

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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# HAT2196C

## Silicon N Channel MOS FET Power Switching

REJ03G1235-0500

Rev.5.00

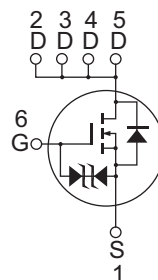
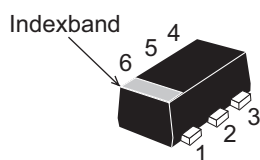
Jun. 13, 2005

### Features

- Low on-resistance  
 $R_{DS(on)} = 45 \text{ m}\Omega$  typ. (at  $V_{GS} = 4.5 \text{ V}$ )
- Low drive current.
- High density mounting
- 2.5 V gate drive devices.

### 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	$V_{DSS}$	20	V
Gate to source voltage	$V_{GSS}$	$\pm 12$	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 × 40 × 1.6 mm)

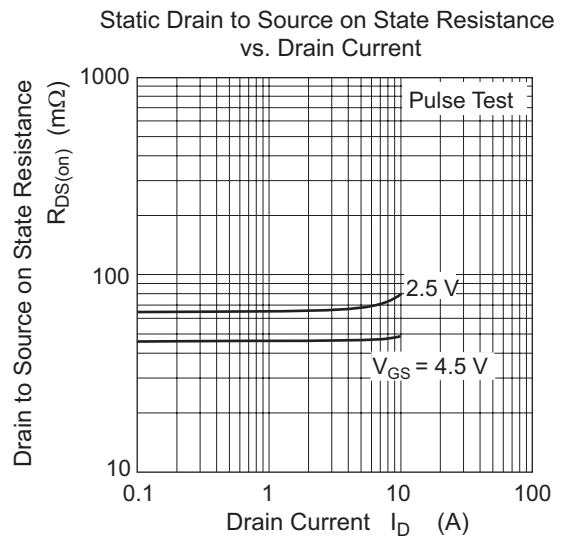
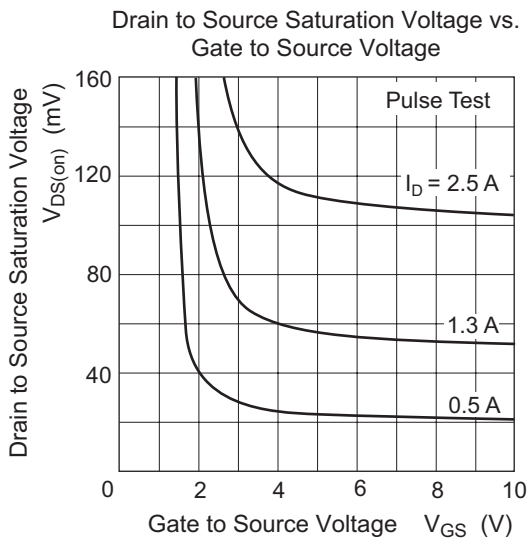
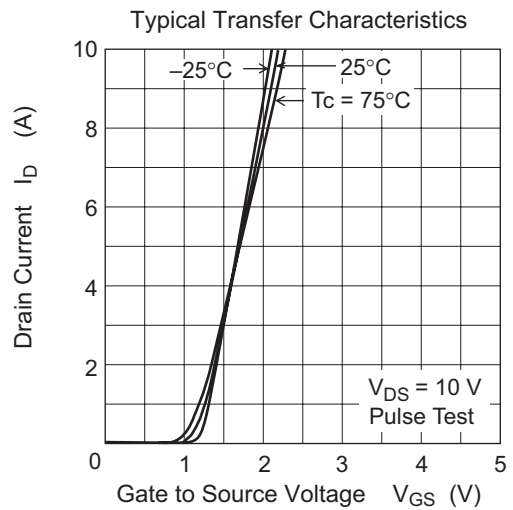
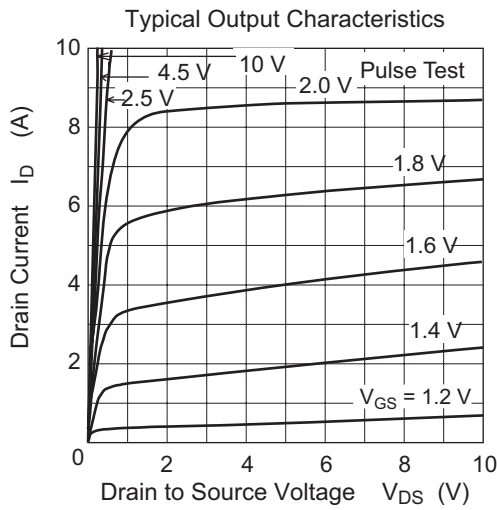
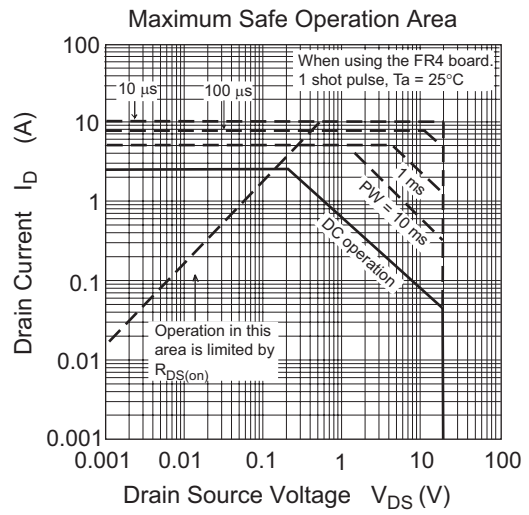
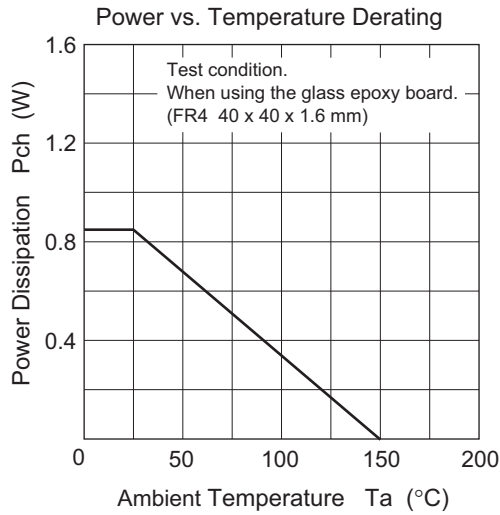
## Electrical Characteristics

