

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# HAT1094C

## Silicon P Channel MOS FET Power Switching

REJ03G1231-0400

Rev.4.00

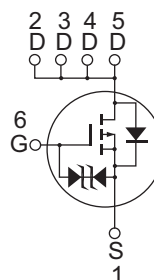
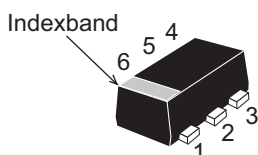
Feb 28, 2006

### Features

- Low on-resistance  
 $R_{DS(on)} = 67 \text{ m}\Omega$  typ. (at  $V_{GS} = -4.5 \text{ V}$ )
- Low drive current.
- 1.8 V gate drive devices.
- 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	$V_{GSS}$	$\pm 8$	V
Drain current	$I_D$	-2.5	A
Drain peak current	$I_D$ (pulse) <sup>Note 1</sup>	-10	A
Body - Drain diode reverse drain current	$I_{DR}$	-2.5	A
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	850	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 glass epoxy board. (FR4  $40 \times 40 \times 1.6\text{mm}$ ),  $T_a = 25^\circ\text{C}$

## Electrical Characteristics

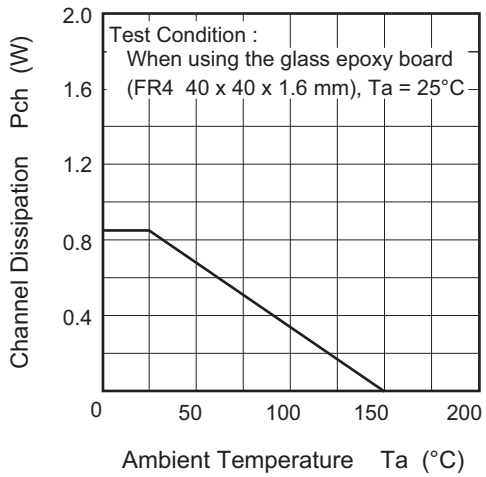
(Ta = 25°C)

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	$V_{(BR)GSS}$	$\pm 8$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to Source leakage current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 6.4 \text{ V}$ , $V_{DS} = 0$
Drain to Source leakage current	$I_{DSS}$	—	—	-1	$\mu\text{A}$	$V_{DS} = -12 \text{ V}$ , $V_{GS} = 0$
Gate to Source cutoff voltage	$V_{GS(th)}$	-0.3	—	-1.2	V	$I_D = -1 \text{ A}$ , $V_{DS} = -10 \text{ V}$ <sup>Note3</sup>
Drain to Source on state resistance	$R_{DS(on)}$	—	67	88	m $\Omega$	$I_D = -1.3 \text{ A}$ , $V_{GS} = -4.5 \text{ V}$ <sup>Note3</sup>
		—	90	126	m $\Omega$	$I_D = -1.3 \text{ A}$ , $V_{GS} = -2.5 \text{ V}$ <sup>Note3</sup>
		—	128	192	m $\Omega$	$I_D = -1.3 \text{ A}$ , $V_{GS} = -1.8 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	3.5	5	—	S	$I_D = -1.3 \text{ A}$ , $V_{DS} = -10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	530	—	pF	$V_{DS} = -10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	130	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	95	—	pF	
Total gate charge	$Q_g$	—	6.5	—	nC	$V_{DS} = -10 \text{ V}$ , $V_{GS} = -4.5 \text{ V}$ , $I_D = -2.5 \text{ A}$
Gate to Source charge	$Q_{gs}$	—	1	—	nC	
Gate to Drain charge	$Q_{gd}$	—	1.8	—	nC	
Turn - on delay time	$t_{d(on)}$	—	12	—	ns	$V_{DS} = -10 \text{ V}$ , $V_{GS} = -4.5 \text{ V}$ , $I_D = -1.3 \text{ A}$ , $R_L = 7.7 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	52	—	ns	
Turn - off delay time	$t_{d(off)}$	—	62	—	ns	
Fall time	$t_f$	—	9	—	ns	
Body - Drain diode forward voltage	$V_{DF}$	—	-0.85	-1.1	V	$I_F = -2.5 \text{ A}$ , $V_{GS} = 0$

