

N-CHANNEL MOS FIELD EFFECT TRANSISTOR
 FOR SWITCHING

DESCRIPTION

The μ PA1852 is a switching device which can be driven directly by a 2.5-V power source.

The μ PA1852 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
 $R_{DS(on)1} = 40 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)2} = 45 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 3.0 \text{ A)}$
 $R_{DS(on)3} = 60 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 3.0 \text{ A)}$
- Built-in G-S protection diode against ESD

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|--------------------|--------------|
| μ PA1852GR-9JG | Power TSSOP8 |

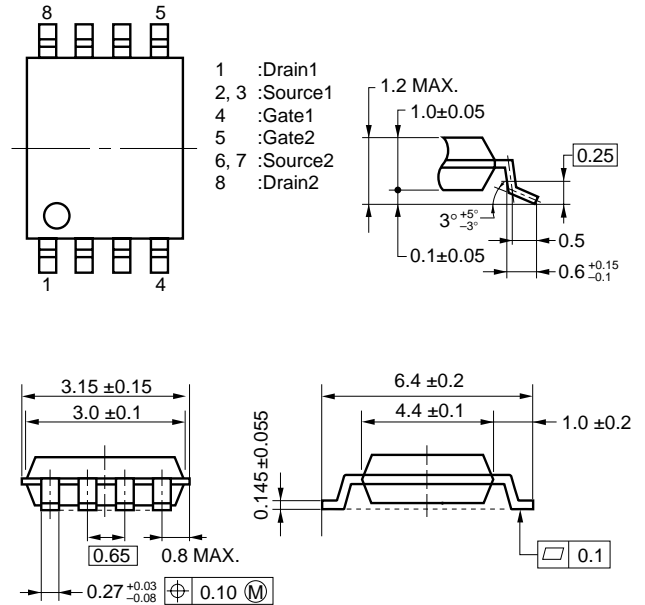
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

| | | | |
|--|----------------|-------------|------------------|
| Drain to Source Voltage | V_{DSS} | 20 | V |
| Gate to Source Voltage | V_{GSS} | ± 12 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ± 6.0 | A |
| Drain Current (pulse) ^{Note1} | $I_{D(pulse)}$ | ± 24 | 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 | $^\circ\text{C}$ |

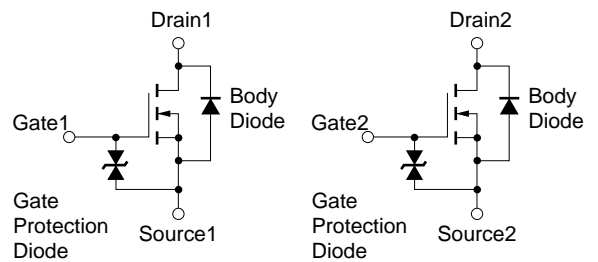
- Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of $5000 \text{ mm}^2 \times 1.1 \text{ mm}$

