

# HAT2205C

## Silicon N Channel MOS FET Power Switching

REJ03G1237-0400

Rev.4.00

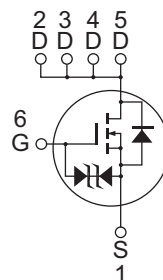
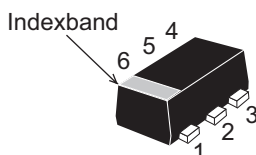
Jan 26, 2006

### Features

- Low on-resistance  
 $R_{DS(on)} = 38 \text{ m}\Omega$  typ. (at  $V_{GS} = 4.5 \text{ V}$ )
- Low drive current.
- High density mounting
- 1.8 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	$V_{DSS}$	12	V
Gate to source voltage	$V_{GSS}$	$\pm 8$	V
Drain current	$I_D$	3	A
Drain peak current	$I_D (\text{pulse})^{\text{Note 1}}$	12	A
Body - Drain diode reverse drain current	$I_{DR}$	3	A
Channel dissipation	$P_{ch}^{\text{Note 2}}$	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  $40 \times 40 \times 1.6 \text{ mm}$ )

## Electrical Characteristics

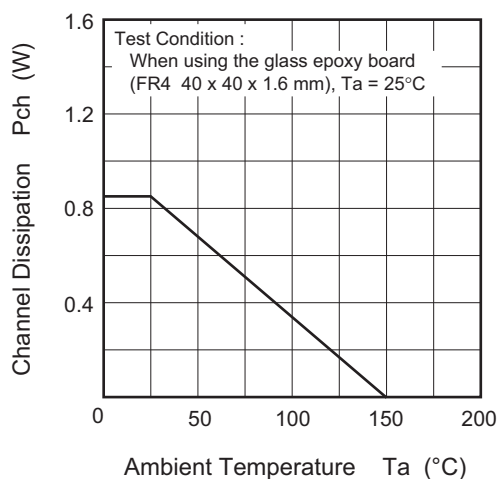
(Ta = 25°C)

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	$I_G = \pm 10 \text{ }\mu\text{A}$ , $V_{DS} = 0$
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	$V_{GS(th)}$	0.3	—	1.2	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Drain to Source on state resistance	$R_{DS(on)}$	—	38	50	$\text{m}\Omega$	$V_{GS} = 4.5 \text{ V}$ , $I_D = 1.5 \text{ A}$ <sup>Note3</sup>
		—	48	67	$\text{m}\Omega$	$V_{GS} = 2.5 \text{ V}$ , $I_D = 1.5 \text{ A}$ <sup>Note3</sup>
		—	65	97	$\text{m}\Omega$	$V_{GS} = 1.8 \text{ V}$ , $I_D = 1.5 \text{ A}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	6	9	—	S	$V_{DS} = 10 \text{ V}$ , $I_D = 1.5 \text{ A}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	430	—	pF	$V_{GS} = 0$ , $f = 1 \text{ MHz}$ , $V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	72	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	35	—	pF	
Total gate charge	$Q_g$	—	6	—	nC	$V_{GS} = 4.5 \text{ V}$ , $V_{DS} = 10 \text{ V}$ , $I_D = 3 \text{ A}$
Gate to Source charge	$Q_{gs}$	—	0.9	—	nC	
Gate to Drain charge	$Q_{gd}$	—	0.9	—	nC	
Turn - on delay time	$t_{d(on)}$	—	9	—	ns	$V_{GS} = 4.5 \text{ V}$ , $I_D = 1.5 \text{ A}$ , $V_{DD} = 10 \text{ V}$ , $R_L = 6.7 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	3	—	ns	
Turn - off delay time	$t_{d(off)}$	—	30	—	ns	
Fall time	$t_f$	—	3	—	ns	
Body - Drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	$I_F = 3 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

