

# MOS FIELD EFFECT TRANSISTOR

# $\mu$ PA2700TP

## SWITCHING

## N-CHANNEL POWER MOS FET

### DESCRIPTION

The  $\mu$ PA2700TP which has a heat spreader is N-Channel MOS Field Effect Transistor designed for DC/DC converter and power management application of notebook computer.

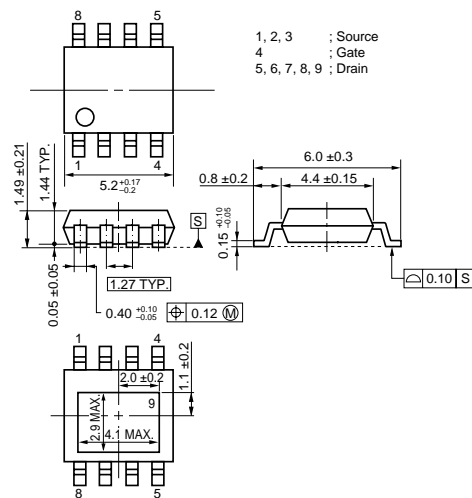
### FEATURES

- Low on-state resistance  
 $R_{DS(on)1} = 5.3 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 9.0 \text{ A)}$   
 $R_{DS(on)2} = 7.3 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 9.0 \text{ A)}$
- Low  $C_{iss}$ :  $C_{iss} = 2600 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Small and surface mount package (Power HSOP8)

### ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA2700TP	Power HSOP8

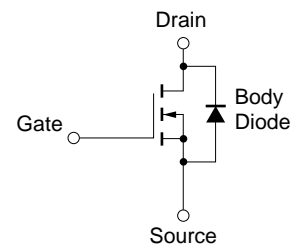
### PACKAGE DRAWING (Unit: mm)



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , Unless otherwise noted, All terminals are connected.)

★ Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DS}$	30	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GS}$	$\pm 20$	V
Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )	$I_{D(DC)1}$	$\pm 42$	A
Drain Current (DC) ( $T_A = 25^\circ\text{C}$ ) <sup>Note1</sup>	$I_{D(DC)2}$	$\pm 20$	A
Drain Current (pulse) <sup>Note2</sup>	$I_{D(pulse)}$	$\pm 120$	A
Total Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_{T1}$	37	W
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ ) <sup>Note1</sup>	$P_{T2}$	3	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \text{ to } +150$	$^\circ\text{C}$
Single Avalanche Current <sup>Note3</sup>	$I_{AS}$	22	A
Single Avalanche Energy <sup>Note3</sup>	$E_{AS}$	48.4	mJ

### EQUIVALENT CIRCUIT



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

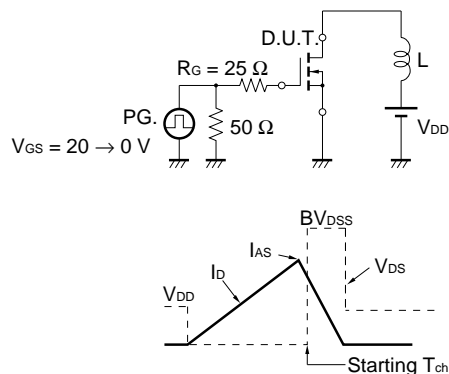
**Remark** Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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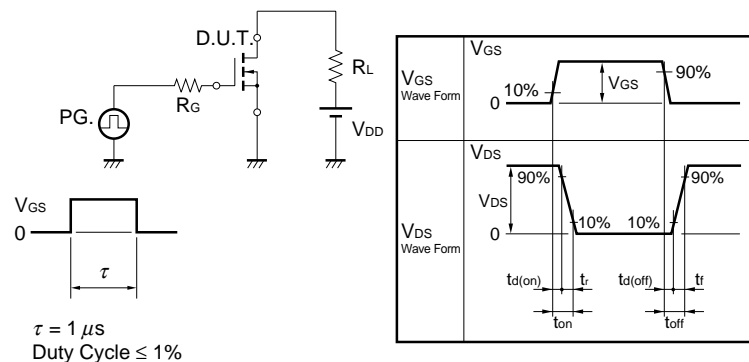
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, Unless otherwise noted, All terminals are connected.)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V			±100	nA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 9.0 A	11	21.5		S
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 9.0 A		4.2	5.3	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 9.0 A		5.5	7.3	mΩ
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 9.0 A		6.3	8.4	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		2600		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		1000		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		340		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, I <sub>D</sub> = 9.0 A		20		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 10 V		24		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		75		ns
Fall Time	t <sub>f</sub>			22		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = 15 V		26		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = 5 V		7		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = 17 A		11		nC
Body Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 17 A, V <sub>GS</sub> = 0 V		0.8	1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 17 A, V <sub>GS</sub> = 0 V		50		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		51		nC

