

P-CHANNEL MOS FIELD EFFECT TRANSISTOR
 FOR SWITCHING

DESCRIPTION

The μ PA1851 is a switching device which can be driven directly by a 4.0-V power source.

The μ PA1851 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 4.0-V power source
- Low on-state resistance
 $R_{DS(on)1} = 105 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -1.5 \text{ A)}$
 $R_{DS(on)2} = 210 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -1.5 \text{ A)}$
 $R_{DS(on)3} = 250 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -1.5 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1851GR-9JG	Power TSSOP8

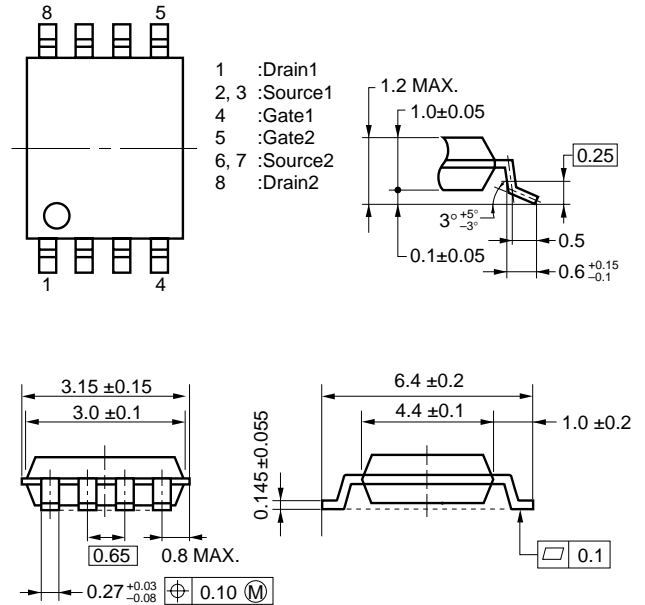
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage	V_{DSS}	-20	V
Gate to Source Voltage	V_{GSS}	-20/+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	$^\circ\text{C}$

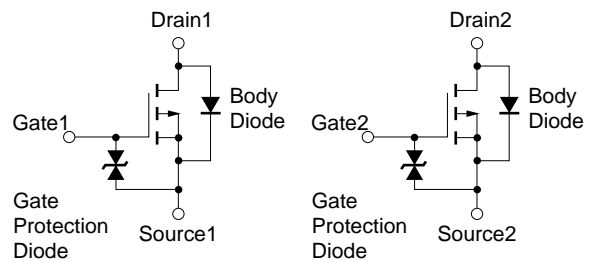
- Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of $50 \text{ cm}^2 \times 1.1 \text{ mm}$