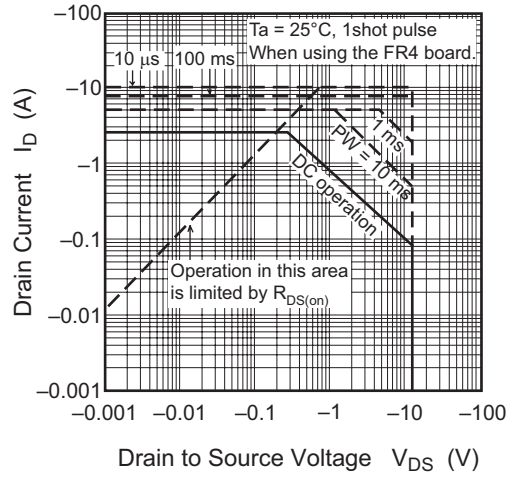
Notes: 3. Pulse test

Main Characteristics

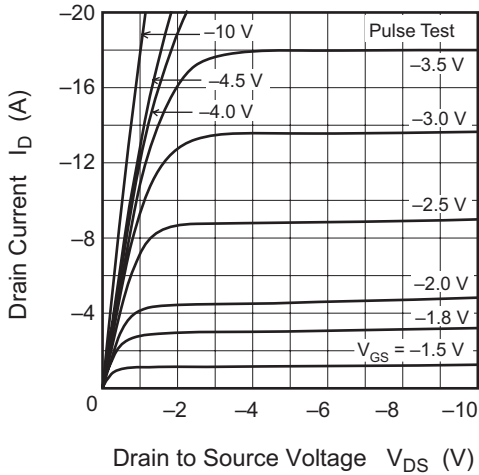
Power vs. Temperature Derating



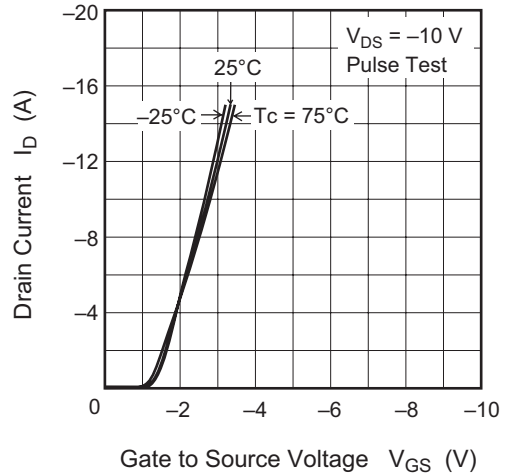
Maximum Safe Operation Area



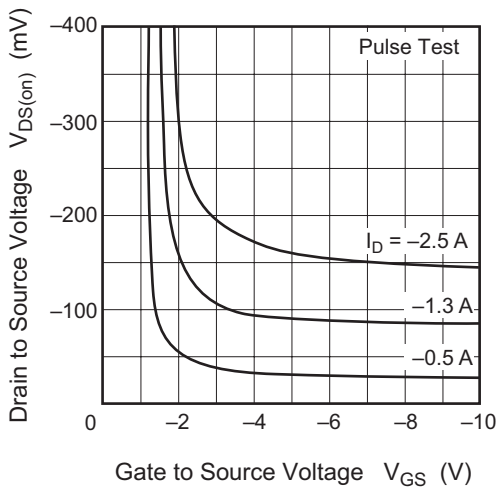
Typical Output Characteristics



