

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

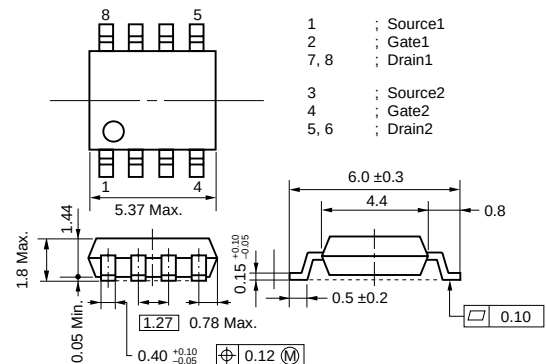
DESCRIPTION

The μ PA1760 is N-Channel MOS Field Effect Transistor designed for DC/DC Converters and power management application of notebook computers.

FEATURES

- Dual Chip Type
- Low On-Resistance
- ★ $R_{DS(on)1} = 26.0 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 10 \text{ V}$, $I_D = 4.0 \text{ A}$)
- ★ $R_{DS(on)2} = 36.0 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 4.5 \text{ V}$, $I_D = 4.0 \text{ A}$)
- ★ $R_{DS(on)3} = 42.0 \text{ m}\Omega \text{ MAX.}$ ($V_{GS} = 4.0 \text{ V}$, $I_D = 4.0 \text{ A}$)
- Low C_{iss} : $C_{iss} = 760 \text{ pF TYP.}$
- Built-in G-S Protection Diode
- Small and Surface Mount Package (Power SOP8)

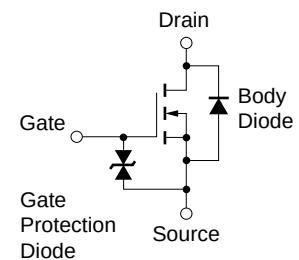
PACKAGE DRAWING (Unit : mm)



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)	$I_{D(DC)}$	± 8.0	A
Drain Current (Pulse) ^{Note1}	$I_{D(pulse)}$	± 32	A
Total Power Dissipation (1 unit) ^{Note2}	P_T	1.7	W
Total Power Dissipation (2 unit) ^{Note2}	P_T	2.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \text{ to } +150$	$^\circ\text{C}$
★ Single Avalanche Current ^{Note3}	I_{AS}	8	A
★ Single Avalanche Energy ^{Note3}	E_{AS}	6.4	mJ

EQUIVALENT CIRCUIT (1/2 Circuit)



Notes 1. $PW \leq 10 \mu\text{s}$, Duty cycle $\leq 1 \%$

- ★ **2.** $T_A = 25^\circ\text{C}$, Mounted on ceramic substrate of $2000 \text{ mm}^2 \times 1.6 \text{ mm}$
- ★ **3.** Starting $T_{ch} = 25^\circ\text{C}$, $R_G = 25 \Omega$, $V_{GS} = 20 \text{ V} \rightarrow 0 \text{ V}$

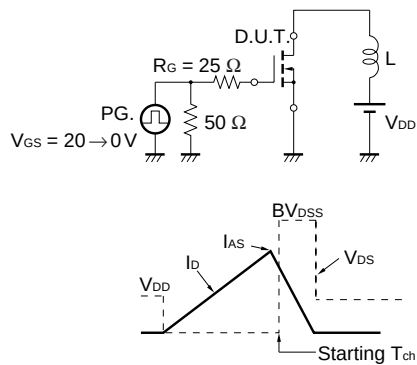
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage Exceeding the rated voltage may be applied to this device.

