

HAT1038R, HAT1038RJ

Silicon P Channel Power MOS FET
High Speed Power Switching

REJ03G1150-0600

Rev.6.00

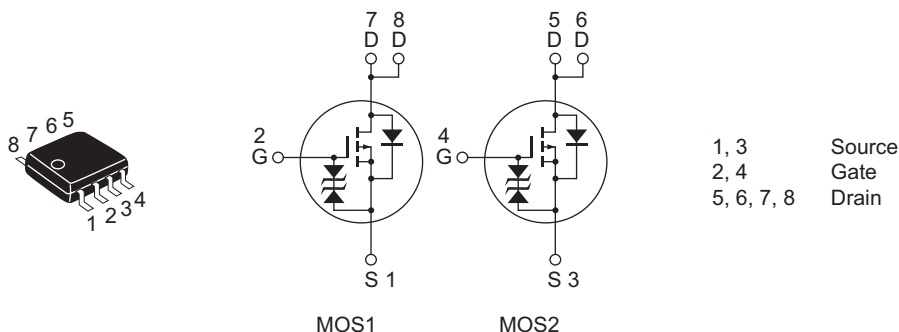
Aug 25, 2009

Features

- For Automotive Application (at Type Code "J")
- Low on-resistance
- Capable of 4 V gate drive
- High density mounting

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_{DSS}	-60	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	-3.5	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	-28	A
Body-drain diode reverse drain current	I_{DR}	-3.5	A
Avalanche current	I_{AP} ^{Note 4}	HAT1038R	—
		HAT1038RJ	-3.5
Avalanche energy	E_{AR} ^{Note 4}	HAT1038R	—
		HAT1038RJ	1.05
Channel dissipation	P_{ch} ^{Note 2}	2	W
Channel dissipation	P_{ch} ^{Note 3}	3	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 × 40 × 1.6 mm), $PW \leq 10 s$

