

P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μ PA1850 is a switching device which can be driven directly by a 2.5-V power source.

The μ PA1850 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 2.5-V power source
- Low on-state resistance
 $R_{DS(on)1} = 115 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -1.5 \text{ A)}$
 $R_{DS(on)2} = 130 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -1.5 \text{ A)}$
 $R_{DS(on)3} = 200 \text{ m}\Omega \text{ MAX. (} V_{GS} = -2.5 \text{ V, } I_D = -1.5 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1850GR-9JG	Power TSSOP8

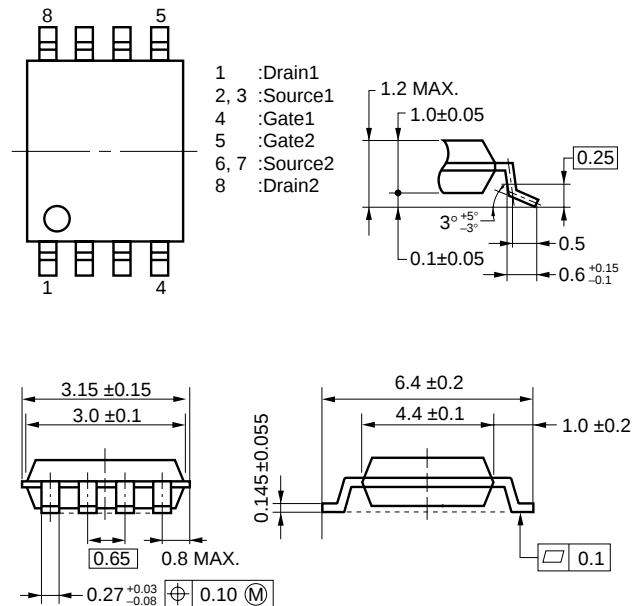
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage	V_{DS}	-12	V
Gate to Source Voltage	V_{GS}	-10/+5	V
Drain Current (DC)	$I_{D(DC)}$	∓ 2.5	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	∓ 10	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	$^\circ\text{C}$

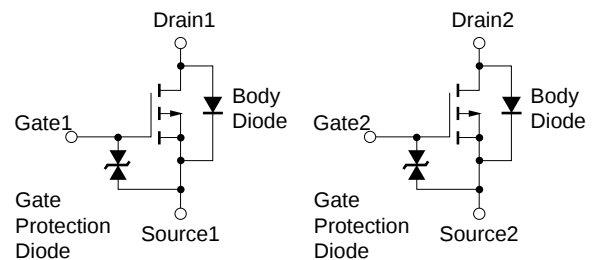
- Notes** 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of $5000 \text{ mm}^2 \times 1.1 \text{ mm}$

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.

PACKAGE DRAWING (Unit : mm)



EQUIVALENT CIRCUIT

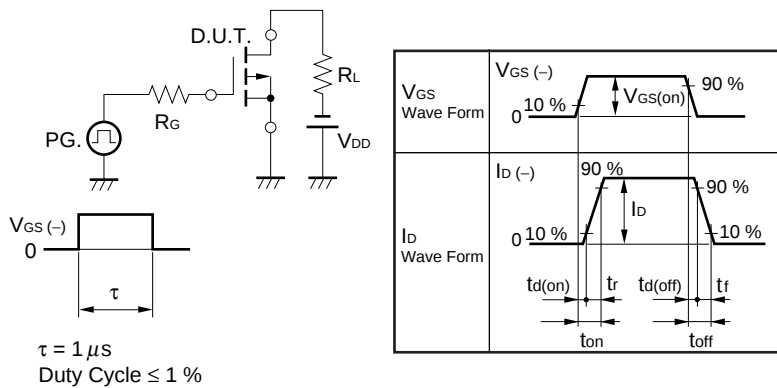


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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

