

# HAT2240C

Silicon N Channel MOS FET  
Power Switching

REJ03G1241-0400

Rev.4.00

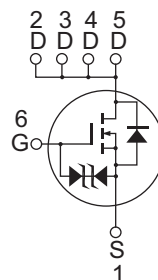
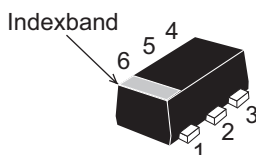
Apr 05, 2006

## Features

- Low on-resistance  
 $R_{DS(on)} = 75 \text{ m}\Omega$  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	$I_D$	2.5	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	10	A
Body - drain diode reverse drain current	$I_{DR}$	2.5	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.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$

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

## Electrical Characteristics

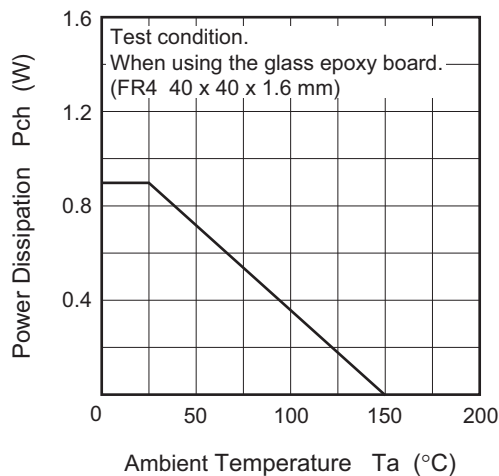
(Ta = 25°C)

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	$R_{DS(on)}$	—	75	98	$\text{m}\Omega$	$I_D = 1.3 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	85	119	$\text{m}\Omega$	$I_D = 1.3 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	3.3	5	—	S	$I_D = 1.3 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	590	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	60	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	35	—	pF	
Turn - on delay time	$t_{d(on)}$	—	17	—	ns	$I_D = 1.3 \text{ A}$ $V_{GS} = 4.5 \text{ V}$ , $V_{DD} = 10 \text{ V}$ $R_L = 7.7 \text{ }\Omega$ , $R_g = 4.7 \text{ }\Omega$
Rise time	$t_r$	—	50	—	ns	
Turn - off delay time	$t_{d(off)}$	—	41	—	ns	
Fall time	$t_f$	—	4	—	ns	
Total gate charge	$Q_g$	—	6	—	nC	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ $I_D = 2.5 \text{ A}$
Gate to source charge	$Q_{gs}$	—	1.2	—	nC	
Gate to drain charge	$Q_{gd}$	—	1.4	—	nC	
Body - drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	$I_F = 2.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

