

SWITCHING
 P-CHANNEL POWER MOS FET
 INDUSTRIAL USE

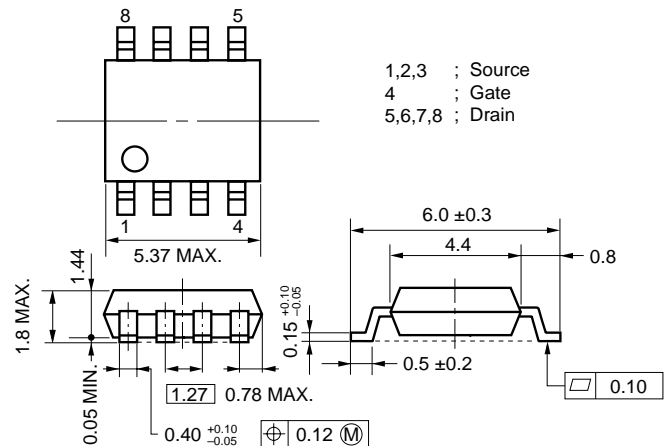
DESCRIPTION

The μ PA1730 is P-Channel MOS Field Effect Transistor designed for power management applications of notebook computers and Li-ion battery protection circuit.

FEATURES

- Low on-resistance
 $R_{DS(on)1} = 9.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -6.5 \text{ A)}$
 $R_{DS(on)2} = 13.5 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -6.5 \text{ A)}$
 $R_{DS(on)3} = 15.0 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.0 \text{ V, } I_D = -6.5 \text{ A)}$
- Low C_{iss} : $C_{iss} = 3800 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit : mm)



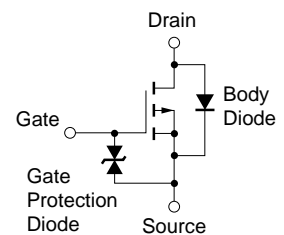
ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|---------------|------------|
| μ PA1730G | 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) | $I_{D(DC)}$ | ∓ 13.0 | A |
| Drain Current (pulse) ^{Note1} | $I_{D(pulse)}$ | ∓ 52.0 | A |
| Total Power Dissipation ($T_A = 25^\circ\text{C}$) ^{Note2} | P_T | 2.2 | W |
| Channel Temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

EQUIVALENT CIRCUIT



- Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1 \%$
 2. Mounted on ceramic substrate of $1200 \text{ mm}^2 \times 2.2 \text{ mm}$

