

## HAT1020R

Silicon P Channel Power MOS FET  
High Speed Power Switching

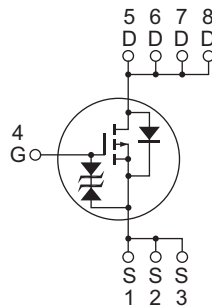
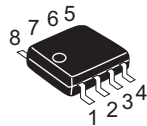
REJ03G1143-1000  
(Previous: ADE-208-435H)  
Rev.10.00  
Sep 07, 2005

### 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> )



1, 2, 3 Source  
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>	-5	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	-40	A
Body-drain diode reverse drain current	I <sub>DR</sub>	-5	A
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	2.5	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

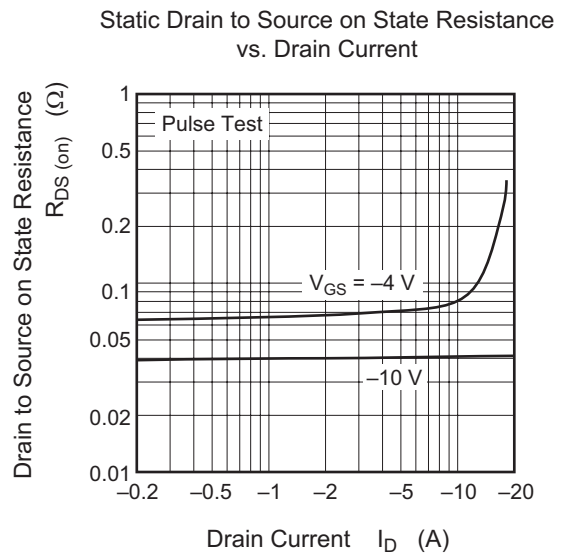
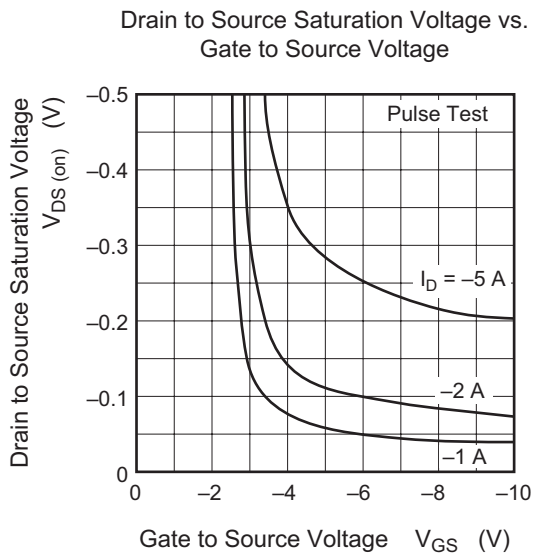
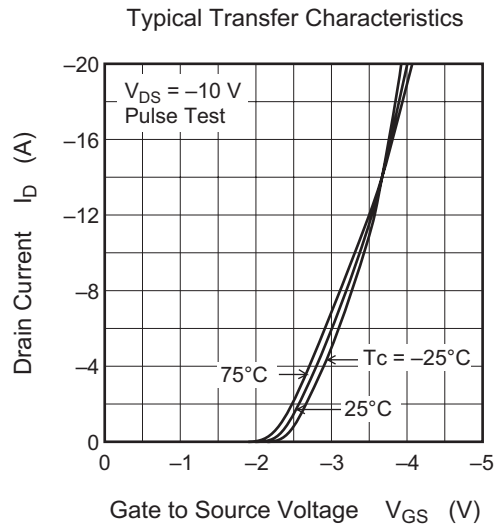
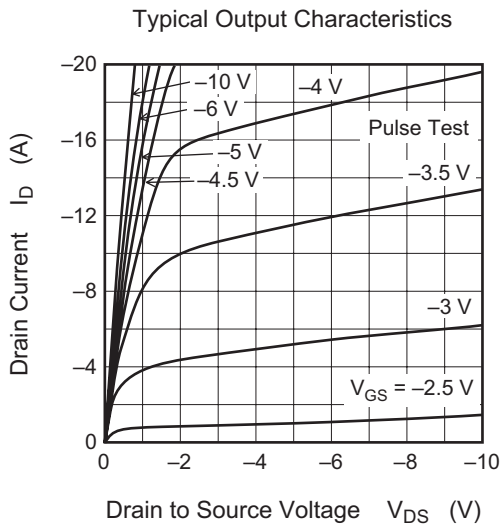
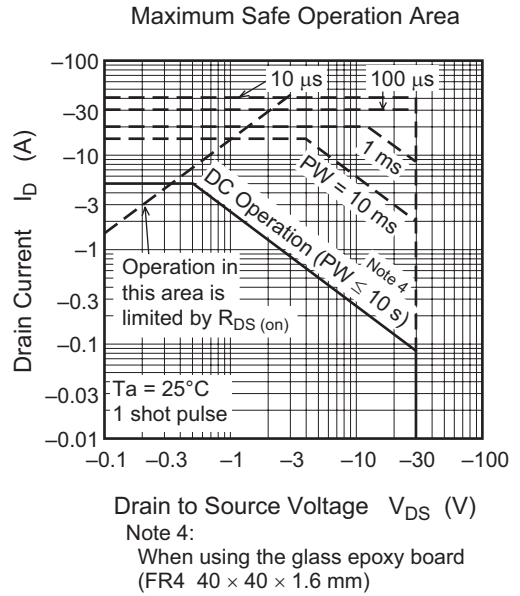
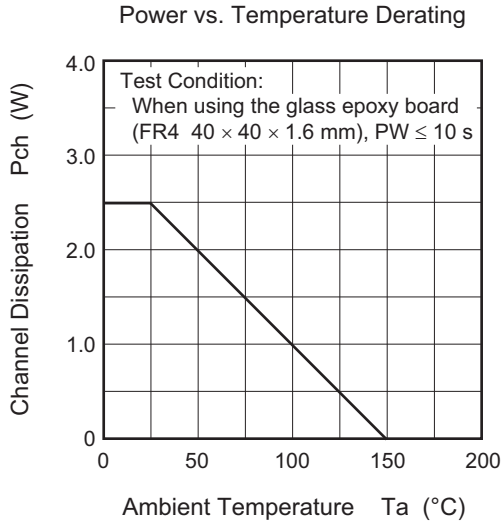
## Electrical Characteristics

