

HAT2033R, HAT2033RJ

Silicon N Channel Power MOS FET
High Speed Power Switching

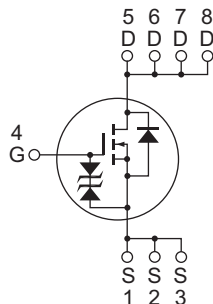
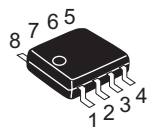
REJ03G1165-0400
(Previous: ADE-208-664B)
Rev.4.00
Sep 07, 2005

Features

- For Automotive Application (at Type Code "J")
- Low on-resistance
- Capable of 4 V gate drive
- High density mounting

Outline

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



1, 2, 3 Source
4 Gate
5, 6, 7, 8 Drain

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	7	A
Drain peak current	I _{D (pulse)} ^{Note 1}	56	A
Body-drain diode reverse drain current	I _{DR}	7	A
Avalanche current	HAT2033R	I _{AP} ^{Note 4}	—
	HAT2033RJ		7
Avalanche energy	HAT2033R	E _{AR} ^{Note 4}	—
	HAT2033RJ		4.2
Channel dissipation	P _{ch} ^{Note 2}	2.5	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

- Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
 2. When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), PW ≤ 10 s
 3. Value at T_{ch} = 25°C, R_g ≥ 50 Ω

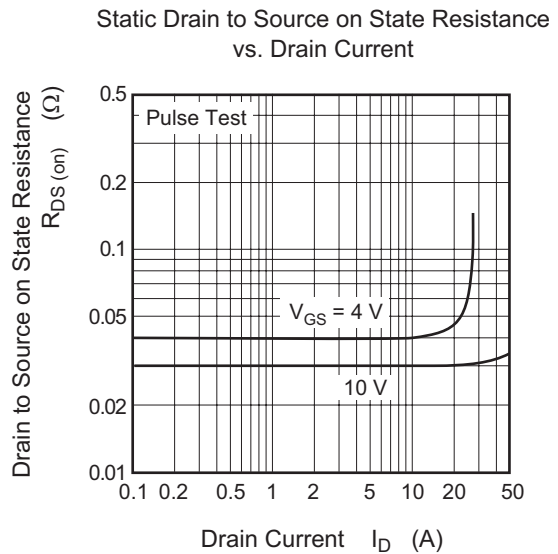
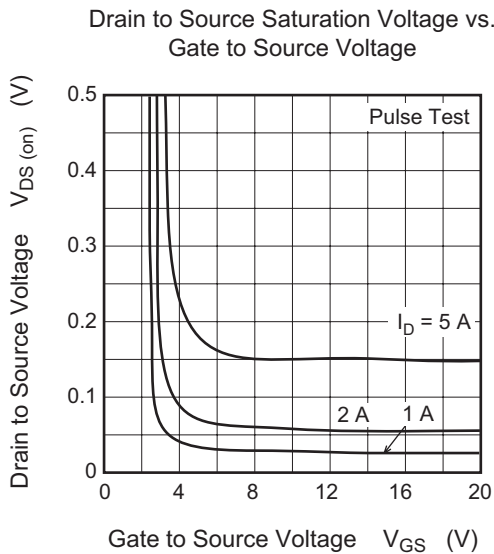
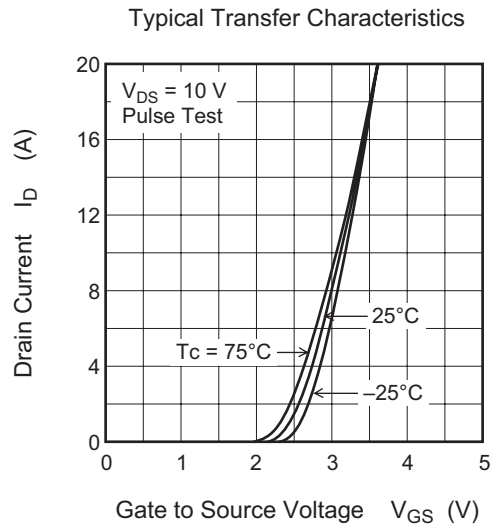
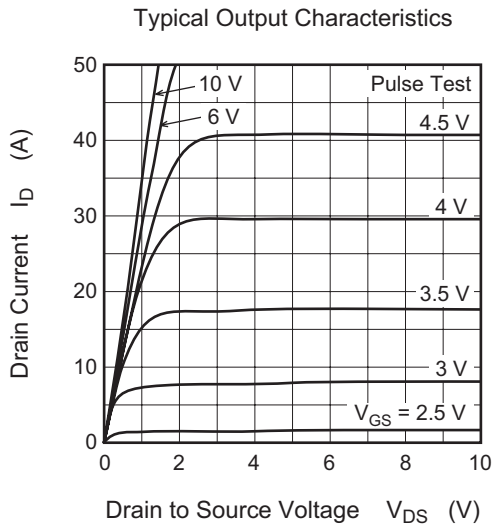
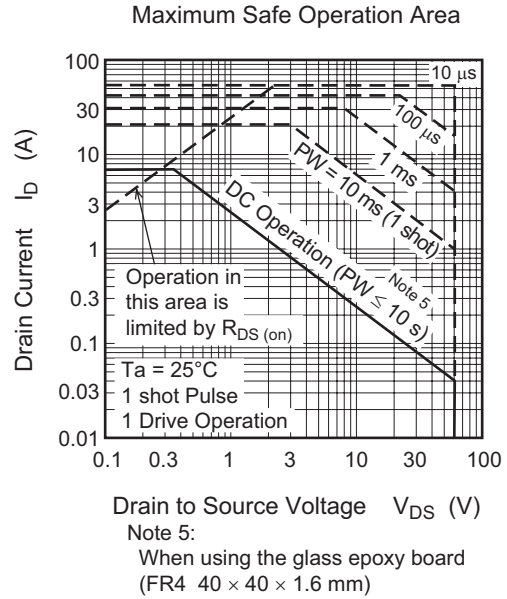
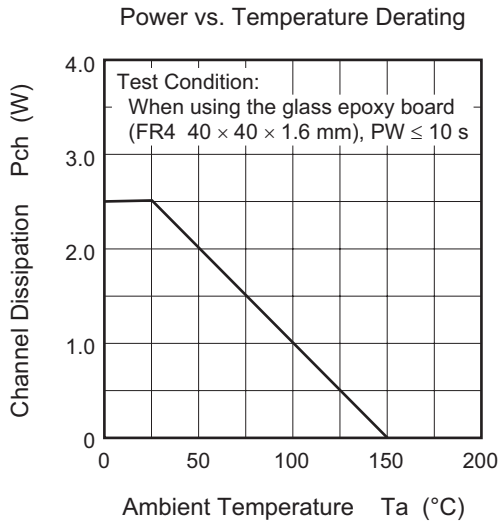
Electrical Characteristics