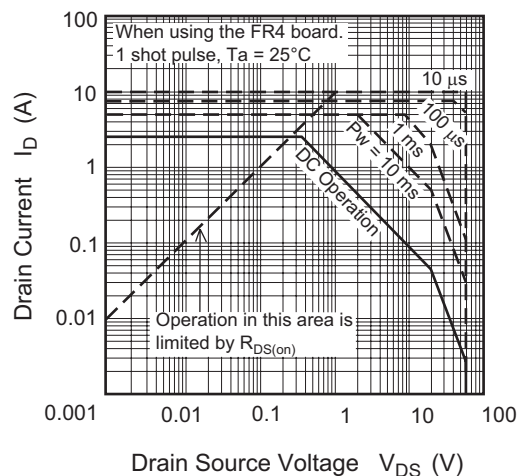
Notes: 3. Pulse test

## Main Characteristics

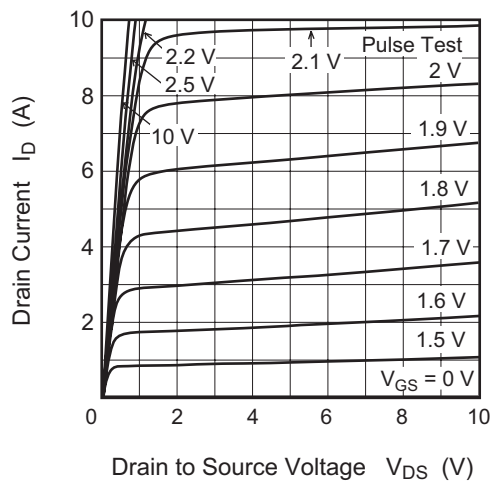
Power vs. Temperature Derating



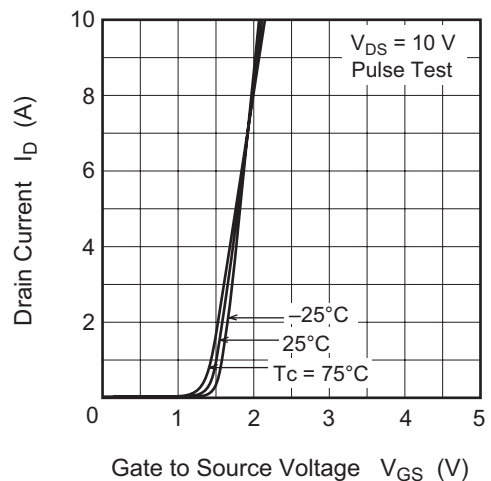
Maximum Safe Operation Area



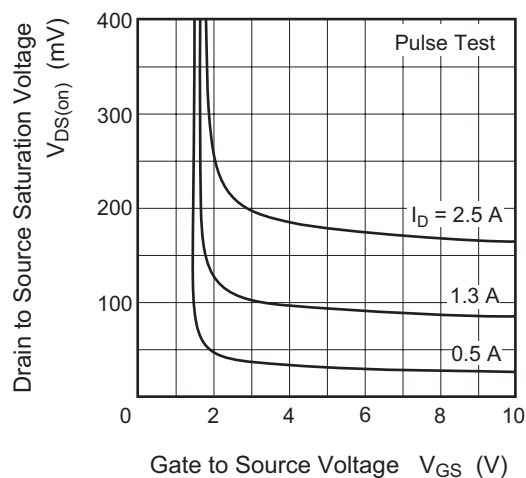
Typical Output Characteristics



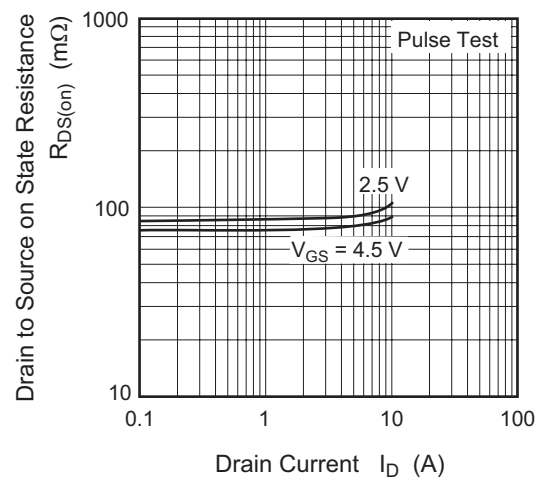
Typical Transfer Characteristics



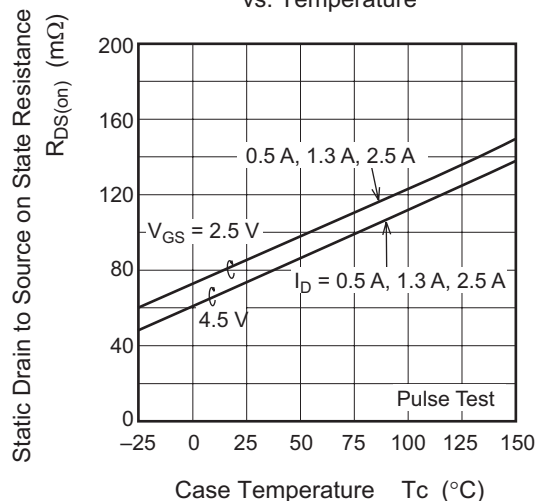
Drain to Source Saturation Voltage vs. Gate to Source Voltage



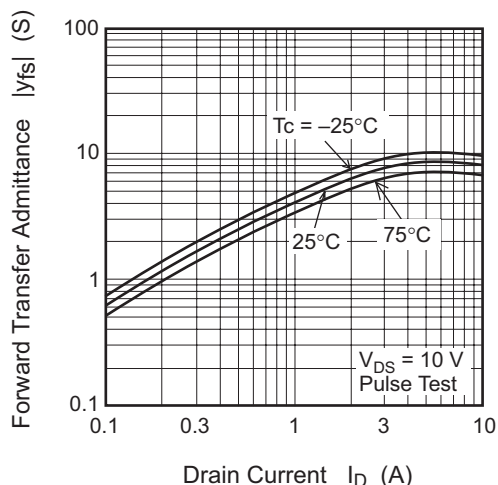
Static Drain to Source on State Resistance vs. Drain Current



