

HAT2058R

Silicon N Channel Power MOS FET High Speed Power Switching

REJ03G1174-0300

Rev.3.00

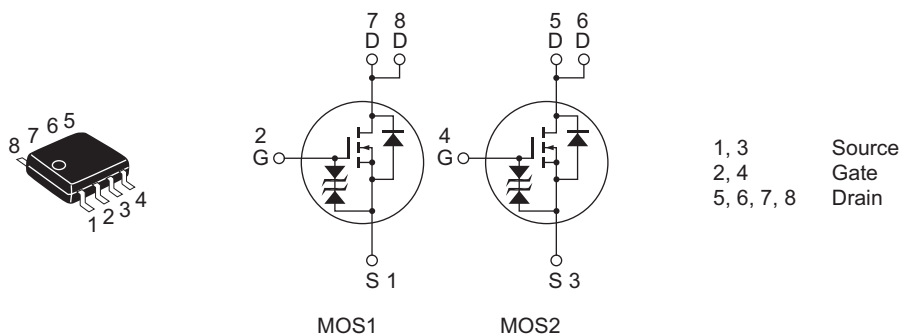
Aug 25, 2009

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 ^{Note 2}	4	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	32	A
Body-drain diode reverse drain current	I_{DR}	4	A
Avalanche current	I_{AP} ^{Note 4}	—	A
Avalanche energy	E_{AR} ^{Note 4}	—	mJ
Channel dissipation	P_{ch} ^{Note 2}	2	W
	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

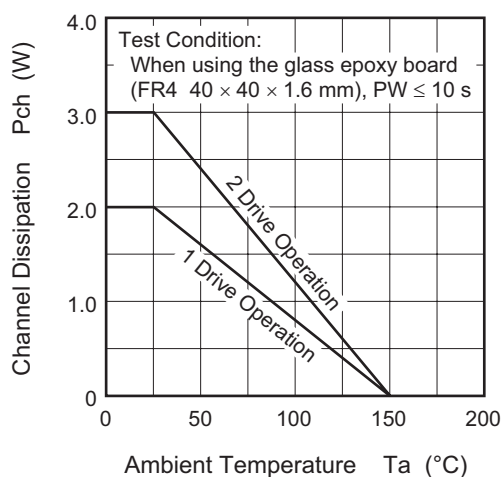
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	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	I_{DSS}	—	—	1	μA	$V_{DS} = 100\text{ V}$, $V_{GS} = 0$
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	$I_F = 4\text{ A}$, $V_{GS} = 0$ $di_F/dt = 50\text{ A}/\mu\text{s}$