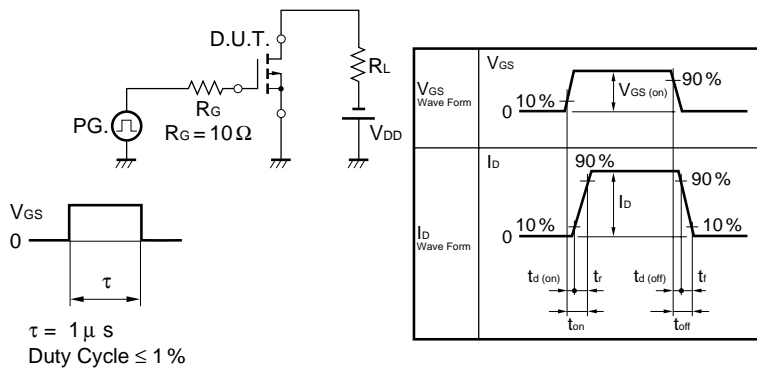
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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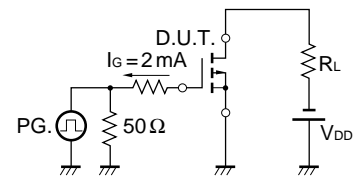
ELECTRICAL CHARACTERISTICS (T_A = 25 °C, All terminals are connected.)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------|---|------|------|------|------|
| Drain to Source On-state Resistance | R _{DS(on)1} | V _{GS} = -10 V, I _D = -6.5 A | | 7.6 | 9.5 | mΩ |
| | R _{DS(on)2} | V _{GS} = -4.5 V, I _D = -6.5 A | | 10.3 | 13.5 | mΩ |
| | R _{DS(on)3} | V _{GS} = -4.0 V, I _D = -6.5 A | | 11.3 | 15.0 | mΩ |
| Gate to Source Cut-off Voltage | V _{GS(off)} | V _{DS} = -10 V, I _D = -1 mA | -1.0 | -1.6 | -2.5 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = -10 V, I _D = -6.5 A | 11.0 | 23.0 | | S |
| Drain Leakage Current | I _{DSS} | V _{DS} = -30 V, V _{GS} = 0 V | | | -1 | 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 | | 3800 | | pF |
| Output Capacitance | C _{oss} | V _{GS} = 0 V | | 1200 | | pF |
| Reverse Transfer Capacitance | C _{rss} | f = 1 MHz | | 500 | | pF |
| Turn-on Delay Time | t _{d(on)} | I _D = -6.5 A | | 40 | | ns |
| Rise Time | t _r | V _{GS(on)} = -10 V | | 240 | | ns |
| Turn-off Delay Time | t _{d(off)} | V _{DD} = -15 V | | 230 | | ns |
| Fall Time | t _f | R _G = 10 Ω | | 160 | | ns |
| Total Gate Charge | Q _G | I _D = -13.0 A | | 70 | | nC |
| Gate to Source Charge | Q _{GS} | V _{DD} = -24 V | | 9 | | nC |
| Gate to Drain Charge | Q _{GD} | V _{GS} = -10 V | | 17 | | nC |
| Body Diode Forward Voltage | V _{F(S-D)} | I _F = 13 A, V _{GS} = 0 V | | 0.80 | | V |
| Reverse Recovery Time | t _{rr} | I _F = 13 A, V _{GS} = 0 V | | 53 | | ns |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100 A/μs | | 57 | | nC |

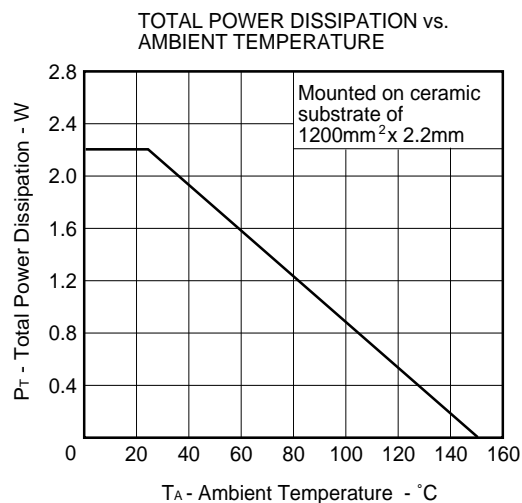
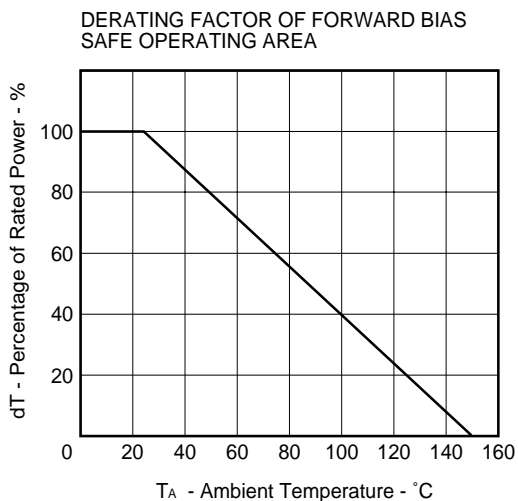
TEST CIRCUIT 1 SWITCHING TIME



