

# HAT2221C

## Silicon N Channel MOS FET Power Switching

REJ03G1240-0400

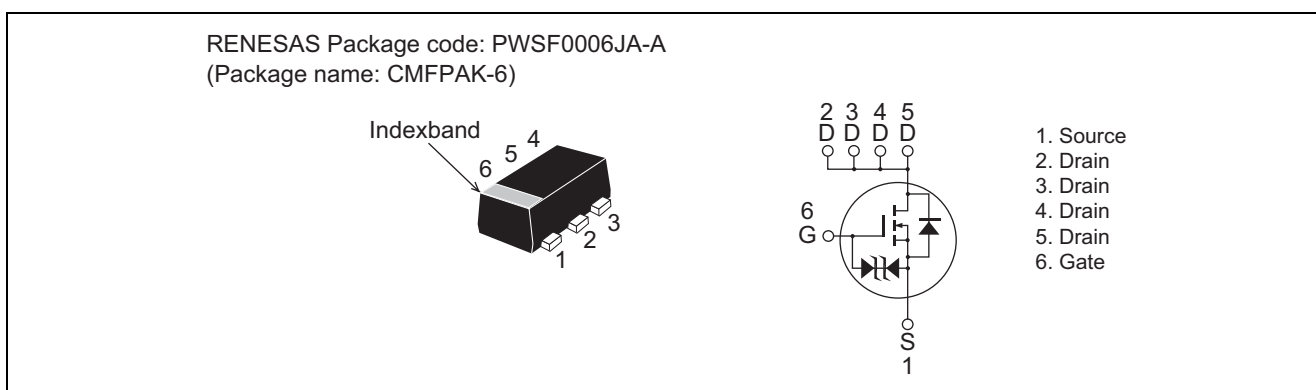
Rev.4.00

Feb 28, 2006

### Features

- Low on-resistance  
 $R_{DS(on)} = 120 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )
- Low drive current.
- High density mounting
- 4.5 V gate drive devices.

### Outline



### Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	30	V
Gate to source voltage	$V_{GSS}$	+20 / -10	V
Drain current	$I_D$	1.5	A
Drain peak current	$I_D$ (pulse) <sup>Note 1</sup>	6	A
Body - Drain diode reverse drain current	$I_{DR}$	1.5	A
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	790	W
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)