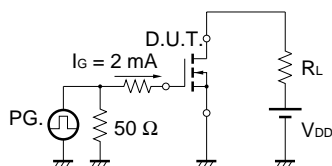
**TEST CIRCUIT 1 AVALANCHE CAPABILITY**



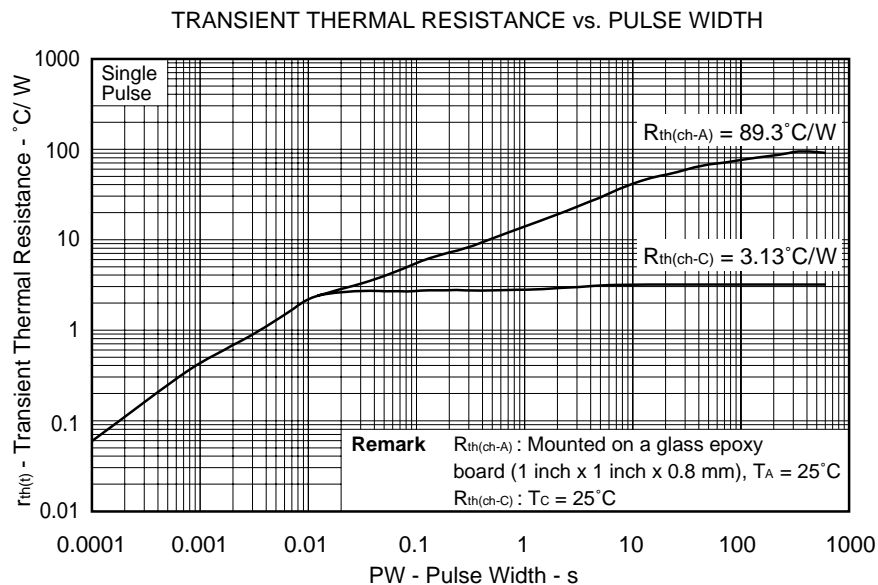
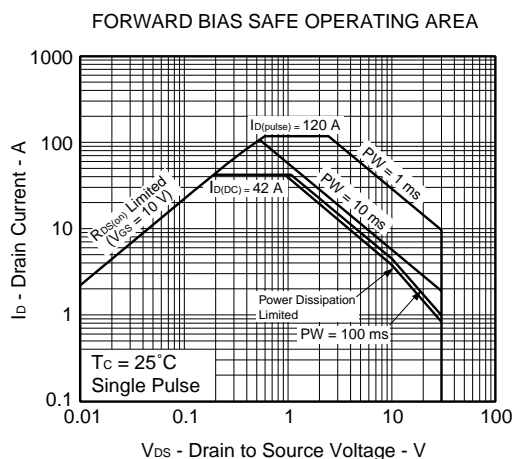
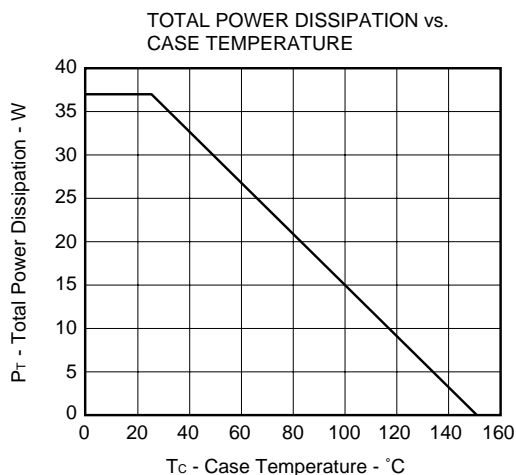
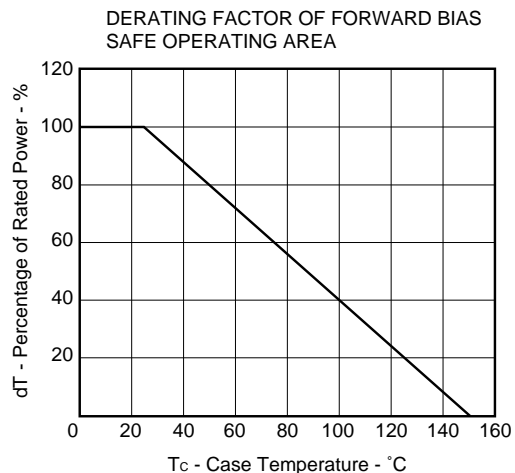
**TEST CIRCUIT 2 SWITCHING TIME**

