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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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HAT1069C

Silicon P Channel Power MOS FET Power Switching

REJ03G0164-0300

Rev.3.00

Oct 19, 2007

Features

- Low on-resistance
 $R_{DS(on)} = 38 \text{ m}\Omega$ typ (at $V_{GS} = -4.5 \text{ V}$)
- High speed switching
- Capable of 1.8 V gate drive
- High density mounting

Outline

RENESAS Package code: PWSF0006JA-A
(Package name: CMFPAK-6)

1. Source
2. Drain
3. Drain
4. Drain
5. Drain
6. Gate

Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

| Item | Symbol | Ratings | Unit |
|--|---------------------------------|-------------|------------------|
| Drain to source voltage | V_{DSS} | -12 | V |
| Gate to source voltage | V_{GSS} | ± 8 | V |
| Drain current | I_D | -4 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | -16 | A |
| Body-drain diode reverse drain current | I_{DR} | -4 | A |
| Channel dissipation | P_{ch} ^{Note2} | 900 | mW |
| 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. When using the grass epoxy board. (FR4 $40 \times 40 \times 1.6 \text{ mm}$)

Electrical Characteristics

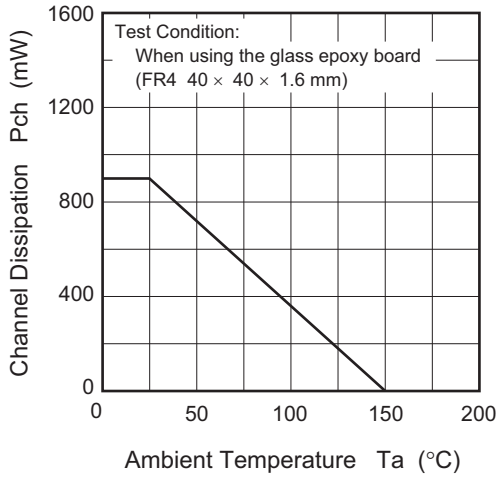
(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|---------|------|----------|------------------|--|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | -12 | — | — | V | $I_D = -10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ± 8 | — | — | V | $I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 10 | μA | $V_{GS} = \pm 6.4 \text{ V}$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | -1 | μA | $V_{DS} = -12 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | -0.3 | — | -1.2 | V | $V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 38 | 52 | $\text{m}\Omega$ | $I_D = -1.5 \text{ A}$, $V_{GS} = -4.5 \text{ V}$ |
| | $R_{DS(on)}$ | — | 48 | 70 | $\text{m}\Omega$ | $I_D = -1.5 \text{ A}$, $V_{GS} = -2.5 \text{ V}$ |
| | $R_{DS(on)}$ | — | 60 | 93 | $\text{m}\Omega$ | $I_D = -1.5 \text{ A}$, $V_{GS} = -1.8 \text{ V}$ |
| Forward transfer admittance | $ y_{fs} $ | 5 | 8 | — | S | $I_D = -1.5 \text{ A}$, $V_{DS} = -10 \text{ V}$ |
| Input capacitance | C_{iss} | — | 1380 | — | pF | $V_{DS} = -10 \text{ V}$ |
| Output capacitance | C_{oss} | — | 235 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 115 | — | pF | $f = 1 \text{ MHz}$ |
| Total gate charge | Q_g | — | 16 | — | nC | $V_{DS} = -10 \text{ V}$ |
| Gate to source charge | Q_{gs} | — | 3 | — | nC | $V_{GS} = -4.5 \text{ V}$ |
| Gate to drain charge | Q_{gd} | — | 6.2 | — | nC | $I_D = -3 \text{ A}$ |
| Turn-on delay time | $t_{d(on)}$ | — | 35 | — | ns | $V_{GS} = -4 \text{ V}$, $I_D = -1.5 \text{ A}$ |
| Rise time | t_r | — | 150 | — | ns | $V_{DD} \cong -10 \text{ V}$ |
| Turn-off delay time | $t_{d(off)}$ | — | 490 | — | ns | $R_L = 6.6 \text{ }\Omega$ |
| Fall time | t_f | — | 350 | — | ns | $R_g = 4.7 \text{ }\Omega$ |
| Body-drain diode forward voltage | V_{DF} | — | -0.8 | -1.1 | V | $I_F = -4 \text{ A}$, $V_{GS} = 0$ ^{Note3} |

