

HAT2058R, HAT2058RJ

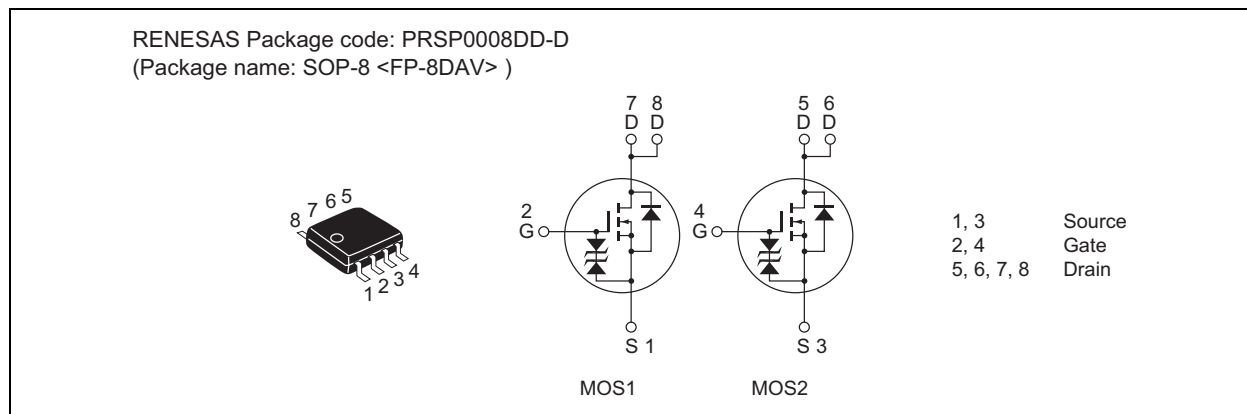
Silicon N Channel Power MOS FET
High Speed Power Switching

