

MOS FIELD EFFECT TRANSISTOR μ PA1873

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μ PA1873 is a switching device which can be driven directly by a 2.5 V power source.

This device 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

- 2.5 V drive available
- · Low on-state resistance

 $R_{DS(on)1} = 23.0 \text{ m}\Omega \text{ MAX.} \text{ (Vgs} = 4.5 \text{ V, ID} = 3.0 \text{ A)}$

 $R_{DS(on)2} = 24.0 \text{ m}\Omega \text{ MAX. (Vgs} = 4.0 \text{ V, Ip} = 3.0 \text{ A)}$

 $R_{DS(on)3} = 28.0 \text{ m}\Omega \text{ MAX.} \text{ (Vgs} = 3.1 \text{ V, ID} = 3.0 \text{ A)}$

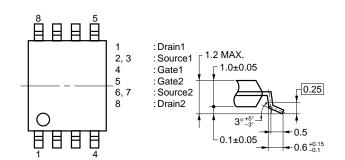
 $R_{DS(on)4} = 29.0 \text{ m}\Omega$ MAX. (VGS = 2.5 V, ID = 3.0 A)

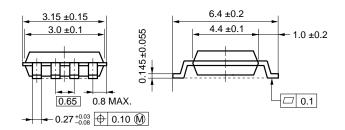
· Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA1873GR-9JG	Power TSSOP8

PACKAGE DRAWING (Unit: mm)

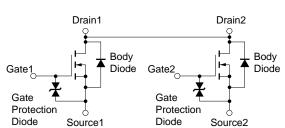




ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage (Vgs = 0 V)	Voss	20	V
Gate to Source Voltage (Vps = 0 V)	Vgss	±12	V
Drain Current (DC) (T _A = 25°C)	I _{D(DC)}	±6.0	Α
Drain Current (pulse) Note1	ID(pulse)	±80	Α
Total Power Dissipation (2 unit) Note2	PT	2.0	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C

EQUIVALENT CIRCUIT



- **Notes 1.** PW \leq 10 μ s, Duty Cycle \leq 1%
 - 2. Mounted on ceramic substrate of 5000 mm² x 1.1 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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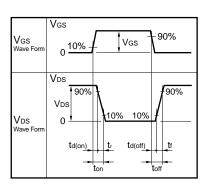


ELECTRICAL CHARACTERISTICS (TA = 25°C)

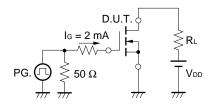
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	Inss	Vps = 20 V, Vgs = 0 V			10	μΑ
Gate Leakage Current	lgss	Vgs = ±12 V, Vps = 0 V			±10	μΑ
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance	yfs	V _{DS} = 10 V, I _D = 3.0 A	5.0			S
Drain to Source On-state Resistance	RDS(on)1	Vgs = 4.5 V, ID = 3.0 A	13.0	18.0	23.0	mΩ
	RDS(on)2	Vgs = 4.0 V, ID = 3.0 A	14.0	19.0	24.0	mΩ
	RDS(on)3	Vgs = 3.1 V, ID = 3.0 A	14.5	21.5	28.0	mΩ
	RDS(on)4	Vgs = 2.5 V, ID = 3.0 A	15.0	24.5	29.0	mΩ
Input Capacitance	Ciss	Vps = 10 V		705		pF
Output Capacitance	Coss	V _{GS} = 0 V		205		pF
Reverse Transfer Capacitance	Crss	f = 1.0 MHz		145		pF
Turn-on Delay Time	td(on)	V _{DD} = 10 V, I _D = 3.0 A		60		ns
Rise Time	tr	Vgs = 4.0 V		310		ns
Turn-off Delay Time	t d(off)	$R_G = 10 \Omega$		380		ns
Fall Time	t _f			420		ns
Total Gate Charge	Q _G	V _{DD} = 16 V		9.0		nC
Gate to Source Charge	Qgs	Vgs = 4.0 V		2.0		nC
Gate to Drain Charge	Q _{GD}	ID = 6.0 A		4.0		nC
Body Diode Forward Voltage	V _F (S-D)	IF = 6.0 A, VGS = 0 V		0.84		V
Reverse Recovery Time	trr	IF = 6.0 A, Vgs = 0 V		480		ns
Reverse Recovery Charge	Qrr	di/dt = 50 A / μs		1200		nC

TEST CIRCUIT 1 SWITCHING TIME

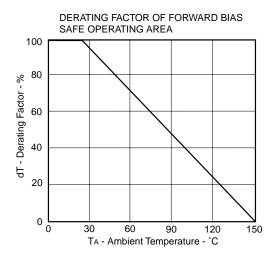
PG. \bigcirc R_{G} 0 $\tau = 1 \,\mu s$ Duty Cycle $\leq 1\%$

