

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

This product is a switching device which can be driven directly by a 4.5 V power source.

The μ PA1804 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.

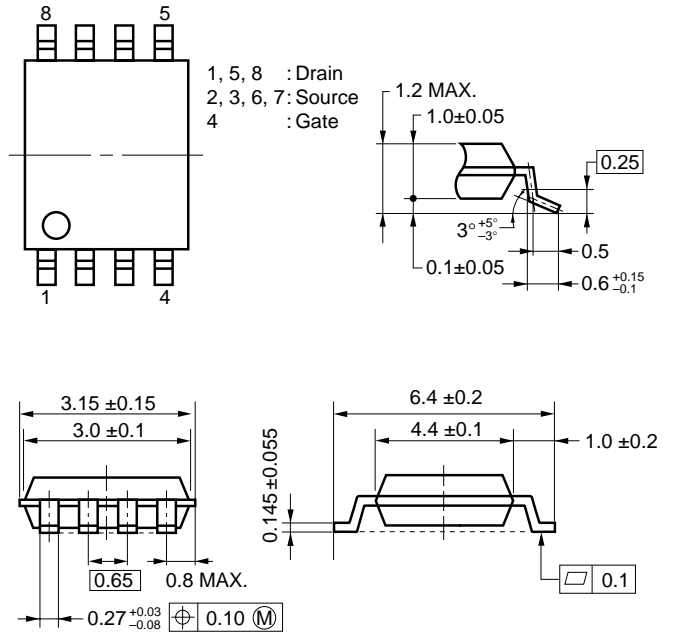
FEATURES

- Can be driven by a 4.5 V power source
- Low on-state resistance
 $R_{DS(on)1} = 23 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 4.0 \text{ A)}$
 $R_{DS(on)2} = 32 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 4.0 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1804GR-9JG	Power TSSOP8

PACKAGE DRAWING (Unit : mm)



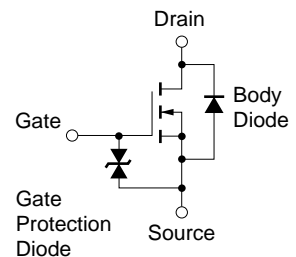
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	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 ^{Note2}	P_T	2.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes 1.** $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$
- 2.** Mounted on ceramic substrate of $5000 \text{ mm}^2 \times 1.1 \text{ mm}$

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.

EQUIVALENT CIRCUIT

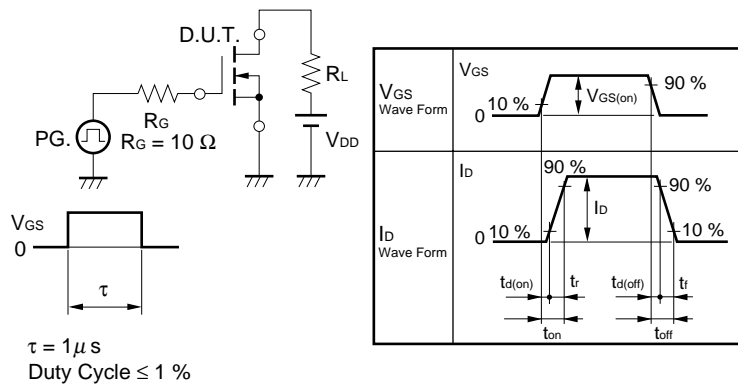


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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

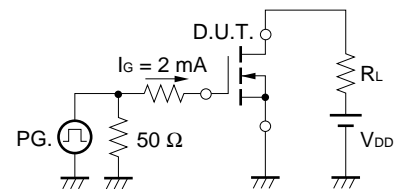
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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} = ±16 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.0	2.1	2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 4.0 A	3	8.7		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 4.0 A		18	23	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 4.0 A		24	32	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		761		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		258		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		99		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V		24		ns
Rise Time	t _r	I _D = 4.0 A		83		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = 10 V		46		ns
Fall Time	t _f	R _G = 10 Ω		29		ns
Total Gate Charge	Q _G	V _{DS} = 24 V		13.5		nC
Gate to Source Charge	Q _{GS}	I _D = 8.0 A		2.4		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 10 V		3.7		nC
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		27		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		16		nC

