

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

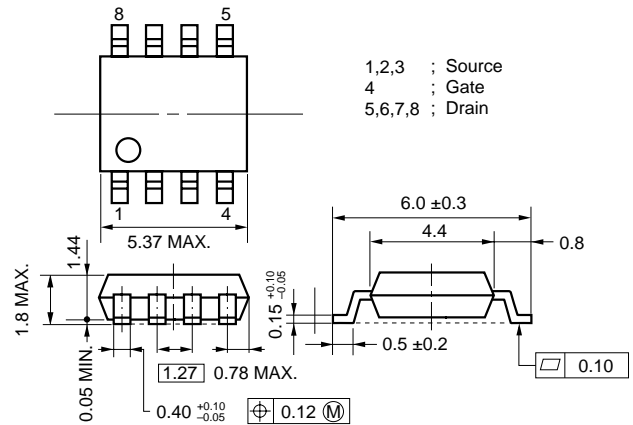
DESCRIPTION

This μ PA1704 is N-Channel MOS Field Effect Transistor designed for power management applications and Li-ion battery application.

FEATURES

- 2.5-V gate drive and low on-resistance
 $R_{DS(on)1} = 13 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 5.0 \text{ A)}$
 $R_{DS(on)2} = 16 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 5.0 \text{ A)}$
- Low C_{iss} : $C_{iss} = 2700 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit : mm)



ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1704G	Power SOP8

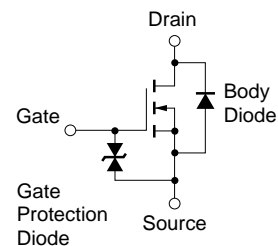
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	±12	V
Drain Current (DC)	$I_{D(DC)}$	±10	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	±40	A
Total Power Dissipation ($T_A = 25^\circ\text{C}$) ^{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 $1200 \text{ mm}^2 \times 0.7 \text{ mm}$

EQUIVALENT CIRCUIT



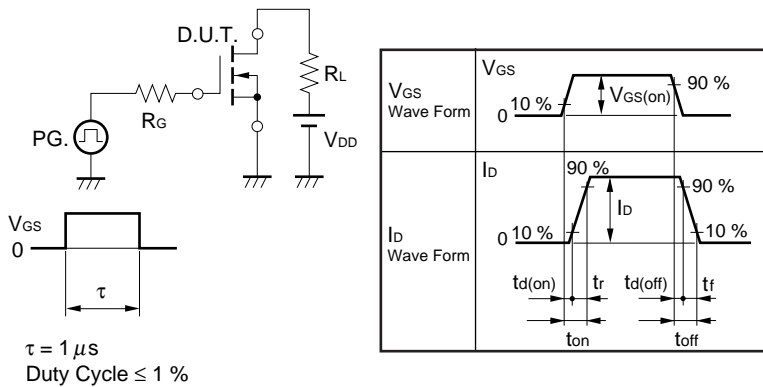
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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

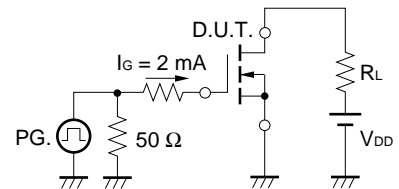
ELECTRICAL CHARACTERISTICS (T_A = 25 °C, All terminals are connected.)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 4.0 V, I _D = 5.0 A		9.8	13	mΩ
	R _{DS(on)2}	V _{GS} = 2.5 V, I _D = 5.0 A		12	16	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	0.5	0.8	1.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 5.0 A	10	25		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} = ±12 V, V _{DS} = 0 V			±10	μA
Input Capacitance	C _{iss}	V _{DS} = 10 V		2700		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		880		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		400		pF
Turn-on Delay Time	t _{d(on)}	I _D = 5.0 A		25		ns
Rise Time	t _r	V _{GS(on)} = 4.0 V		95		ns
Turn-off Delay Time	t _{d(off)}	V _{DD} = 15 V		235		ns
Fall Time	t _f	R _G = 10 Ω		200		ns
Total Gate Charge	Q _G	I _D = 10 A		38		nC
Gate to Source Charge	Q _{GS}	V _{DD} = 24 V		3.3		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 4.0 V		15		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 10 A, V _{GS} = 0 V		0.8		V
Reverse Recovery Time	t _{rr}	I _F = 10 A, V _{GS} = 0 V		48		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		53		nC

