HAT1093C

Silicon P Channel MOSFET
Power Switching

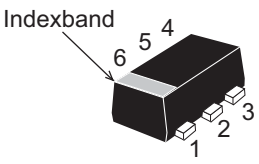
R07DS0605EJ0700
Rev.7.00
Mar 19, 2014

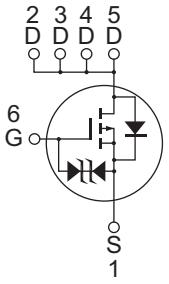
Features

- Low on-resistance
  $R_{DS(on)}$ = 41 mΩ typ. (at V_{GS} = –4.5 V)
- Low drive current.
- 1.8 V gate drive devices.
- High density mounting

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

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to Source voltage	V_{DSS}	–12	V
Gate to Source voltage	V_{GSS}	±8	V
Drain current	I_D	–3	A
Drain peak current	$I_{D(pulse)}$ Note1	–12	A
Body - Drain diode reverse drain current	I_{DR}	–3	A
Channel dissipation	Pch Note 2	900	mW
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%
2. When using the glass epoxy board. (FR4 40 × 40 × 1.6mm), Ta = 25°C

Electrical Characteristics

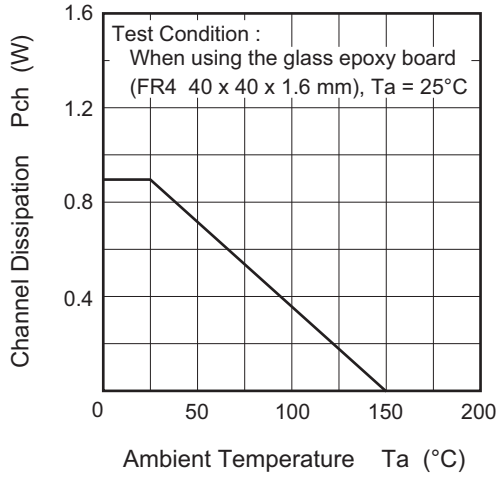
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to Source breakdown voltage	$V_{(BR)DSS}$	–12	—	—	V	I_D = –10 mA, V_{GS} = 0
Gate to Source breakdown voltage	$V_{(BR)GSS}$	±8	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to Source leakage current	I_{GSS}	—	—	±10	µA	V_{GS} = ±6.4V, V_{DS} = 0
Drain to Source leakage current	I_{DSS}	—	—	–1	µA	V_{DS} =-12 V, V_{GS} = 0
Gate to Source cutoff voltage	$V_{GS(th)}$	–0.3	—	–1.2	V	I_D = –1 mA, V_{DS} = –10 V Note3
Drain to Source on state resistance	$R_{DS(on)}$	—	41	54	mΩ	I_D = –1.5 A, V_{GS} = –4.5 V Note3
		—	54	76	mΩ	I_D = –1.5 A, V_{GS} = –2.5 V Note3
		—	79	119	mΩ	I_D = –1.5 A, V_{GS} = –1.8 V Note3
Forward transfer admittance	$\|y_{fs}\|$	4	6.5	—	S	I_D = –1.5 A, V_{DS} = –10 V Note3
Input capacitance	Ciss	—	940	—	pF	V_{DS} = –10 V, V_{GS} = 0, f = 1 MHz
Output capacitance	Coss	—	200	—	pF	
Reverse transfer capacitance	Crss	—	130	—	pF	
Total gate charge	Qg	—	11	—	nC	V_{DS} = –10 V, V_{GS} = –4.5 V, I_D = –3 A
Gate to Source charge	Qgs	—	1.5	—	nC	
Gate to Drain charge	Qgd	—	3.5	—	nC	
Turn - on delay time	$t_{d(on)}$	—	18	—	ns	V_{DS} = –10 V, V_{GS} = –4.5 V, I_D = –1.5 A, R_L = 6.7 Ω, R_g = 4.7 Ω
Rise time	t_r	—	23	—	ns	
Turn - off delay time	$t_{d(off)}$	—	50	—	ns	
Fall time	t_f	—	28	—	ns	
Body - Drain diode forward voltage	V_{DF}	—	–0.8	–1.1	V	I_F = –3 A, V_{GS} = 0

