

MOS FIELD EFFECT TRANSISTOR

μ PA1706TP

SWITCHING

N-CHANNEL POWER MOS FET

DESCRIPTION

The μ PA1706TP which has a heat spreader is N-Channel MOS Field Effect Transistor designed for DC/DC converter and power management application of notebook computer.

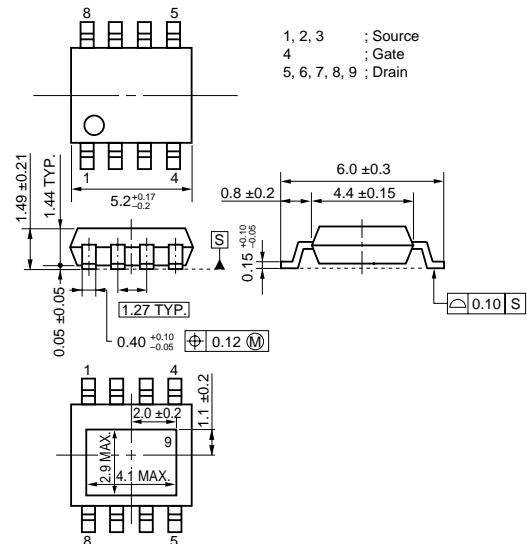
FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 7.8 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 7.0 \text{ A)}$
 $R_{DS(on)2} = 10.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 7.0 \text{ A)}$
- Low C_{iss} : $C_{iss} = 3000 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Small and surface mount package (Power HSOP8)

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1706TP	Power HSOP8

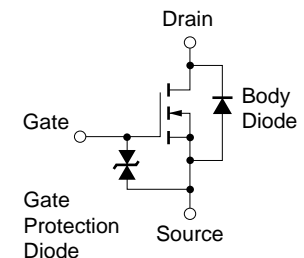
PACKAGE DRAWING (Unit: mm)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, 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) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)1}$	± 28	A
Drain Current (DC) ^{Note1}	$I_{D(DC)2}$	± 17	A
Drain Current (pulse) ^{Note2}	$I_{D(pulse)}$	± 100	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	39	W
Total Power Dissipation ^{Note1}	P_{T2}	3	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to + 150	$^\circ\text{C}$
Single Avalanche Current ^{Note3}	I_{AS}	19	A
Single Avalanche Energy ^{Note3}	E_{AS}	36.1	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 $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 15 \text{ V}$, $R_G = 25 \Omega$, $L = 100 \mu\text{H}$, $V_{GS} = 20 \rightarrow 0 \text{ V}$

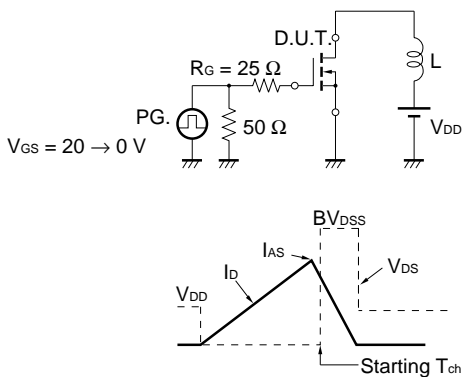
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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

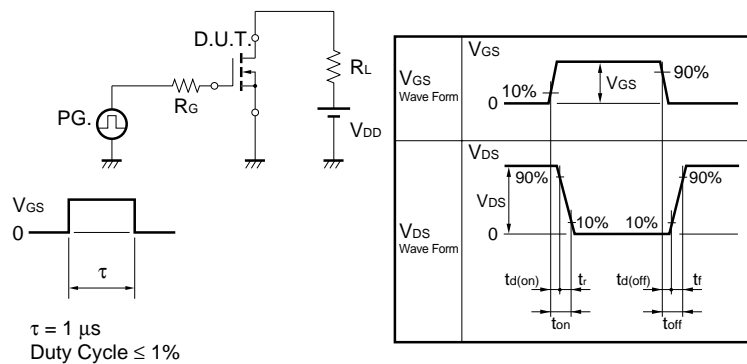
ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