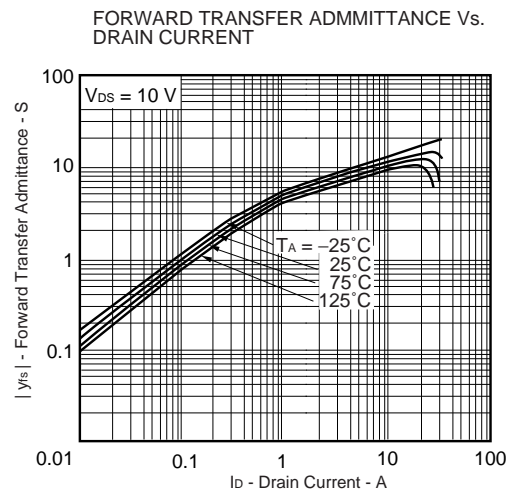
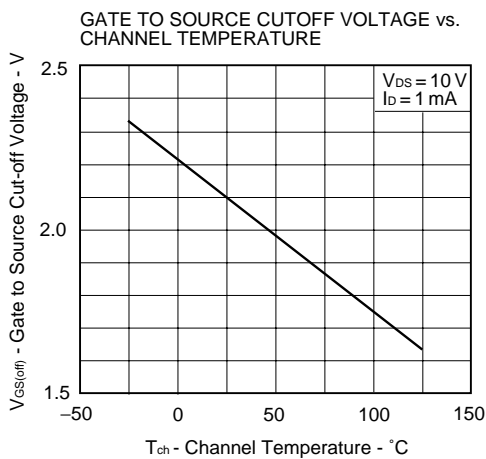
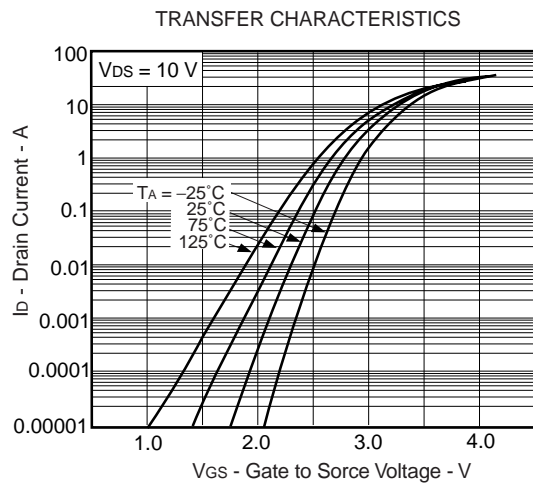
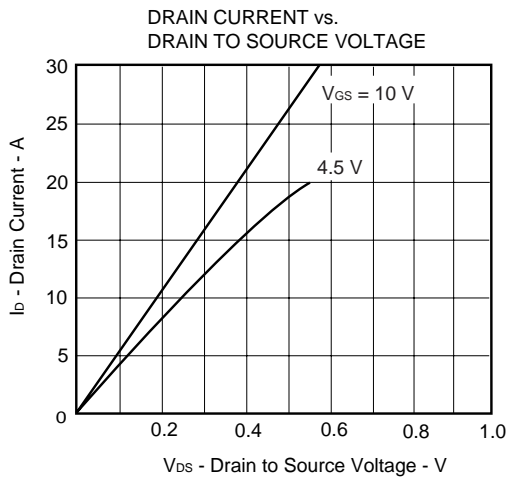
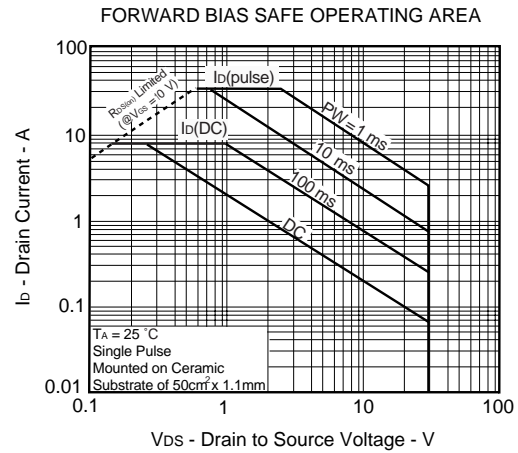
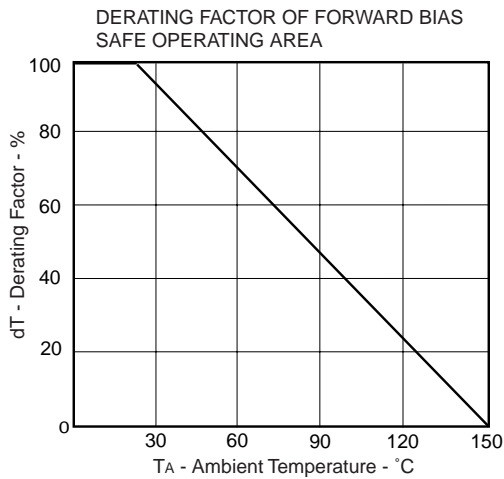
TEST CIRCUIT 1 SWITCHING TIME

