

HAT2028R, HAT2028RJ

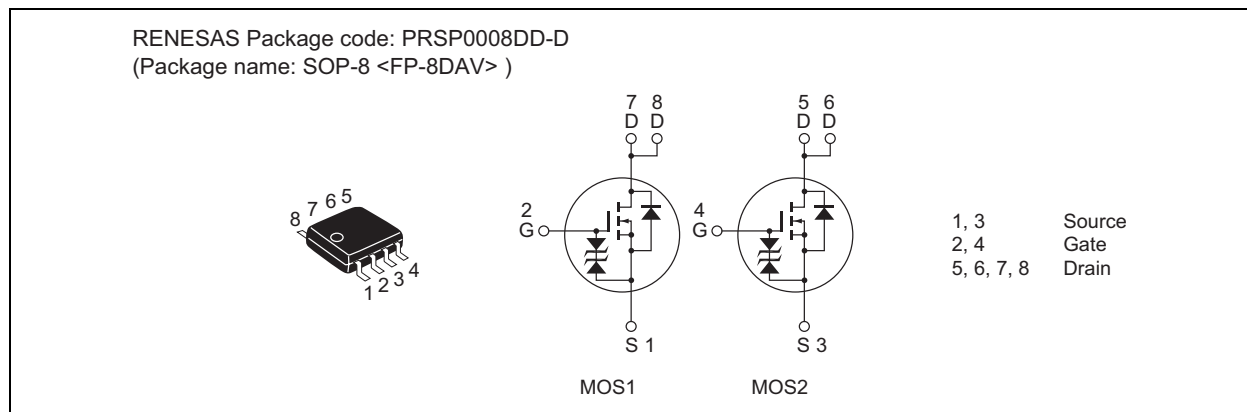
Silicon N Channel Power MOS FET
High Speed Power Switching

REJ03G1163-0500
(Previous: ADE-208-524C)
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



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	4	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	32	A
Body-drain diode reverse drain current	I_{DR}	4	A
Avalanche current	HAT2028R	—	—
	HAT2028RJ	4	A
Avalanche energy	HAT2028R	—	—
	HAT2028RJ	1.37	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 $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