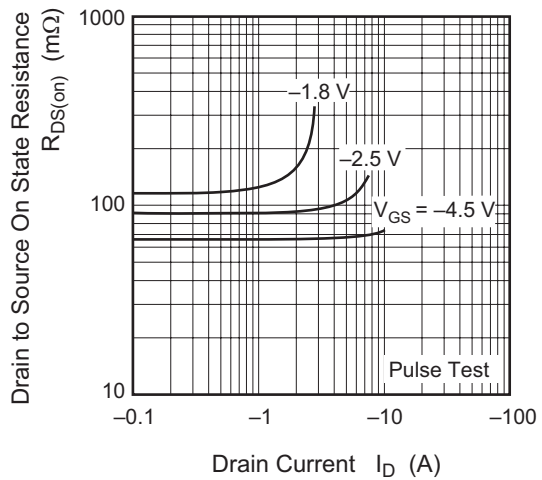
Typical Transfer Characteristics

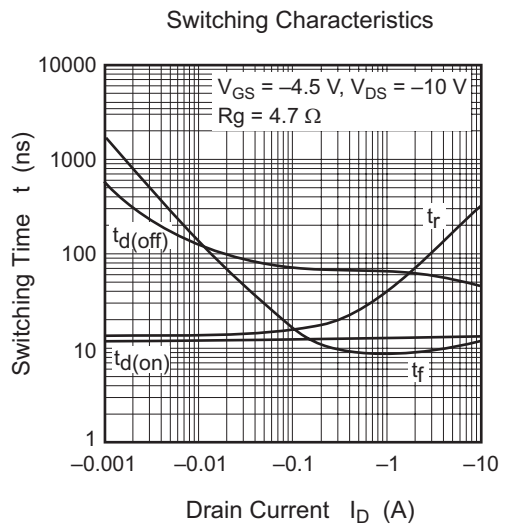
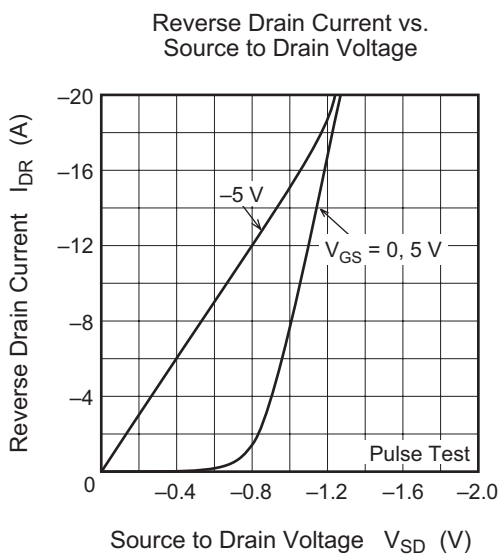
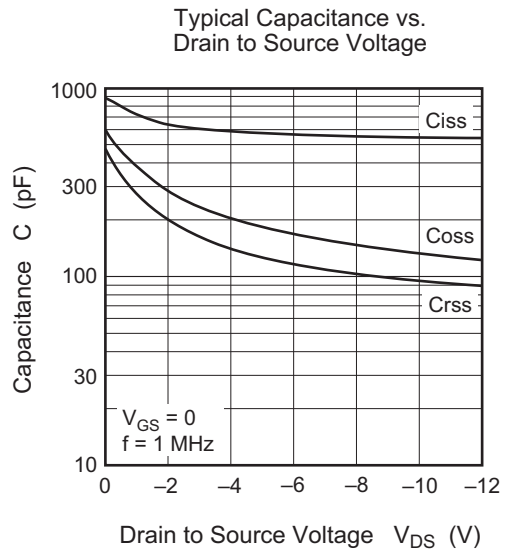
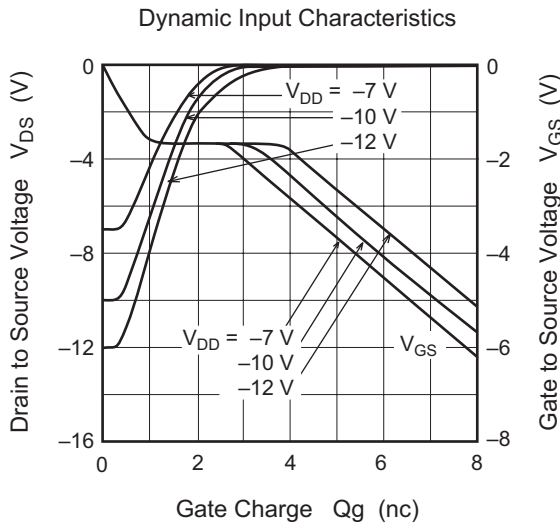
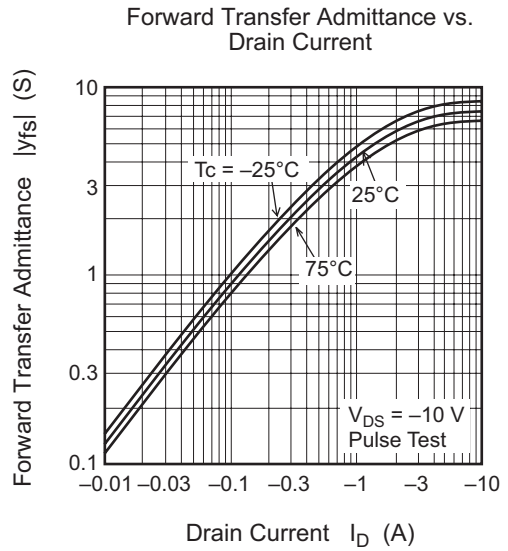
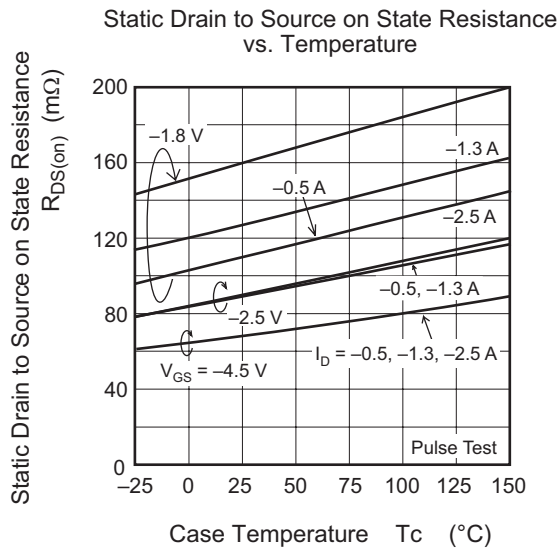


