

HAT2058R, HAT2058RJ

Silicon N Channel Power MOS FET
High Speed Power Switching

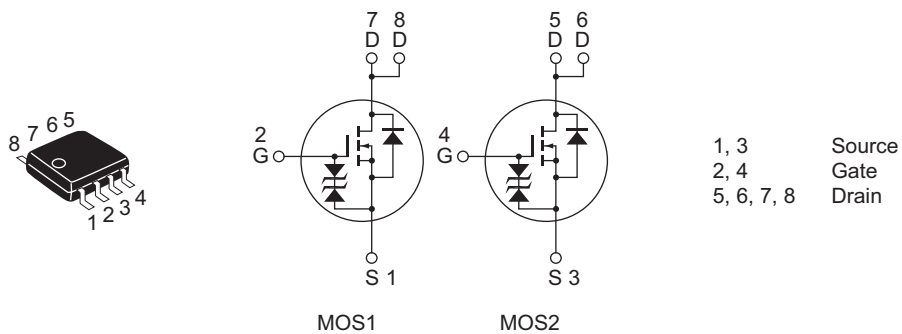
REJ03G1174-0200
(Previous: ADE-208-934)
Rev.2.00
Sep 07, 2005

Features

- Low on-resistance
- Capable of 4 V gate drive
- Low drive current
- High density mounting
- “J” is for Automotive application
High temperature D-S leakage guarantee
Avalanche rating

Outline

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



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value		Unit
		HAT2058R	HAT2058RJ	
Drain to source voltage	V_{DSS}	100	100	V
Gate to source voltage	V_{GSS}	± 20	± 20	V
Drain current	I_D ^{Note 2}	4	4	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	32	32	A
Body-drain diode reverse drain current	I_{DR}	4	4	A
Avalanche current	I_{AP} ^{Note 4}	—	4	A
Avalanche energy	E_{AR} ^{Note 4}	—	1.6	mJ
Channel dissipation	P_{ch} ^{Note 2}	2	2	W
	P_{ch} ^{Note 3}	3	3	W
Channel temperature	T_{ch}	150	150	°C
Storage temperature	T_{stg}	–55 to +150	–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

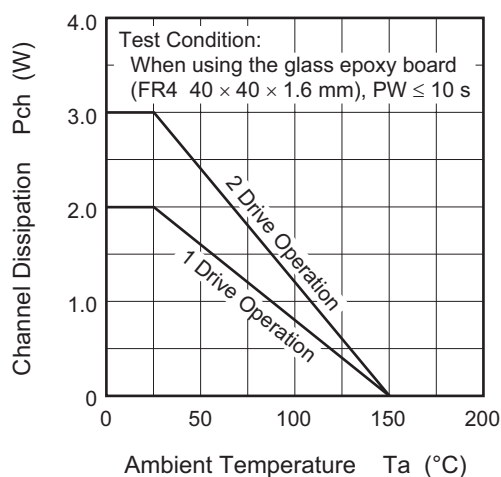
(Ta = 25°C)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage		$V_{(BR)DSS}$	100	—	—	V	$I_D = 10\text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage		$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100\text{ }\mu\text{A}$, $V_{DS} = 0$
Zero gate voltage drain current	HAT2058R	I_{DSS}	—	—	1	μA	$V_{DS} = 100\text{ V}$, $V_{GS} = 0$
	HAT2058RJ	I_{DSS}	—	—	0.1	μA	
Zero gate voltage drain current	HAT2058R	I_{DSS}	—	—	—	μA	$V_{DS} = 80\text{ V}$, $V_{GS} = 0$ $T_a = 125^\circ\text{C}$
	HAT2058RJ	I_{DSS}	—	—	10	μA	
Gate to source leak current		I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0$
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} $	3	5	—	S	$I_D = 2\text{ A}$, $V_{DS} = 10\text{ V}$ ^{Note 5}
Static drain to source on state resistance	$R_{DS(on)}$	—	120	145	$\text{m}\Omega$	$I_D = 2\text{ A}$, $V_{GS} = 10\text{ V}$ ^{Note 5}	
	$R_{DS(on)}$	—	150	180	$\text{m}\Omega$	$I_D = 2\text{ A}$, $V_{GS} = 4\text{ V}$ ^{Note 5}	
Input capacitance		C_{iss}	—	420	—	pF	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$ $f = 1\text{ MHz}$
Output capacitance		C_{oss}	—	180	—	pF	
Reverse transfer capacitance		C_{rss}	—	100	—	pF	
Turn-on delay time		$t_{d(on)}$	—	10	—	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		$t_{d(off)}$	—	110	—	ns	
Fall time		t_f	—	60	—	ns	
Body-drain diode forward voltage		V_{DF}	—	0.85	1.1	V	$I_F = 4\text{ A}$, $V_{GS} = 0$ ^{Note 5}
Body-drain diode reverse recovery time		t_{rr}	—	75	—	ns	$I_F = 4\text{ A}$, $V_{GS} = 0$ $di_F/dt = 50\text{ A}/\mu\text{s}$