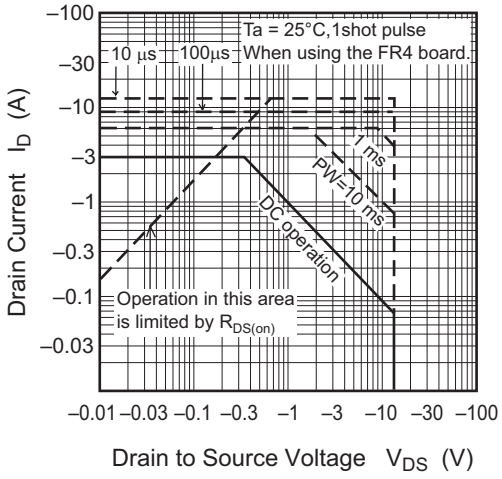
Note: 3. Pulse test

Main Characteristics

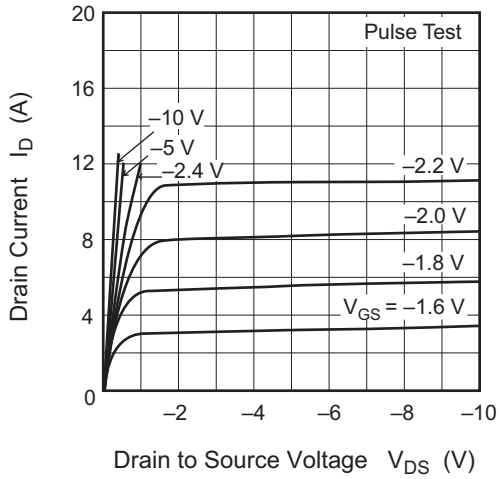
Power vs. Temperature Derating



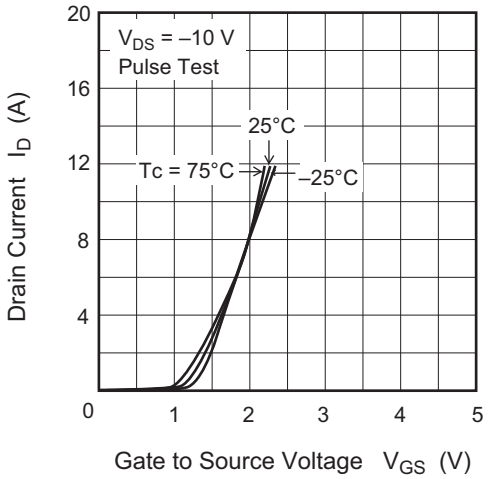
Maximum Safe Operation Area



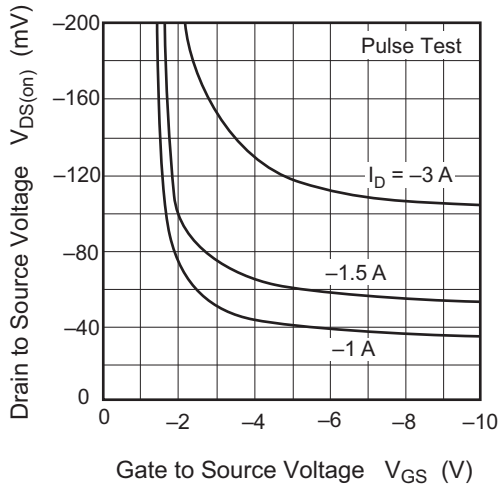
Typical Output Characteristics



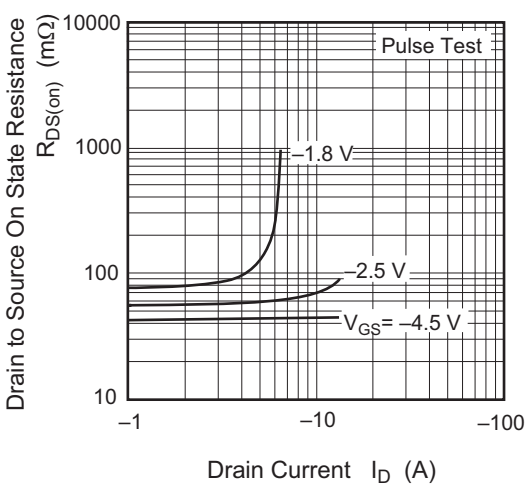
Typical Transfer Characteristics



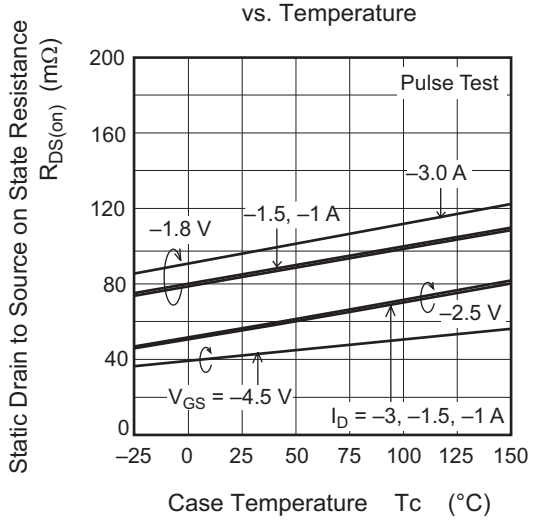
Drain to Source Saturation Voltage vs. Gate to Source Voltage



