

# HAT2204C

Silicon N Channel MOS FET  
Power Switching

REJ03G0448-0400

Rev.4.00

May 19.2005

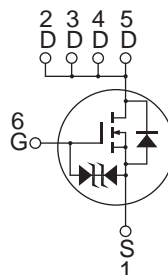
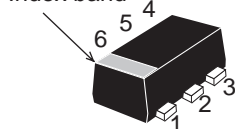
## Features

- Low on-resistance  
 $R_{DS(on)} = 26m\Omega$  typ.(at  $V_{GS} = 4.5V$ )
- Low drive current
- High density mounting
- 1.8V gate drive device

## Outline

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

Index band



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	$I_D$	3.5	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	14	A
Body - Drain diode reverse Drain current	$I_{DR}$	3.5	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	900	mW
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Notes: 1.  $PW \leq 10\mu s$ , duty cycle  $\leq 1\%$

2. When using the glass epoxy board (FR4 40 x 40 x 1.6mm)

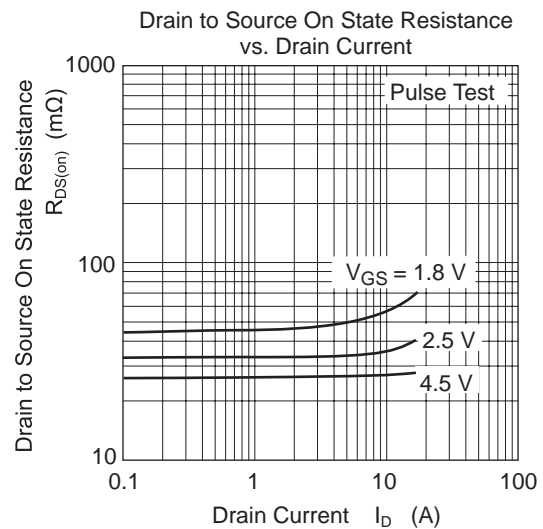
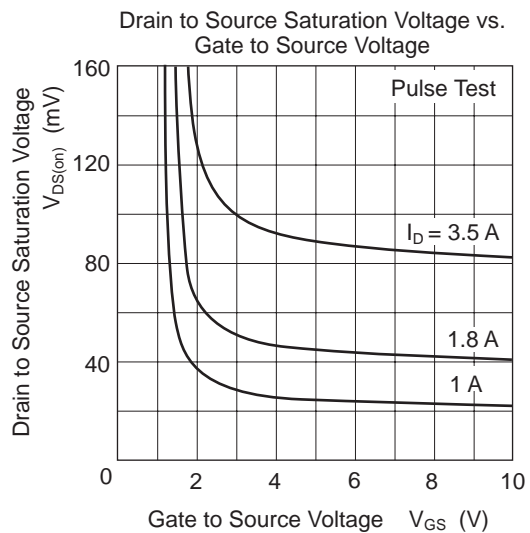
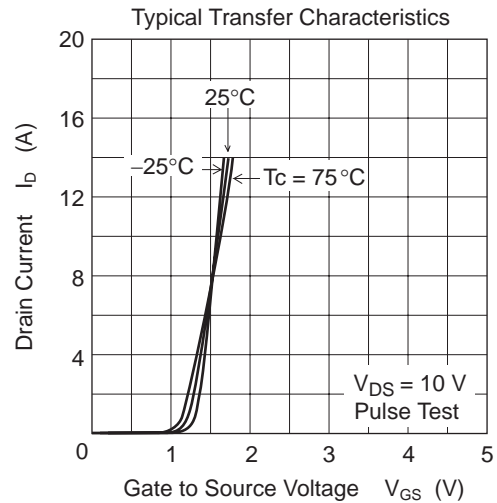
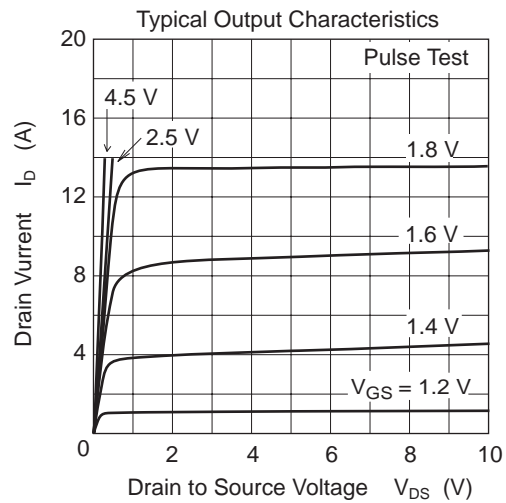
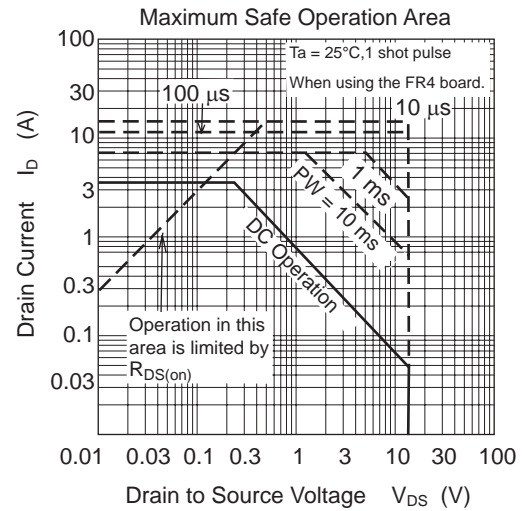
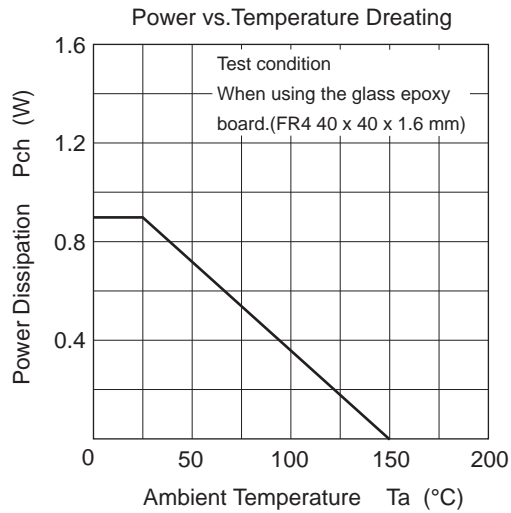
## Electrical Characteristics