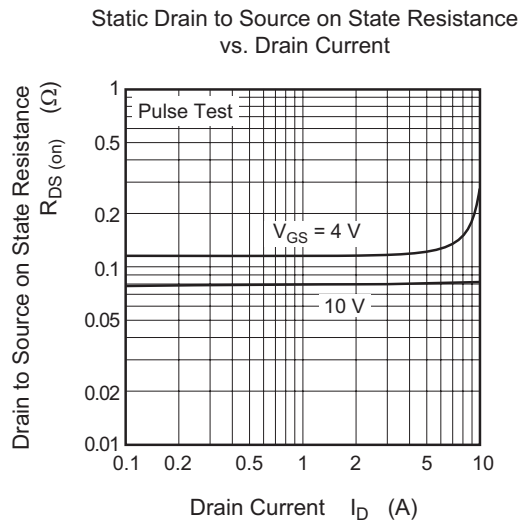
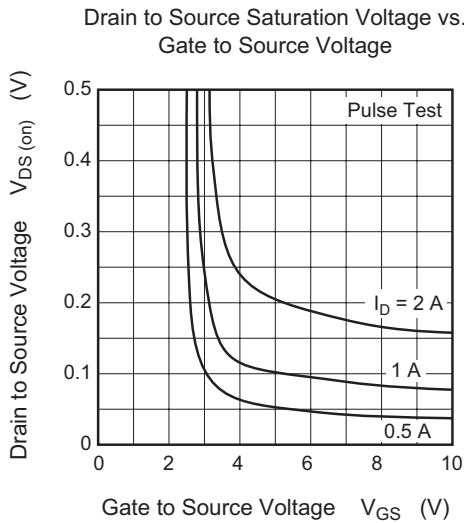
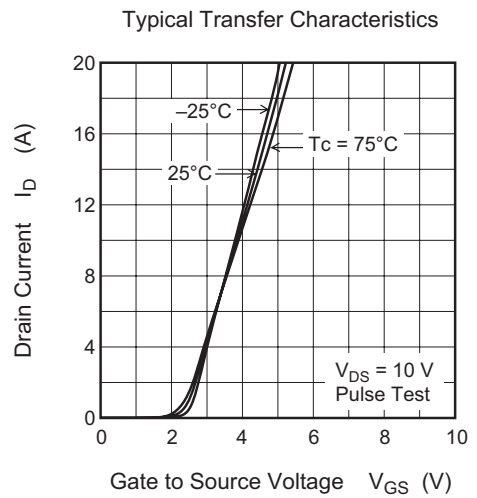
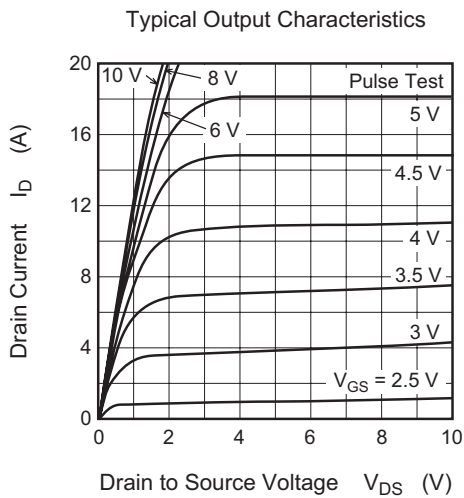
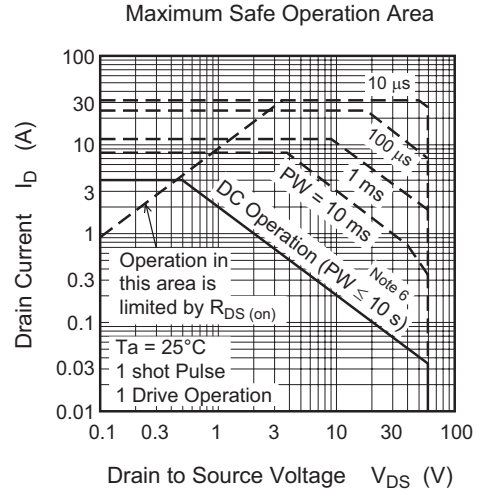
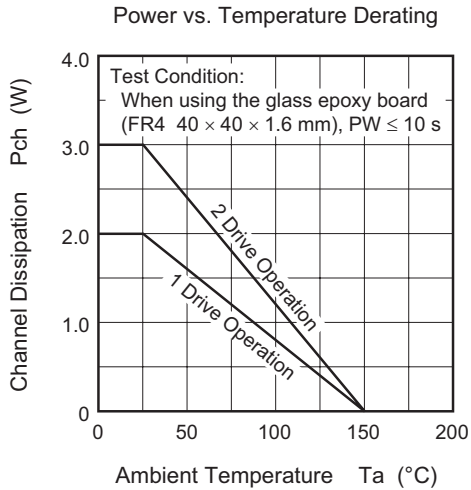
Electrical Characteristics

