

HAT2038R, HAT2038RJ

Silicon N Channel Power MOS FET
High Speed Power Switching

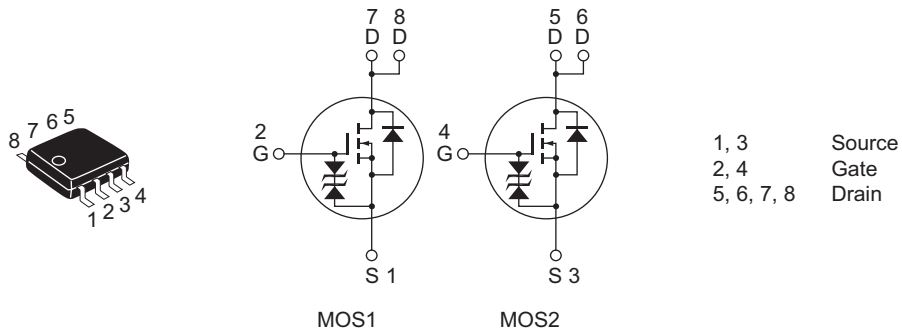
REJ03G1167-0500
(Previous: ADE-208-666C)
Rev.5.00
Sep 07, 2005

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	5	A
Drain peak current		$I_{D(pulse)}$ ^{Note 1}	40	A
Body-drain diode reverse drain current		I_{DR}	5	A
Avalanche current	HAT2038R	I_{AP} ^{Note 4}	—	—
	HAT2038RJ		5	A
Avalanche energy	HAT2038R	E_{AR} ^{Note 4}	—	—
	HAT2038RJ		2.14	mJ
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

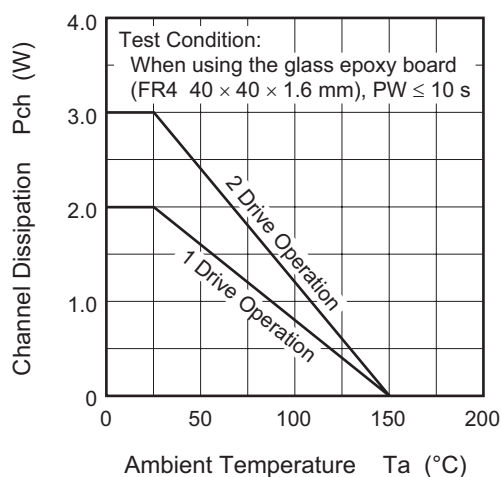
(Ta = 25°C)

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 breakdown voltage		$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
Gate to source leak current		I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	HAT2038R	I_{DSS}	—	—	1	μA	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0$
	HAT2038RJ	I_{DSS}	—	—	0.1	μA	
Zero gate voltage drain current	HAT2038R	I_{DSS}	—	—	—	μA	$V_{DS} = 48 \text{ V}$, $V_{GS} = 0$ $T_a = 125^\circ C$
	HAT2038RJ	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		$R_{DS(on)}$	—	0.043	0.058	Ω	$I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 5}
		$R_{DS(on)}$	—	0.056	0.084	Ω	
Forward transfer admittance		$ y_{fs} $	6	9	—	S	$I_D = 3 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 5}
Input capacitance		C_{iss}	—	520	—	pF	$V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance		C_{oss}	—	270	—	pF	
Reverse transfer capacitance		C_{rss}	—	100	—	pF	
Turn-on delay time		$t_{d(on)}$	—	11	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 3 \text{ A}$, $V_{DD} \approx 30 \text{ V}$
Rise time		t_r	—	40	—	ns	
Turn-off delay time		$t_{d(off)}$	—	110	—	ns	
Fall time		t_f	—	80	—	ns	
Body-drain diode forward voltage		V_{DF}	—	0.84	1.1	V	$I_F = 5 \text{ A}$, $V_{GS} = 0$ ^{Note 5}
Body-drain diode reverse recovery time		t_{rr}	—	40	—	ns	$I_F = 5 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu s$