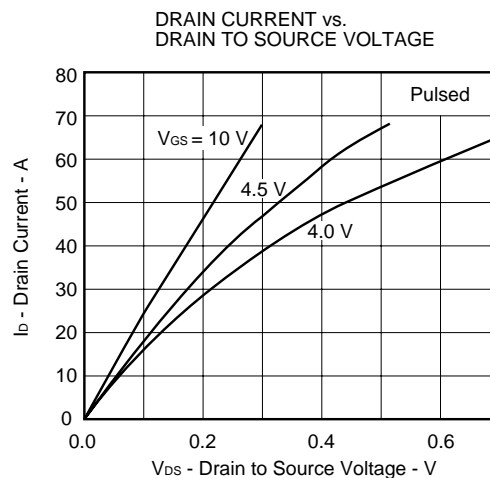
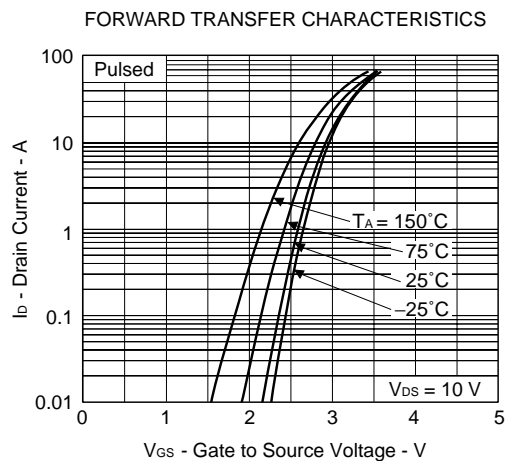
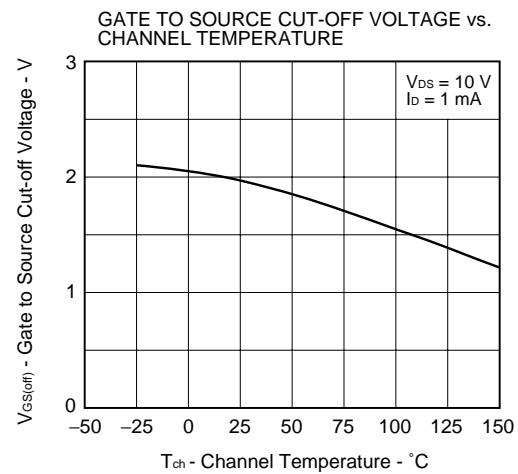
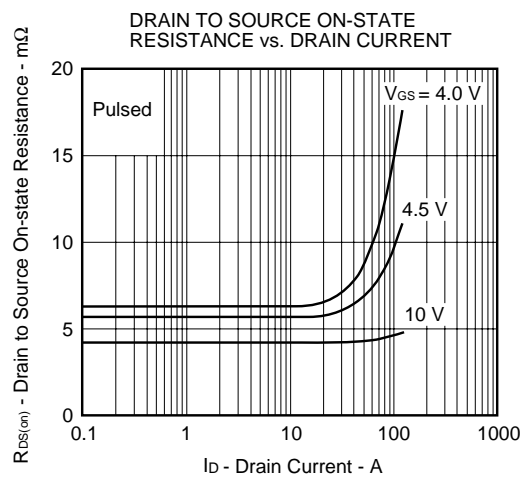
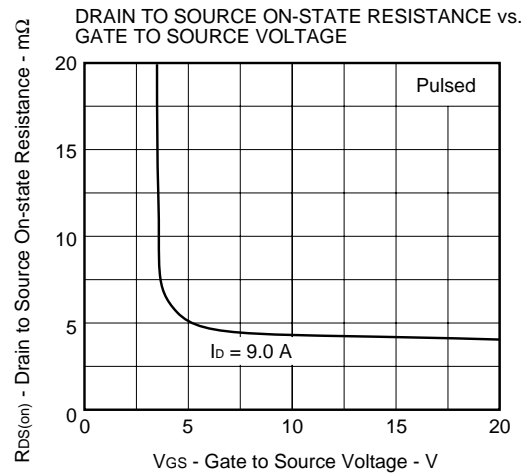
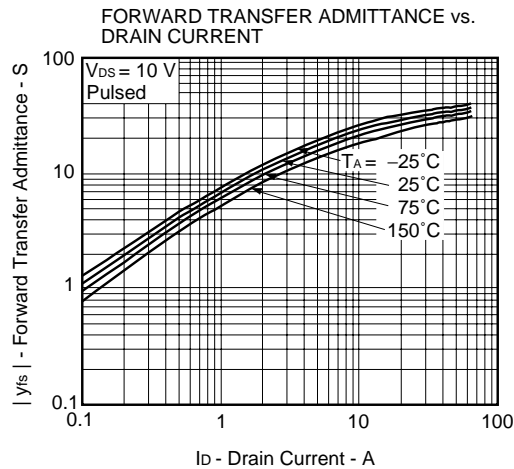


