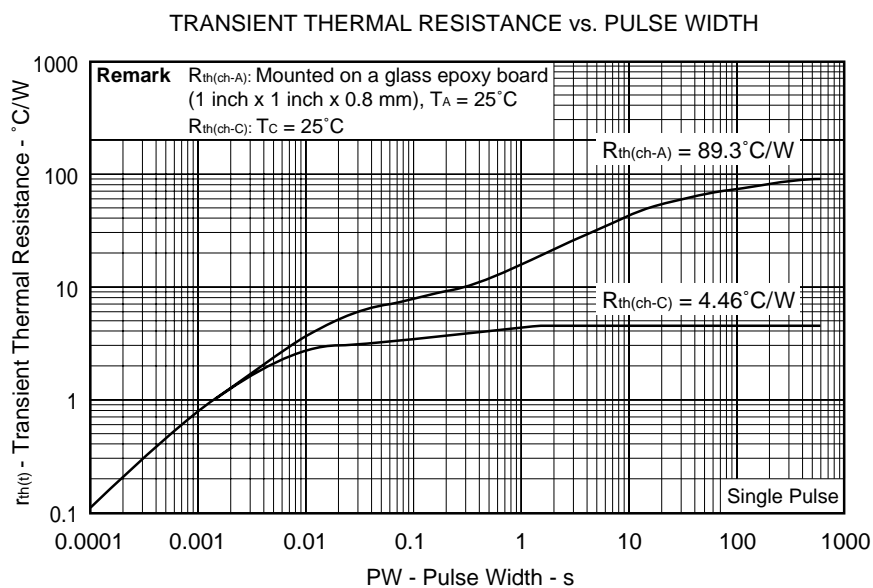
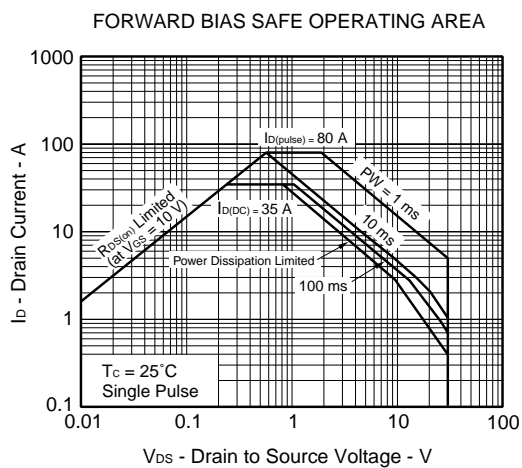
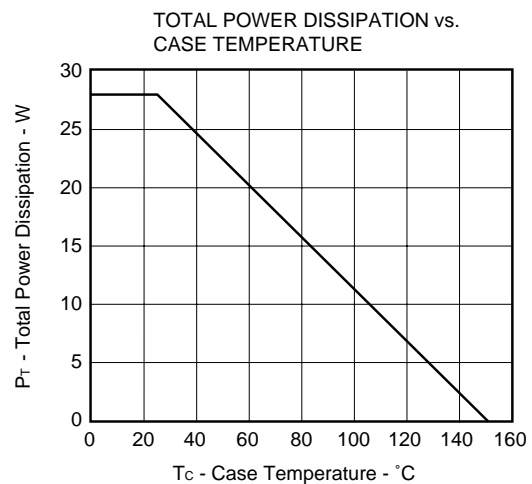
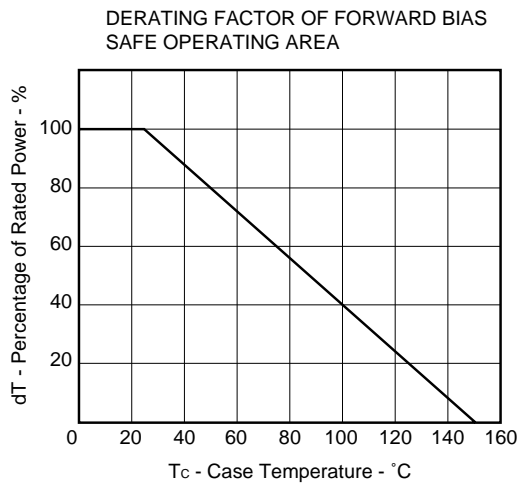
TEST CIRCUIT 2 SWITCHING TIME