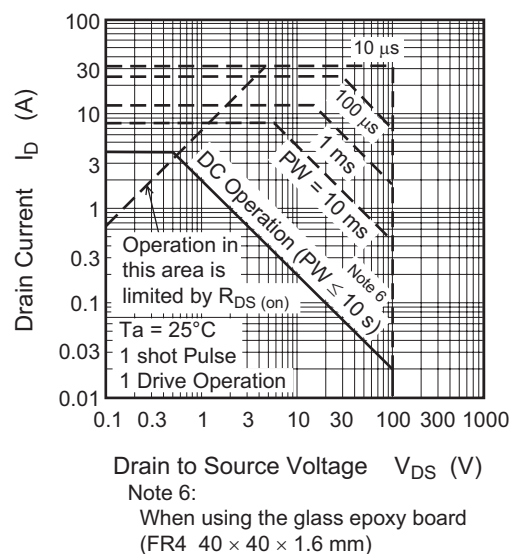
Note: 5. Pulse test

Main Characteristics

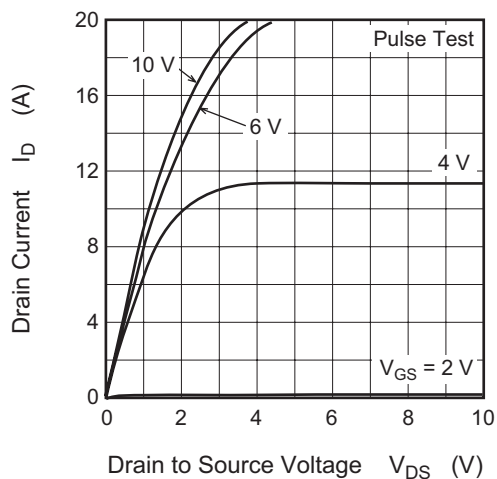
Power vs. Temperature Derating



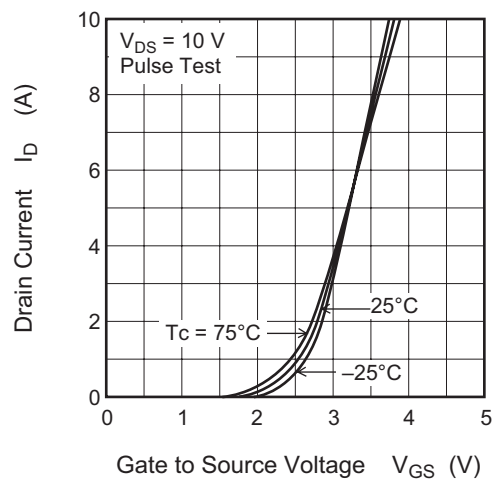
Maximum Safe Operation Area



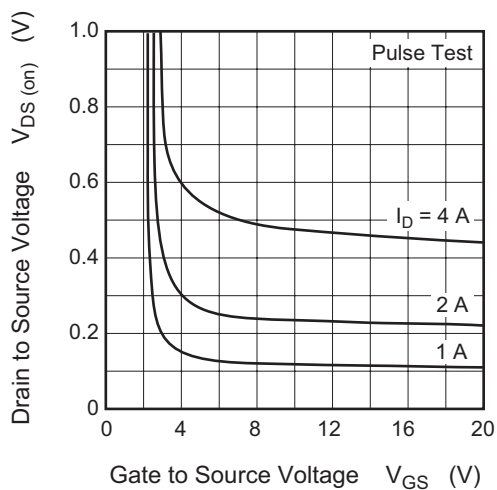
Typical Output Characteristics



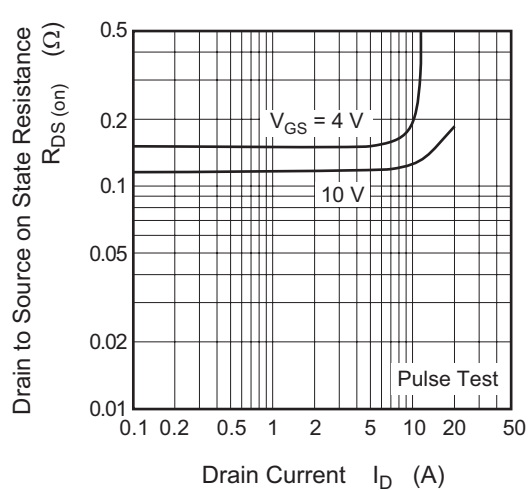
Typical Transfer Characteristics



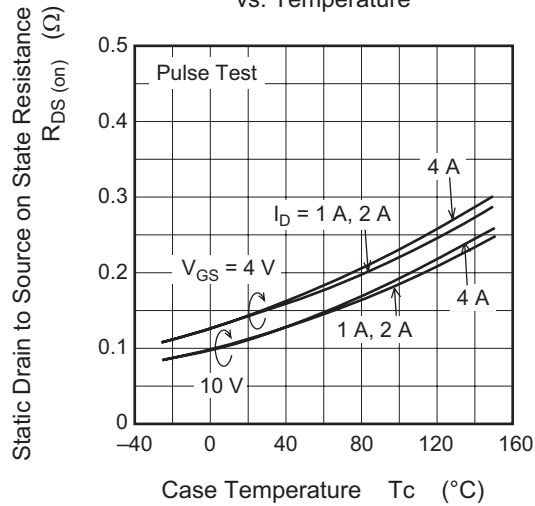
Drain to Source Saturation Voltage vs. Gate to Source Voltage