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



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

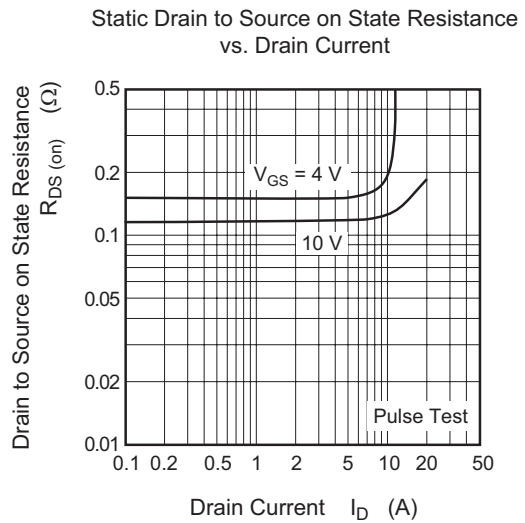
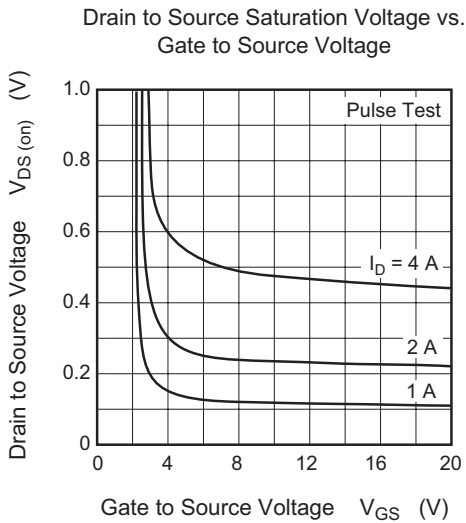
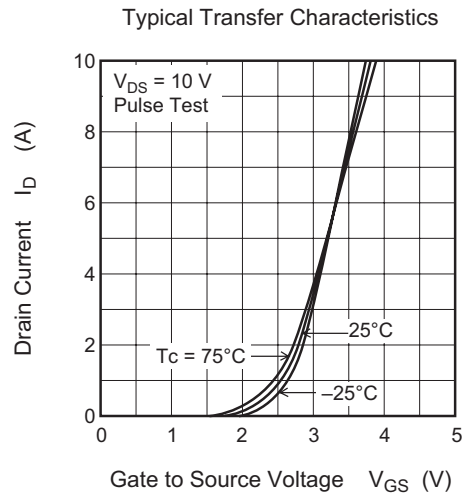
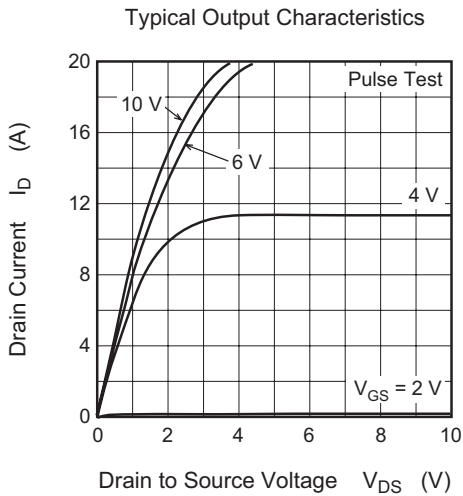
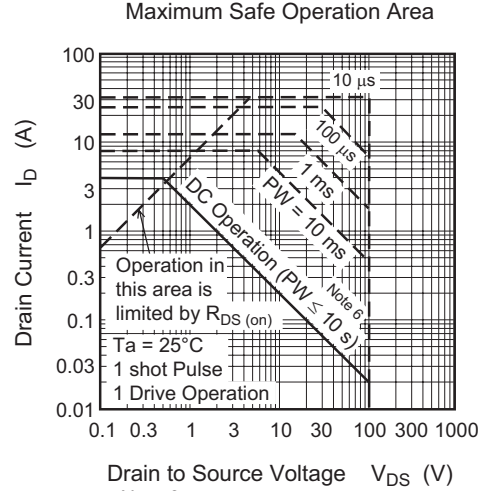
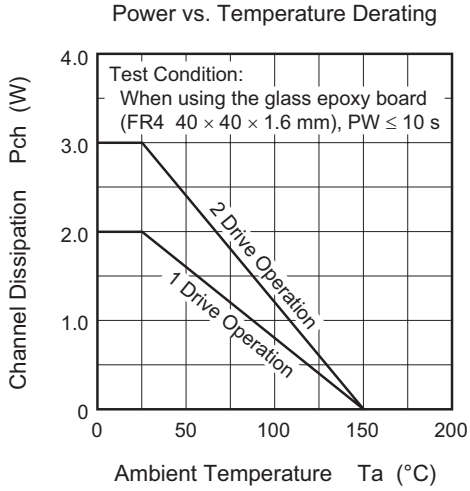
Electrical Characteristics

