

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

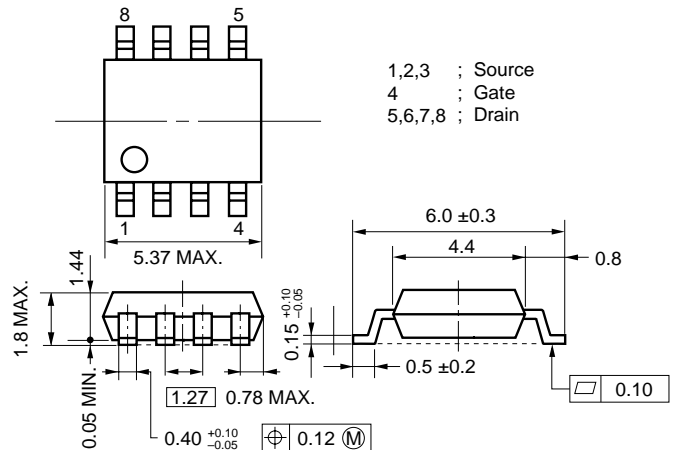
DESCRIPTION

This product is N-Channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

FEATURES

- Low on-resistance
 $R_{DS(on)1} = 10.0 \text{ m}\Omega$ (TYP.) ($V_{GS} = 10 \text{ V}$, $I_D = 5.0 \text{ A}$)
 $R_{DS(on)2} = 12.5 \text{ m}\Omega$ (TYP.) ($V_{GS} = 4.5 \text{ V}$, $I_D = 5.0 \text{ A}$)
 $R_{DS(on)3} = 14.0 \text{ m}\Omega$ (TYP.) ($V_{GS} = 4.0 \text{ V}$, $I_D = 5.0 \text{ A}$)
- Low C_{iss} : $C_{iss} = 1400 \text{ pF}$ (TYP.)
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit : mm)



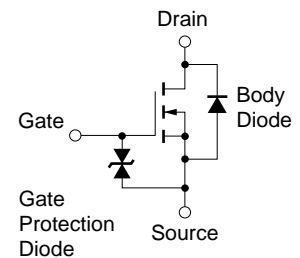
ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|---------------|------------|
| μ PA1707G | Power SOP8 |

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, All terminals are connected.)

| | | | |
|---|----------------|-------------|----|
| Drain to Source Voltage ($V_{GS} = 0 \text{ V}$) | V_{DSS} | 30 | V |
| Gate to Source Voltage ($V_{DS} = 0 \text{ V}$) | V_{GSS} | ±20 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ±10 | A |
| Drain Current (pulse) ^{Note1} | $I_{D(pulse)}$ | ±40 | A |
| Total Power Dissipation ($T_A = 25^\circ\text{C}$) ^{Note2} | P_T | 2.0 | W |
| Channel Temperature | T_{ch} | 150 | °C |
| Storage Temperature | T_{stg} | -55 to +150 | °C |

EQUIVALENT CIRCUIT



- Notes 1.** $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$
2. Mounted on ceramic substrate of $1200 \text{ mm}^2 \times 1.7 \text{ mm}$

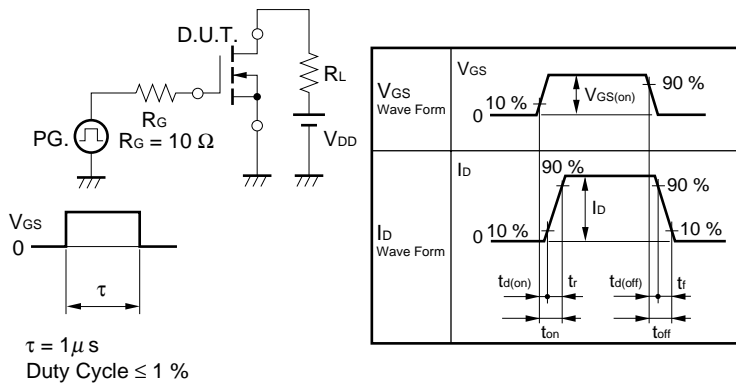
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

The information in this document is subject to change without notice.