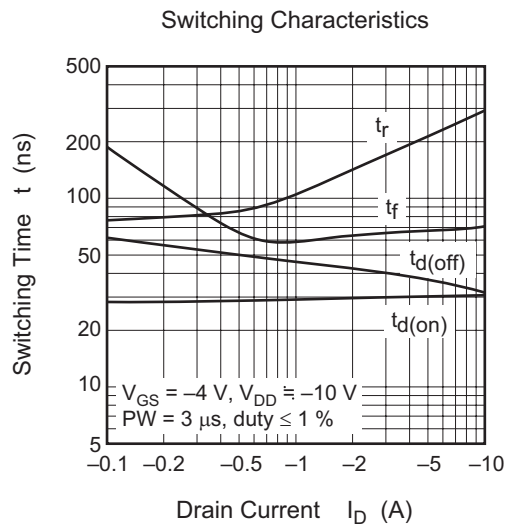
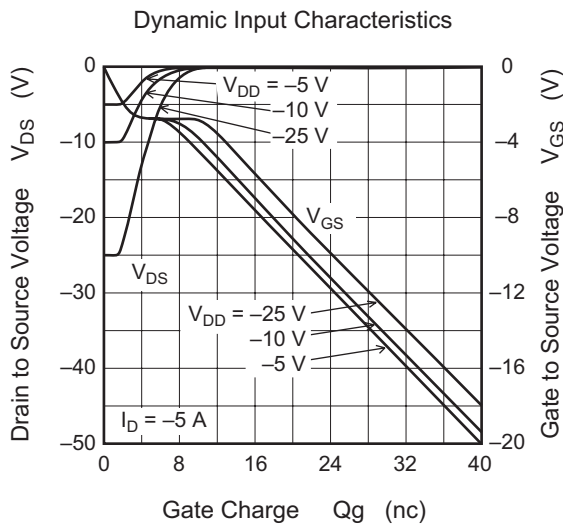
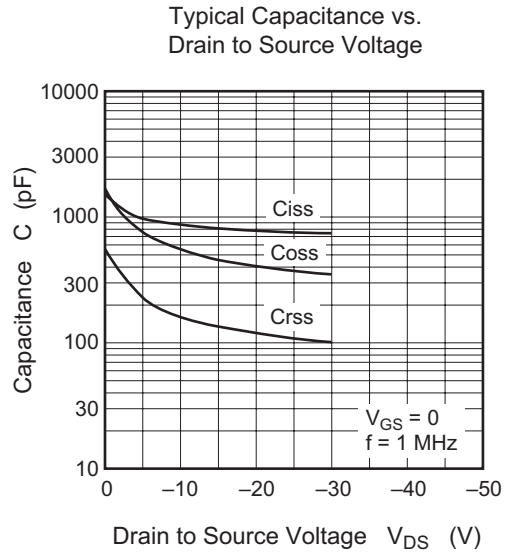
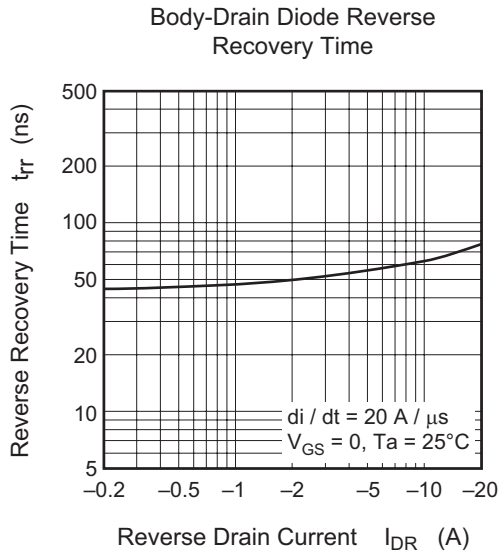
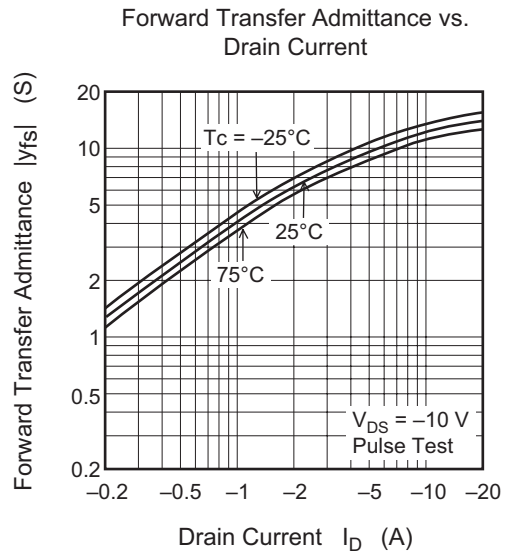
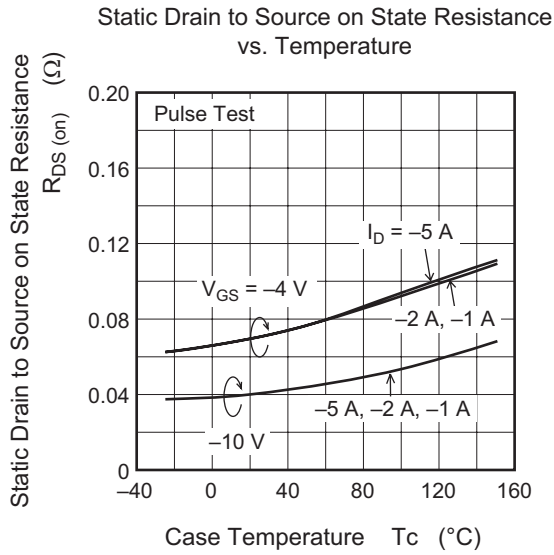
(Ta = 25°C)

