

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 |

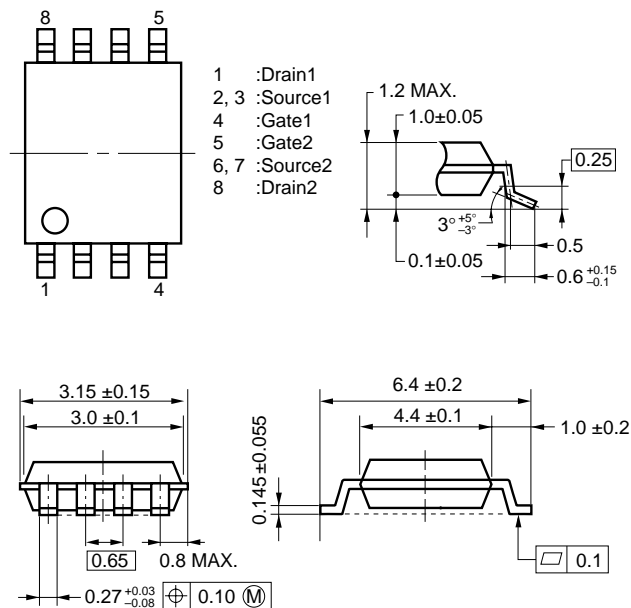
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

| | | | |
|--|-----------------------|-------------|----|
| Drain to Source Voltage | V _{DSS} | -12 | V |
| Gate to Source Voltage | V _{GSS} | -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 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |

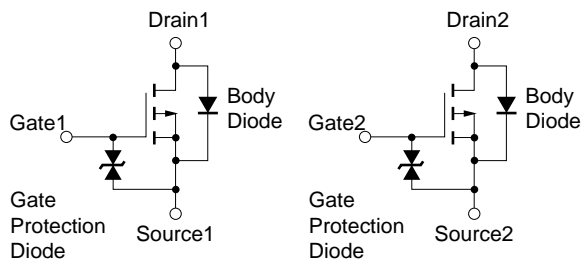
- Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1 %
 2. Mounted on ceramic substrate of 5000 mm² x 1.1 mm

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.

PACKAGE DRAWING (Unit : mm)



EQUIVALENT CIRCUIT

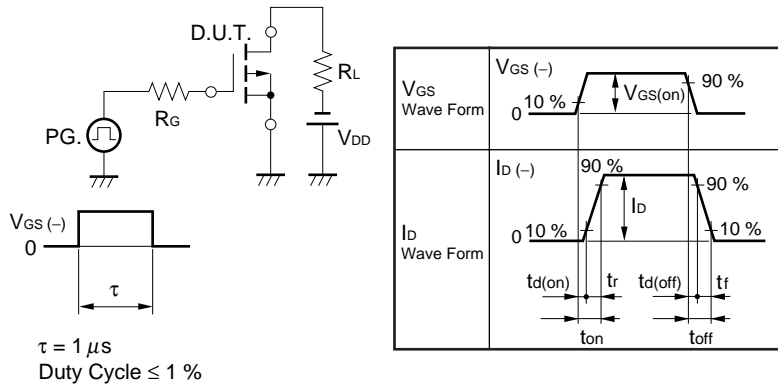


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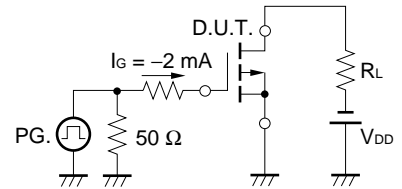
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------|---|------|------|------|------|
| Drain Cut-off Current | I _{DSS} | V _{DS} = -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 |