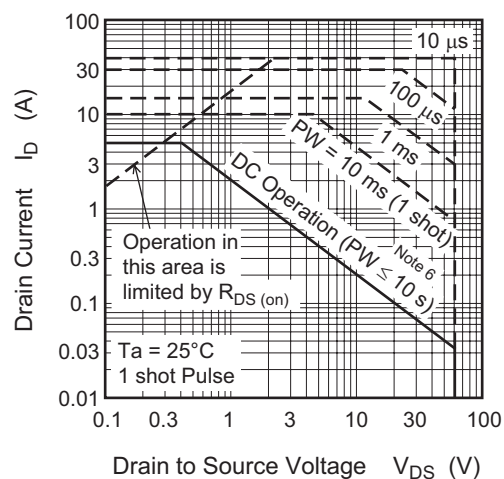
Note: 5. Pulse test

Main Characteristics

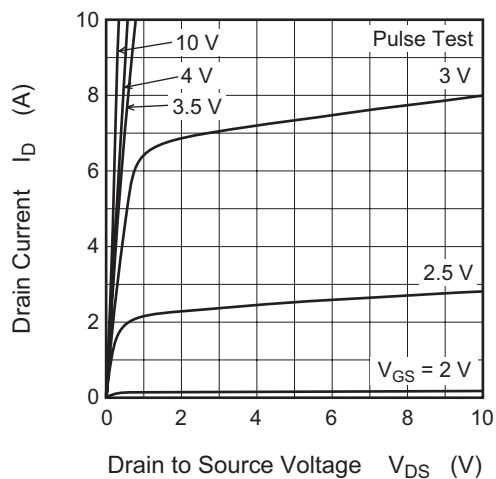
Power vs. Temperature Derating



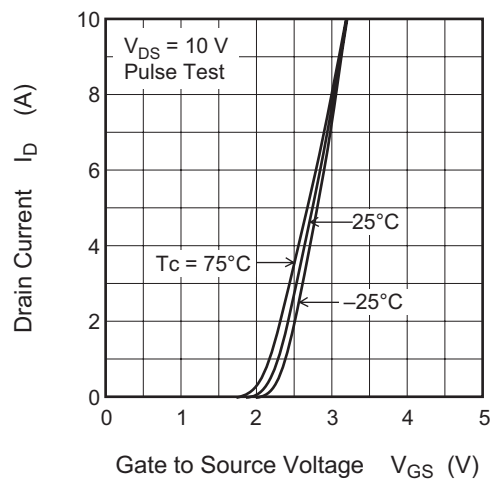
Maximum Safe Operation Area



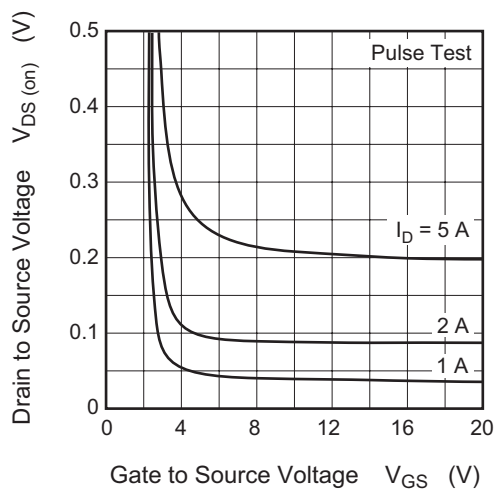
Typical Output Characteristics