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

4. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

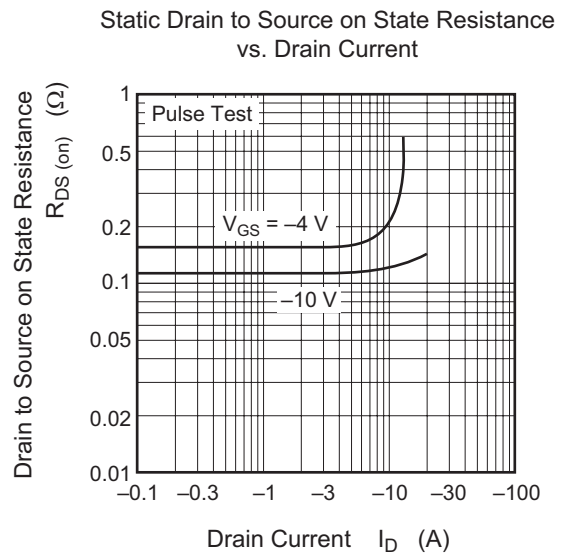
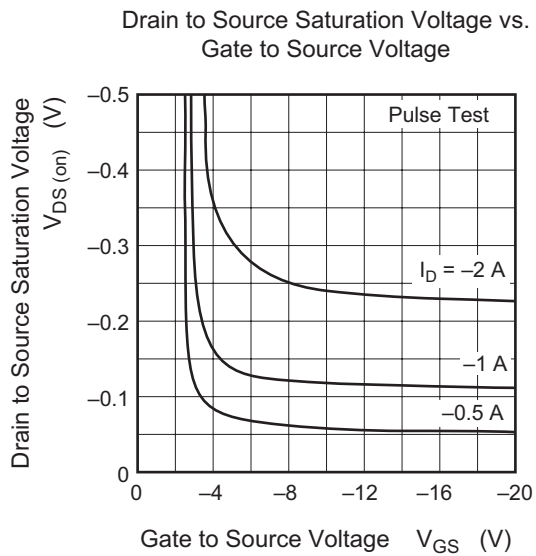
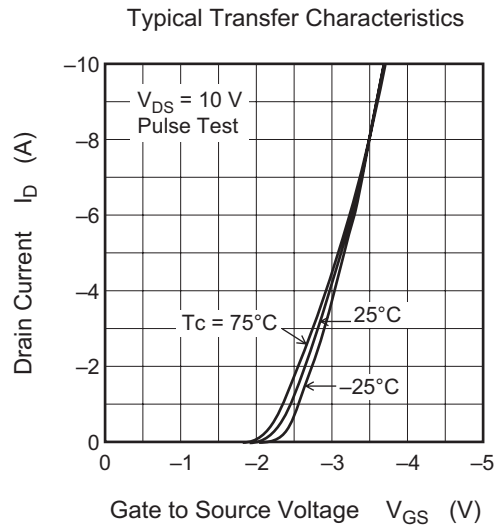
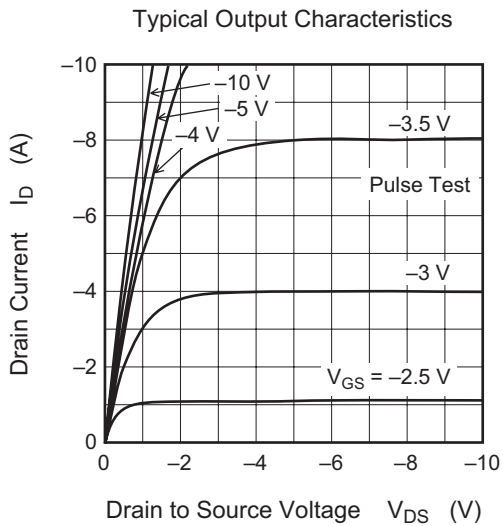
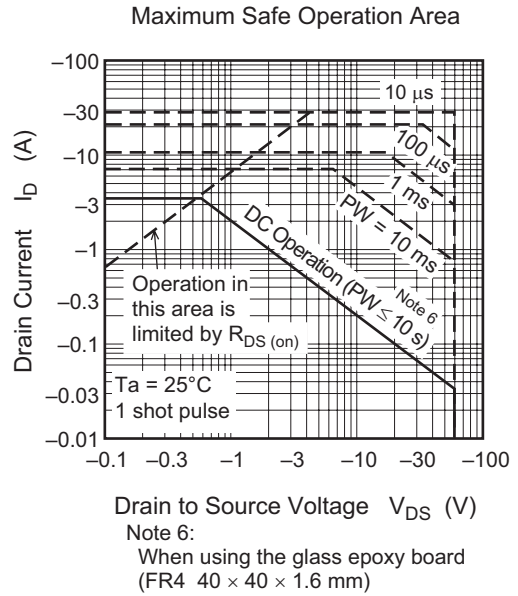
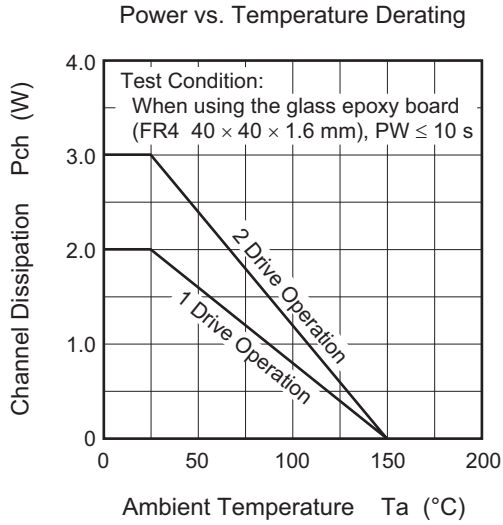
Electrical Characteristics