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

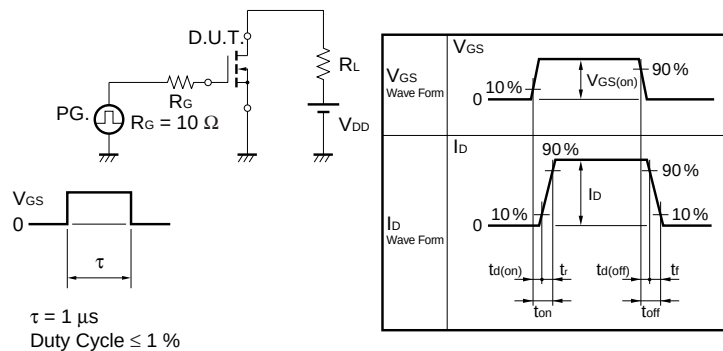
★ ELECTRICAL CHARACTERISTICS (T_A = 25 °C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 4.0 A		20.5	26.0	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 4.0 A		27.0	36.0	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 4.0 A		31.0	42.0	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5	2.1	2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 4.0 A	3.0	7.5		S
Drain Leakage Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			10	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Input Capacitance	C _{iss}	V _{DS} = 10 V		760		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		250		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		95		pF
Turn-on Delay Time	t _{d(on)}	I _D = 4.0 A		20		ns
Rise Time	t _r	V _{GS(on)} = 10 V		140		ns
Turn-off Delay Time	t _{d(off)}	V _{DD} = 15 V		50		ns
Fall Time	t _f	R _G = 10 Ω		30		ns
Total Gate Charge	Q _G	I _D = 8.0 A		14		nC
Gate to Source Charge	Q _{GS}	V _{DD} = 24 V		2.0		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 10 V		5.0		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 8.0 A, V _{GS} = 0 V		0.86		V
Reverse Recovery Time	t _{rr}	I _F = 8.0 A, V _{GS} = 0 V		30		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs		20		nC

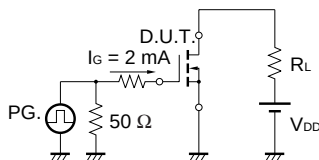
TEST CIRCUIT 1 AVALANCHE CAPABILITY



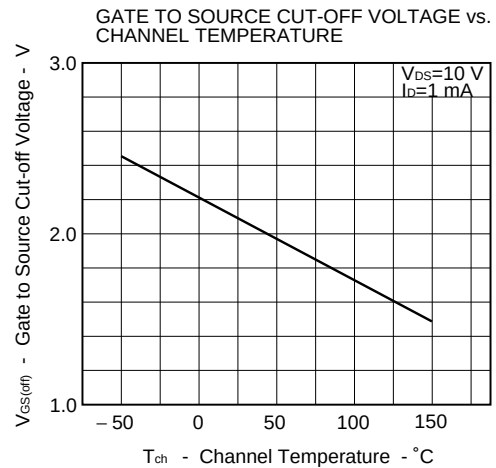
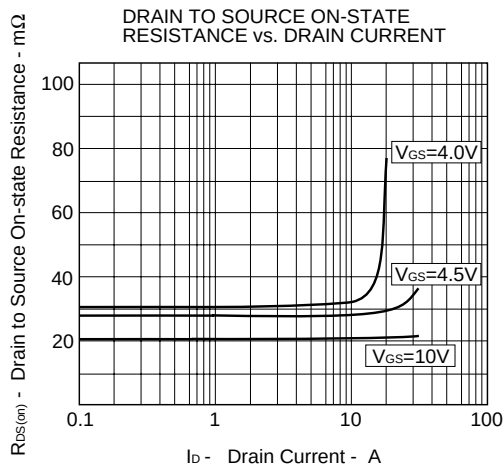
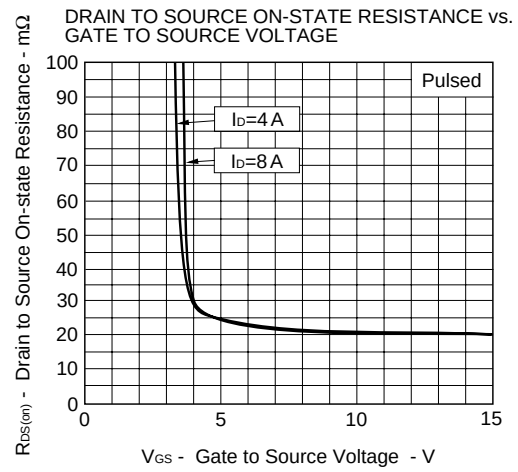
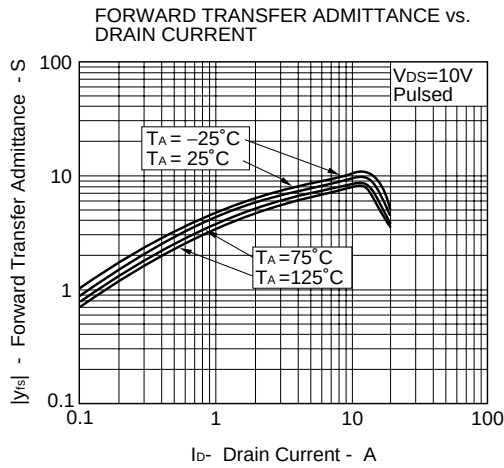
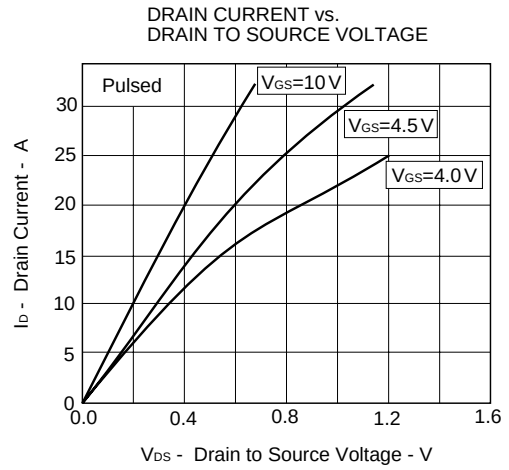
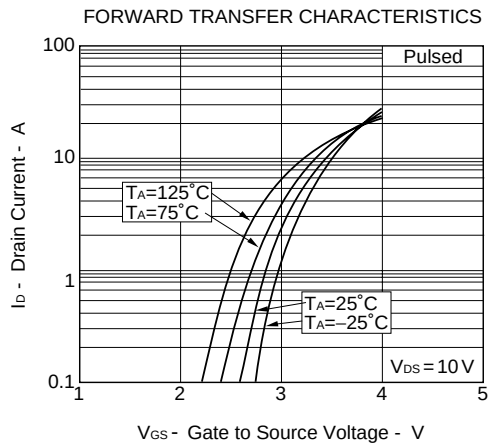
TEST CIRCUIT 2 SWITCHING TIME