TEST CIRCUIT 1 SWITCHING TIME

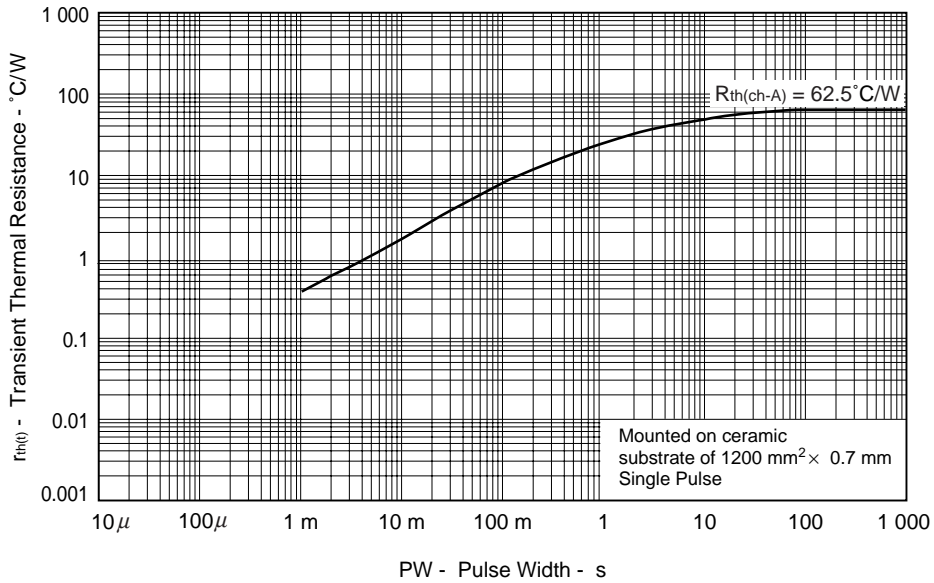


TEST CIRCUIT 2 GATE CHARGE

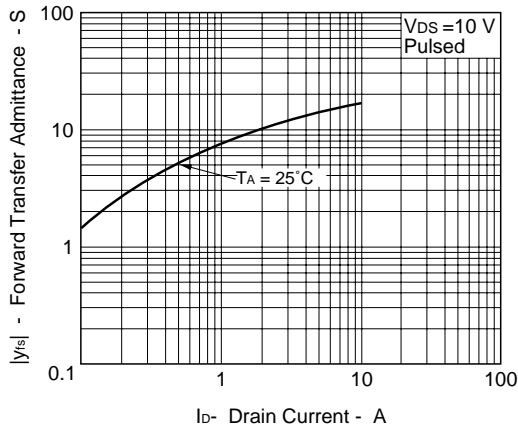


TYPICAL CHARACTERISTICS (T_A = 25 °C)

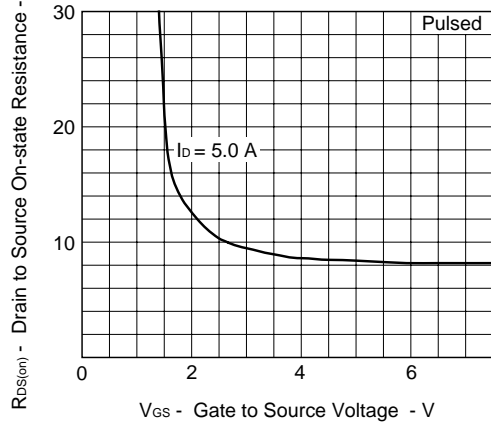
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



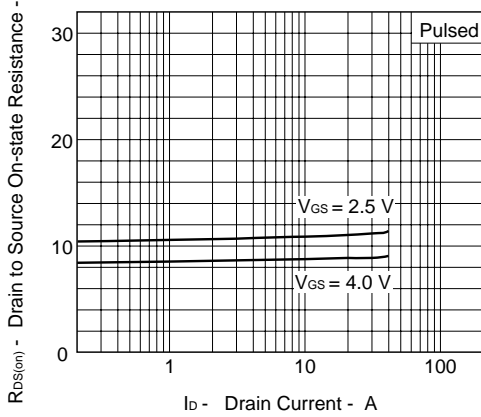
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



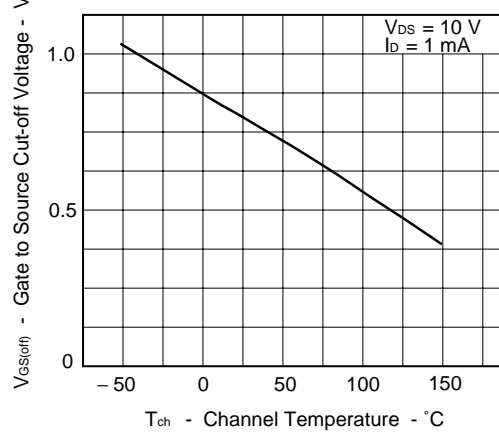
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