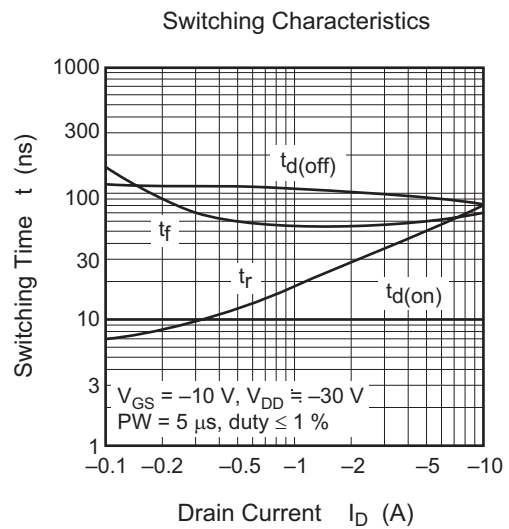
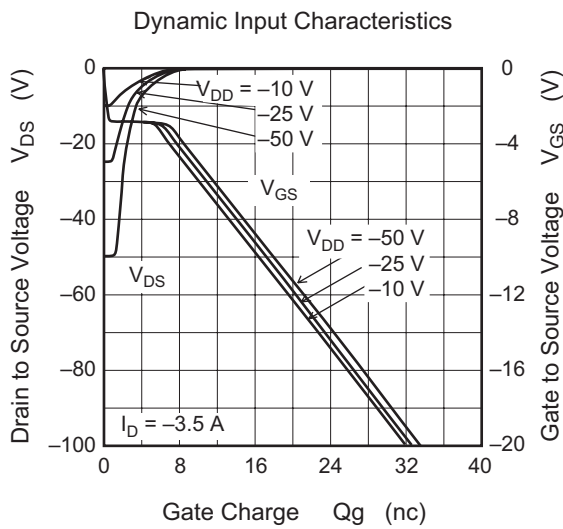
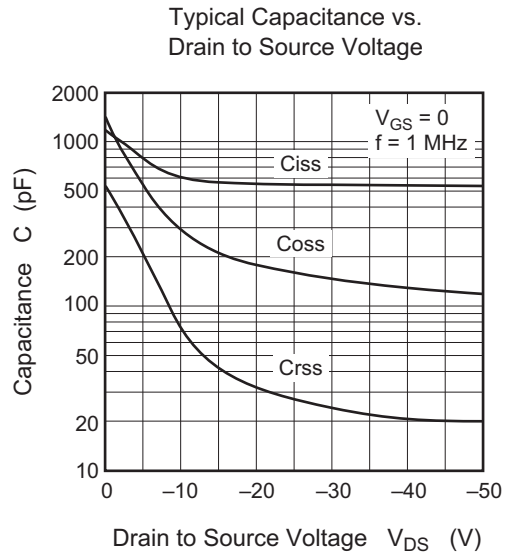
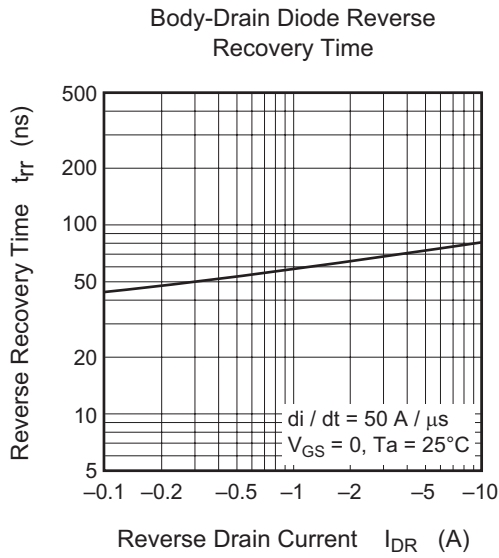
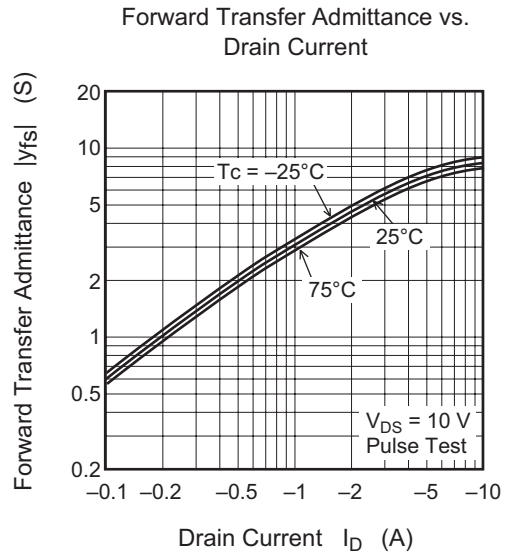
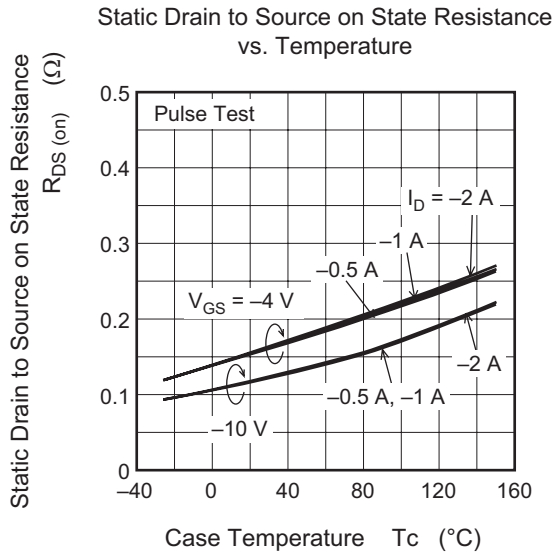
(Ta = 25°C)