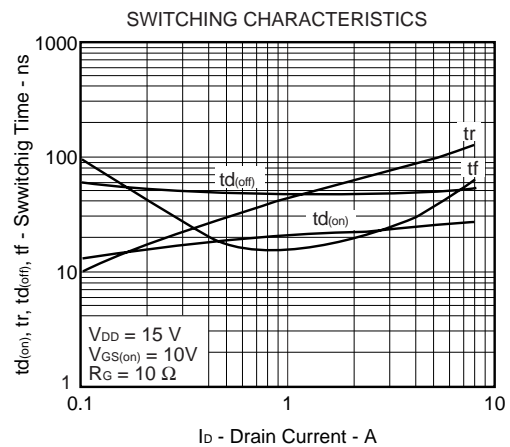
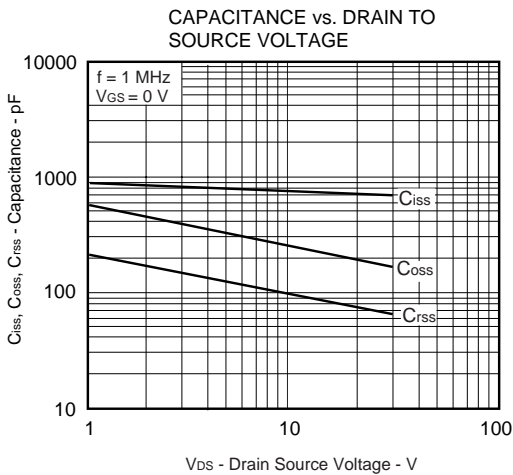
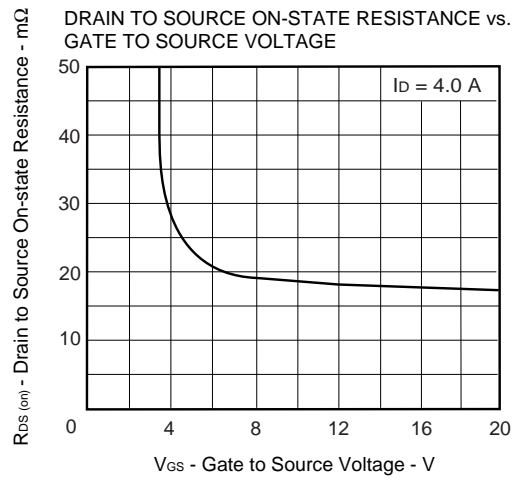
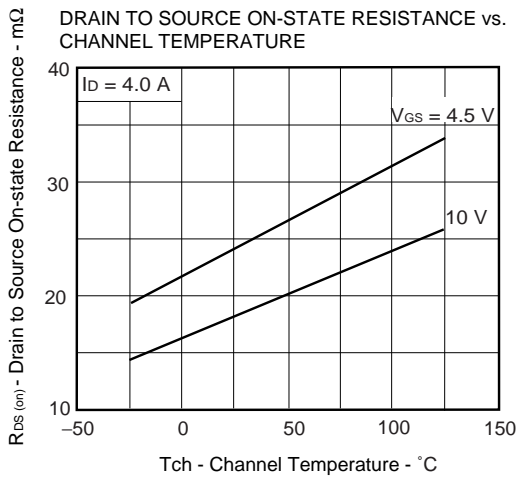
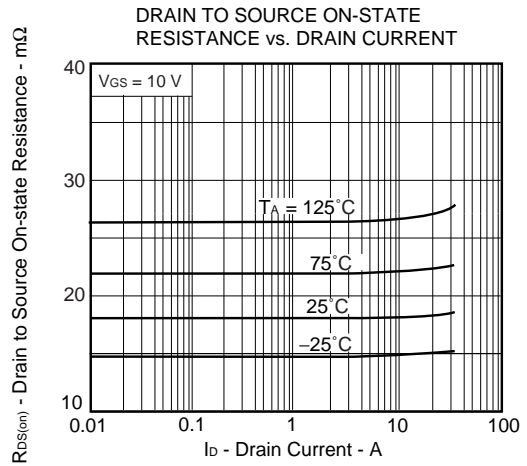
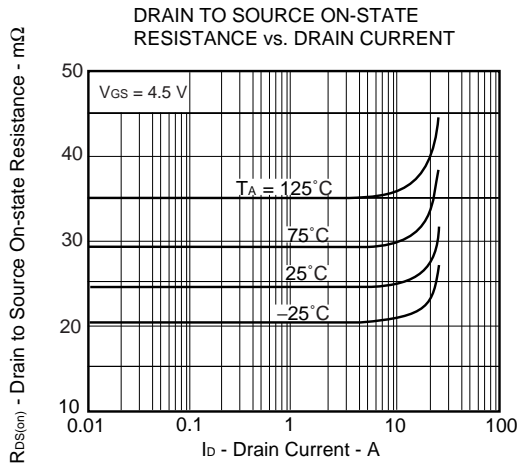


