

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## HAT2141H

Silicon N Channel Power MOS FET  
Power Switching

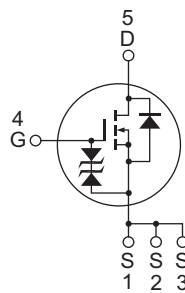
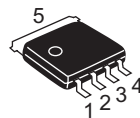
REJ03G1193-0700  
(Previous: ADE-208-1582E)  
Rev.7.00  
Sep 07, 2005

### Features

- Capable of 7 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)} = 22 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )

### Outline

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



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>	100	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	15	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	60	A
Body-drain diode reverse drain current	I <sub>DR</sub>	15	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	15	A
Avalanche energy	E <sub>AR</sub> <sup>Note 3</sup>	22.5	mJ
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	20	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. T<sub>c</sub> = 25 °C  
 3. Value at T<sub>ch</sub> = 25°C, R<sub>g</sub> ≥ 50 Ω

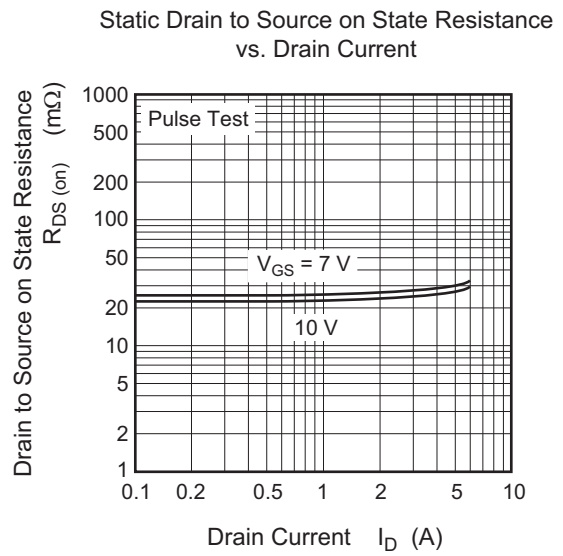
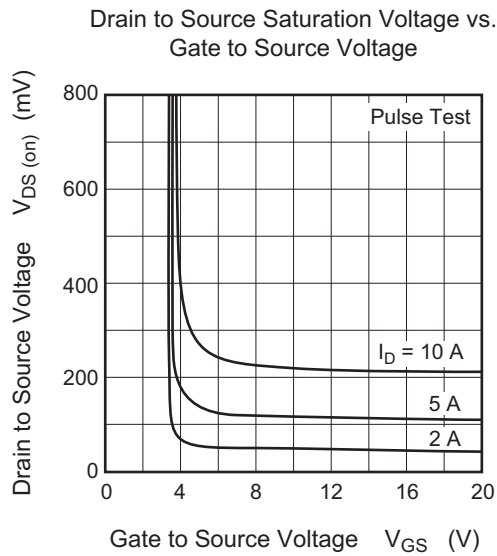
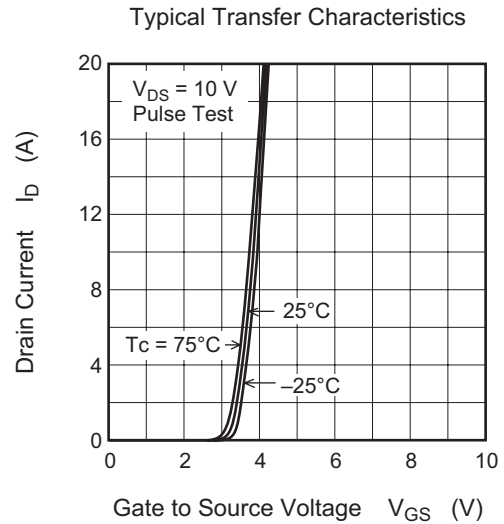
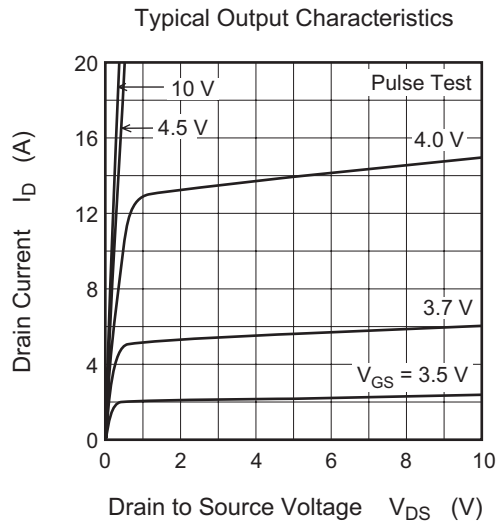
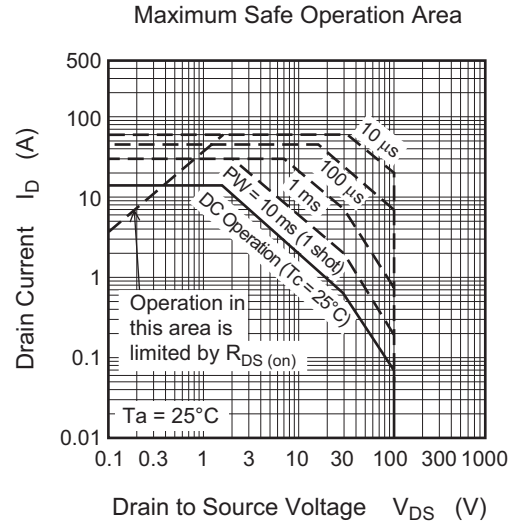
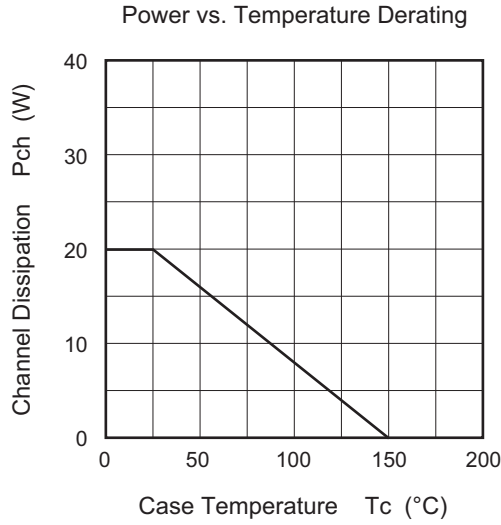
## Electrical Characteristics

