

# HAT2070R

## Silicon N Channel Power MOS FET Power Switching

REJ03G1177-0400  
(Previous: ADE-208-1226B)  
Rev.4.00  
Sep 07, 2005

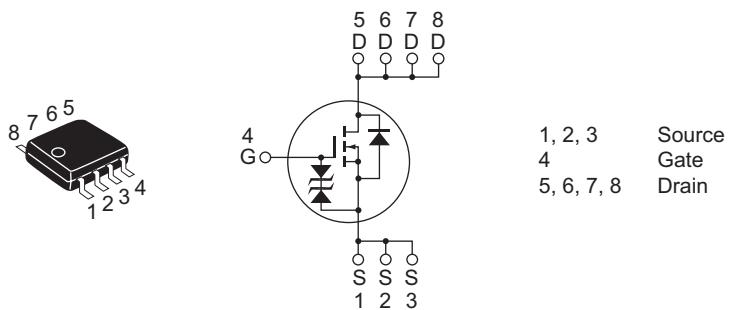
### Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance

$R_{DS(on)} = 11 \text{ m}\Omega \text{ typ (at } V_{GS} = 10 \text{ V)}$

### Outline

RENESAS Package code: PRSP0008DD-D  
(Package name: SOP-8 <FP-8DAV> )



**Absolute Maximum Ratings**

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V <sub>DSS</sub>	30	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	12	A
Drain peak current	I <sub>D</sub> (pulse) <sup>Note 1</sup>	96	A
Body-drain diode reverse drain current	I <sub>DR</sub>	12	A
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	2.5	W
Channel to ambient thermal impedance	θ <sub>ch-a</sub> <sup>Note 2</sup>	50	°C/W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