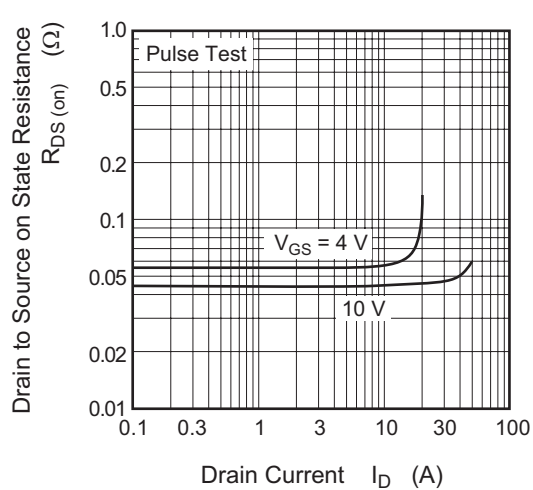
Typical Transfer Characteristics

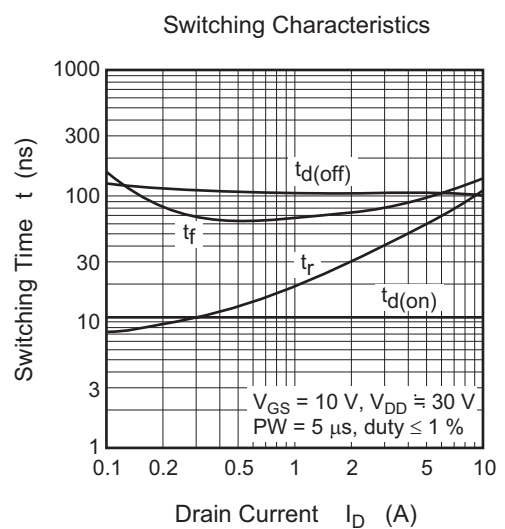
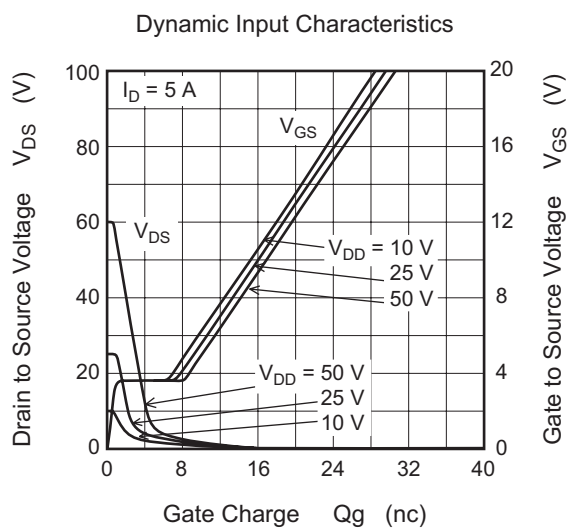
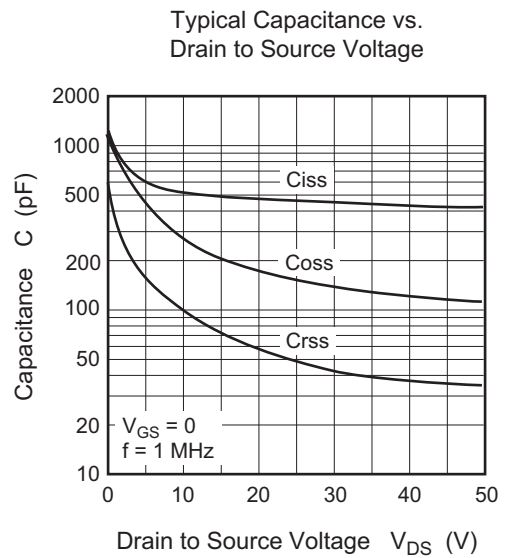
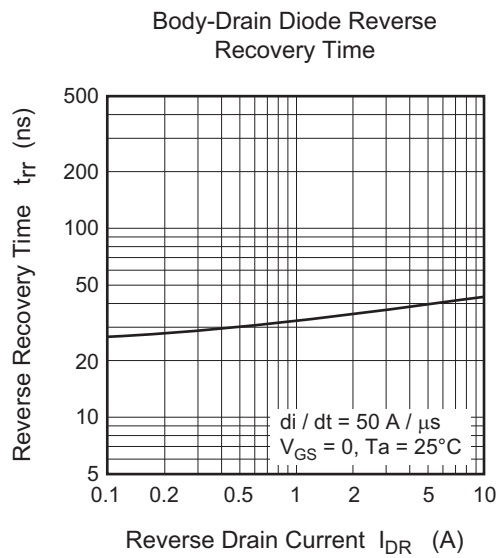
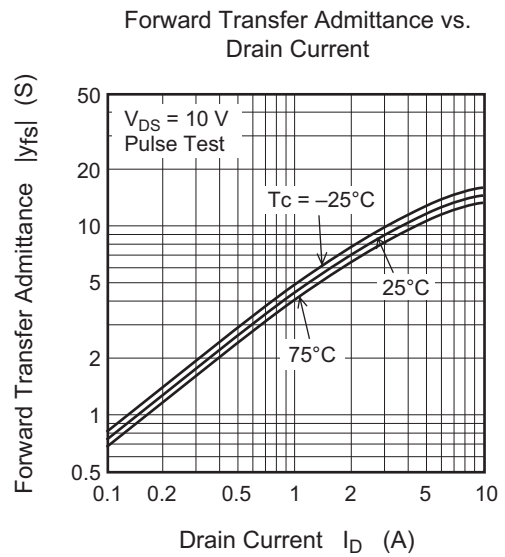
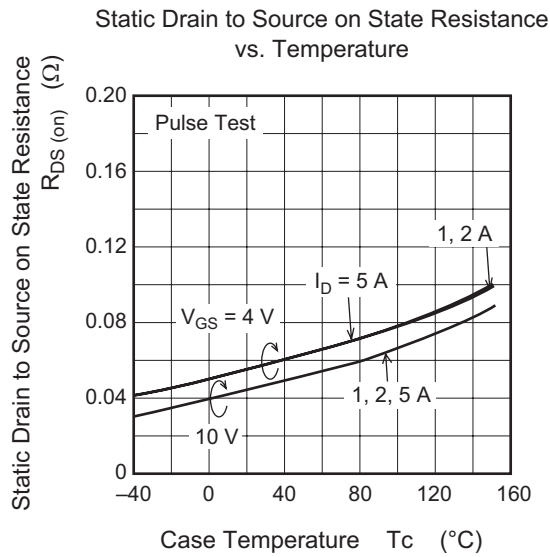


