

# HAT3005R

Silicon N/P Channel Power MOS FET  
High Speed Power Switching

REJ03G0366-0300

Rev.3.00

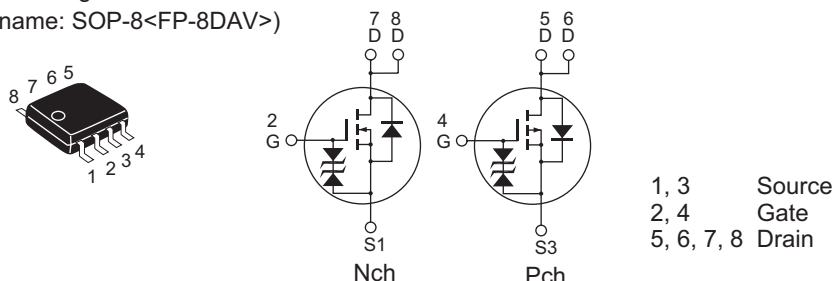
Jun. 10, 2005

## Features

- Low on-resistance
- Capable of 4 V gate drive
- Low drive current
- High density mounting

## Outline

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



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings		Unit
		Nch	Pch	
Drain to source voltage	$V_{DSS}$	150	-150	V
Gate to source voltage	$V_{GSS}$	±15	±15	V
Drain current	$I_D$	0.5	-0.25	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	2	-1	A
Body-drain diode reverse drain current	$I_{DR}$	0.5	-0.25	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	1		W
Channel dissipation	$P_{ch}$ <sup>Note3</sup>	1.5		W
Channel temperature	$T_{ch}$	150		°C
Storage temperature	$T_{stg}$	-55 to +150		°C

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1 \%$

2. 1 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm)

3. 2 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm)

## Electrical Characteristics

## • N channel

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	150	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 15$	—	—	V	$I_G = \pm 100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 12 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	5	$\mu\text{A}$	$V_{DS} = 150 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.1	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	1.6	2.2	$\Omega$	$I_D = 0.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	1.9	2.7	$\Omega$	$I_D = 0.5 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	2.4	5.5	$\Omega$	$I_D = 2 \text{ A}$ , $V_{GS} = 5 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	0.56	0.86	—	S	$I_D = 0.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	95	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	42	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	11	—	pF	
Turn-on delay time	$t_{d(on)}$	—	9	—	ns	$V_{GS} = 5 \text{ V}$ , $I_D = 0.5 \text{ A}$ , $V_{DD} \cong 30 \text{ V}$
Rise time	$t_r$	—	16	—	ns	
Turn-off delay time	$t_{d(off)}$	—	18	—	ns	
Fall time	$t_f$	—	14	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.9	1.4	V	$I_F = 0.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	90	—	ns	$I_F = 0.5 \text{ A}$ , $V_{GS} = 0$ $diF/dt = 50 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