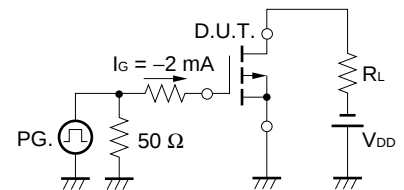
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I _{DSS}	V _{DS} = -12 V, V _{GS} = 0 V			-10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ± 10 V, V _{DS} = 0 V			± 10	μA
★ Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1 mA	-0.5	-1.0	-1.5	V
★ Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -1.5 A	2.0	5.0		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -4.5 V, I _D = -1.5 A		80	115	mΩ
	R _{DS(on)2}	V _{GS} = -4.0 V, I _D = -1.5 A		85	130	mΩ
	R _{DS(on)3}	V _{GS} = -2.5 V, I _D = -1.5 A		127	200	mΩ
Input Capacitance	C _{iss}	V _{DS} = -10 V		260		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		300		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		45		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10 V		120		ns
Rise Time	t _r	I _D = -1.5 A		420		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = -4.0 V		520		ns
Fall Time	t _f	R _G = 10 Ω		430		ns
Total Gate Charge	Q _G	V _{DD} = -10 V		12		nC
Gate to Source Charge	Q _{GS}	I _D = -2.5 A		2		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = -4.0 V		5		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 2.5 A, V _{GS} = 0 V		0.80		V
★ Reverse Recovery Time	t _{rr}	I _F = 2.5 A, V _{GS} = 0 V		750		ns
★ Reverse Recovery Charge	Q _{rr}	di/dt = 10 A/μs		950		nC

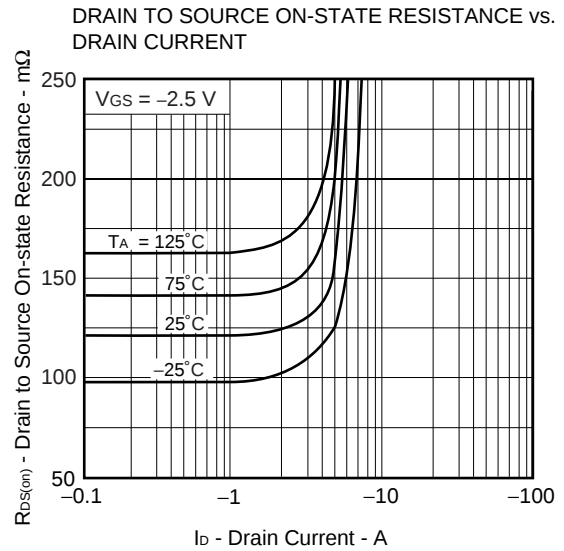
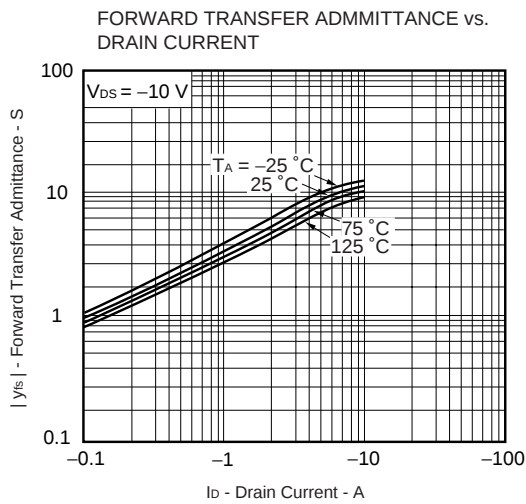
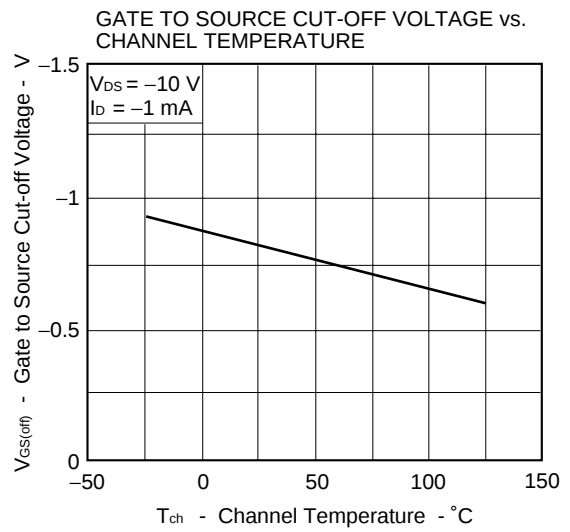
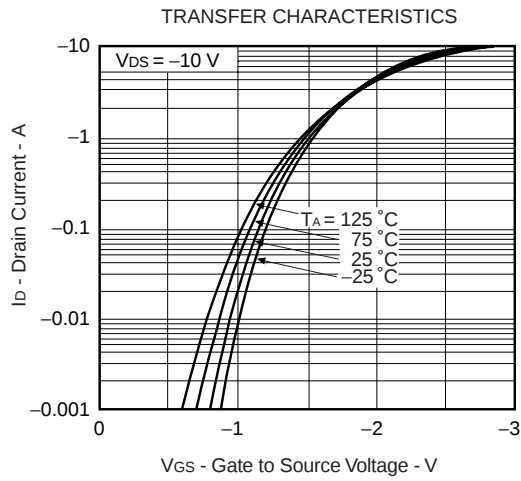
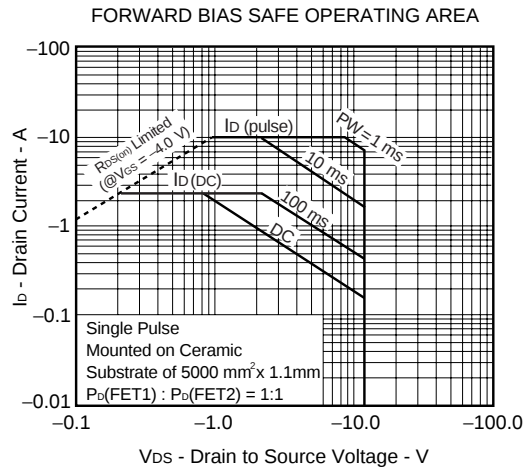
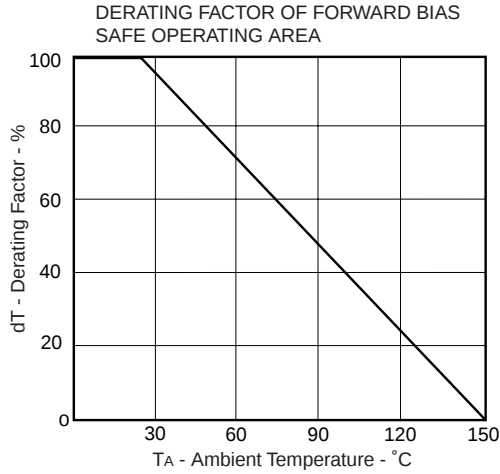
TEST CIRCUIT 1 SWITCHING TIME