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>	—	—	-10	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>	—	0.04	0.07	Ω	I <sub>D</sub> = -3 A, V <sub>GS</sub> = -10 V <sup>Note 3</sup>
	R <sub>DS (on)</sub>	—	0.07	0.13	Ω	I <sub>D</sub> = -3 A, V <sub>GS</sub> = -4 V <sup>Note 3</sup>
Forward transfer admittance	y <sub>fs</sub>	5.0	7.5	—	S	I <sub>D</sub> = -3 A, V <sub>DS</sub> = -10 V <sup>Note 3</sup>
Input capacitance	C <sub>iss</sub>	—	860	—	pF	V <sub>DS</sub> = -10 V V <sub>GS</sub> = 0 f = 1 MHz
Output capacitance	C <sub>oss</sub>	—	560	—	pF	
Reverse transfer capacitance	C <sub>rss</sub>	—	165	—	pF	
Turn-on delay time	t <sub>d (on)</sub>	—	30	—	ns	V <sub>GS</sub> = -4 V, I <sub>D</sub> = -3 A, V <sub>DD</sub> ≅ -10 V
Rise time	t <sub>r</sub>	—	170	—	ns	
Turn-off delay time	t <sub>d (off)</sub>	—	40	—	ns	
Fall time	t <sub>f</sub>	—	65	—	ns	
Body-drain diode forward voltage	V <sub>DF</sub>	—	-0.9	-1.4	V	I <sub>F</sub> = -5 A, V <sub>GS</sub> = 0 <sup>Note 3</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	55	—	ns	I <sub>F</sub> = -5 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 20 A/μs