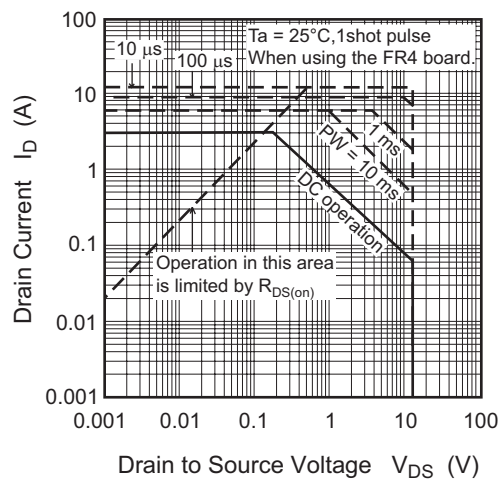
Notes: 3. Pulse test

## Main Characteristics

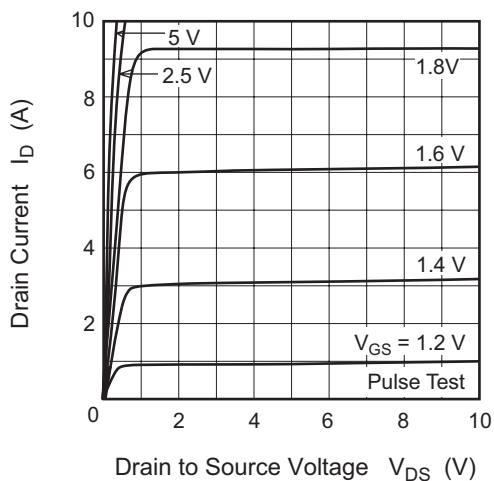
Power vs. Temperature Derating



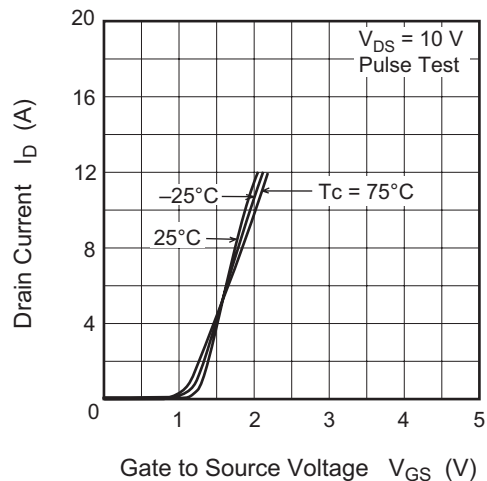
Maximum Safe Operation Area



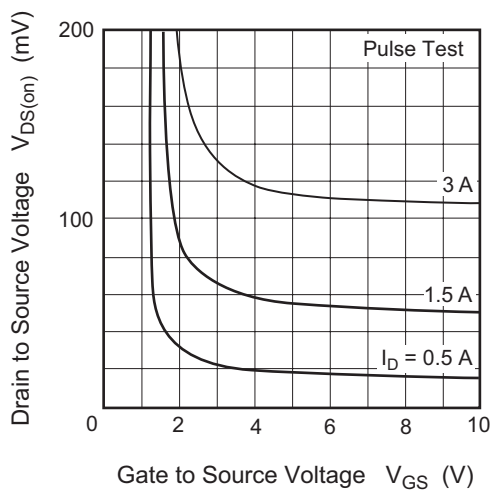
Typical Output Characteristics



