

HAT2173H

Silicon N Channel Power MOS FET Power Switching

REJ03G0030-0200

Rev.2.00

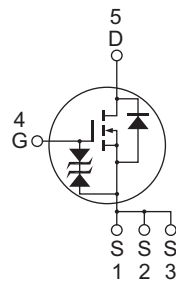
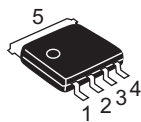
Sep 26, 2005

Features

- High speed switching
- Capable of 8 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 12 \text{ m}\Omega$ 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

($T_a = 25^\circ\text{C}$)

| Item | Symbol | Ratings | Unit |
|--|----------------------------------|-------------|--------------------|
| Drain to source voltage | V_{DSS} | 100 | V |
| Gate to source voltage | V_{GSS} | ± 20 | V |
| Drain current | I_D | 25 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note 1} | 100 | A |
| Body-drain diode reverse drain current | I_{DR} | 25 | A |
| Avalanche current | I_{AP} ^{Note 2} | 25 | A |
| Avalanche energy | E_{AR} ^{Note 2} | 62.5 | mJ |
| Channel dissipation | P_{ch} ^{Note 3} | 30 | W |
| Channel to Case Thermal Resistance | θ_{ch-C} | 4.17 | $^\circ\text{C/W}$ |
| Channel temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

- Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$
 2. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$
 3. $T_c = 25^\circ\text{C}$

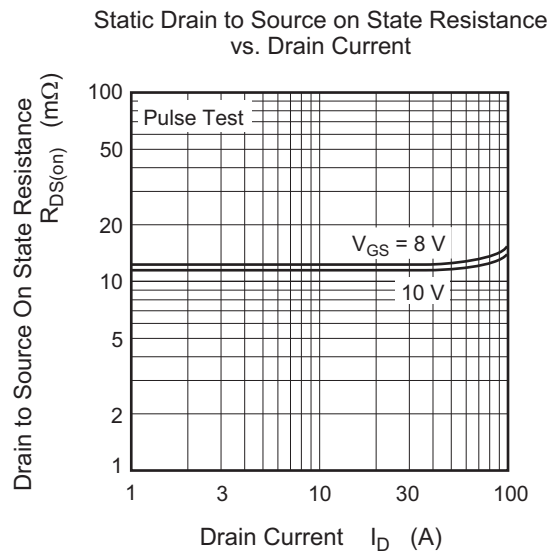
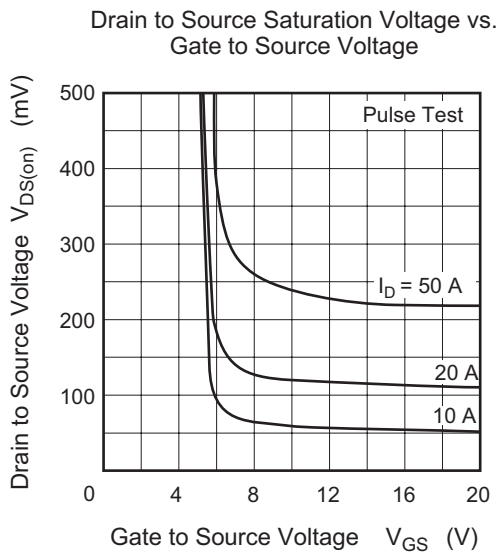
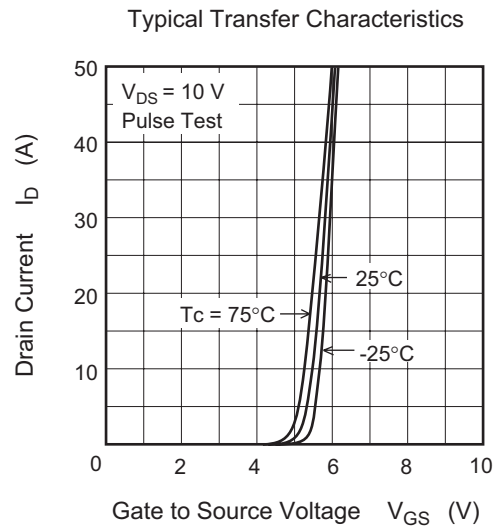
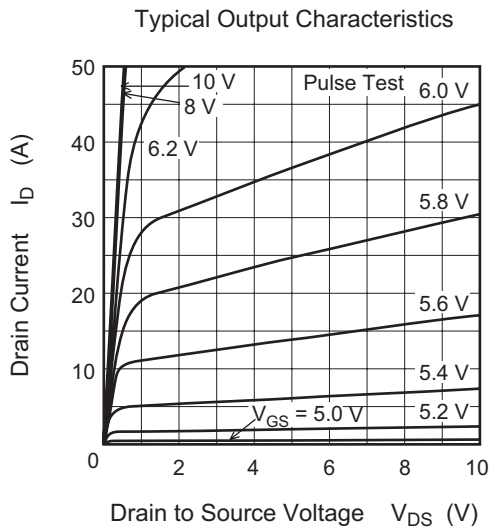
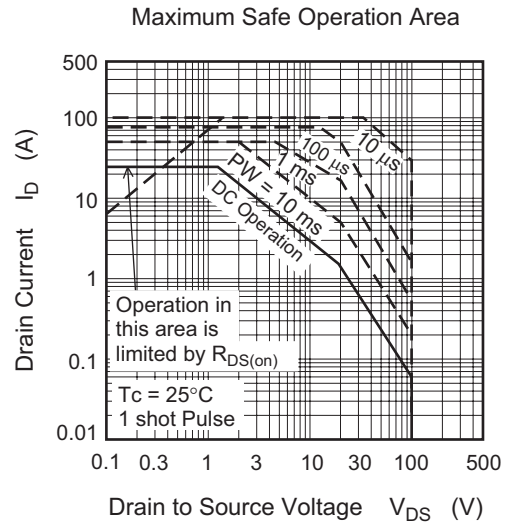
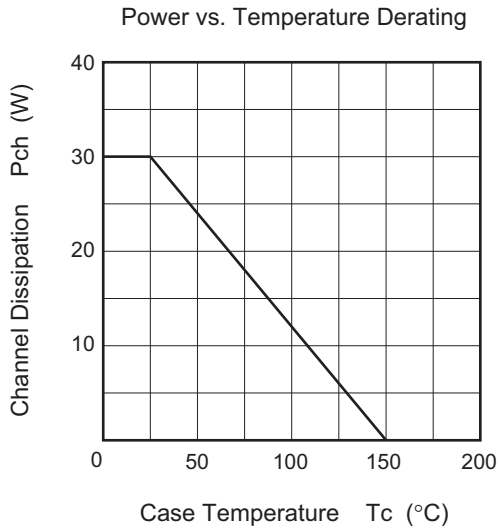
Electrical Characteristics