(Ta = 25°C)

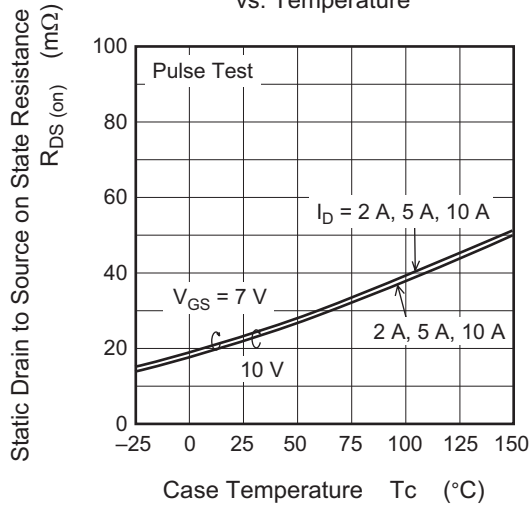
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	100	—	—	V	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0
Gate to source breakdown voltage	V <sub>(BR) GSS</sub>	±20	—	—	V	I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0
Gate to source leak current	I <sub>GSS</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> = 100 V, V <sub>GS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	2.0	—	3.5	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>	—	22	27.5	mΩ	I <sub>D</sub> = 7.5 A, V <sub>GS</sub> = 10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	23.5	32	mΩ	I <sub>D</sub> = 7.5 A, V <sub>GS</sub> = 7 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	15	25	—	S	I <sub>D</sub> = 7.5 A, V <sub>DS</sub> = 10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	3200	—	pF	V <sub>DS</sub> = 10 V
Output capacitance	C <sub>oss</sub>	—	255	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	125	—	pF	f = 1 MHz
Total gate charge	Q <sub>g</sub>	—	46	—	nC	V <sub>DD</sub> = 50 V
Gate to source charge	Q <sub>gs</sub>	—	11	—	nC	V <sub>GS</sub> = 10 V
Gate to drain charge	Q <sub>gd</sub>	—	10	—	nC	I <sub>D</sub> = 15 A
Turn-on delay time	t <sub>d (on)</sub>	—	22	—	ns	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 7.5 A
Rise time	t <sub>r</sub>	—	13	—	ns	V <sub>DD</sub> ≅ 30 V
Turn-off delay time	t <sub>d (off)</sub>	—	70	—	ns	R <sub>L</sub> = 4 Ω
Fall time	t <sub>f</sub>	—	10	—	ns	R <sub>g</sub> = 4.7 Ω
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.82	1.07	V	I <sub>F</sub> = 15 A, V <sub>GS</sub> = 0 <sup>Note 4</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	50	—	ns	I <sub>F</sub> = 15 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 100 A/μs