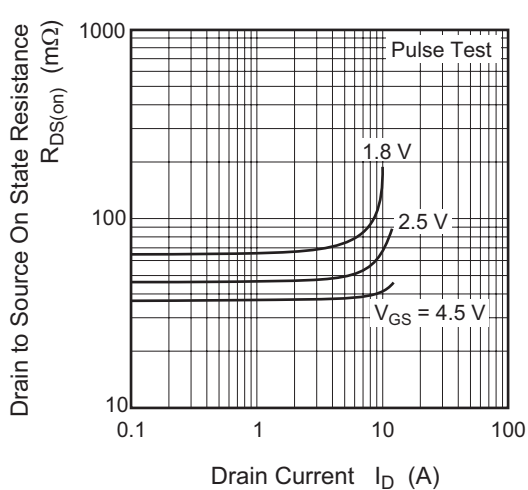
Typical Transfer Characteristics

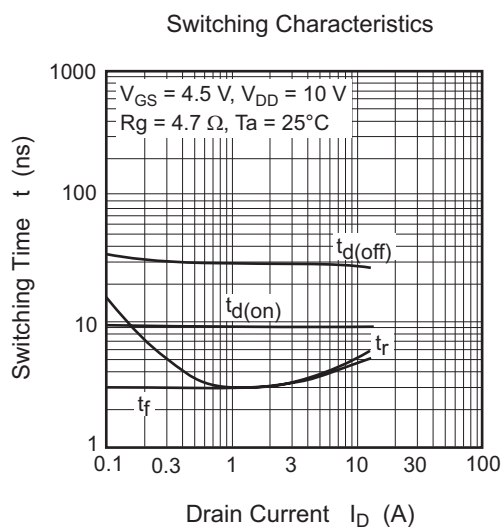
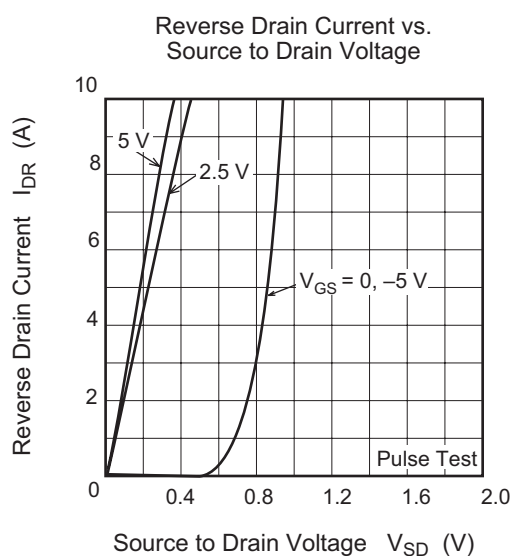
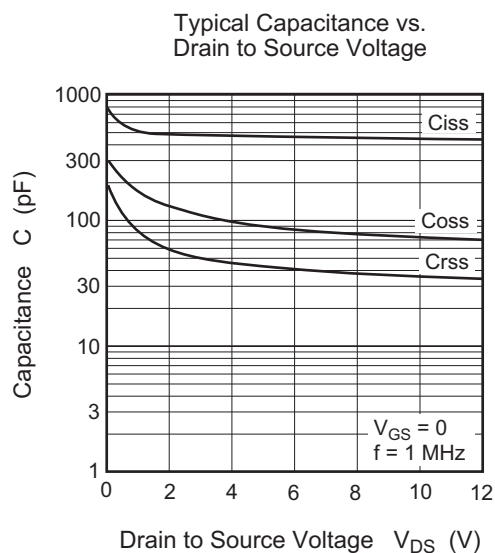
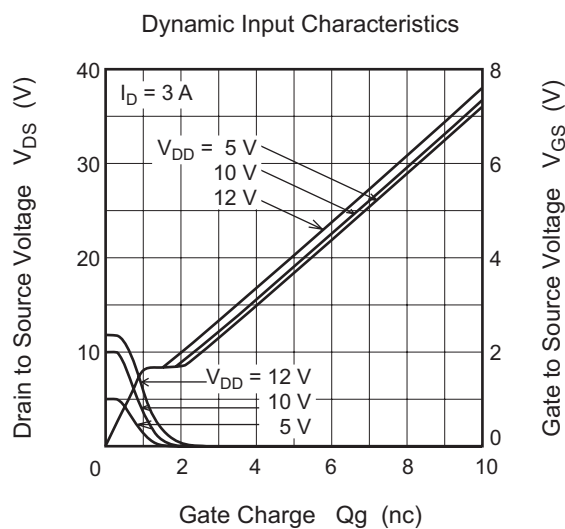
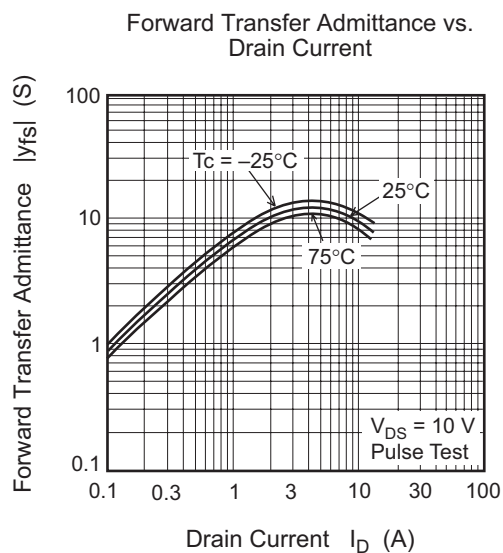
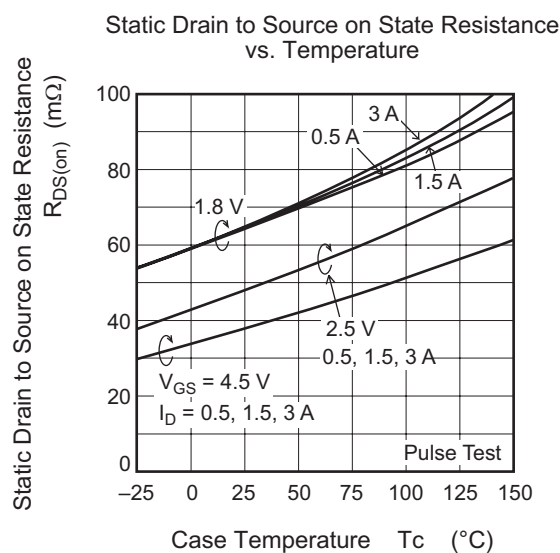


