

# HAT2058R

Silicon N Channel Power MOS FET  
High Speed Power Switching

REJ03G1174-0300

Rev.3.00

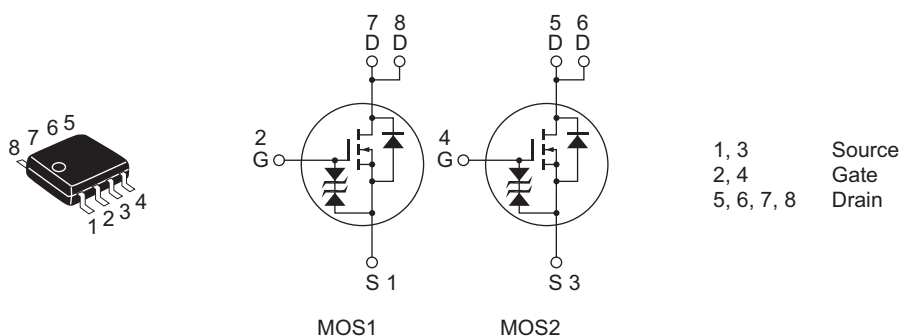
Aug 25, 2009

## 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
Drain to source voltage	$V_{DSS}$	100	V
Gate to source voltage	$V_{GSS}$	±20	V
Drain current	$I_D$ <sup>Note 2</sup>	4	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	32	A
Body-drain diode reverse drain current	$I_{DR}$	4	A
Avalanche current	$I_{AP}$ <sup>Note 4</sup>	—	A
Avalanche energy	$E_{AR}$ <sup>Note 4</sup>	—	mJ
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	2	W
	$P_{ch}$ <sup>Note 3</sup>	3	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

