

# HAT1069C

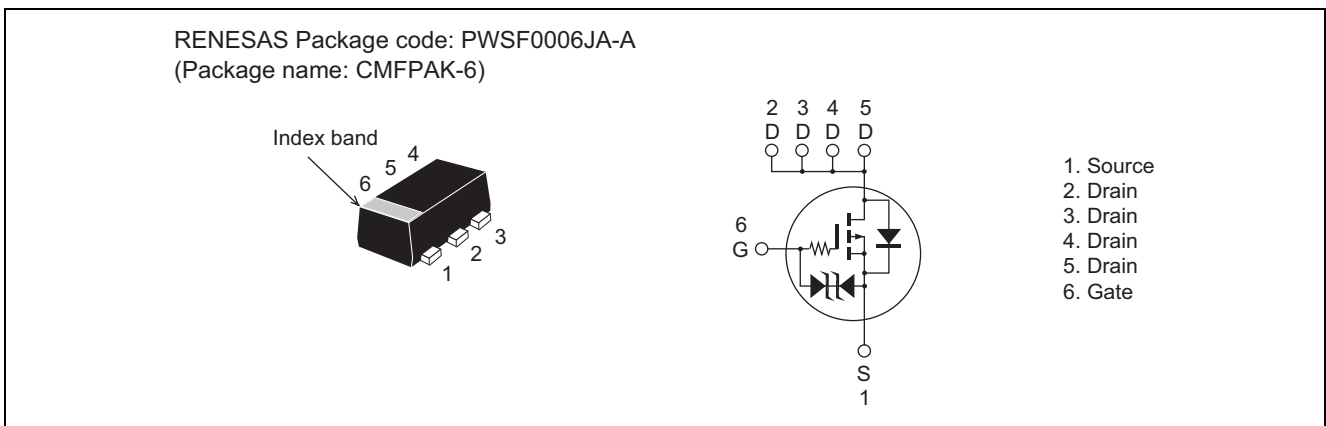
## Silicon P Channel Power MOS FET Power Switching

REJ03G0164-0300  
Rev.3.00  
Oct 19, 2007

### Features

- Low on-resistance  
 $R_{DS(on)} = 38 \text{ m}\Omega$  typ (at  $V_{GS} = -4.5 \text{ V}$ )
- High speed switching
- Capable of 1.8 V gate drive
- High density mounting

### Outline



### 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	$I_D$	-4	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	-16	A
Body-drain diode reverse drain current	$I_{DR}$	-4	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  $40 \times 40 \times 1.6 \text{ mm}$ )

## Electrical Characteristics

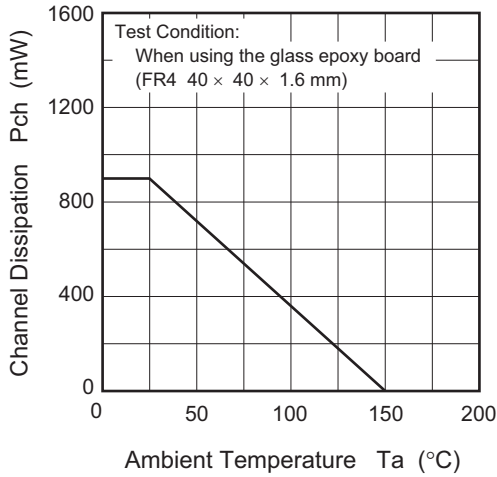
(Ta = 25°C)

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	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 6.4 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain 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	$V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	38	52	$\text{m}\Omega$	$I_D = -1.5 \text{ A}$ , $V_{GS} = -4.5 \text{ V}$
	$R_{DS(on)}$	—	48	70	$\text{m}\Omega$	$I_D = -1.5 \text{ A}$ , $V_{GS} = -2.5 \text{ V}$
	$R_{DS(on)}$	—	60	93	$\text{m}\Omega$	$I_D = -1.5 \text{ A}$ , $V_{GS} = -1.8 \text{ V}$
Forward transfer admittance	$ y_{fs} $	5	8	—	S	$I_D = -1.5 \text{ A}$ , $V_{DS} = -10 \text{ V}$
Input capacitance	$C_{iss}$	—	1380	—	pF	$V_{DS} = -10 \text{ V}$
Output capacitance	$C_{oss}$	—	235	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	115	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	16	—	nC	$V_{DS} = -10 \text{ V}$
Gate to source charge	$Q_{gs}$	—	3	—	nC	$V_{GS} = -4.5 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	6.2	—	nC	$I_D = -3 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$V_{GS} = -4 \text{ V}$ , $I_D = -1.5 \text{ A}$
Rise time	$t_r$	—	150	—	ns	$V_{DD} \cong -10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	490	—	ns	$R_L = 6.6 \text{ }\Omega$
Fall time	$t_f$	—	350	—	ns	$R_g = 4.7 \text{ }\Omega$
Body-drain diode forward voltage	$V_{DF}$	—	-0.8	-1.1	V	$I_F = -4 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>

