

SWITCHING  
N-CHANNEL POWER MOS FET  
INDUSTRIAL USE

DESCRIPTION

The  $\mu$ PA1722 is N-Channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

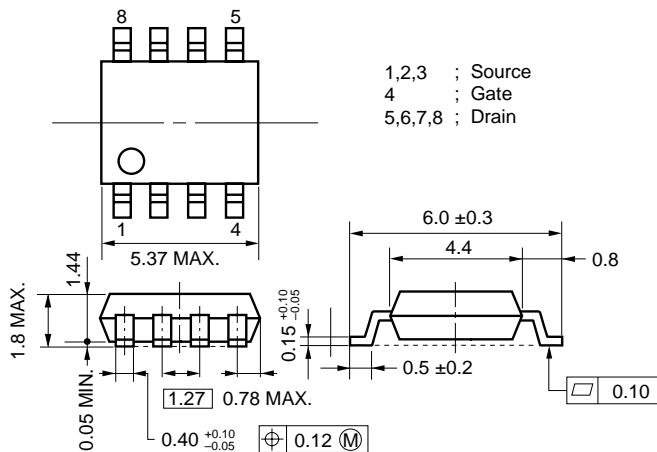
FEATURES

- Low on-resistance
- ★  $R_{DS(on)1} = 21.0 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 4.5 \text{ A}$ )
- ★  $R_{DS(on)2} = 29.0 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 4.5 \text{ V}$ ,  $I_D = 4.5 \text{ A}$ )
- ★  $R_{DS(on)3} = 32.0 \text{ m}\Omega \text{ MAX.}$  ( $V_{GS} = 4.0 \text{ V}$ ,  $I_D = 4.5 \text{ A}$ )
- Low  $C_{iss}$ :  $C_{iss} = 980 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

★ ORDERING INFORMATION

PART NUMBER	PACKAGE
$\mu$ PA1722G	Power SOP8

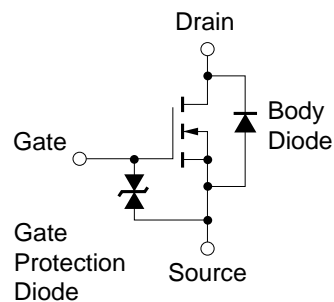
PACKAGE DRAWING (Unit : mm)



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)	$I_{D(DC)}$	±9	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	±36	A
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ ) <sup>Note2</sup>	$P_T$	2.0	W
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C

EQUIVALENT CIRCUIT



- Notes 1.  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1 \%$   
2. Mounted on ceramic substrate of  $1200 \text{ mm}^2 \times 2.2 \text{ mm}$

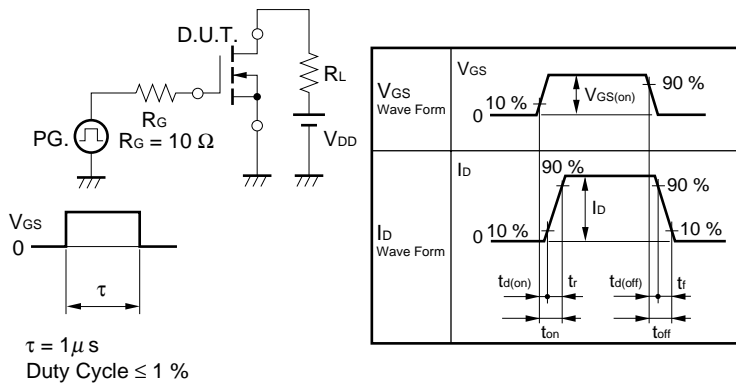
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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

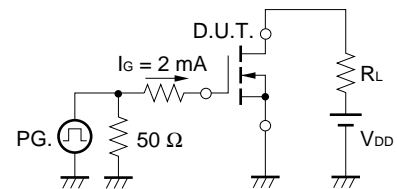
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, All terminals are connected.)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
★ Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.5 A		14.0	21.0	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 4.5 A		19.0	29.0	mΩ
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 4.5 A		22.0	32.0	mΩ
Gate to Source 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> = 4.5 A	5.0	9.2		S
Drain Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			10	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V			±10	μA
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = 10 V		980		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		320		pF
Reverse Transfer Capacitance	C <sub>rSS</sub>	f = 1 MHz		125		pF
Turn-on Delay Time	t <sub>d(on)</sub>	I <sub>D</sub> = 4.5 A		20		ns
Rise Time	t <sub>r</sub>	V <sub>GS(on)</sub> = 10 V		80		ns
Turn-off Delay Time	t <sub>d(off)</sub>	V <sub>DD</sub> = 15 V		60		ns
Fall Time	t <sub>f</sub>	R <sub>G</sub> = 10 Ω		30		ns
Total Gate Charge	Q <sub>G</sub>	I <sub>D</sub> = 9 A		20		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>DD</sub> = 24 V		2.3		nC
Gate to Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = 10 V		6.0		nC
★ Body Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 9 A, V <sub>GS</sub> = 0 V		0.84		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 9 A, V <sub>GS</sub> = 0 V		35		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		45		nC