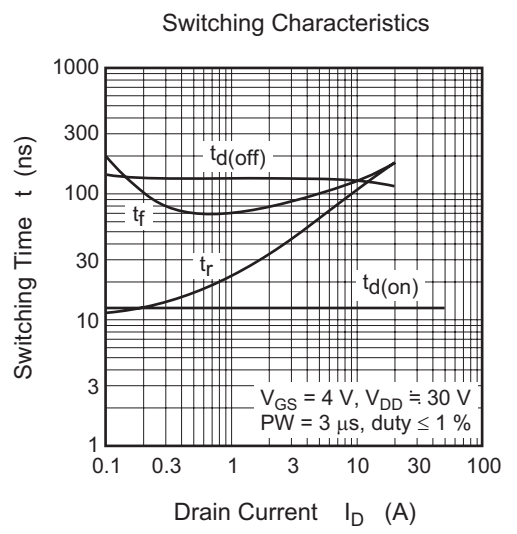
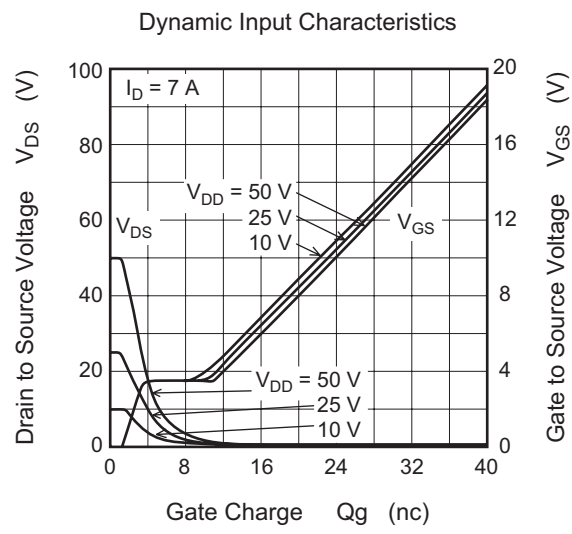
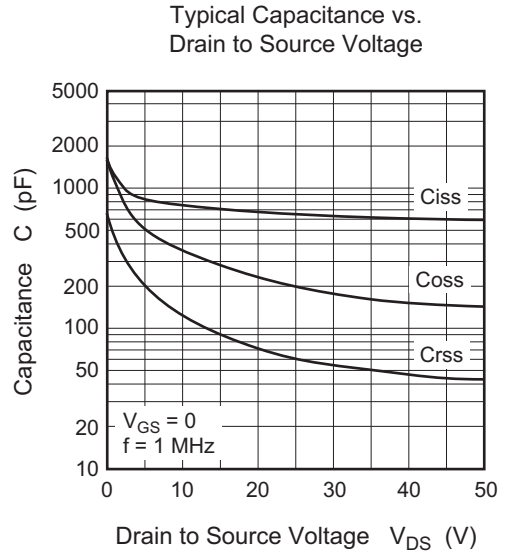
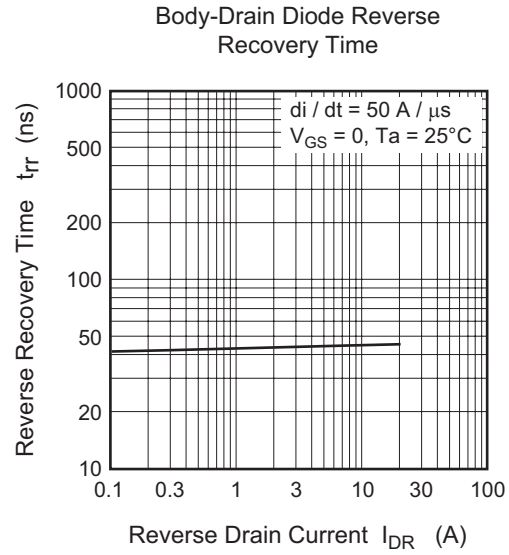
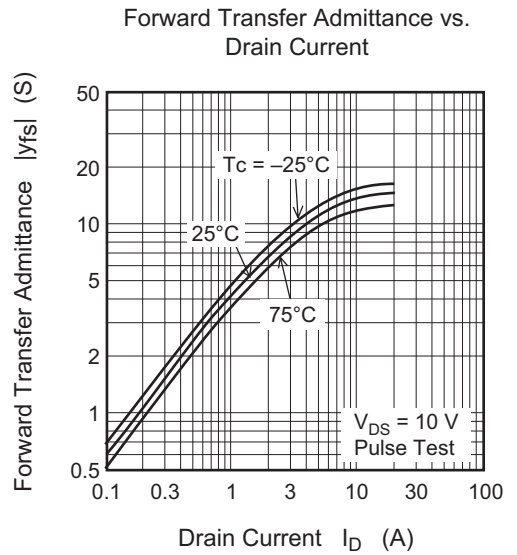
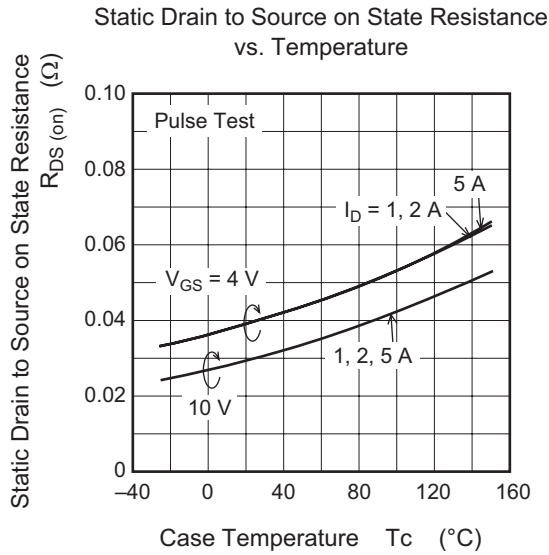
(Ta = 25°C)

