

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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## HAT2093R

Silicon N Channel Power MOS FET  
High Speed Power Switching

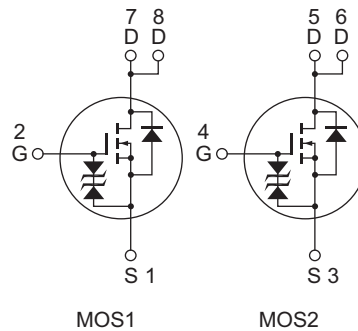
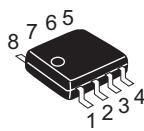
REJ03G1185-0300  
(Previous: ADE-208-1237A)  
Rev.3.00  
Sep 07, 2005

### Features

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

### Outline

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



1, 3      Source  
2, 4      Gate  
5, 6, 7, 8      Drain

## 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>	9	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	72	A
Body-drain diode reverse drain current	I <sub>DR</sub>	9	A
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	2	W
Channel dissipation	P <sub>ch</sub> <sup>Note 3</sup>	3	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. 1 Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), PW ≤ 10 s

3. 2 Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), PW ≤ 10 s

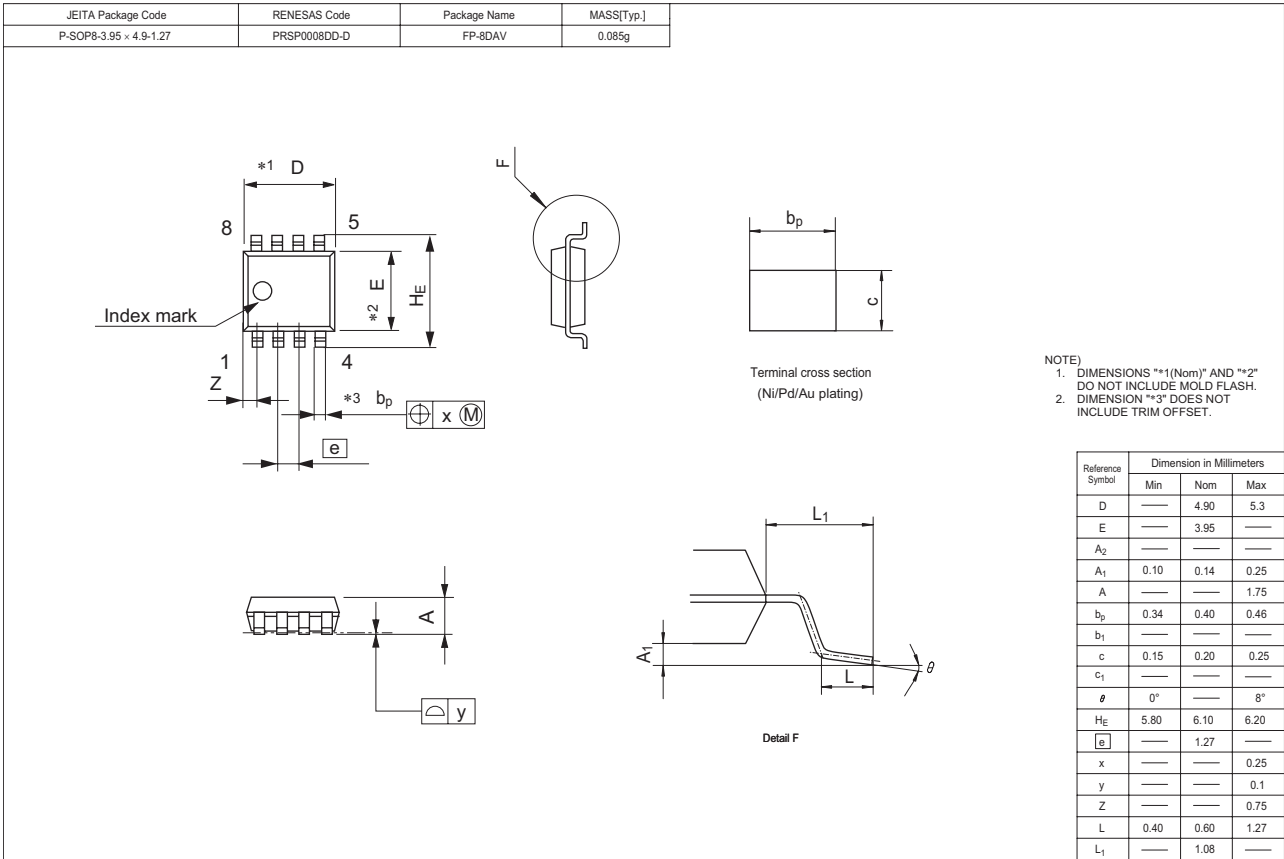
## Electrical Characteristics

(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>	—	18	23	mΩ	I <sub>D</sub> = 4.5 A, V <sub>GS</sub> = 10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	27	39	mΩ	I <sub>D</sub> = 4.5 A, V <sub>GS</sub> = 4.5 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	9	15	—	S	I <sub>D</sub> = 4.5 A, V <sub>DS</sub> = 10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	750	—	pF	V <sub>DS</sub> = 10 V
Output capacitance	C <sub>oss</sub>	—	200	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	110	—	pF	f = 1 MHz
Total gate charge	Q <sub>g</sub>	—	12	—	nC	V <sub>DD</sub> = 10 V
Gate to source charge	Q <sub>gs</sub>	—	2.3	—	nC	V <sub>GS</sub> = 10 V
Gate to drain charge	Q <sub>gd</sub>	—	2.2	—	nC	I <sub>D</sub> = 9 A
Turn-on delay time	t <sub>d (on)</sub>	—	11	—	ns	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.5 A
Rise time	t <sub>r</sub>	—	16	—	ns	V <sub>DD</sub> ≅ 10 V
Turn-off delay time	t <sub>d (off)</sub>	—	40	—	ns	R <sub>L</sub> = 2.22 Ω
Fall time	t <sub>f</sub>	—	7	—	ns	R <sub>g</sub> = 4.7 Ω
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.85	1.10	V	I <sub>F</sub> = 9 A, V <sub>GS</sub> = 0 <sup>Note 4</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	50	—	ns	I <sub>F</sub> = 9 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 50 A/μs

Note: 4. Pulse test

### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT2093R-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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