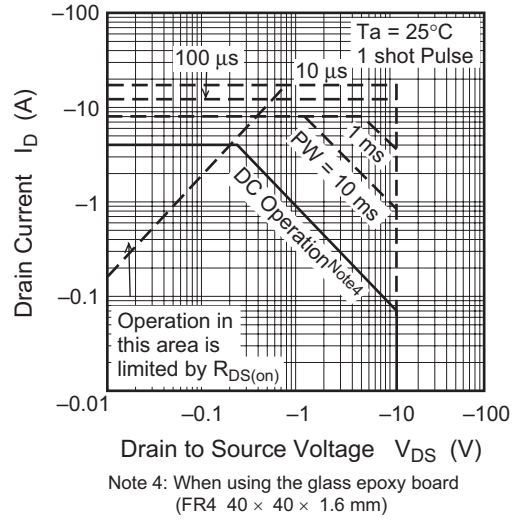
Notes: 3. Pulse test

Main Characteristics

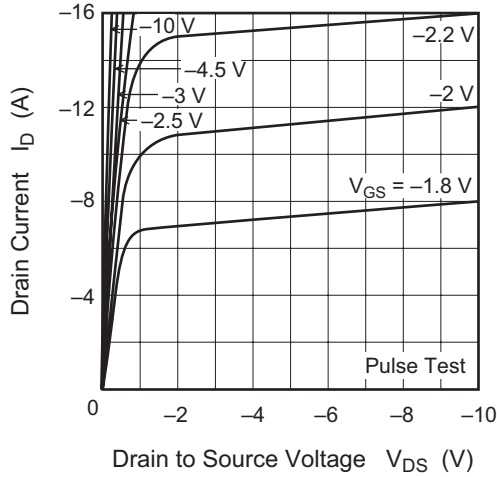
Power vs. Temperature Derating



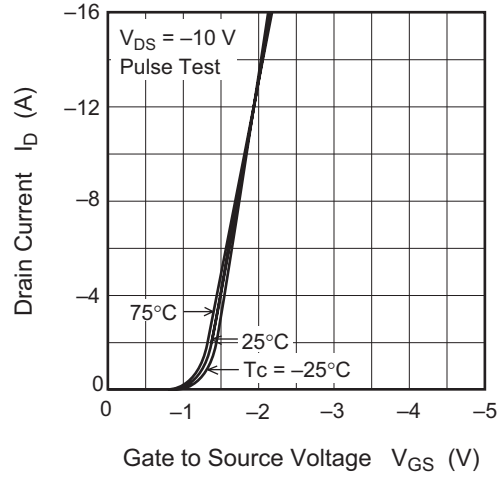
Maximum Safe Operation Area



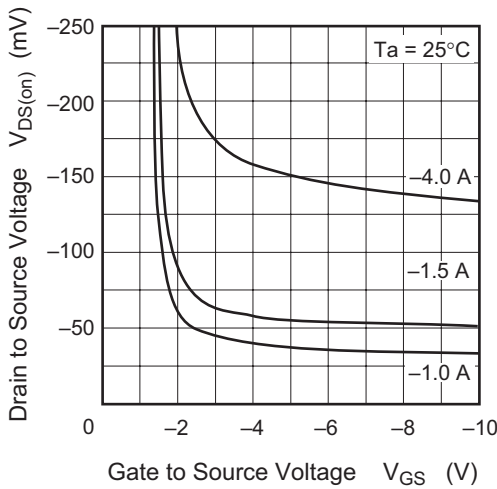
Typical Output Characteristics



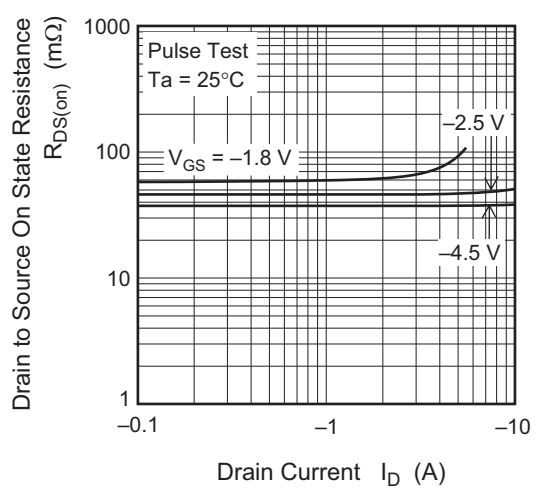
Typical Transfer Characteristics



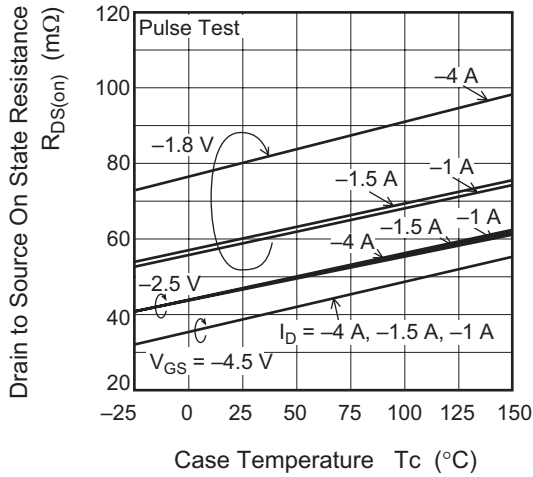