2. 1 Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), PW ≤ 10 s

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

4. Value at Tch = 25°C, Rg ≥ 50 Ω

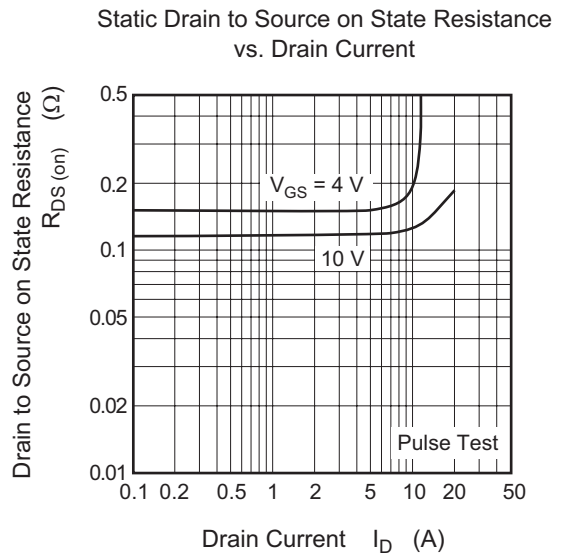
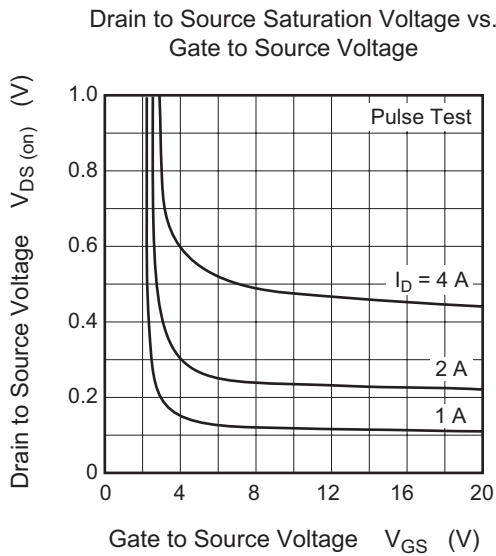
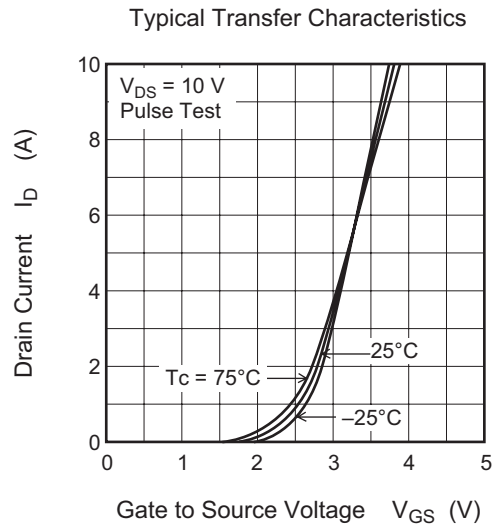
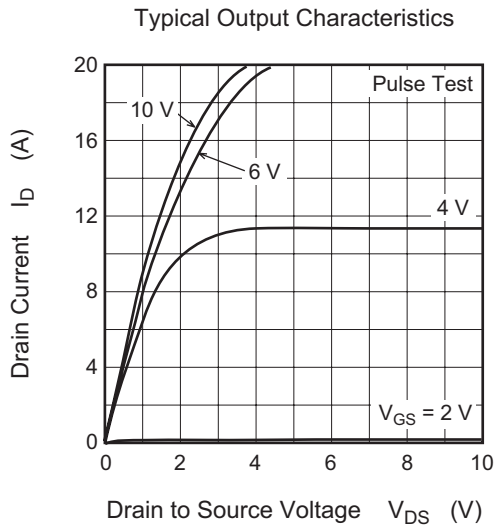
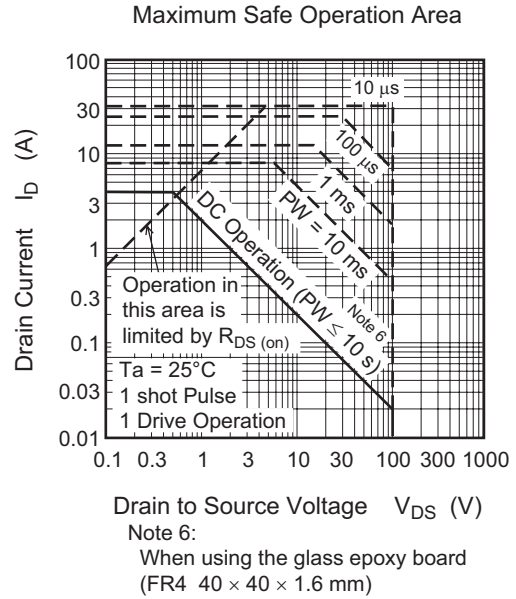
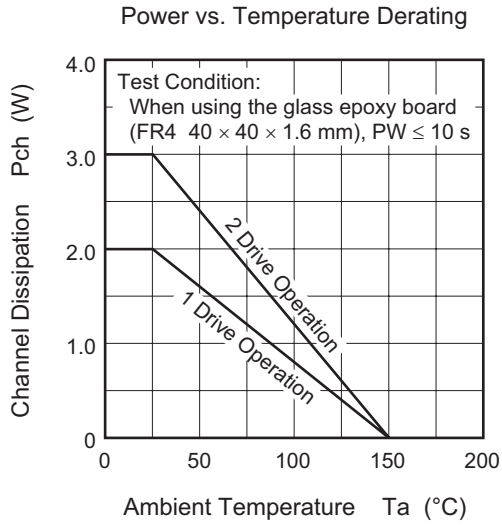
## Electrical Characteristics