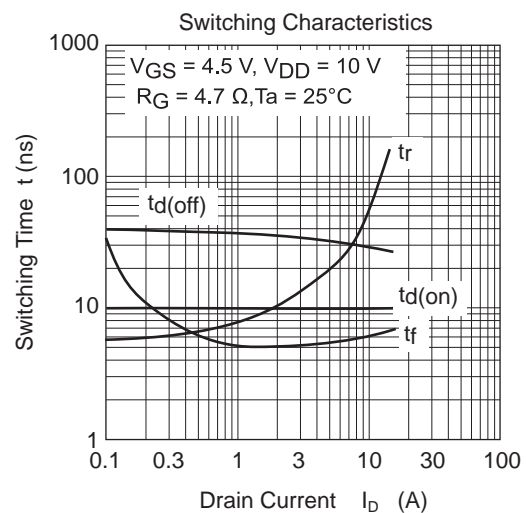
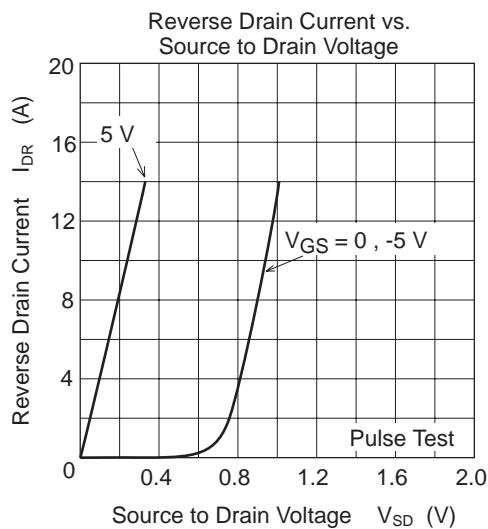
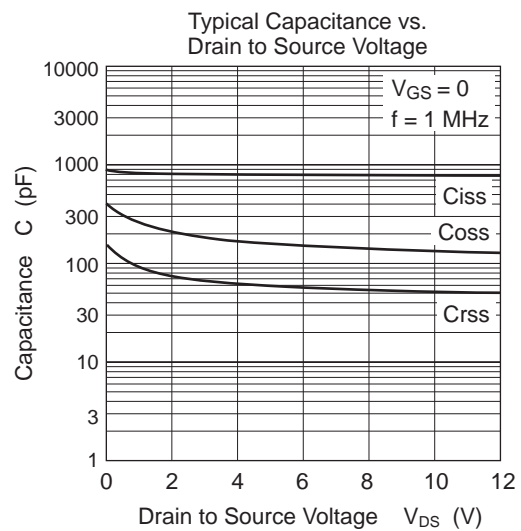
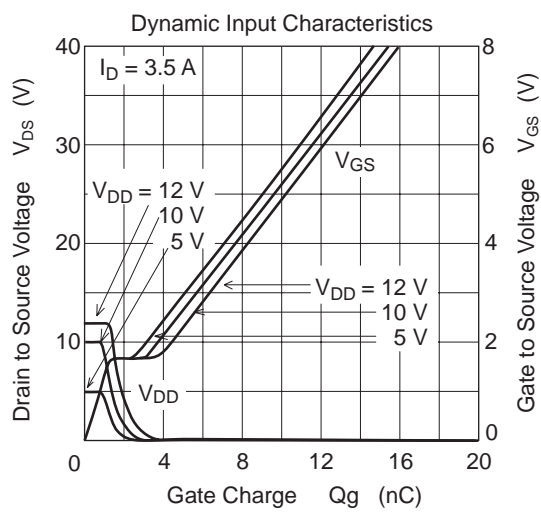
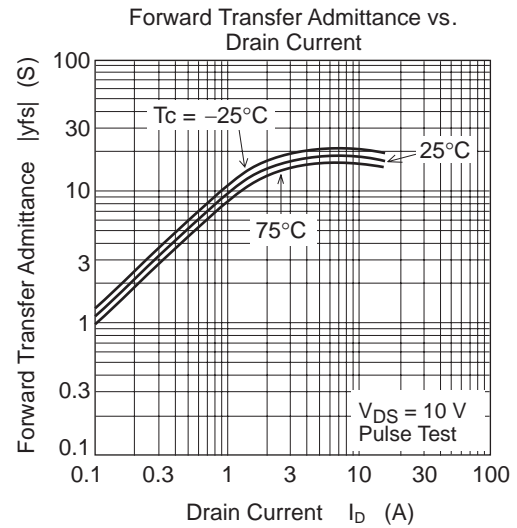
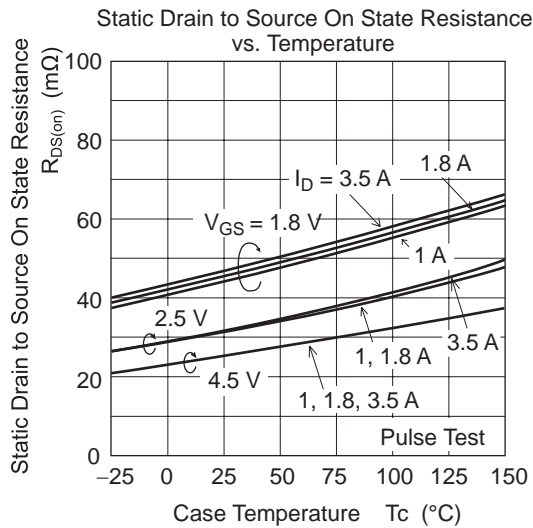
(Ta = 25°C)