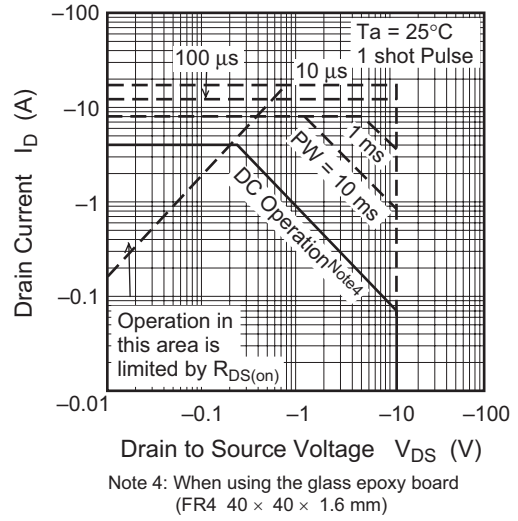
Notes: 3. Pulse test

Main Characteristics

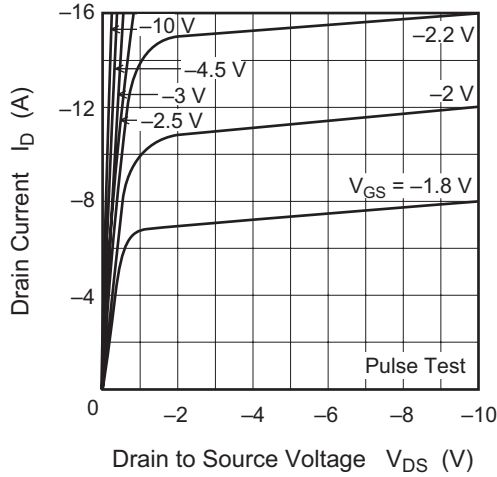
Power vs. Temperature Derating



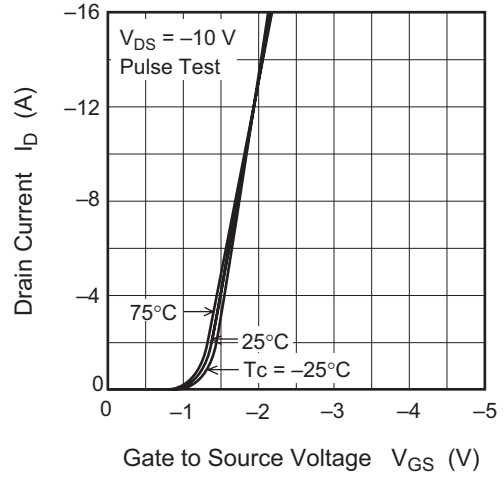
Maximum Safe Operation Area



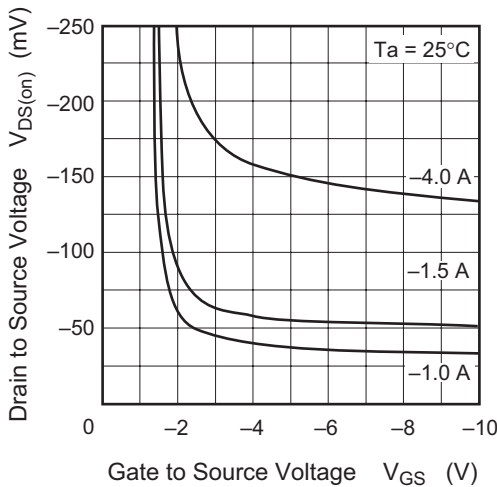
Typical Output Characteristics



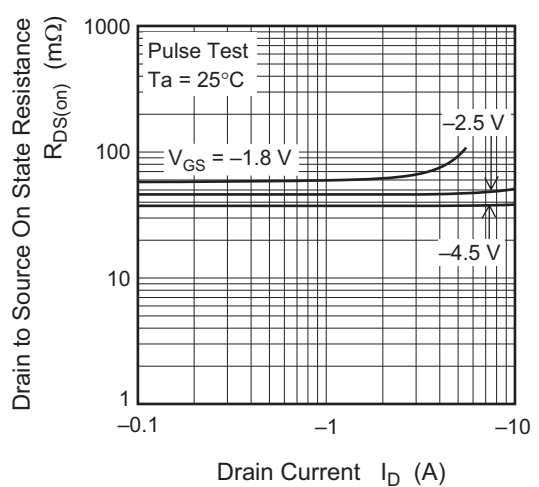
Typical Transfer Characteristics



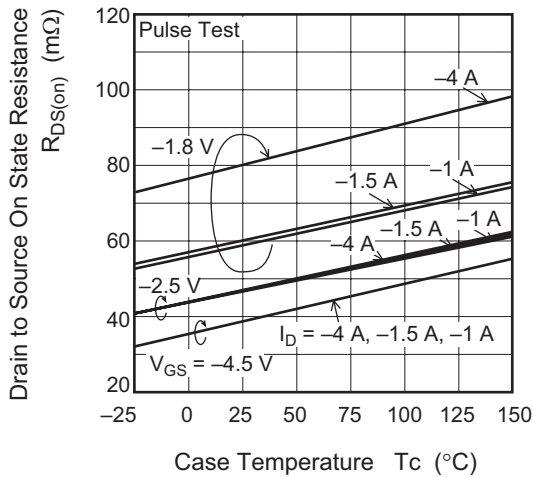
Drain to Source Saturation Voltage vs. Gate to Source Voltage