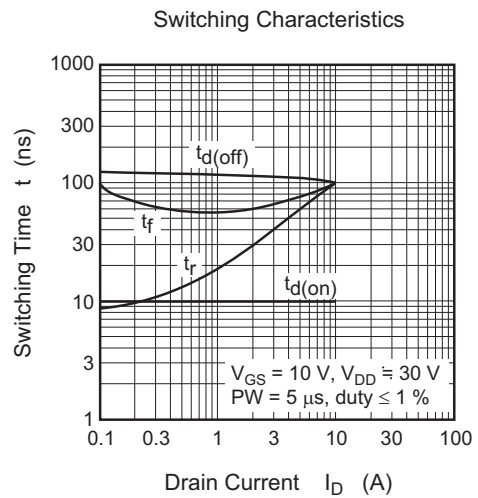
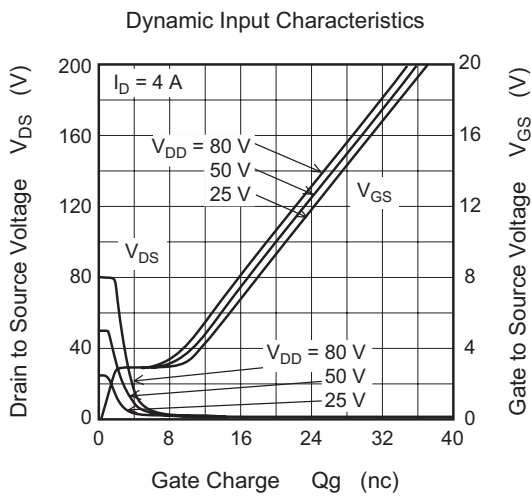
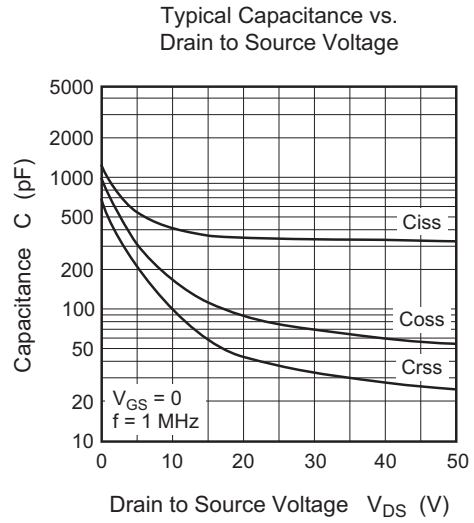
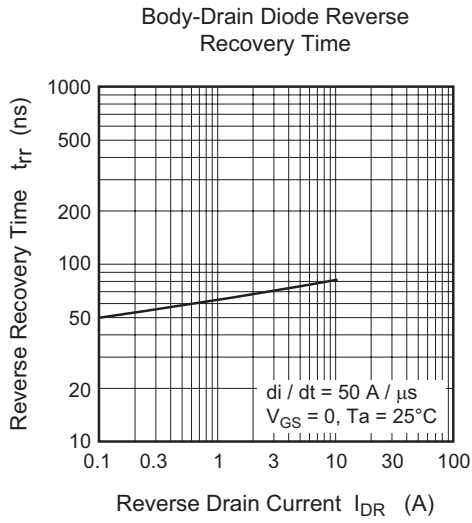
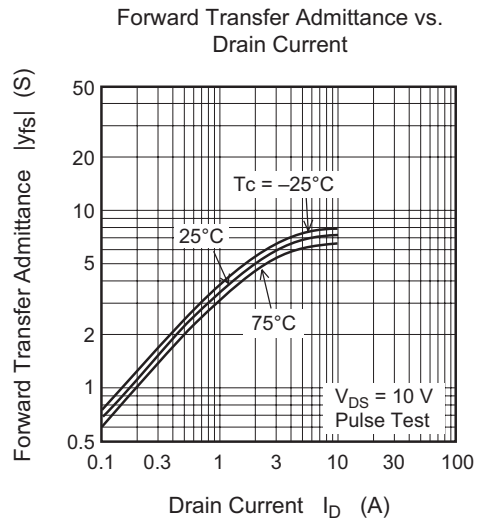
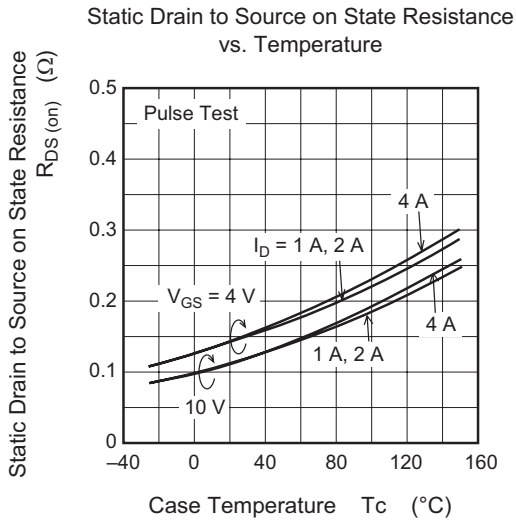
(Ta = 25°C)