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

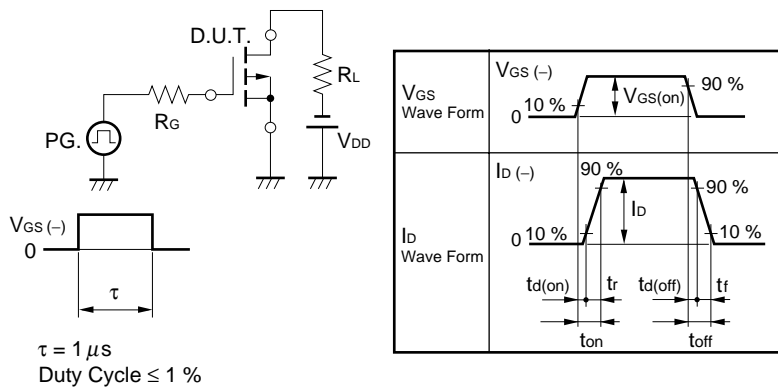


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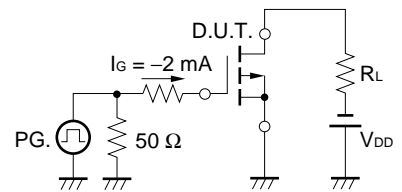
★ ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I _{DSS}	V _{DS} = -20 V, V _{GS} = 0 V			-10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ± 20 V, V _{DS} = 0 V			± 10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = -10 V, I _D = -1 mA	-1.0	-1.5	-2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = -10 V, I _D = -1.5 A	1	3.5		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = -10 V, I _D = -1.5 A		83	105	mΩ
	R _{DS(on)2}	V _{GS} = -4.5 V, I _D = -1.5 A		141	210	mΩ
	R _{DS(on)3}	V _{GS} = -4.0 V, I _D = -1.5 A		163	250	mΩ
Input Capacitance	C _{iSS}	V _{DS} = -10 V		220		pF
Output Capacitance	C _{oSS}	V _{GS} = 0 V		240		pF