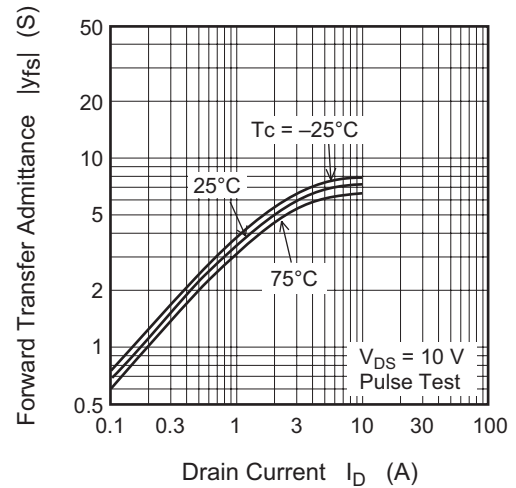
Static Drain to Source on State Resistance vs. Drain Current



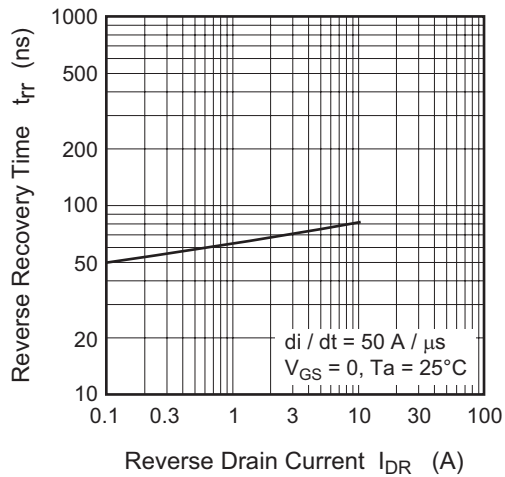
Static Drain to Source on State Resistance vs. Temperature



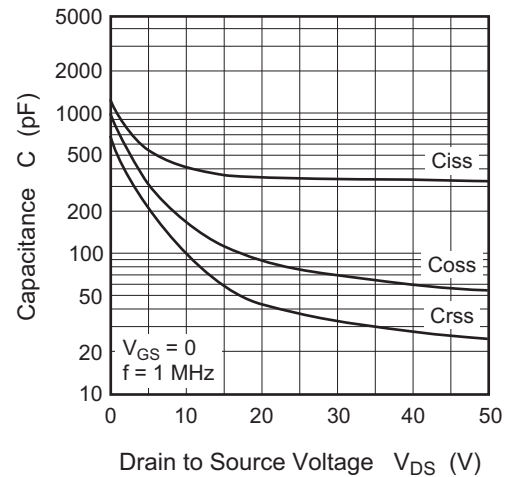
Forward Transfer Admittance vs. Drain Current



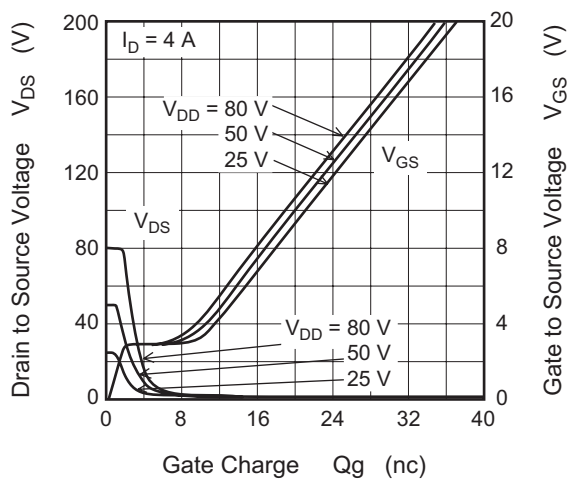
Body-Drain Diode Reverse Recovery Time



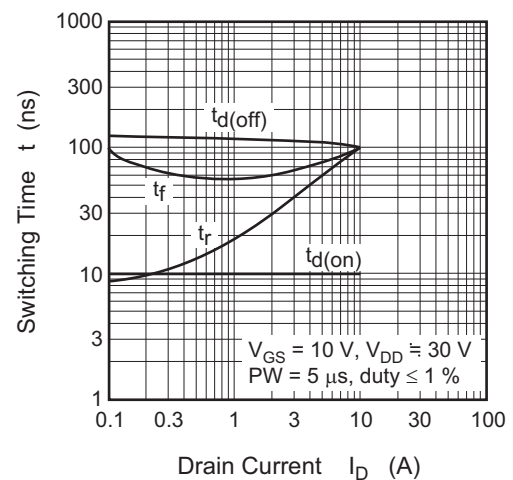
Typical Capacitance vs. Drain to Source Voltage