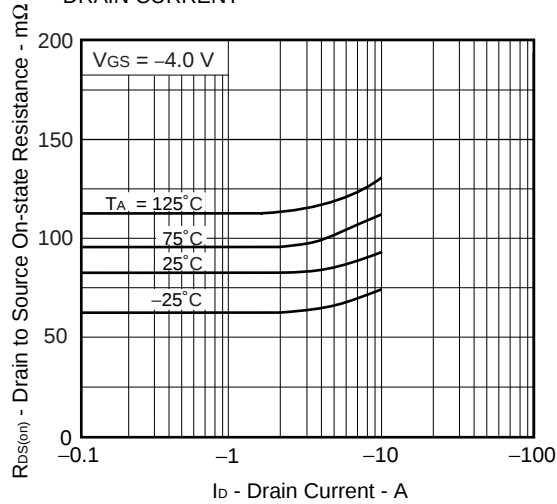
TEST CIRCUIT 2 GATE CHARGE



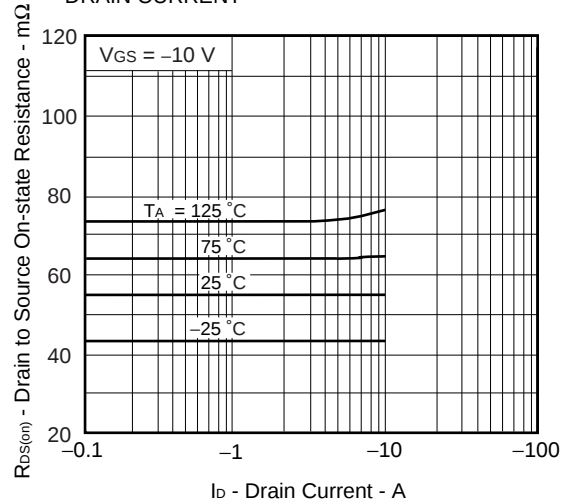
★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