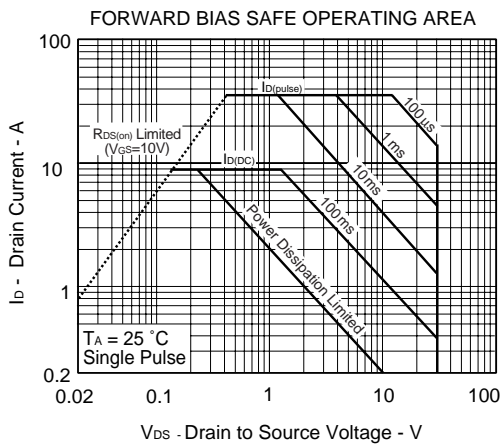
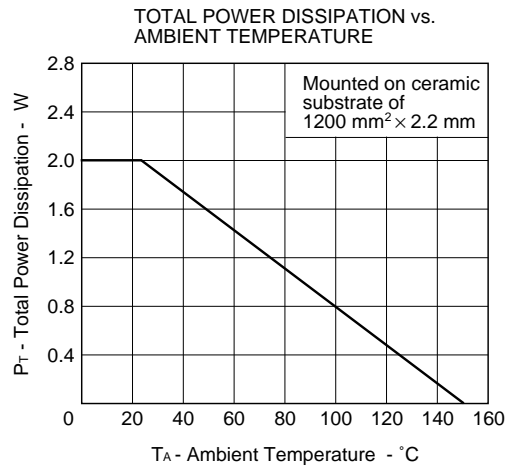
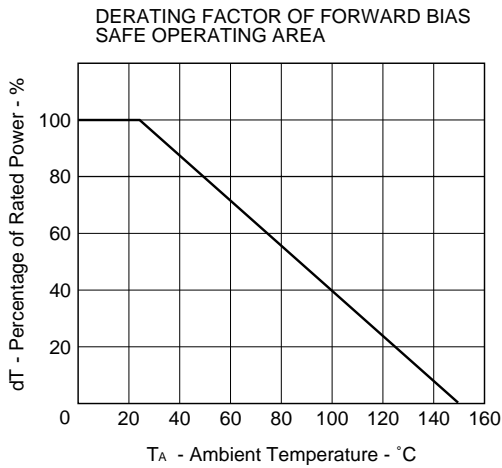
**TEST CIRCUIT 1 SWITCHING TIME**