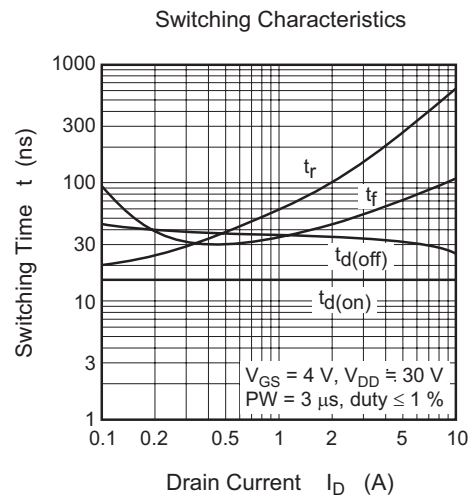
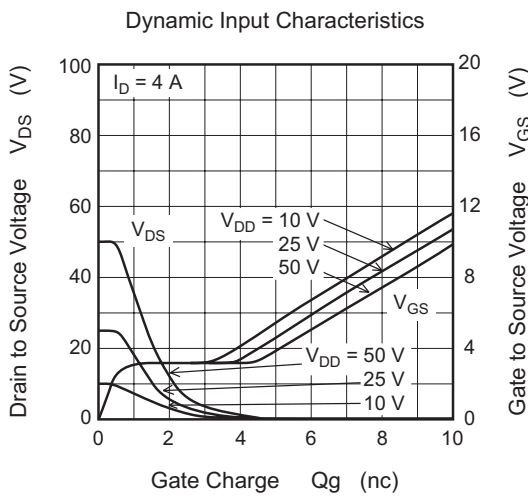
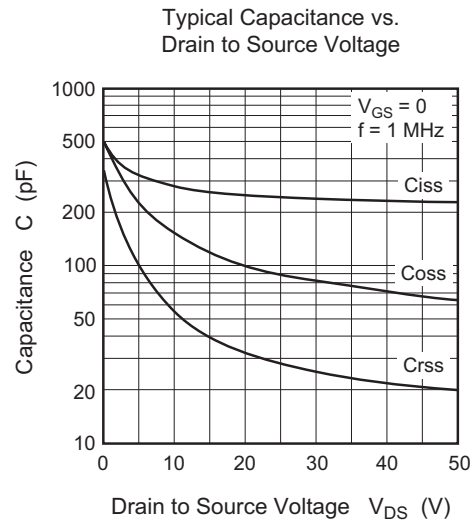
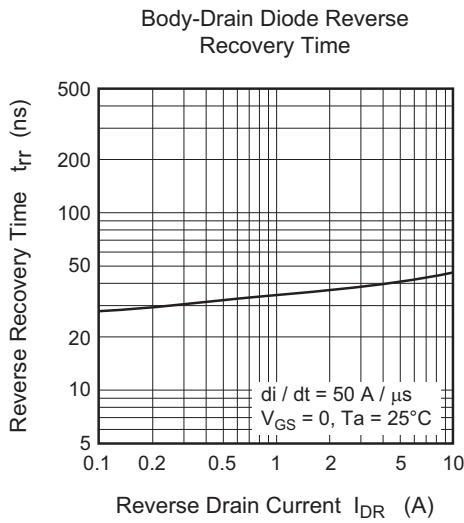
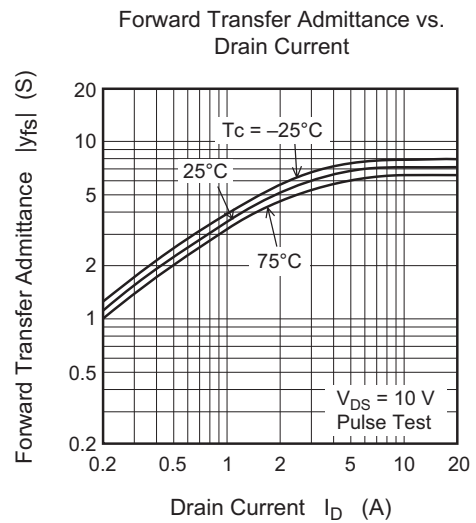
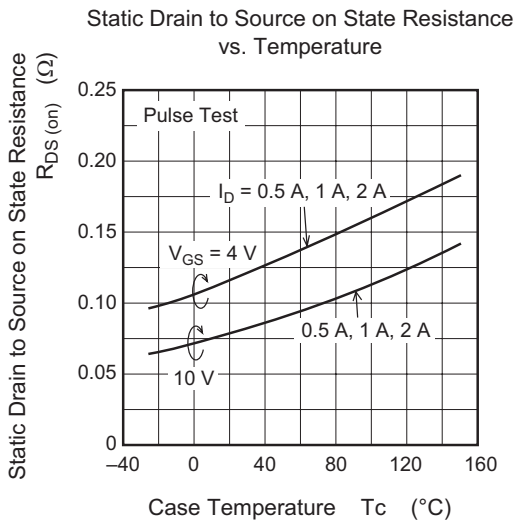
(Ta = 25°C)