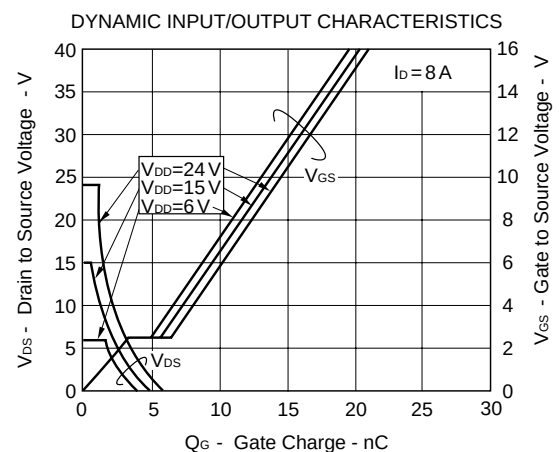
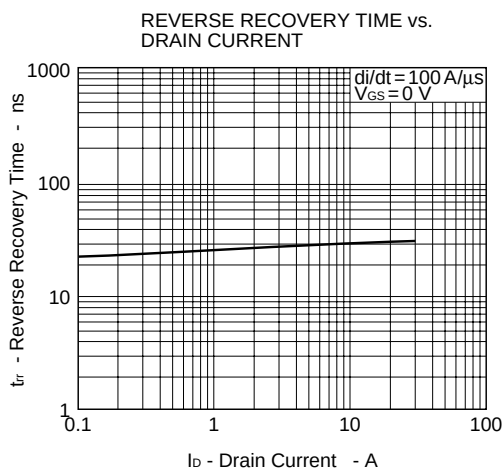
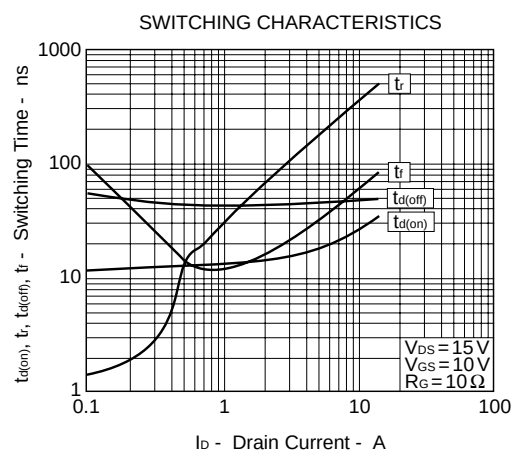
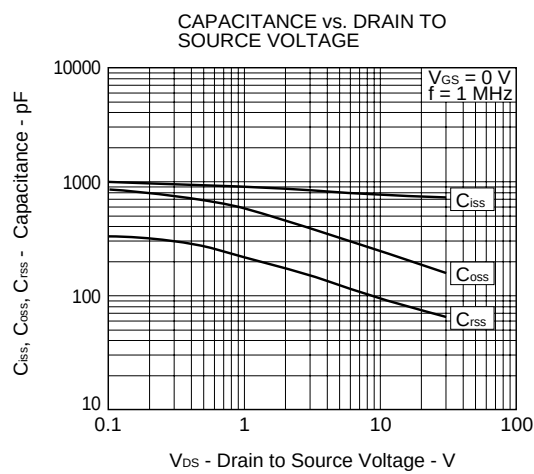
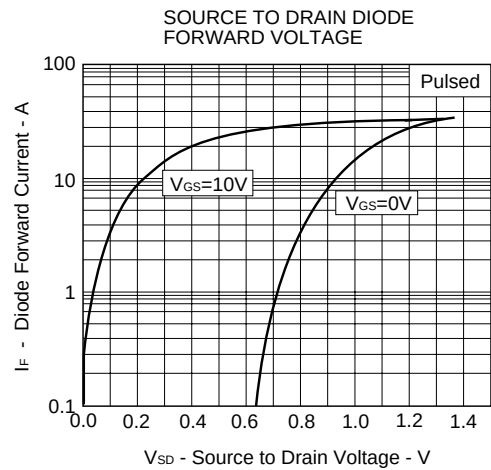
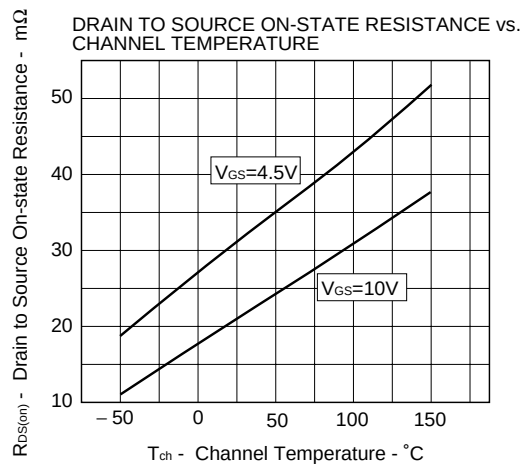