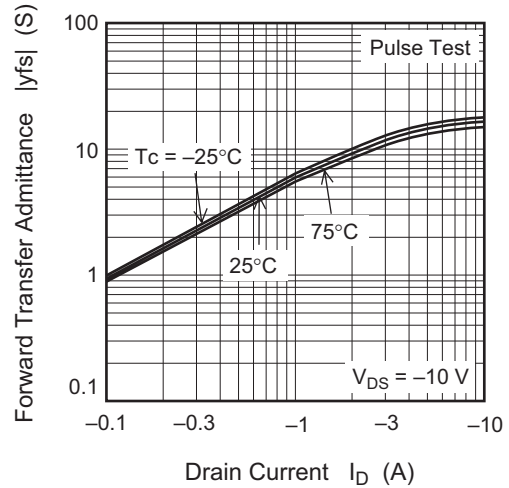
Static Drain to Source on State Resistance vs. Drain Current



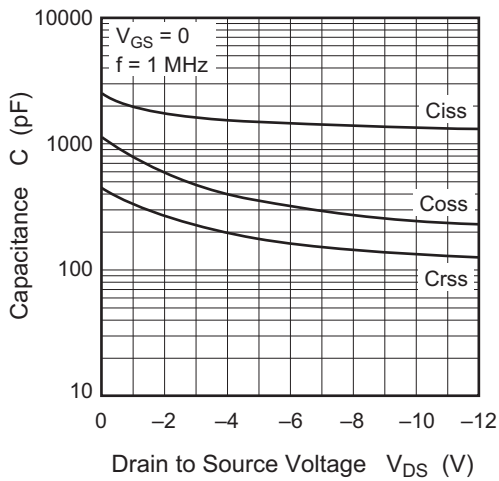
Static Drain to Source on State Resistance vs. Temperature



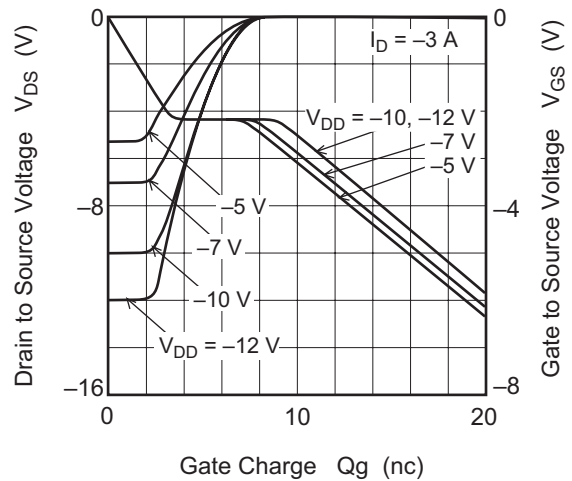
Forward Transfer Admittance vs. Drain Current



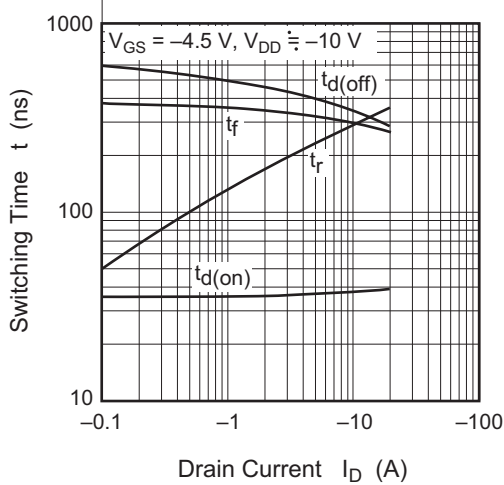
Typical Capacitance vs. Drain to Source Voltage