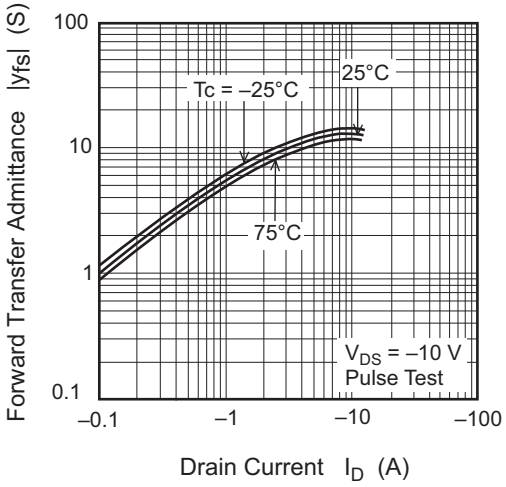
Static Drain to Source on State Resistance vs. Drain Current



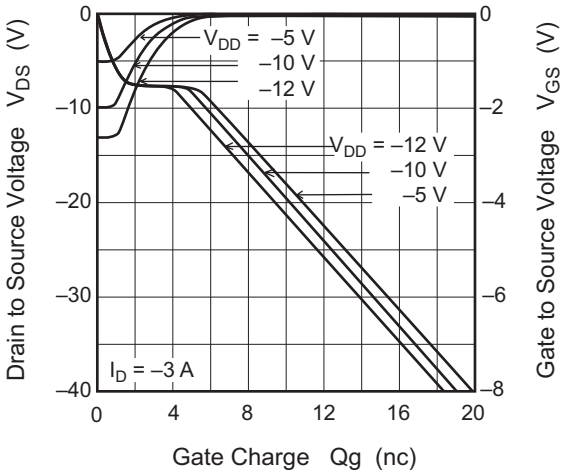
Static Drain to Source on State Resistance vs. Temperature



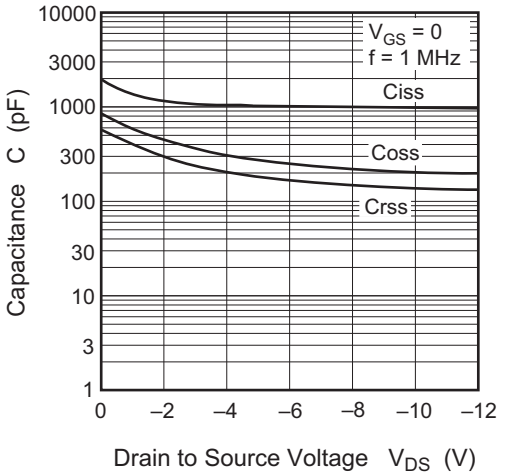
Forward Transfer Admittance vs. Drain Current



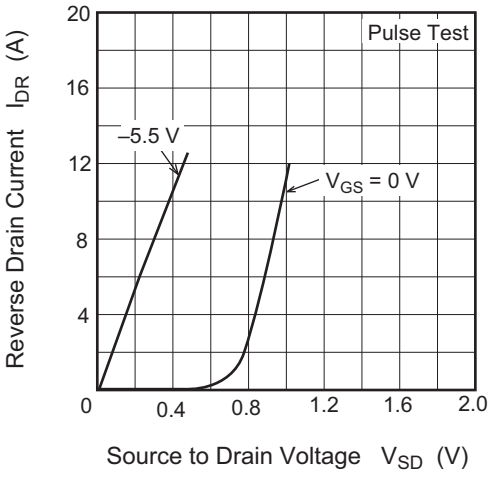
Dynamic Input Characteristics



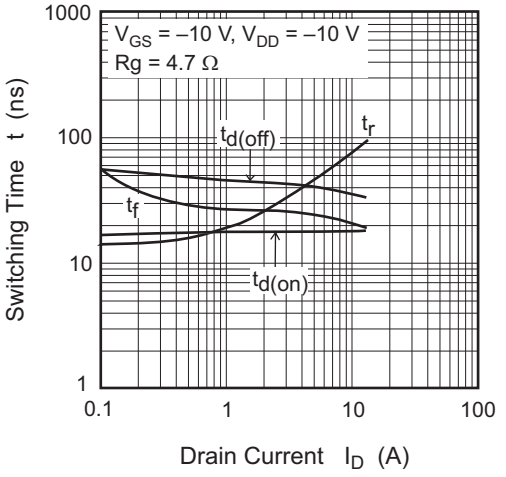
Typical Capacitance vs. Drain to Source Voltage



