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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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SWITCHING
 P-CHANNEL POWER MOS FET
 INDUSTRIAL USE

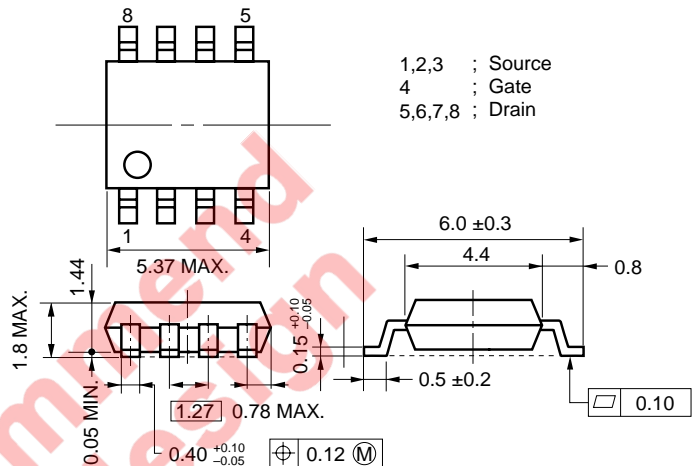
DESCRIPTION

The μ PA1717 is P-Channel MOS Field Effect Transistor designed for power management applications of notebook computers.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 33 \text{ m}\Omega \text{ MAX. (} V_{GS} = -10 \text{ V, } I_D = -3 \text{ A)}$
 $R_{DS(on)2} = 59 \text{ m}\Omega \text{ MAX. (} V_{GS} = -4.5 \text{ V, } I_D = -3 \text{ A)}$
- Low C_{iss} : $C_{iss} = 830 \text{ pF TYP.}$
- Built-in G-S protection diode
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit : mm)



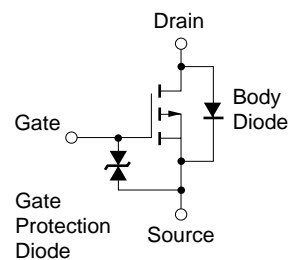
ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|---------------|------------|
| μ PA1717G | 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} | ∓ 25 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ∓ 6 | A |
| Drain Current (pulse) ^{Note1} | $I_{D(pulse)}$ | ∓ 24 | A |
| Total Power Dissipation ($T_A = 25^\circ\text{C}$) ^{Note2} | P_T | 2.0 | 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 $1200 \text{ mm}^2 \times 2.2 \text{ mm}$