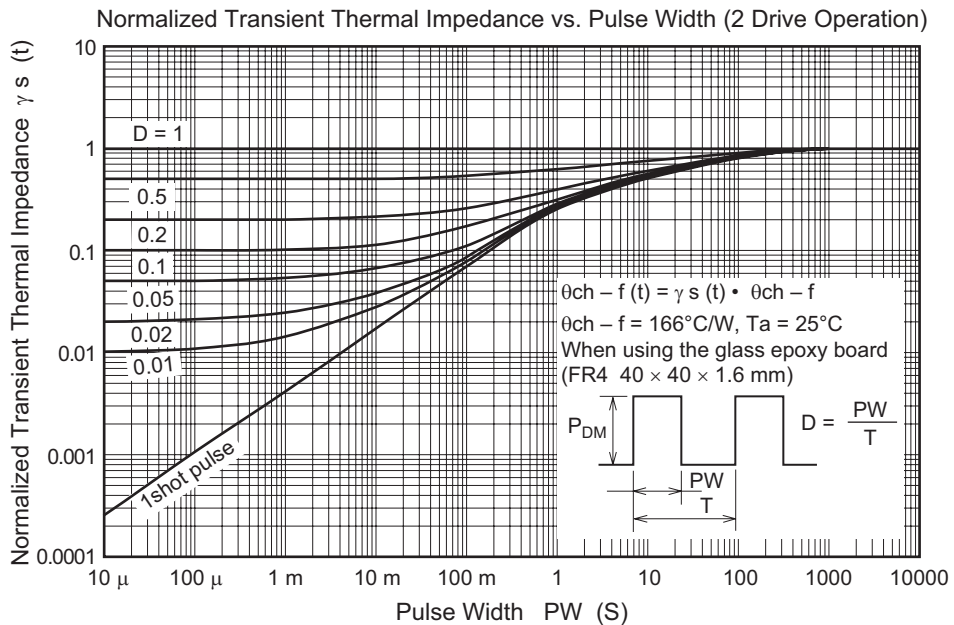
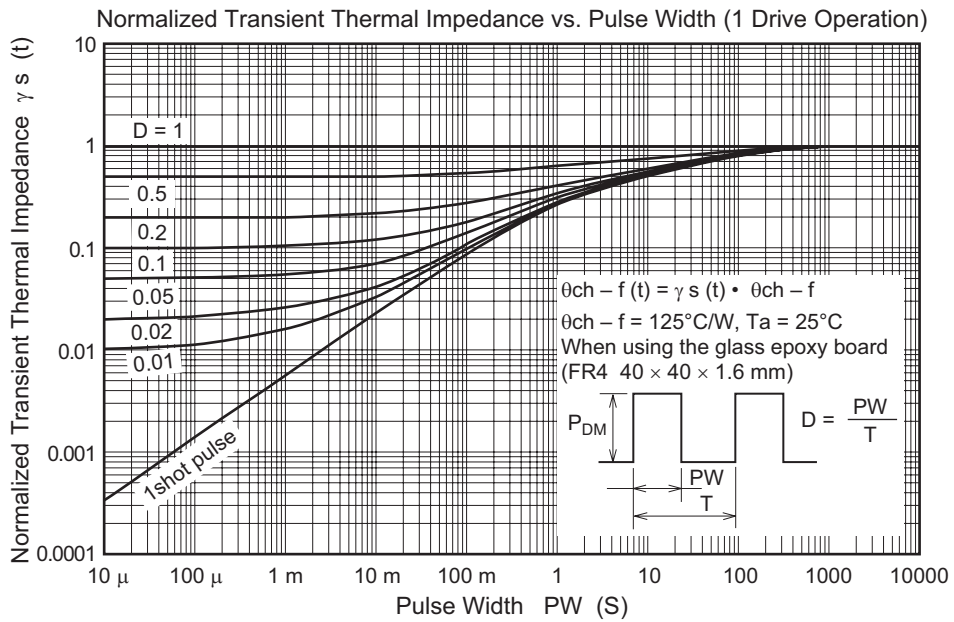
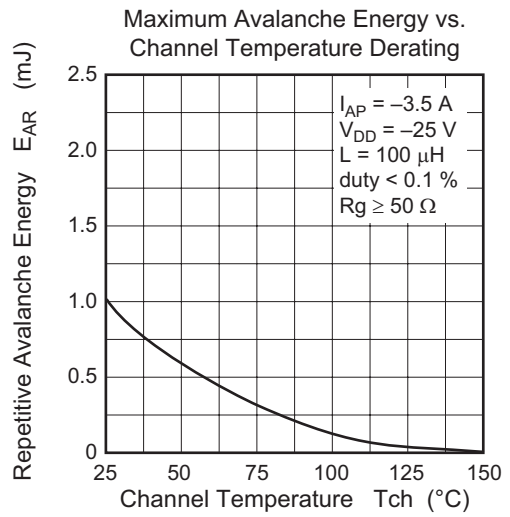
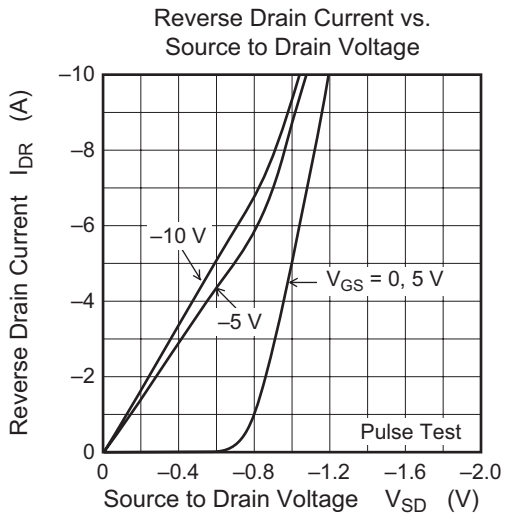
Item	Symbol	Min	Typ	Max	Unit	Test Conditions	
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -10 \text{ mA}$, $V_{GS} = 0$	
Gate to source leak voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$	
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$	
Zero gate voltage drain current	HAT1038R	I_{DSS}	—	—	-1	μA	$V_{DS} = -60 \text{ V}$, $V_{GS} = 0$
	HAT1038RJ	I_{DSS}	—	—	-0.1	μA	
Zero gate voltage drain current	HAT1038R	I_{DSS}	—	—	—	μA	$V_{DS} = -48 \text{ V}$, $V_{GS} = 0$ $T_a = 125^\circ\text{C}$
	HAT1038RJ	I_{DSS}	—	—	-10	μA	
Gate to source cutoff voltage	$V_{GS(off)}$	-1.2	—	-2.2	V	$V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$	
Static drain to source on state resistance	$R_{DS(on)}$	—	0.12	0.15	Ω	$I_D = -2 \text{ A}$, $V_{GS} = -10 \text{ V}$ ^{Note 5}	