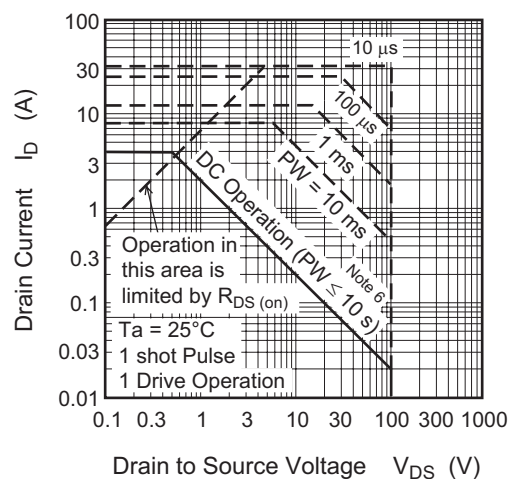
Note: 5. Pulse test

Main Characteristics

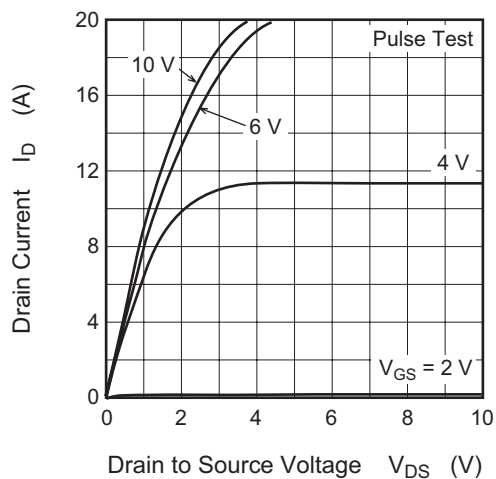
Power vs. Temperature Derating



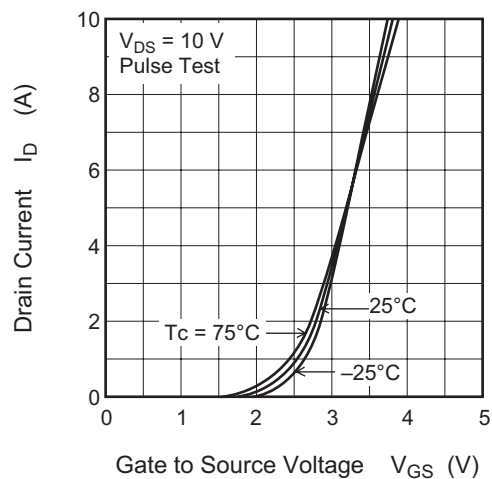