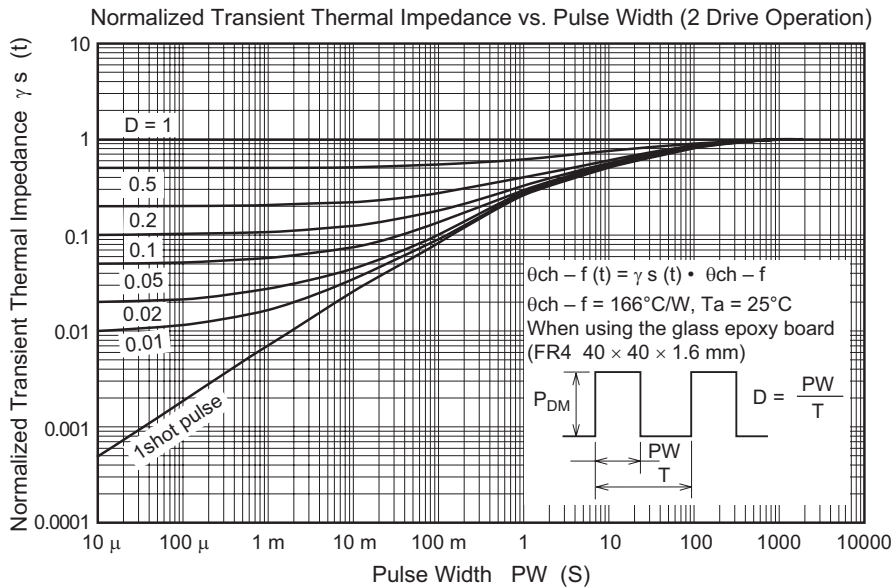
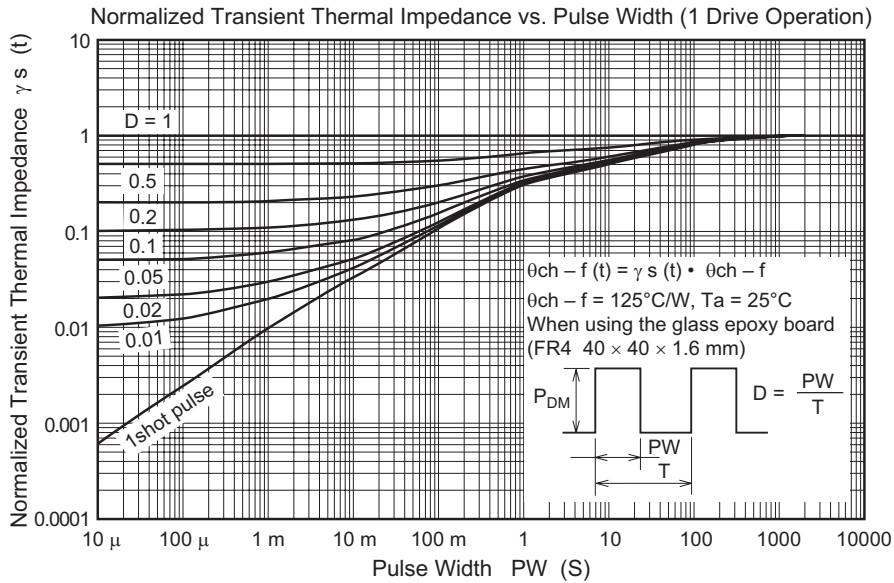
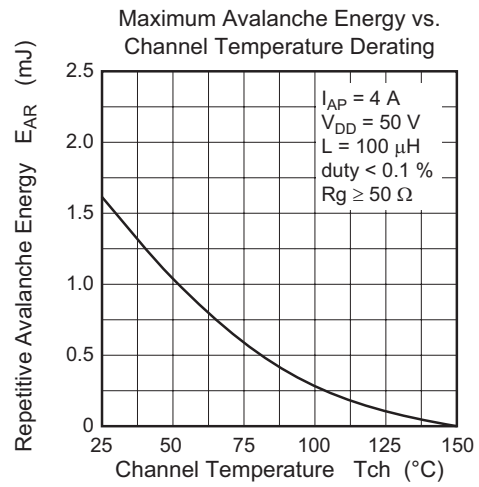
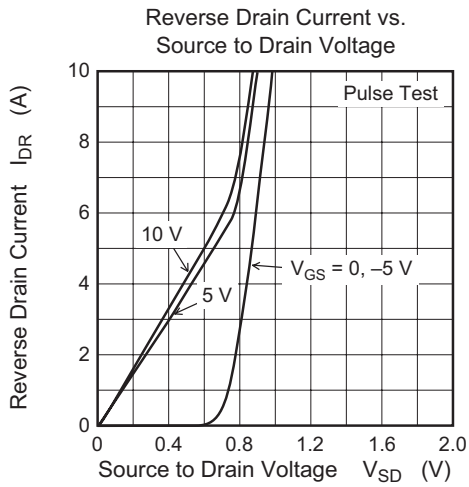
Item	Symbol	Min	Typ	Max	Unit	Test Conditions	
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10 mA$, $V_{GS} = 0$	
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$	
Zero gate voltage drain current	HAT2058R	I_{DSS}	—	—	1	μA	$V_{DS} = 100 V$, $V_{GS} = 0$
	HAT2058RJ	I_{DSS}	—	—	0.1	μA	
Zero gate voltage drain current	HAT2058R	I_{DSS}	—	—	—	μA	$V_{DS} = 80 V$, $V_{GS} = 0$ $T_a = 125^\circ C$
	HAT2058RJ	I_{DSS}	—	—	10	μA	
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 V$, $V_{DS} = 0$	
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 V$, $I_D = 1 mA$	
Forward transfer admittance	$ y_{fs} $	3	5	—	S	$I_D = 2 A$, $V_{DS} = 10 V$ ^{Note 5}	
Static drain to source on state resistance	$R_{DS(on)}$	—	120	145	m Ω	$I_D = 2 A$, $V_{GS} = 10 V$ ^{Note 5}	
	$R_{DS(on)}$	—	150	180	m Ω		$I_D = 2 A$, $V_{GS} = 4 V$ ^{Note 5}
Input capacitance	C_{iss}	—	420	—	pF	$V_{DS} = 10 V$, $V_{GS} = 0$ $f = 1 MHz$	
Output capacitance	C_{oss}	—	180	—	pF		
Reverse transfer capacitance	C_{rss}	—	100	—	pF		
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$V_{GS} = 10 V$, $I_D = 2 A$, $V_{DD} \cong 30 V$	
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	$I_F = 4 A$, $V_{GS} = 0$ ^{Note 5}	
Body-drain diode reverse recovery time	t_{rr}	—	75	—	ns	$I_F = 4 A$, $V_{GS} = 0$ $di_F/dt = 50 A/\mu s$	