Reverse Transfer Capacitance	C _{rSS}	f = 1 MHz		50		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10 V		110		ns
Rise Time	t _r	I _D = -2.0 A		500		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = -4.0 V		160		ns
Fall Time	t _f	R _G = 10 Ω		310		ns
Total Gate Charge	Q _G	V _{DD} = -10 V		8.3		nC
Gate to Source Charge	Q _{GS}	I _D = -2.5 A		2.4		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = -4.0 V		4.7		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 2.5 A, V _{GS} = 0 V		0.82		V
Reverse Recovery Time	t _{rr}	I _F = 2.5 A, V _{GS} = 0 V		40		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 20 A/μs		6.5		nC

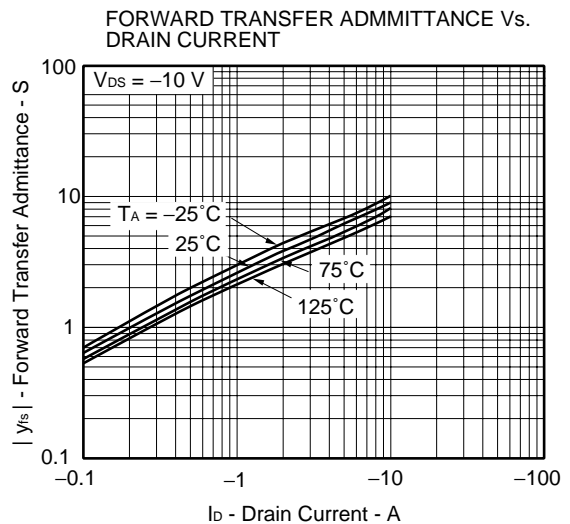
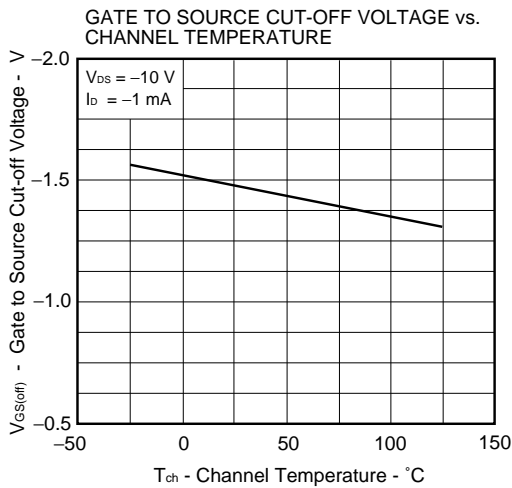
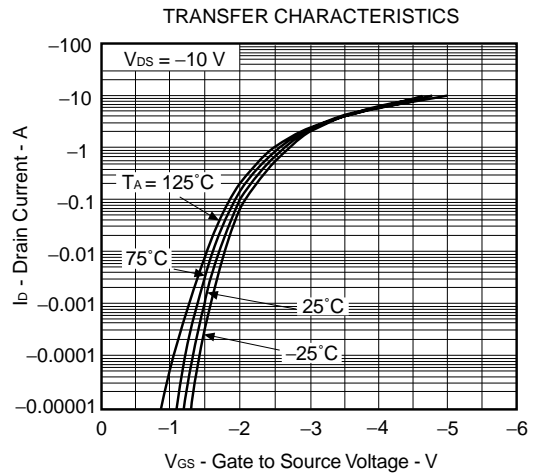
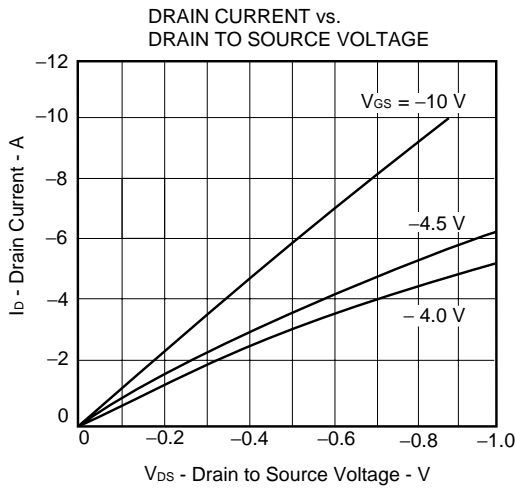
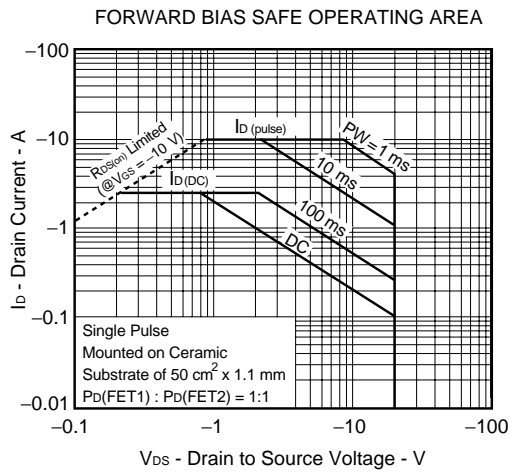
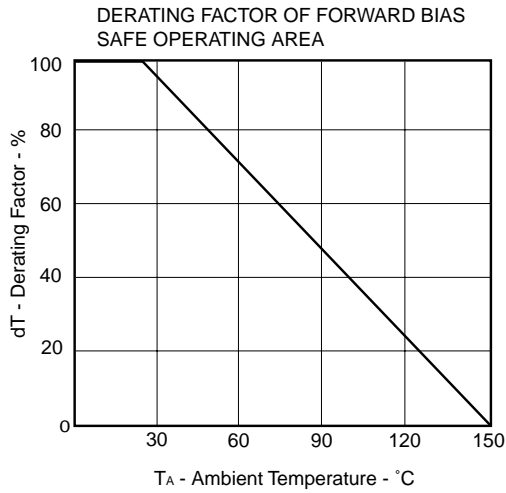
★ TEST CIRCUIT 1 SWITCHING TIME