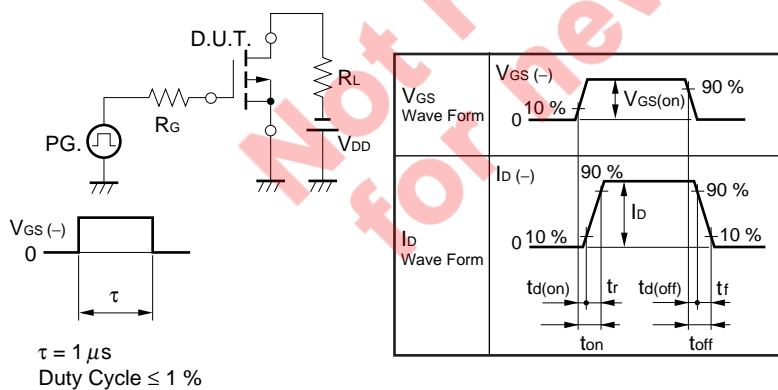
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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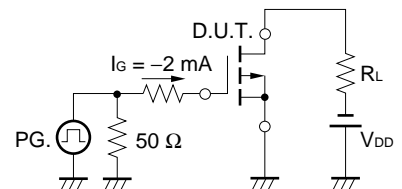
ELECTRICAL CHARACTERISTICS (TA = 25 °C, All terminals are connected.)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|---------------|---|------|------|------|------|
| Drain to Source On-state Resistance | $R_{DS(on)1}$ | $V_{GS} = -10\text{ V}, I_D = -3\text{ A}$ | | 26 | 33 | mΩ |
| | $R_{DS(on)2}$ | $V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$ | | 44 | 59 | mΩ |
| Gate to Source Cut-off Voltage | $V_{GS(off)}$ | $V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$ | -1.5 | -2.0 | -2.5 | V |
| Forward Transfer Admittance | $ y_{fs} $ | $V_{DS} = -10\text{ V}, I_D = -3\text{ A}$ | 3.0 | 7.5 | | S |
| Drain Leakage Current | I_{DSS} | $V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$ | | | -1 | μA |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS} = \mp 25\text{ V}, V_{DS} = 0\text{ V}$ | | | ± 10 | μA |
| Input Capacitance | C_{iss} | $V_{DS} = -10\text{ V}$ | | 830 | | pF |
| Output Capacitance | C_{oss} | $V_{GS} = 0\text{ V}$ | | 330 | | pF |
| Reverse Transfer Capacitance | C_{rss} | $f = 1\text{ MHz}$ | | 130 | | pF |
| Turn-on Delay Time | $t_{d(on)}$ | $I_D = -3\text{ A}$ | | 15 | | ns |
| Rise Time | t_r | $V_{GS(on)} = -10\text{ V}$ | | 120 | | ns |
| Turn-off Delay Time | $t_{d(off)}$ | $V_{DD} = -15\text{ V}$ | | 70 | | ns |
| Fall Time | t_f | $R_G = 6\ \Omega$ | | 50 | | ns |
| Total Gate Charge | Q_G | $I_D = -6\text{ A}$ | | 15 | | nC |
| Gate to Source Charge | Q_{GS} | $V_{DD} = -24\text{ V}$ | | 3 | | nC |
| Gate to Drain Charge | Q_{GD} | $V_{GS} = -10\text{ V}$ | | 5 | | nC |
| Body Diode Forward Voltage | $V_{F(S-D)}$ | $I_F = 6\text{ A}, V_{GS} = 0\text{ V}$ | | 0.82 | | V |
| Reverse Recovery Time | t_{rr} | $I_F = 6\text{ A}, V_{GS} = 0\text{ V}$ | | 35 | | ns |
| Reverse Recovery Charge | Q_{rr} | $di/dt = 100\text{ A}/\mu\text{s}$ | | 15 | | nC |

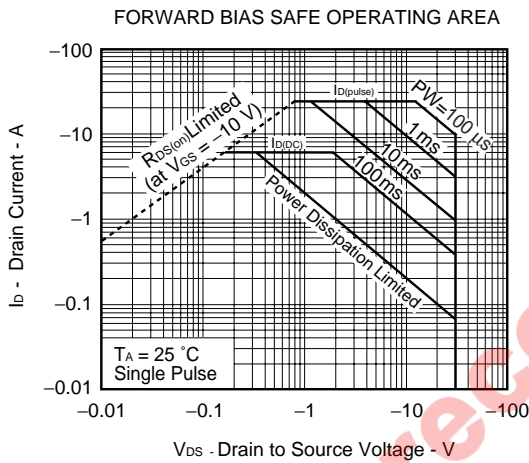
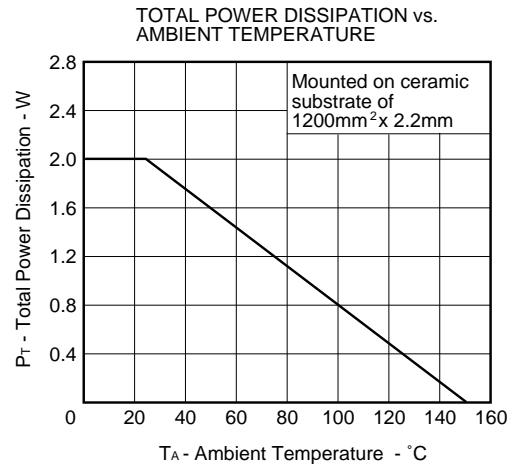
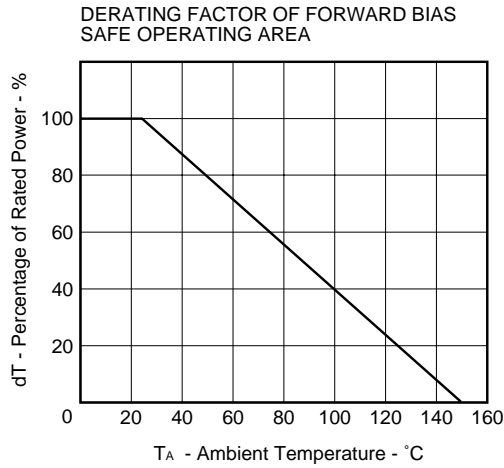
TEST CIRCUIT 1 SWITCHING TIME