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

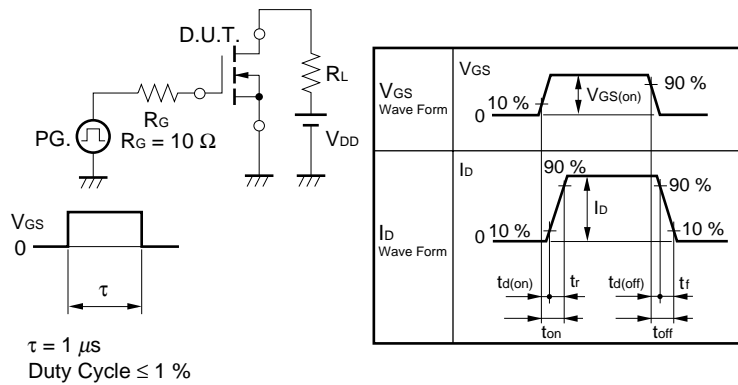


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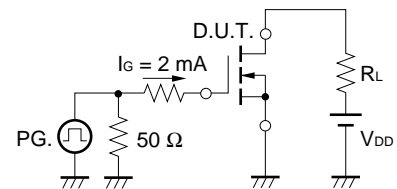
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| 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} = ±12 V, V _{DS} = 0 V | | | ±10 | μA |
| Gate Cut-off Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 mA | 0.5 | 0.74 | 1.5 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = 10 V, I _D = 3.0 A | 1 | 10 | | S |
| Drain to Source On-state Resistance | R _{DS(on)1} | V _{GS} = 4.5 V, I _D = 3.0 A | | 29 | 40 | mΩ |
| | R _{DS(on)2} | V _{GS} = 4.0 V, I _D = 3.0 A | | 31 | 45 | mΩ |
| | R _{DS(on)3} | V _{GS} = 2.5 V, I _D = 3.0 A | | 39 | 60 | mΩ |
| Input Capacitance | C _{iSS} | V _{DS} = 10 V | | 420 | | pF |
| Output Capacitance | C _{oSS} | V _{GS} = 0 V | | 265 | | pF |