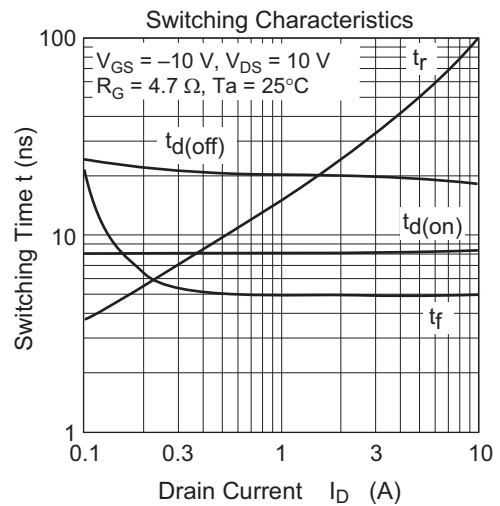
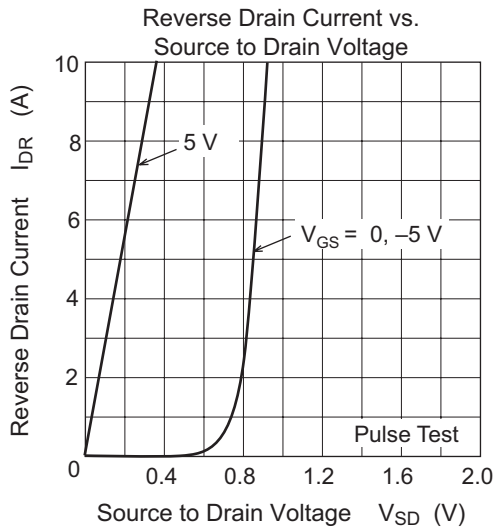
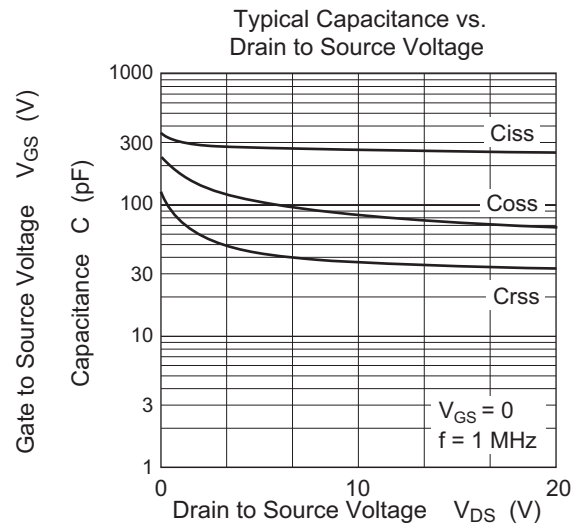
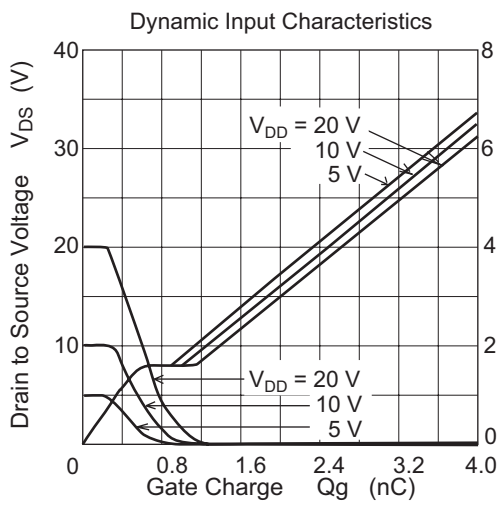
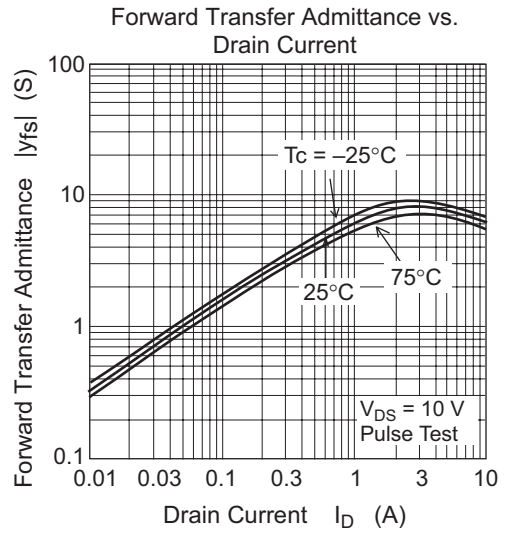
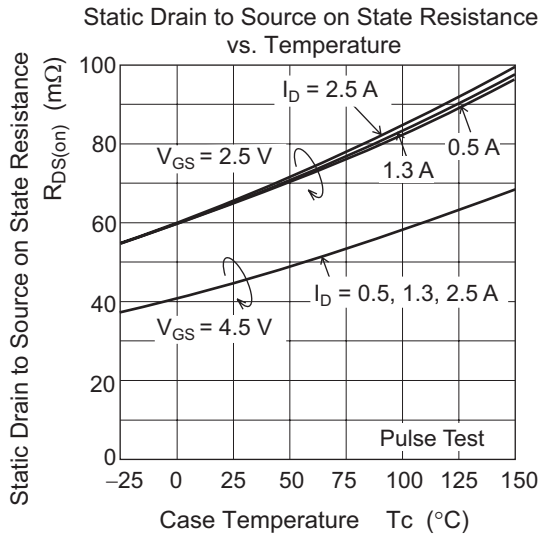
(Ta = 25°C)