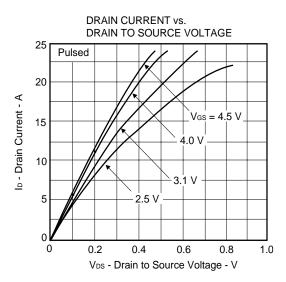


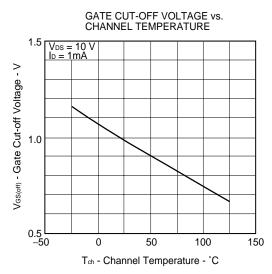
TEST CIRCUIT 2 GATE CHARGE



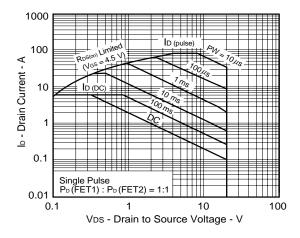
TYPICAL CHARACTERISTICS (TA = 25°C)



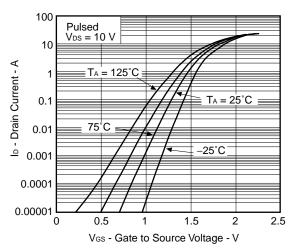




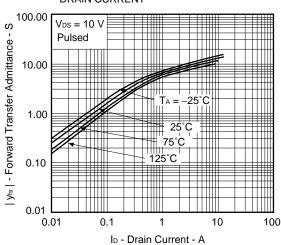
FORWARD BIAS SAFE OPERATING AREA

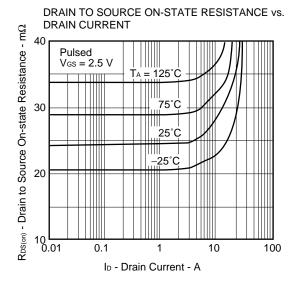


FORWARD TRANSFER CHARACTERISTICS

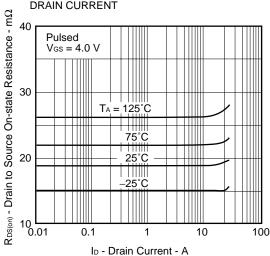


FORWARD TRANSFER ADMITTANCE Vs. DRAIN CURRENT

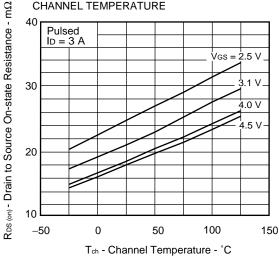




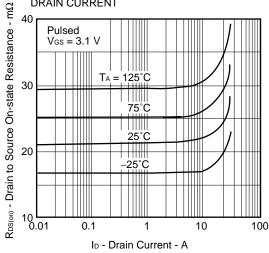
DRAIN TO SOURCE ON-STATE RESISTANCE vs. **DRAIN CURRENT**



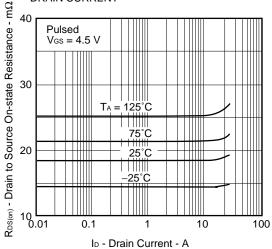
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



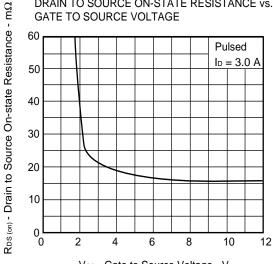
DRAIN TO SOURCE ON-STATE RESISTANCE vs. **DRAIN CURRENT**



DRAIN TO SOURCE ON-STATE RESISTANCE vs. **DRAIN CURRENT**

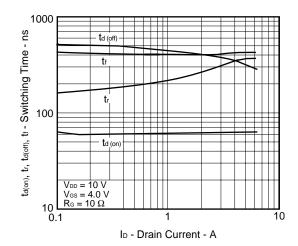


DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



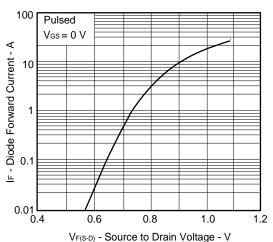
V_{GS} - Gate to Source Voltage - V

SWITCHING CHARACTERISTICS

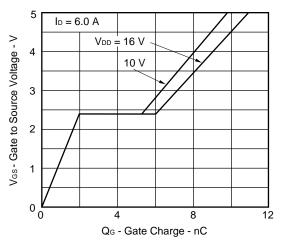


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

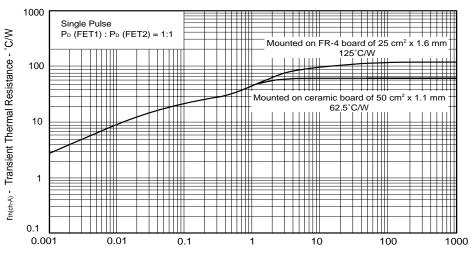
V_{DS} - Drain to Source Voltage - V



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



PW - Pulse Width - s

 μ PA1873

[MEMO]

NEC μ PA1873

[MEMO]

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