Note: 4. Pulse test

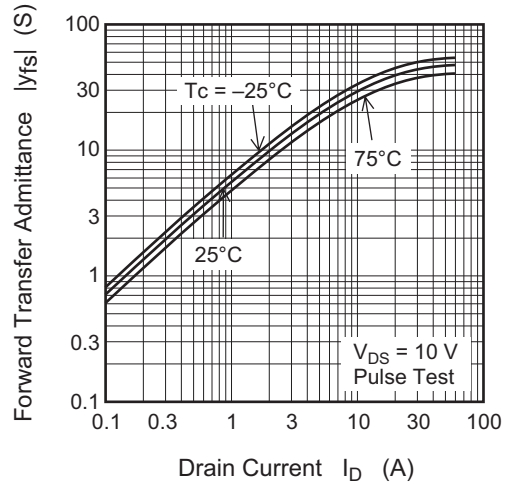
Main Characteristics



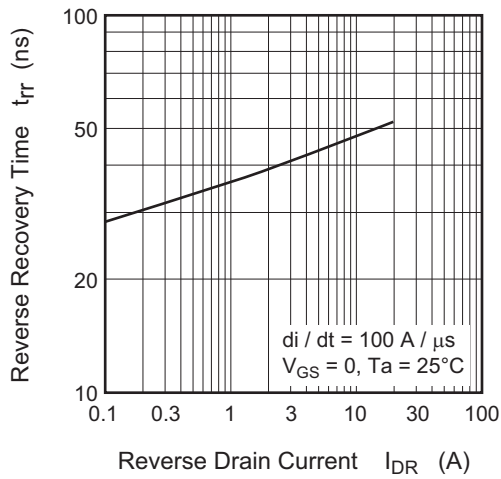
Static Drain to Source on State Resistance vs. Temperature



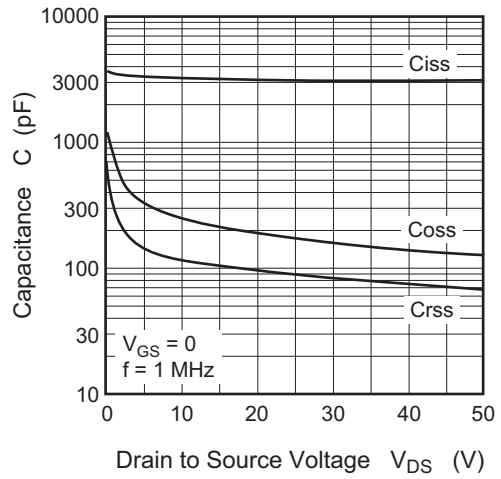
Forward Transfer Admittance vs. Drain Current



