

# HAT2099H

## Silicon N Channel Power MOS FET Power Switching

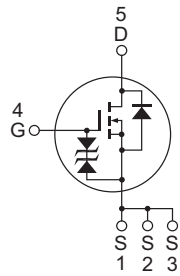
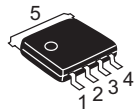
REJ03G1187-0500  
(Previous: ADE-208-1432C)  
Rev.5.00  
Sep 07, 2005

### Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)} = 2.9 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )

### Outline

RENESAS Package code: PTZZ0005DA-A  
(Package name: LFPAK)



1, 2, 3 Source  
4 Gate  
5 Drain

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V <sub>DSS</sub>	30	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	50	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	200	A
Body-drain diode reverse drain current	I <sub>DR</sub>	50	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	5	A
Avalanche energy	E <sub>AR</sub> <sup>Note 3</sup>	2.5	mJ
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	30	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

- Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%  
 2. Tc = 25 °C  
 3. Value at T<sub>ch</sub> = 25°C, R<sub>g</sub> ≥ 50 Ω

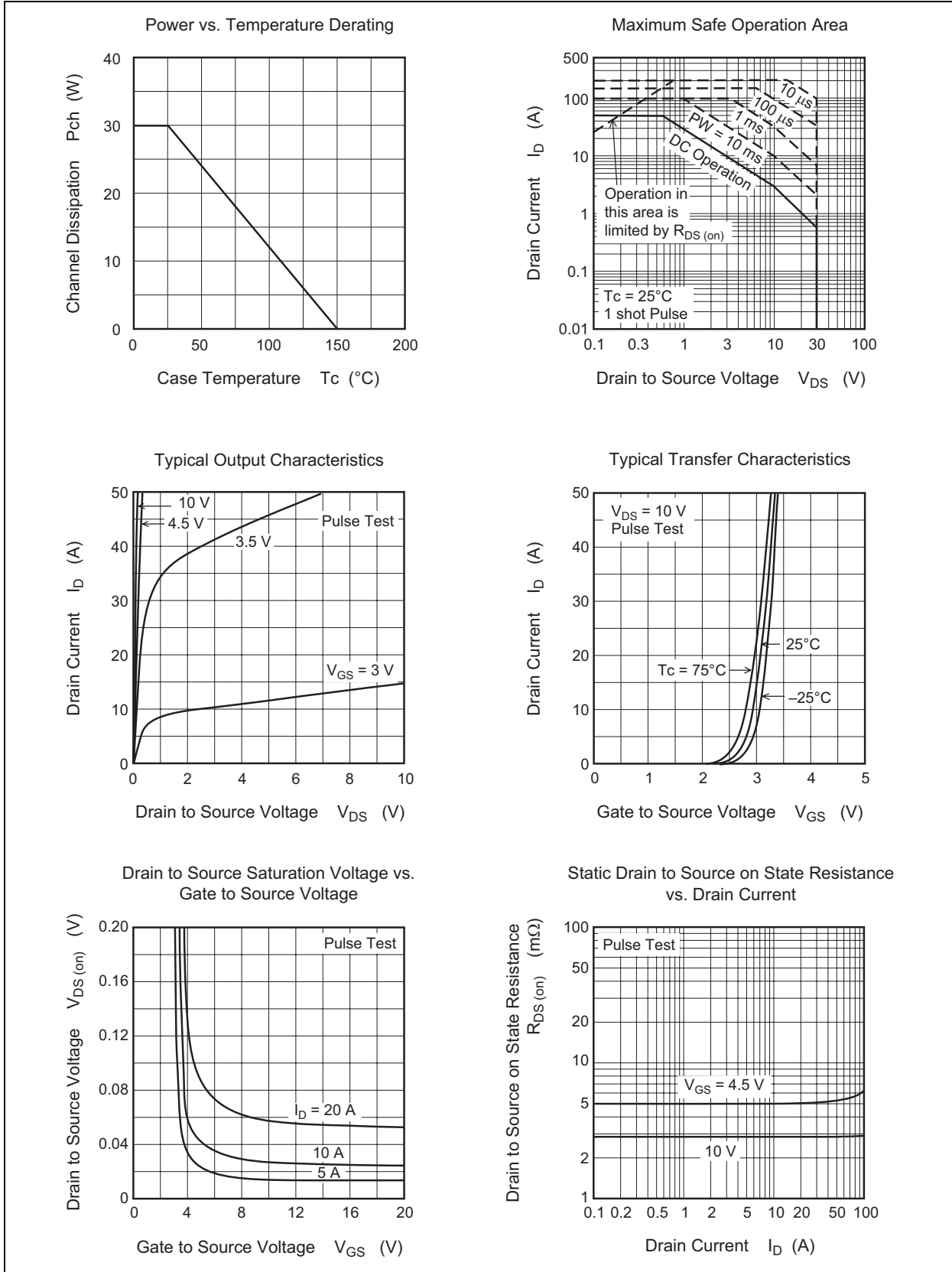
## Electrical Characteristics

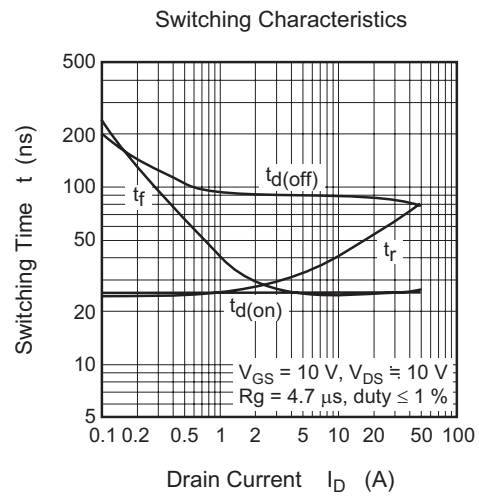
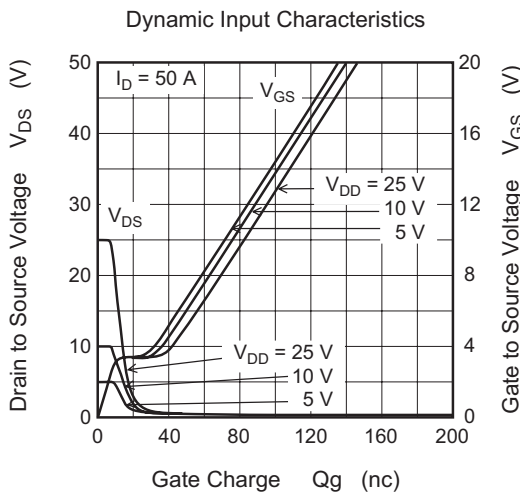
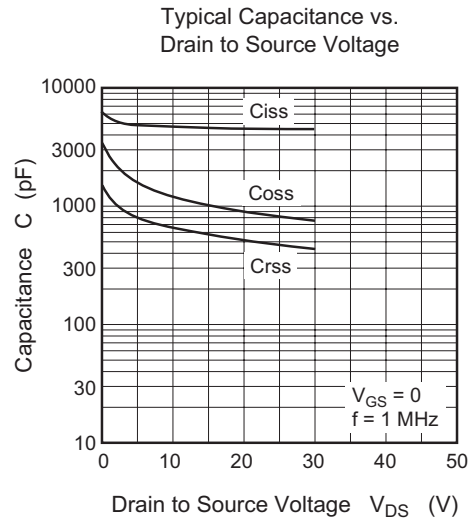
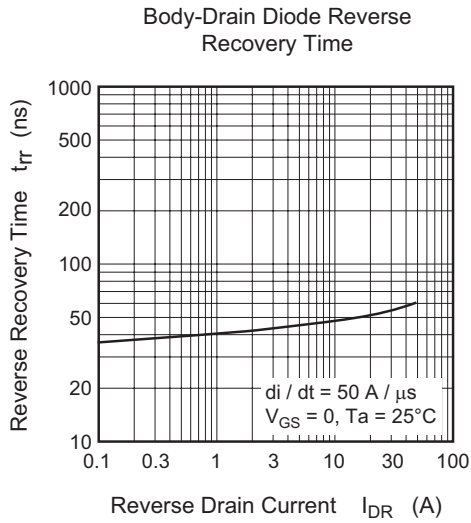
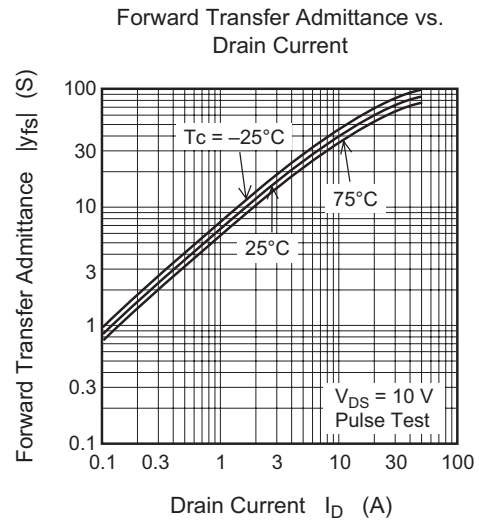
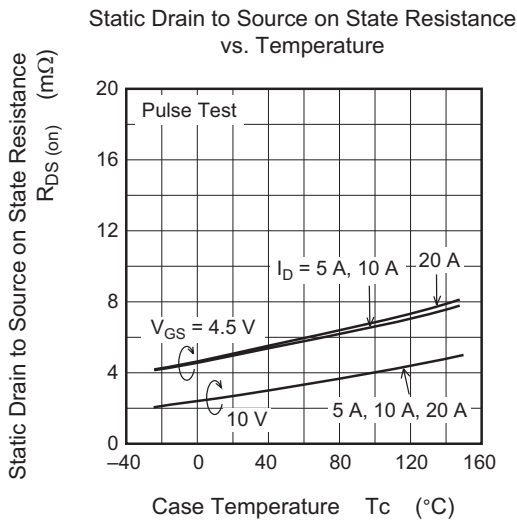
(Ta = 25°C)