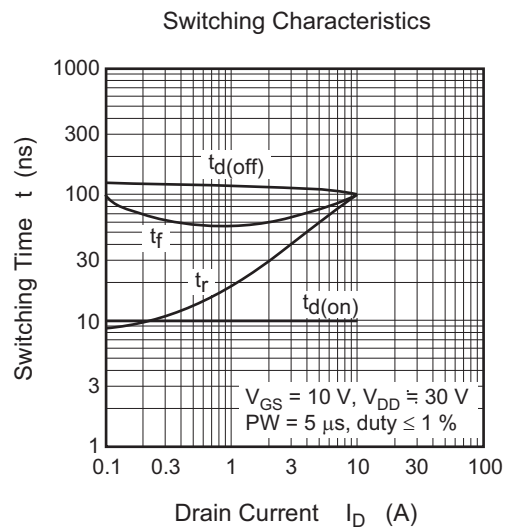
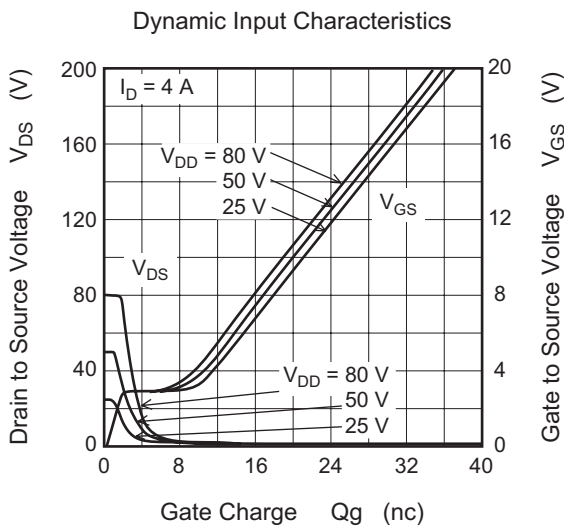
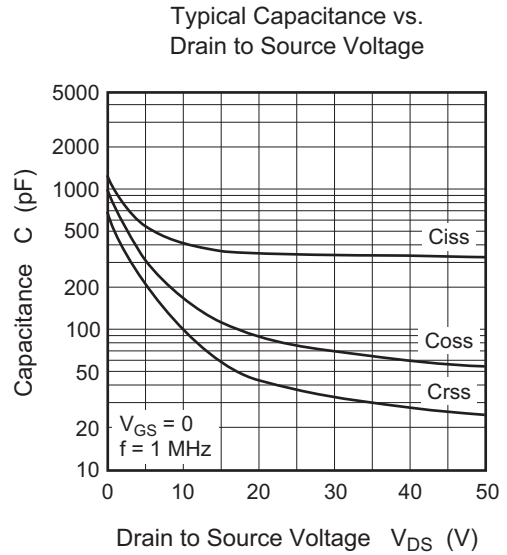
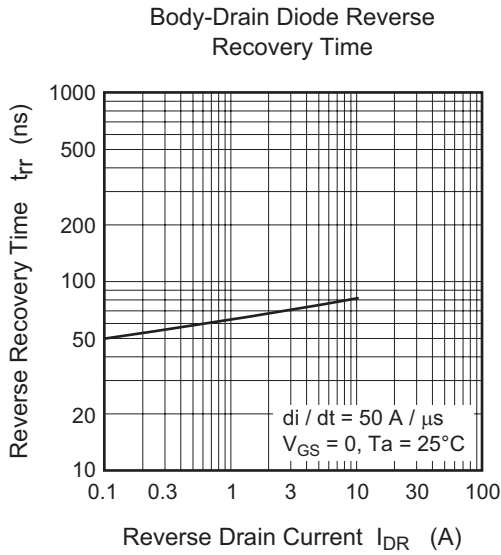
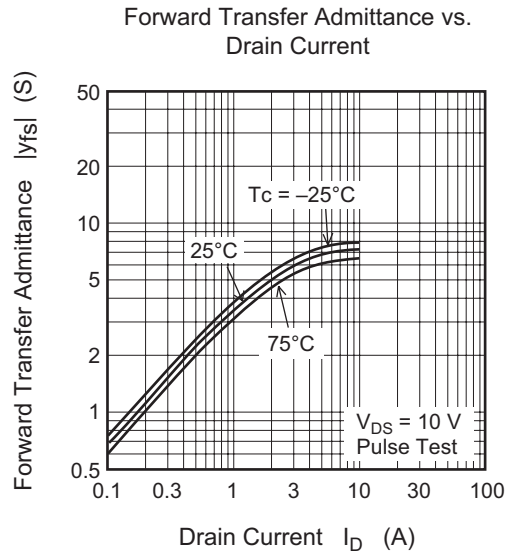
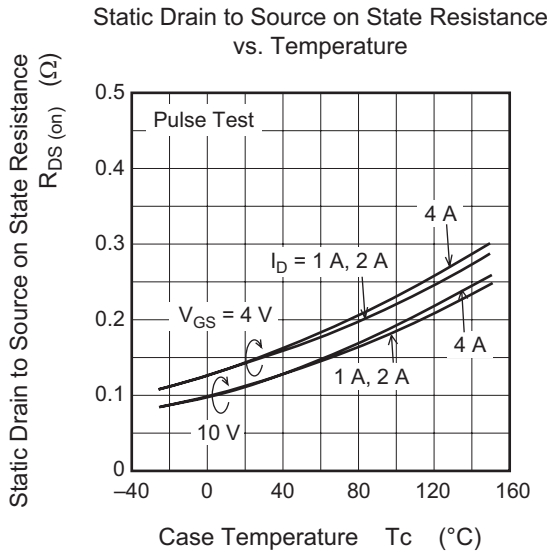
(Ta = 25°C)