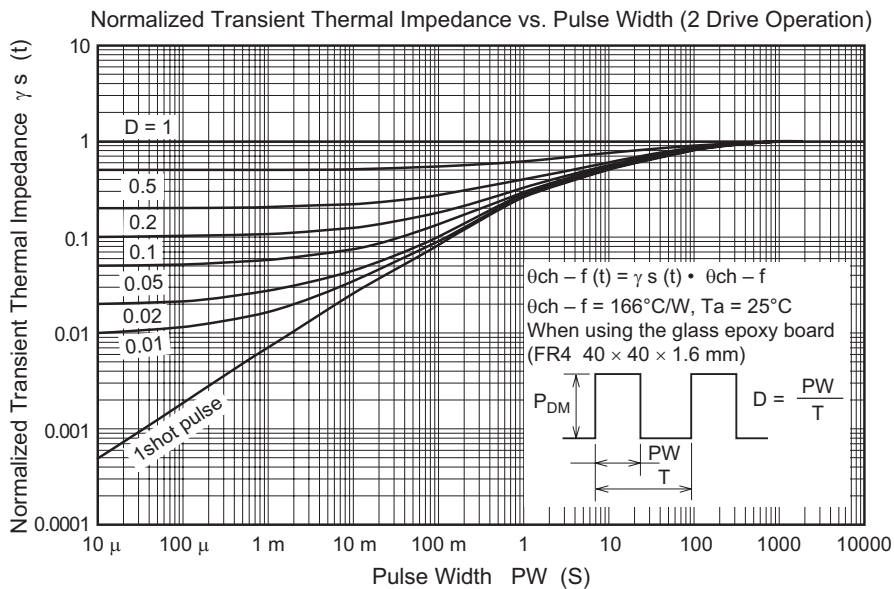
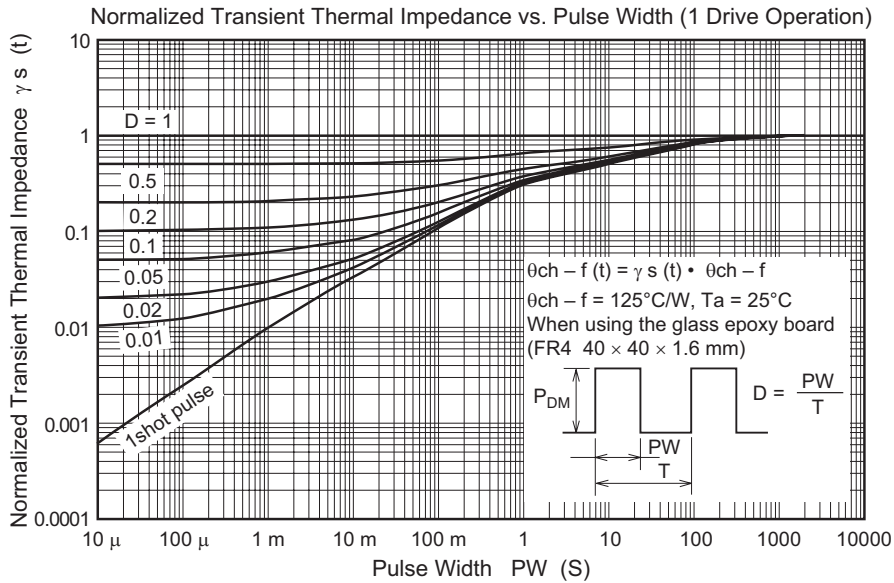
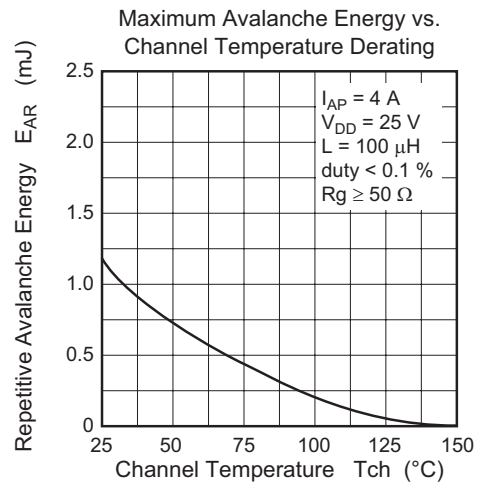
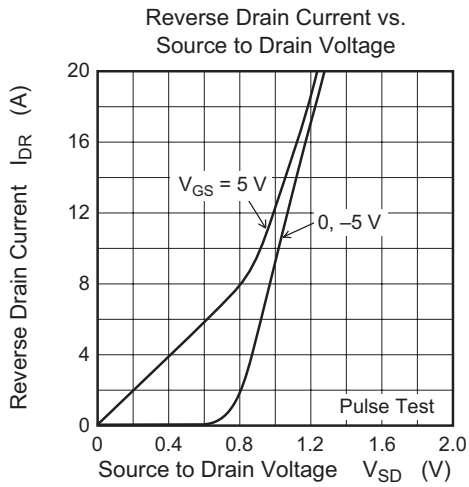
Item	Symbol	Min	Typ	Max	Unit	Test Conditions	
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10 mA$, $V_{GS} = 0$	
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$	
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 V$, $V_{DS} = 0$	
Zero gate voltage drain current	HAT2028R	I_{DSS}	—	—	1	μA	$V_{DS} = 60 V$, $V_{GS} = 0$
	HAT2028RJ	I_{DSS}	—	—	0.1	μA	
Zero gate voltage drain current	HAT2028R	I_{DSS}	—	—	—	μA	$V_{DS} = 48 V$, $V_{GS} = 0$ $T_a = 125^\circ C$
	HAT2028RJ	I_{DSS}	—	—	10	μA	
Gate to source cutoff voltage	$V_{GS(off)}$	1.3	—	2.3	V	$V_{DS} = 10 V$, $I_D = 1 mA$	