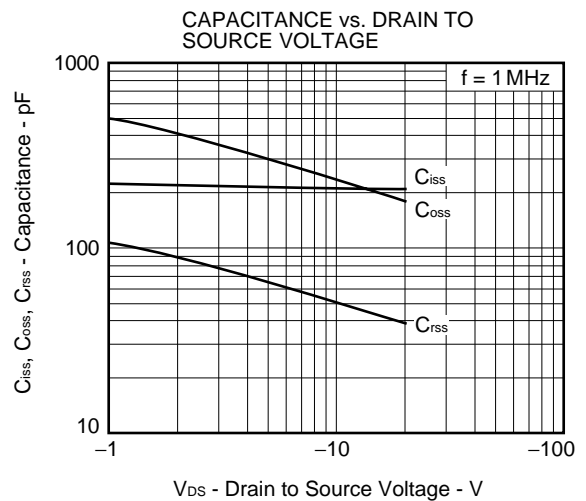
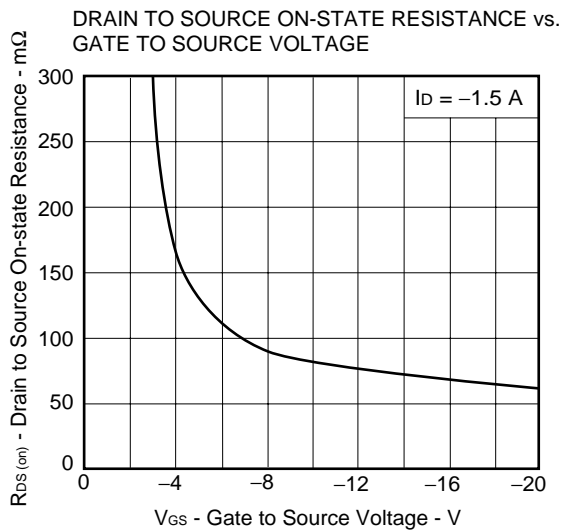
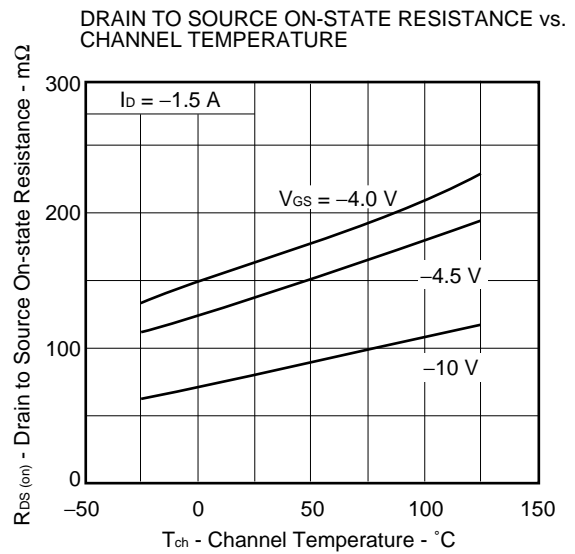
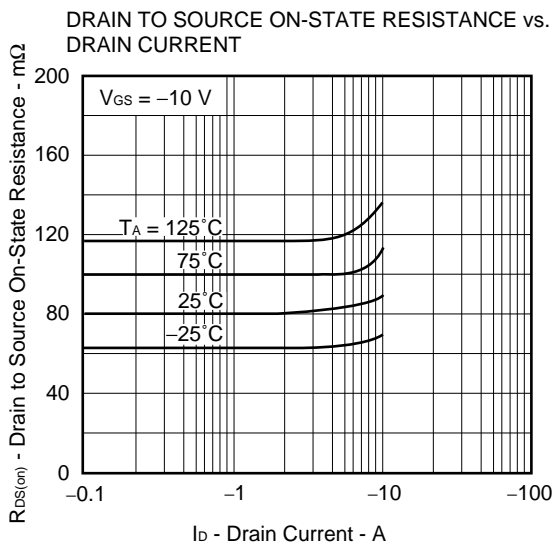
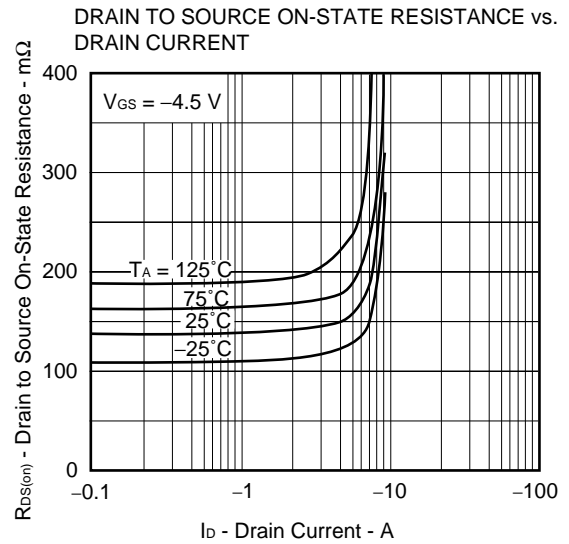
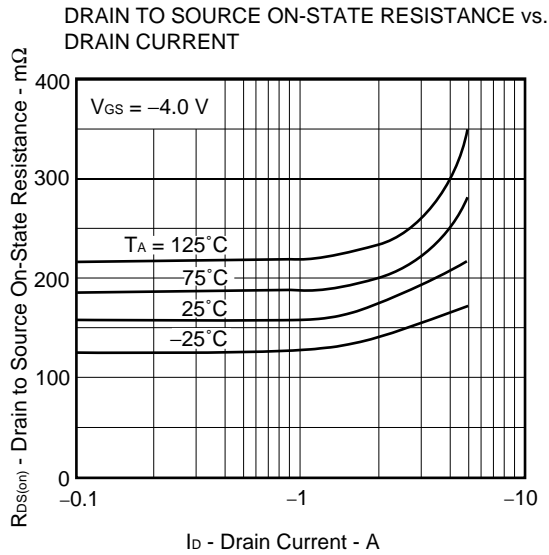