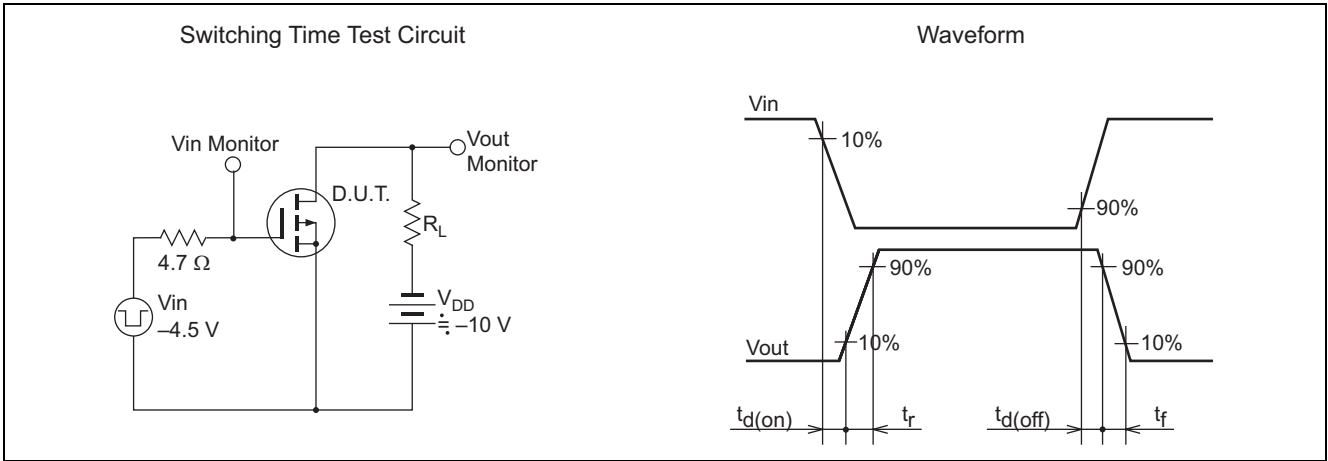
Drain to Source Saturation Voltage vs. Gate to Source Voltage