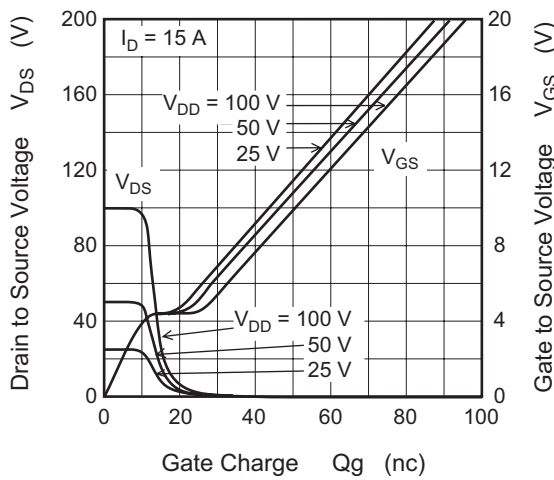
Body-Drain Diode Reverse Recovery Time



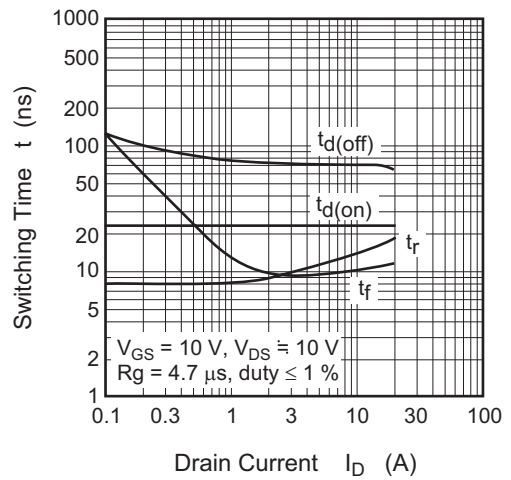
Typical Capacitance vs. Drain to Source Voltage

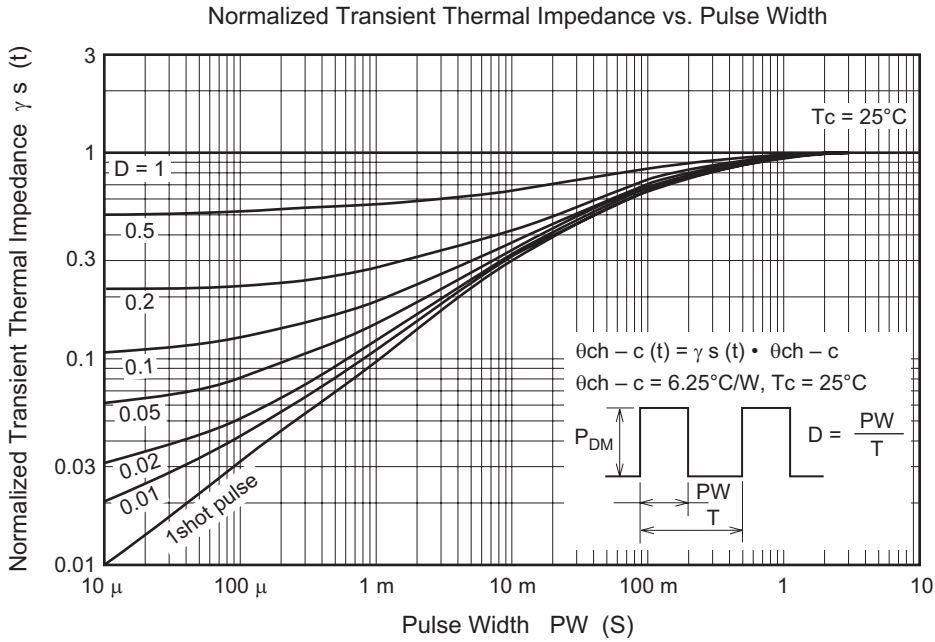
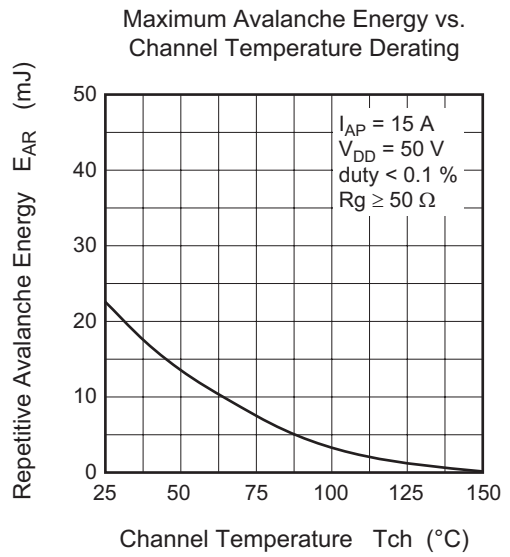
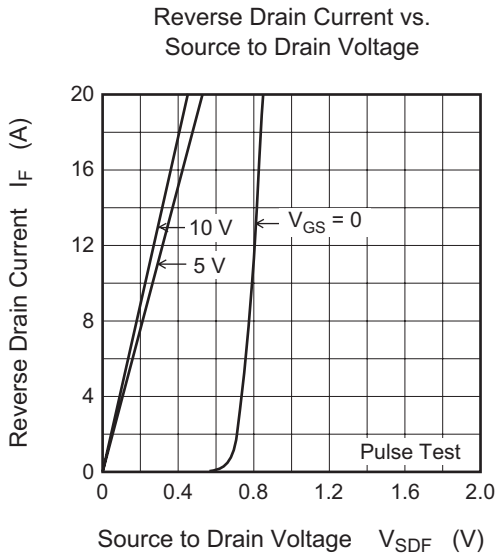