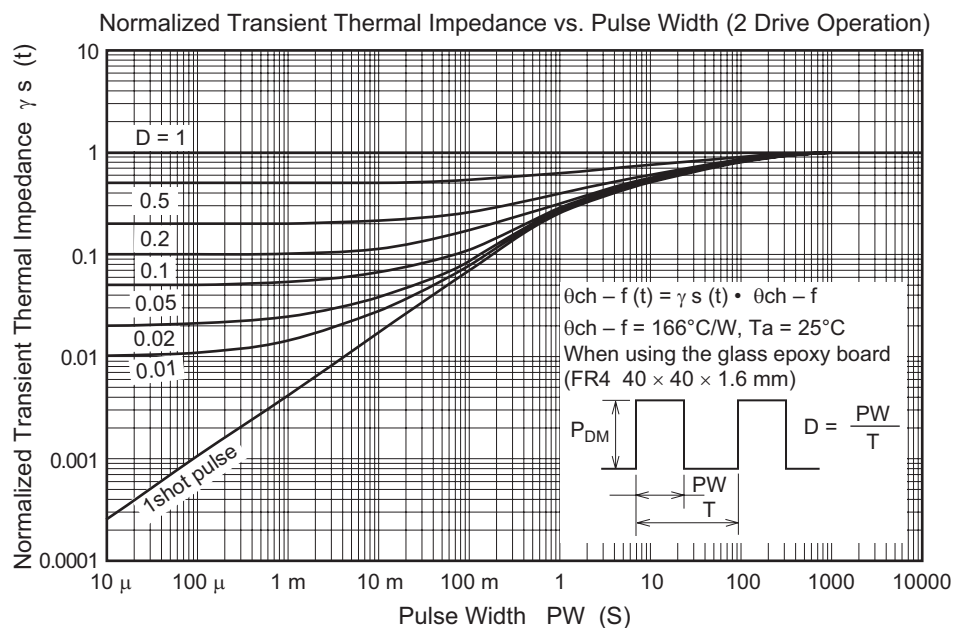
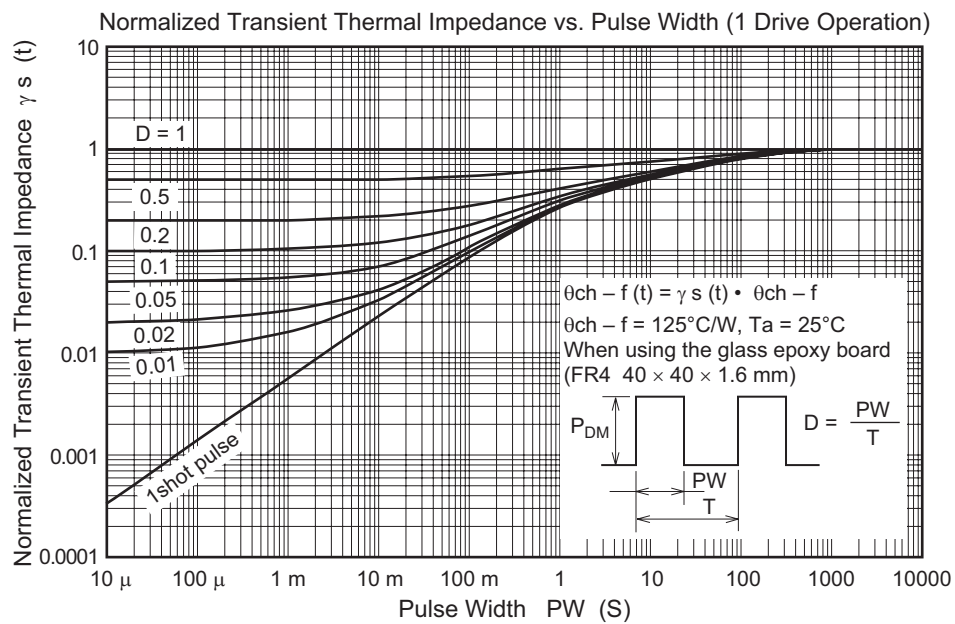
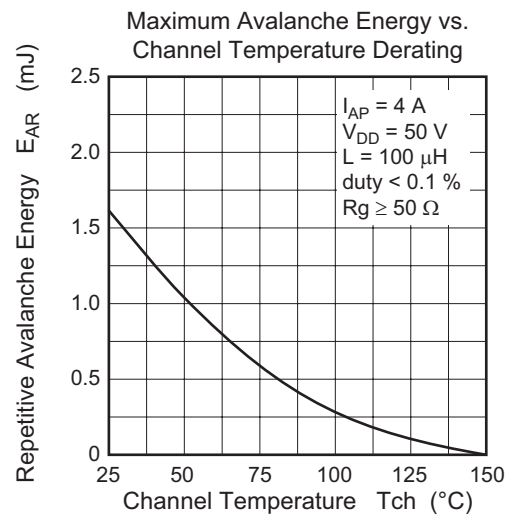
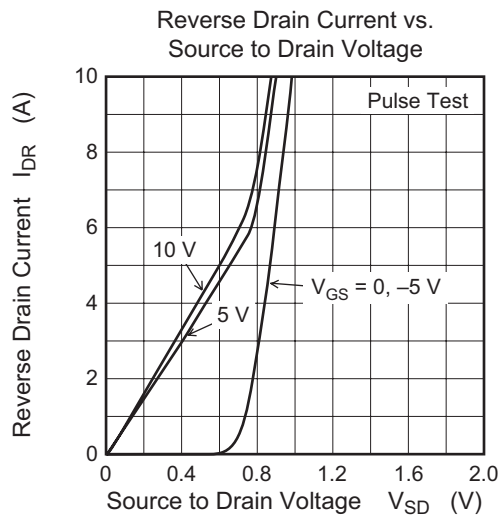