Maximum Safe Operation Area



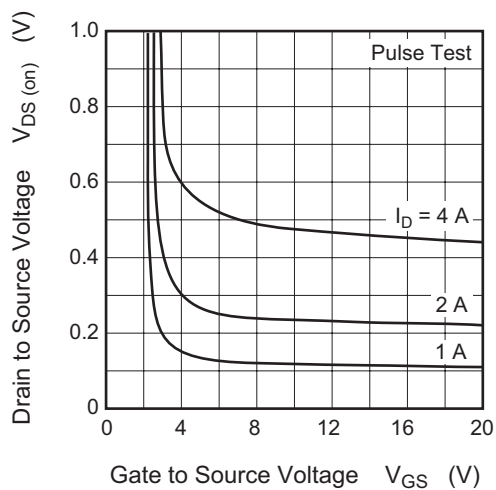
Typical Output Characteristics



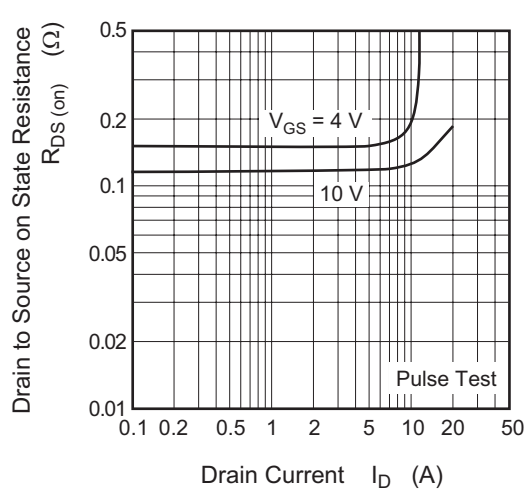
Typical Transfer Characteristics

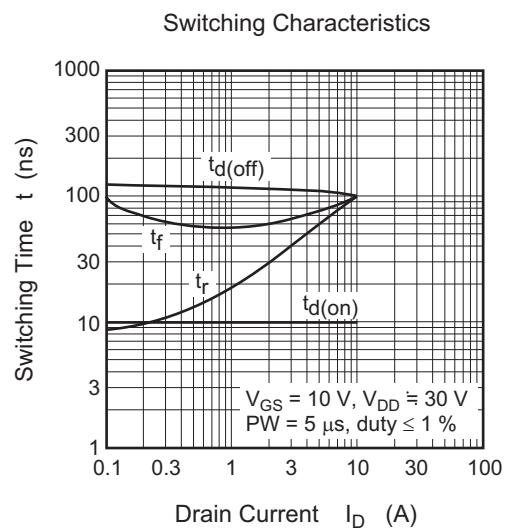
