

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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# HAT2131R

## Silicon N Channel Power MOS FET Power Switching

REJ03G1815-0100

Rev.1.00

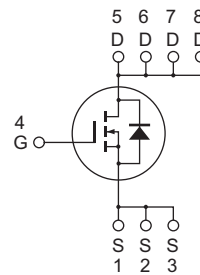
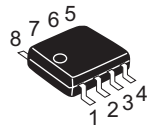
Jul 17, 2009

### Features

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

### 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	Ratings	Unit
Drain to source voltage	$V_{DSS}$	350	V
Gate to source voltage	$V_{GSS}$	±20	V
Drain current	$I_D$	0.9	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	7.2	A
Body-drain diode reverse drain current	$I_{DR}$	0.9	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note1</sup>	7.2	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	2.5	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. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW \leq 10 s$

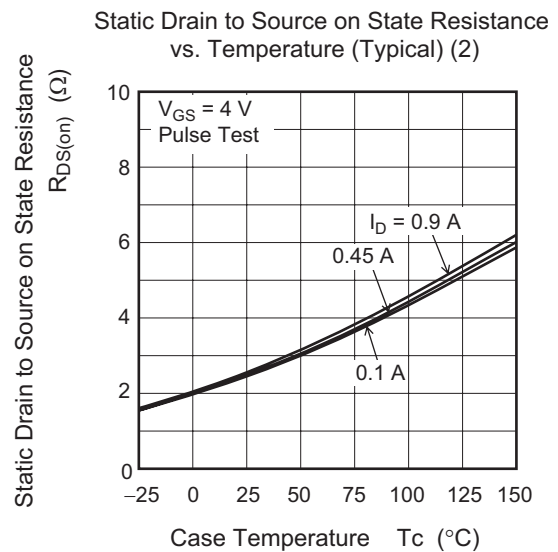
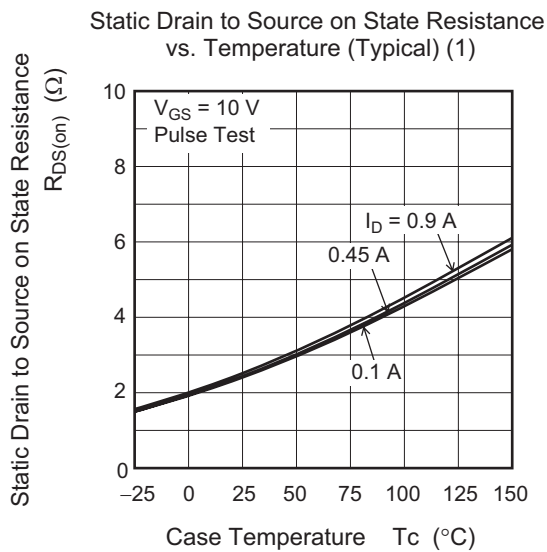
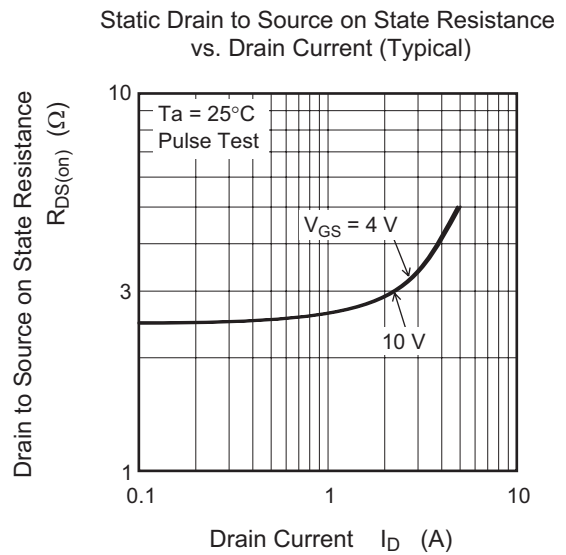
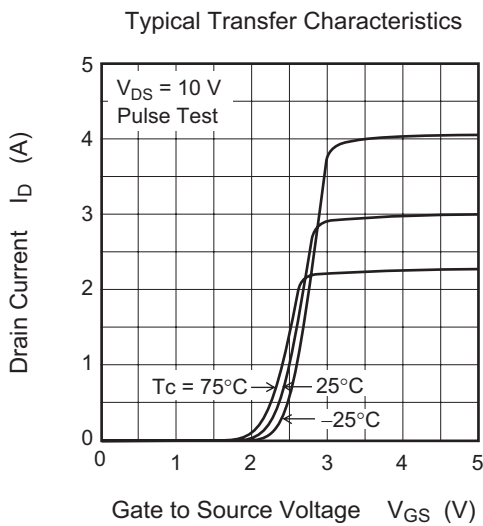
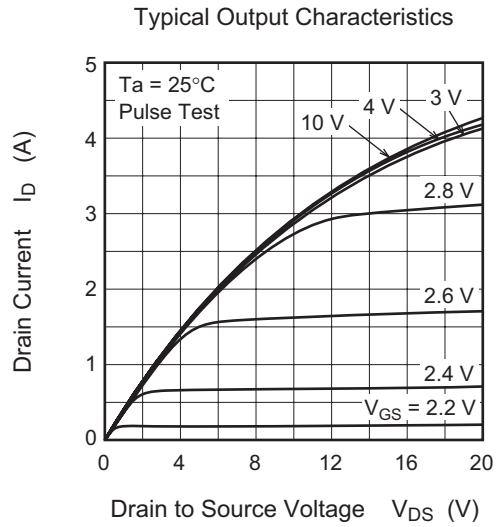
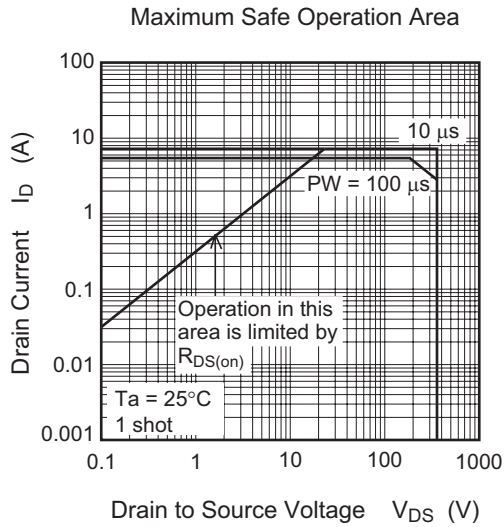
## Electrical Characteristics