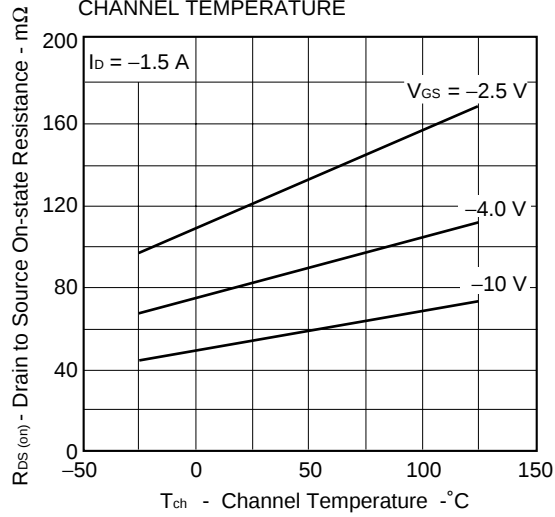
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



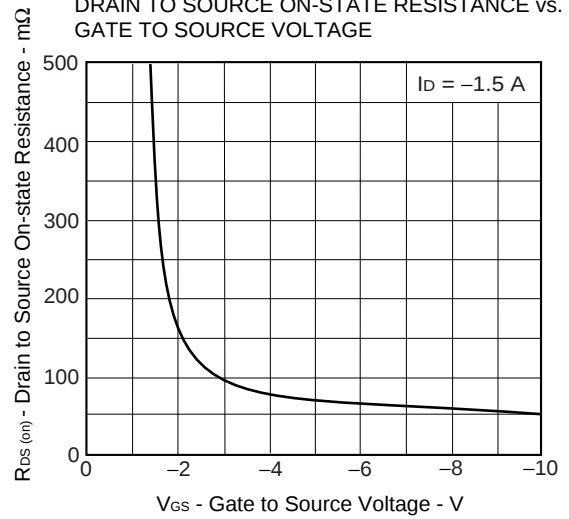
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



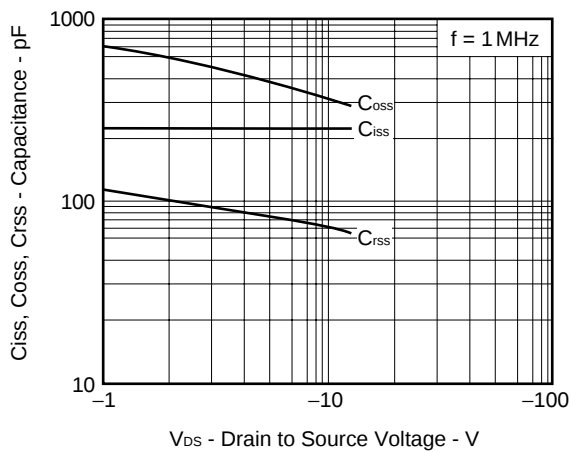
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



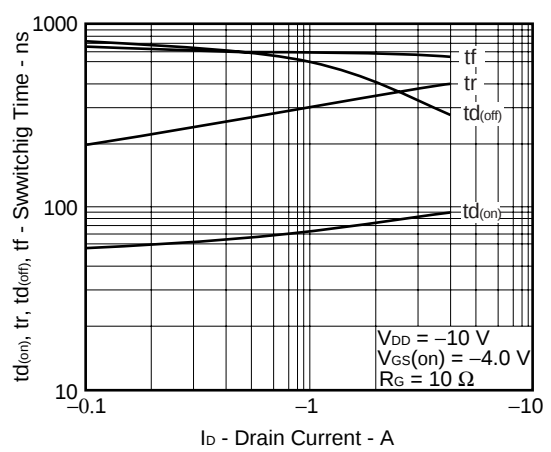
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