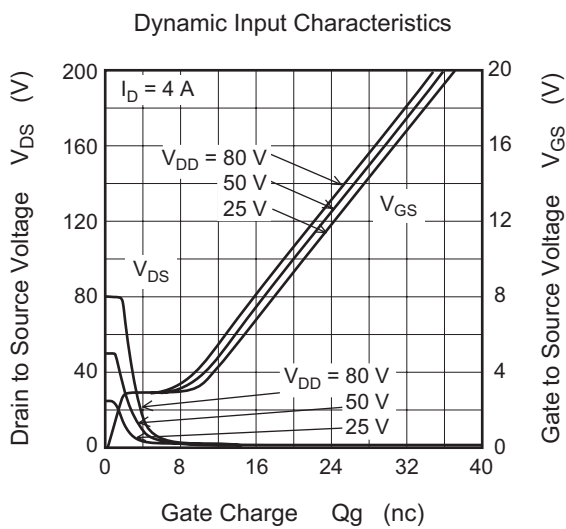
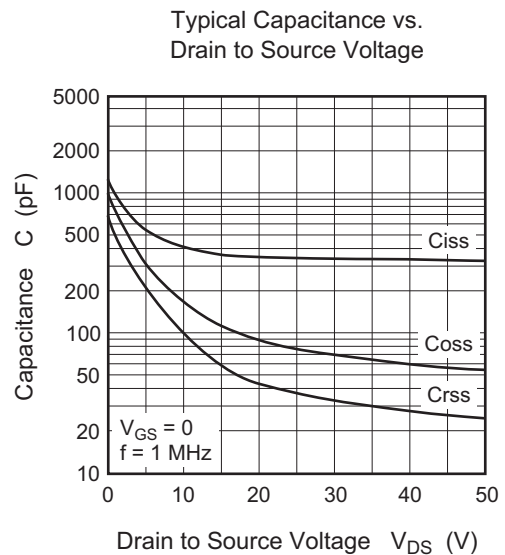
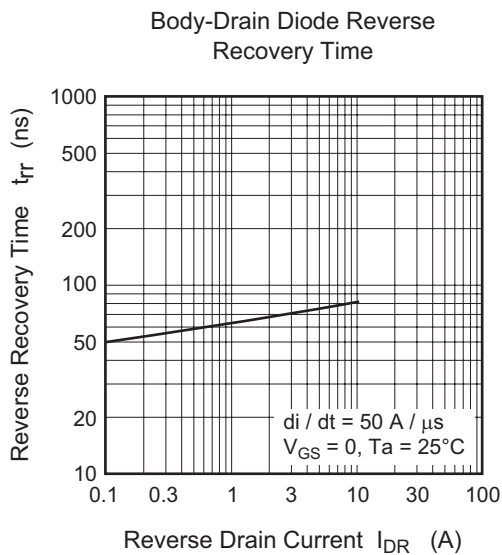
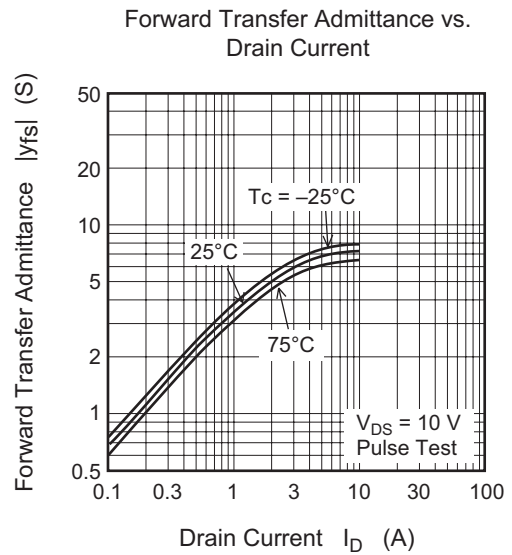
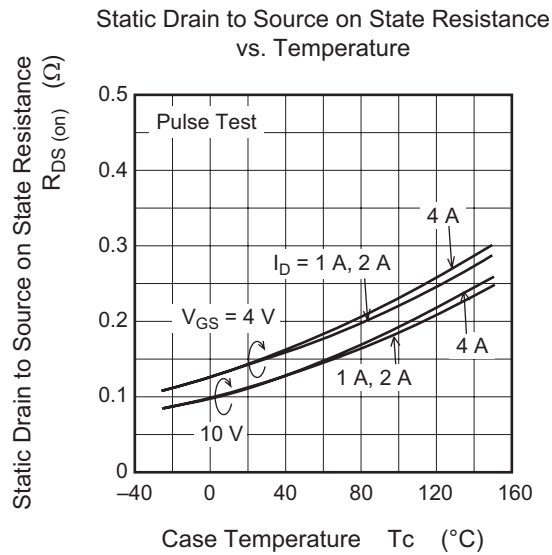