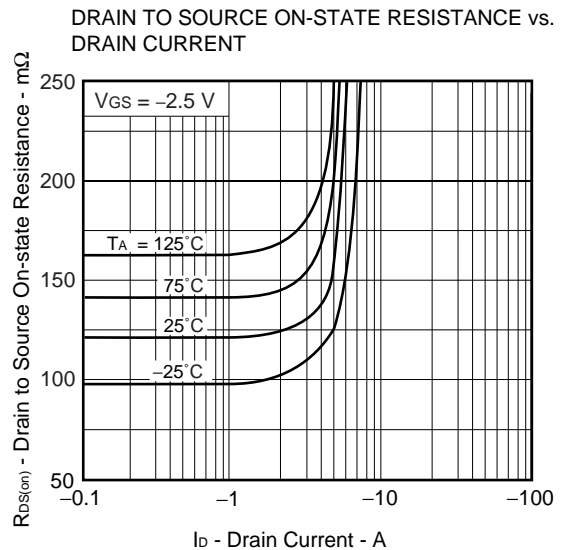
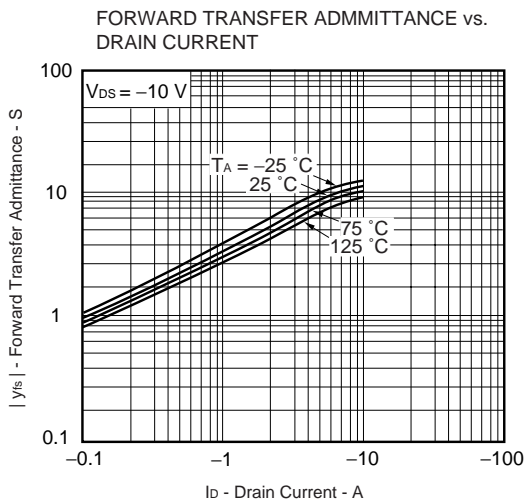
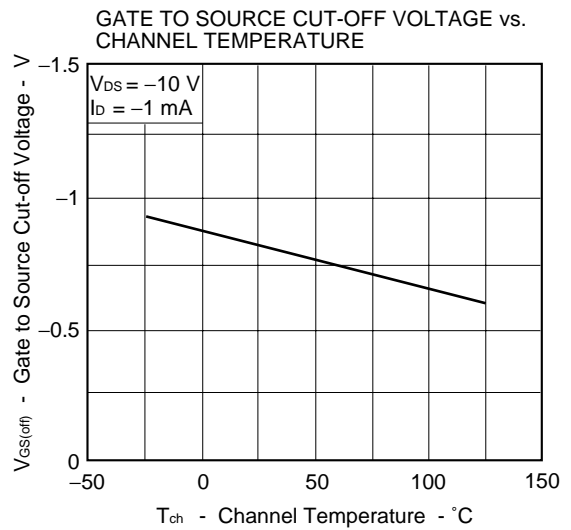
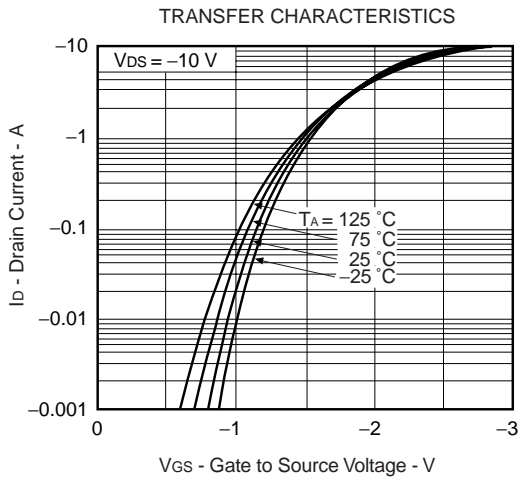
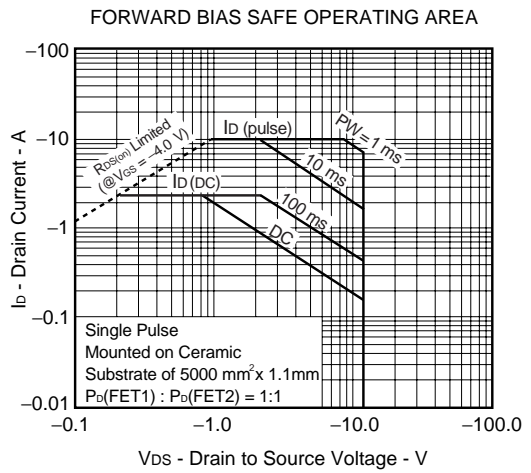
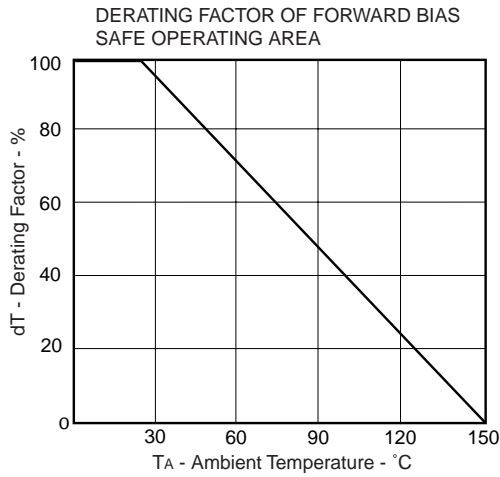
TEST CIRCUIT 1 SWITCHING TIME