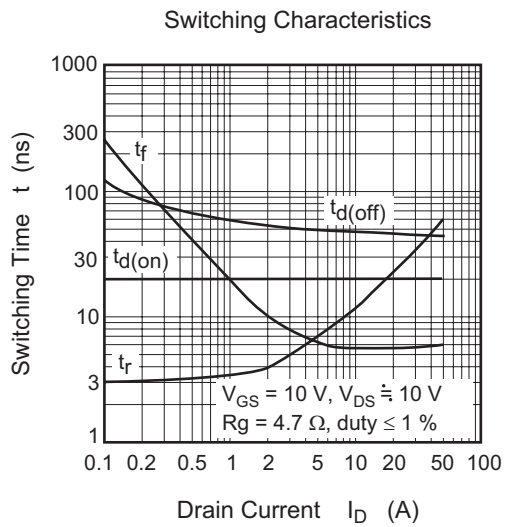
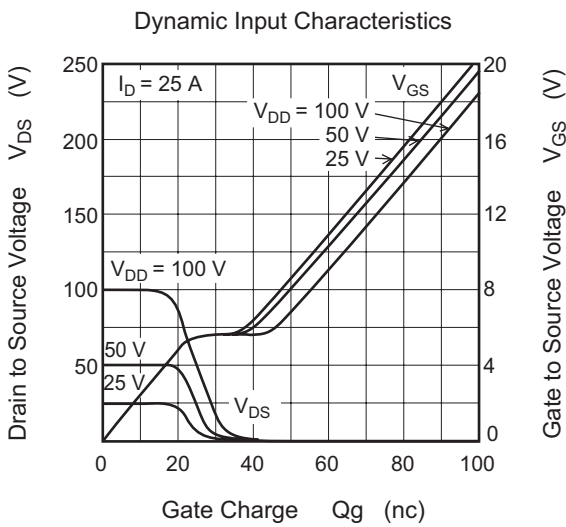
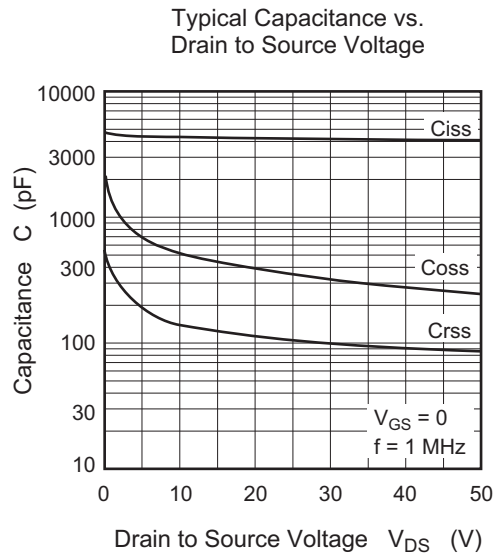
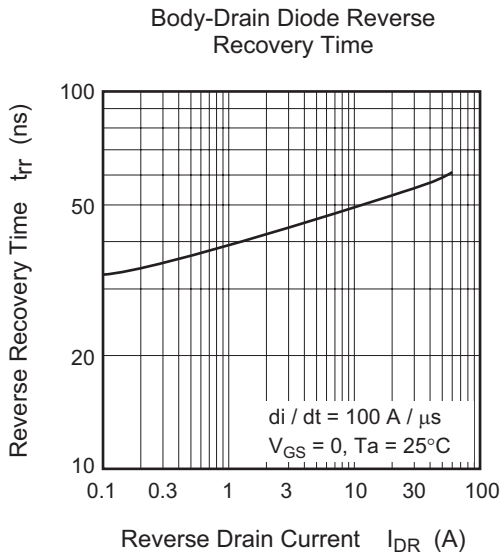
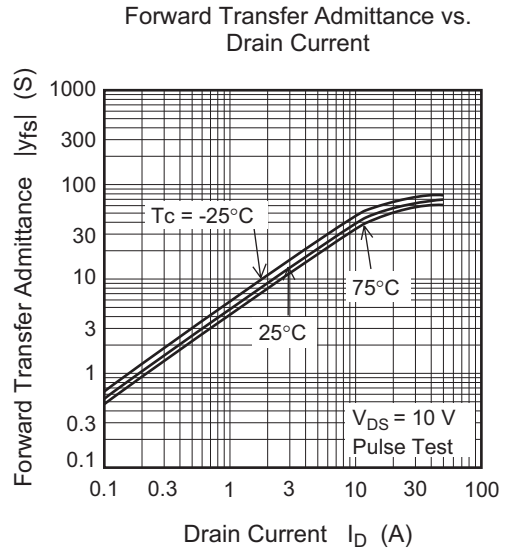
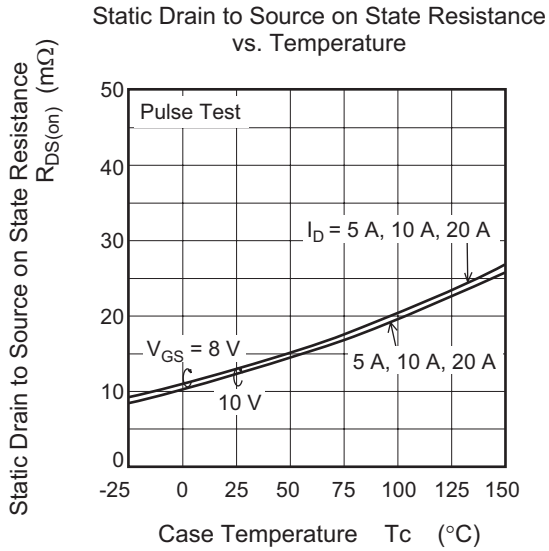
(Ta = 25°C)