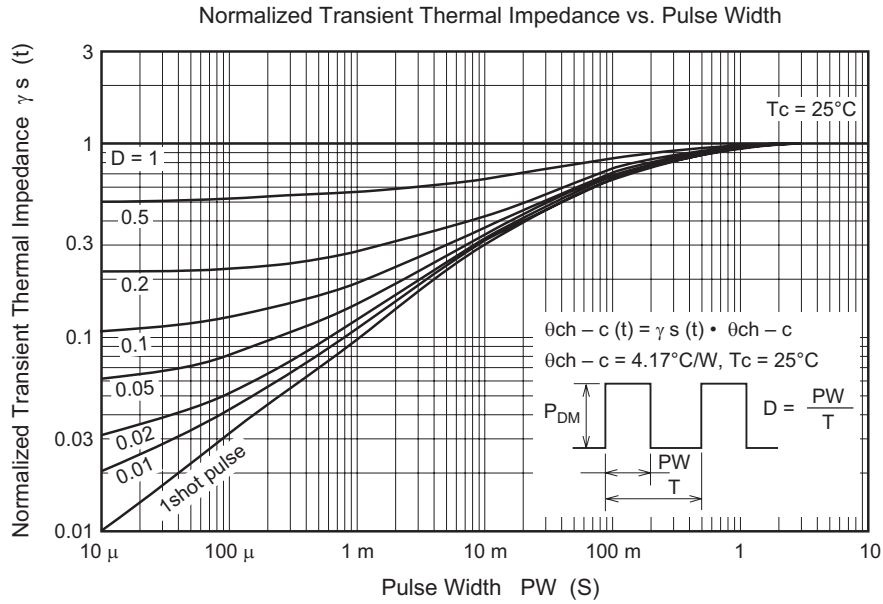
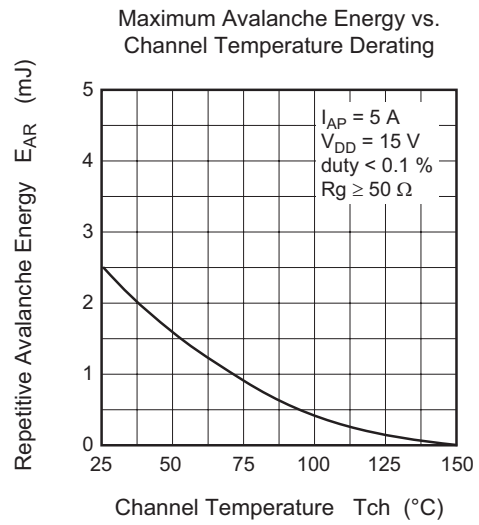
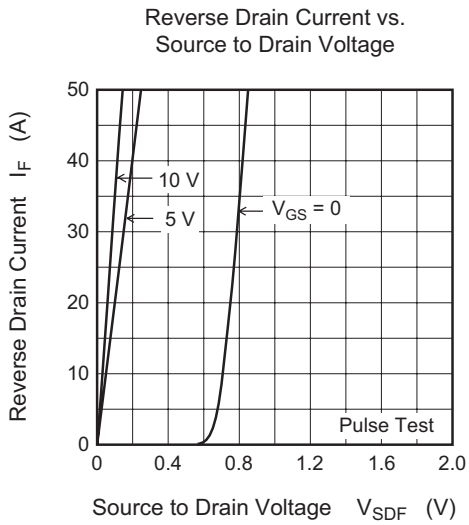
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	30	—	—	V	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0
Gate to source breakdown voltage	V <sub>(BR) GSS</sub>	±20	—	—	V	I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	1.0	—	2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Static drain to source on state resistance	R <sub>DS (on)</sub>	—	2.9	3.7	mΩ	I <sub>D</sub> = 25 A, V <sub>GS</sub> = 10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	5.0	7.3	mΩ	I <sub>D</sub> = 25 A, V <sub>GS</sub> = 4.5 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	39	65	—	S	I <sub>D</sub> = 25 A, V <sub>DS</sub> = 10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	4750	—	pF	V <sub>DS</sub> = 10 V
Output capacitance	C <sub>oss</sub>	—	1180	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	650	—	pF	f = 1 MHz
Total gate charge	Q <sub>g</sub>	—	75	—	nC	V <sub>DD</sub> = 10 V
Gate to source charge	Q <sub>gs</sub>	—	16	—	nC	V <sub>GS</sub> = 10 V
Gate to drain charge	Q <sub>gd</sub>	—	14	—	nC	I <sub>D</sub> = 50 A
Turn-on delay time	t <sub>d (on)</sub>	—	26	—	ns	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A
Rise time	t <sub>r</sub>	—	60	—	ns	V <sub>DD</sub> ≅ 10 V
Turn-off delay time	t <sub>d (off)</sub>	—	85	—	ns	R <sub>L</sub> = 0.4 Ω
Fall time	t <sub>f</sub>	—	26	—	ns	R <sub>g</sub> = 4.7 Ω
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.85	0.98	V	I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0 <sup>Note 4</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	60	—	ns	I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 50 A/μs

