

# HAT2281C

## Silicon N Channel MOS FET Power Switching

REJ03G1328-0200

Rev.2.00

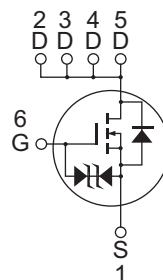
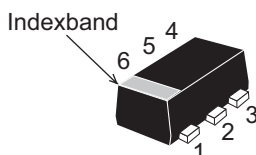
Jan 26, 2006

### Features

- Low on-resistance  
 $R_{DS(on)} = 109 \text{ m}\Omega$  typ.(at  $V_{GS} = 4.5 \text{ V}$ )
- Low drive current
- High density mounting
- 2.5 V gate drive device

### 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	$V_{DSS}$	60	V
Gate to Source voltage	$V_{GSS}$	$\pm 12$	V
Drain current	$I_D$	2	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	8	A
Body - Drain diode reverse Drain current	$I_{DR}$	2	A
Channel dissipation	$P_{ch}$ <sup>Note2</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 x 40 x 1.6mm)

## Electrical Characteristics

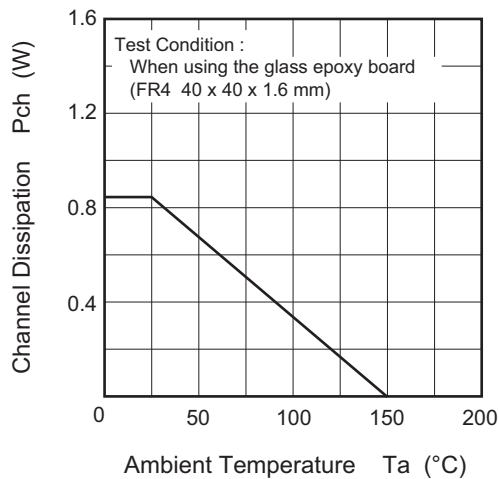
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to Source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to Source breakdown voltage	$V_{(BR)GSS}$	$\pm 12$				$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to Source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 10 \text{ V}$ , $V_{DS} = 0$
Drain to Source leak current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 60 \text{ V}$ , $V_{GS} = 0$
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	$R_{DS(on)}$	—	109	142	$\text{m}\Omega$	$I_D = 1.0 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	126	177	$\text{m}\Omega$	$I_D = 1.0 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	3	4.5	—	S	$I_D = 1.0 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	335	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	40	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	20	—	pF	
Turn - on delay time	$t_{d(on)}$	—	12	—	ns	$I_D = 1.0 \text{ A}$ $V_{GS} = 4.5 \text{ V}$ , $V_{DD} = 10 \text{ V}$ $R_L = 10 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	27	—	ns	
Turn - off delay time	$t_{d(off)}$	—	36	—	ns	
Fall time	$t_f$	—	5	—	ns	
Total Gate charge	$Q_g$	—	3.6	—	nC	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ $I_D = 2.0 \text{ A}$
Gate to Source charge	$Q_{gs}$	—	0.6	—	nC	
Gate to Drain charge	$Q_{gd}$	—	0.7	—	nC	
Body - Drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	$I_F = 2.0 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