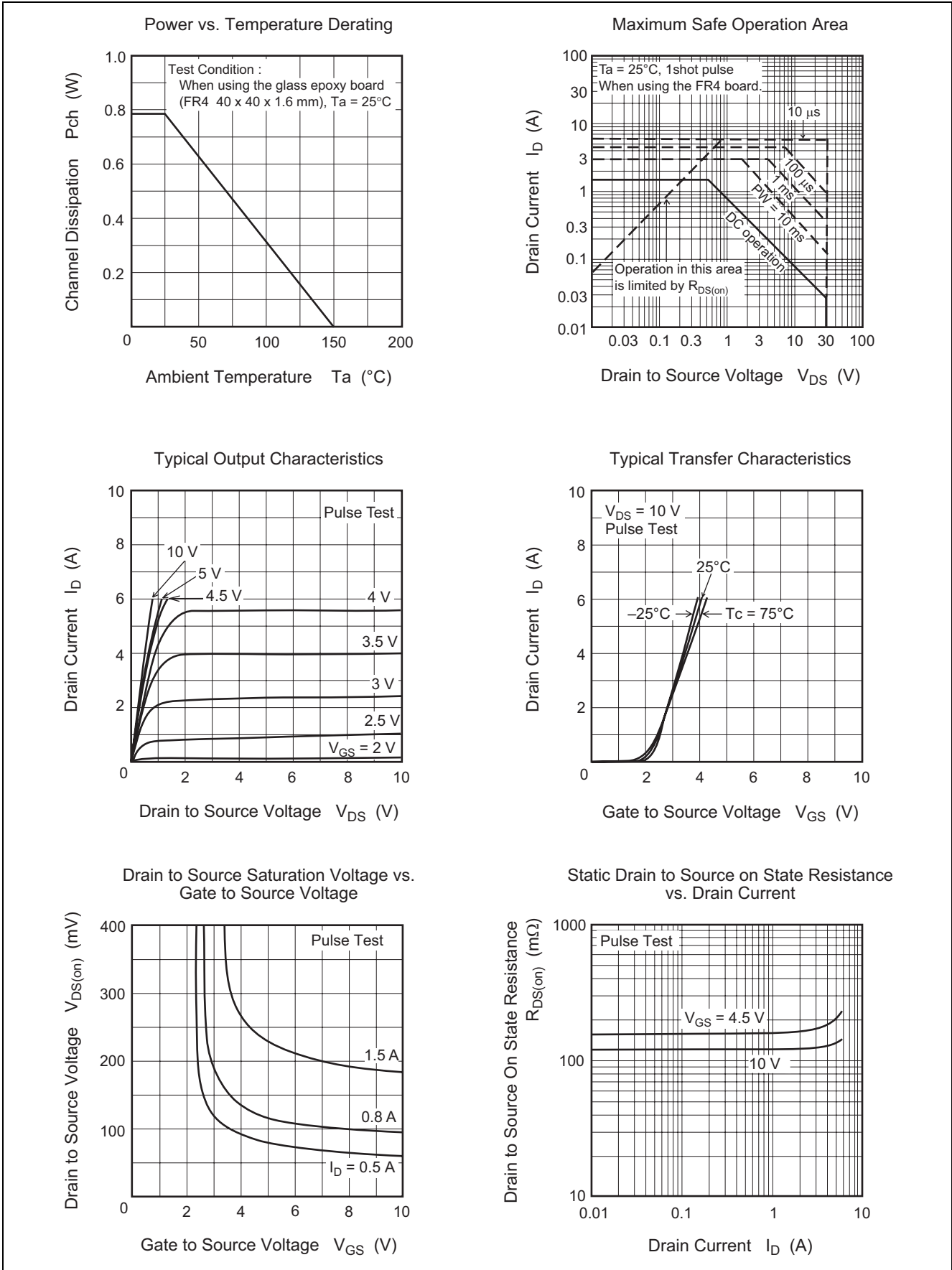
## Electrical Characteristics

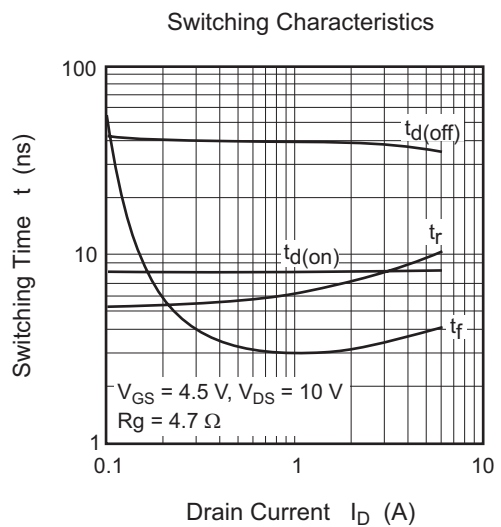
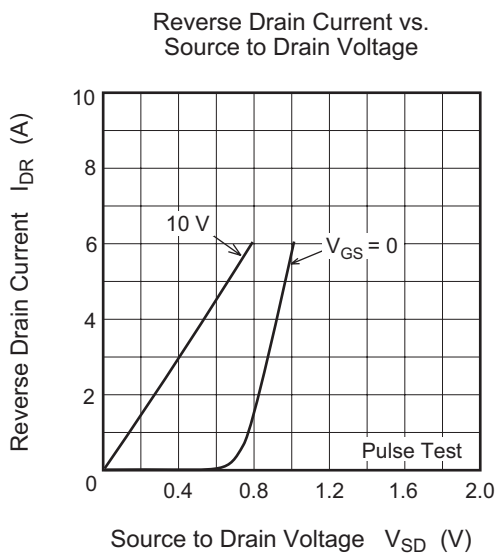
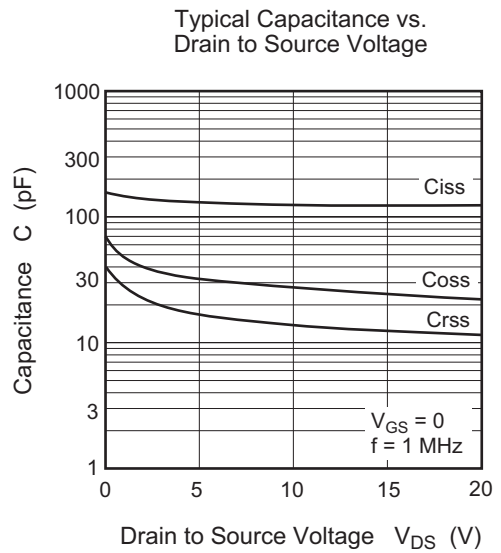
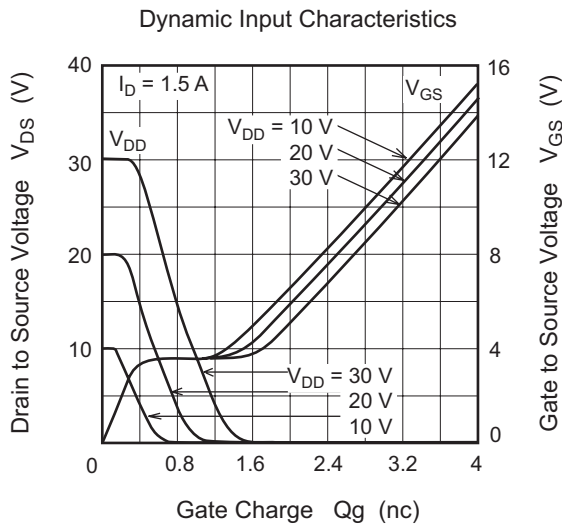
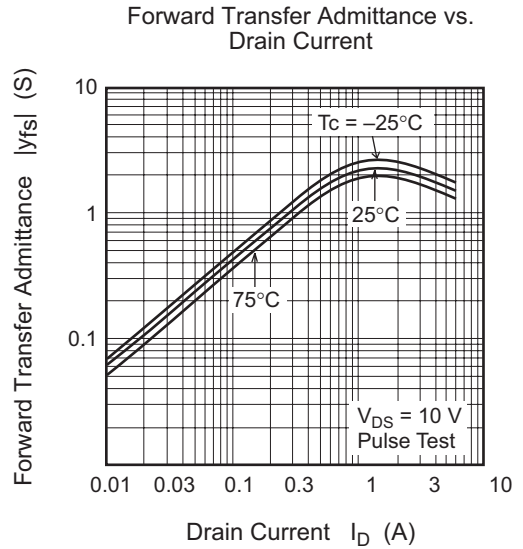
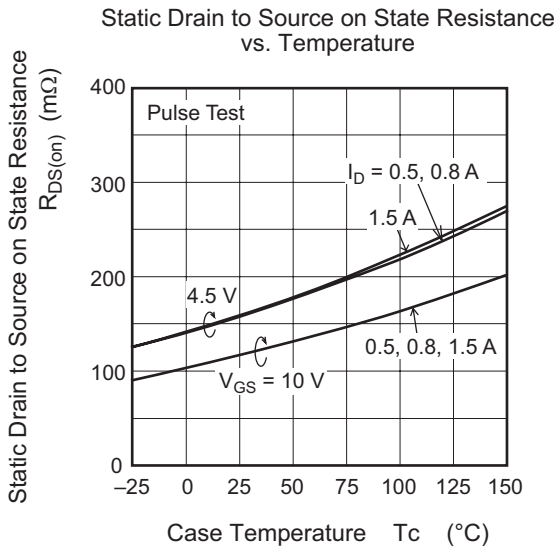
(Ta = 25°C)