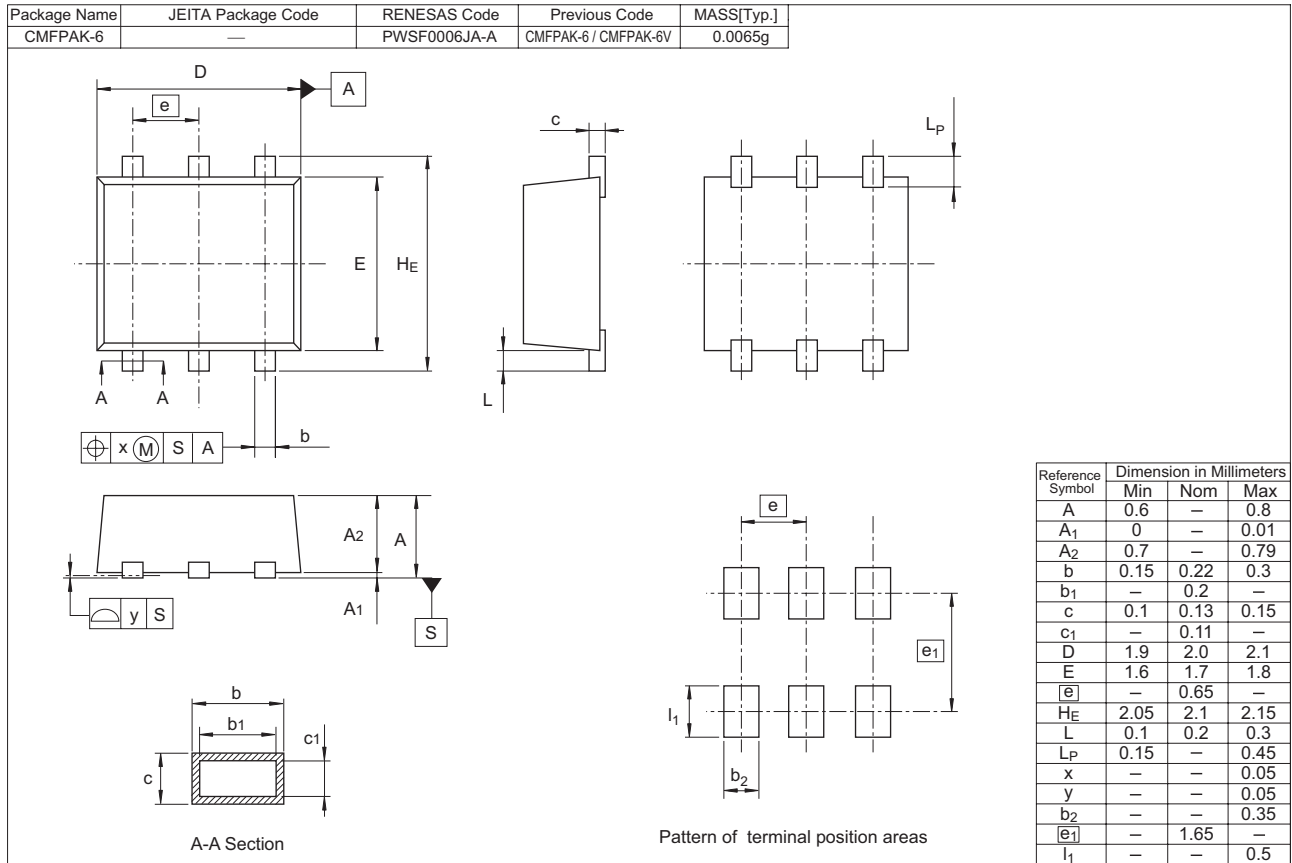
Static Drain to Source on State Resistance vs. Drain Current







### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT1094C-EL-E	3000 pcs	Taping

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**Renesas Technology America, Inc.**

450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**

Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7898

**Renesas Technology Hong Kong Ltd.**

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2730-6071

**Renesas Technology Taiwan Co., Ltd.**

10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

**Renesas Technology Singapore Pte. Ltd.**

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

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Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology Malaysia Sdn. Bhd**

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510