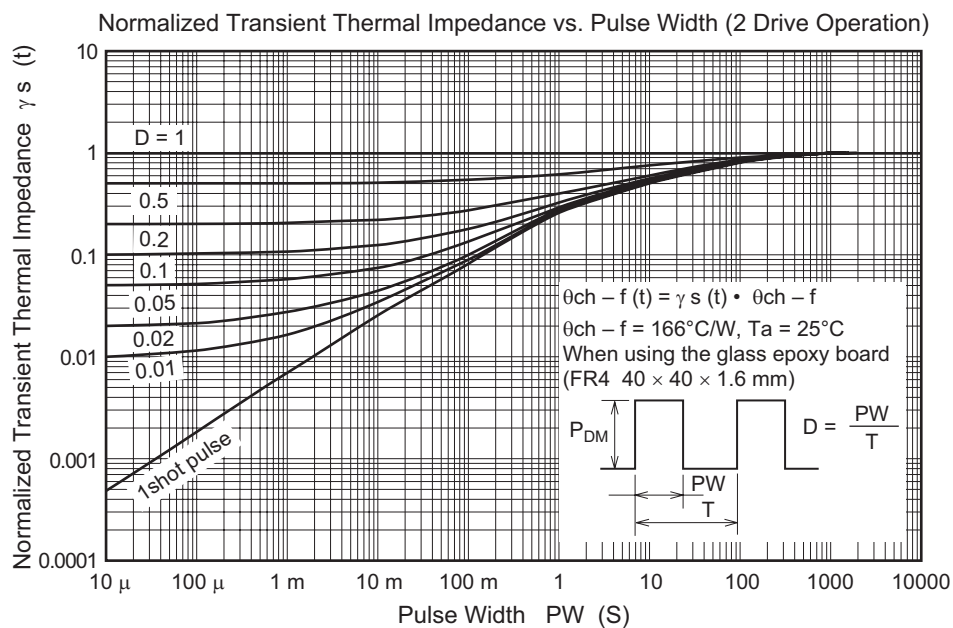
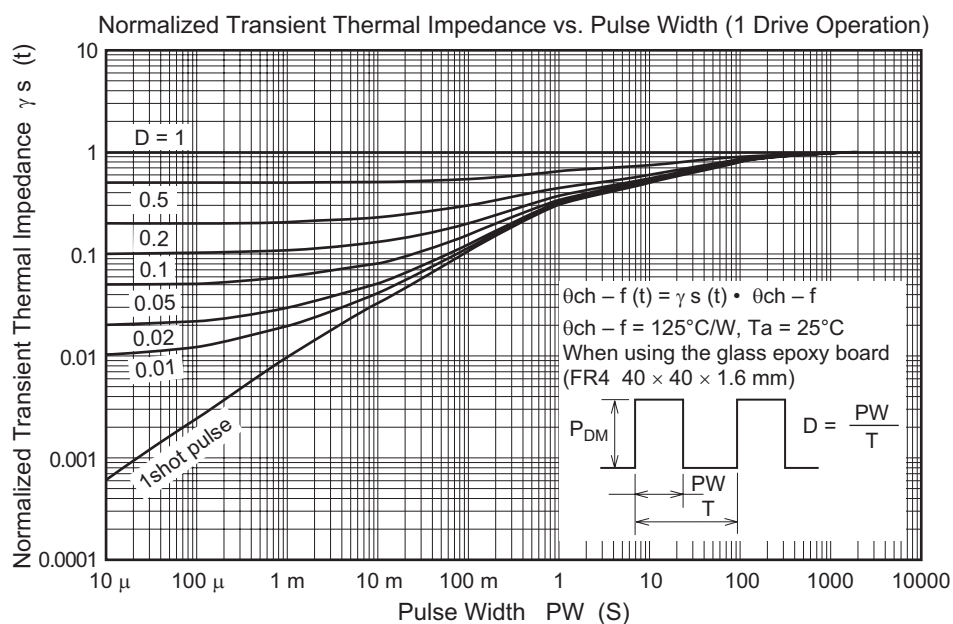
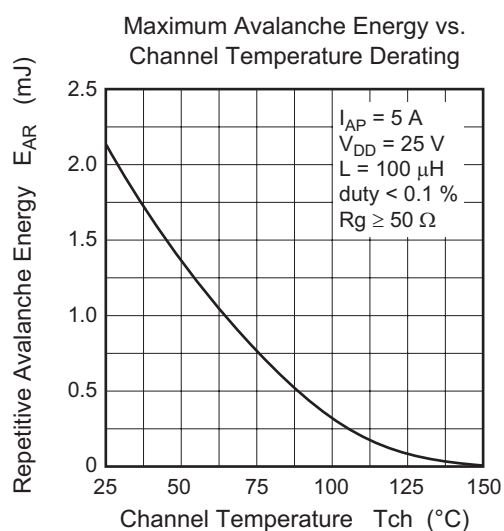
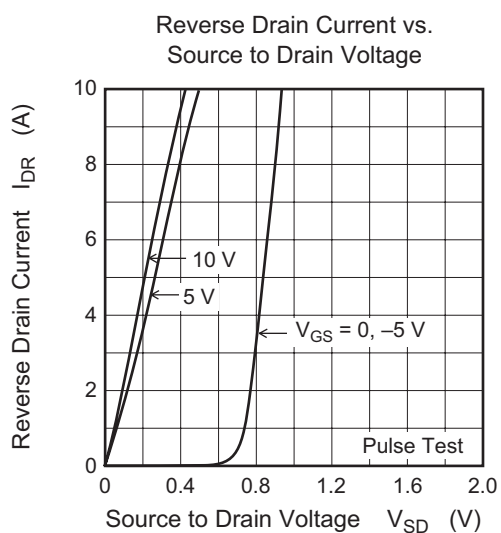
Drain to Source Saturation Voltage vs. Gate to Source Voltage