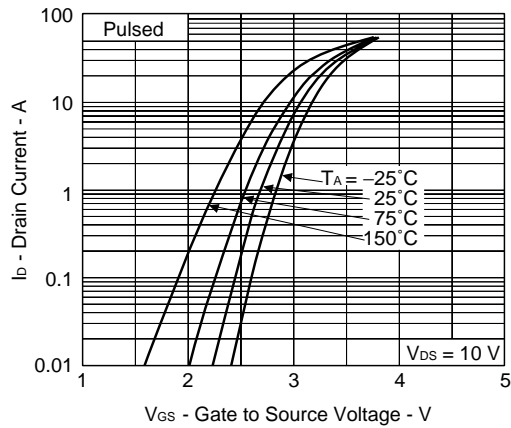
TEST CIRCUIT 3 GATE CHARGE



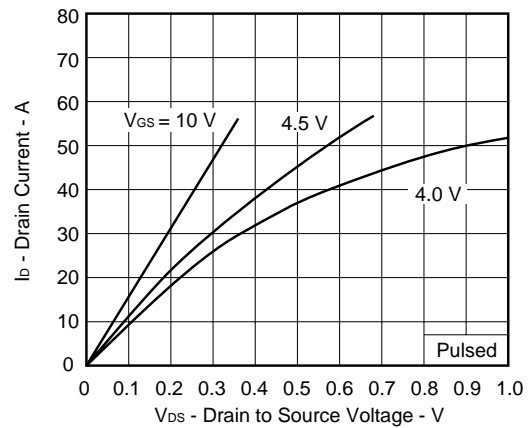
TYPICAL CHARACTERISTICS (T_A = 25°C)



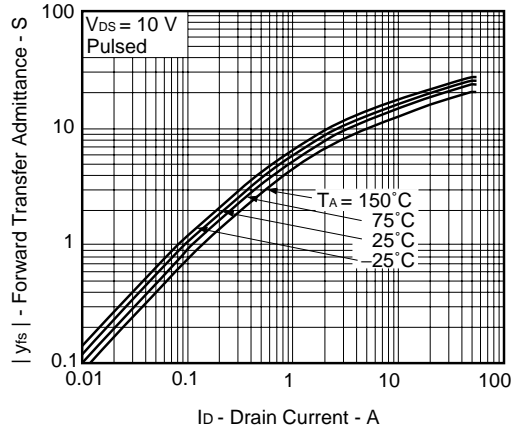
FORWARD TRANSFER CHARACTERISTICS



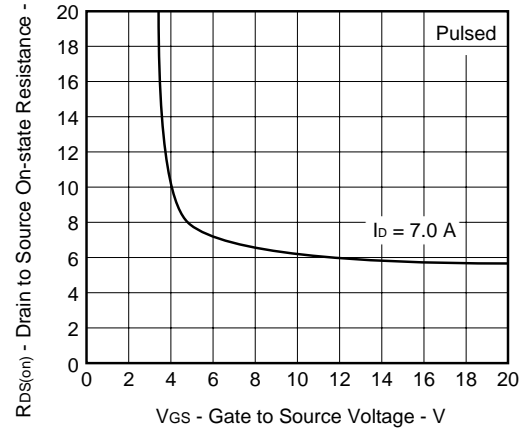
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



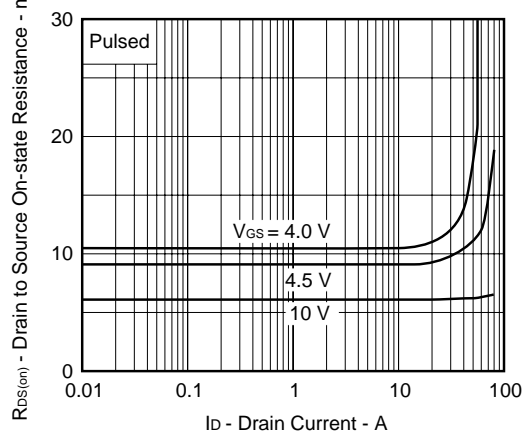
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



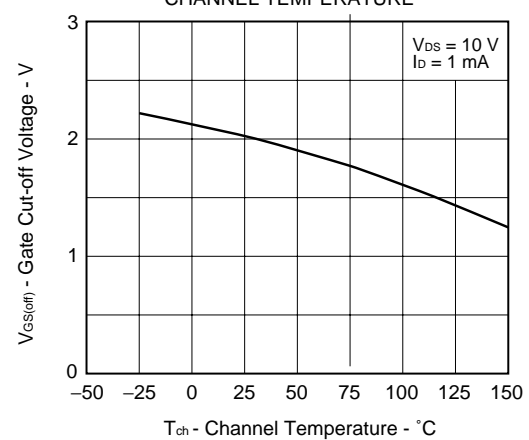
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