TEST CIRCUIT 2 GATE CHARGE

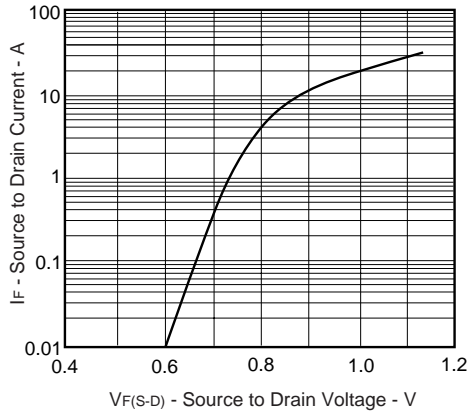


TYPICAL CHARACTERISTICS (T_A = 25 °C)

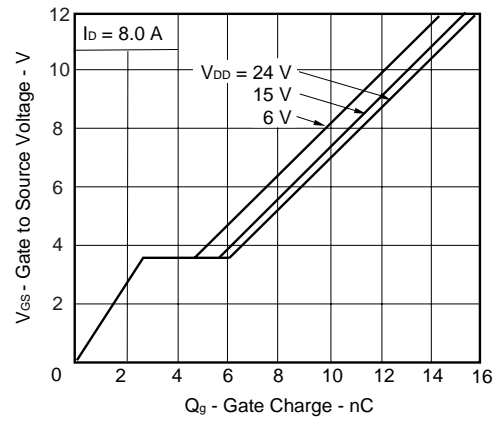




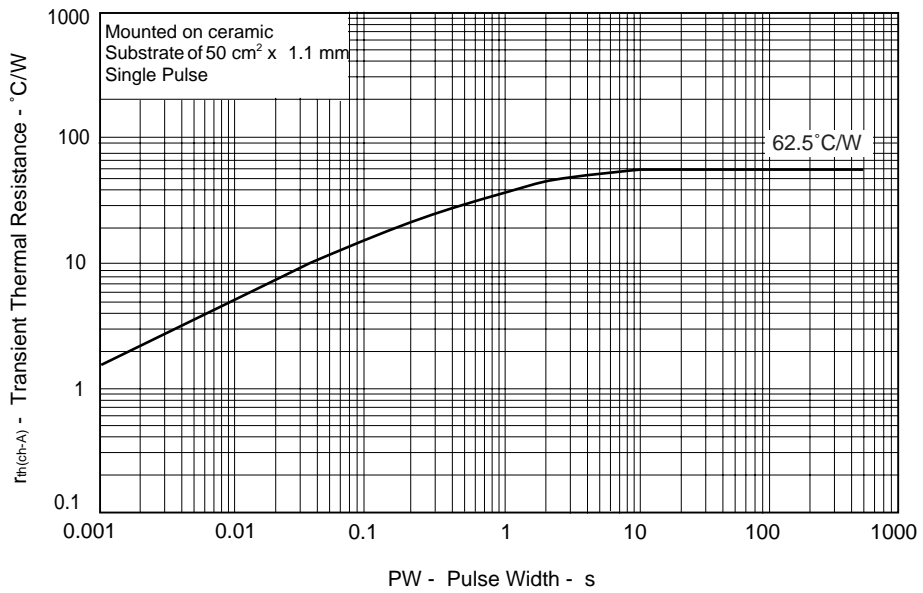
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

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