Dynamic Input Characteristics

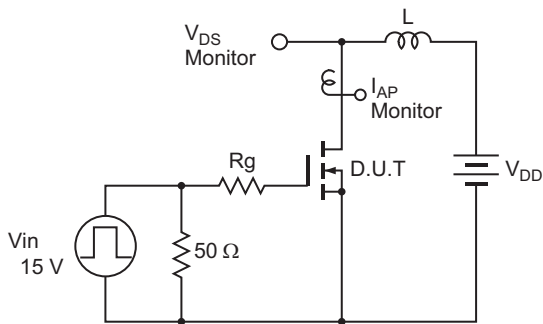


Switching Characteristics

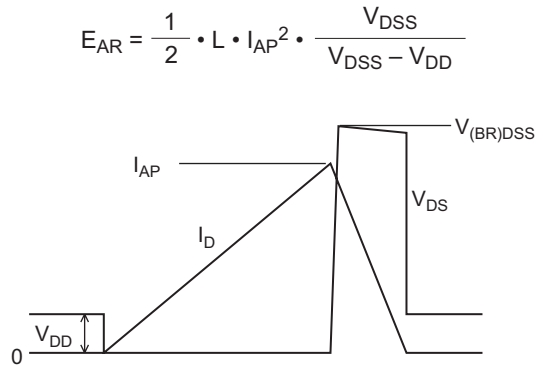


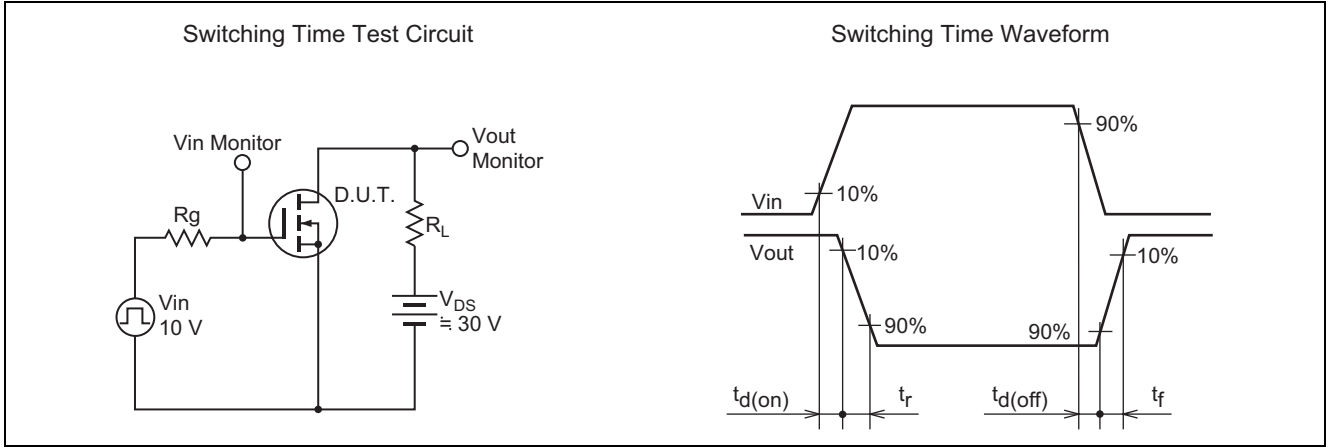


Avalanche Test Circuit