Note: 4. Pulse test

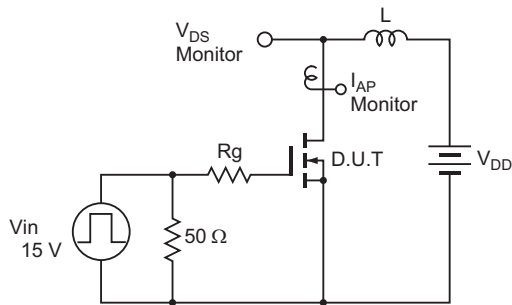
Main Characteristics



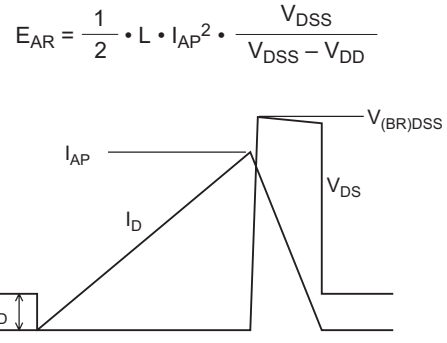


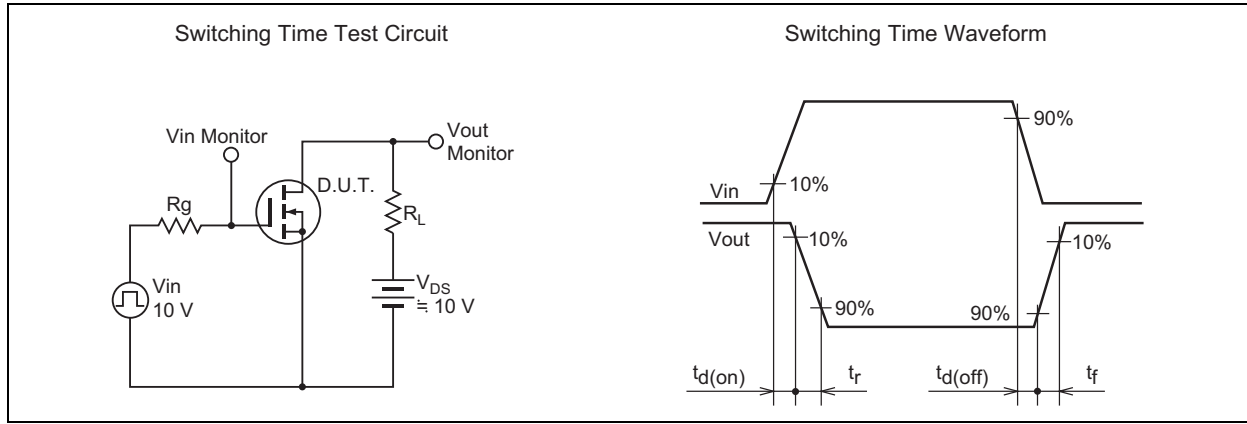


Avalanche Test Circuit