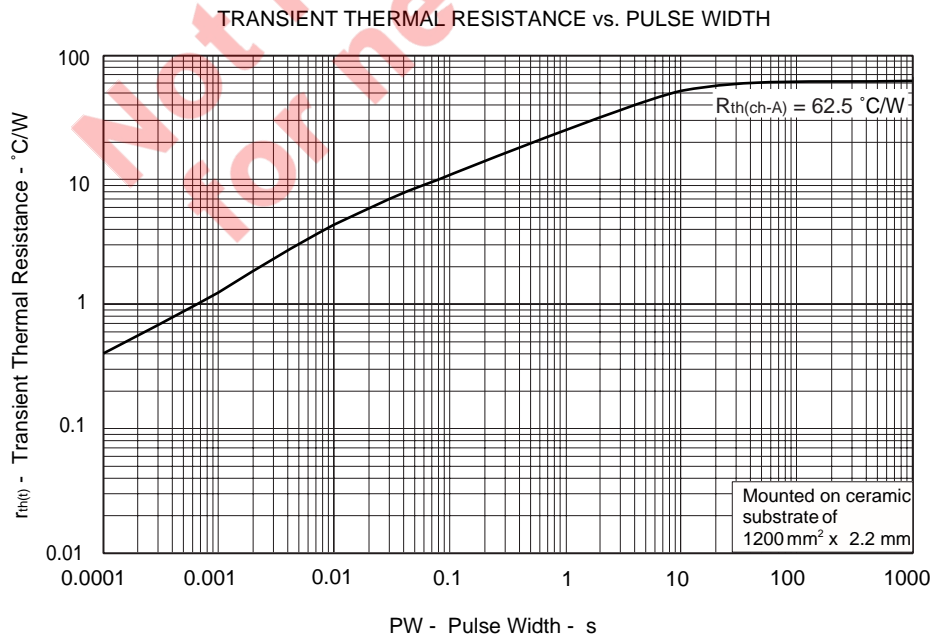
TEST CIRCUIT 2 GATE CHARGE

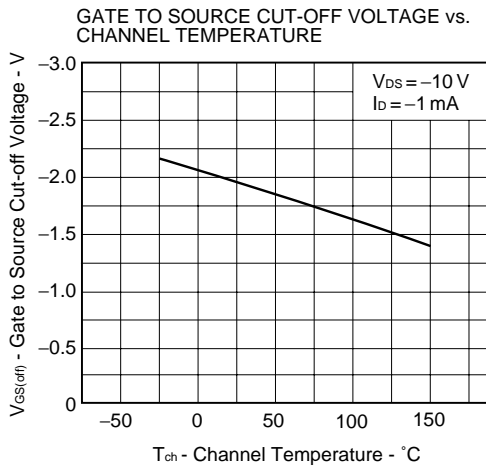
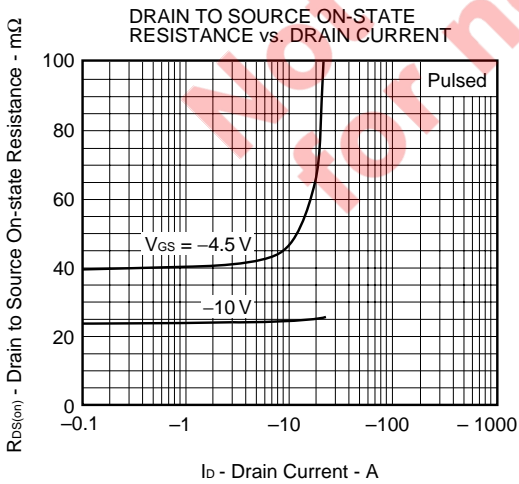
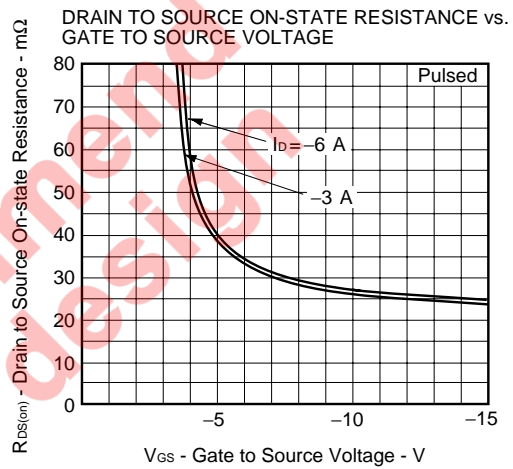