2. When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), PW ≤ 10 s

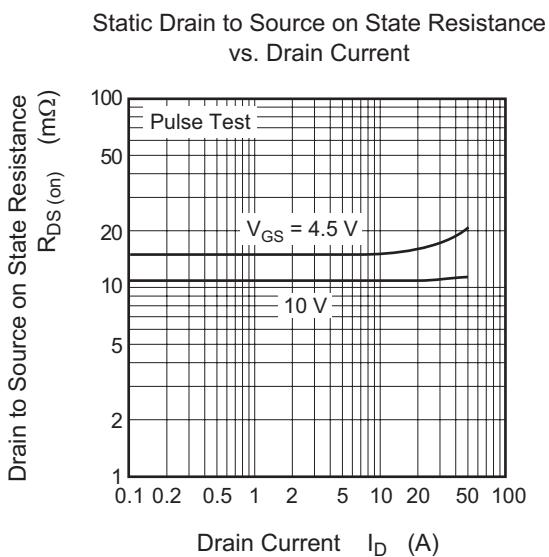
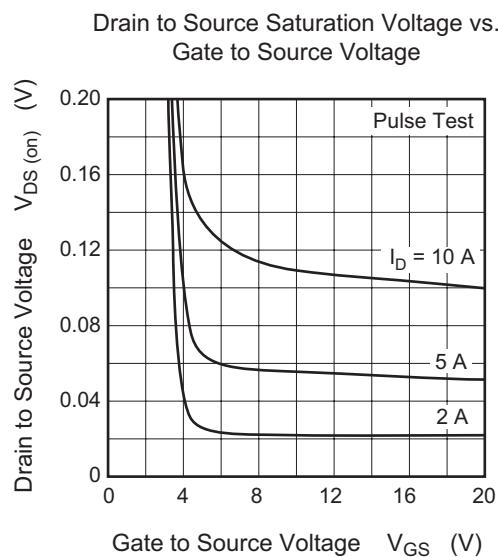
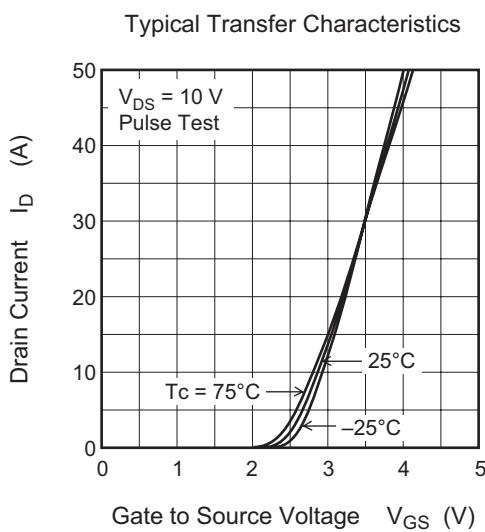
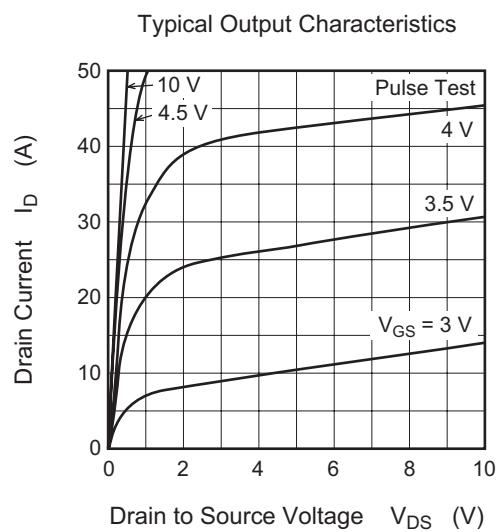
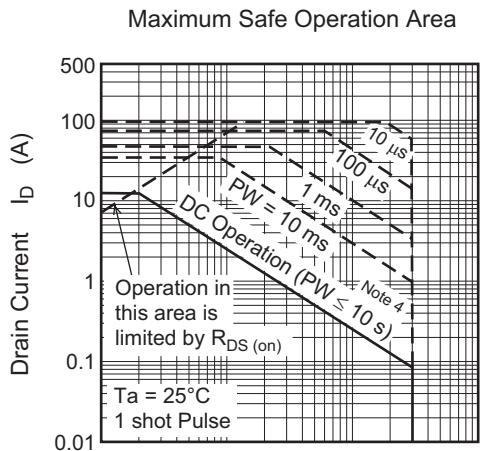
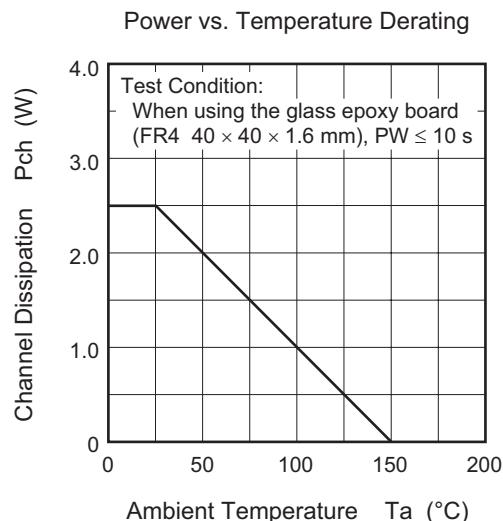
**Electrical Characteristics**