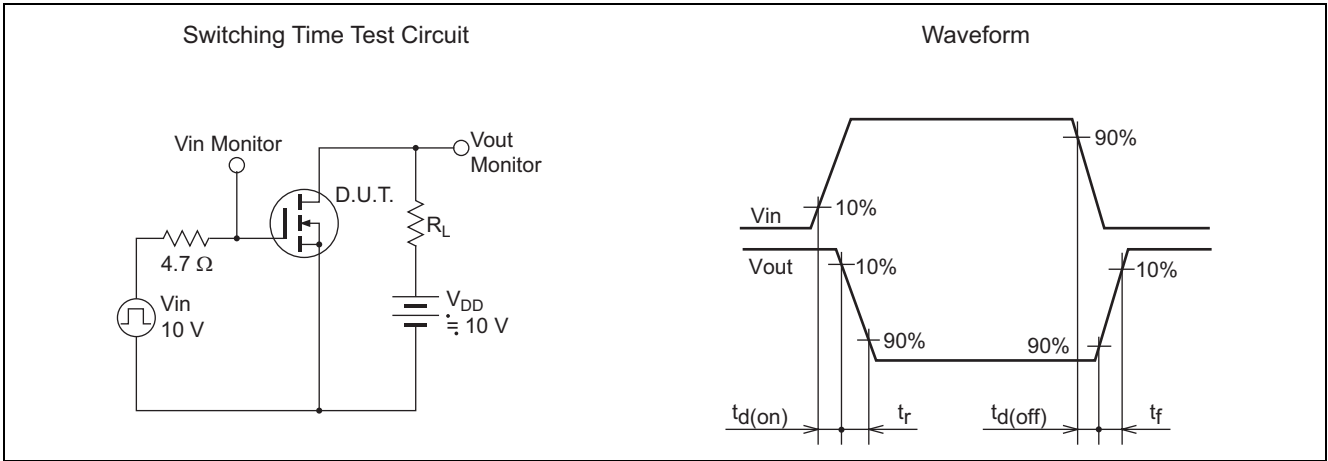
Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain to Source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to Source breakdown voltage	$V_{(BR)GSS}$	+20 -10	—	—	V	$I_G = \pm 10 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to Source leakage current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = +16 / -8 \text{ V}$ , $V_{DS} = 0$
Drain to Source leakage current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$
Gate to Source cutoff voltage	$V_{GS(off)}$	0.4	—	1.4	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Drain to Source on state resistance	$R_{DS(on)}$	—	120	150	$\text{m}\Omega$	$I_D = 0.8 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>
		—	160	235	$\text{m}\Omega$	$I_D = 0.8 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	1.3	2	—	S	$I_D = 0.8 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	110	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	27	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	13	—	PF	
Total gate charge	$Q_g$	—	2.8	—	nC	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 1.5 \text{ A}$
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	$I_D = 0.8 \text{ A}$ , $V_{GS} = 10 \text{ V}$ , $V_{DD} = 10 \text{ V}$ , $R_L = 12.5 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	6	—	ns	
Turn - off delay time	$t_{d(off)}$	—	40	—	ns	
Fall time	$t_f$	—	3	—	ns	
Body - Drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	$I_F = 1.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