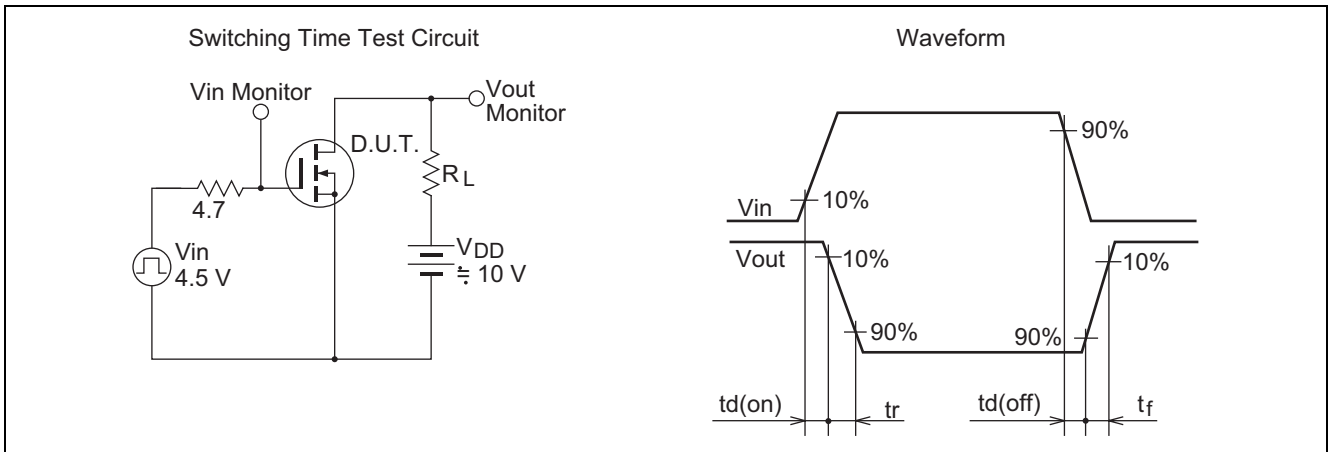
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to Source breakdown voltage	$V_{(BR)DSS}$	20	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to Source breakdown voltage	$V_{(BR)GSS}$	$\pm 12$	—	—	V	$I_G = \pm 10 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to Source leakage current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 10 \text{ V}$ , $V_{DS} = 0$
Drain to Source leakage current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20 \text{ V}$ , $V_{GS} = 0$
Gate to Source cutoff voltage	$V_{GS(off)}$	0.4	—	1.4	V	$I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$
Drain to Source on state resistance	$R_{DS(on)}$	—	45	58	$\text{m}\Omega$	$I_D = 1.3 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
		—	66	93	$\text{m}\Omega$	$I_D = 1.3 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	4.5	7	—	S	$I_D = 1.3 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	270	—	pF	$V_{GS} = 0$ , $f = 1 \text{ MHz}$ , $V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	85	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	35	—	pF	
Total gate charge	$Q_g$	—	2.8	—	nC	$V_{GS} = 4.5 \text{ V}$ , $V_{DS} = 10 \text{ V}$ , $I_D = 2.5 \text{ A}$
Gate to Source charge	$Q_{gs}$	—	0.6	—	nC	
Gate to Drain charge	$Q_{gd}$	—	0.5	—	nC	
Turn - on delay time	$t_{d(on)}$	—	8	—	ns	$V_{GS} = 4.5 \text{ V}$ , $I_D = 1.3 \text{ A}$ , $V_{DD} = 10 \text{ V}$ , $R_L = 7.7 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	19	—	ns	
Turn - off delay time	$t_{d(off)}$	—	20	—	ns	
Fall time	$t_f$	—	5	—	ns	
Body - Drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	$I_F = 2.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