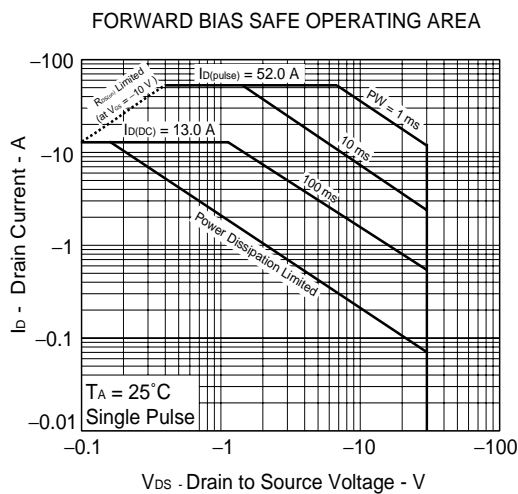
TEST CIRCUIT 2 GATE CHARGE



TYPICAL CHARACTERISTICS (T_A = 25 °C)

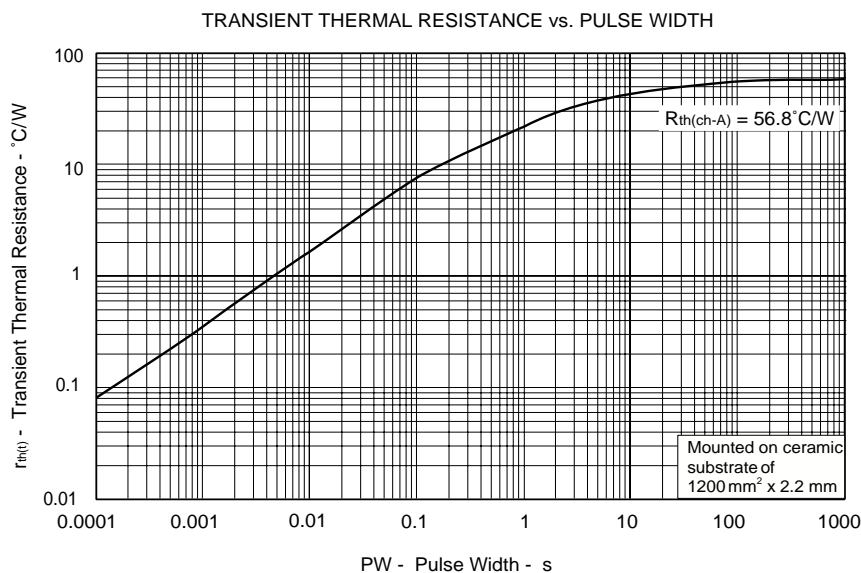


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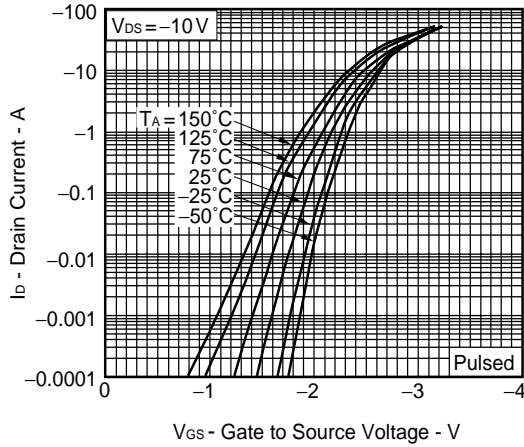


Remark Mounted on ceramic substrate of 1200 mm² x 2.2 mm

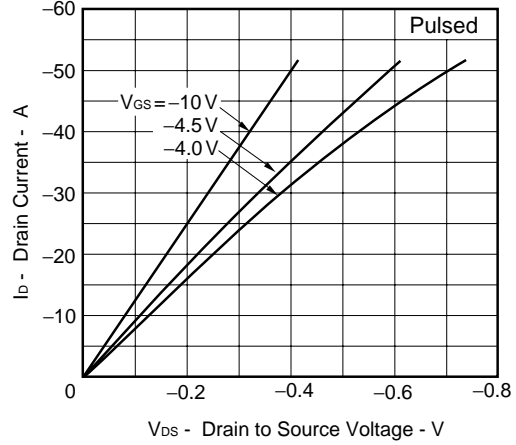
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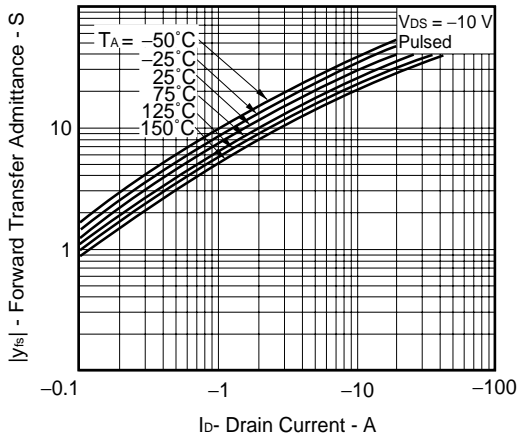
FORWARD TRANSFER CHARACTERISTICS