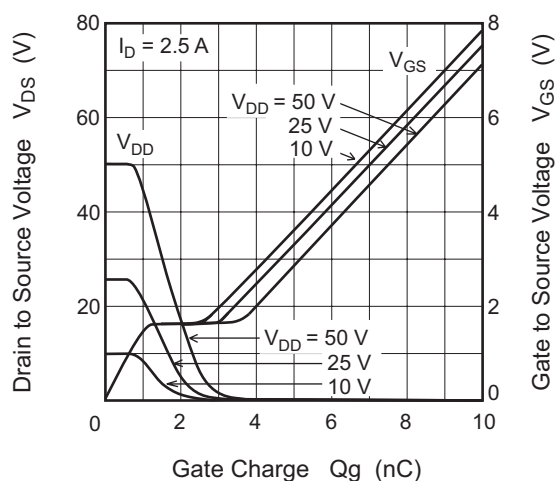
Static Drain to Source on State Resistance vs. Temperature



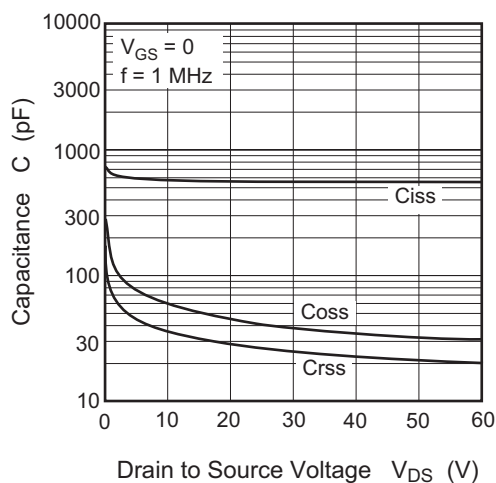
Forward Transfer Admittance vs. Drain Current



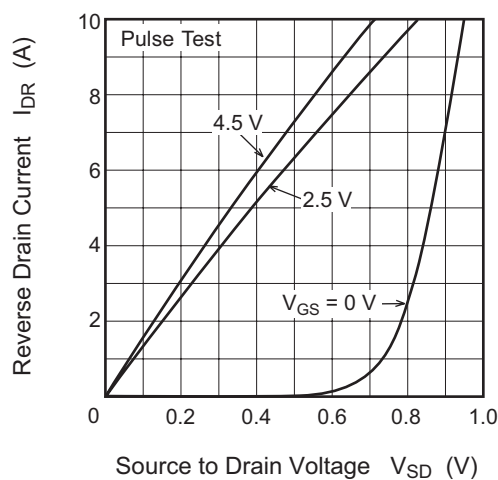
Dynamic Input Characteristics



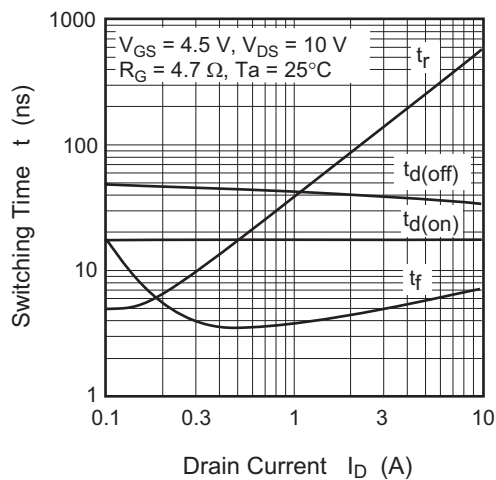
Typical Capacitance vs. Drain to Source Voltage



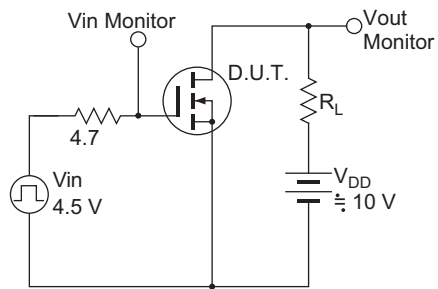
Reverse Drain Current vs. Source to Drain Voltage



