

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

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

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**SWITCHING
 N-CHANNEL POWER MOS FET**

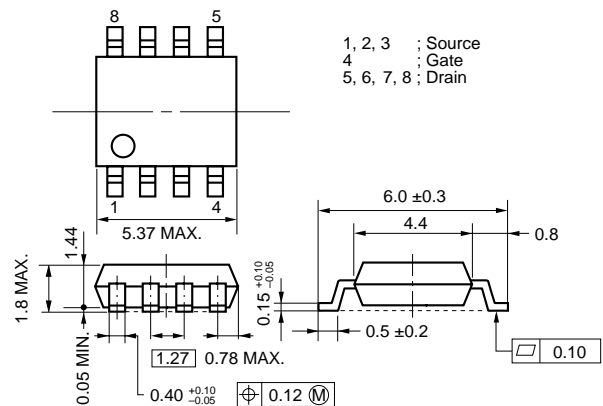
DESCRIPTION

The μPA2702GR is N-Channel MOS Field Effect Transistor designed for DC/DC converters and power management applications of notebook computers.

FEATURES

- Low on-state resistance
 $R_{DS(on)1} = 9.2 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 7.0 \text{ A)}$
 $R_{DS(on)2} = 14.8 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 7.0 \text{ A)}$
- Low C_{iss} : $C_{iss} = 900 \text{ pF TYP. (} V_{DS} = 10 \text{ V, } V_{GS} = 0 \text{ V)}$
- Small and surface mount package (Power SOP8)

PACKAGE DRAWING (Unit: mm)



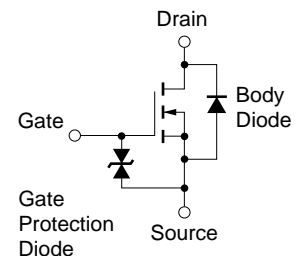
ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|------------|
| μPA2705GR | Power SOP8 |

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, All terminals are connected.)

| | | | |
|--|-----------------------|-------------|----|
| Drain to Source Voltage (V _{GS} = 0 V) | V _{DSS} | 30 | V |
| Gate to Source Voltage (V _{DS} = 0 V) | V _{GSS} | ±20 | V |
| Drain Current (DC) | I _{D(DC)} | ±13 | A |
| Drain Current (pulse) ^{Note1} | I _{D(pulse)} | ±52 | A |
| Total Power Dissipation (T _A = 25°C) ^{Note2} | P _T | 2.0 | W |
| Channel Temperature | T _{ch} | 150 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |
| Single Avalanche Current ^{Note3} | I _{AS} | 13 | A |
| Single Avalanche Energy ^{Note3} | E _{AS} | 16.9 | mJ |

EQUIVALENT CIRCUIT



- Notes**
1. $PW \leq 10 \mu s$, Duty Cycle $\leq 1\%$
 2. Mounted on ceramic substrate of 1200 mm² x 2.2 mm
 3. Starting T_{ch} = 25°C, V_{BD} = 15 V, R_G = 25 Ω, L = 100 μH, V_{GS} = 20 → 0 V

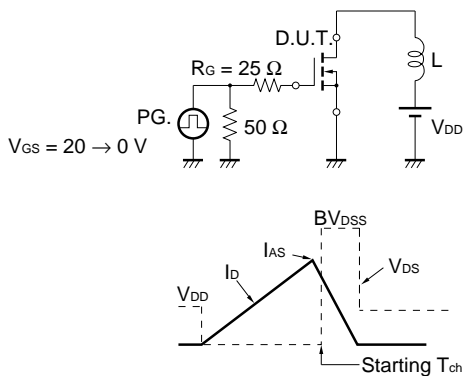
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

The information contained in this document is being issued in advance of the production cycle for the device. The parameters for the device may change before final production or NEC Corporation, at its own discretion, may withdraw the device prior to its production.
 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

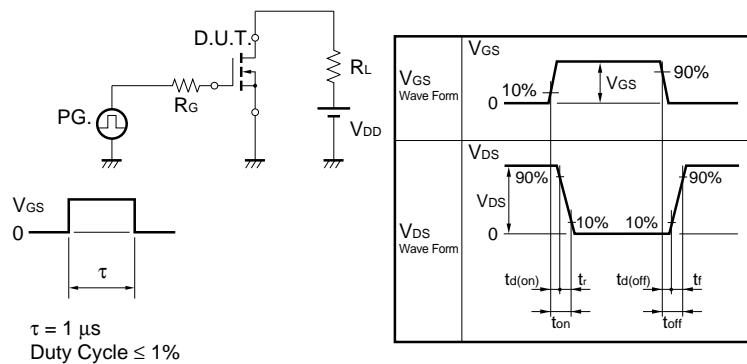
ELECTRICAL CHARACTERISTICS (T_A = 25°C, All terminals are connected.)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------|---|------|------|------|------|
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | | | 10 | μA |
| Gate Leakage Current | I _{GSS} | V _{GS} = ±20 V, V _{DS} = 0 V | | | ±10 | μA |
| Gate Cut-off Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 mA | 1.5 | | 2.5 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = 10 V, I _D = 7.0 A | 7 | 13 | | S |
| Drain to Source On-state Resistance | R _{DS(on)1} | V _{GS} = 10 V, I _D = 7.0 A | | 7.3 | 9.2 | mΩ |
| | R _{DS(on)2} | V _{GS} = 4.5 V, I _D = 7.0 A | | 11.1 | 14.8 | mΩ |
| | R _{DS(on)3} | V _{GS} = 4.0 V, I _D = 7.0 A | | 12.7 | 17.0 | mΩ |
| Input Capacitance | C _{iss} | V _{DS} = 10 V | | 900 | | pF |
| Output Capacitance | C _{oss} | V _{GS} = 0 V | | 380 | | pF |
| Reverse Transfer Capacitance | C _{rss} | f = 1 MHz | | 120 | | pF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} = 15 V, I _D = 7.0 A | | 9 | | ns |
| Rise Time | t _r | V _{GS} = 10 V | | 5 | | ns |
| Turn-off Delay Time | t _{d(off)} | R _G = 10 Ω | | 35 | | ns |
| Fall Time | t _f | | | 8 | | ns |
| Total Gate Charge | Q _G | V _{DD} = 15 V | | 9 | | nC |
| Gate to Source Charge | Q _{GS} | V _{GS} = 5 V | | 3 | | nC |
| Gate to Drain Charge | Q _{GD} | I _D = 13 A | | 4 | | nC |
| Body Diode Forward Voltage | V _{F(S-D)} | I _F = 13 A, V _{GS} = 0 V | | 0.82 | 1.2 | V |
| Reverse Recovery Time | t _{rr} | I _F = 13 A, V _{GS} = 0 V | | 28 | | ns |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100 A/μs | | 22 | | nC |

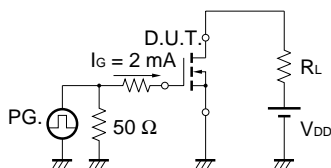
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME



TEST CIRCUIT 3 GATE CHARGE



[MEMO]

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