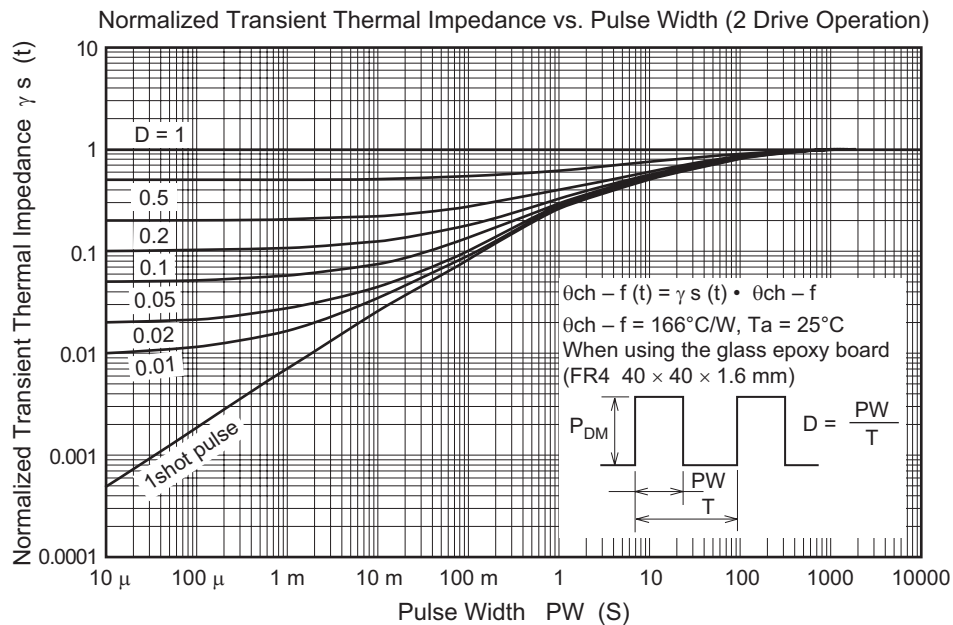
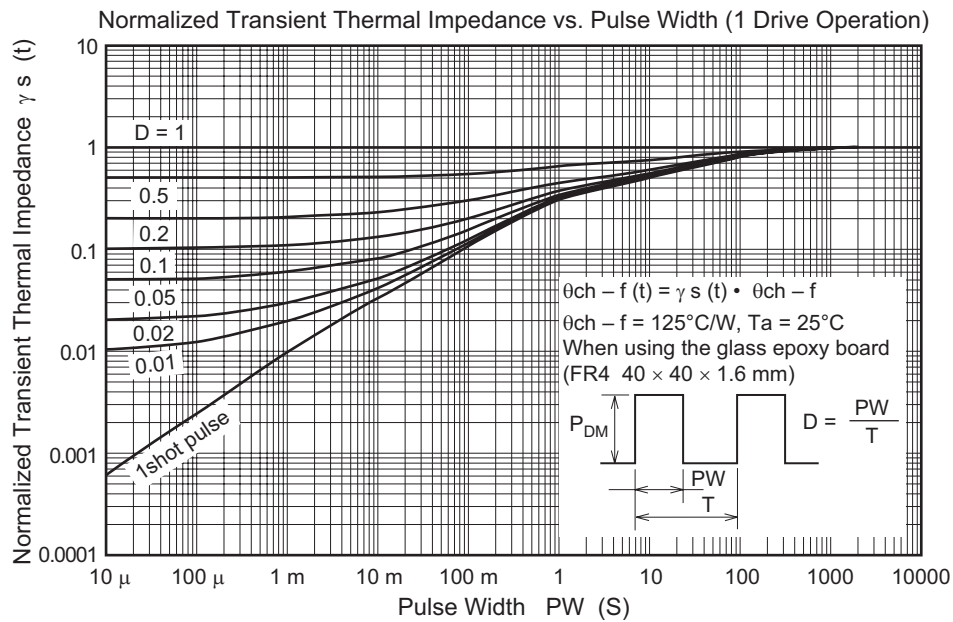
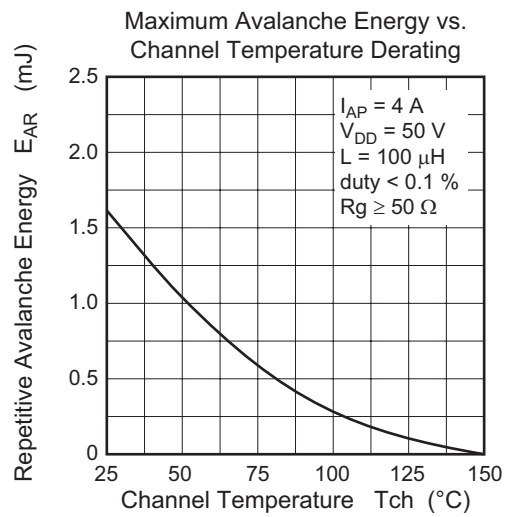
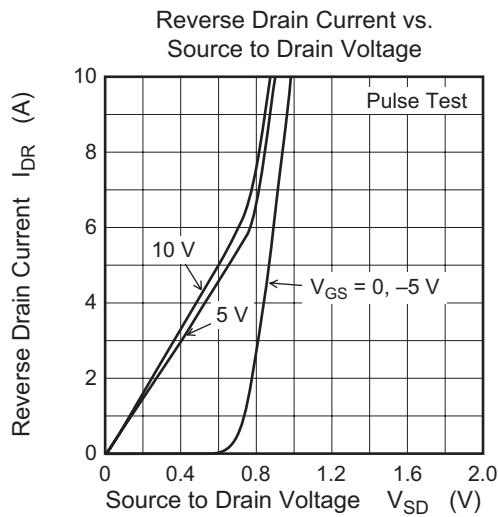
Drain to Source Saturation Voltage vs. Gate to Source Voltage