TEST CIRCUIT 2 GATE CHARGE

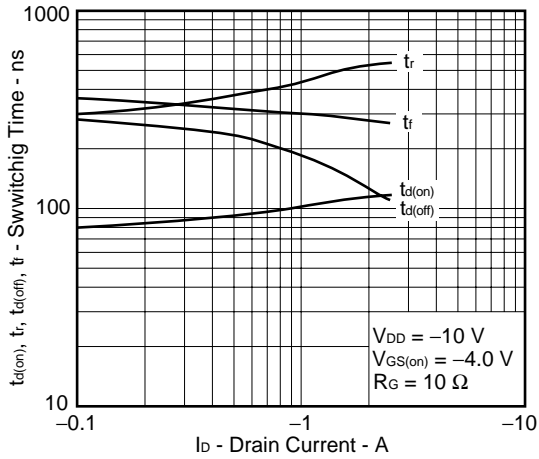


★ TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

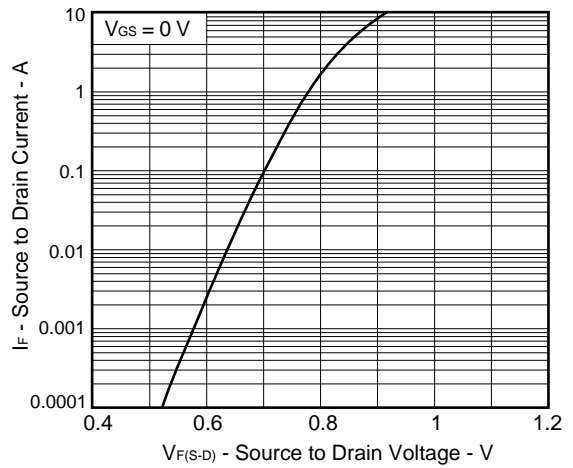




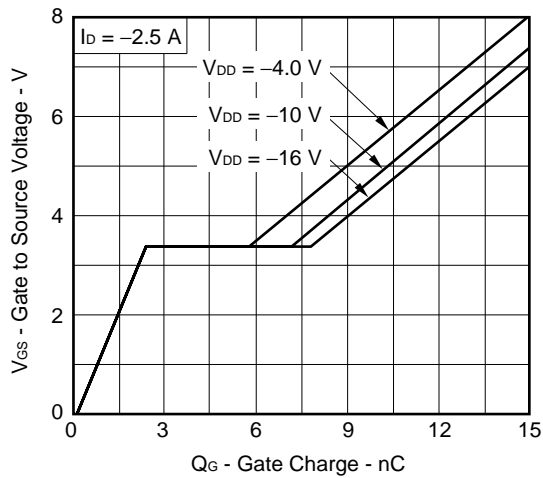
SWITCHING CHARACTERISTICS



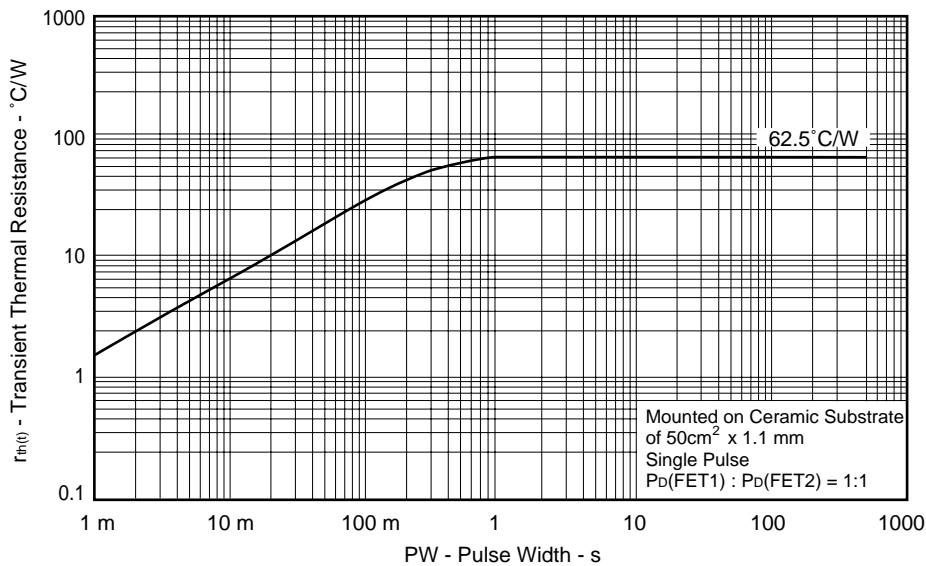
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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