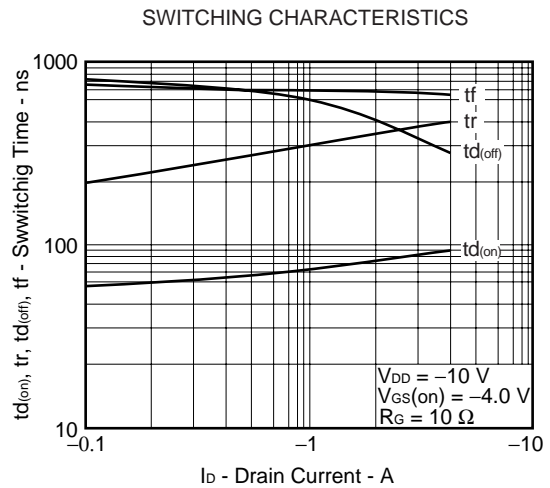
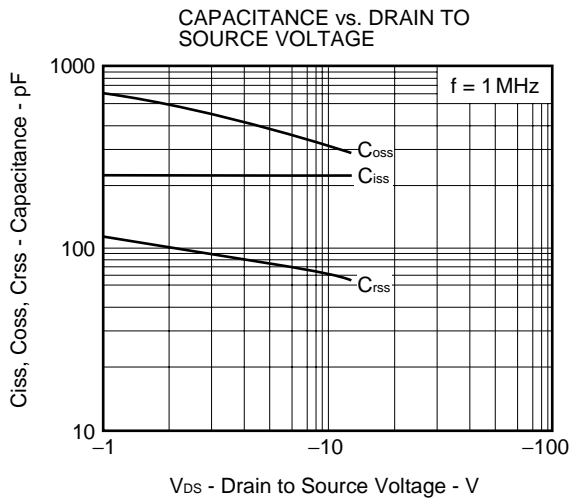
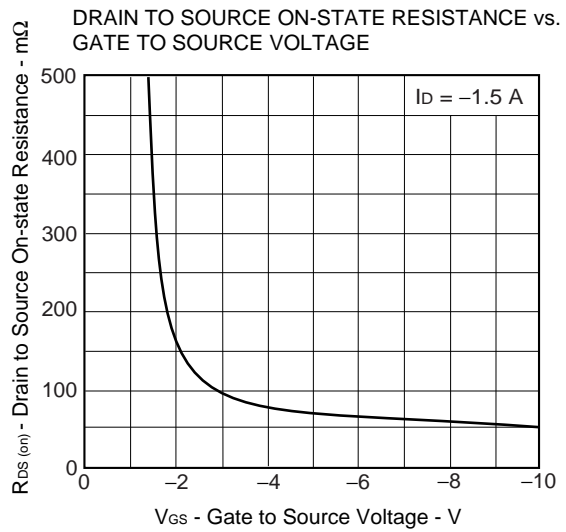
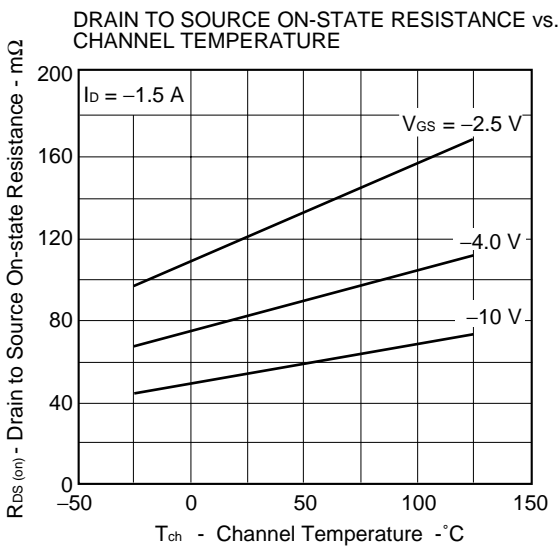
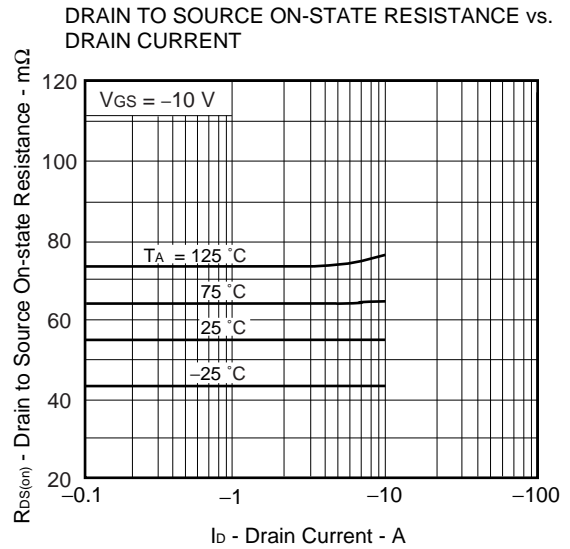
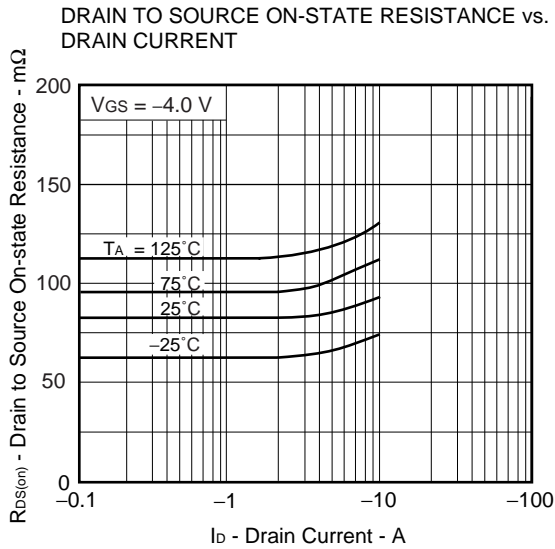