Drain to Source Saturation Voltage vs. Gate to Source Voltage



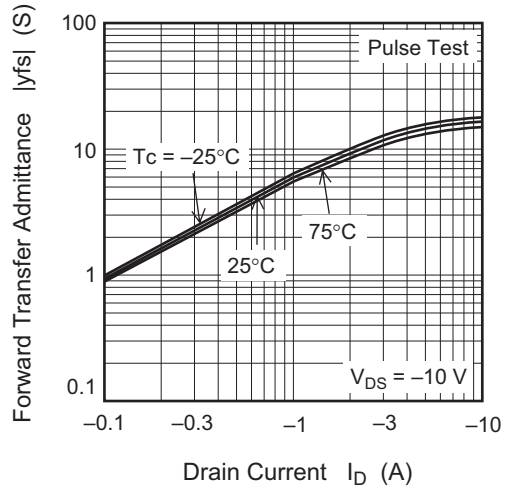
Static Drain to Source on State Resistance vs. Drain Current



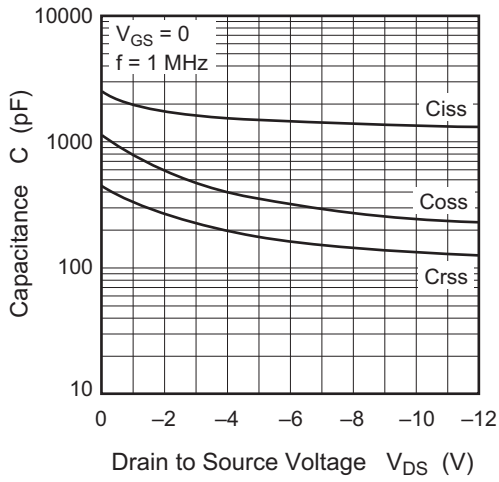
Static Drain to Source on State Resistance vs. Temperature



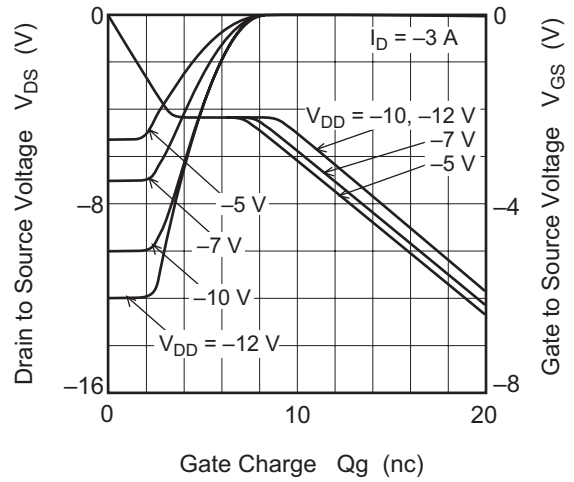
Forward Transfer Admittance vs. Drain Current



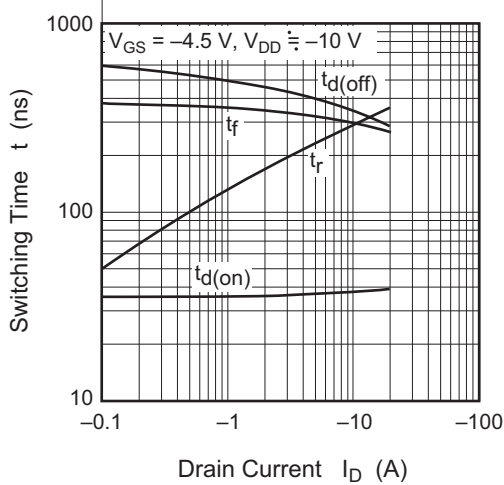
Typical Capacitance vs. Drain to Source Voltage