Notes: 3. Pulse test

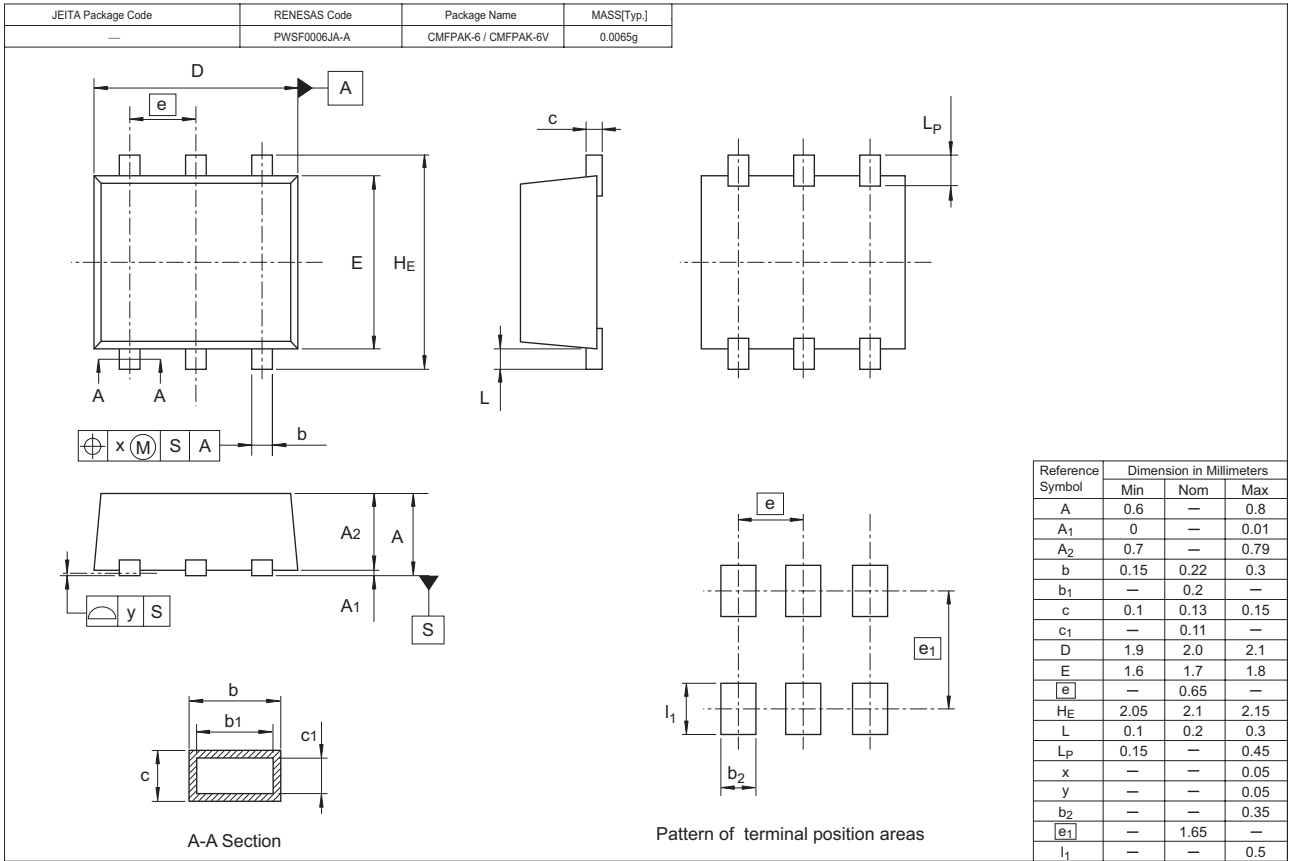
### Main Characteristics







### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT2196C-EL-E	3000 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.



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