	$R_{DS(on)}$	—	0.16	0.23	Ω	$I_D = -2 \text{ A}$, $V_{GS} = -4 \text{ V}$ ^{Note 5}	
Forward transfer admittance	$ y_{fs} $	3	4.5	—	S	$I_D = -2 \text{ A}$, $V_{DS} = -10 \text{ V}$ ^{Note 5}	
Input capacitance	C_{iss}	—	600	—	pF	$V_{DS} = -10 \text{ V}$	
Output capacitance	C_{oss}	—	290	—	pF	$V_{GS} = 0$	
Reverse transfer capacitance	C_{rss}	—	75	—	pF	$f = 1 \text{ MHz}$	
Turn-on delay time	$t_{d(on)}$	—	11	—	ns	$V_{GS} = -10 \text{ V}$, $I_D = -2 \text{ A}$, $V_{DD} \cong -30 \text{ V}$	
Rise time	t_r	—	30	—	ns		
Turn-off delay time	$t_{d(off)}$	—	100	—	ns		
Fall time	t_f	—	55	—	ns		
Body-drain diode forward voltage	V_{DF}	—	-0.98	-1.28	V	$I_F = -3.5 \text{ A}$, $V_{GS} = 0$ ^{Note 5}	
Body-drain diode reverse recovery time	t_{rr}	—	70	—	ns	$I_F = -3.5 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu\text{s}$	