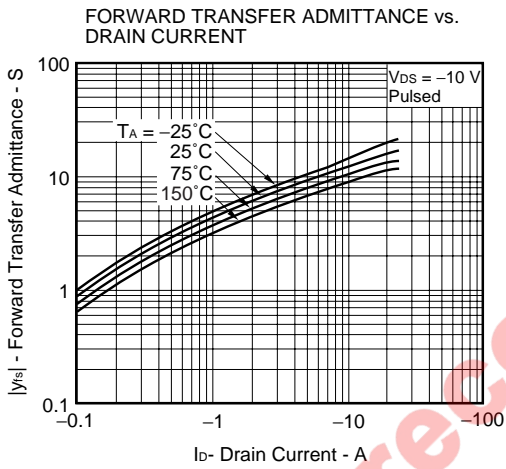
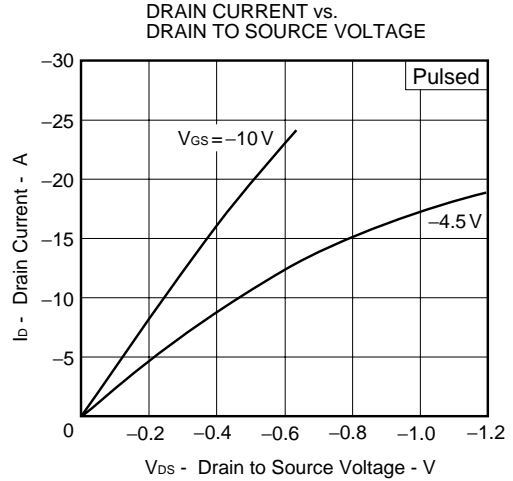
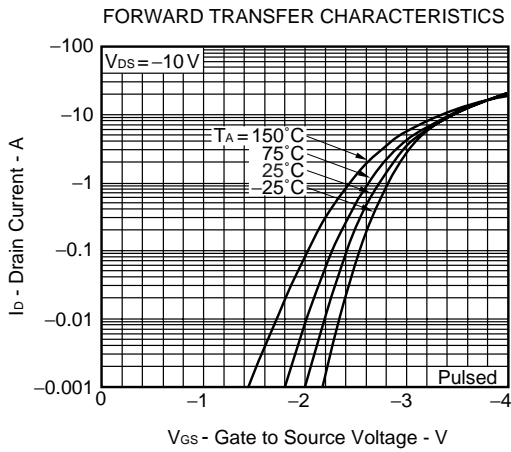


TYPICAL CHARACTERISTICS (T_A = 25 °C)