Drain to Source Saturation Voltage vs. Gate to Source Voltage

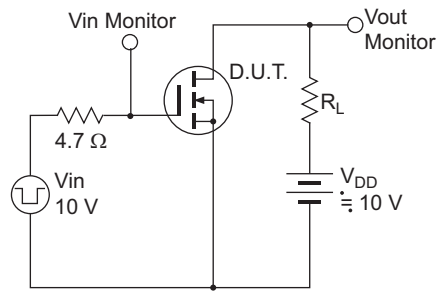


Static Drain to Source on State Resistance vs. Drain Current

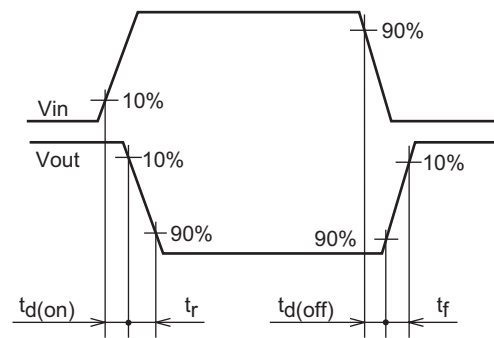




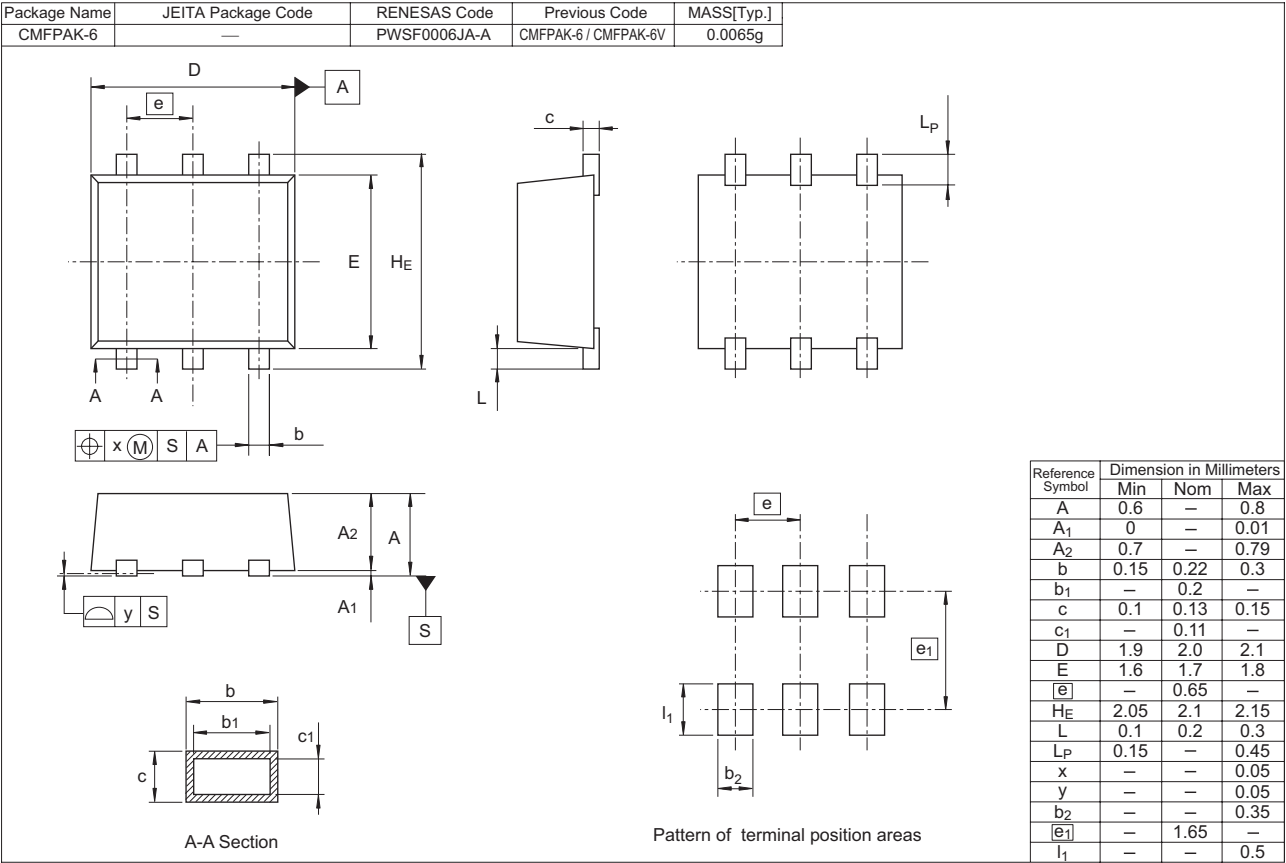
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2205C-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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