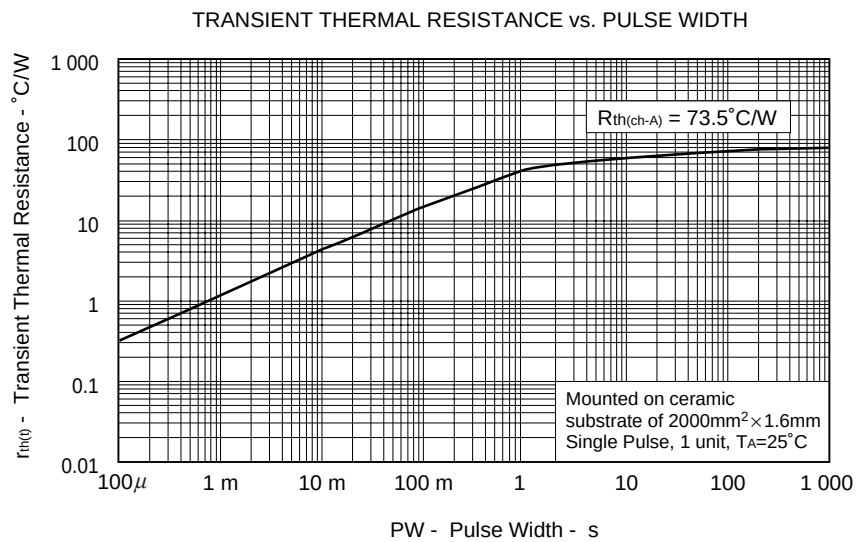
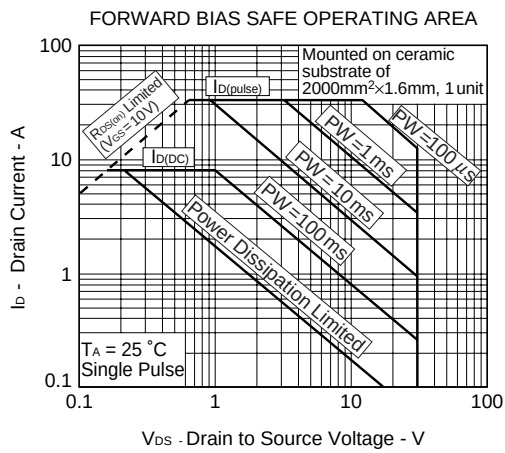
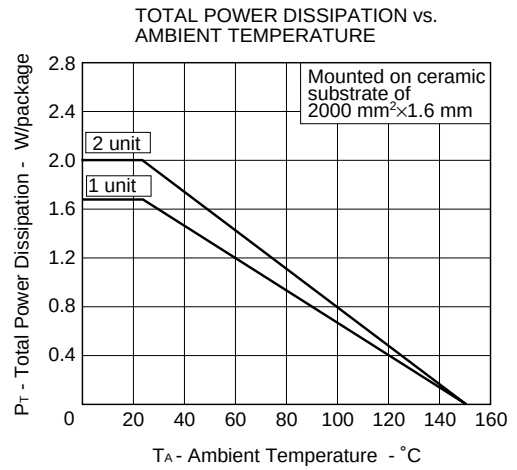
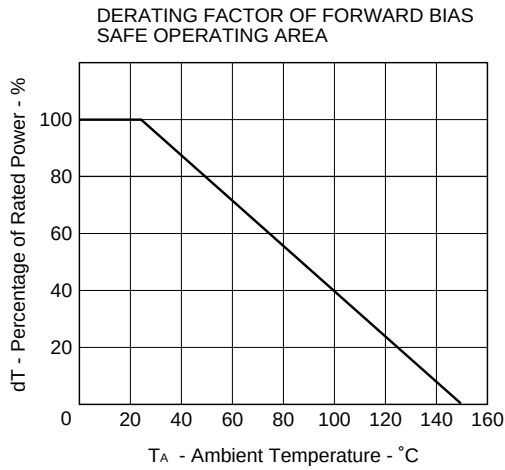
TEST CIRCUIT 3 GATE CHARGE