| Reverse Transfer Capacitance | C _{rSS} | f = 1 MHz | | 120 | | pF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} = 10 V | | 55 | | ns |
| Rise Time | t _r | I _D = 1.5 A | | 160 | | ns |
| Turn-off Delay Time | t _{d(off)} | V _{GS(on)} = 4.0 V | | 385 | | ns |
| Fall Time | t _f | R _G = 10 Ω | | 355 | | ns |
| Total Gate Charge | Q _G | V _{DD} = 10 V | | 6 | | nC |
| Gate to Source Charge | Q _{GS} | I _D = 6.0 A | | 2 | | nC |
| Gate to Drain Charge | Q _{GD} | V _{GS} = 4.0 V | | 3 | | nC |
| Diode Forward Voltage | V _{F(S-D)} | I _F = 6.0 A, V _{GS} = 0 V | | 0.74 | | V |
| Reverse Recovery Time | t _{rr} | I _F = 6.0 A, V _{GS} = 0 V | | 20 | | ns |
| Reverse Recovery Charge | Q _{rr} | di/dt = 15 A/μs | | 2 | | nC |

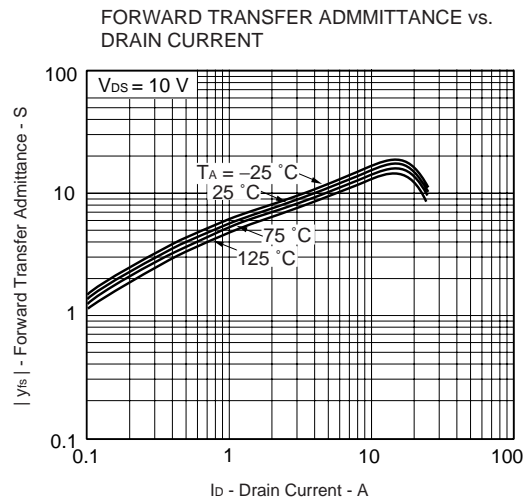
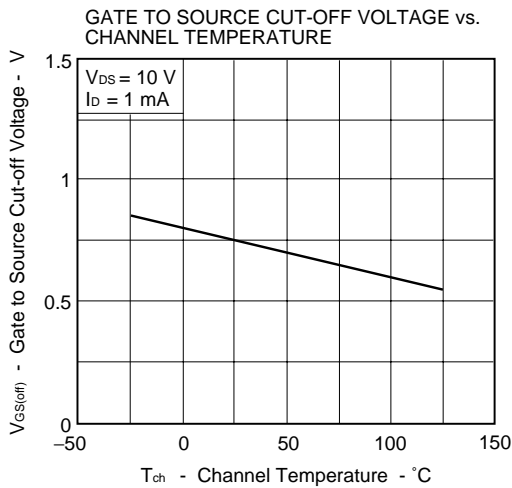
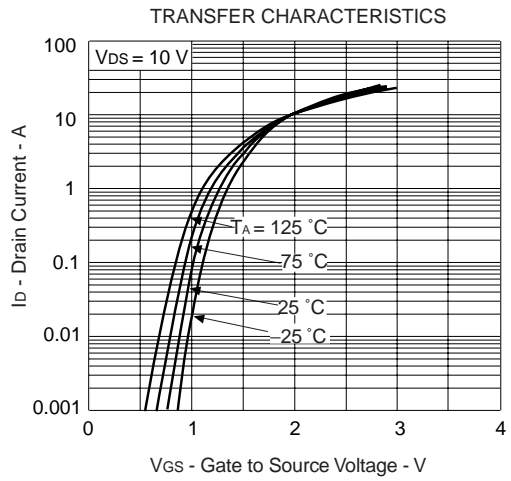
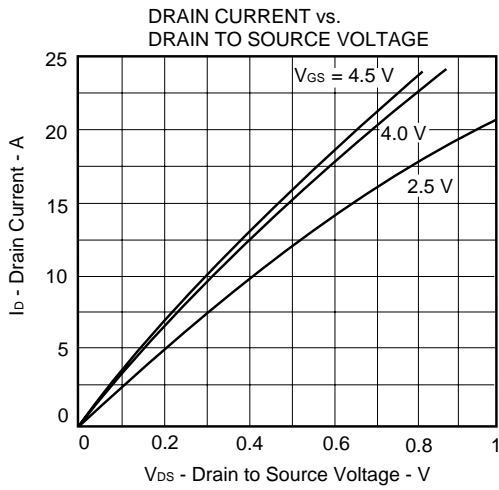
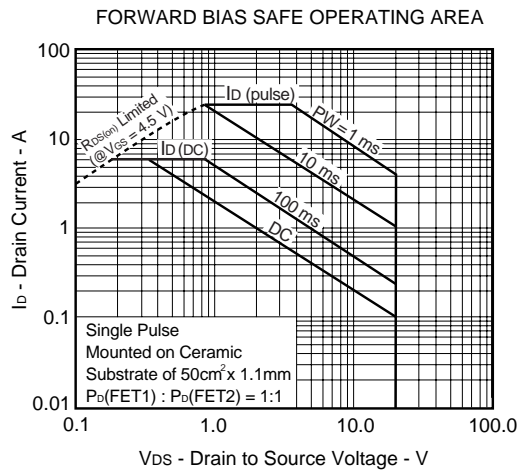
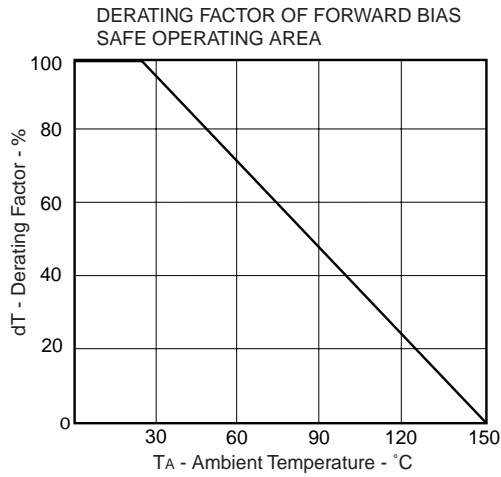
TEST CIRCUIT 1 SWITCHING TIME