Note: 5. Pulse test

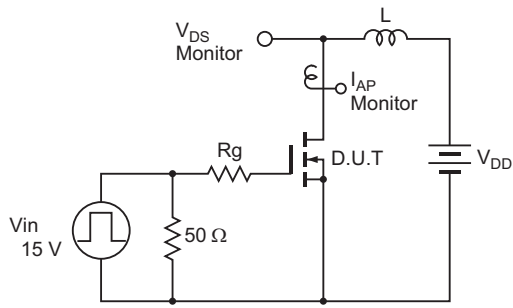
Main Characteristics





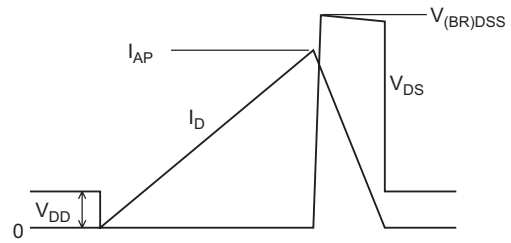


Avalanche Test Circuit

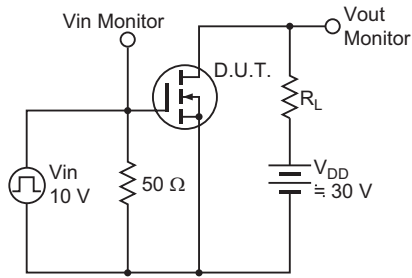


Avalanche Waveform

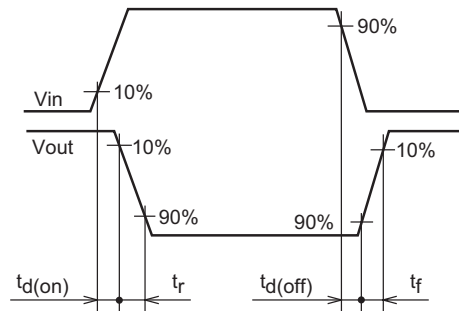
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



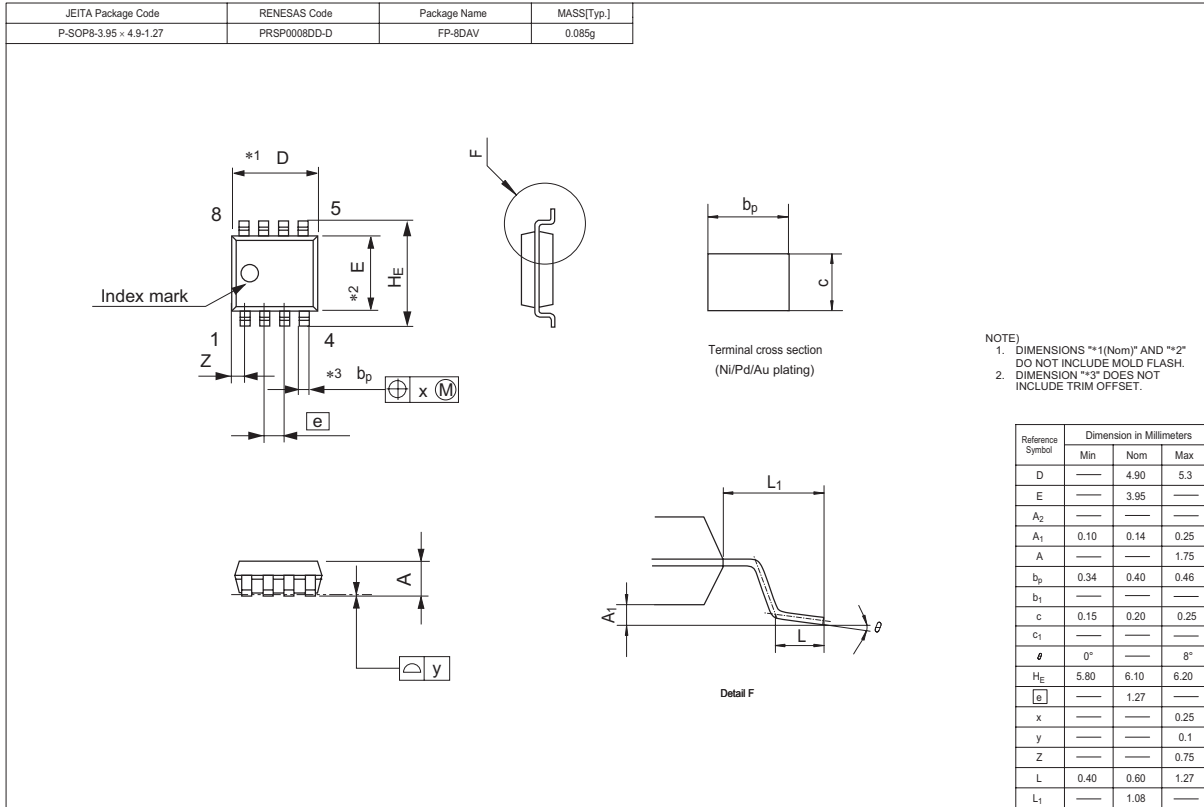
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

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

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