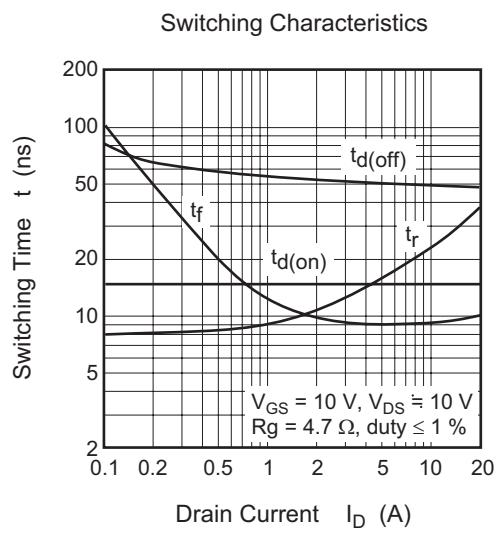
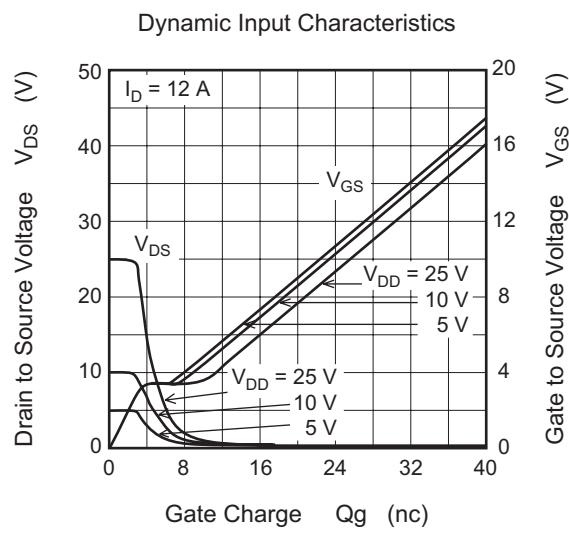
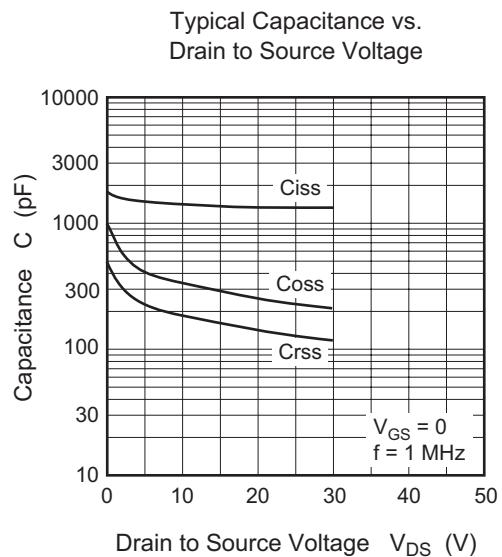
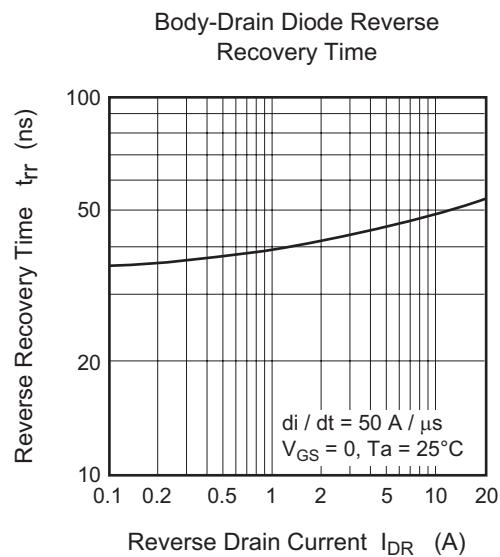
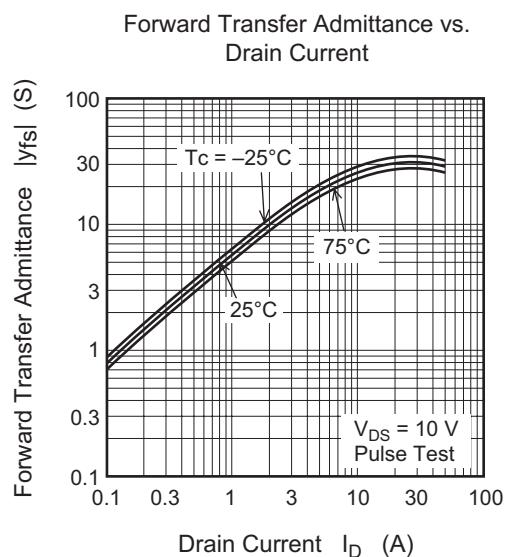
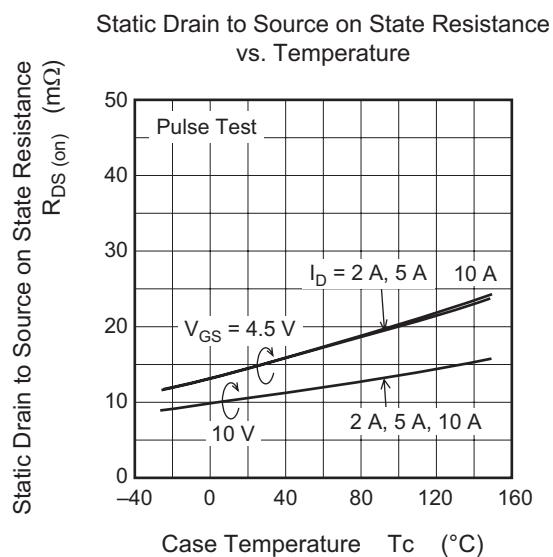
(Ta = 25°C)