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	10	22		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 7.0 A		5.8	7.8	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 7.0 A		7.0	10.0	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 7.0 A		8.0	12.0	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		3000		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		950		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		380		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 13 A		20		ns
Rise Time	t _r	V _{GS} = 10 V		20		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		80		ns
Fall Time	t _f			30		ns
Total Gate Charge	Q _G	V _{DD} = 24 V		56		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V		9		nC
Gate to Drain Charge	Q _{GD}	I _D = 13 A		14		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 13 A, V _{GS} = 0 V		0.8		V
Reverse Recovery Time	t _{rr}	I _F = 13 A, V _{GS} = 0 V		43		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		50		nC

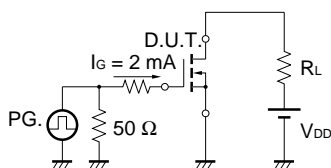
TEST CIRCUIT 1 AVALANCHE CAPABILITY



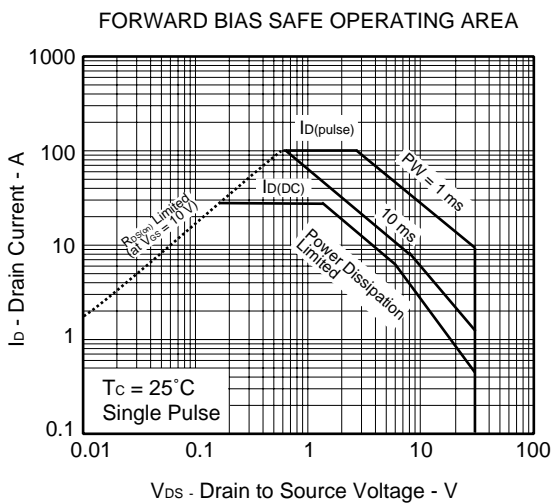
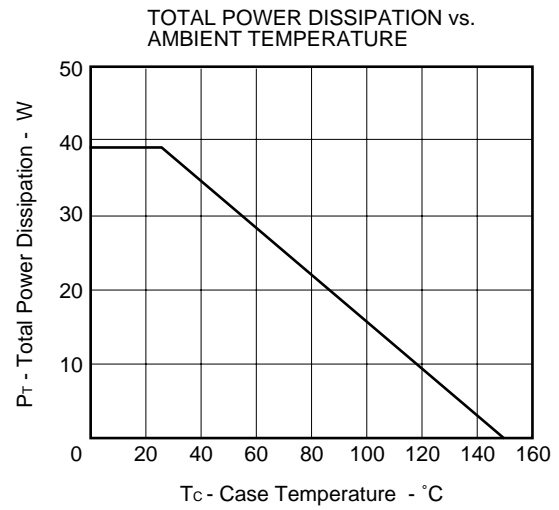
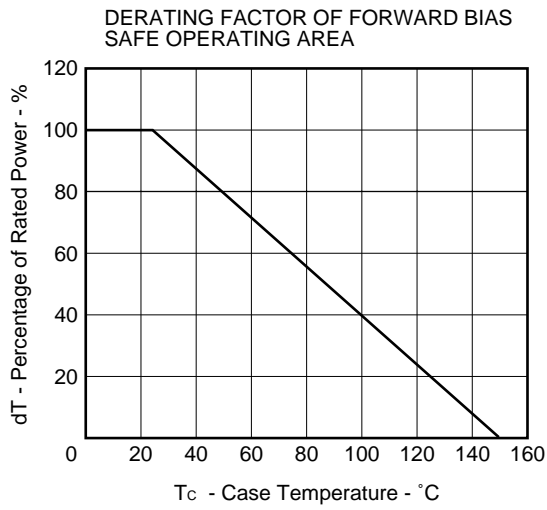
TEST CIRCUIT 2 SWITCHING TIME