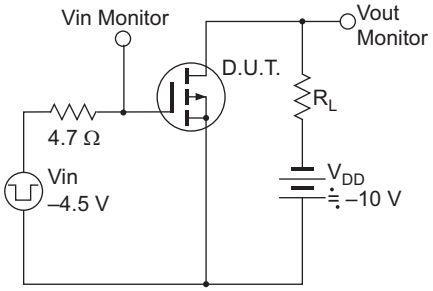
Reverse Drain Current vs. Source to Drain Voltage



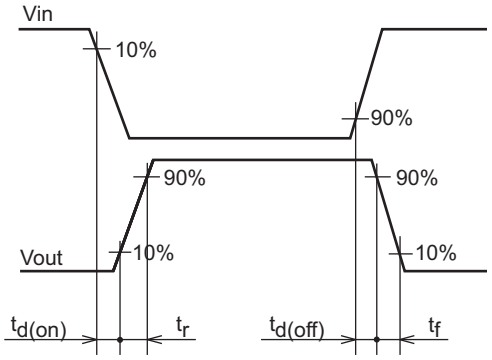
Switching Characteristics



Switching Time Test Circuit

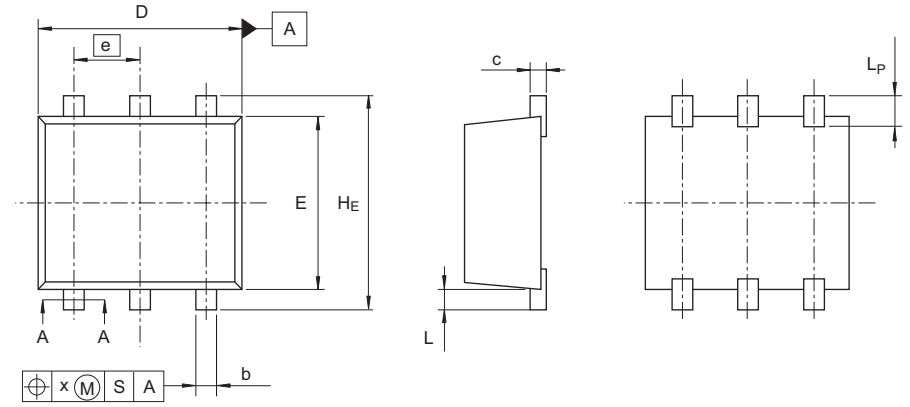


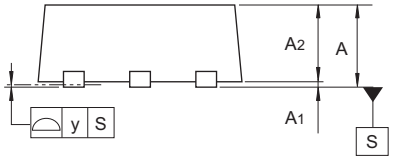
Waveform

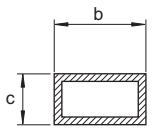


Package Dimensions

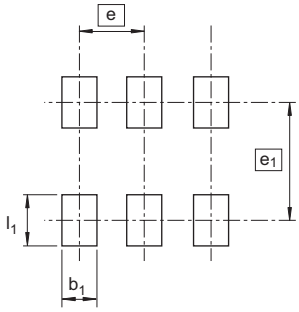
Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
CMFPAK-6	—	PWSF0006JA-A	CMFPAK-6 / CMFPAK-6V	0.0065g







A-A Section



Pattern of terminal position areas

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	0.7	–	0.8
A_1	0	–	0.01
A_2	0.7	–	0.79
b	0.15	0.2	0.3
c	0.1	0.15	0.25
D	1.9	2.0	2.1
E	1.6	1.7	1.8
e	–	0.65	–
H_E	2.05	2.1	2.15
L	0.1	0.2	0.3
L_P	0.15	–	0.45
x	–	–	0.05
y	–	–	0.05
b_1	–	0.3	–
e_1	–	1.9	–
l_1	–	0.4	–

Ordering Information

Orderable Part Number	Quantity	Shipping Container
HAT1093C-EL-E	3000 pcs	Taping

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