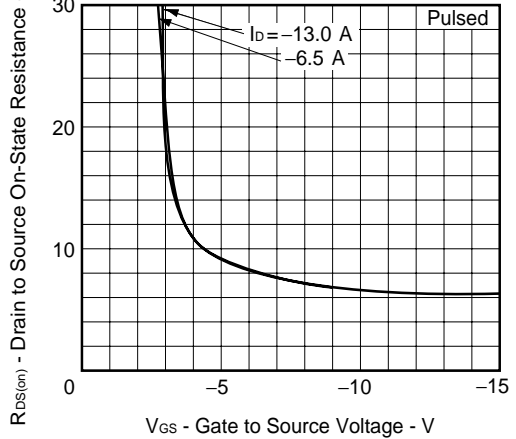
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



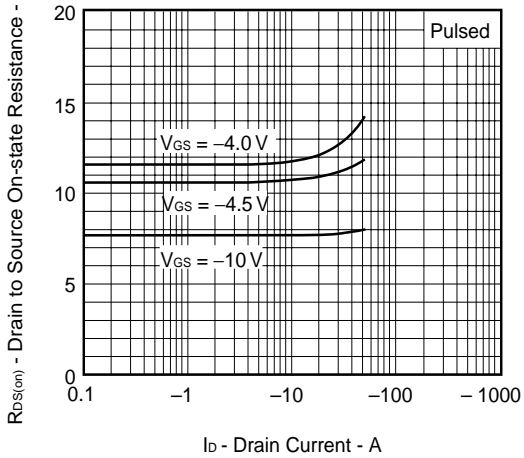
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



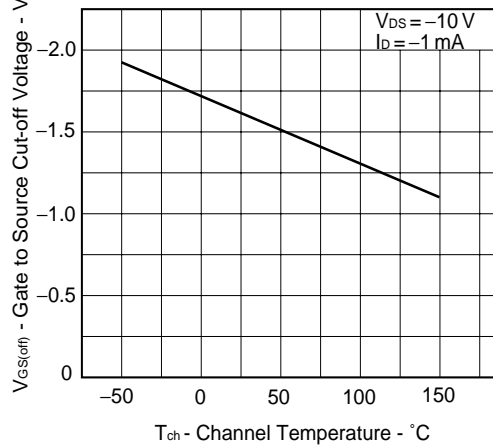
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



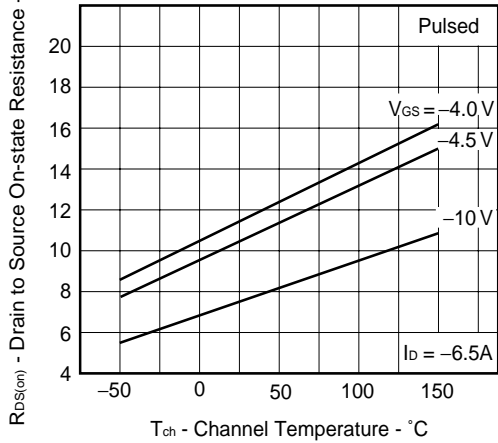
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