Dynamic Input Characteristics

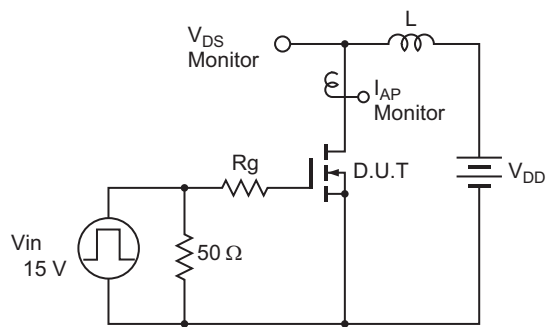


Switching Characteristics



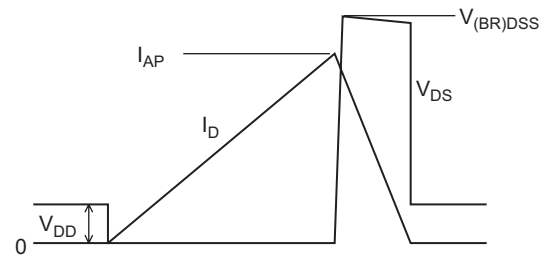


Avalanche Test Circuit

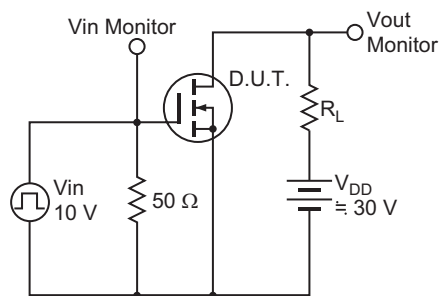


Avalanche Waveform

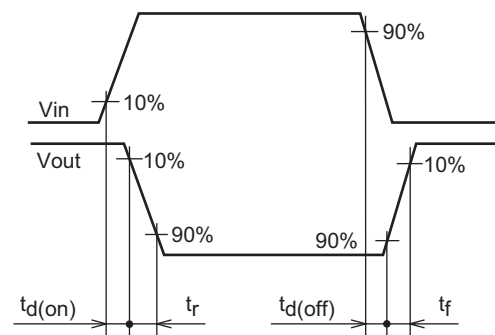
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