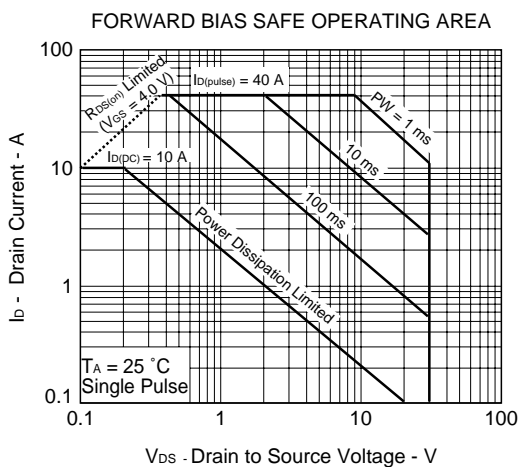
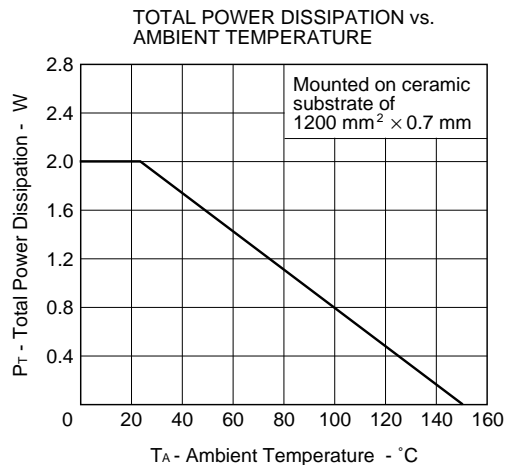
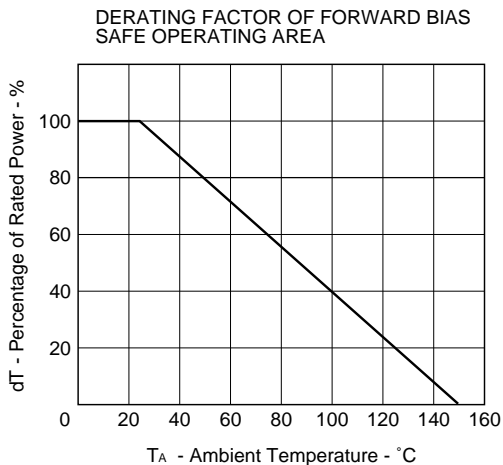


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

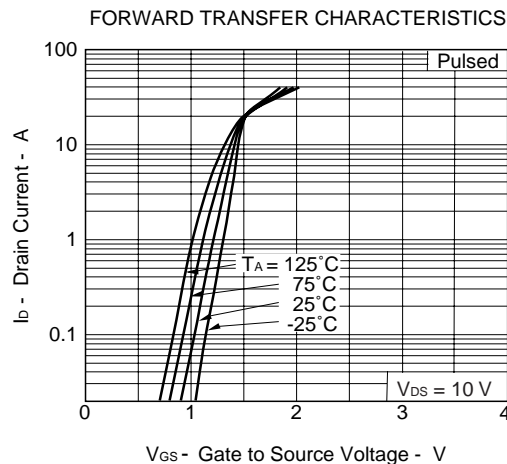
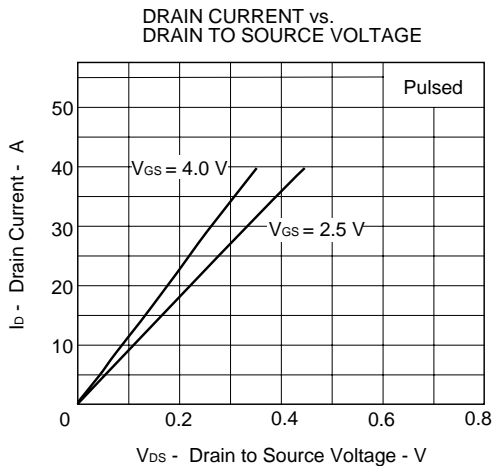