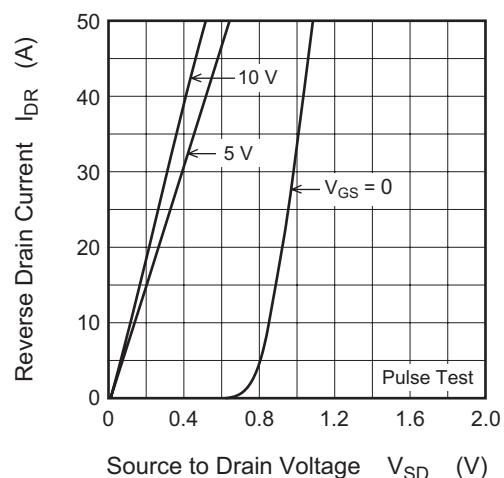
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	30	—	—	V	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0
Gate to source breakdown voltage	V <sub>(BR) GSS</sub>	±20	—	—	V	I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	1.0	—	2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Static drain to source on state resistance	R <sub>DS (on)</sub>	—	11	14	mΩ	I <sub>D</sub> = 6 A, V <sub>GS</sub> = 10 V <sup>Note 3</sup>
	R <sub>DS (on)</sub>	—	15	22	mΩ	I <sub>D</sub> = 6 A, V <sub>GS</sub> = 4.5 V <sup>Note 3</sup>
Forward transfer admittance	y <sub>fs</sub>	12	20	—	S	I <sub>D</sub> = 6 A, V <sub>DS</sub> = 10 V <sup>Note 3</sup>
Input capacitance	C <sub>iss</sub>	—	1400	—	pF	V <sub>DS</sub> = 10 V V <sub>GS</sub> = 0 f = 1 MHz
Output capacitance	C <sub>oss</sub>	—	340	—	pF	
Reverse transfer capacitance	C <sub>rss</sub>	—	190	—	pF	
Total gate charge	Q <sub>g</sub>	—	23	—	nC	V <sub>DD</sub> = 10 V V <sub>GS</sub> = 10 V I <sub>D</sub> = 12 A
Gate to source charge	Q <sub>gs</sub>	—	4	—	nC	
Gate to drain charge	Q <sub>gd</sub>	—	4	—	nC	
Turn-on delay time	t <sub>d (on)</sub>	—	15	—	ns	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 6 A V <sub>DD</sub> ≈ 10 V R <sub>L</sub> = 1.67 Ω R <sub>g</sub> = 4.7 Ω
Rise time	t <sub>r</sub>	—	18	—	ns	
Turn-off delay time	t <sub>d (off)</sub>	—	50	—	ns	
Fall time	t <sub>f</sub>	—	9	—	ns	
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.85	1.10	V	I <sub>F</sub> = 12 A, V <sub>GS</sub> = 0 <sup>Note 3</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	50	—	ns	I <sub>F</sub> = 12 A, V <sub>GS</sub> = 0 dI <sub>F</sub> /dt = 50 A/μs