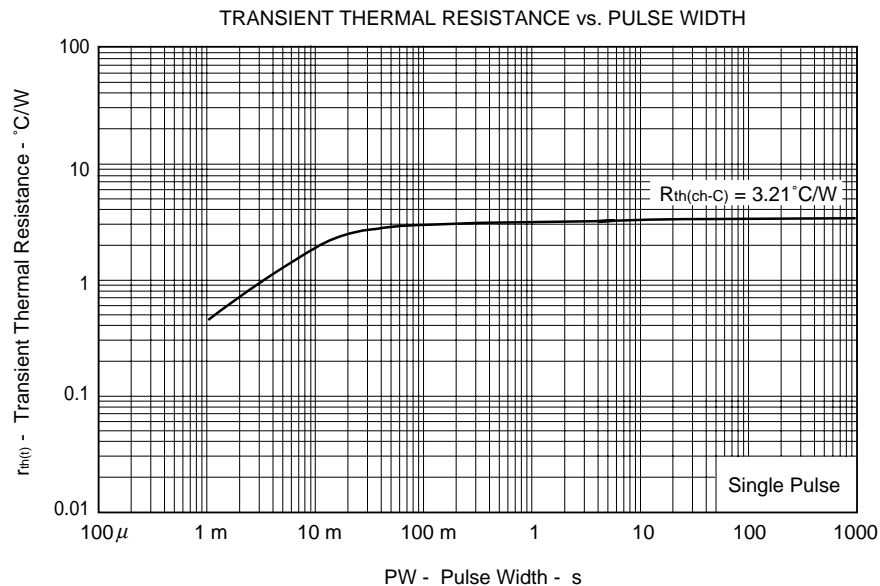
TEST CIRCUIT 3 GATE CHARGE

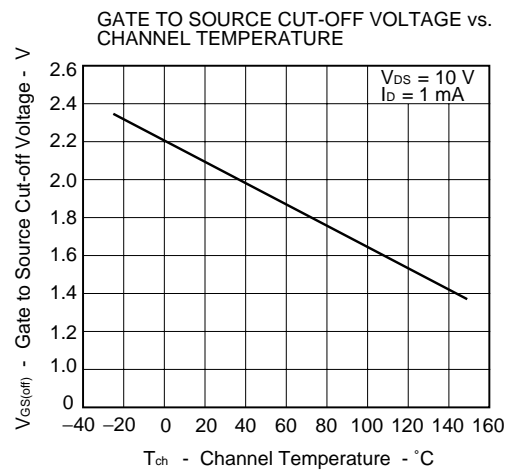
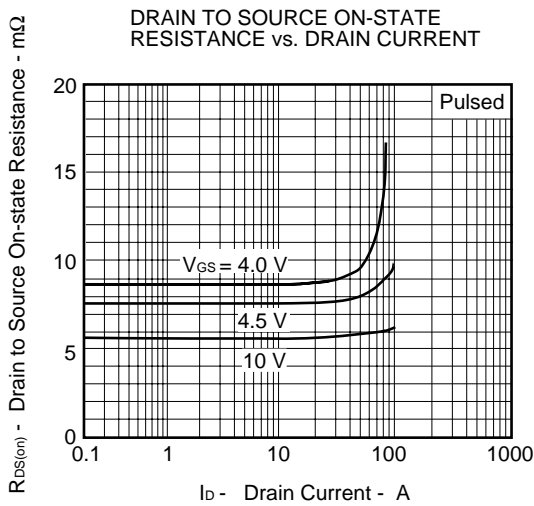