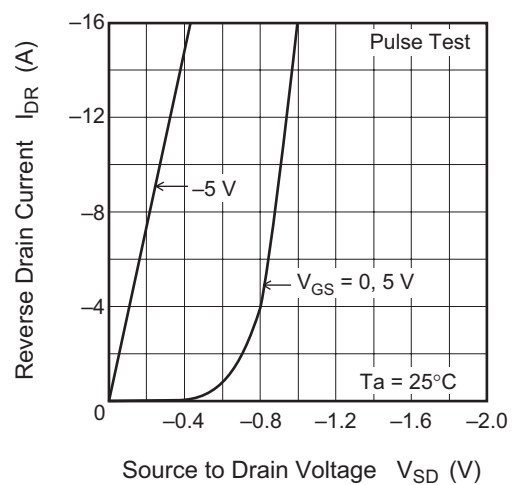
Dynamic Input Characteristics



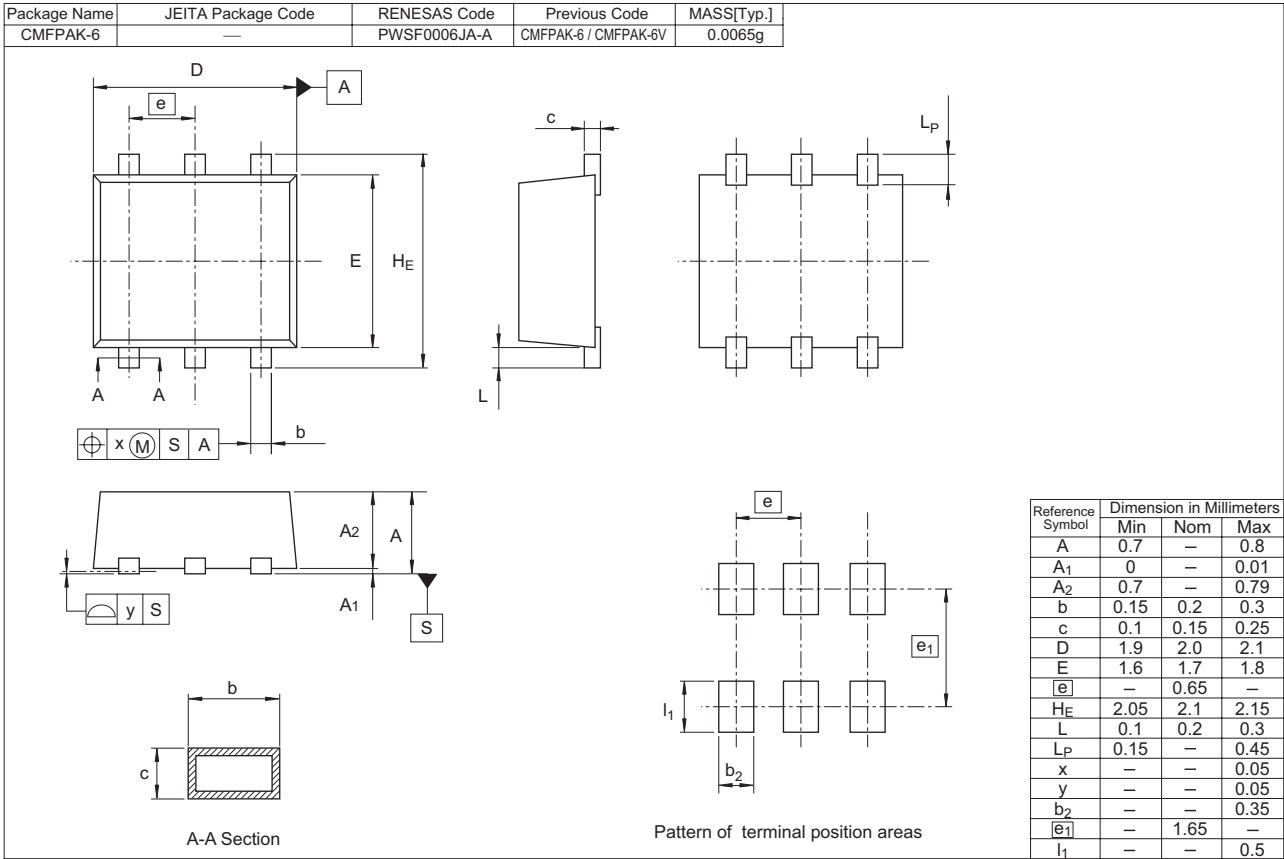
Switching Characteristics



Reverse Drain Current vs. Source to Drain Voltage



Package Dimensions



Ordering Information

| Part Name | Quantity | Shipping Container |
|---------------|----------|--------------------|
| HAT1069C-EL-E | 3000 pcs | Taping |

Notes:

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