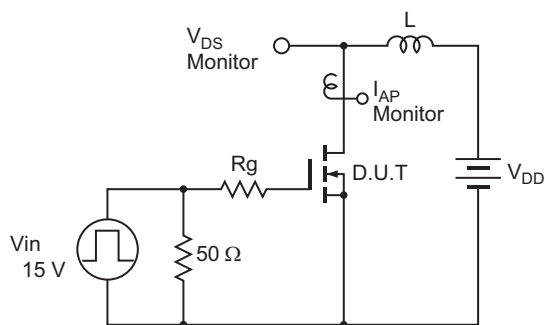
Static Drain to Source on State Resistance vs. Drain Current



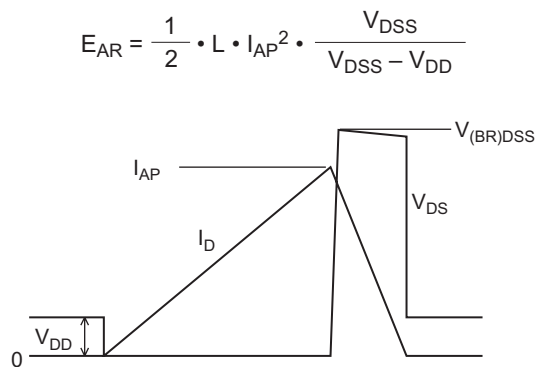




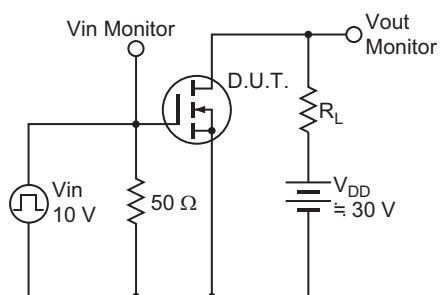
Avalanche Test Circuit



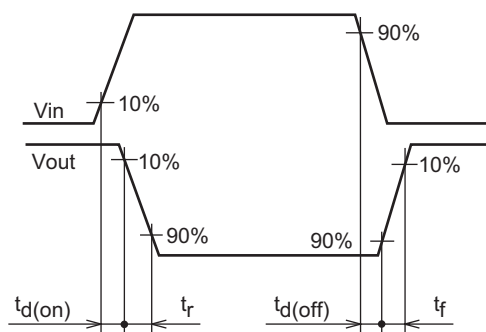