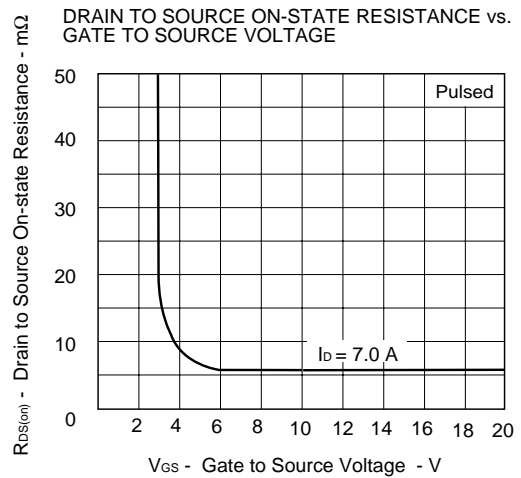
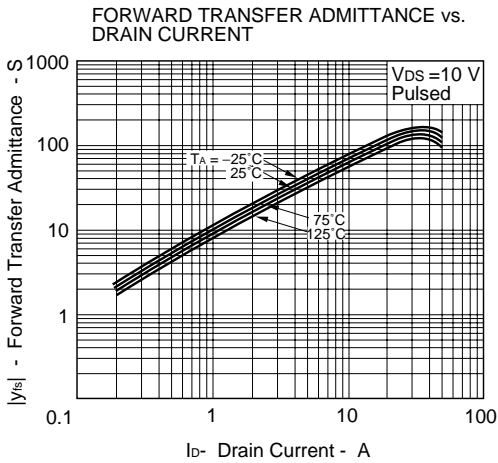
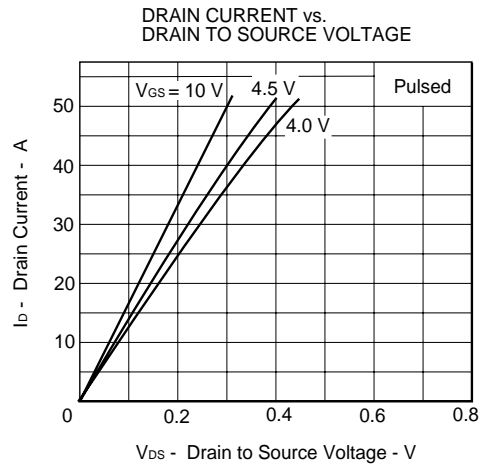
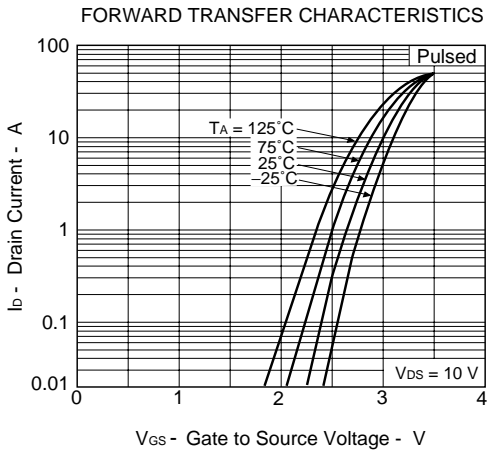