(Ta = 25°C)

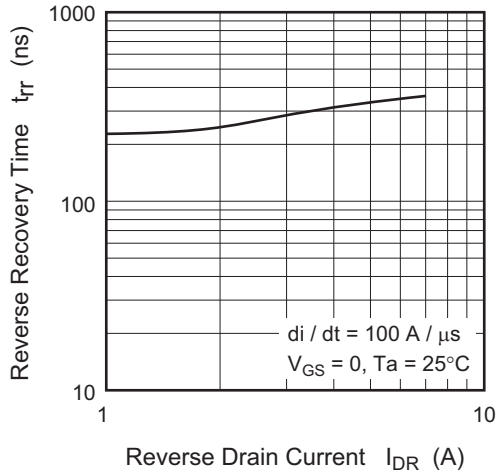
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	350	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	0.1	$\mu\text{A}$	$V_{DS} = 350 \text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Forward transfer admittance	$ y_{fs} $	1.2	2.0	—	S	$I_D = 0.45 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	2.5	3.0	$\Omega$	$I_D = 0.45 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	2.6	3.2	$\Omega$	$I_D = 0.45 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	460	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	32	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	8	—	pF	
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$I_D = 0.45 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 556 \Omega$ $R_g = 10 \Omega$
Rise time	$t_r$	—	13	—	ns	
Turn-off delay time	$t_{d(off)}$	—	76	—	ns	
Fall time	$t_f$	—	50	—	ns	
Total gate charge	$Q_g$	—	20	—	nC	$V_{DD} = 250 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 0.9 \text{ A}$
Gate to source charge	$Q_{gs}$	—	1	—	nC	
Gate to drain charge	$Q_{gd}$	—	6	—	nC	
Body-drain diode forward voltage	$V_{DF}$	—	0.8	1.2	V	$I_F = 0.9 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	220	—	ns	$I_F = 0.9 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 3. Pulse test