Note: 5. Pulse test

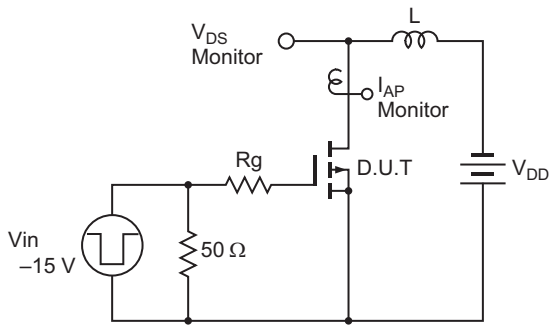
Main Characteristics



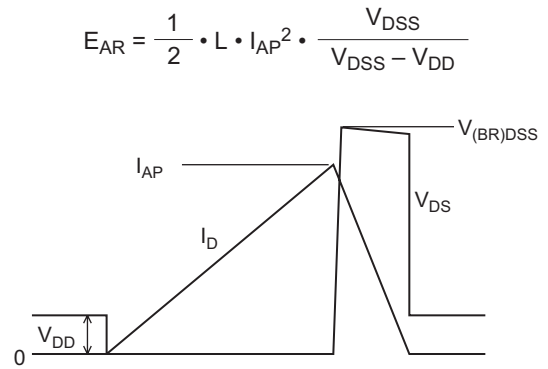




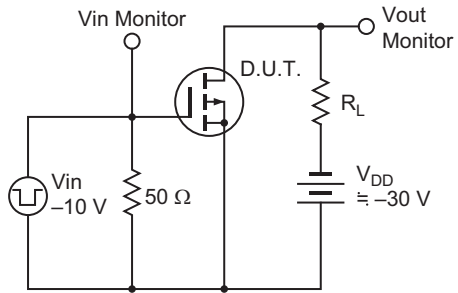
Avalanche Test Circuit



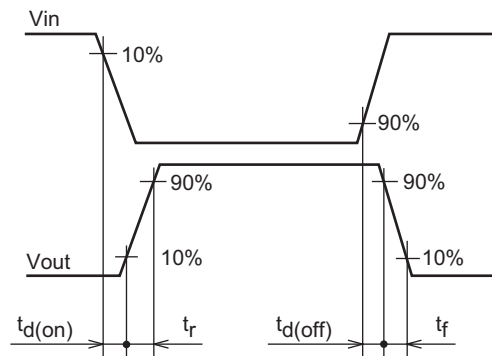
Avalanche Waveform



Switching Time Test Circuit

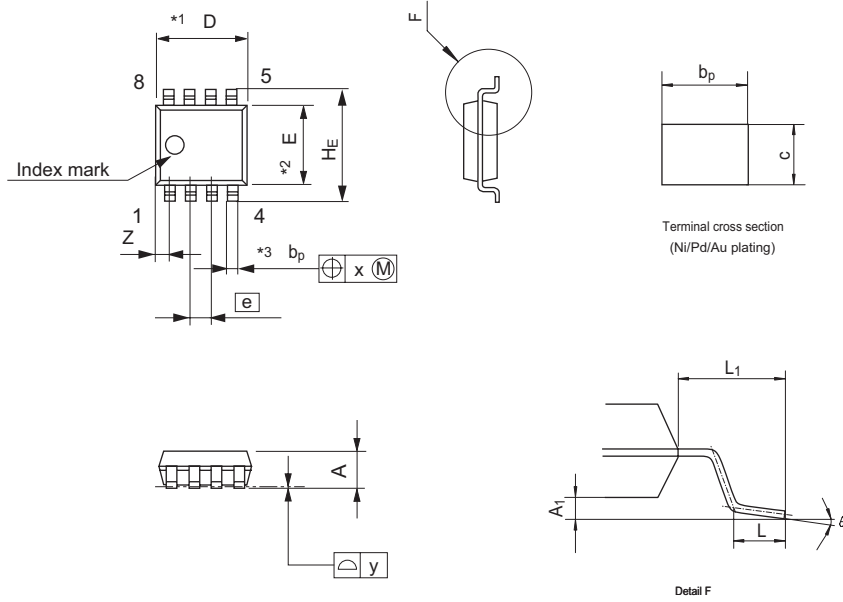


Switching Time Waveform



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



Terminal cross section
(Ni/Pd/Au plating)

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 ₂	—	—	—
A ₁	0.10	0.14	0.25
A	—	—	1.75
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.15	0.20	0.25
c ₁	—	—	—
θ	0°	—	8°
H _E	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 ₁	—	1.08	—

Ordering Information

Part Name	Quantity	Shipping Container
HAT1038R-EL-E	2500 pcs	Taping
HAT1038RJ-EL-E	2500 pcs	Taping

Notes:

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