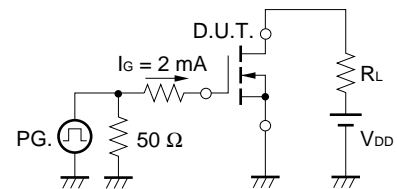
ELECTRICAL CHARACTERISTICS (T_A = 25 °C, All terminals are connected.)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------|---|------|------|------|------|
| Drain to Source On-state Resistance | R _{DS(on)1} | V _{GS} = 10 V, I _D = 5.0 A | | 10.0 | 13.5 | mΩ |
| | R _{DS(on)2} | V _{GS} = 4.5 V, I _D = 5.0 A | | 12.5 | 18 | mΩ |
| | R _{DS(on)3} | V _{GS} = 4.0 V, I _D = 5.0 A | | 14.0 | 21 | mΩ |
| Gate to Source Cut-off Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 mA | 1.5 | 2.0 | 2.5 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = 10 V, I _D = 5.0 A | 5.0 | 13 | | S |
| Drain Leakage Current | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | | | 10 | μA |
| Gate to Source Leakage Current | I _{GSS} | V _{GS} = ±20 V, V _{DS} = 0 V | | | ±10 | μA |
| Input Capacitance | C _{iSS} | V _{DS} = 10 V | | 1400 | | pF |
| Output Capacitance | C _{oSS} | V _{GS} = 0 V | | 450 | | pF |
| Reverse Transfer Capacitance | C _{rSS} | f = 1 MHz | | 180 | | pF |
| Turn-on Delay Time | t _{d(on)} | I _D = 5.0 A | | 20 | | ns |
| Rise Time | t _r | V _{GS(on)} = 10 V | | 185 | | ns |
| Turn-off Delay Time | t _{d(off)} | V _{DD} = 15 V | | 65 | | ns |
| Fall Time | t _f | R _G = 10 Ω | | 40 | | ns |
| Total Gate Charge | Q _G | I _D = 10 A | | 26 | | nC |
| Gate to Source Charge | Q _{GS} | V _{DD} = 24 V | | 4.2 | | nC |
| Gate to Drain Charge | Q _{GD} | V _{GS} = 10 V | | 6.5 | | nC |
| Body Diode Forward Voltage | V _{F(S-D)} | I _F = 10 A, V _{GS} = 0 V | | 0.8 | | V |
| Reverse Recovery Time | t _{rr} | I _F = 10 A, V _{GS} = 0 V | | 30 | | ns |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100 A/μs | | 25 | | nC |

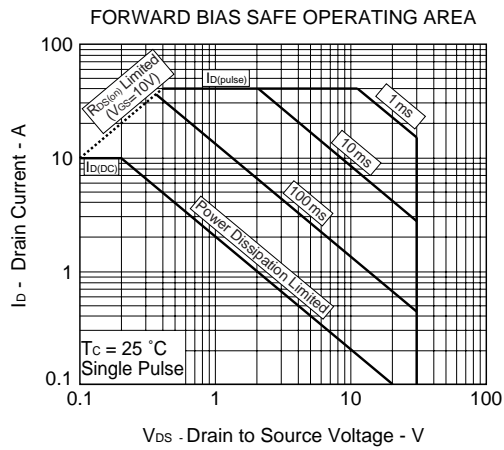
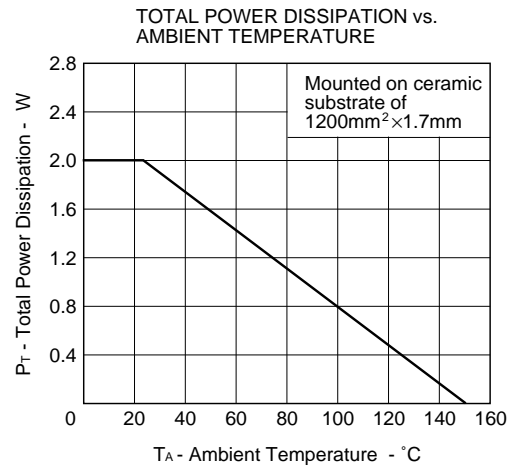
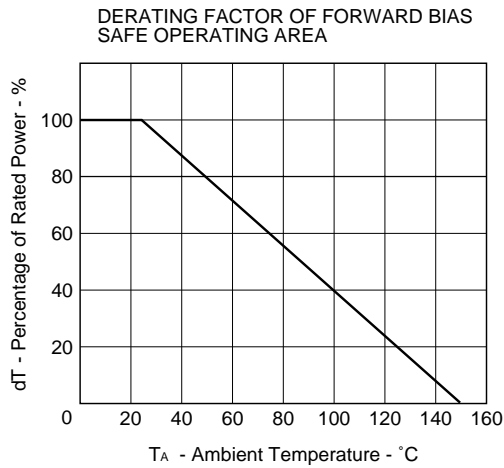
TEST CIRCUIT 1 SWITCHING TIME