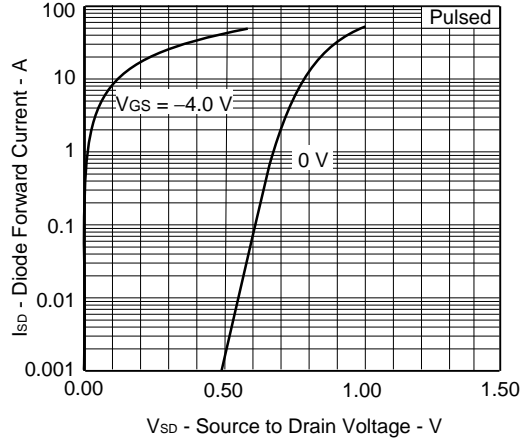
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



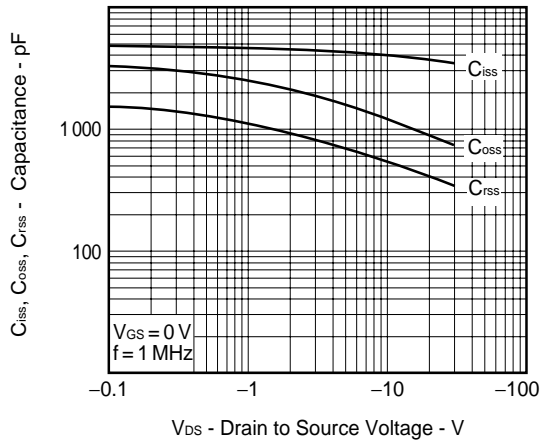
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



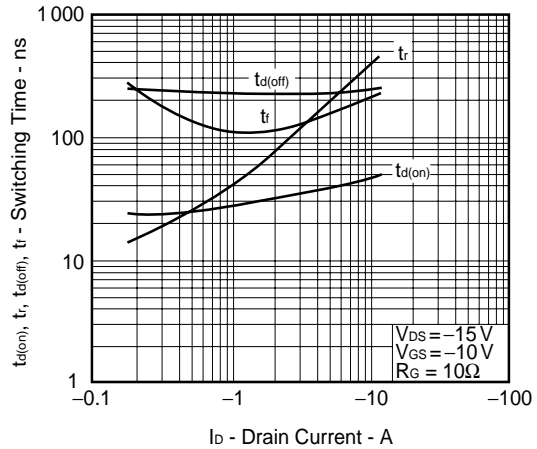
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



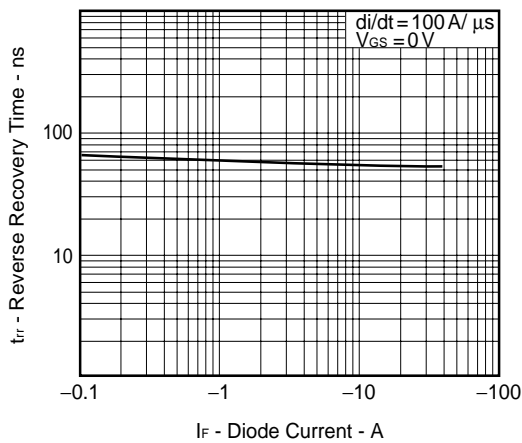
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



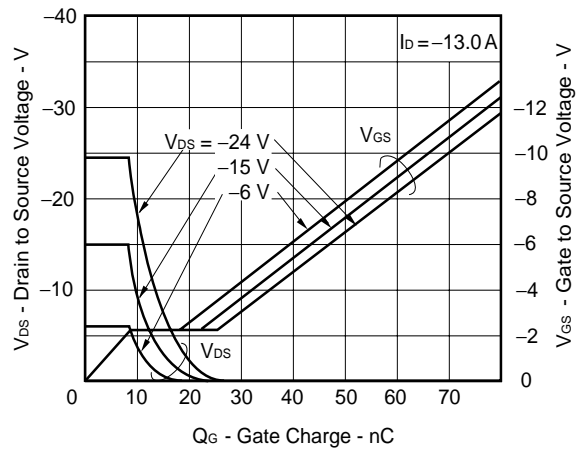
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

[MEMO]

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