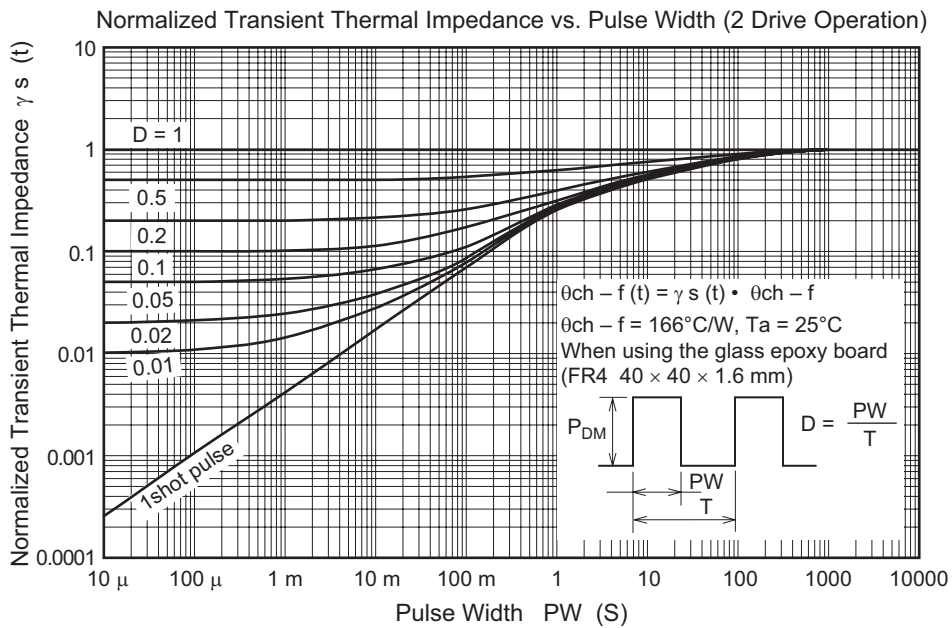
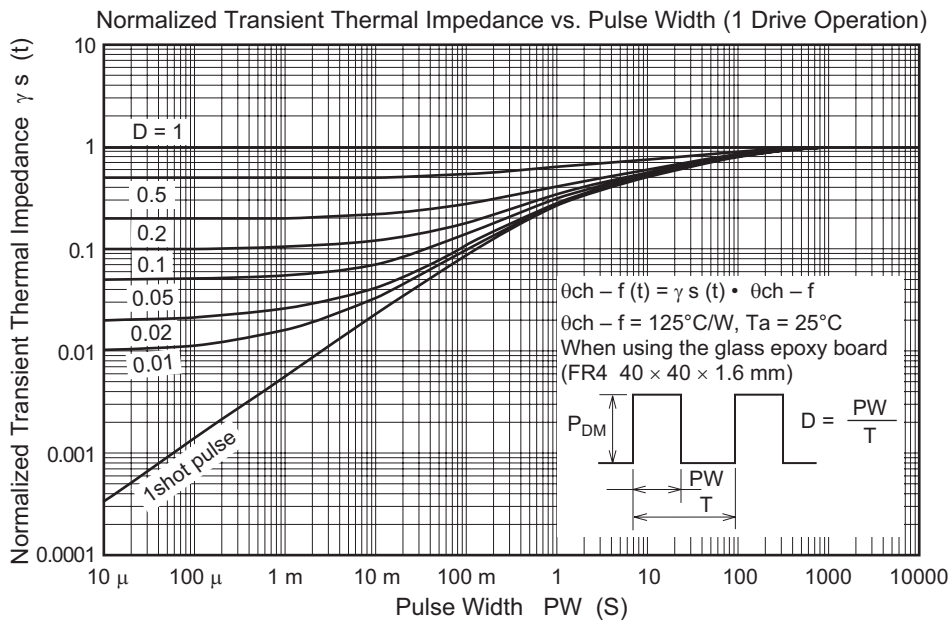
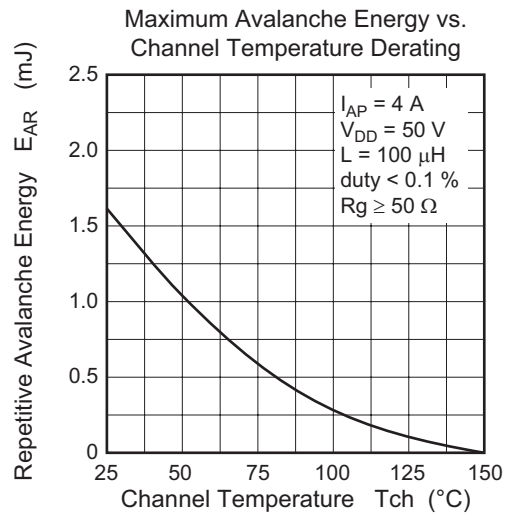
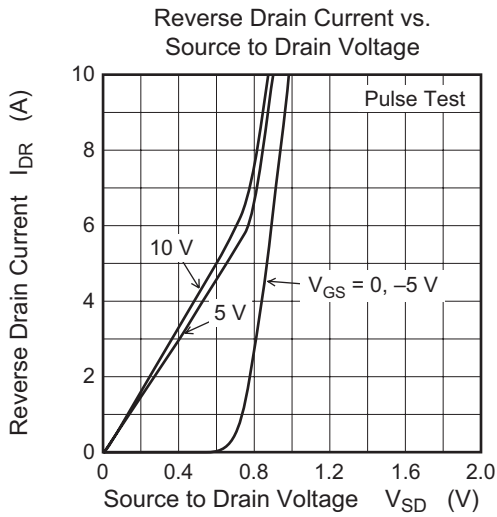
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 100 \text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$
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	$I_D = 2 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 5</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	120	145	$\text{m}\Omega$	$I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 5</sup>
	$R_{DS(on)}$	—	150	180	$\text{m}\Omega$	$I_D = 2 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note 5</sup>
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	$I_F = 4 \text{ A}$ , $V_{GS} = 0$ <sup>Note 5</sup>
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