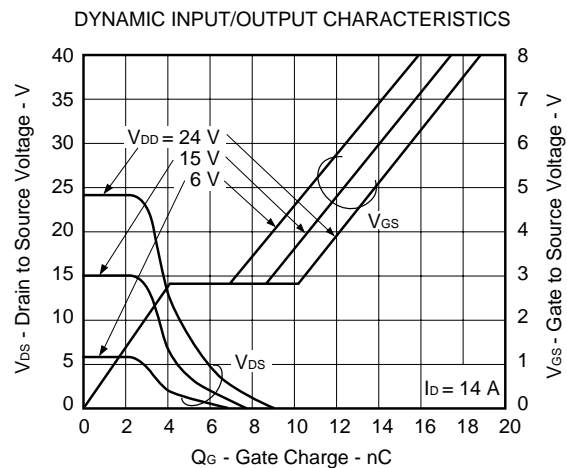
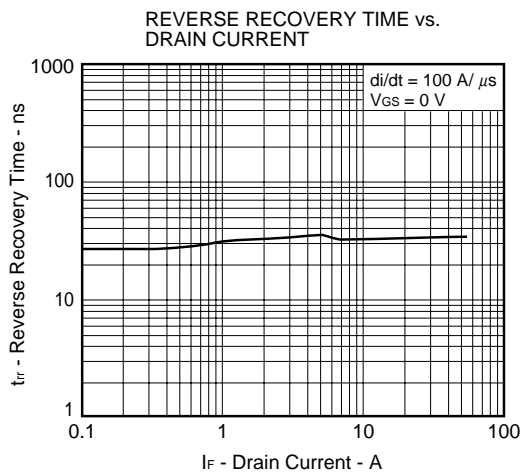
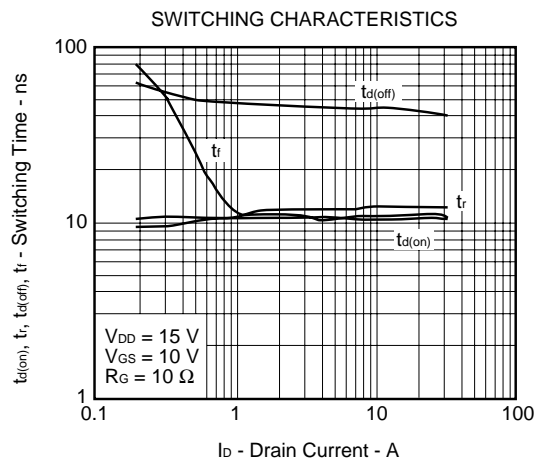
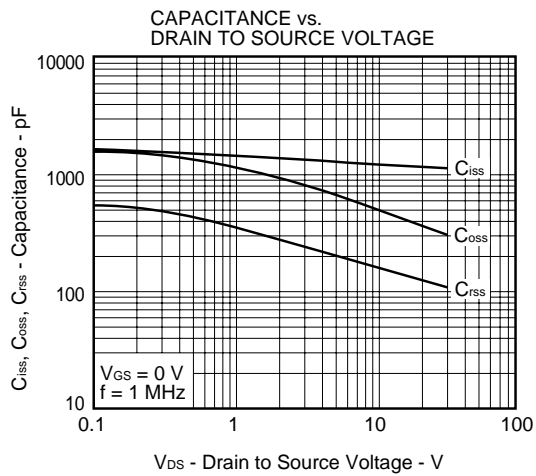
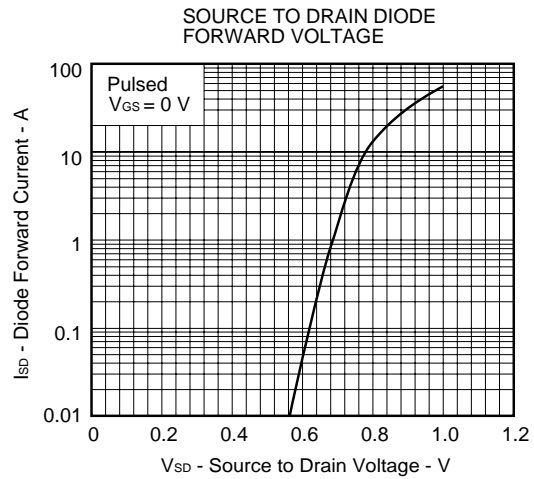
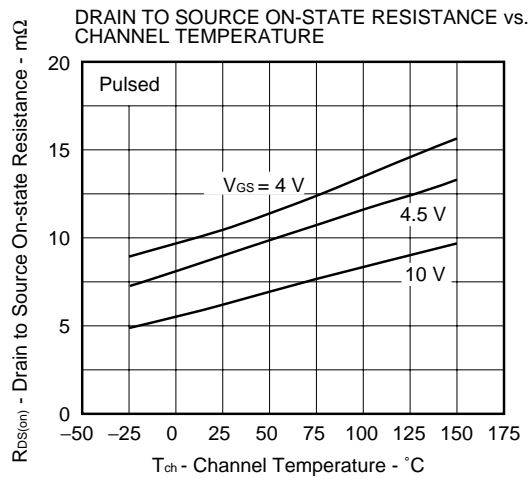


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE





[MEMO]

[MEMO]

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