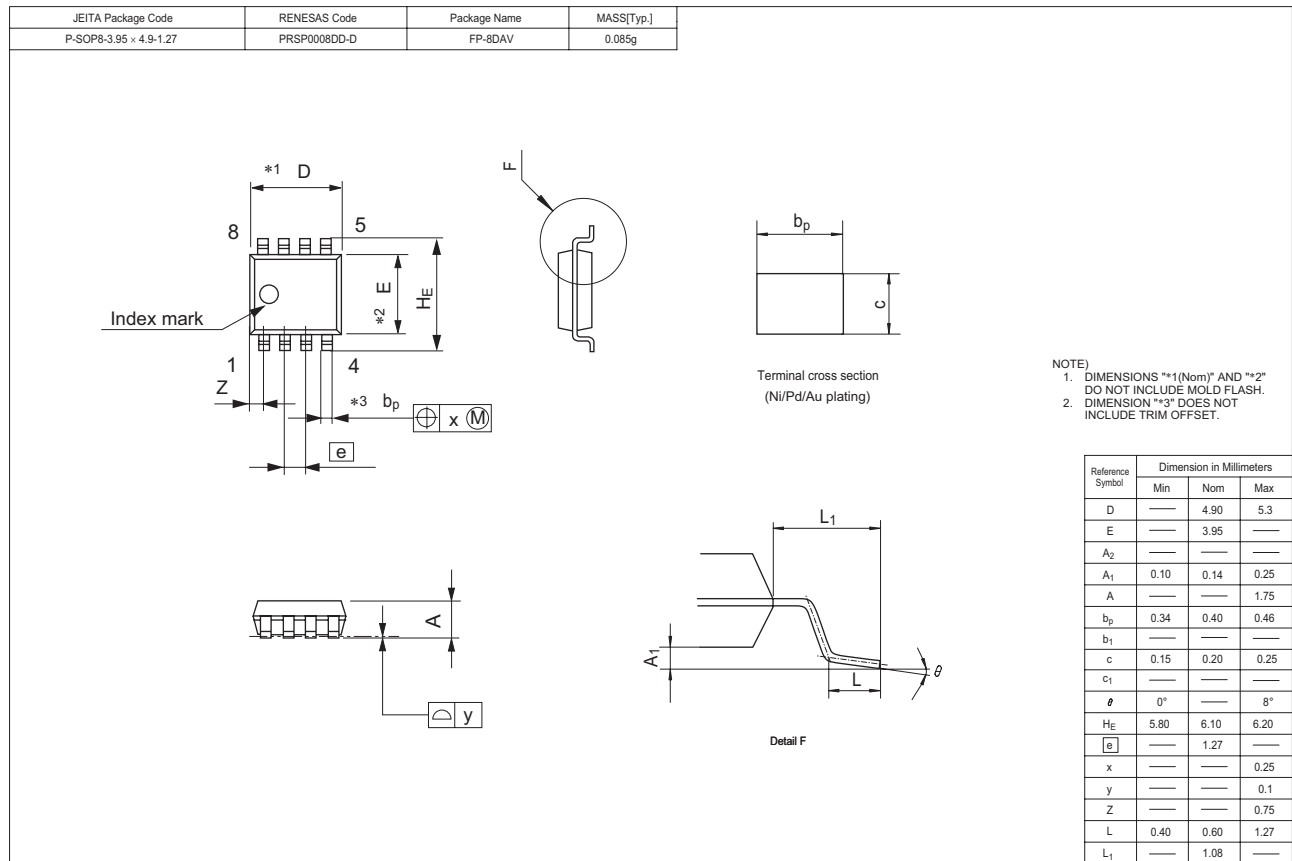
## • P channel

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-150	—	—	V	$I_D = -10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 15$	—	—	V	$I_G = \pm 100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 12 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-5	$\mu\text{A}$	$V_{DS} = -150 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	-1.0	—	-2.0	V	$V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	5.0	6.2	$\Omega$	$I_D = -0.25 \text{ A}$ , $V_{GS} = -10 \text{ V}$ <sup>Note5</sup>
	$R_{DS(on)}$	—	6.0	7.5	$\Omega$	$I_D = -0.25 \text{ A}$ , $V_{GS} = -4 \text{ V}$ <sup>Note5</sup>
	$R_{DS(on)}$	—	7.0	10.0	$\Omega$	$I_D = -1 \text{ A}$ , $V_{GS} = -5 \text{ V}$ <sup>Note5</sup>
Forward transfer admittance	$ y_{fs} $	0.29	0.45	—	S	$I_D = -0.25 \text{ A}$ , $V_{DS} = -10 \text{ V}$ <sup>Note5</sup>
Input capacitance	$C_{iss}$	—	92	—	pF	$V_{DS} = -10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	37	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	10	—	pF	
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$V_{GS} = -5 \text{ V}$ , $I_D = -0.25 \text{ A}$ , $V_{DD} \cong -30 \text{ V}$
Rise time	$t_r$	—	13	—	ns	
Turn-off delay time	$t_{d(off)}$	—	22	—	ns	
Fall time	$t_f$	—	15	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	-0.9	-1.4	V	$I_F = -0.25 \text{ A}$ , $V_{GS} = 0$ <sup>Note5</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	80	—	ns	$I_F = -0.25 \text{ A}$ , $V_{GS} = 0$ $diF/dt = 50 \text{ A}/\mu\text{s}$

Notes: 5. Pulse test

## Package Dimensions



## Ordering Information

Part Name	Quantity	Shipping Container
HAT3005R-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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