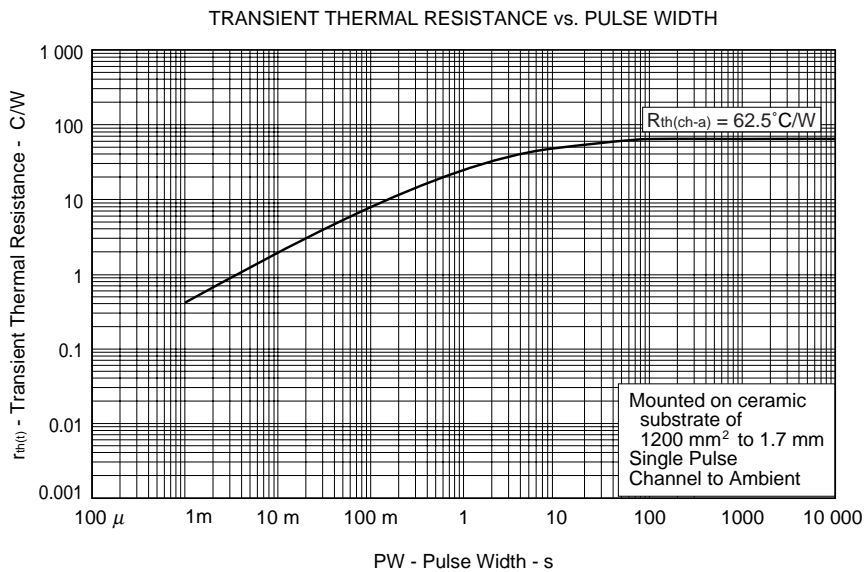
TEST CIRCUIT 2 GATE CHARGE

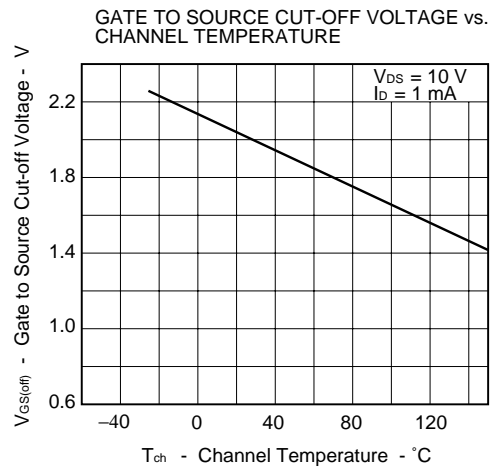
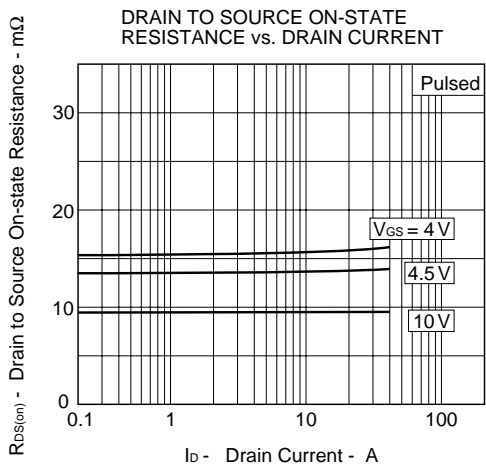