**TEST CIRCUIT 2 GATE CHARGE**

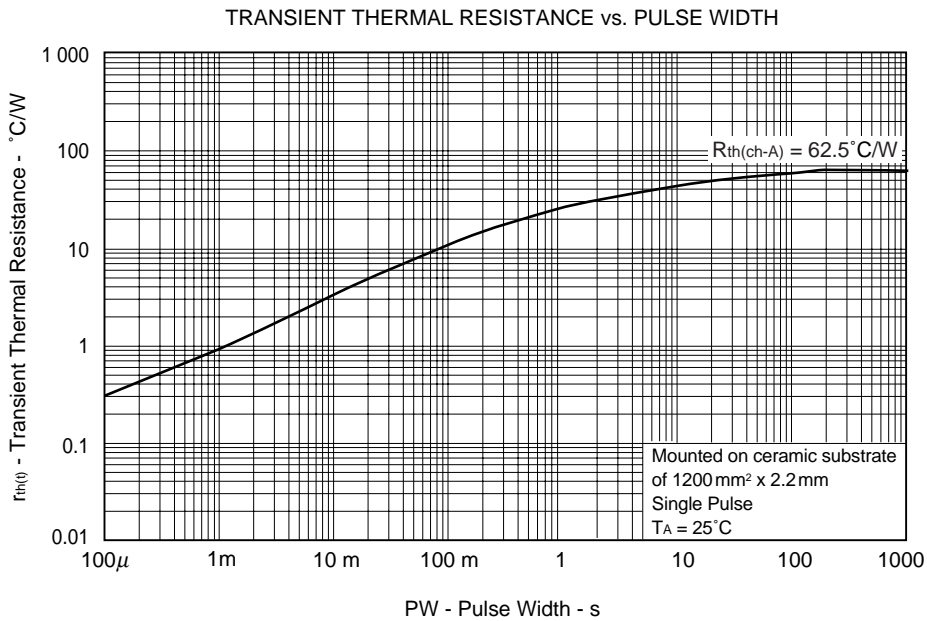


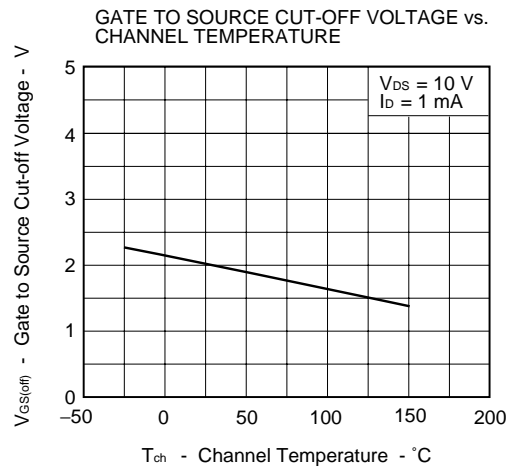
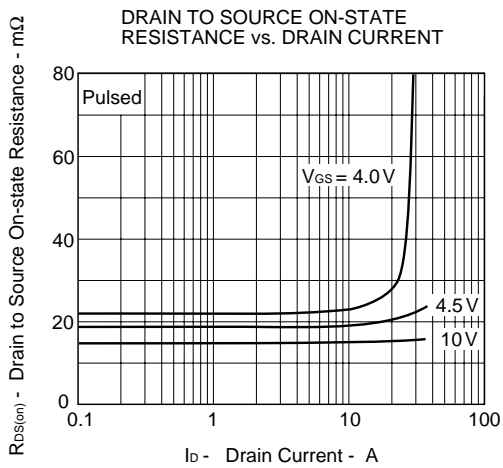
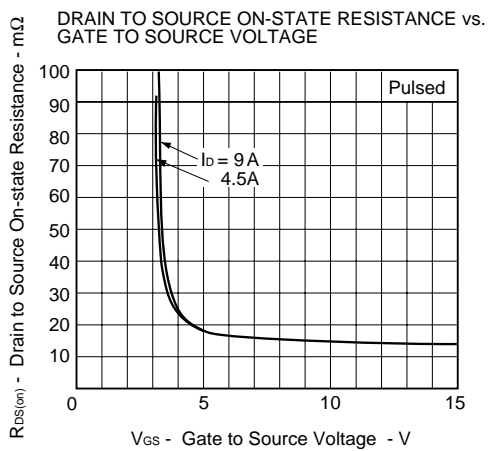
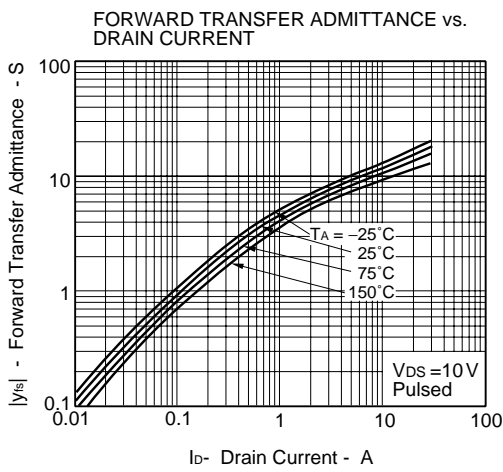
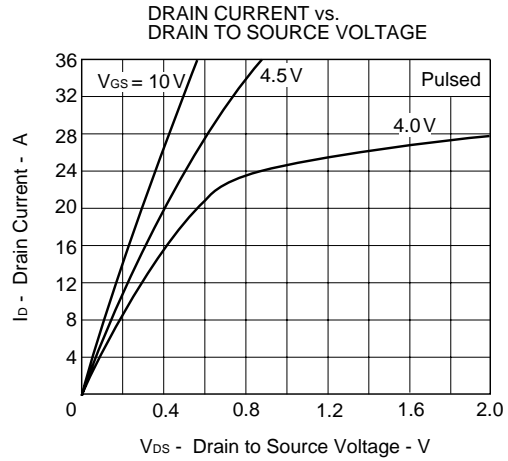
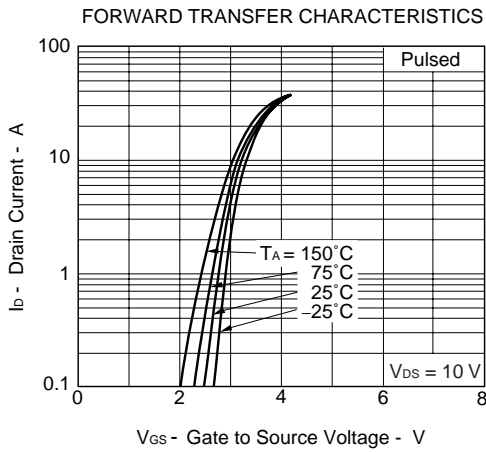
★ TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)