Note: 3. Pulse test

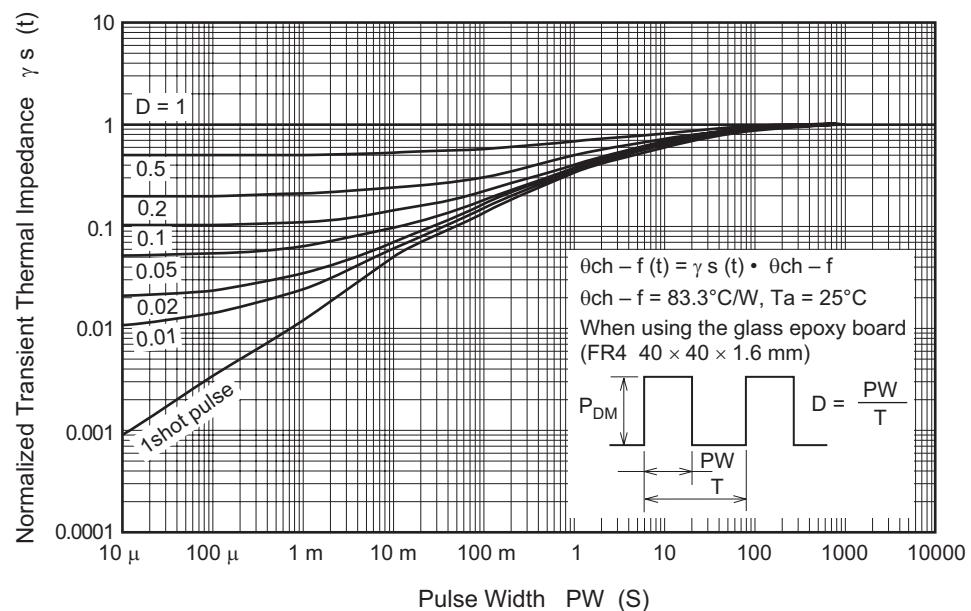
## Main Characteristics



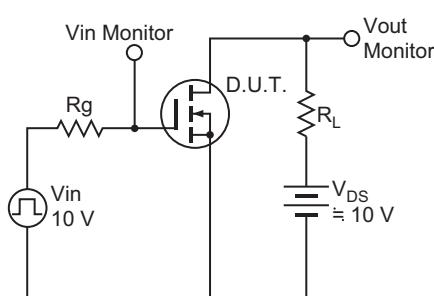


Reverse Drain Current vs.  
Source to Drain Voltage

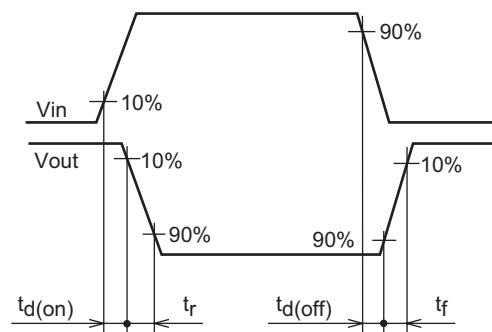
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Switching Time Waveform



## Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
P-SOP8-3.95 x 4.9-1.27	PRSP0008DD-D	FP-8DAV	0.085g

NOTE)

1. DIMENSIONS \*\*1(Nom) AND \*\*2 DO NOT INCLUDE MOLD FLASH.  
2. DIMENSION \*\*3 DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.90	5.3
E	—	3.95	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.10	0.14	0.25
A	—	—	1.75
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	5.80	6.10	6.20
[e]	—	1.27	—
x	—	—	0.25
y	—	—	0.1
Z	—	—	0.75
L	0.40	0.60	1.27
L <sub>1</sub>	—	1.08	—

## Ordering Information

Part Name	Quantity	Shipping Container
HAT2070R-EL-E	2500 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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