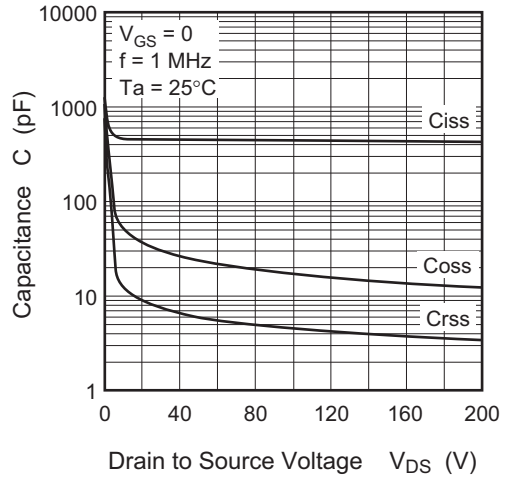
Main Characteristics



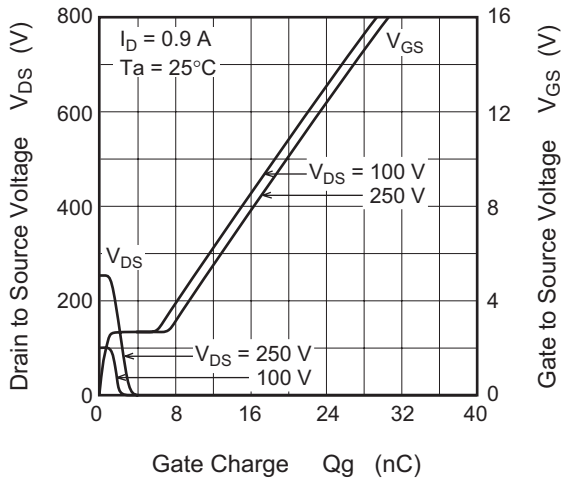
Body-Drain Diode Reverse Recovery Time (Typical)



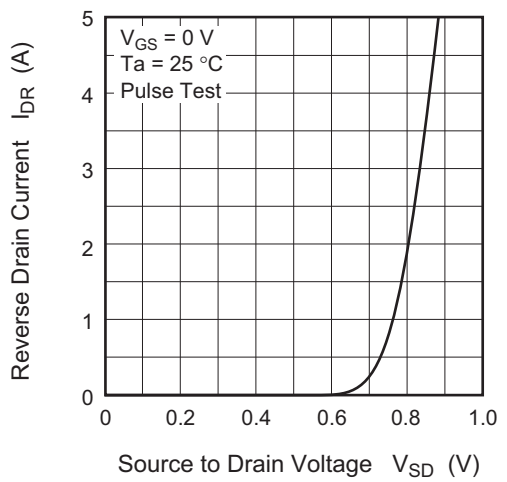
Typical Capacitance vs. Drain to Source Voltage



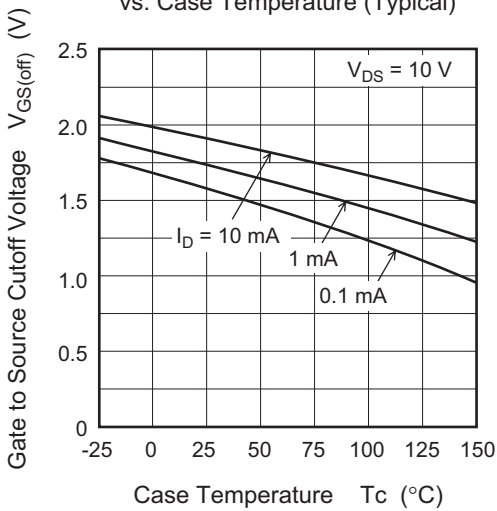
Dynamic Input Characteristics (Typical)