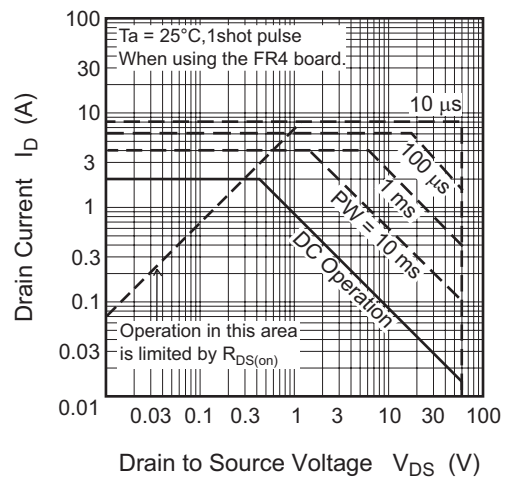
Notes: 3. Pulse test

## Main Characteristics

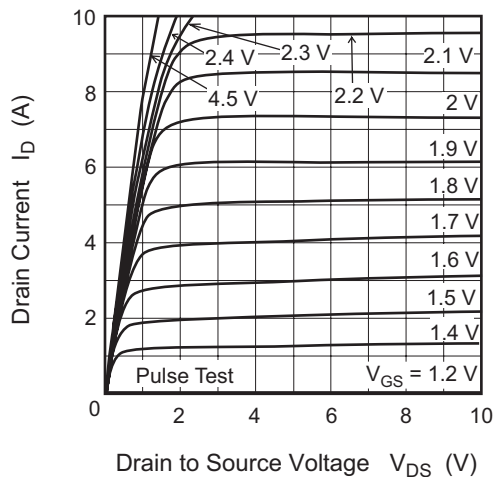
Power vs. Temperature Derating



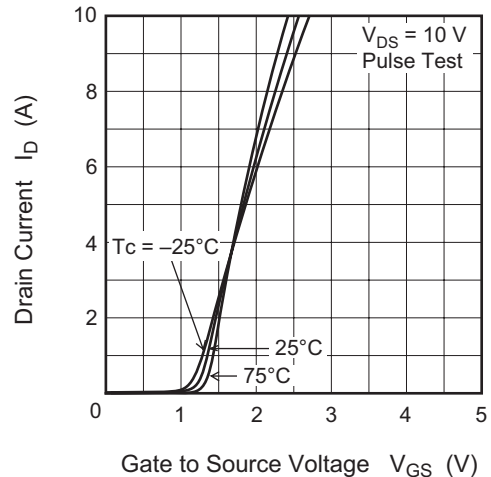
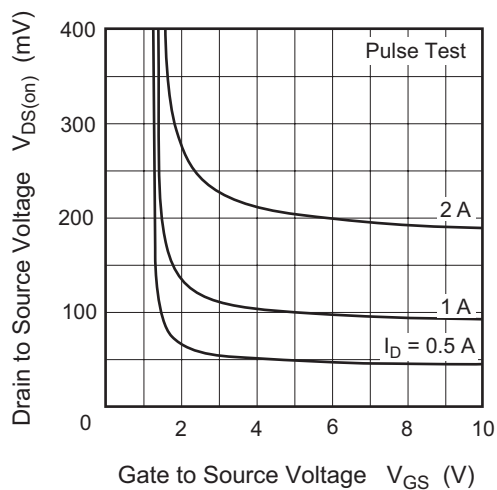
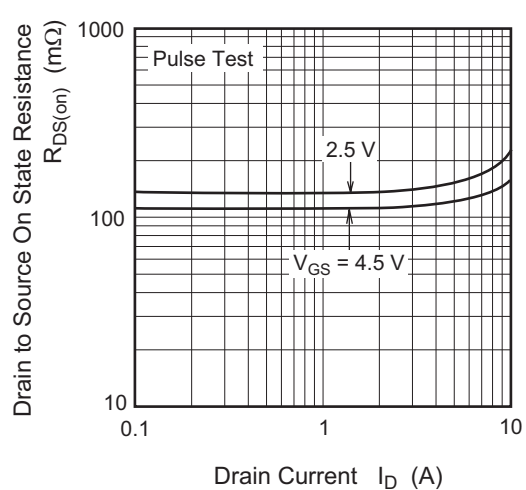
Maximum Safe Operation Area