Static drain to source on state resistance	$R_{DS(on)}$	—	0.08	0.1	Ω	$I_D = 2 A$, $V_{GS} = 10 V$ ^{Note 5}	
	$R_{DS(on)}$	—	0.12	0.16	Ω	$I_D = 2 A$, $V_{GS} = 4 V$ ^{Note 5}	
Forward transfer admittance	$ y_{fs} $	3.3	5	—	S	$I_D = 2 A$, $V_{DS} = 10 V$ ^{Note 5}	
Input capacitance	C_{iss}	—	280	—	pF	$V_{DS} = 10 V$	
Output capacitance	C_{oss}	—	150	—	pF	$V_{GS} = 0$	
Reverse transfer capacitance	C_{rss}	—	55	—	pF	$f = 1 MHz$	
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{GS} = 4 V$, $I_D = 2 A$, $V_{DD} \cong 30 V$	
Rise time	t_r	—	100	—	ns		
Turn-off delay time	$t_{d(off)}$	—	35	—	ns		
Fall time	t_f	—	45	—	ns		
Body-drain diode forward voltage	V_{DF}	—	0.88	1.15	V	$I_F = 4 A$, $V_{GS} = 0$ ^{Note 5}	
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 4 A$, $V_{GS} = 0$ $di_F/dt = 50 A/\mu s$	