Avalanche Waveform



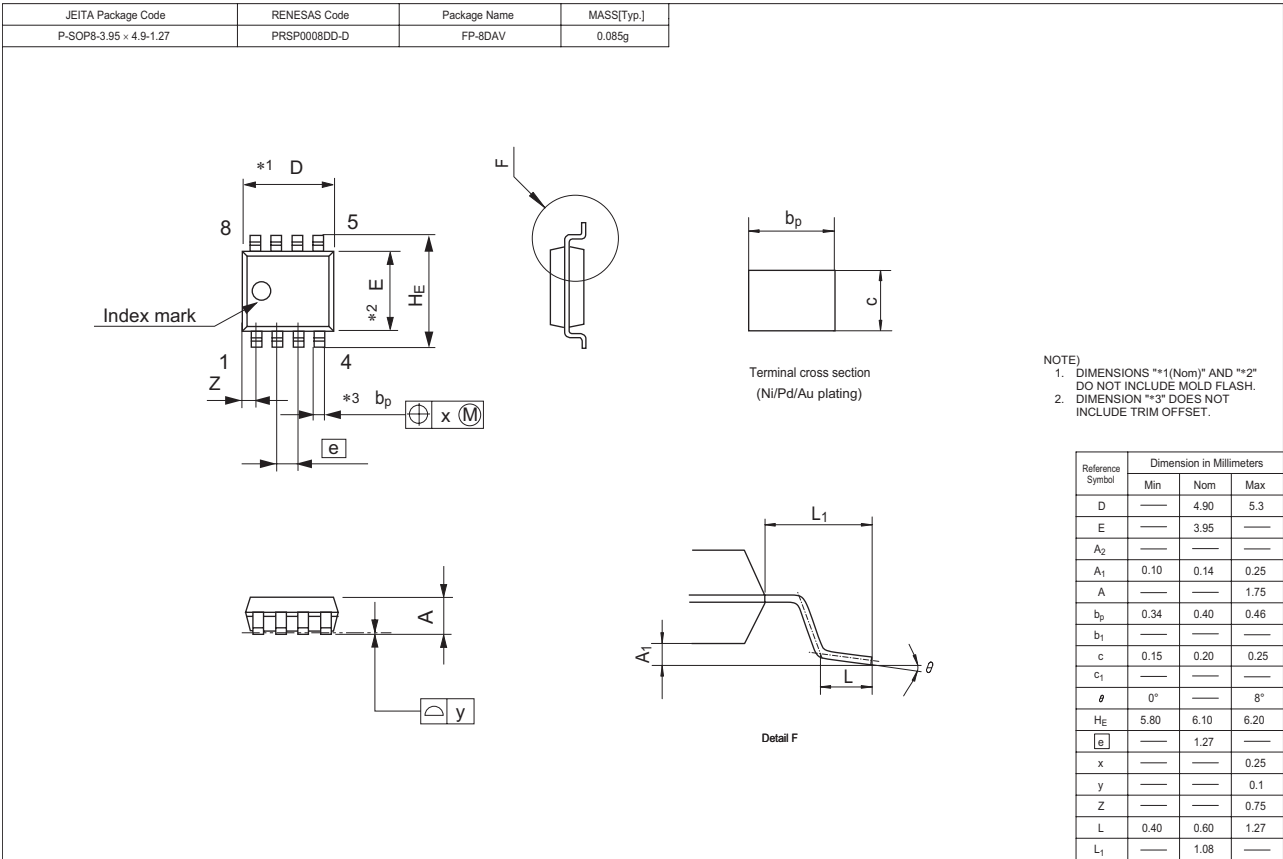
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2038R-EL-E	2500 pcs	Taping
HAT2038RJ-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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