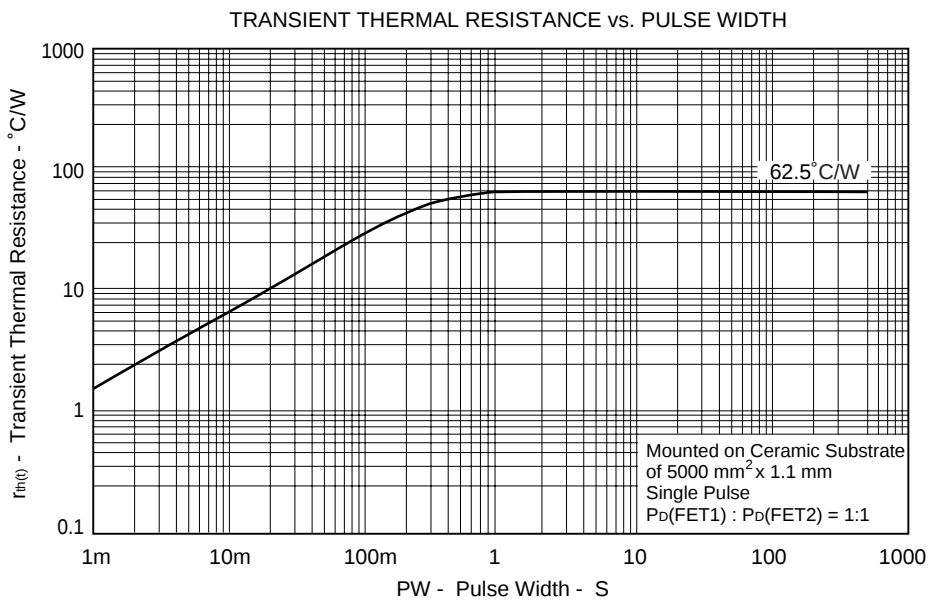
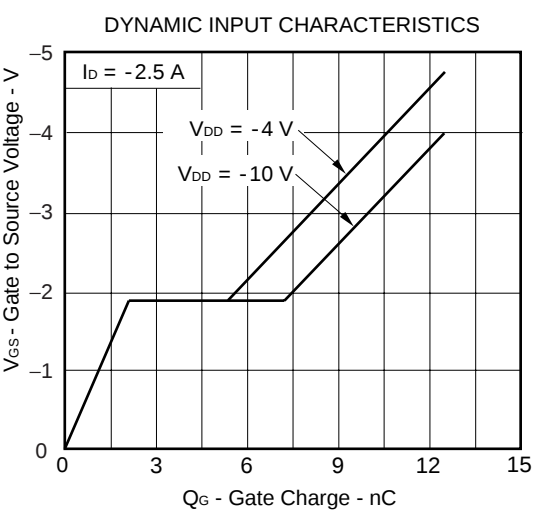
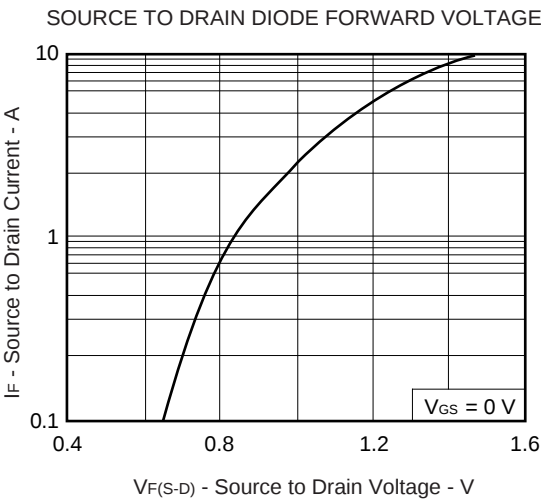


CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS





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