Note: 5. Pulse test

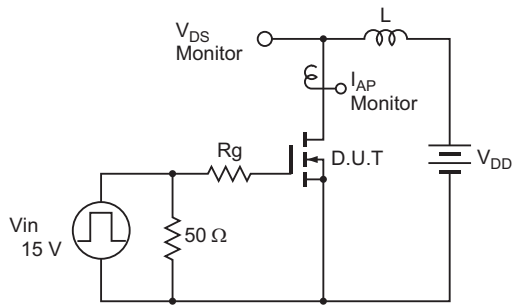
Main Characteristics





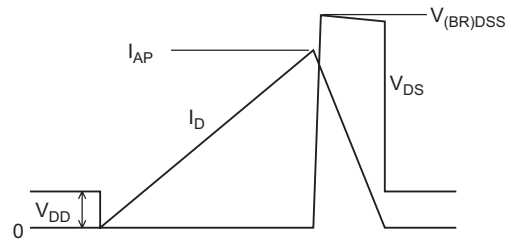


Avalanche Test Circuit

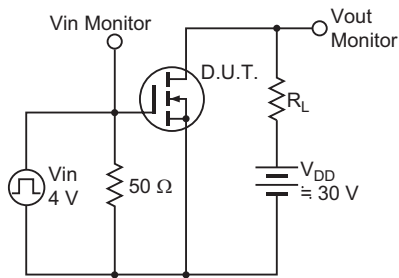


Avalanche Waveform

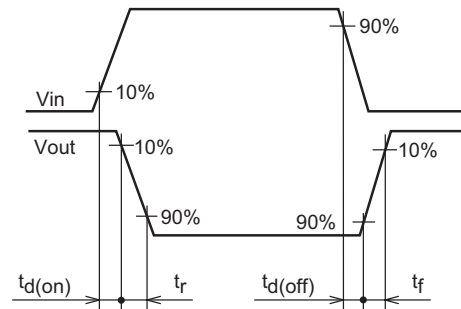
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



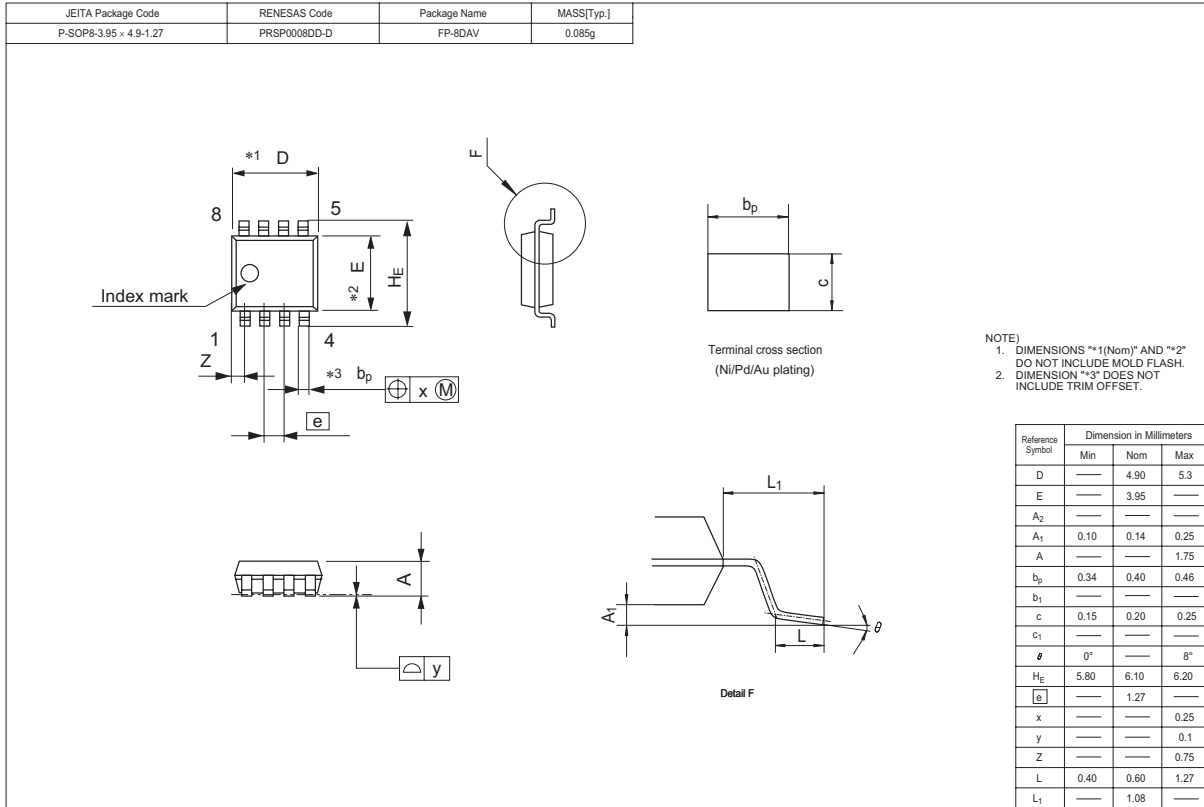
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2028R-EL-E	2500 pcs	Taping
HAT2028RJ-EL-E	2500 pcs	Taping

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