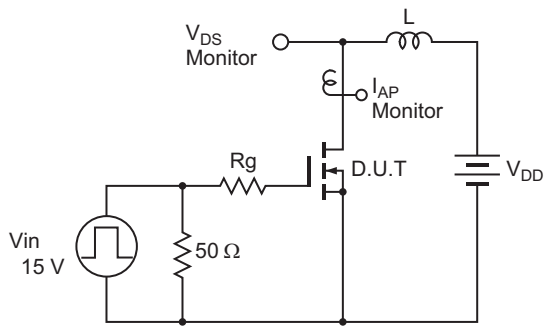
Main Characteristics





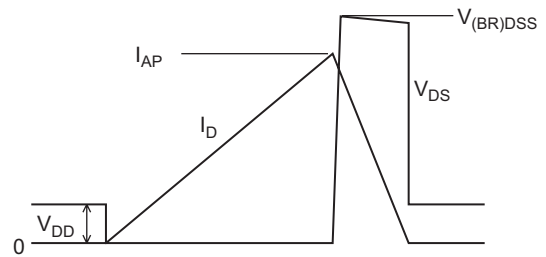


Avalanche Test Circuit

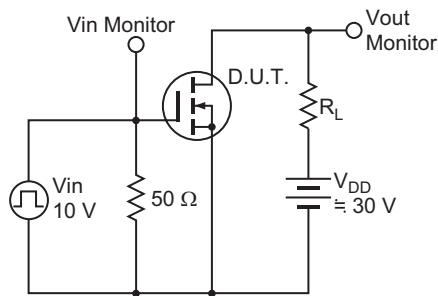


Avalanche Waveform

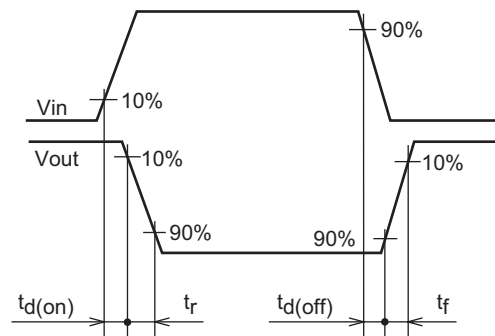
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