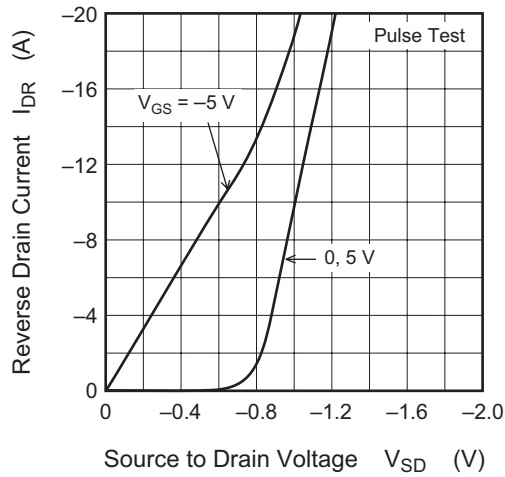
Note: 3. Pulse test

Main Characteristics

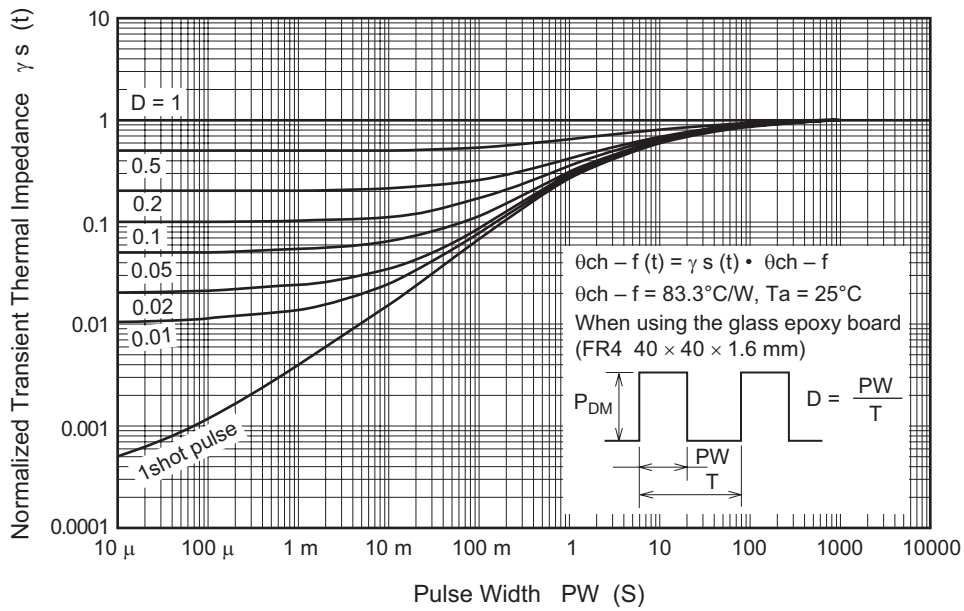




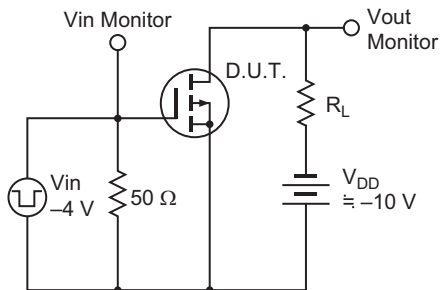
Reverse Drain Current vs. Source to Drain Voltage