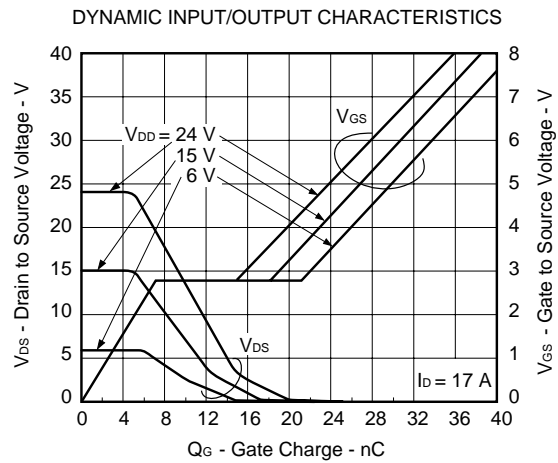
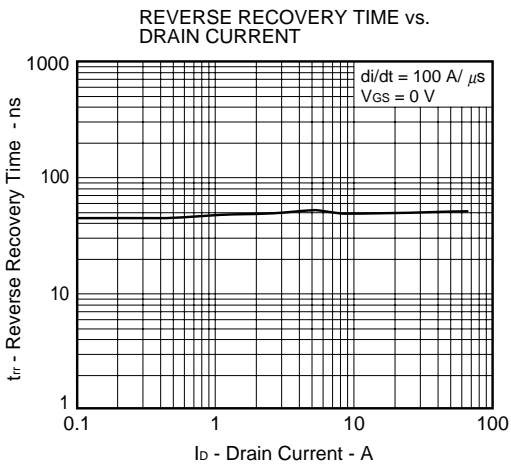
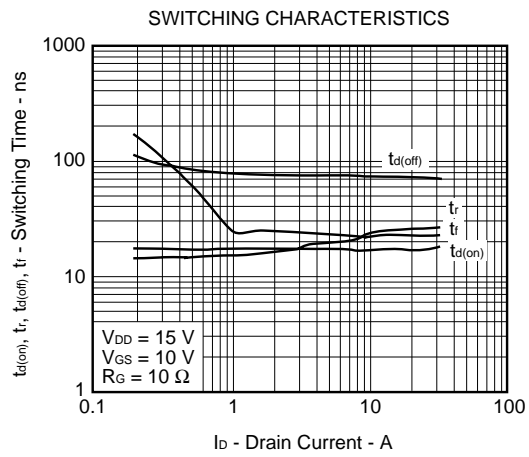
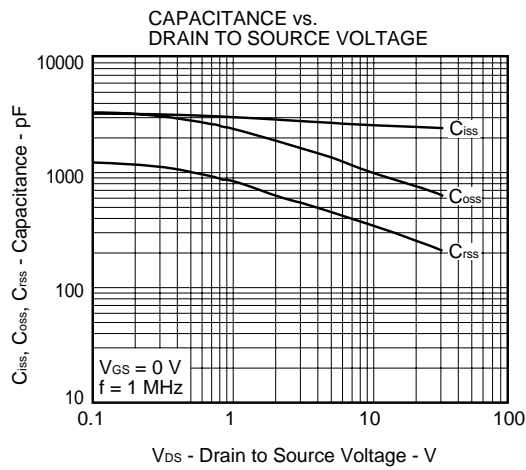
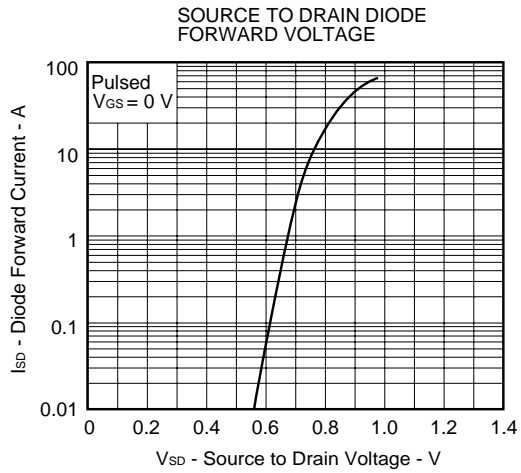
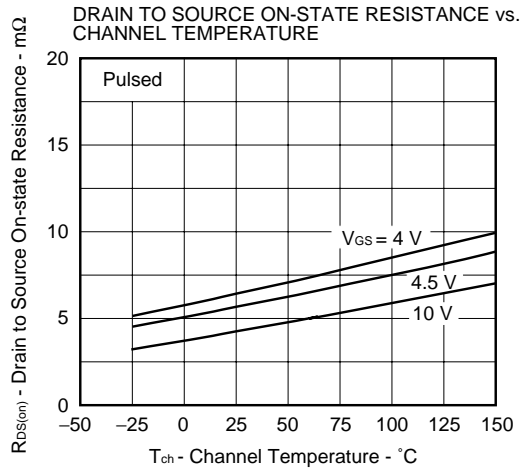
**TEST CIRCUIT 3 GATE CHARGE**



# TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)







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