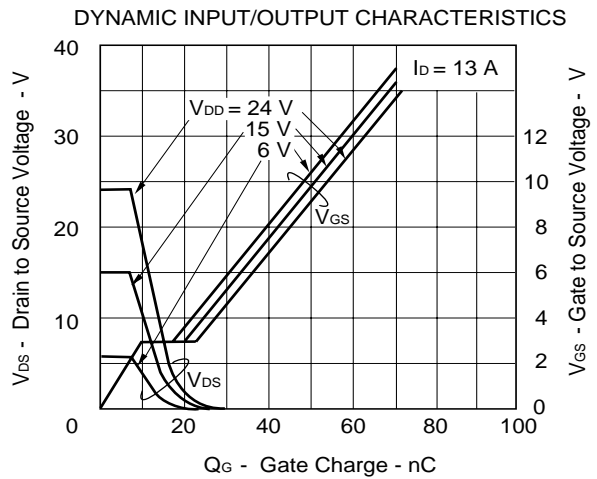
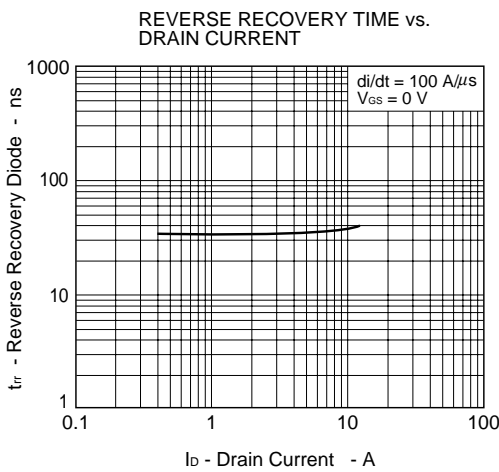
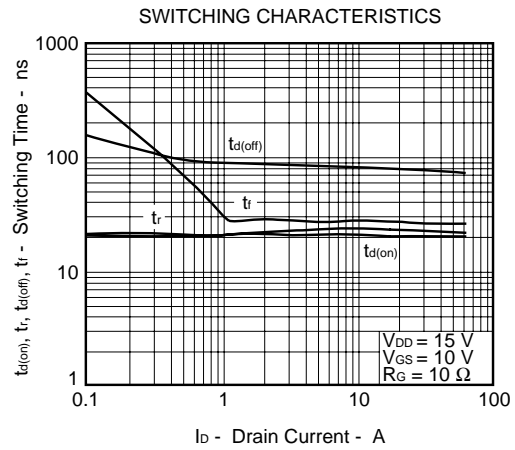
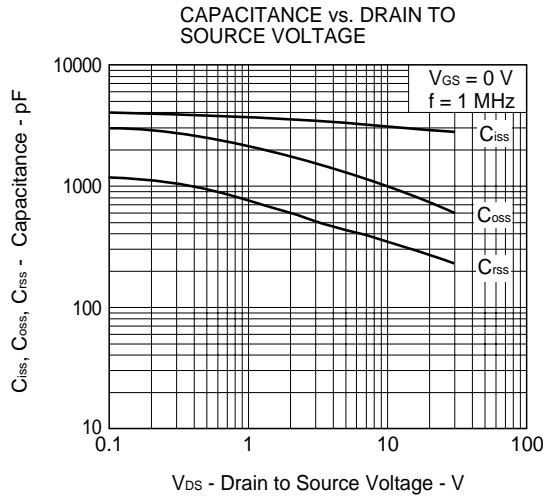
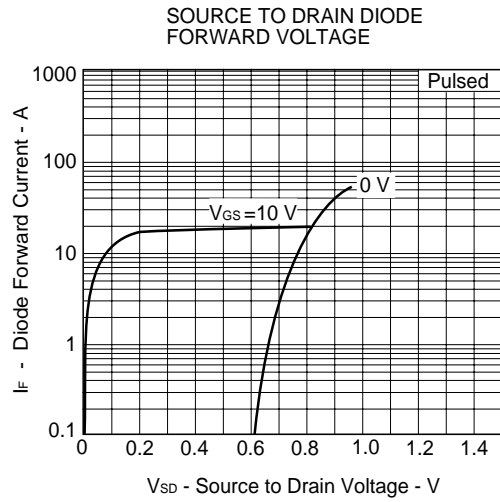
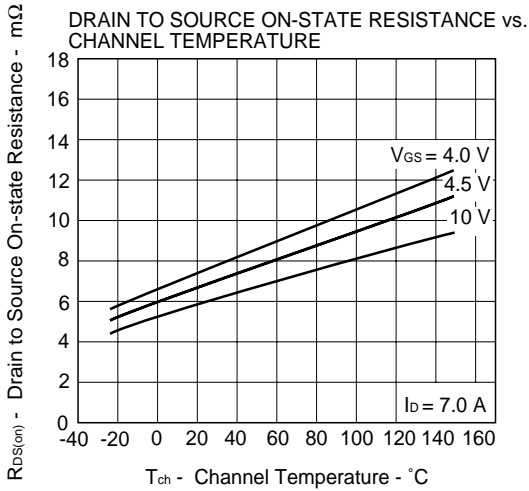
TYPICAL CHARACTERISTICS (T_A = 25°C)



T_c = 25°C
Single Pulse







[MEMO]

[MEMO]

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