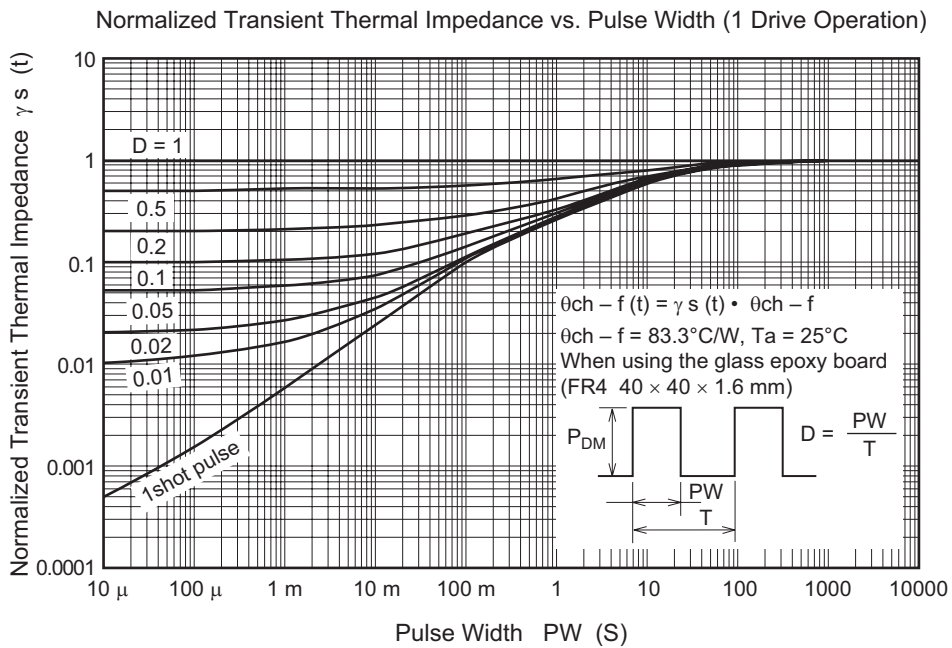
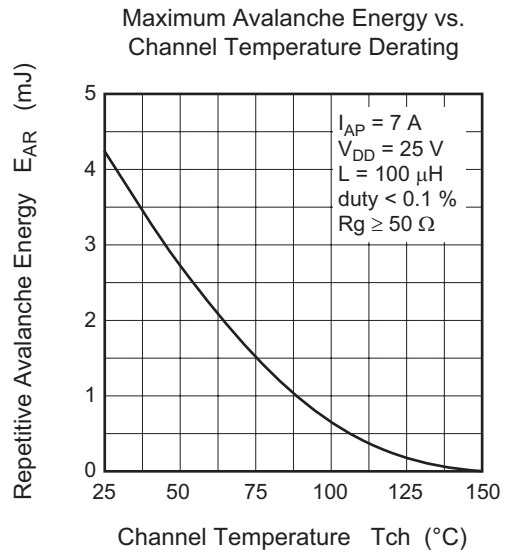
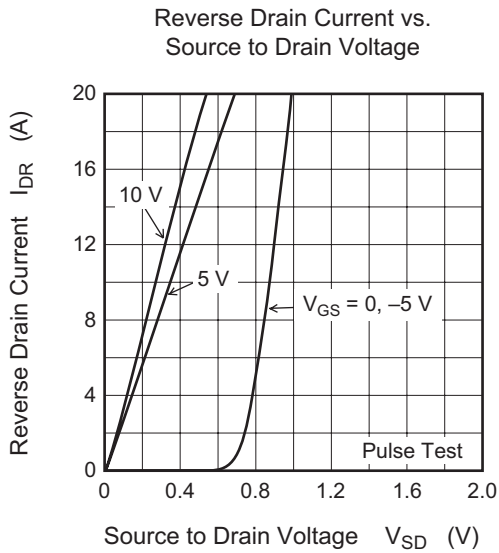
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V _{(BR) DSS}	60	—	—	V	I _D = 10 mA, V _{GS} = 0
Gate to source breakdown voltage	V _{(BR) GSS}	±20	—	—	V	I _G = ±100 μA, V _{DS} = 0
Gate to source leak current	I _{GSS}	—	—	±10	μA	V _{GS} = ±16 V, V _{DS} = 0
Zero gate voltage drain current	HAT2033R	I _{DSS}	—	1	μA	V _{DS} = 60 V, V _{GS} = 0
	HAT2033RJ	I _{DSS}	—	0.1	μA	
Zero gate voltage drain current	HAT2033R	I _{DSS}	—	—	μA	V _{DS} = 48 V, V _{GS} = 0 Ta = 125°C
	HAT2033RJ	I _{DSS}	—	10	μA	
Gate to source cutoff voltage	V _{GS (off)}	1.2	—	2.2	V	V _{DS} = 10 V, I _D = 1 mA
Static drain to source on state resistance	R _{DS (on)}	—	0.03	0.038	Ω	I _D = 4 A, V _{GS} = 10 V ^{Note 4}
	R _{DS (on)}	—	0.04	0.053	Ω	I _D = 4 A, V _{GS} = 4 V ^{Note 4}
Forward transfer admittance	y _{fs}	6.5	10	—	S	I _D = 4 A, V _{DS} = 10 V ^{Note 4}
Input capacitance	C _{iss}	—	740	—	pF	V _{DS} = 10 V V _{GS} = 0 f = 1 MHz
Output capacitance	C _{oss}	—	370	—	pF	
Reverse transfer capacitance	C _{rss}	—	130	—	pF	
Turn-on delay time	t _{d (on)}	—	13	—	ns	V _{GS} = 10 V, I _D = 4 A, V _{DD} ≅ 30 V
Rise time	t _r	—	55	—	ns	
Turn-off delay time	t _{d (off)}	—	140	—	ns	
Fall time	t _f	—	95	—	ns	
Body-drain diode forward voltage	V _{DF}	—	0.82	1.07	V	I _F = 7 A, V _{GS} = 0 ^{Note 4}
Body-drain diode reverse recovery time	t _{rr}	—	45	—	ns	I _F = 7 A, V _{GS} = 0 di _F /dt = 50 A/μs