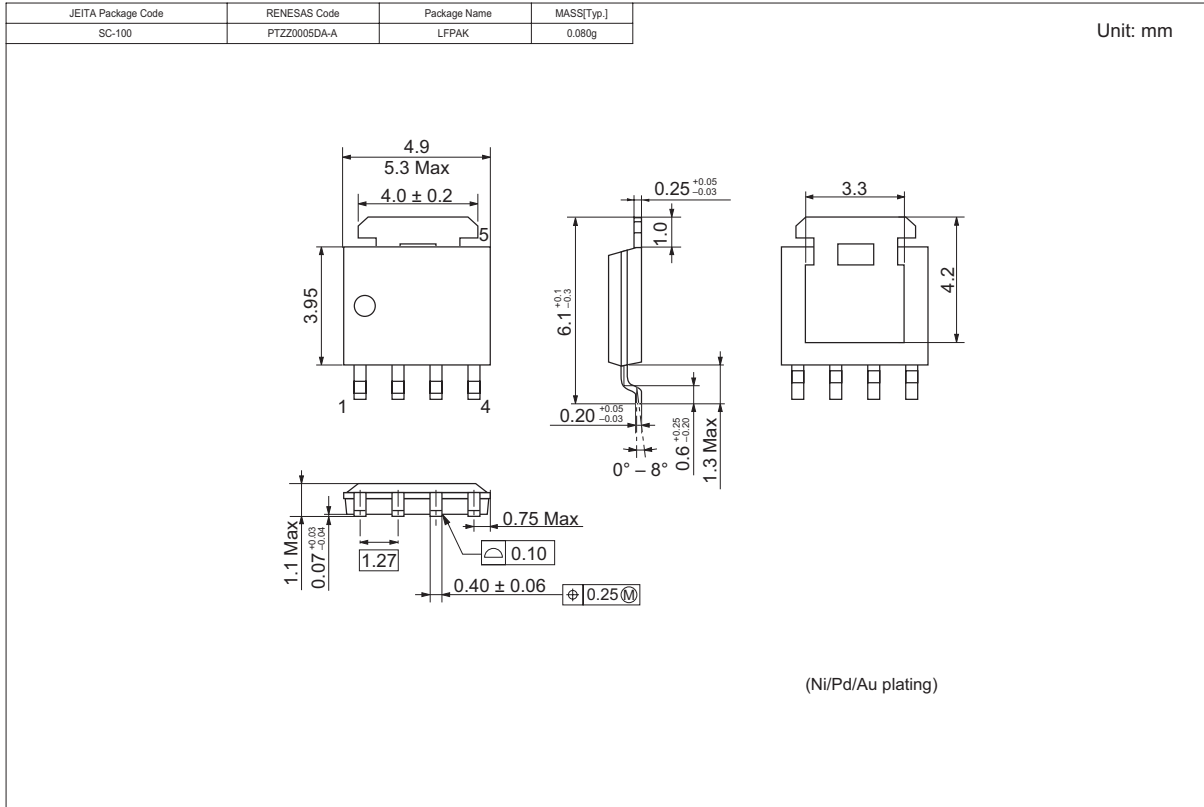


Avalanche Waveform





Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2099H-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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