Notes: 3. Pulse test

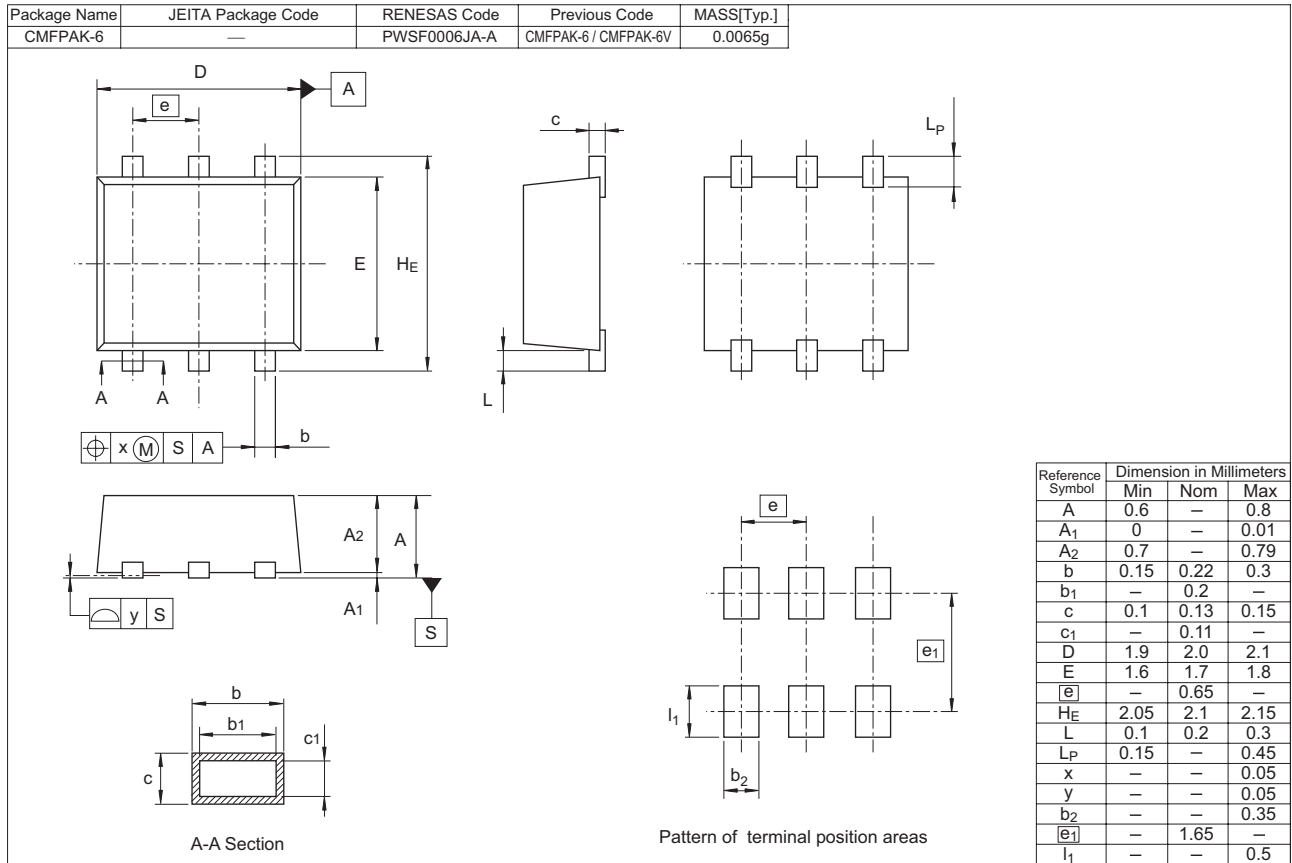
### Main Characteristics







### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT2221C-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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