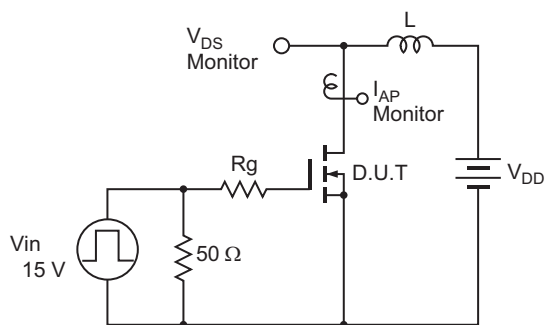
Static Drain to Source on State Resistance vs. Drain Current





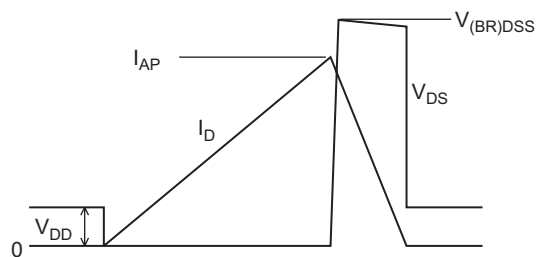


Avalanche Test Circuit

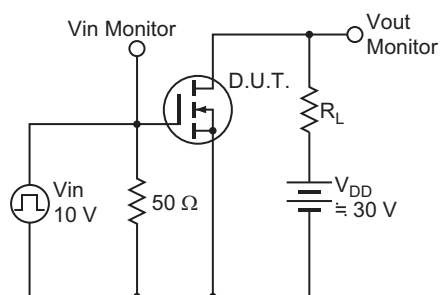


Avalanche Waveform

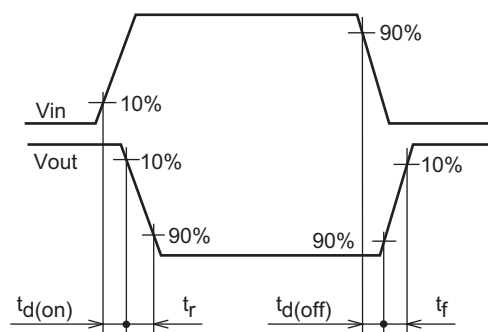
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