- Note: 4. Pulse test

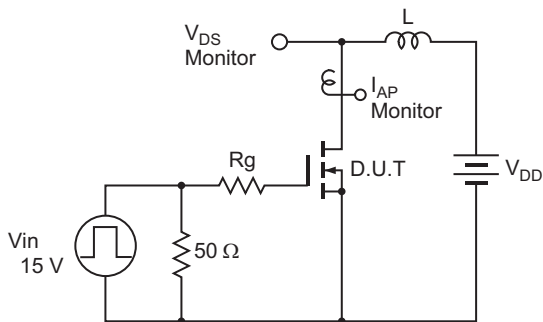
Main Characteristics



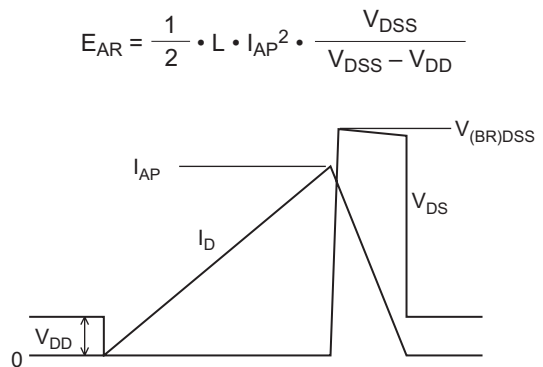




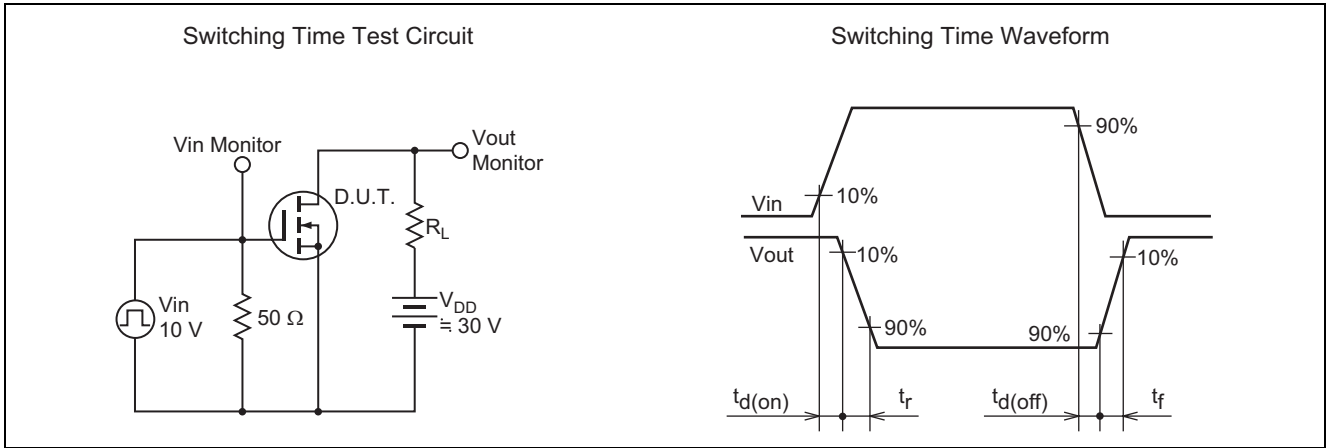
Avalanche Test Circuit



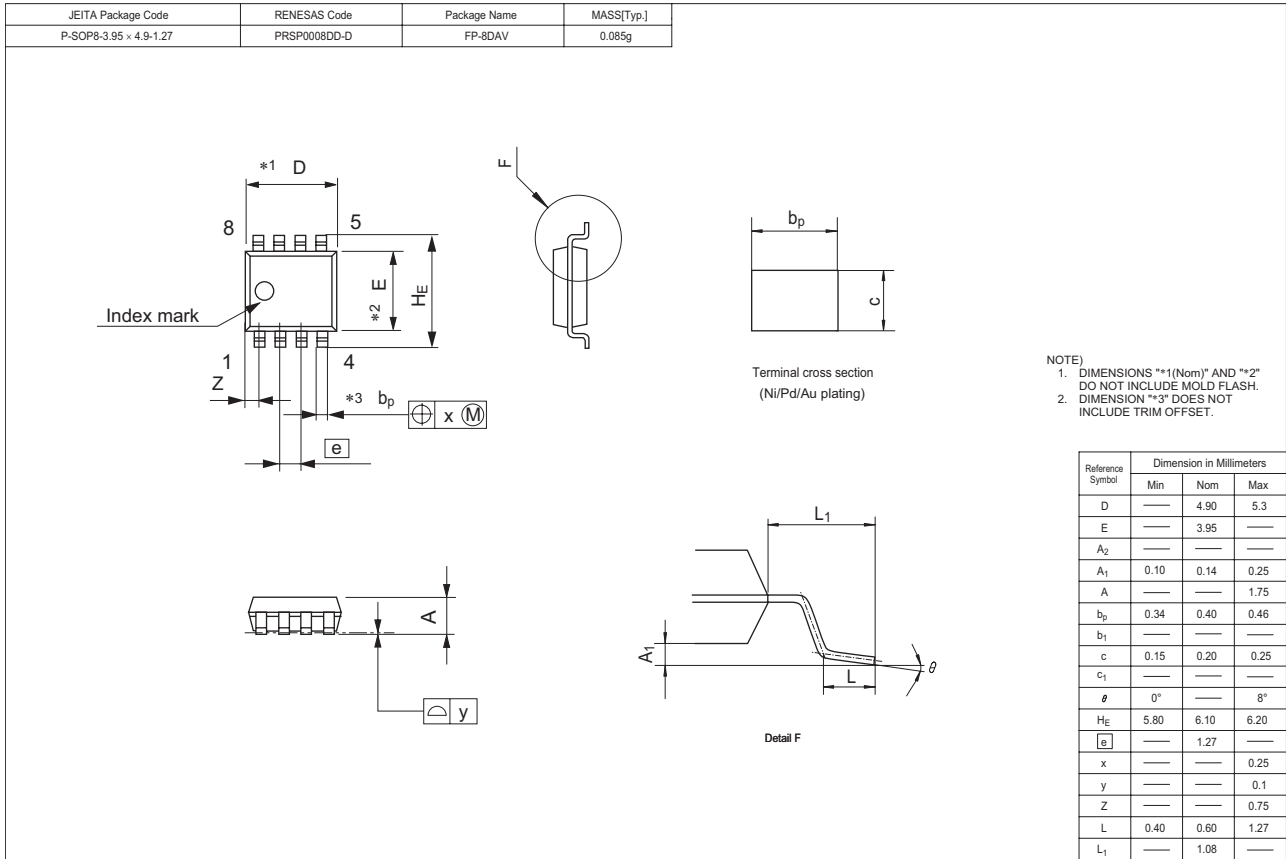
Avalanche Waveform



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



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2033R-EL-E	2500 pcs	Taping
HAT2033RJ-EL-E	2500 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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