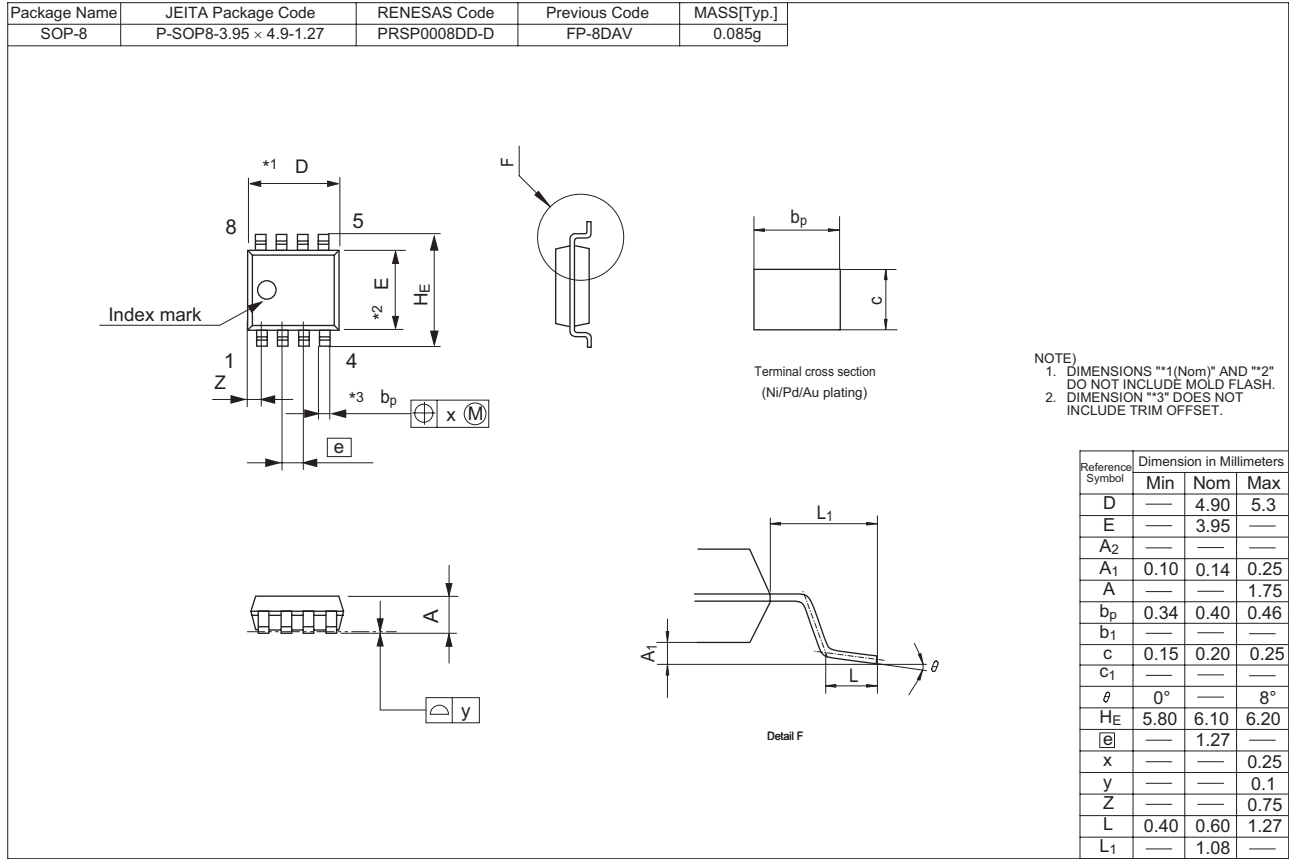
Switching Time Test Circuit



Switching Time Waveform



### Package Dimensions



### Ordering Information

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

Notes:

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