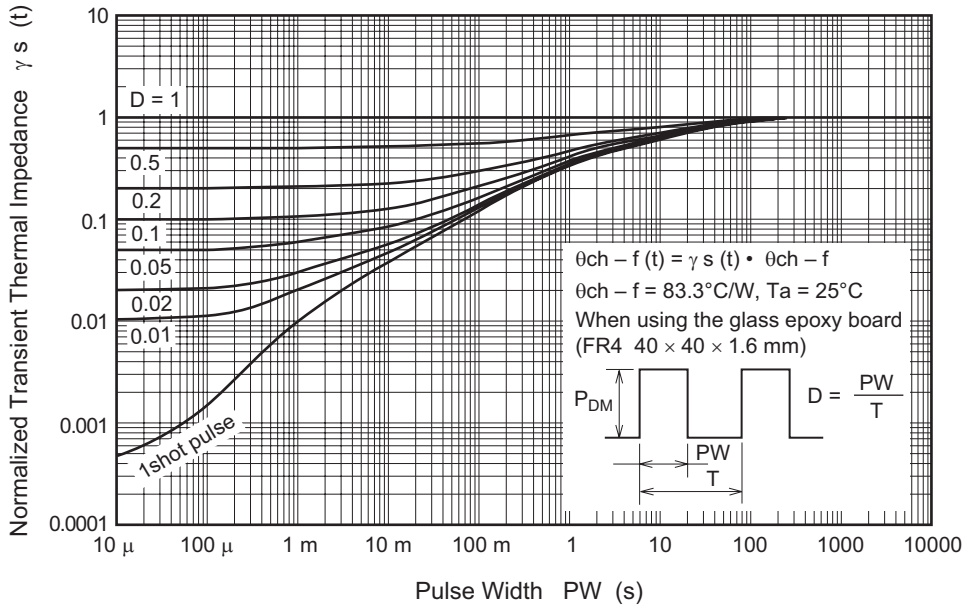
Reverse Drain Current vs. Source to Drain Voltage (Typical)



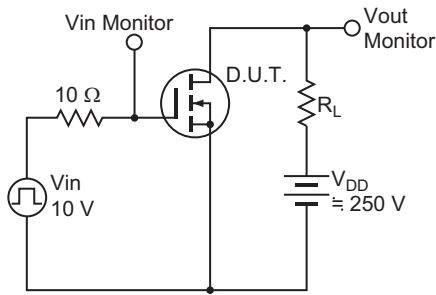
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



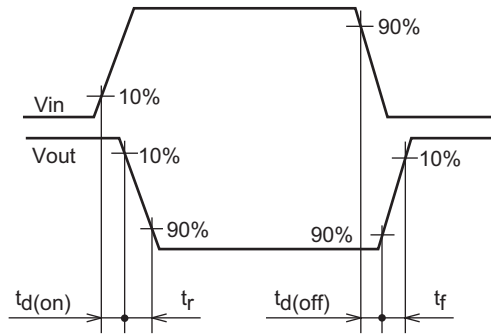
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

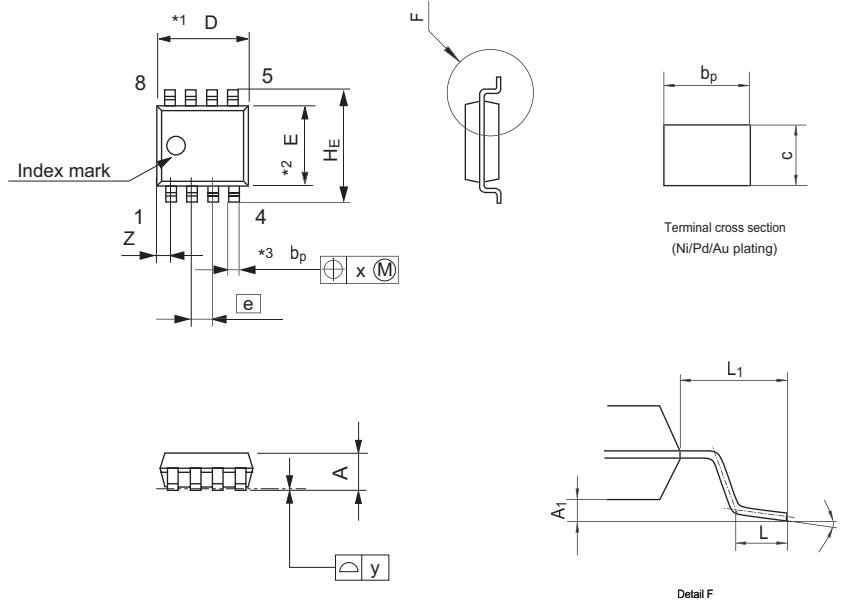


Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SOP-8	P-SOP8-3.95 × 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
Ⓜ	—	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 No.	Quantity	Shipping Container
HAT2131R-EL-E	2500 pcs	Taping

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