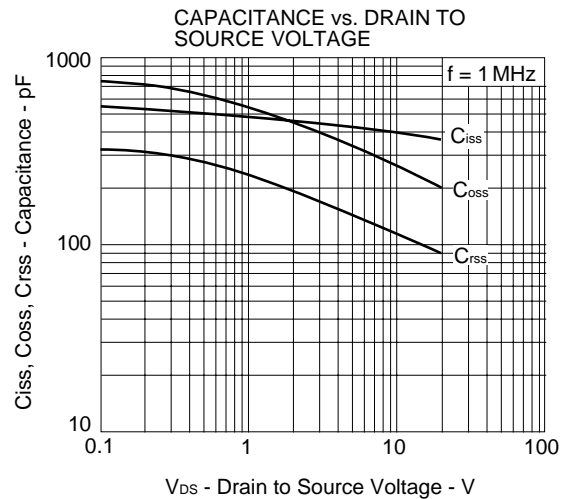
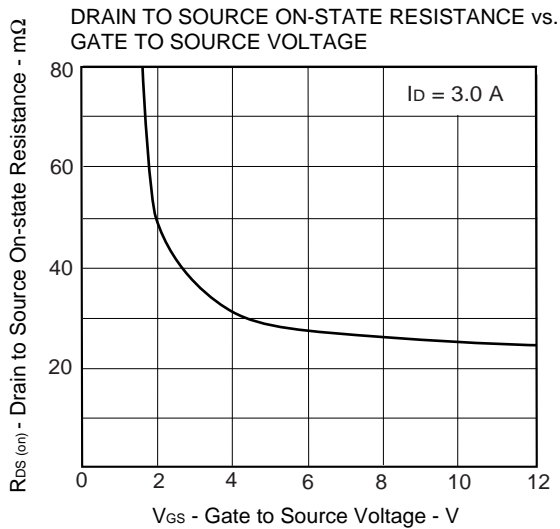
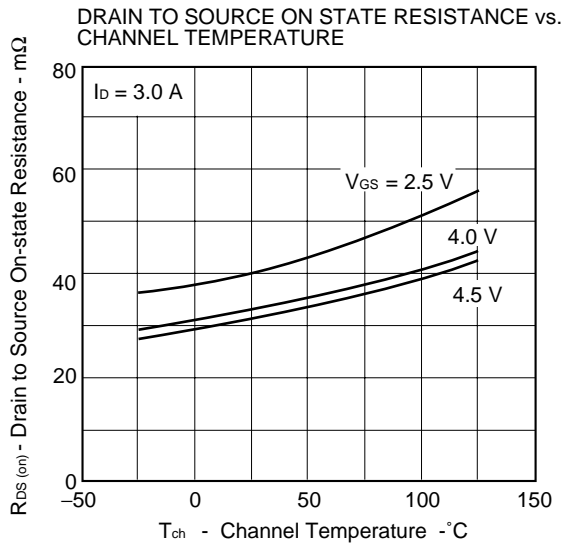
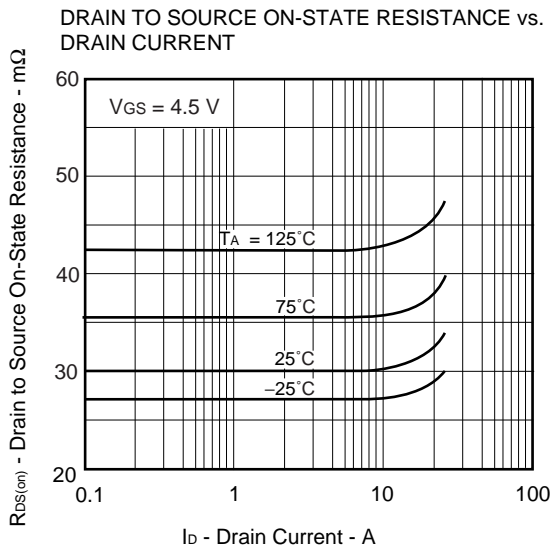
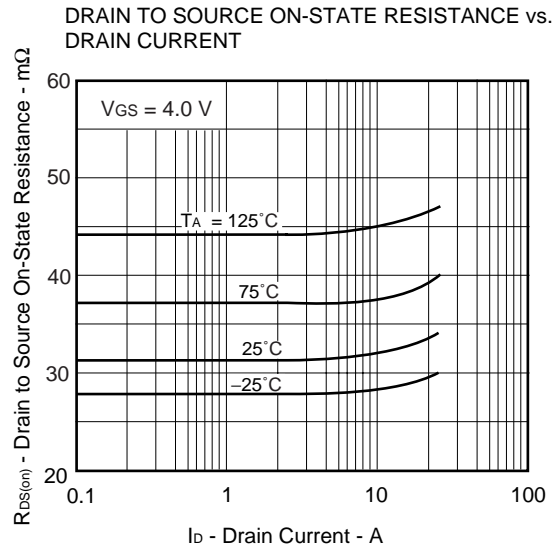
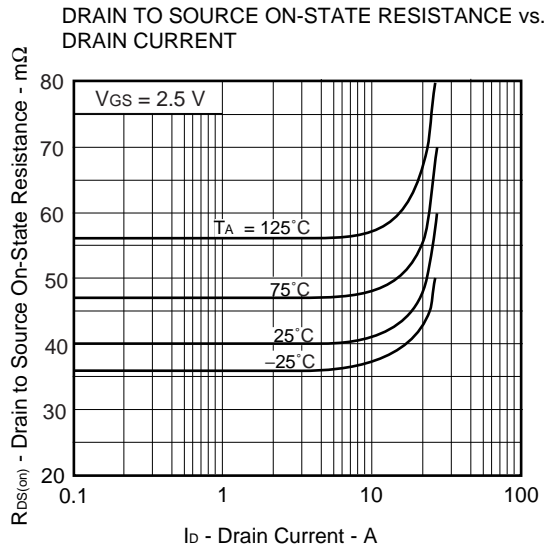