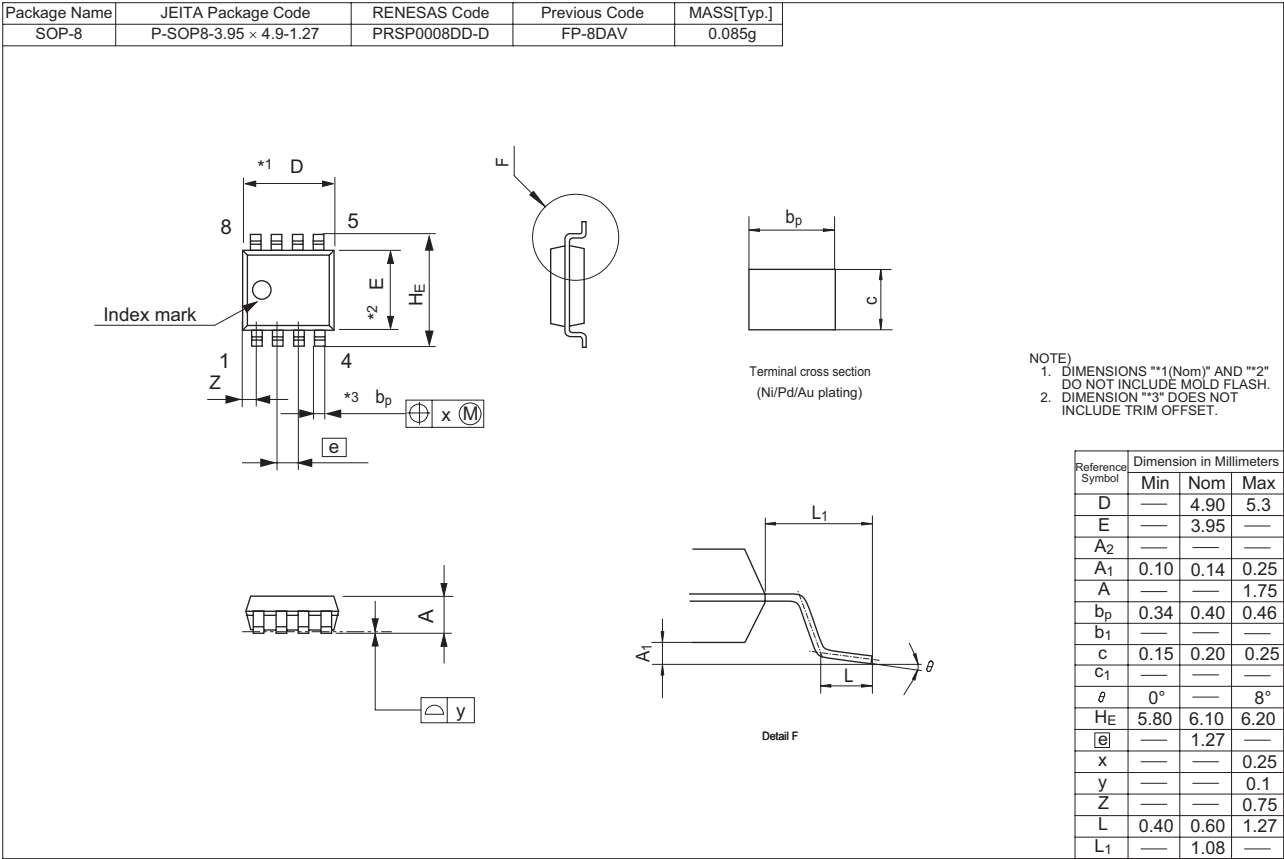
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

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

Notes:

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