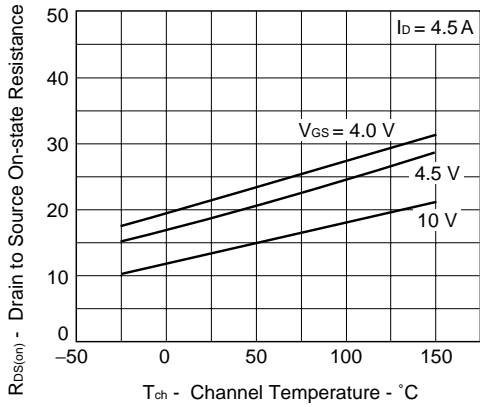
Remark

Mounted on ceramicsubstrate of 1200 mm<sup>2</sup> × 2.2 mm

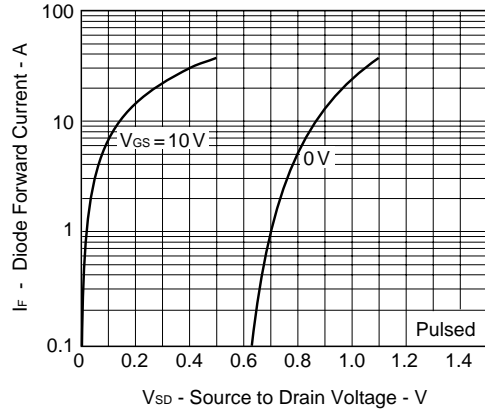




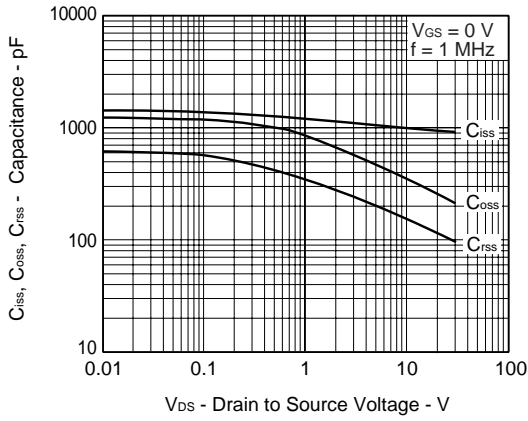
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



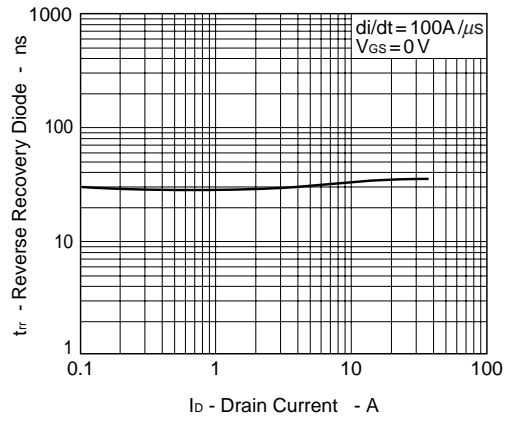
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



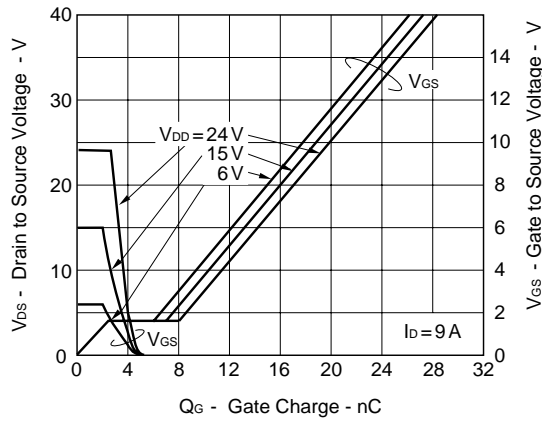
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



REVERSE RECOVERY TIME vs. DRAIN CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

[MEMO]

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