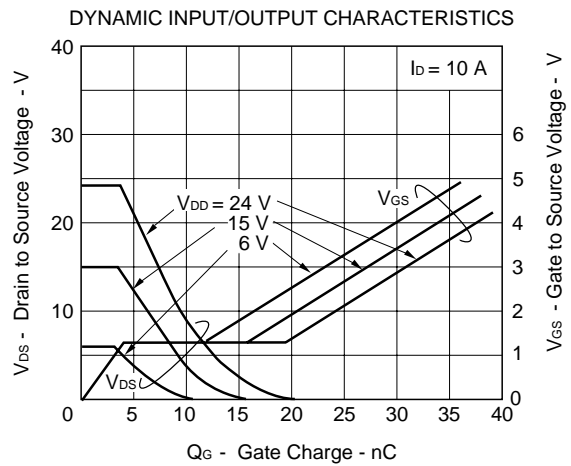
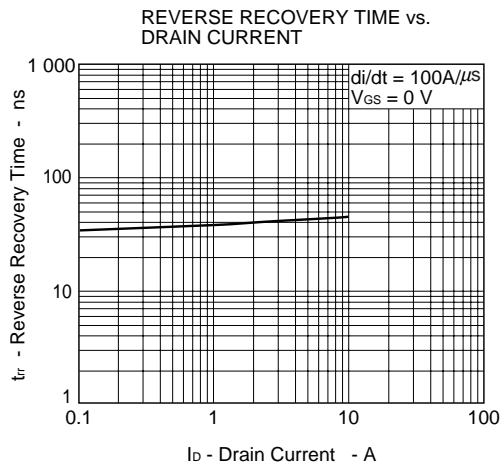
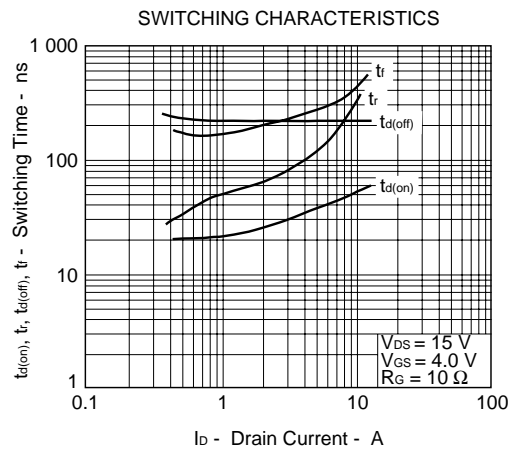
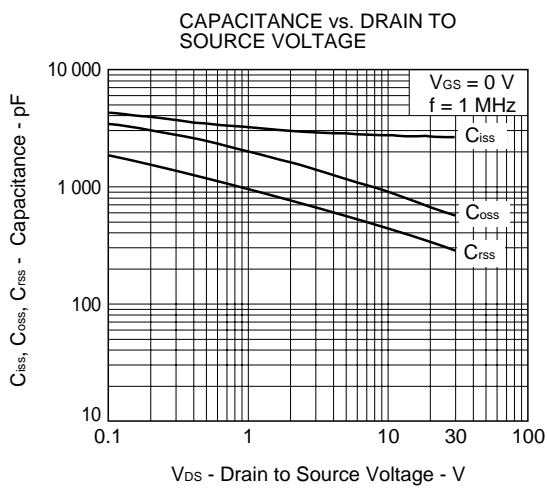
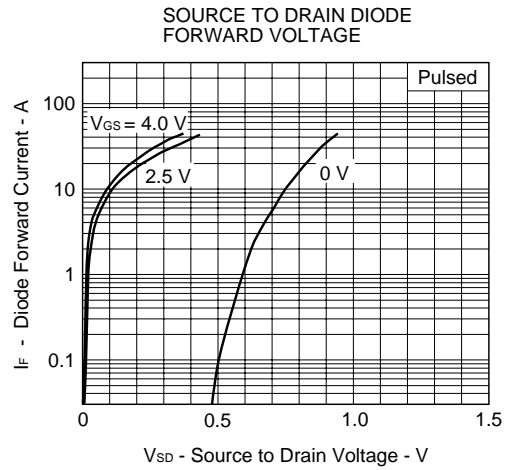
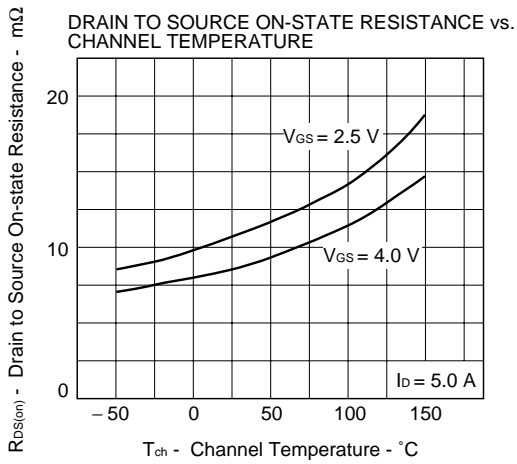
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE





Remark
Mounted on ceramic substrate of 1200 mm² × 0.7 mm





[MEMO]

[MEMO]

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