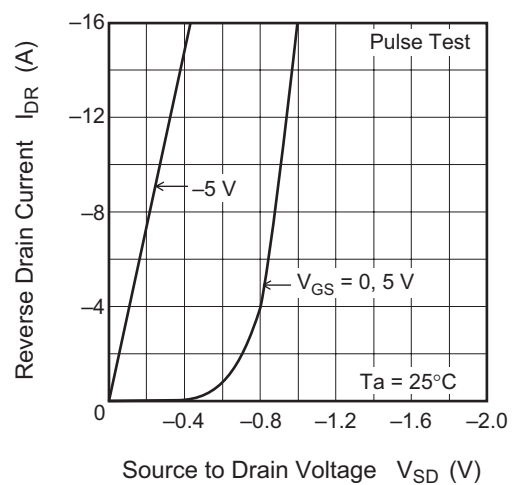
Dynamic Input Characteristics



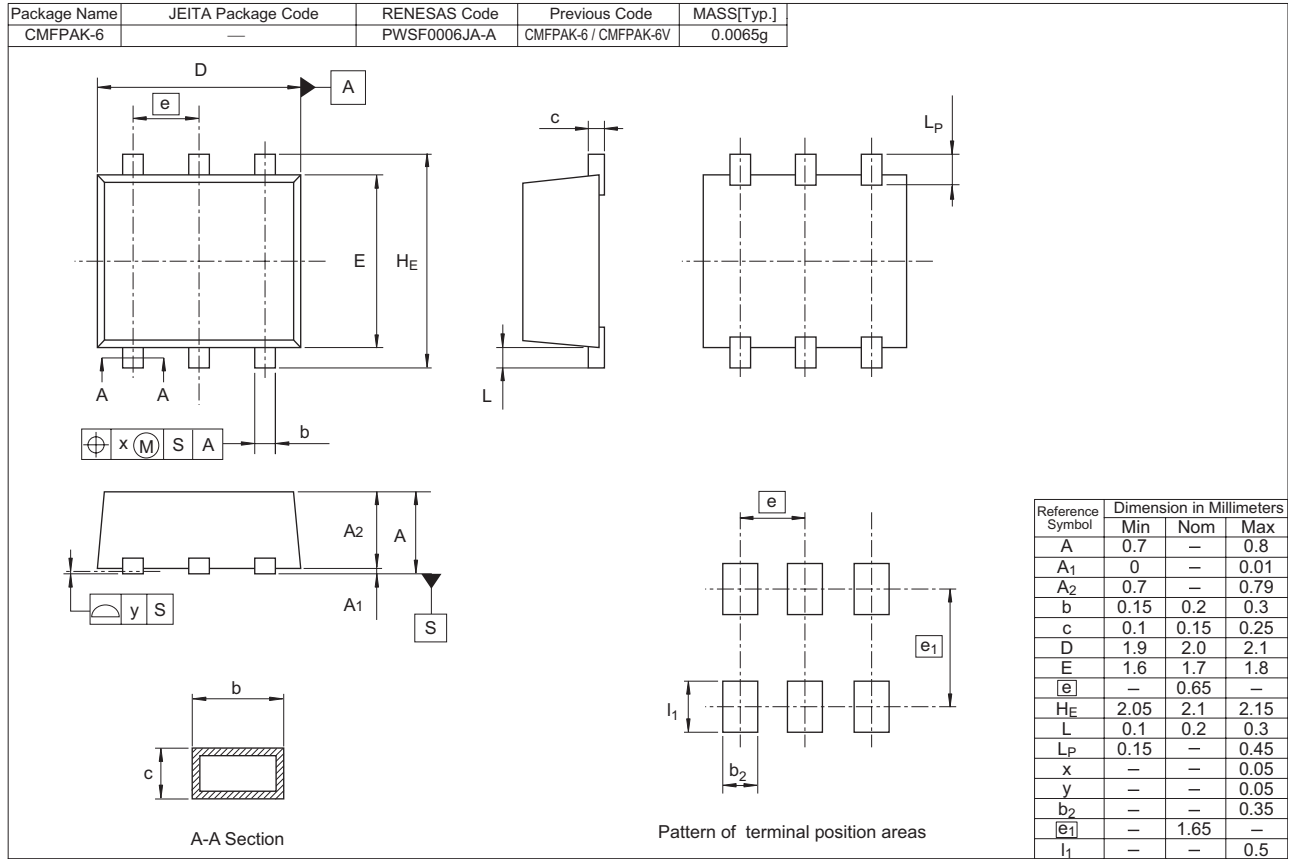
Switching Characteristics



Reverse Drain Current vs. Source to Drain Voltage



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT1069C-EL-E	3000 pcs	Taping

Notes:

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