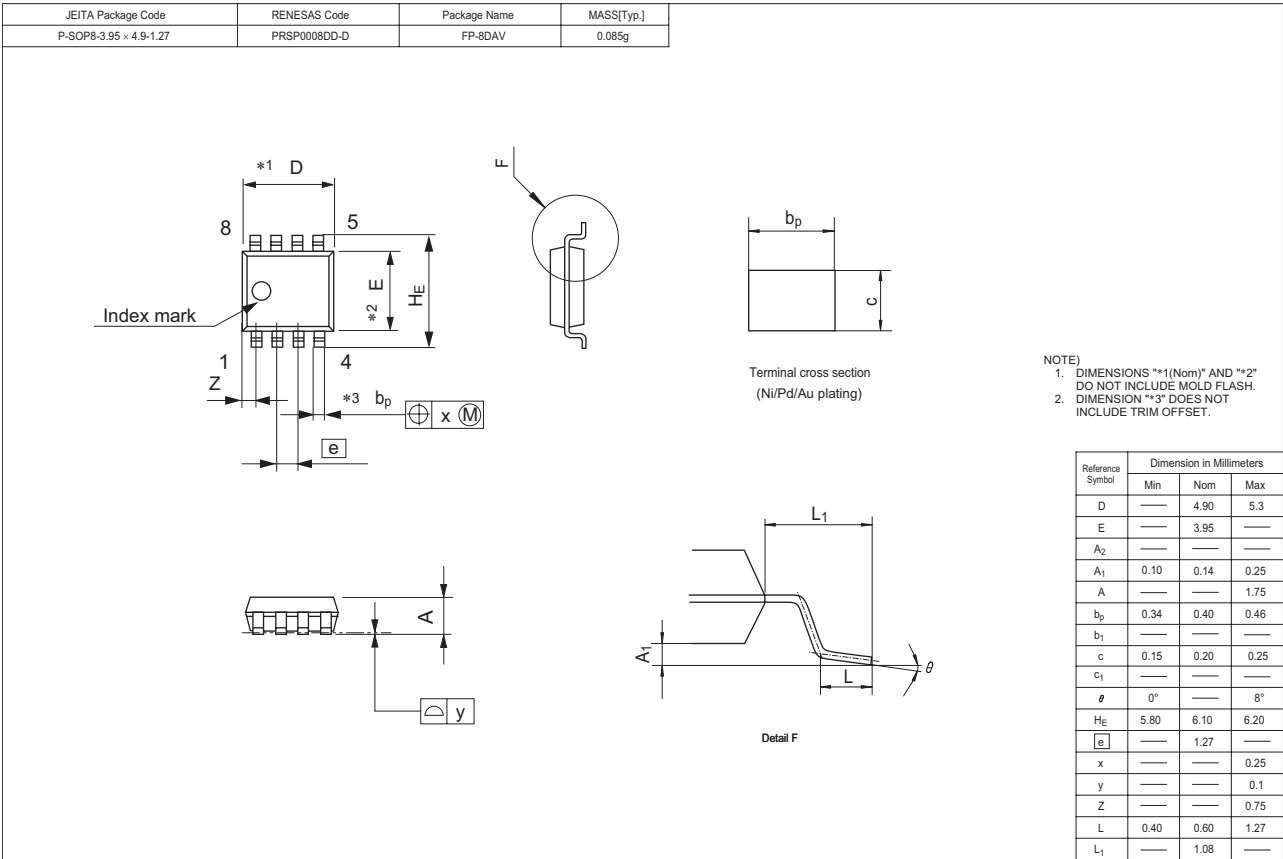
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2058R-EL-E	2500 pcs	Taping
HAT2058RJ-EL-E	2500 pcs	Taping

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