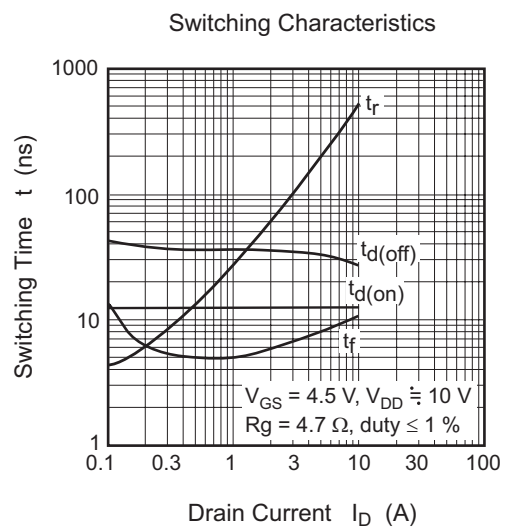
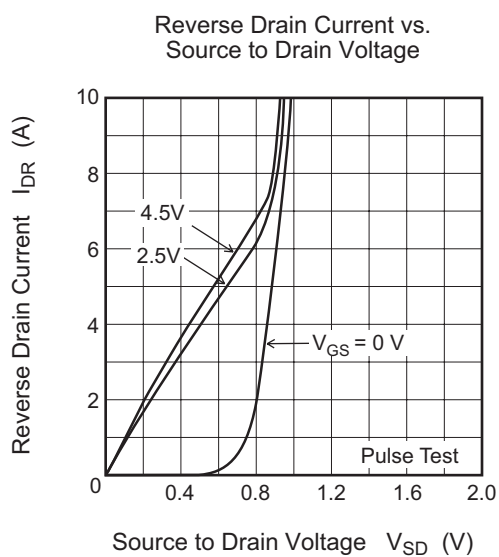
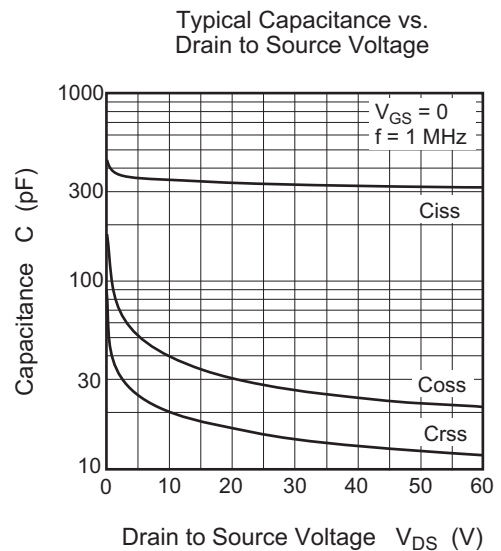
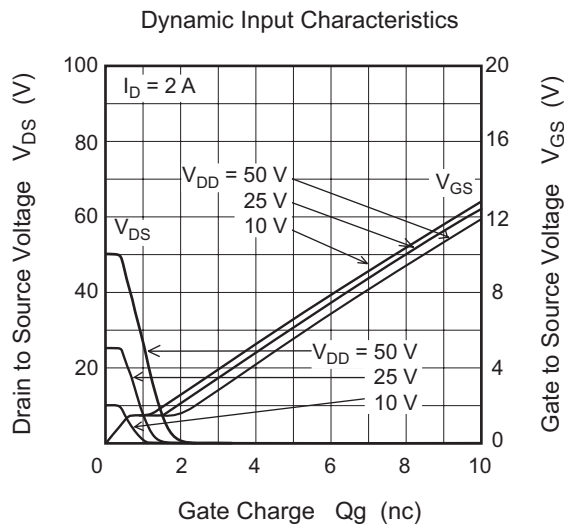
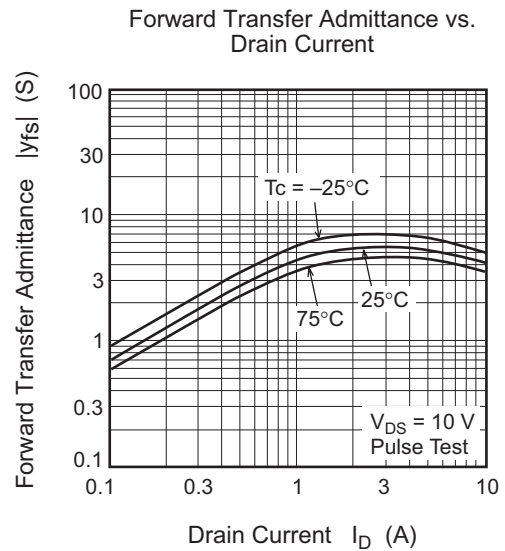
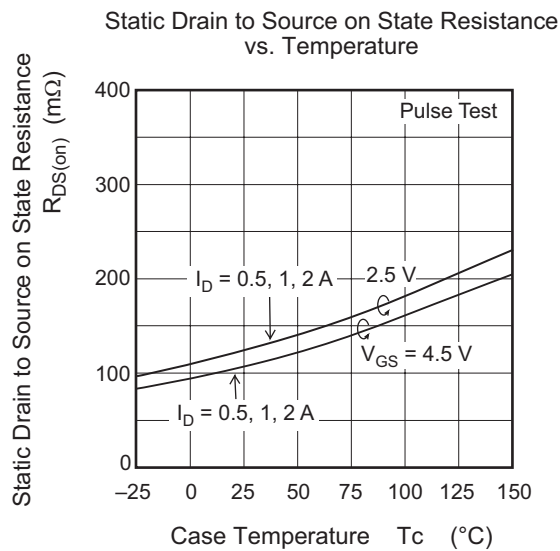