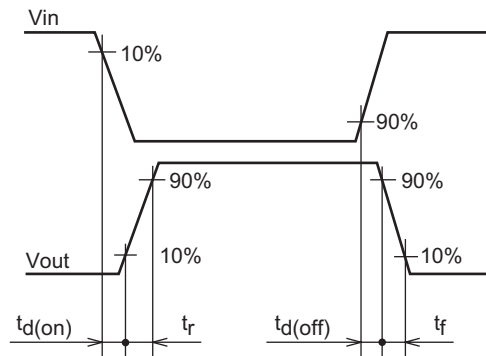
Normalized Transient Thermal Impedance vs. Pulse Width



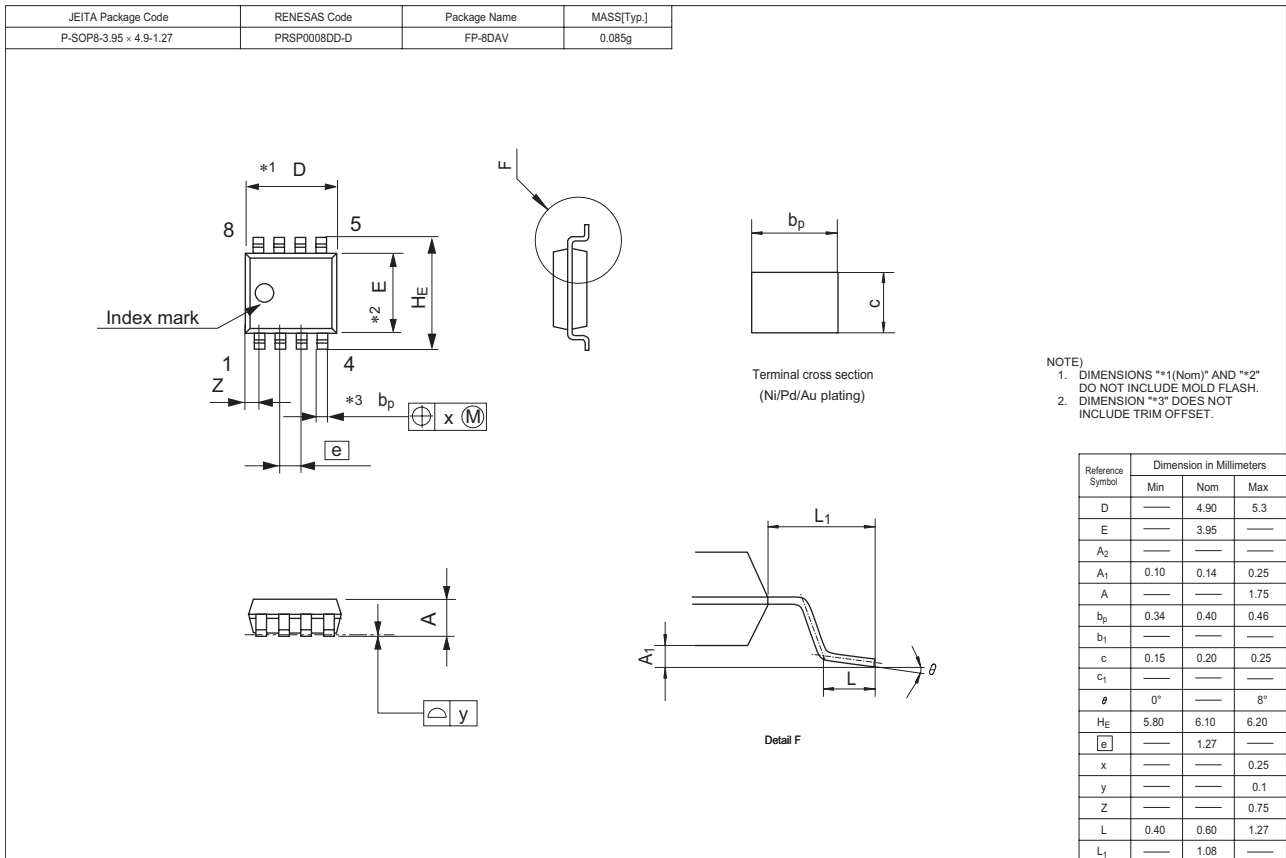
Switching Time Test Circuit



Switching Time Waveform



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT1020R-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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