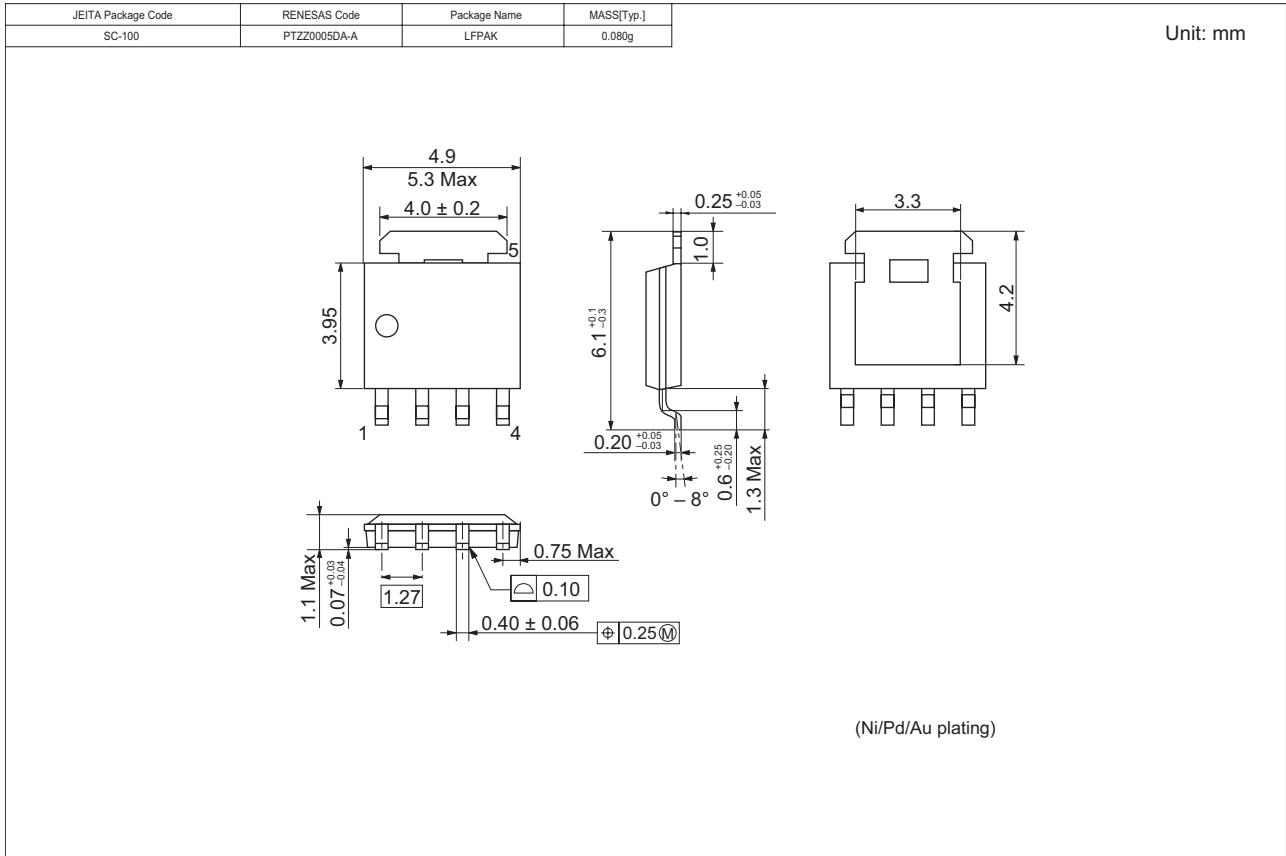
Avalanche Waveform







Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2141H-EL-E	2500 pcs	Taping

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