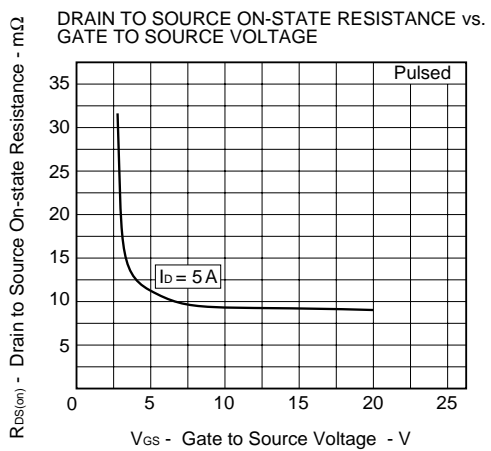
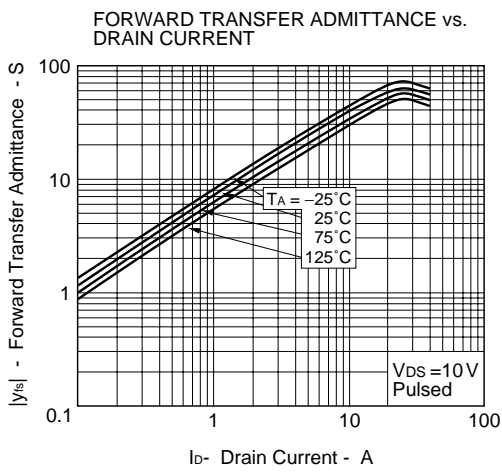
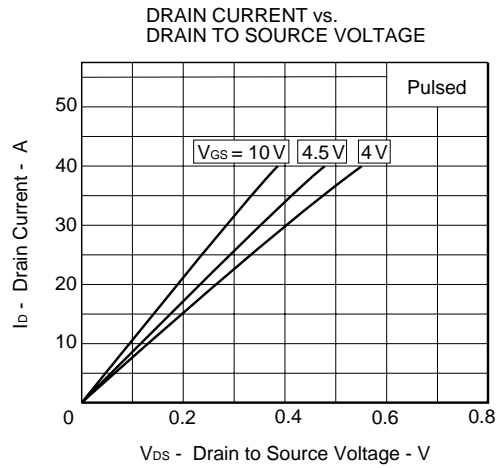
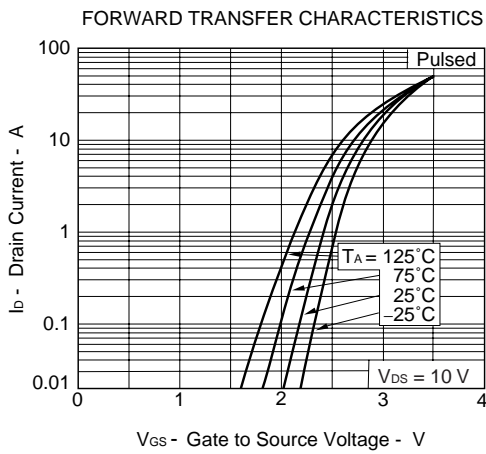