Typical Output Characteristics

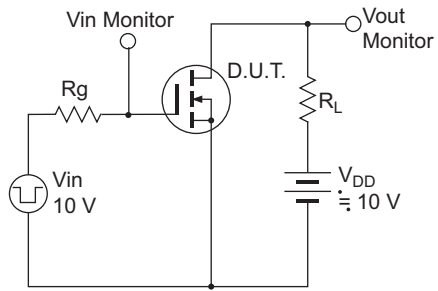


Typical Transfer Characteristics

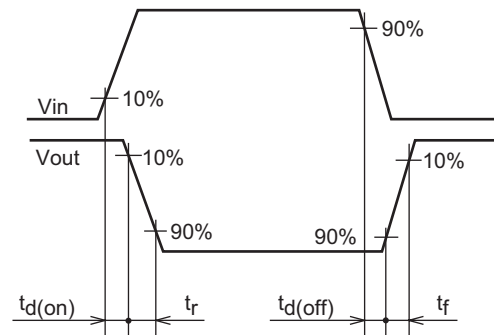
Drain to Source Saturation Voltage vs.  
Gate to Source VoltageStatic Drain to Source on State Resistance  
vs. Drain Current



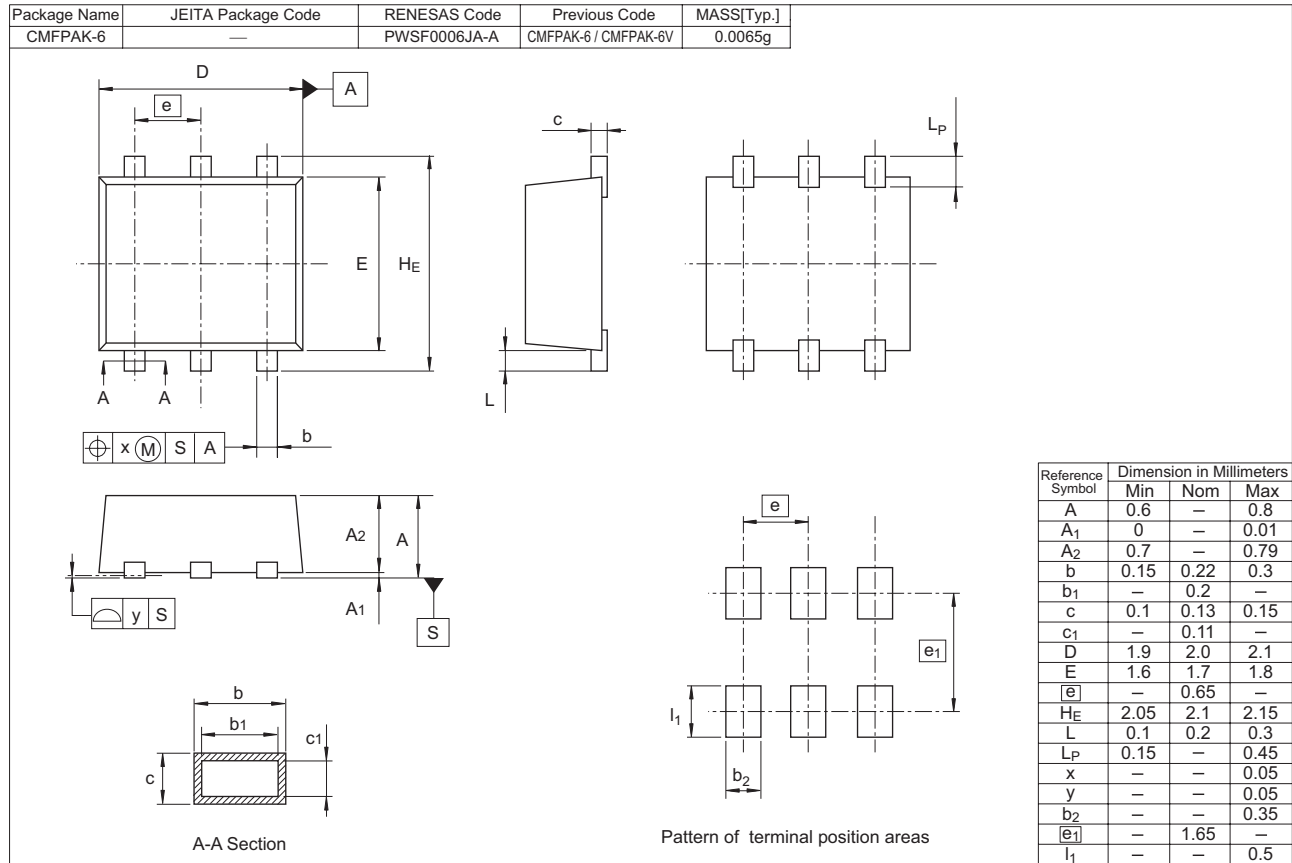
Switching Time Test Circuit



Waveform



## Package Dimensions



## Ordering Information

Part Name	Quantity	Shipping Container
HAT2281C-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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