TEST CIRCUIT 2 GATE CHARGE

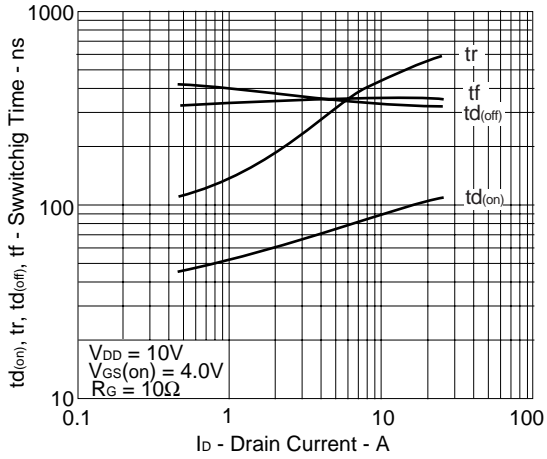


TYPICAL CHARACTERISTICS (T_A = 25°C)

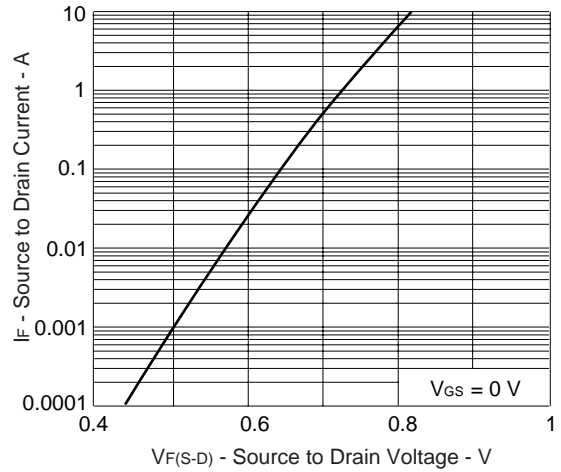




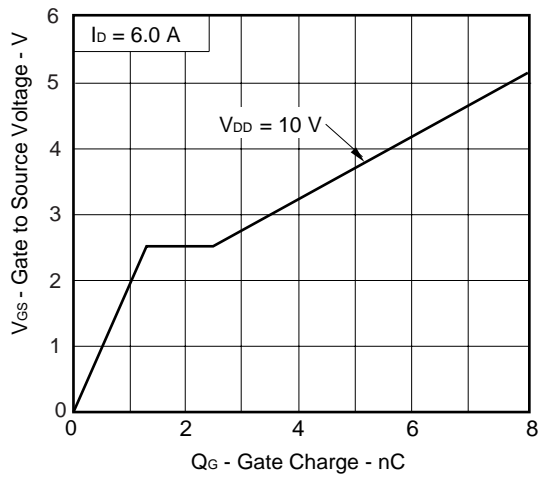
SWITCHING CHARACTERISTICS



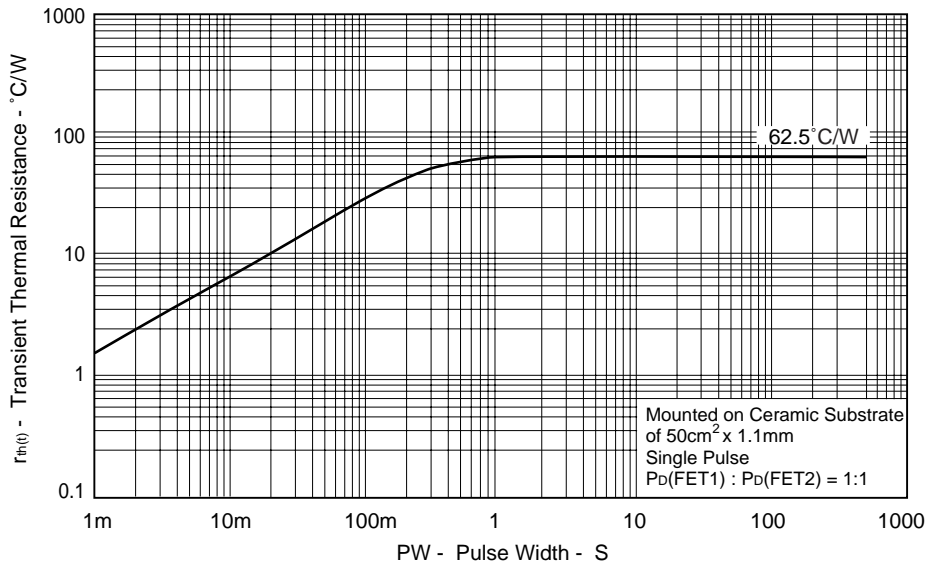
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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