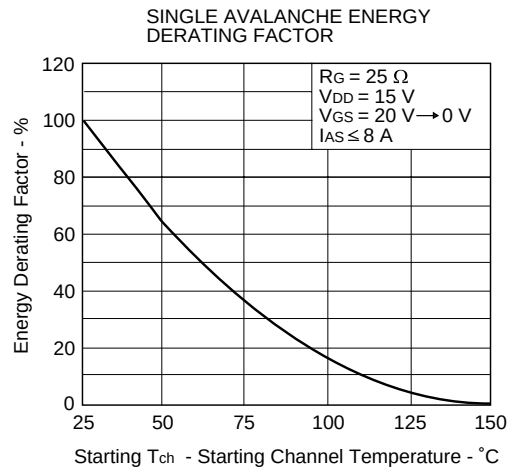
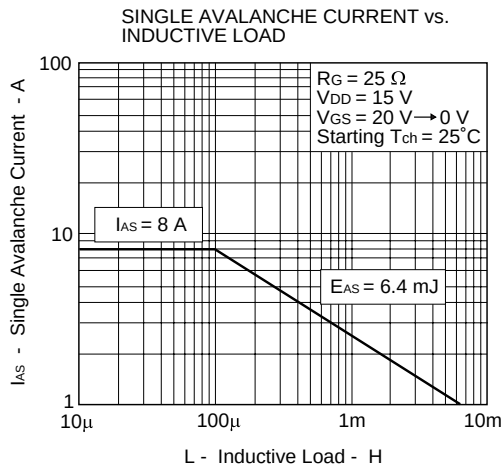


★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)









[MEMO]

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