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	$V_{(BR)GSS}$	$\pm 8$				$I_G = \pm 10 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to Source leakage current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 6.4 \text{ V}$ , $V_{DS} = 0$
Drain to Source leakage current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 12 \text{ V}$ , $V_{GS} = 0$
Gate to Source cutoff voltage	$V_{GS(off)}$	0.3	—	1.2	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Drain to Source on state resistance	$R_{DS(on)}$	—	26	34	$\text{m}\Omega$	$I_D = 1.8 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	34	44	$\text{m}\Omega$	$I_D = 1.8 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	45	69	$\text{m}\Omega$	$I_D = 1.8 \text{ A}$ , $V_{GS} = 1.8 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	8.5	13	—	S	$I_D = 1.8 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	770	—	pF	$V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	115	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	50	—	pF	
Turn - on delay time	$t_{d(on)}$	—	10	—	ns	$I_D = 1.8 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ $V_{DS} = 10 \text{ V}$ , $R_L = 5.6 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	9.5	—	ns	
Turn - off delay time	$t_{d(off)}$	—	36	—	ns	
Fall time	$t_f$	—	5	—	ns	
Total Gate charge	$Q_g$	—	9	—	nC	$V_{DD} = 10 \text{ V}$ $V_{GS} = 4.5 \text{ V}$ $I_D = 3.5 \text{ A}$
Gate to Source charge	$Q_{gs}$	—	1.5	—	nC	
Gate to Drain charge	$Q_{gd}$	—	2	—	nC	
Body - Drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	$I_F = 3.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