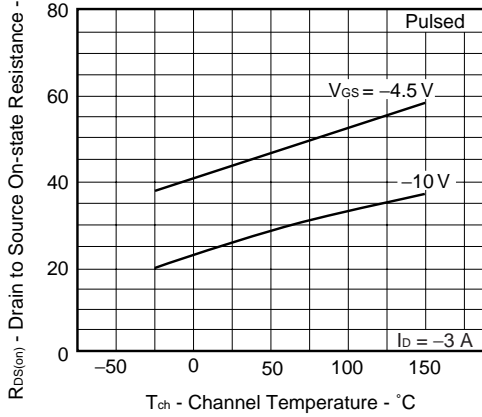


Remark Mounted on ceramic substrate of 1200 mm² x 2.2 mm

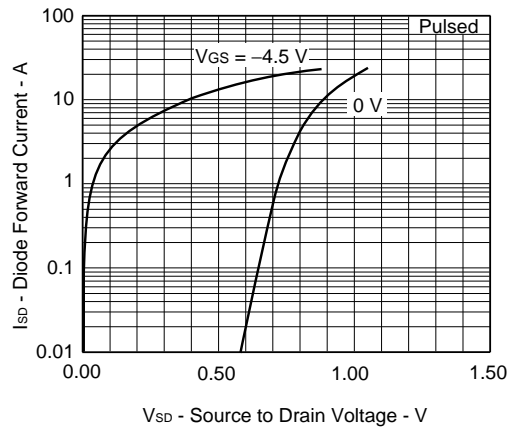




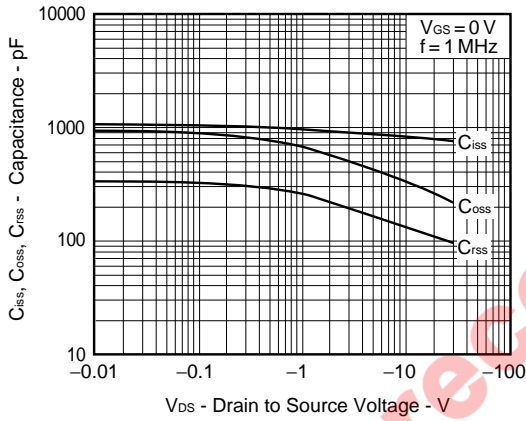
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



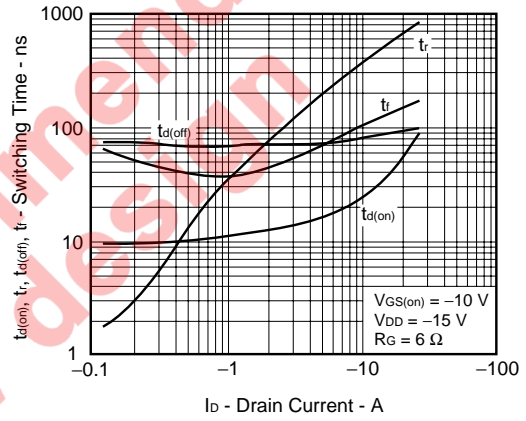
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



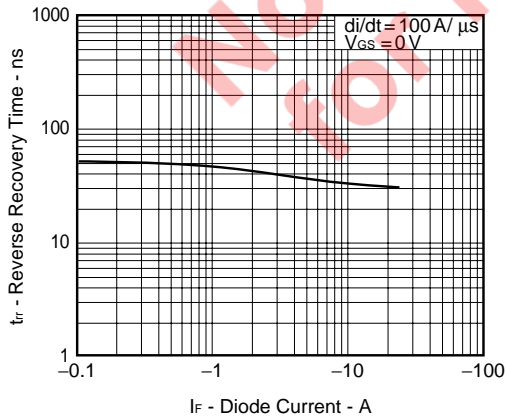
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



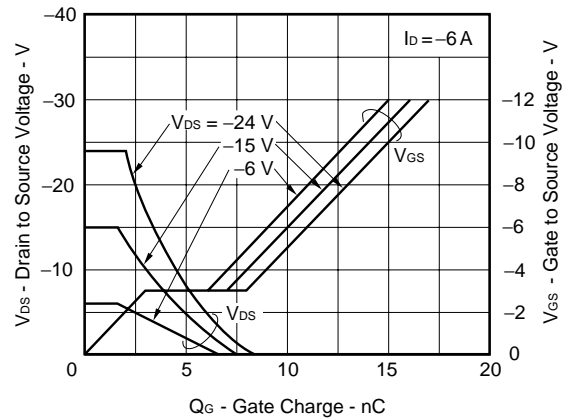
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE CURRENT



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

Not recommend
for new design

[MEMO]

**Not recommend
for new design**

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