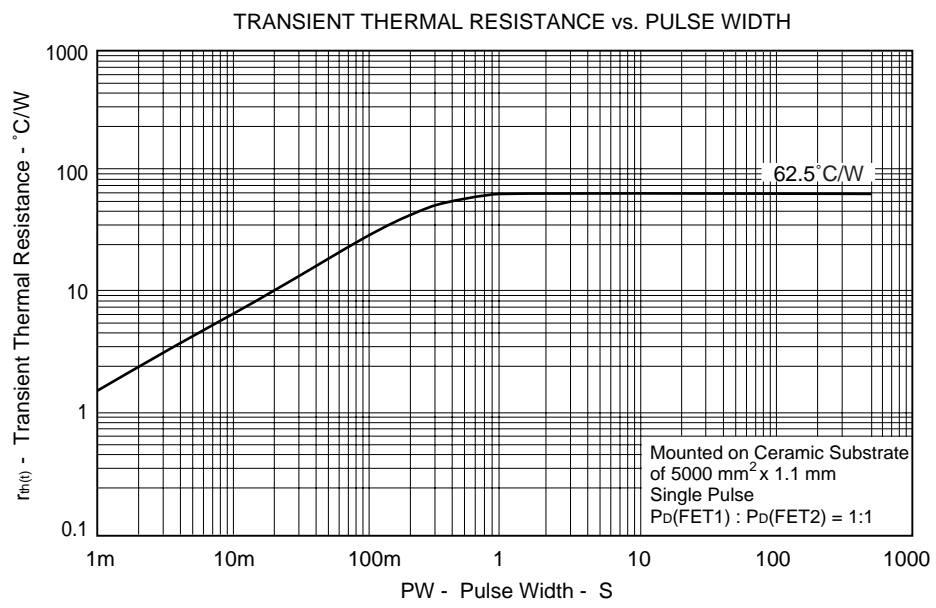
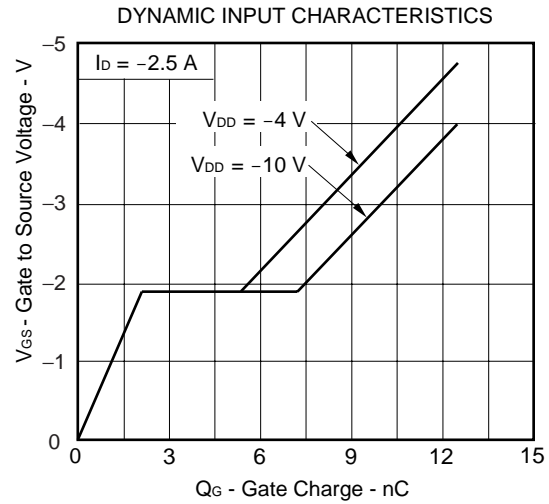
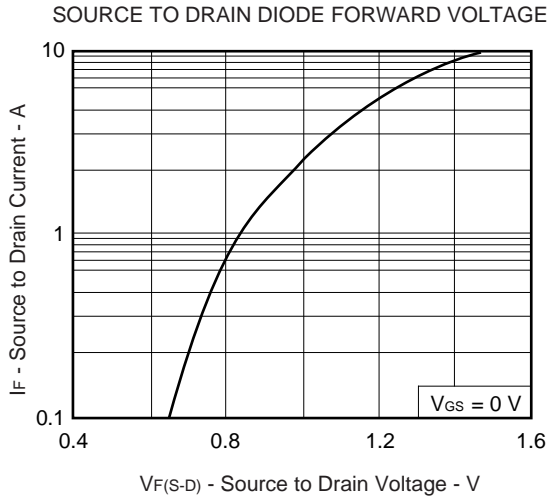
TEST CIRCUIT 2 GATE CHARGE



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







[MEMO]

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