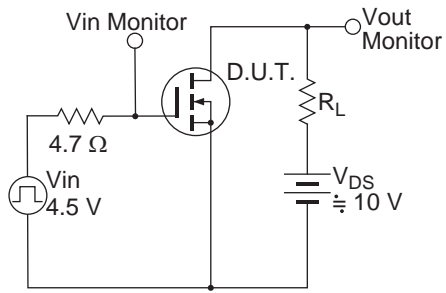
Notes: 3. Pulse test

## Main Characteristics

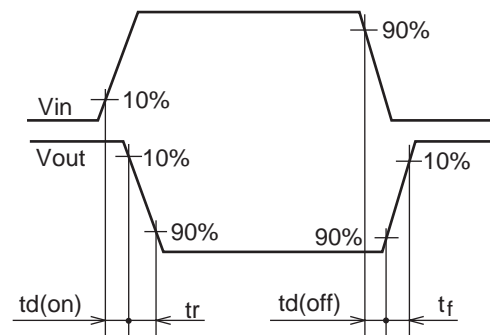




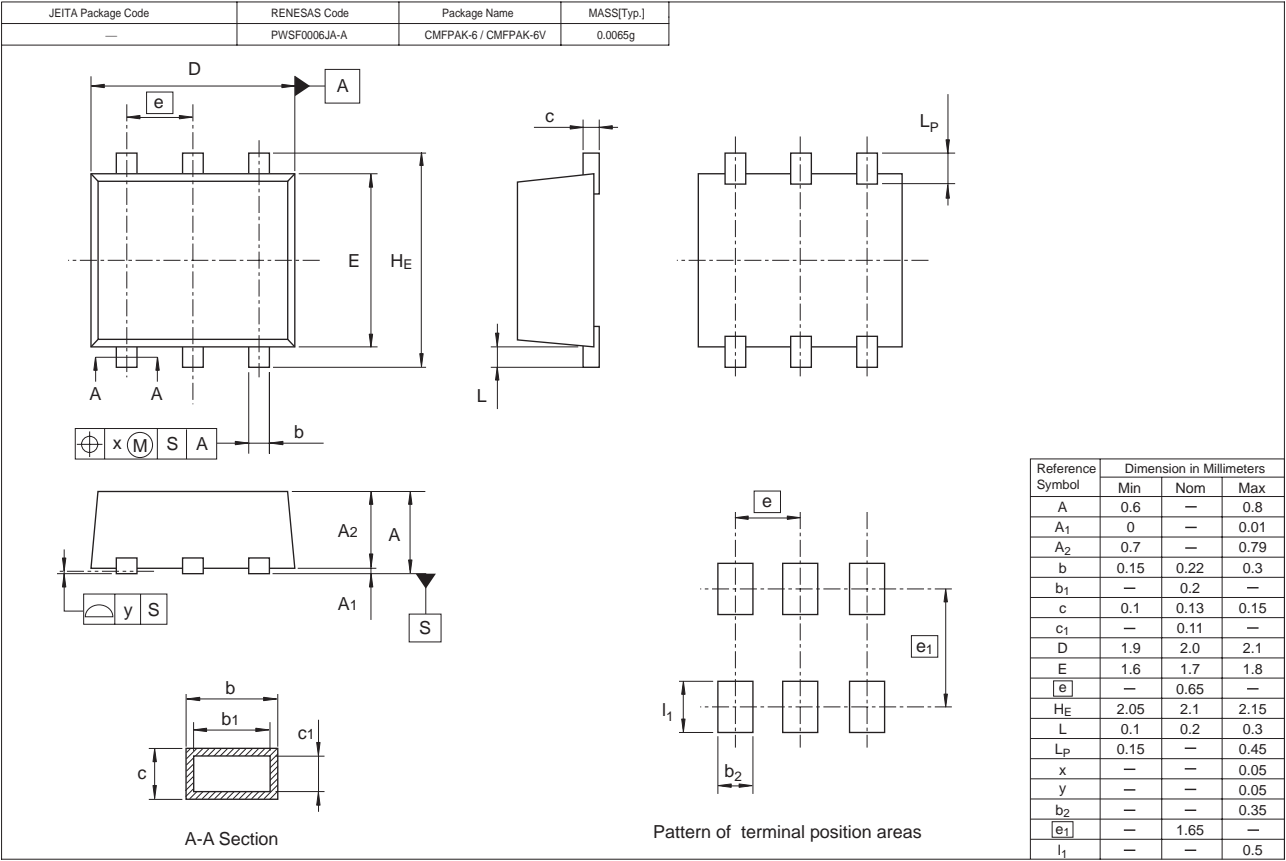
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2203C-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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