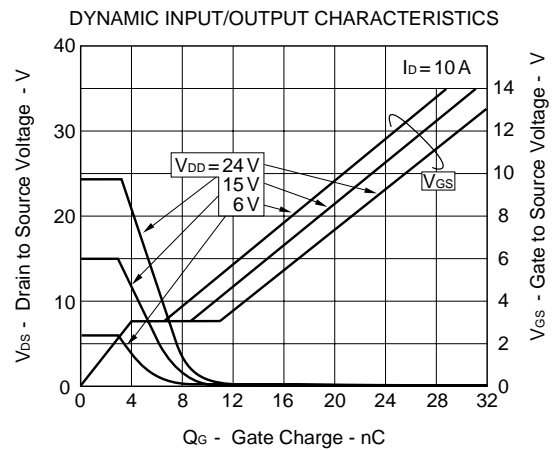
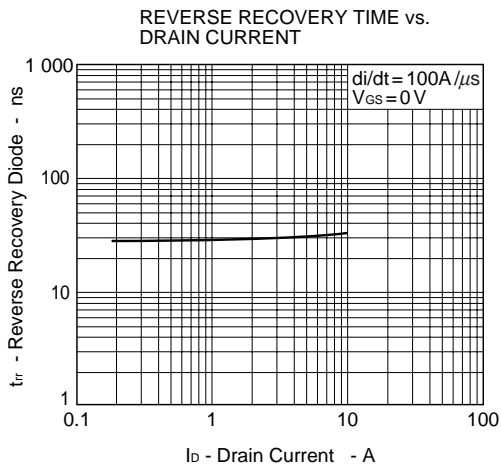
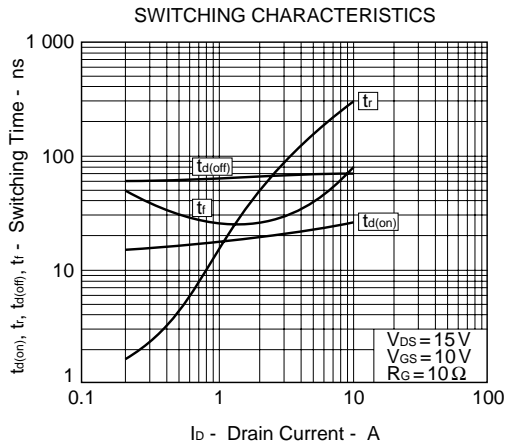
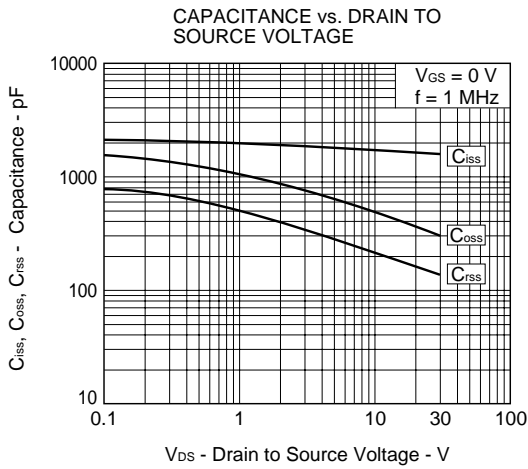
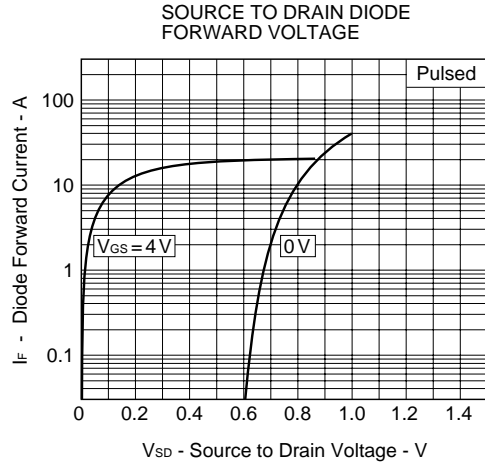
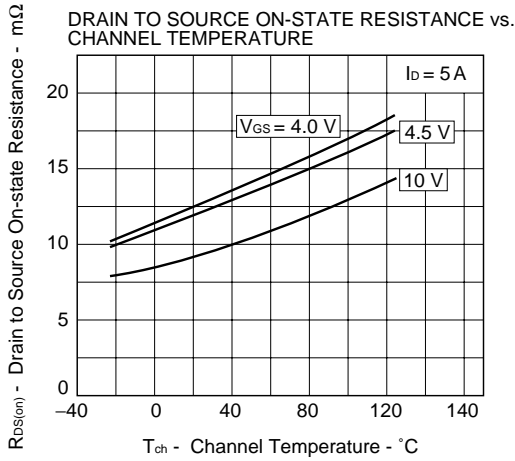
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



Note
Mounted on ceramic substrate of $1200\text{mm}^2 \times 1.7\text{mm}$







[MEMO]

[MEMO]

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Anti-radioactive design is not implemented in this product.