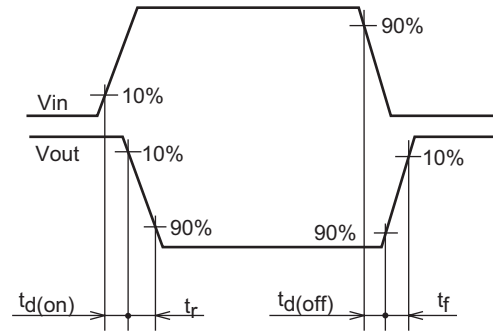
Switching Characteristics



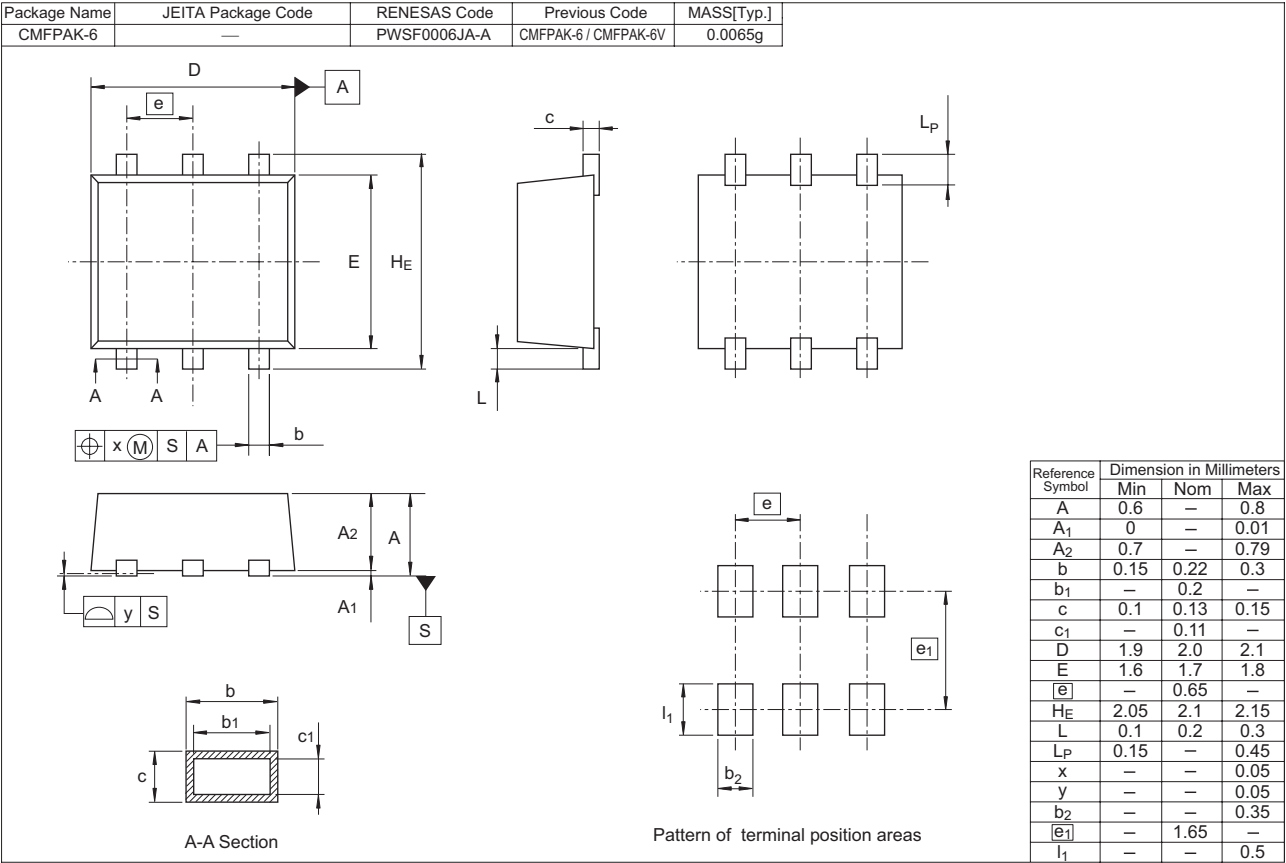
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2240C-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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Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

#### **Renesas Technology Europe Limited**

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#### **Renesas Technology (Shanghai) Co., Ltd.**

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#### **Renesas Technology Taiwan Co., Ltd.**

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Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

#### **Renesas Technology Malaysia Sdn. Bhd**

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510