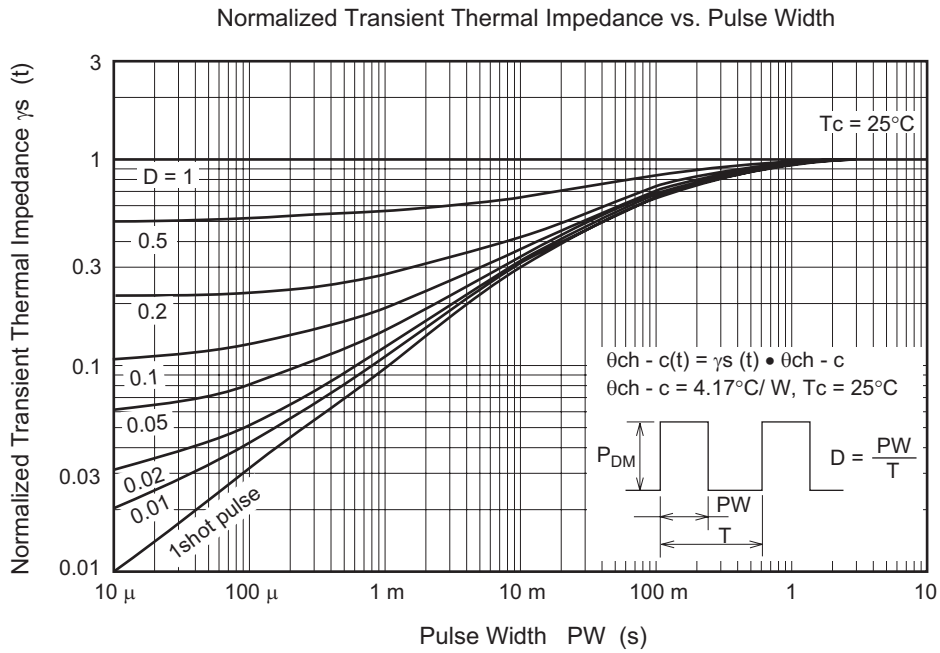
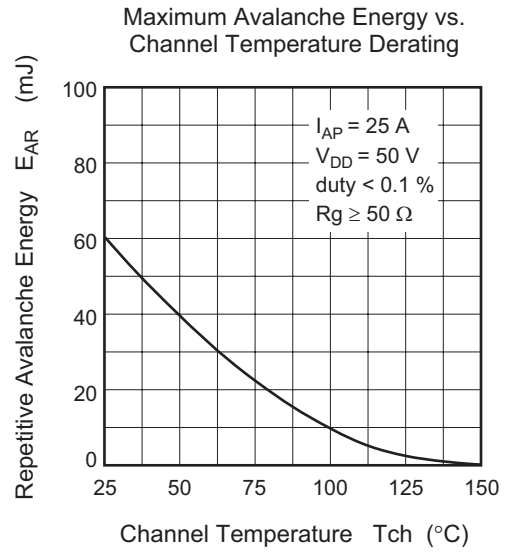
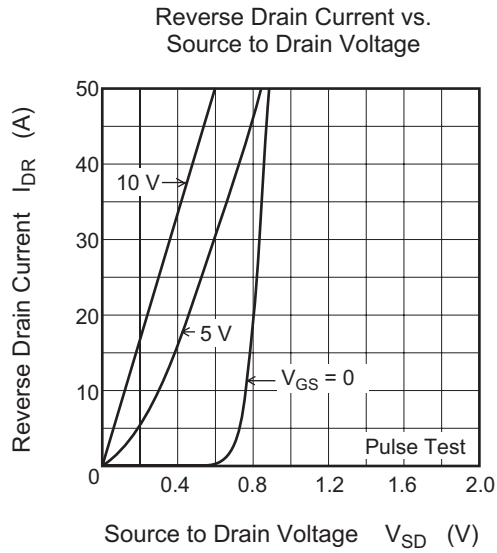
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|----------|------|----------|------------------|--|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 100 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ± 20 | — | — | V | $I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 10 | μA | $V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 100 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 4.0 | — | 6.0 | V | $V_{DS} = 10 \text{ V}$, $I_D = 20 \text{ mA}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 12 | 15 | $\text{m}\Omega$ | $I_D = 12.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 13 | 17.5 | $\text{m}\Omega$ | $I_D = 12.5 \text{ A}$, $V_{GS} = 8 \text{ V}$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | 27 | 45 | — | S | $I_D = 12.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4} |
| Input capacitance | C_{iss} | — | 4350 | — | pF | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 520 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 150 | — | pF | |
| Gate resistance | R_g | — | 0.5 | — | Ω | |
| Total gate charge | Q_g | — | 61 | — | nC | $V_{DD} = 50 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 25 \text{ A}$ |
| Gate to source charge | Q_{gs} | — | 23 | — | nC | |
| Gate to drain charge | Q_{gd} | — | 14.5 | — | nC | |
| Turn-on delay time | $t_{d(on)}$ | — | 20 | — | ns | $V_{GS} = 10 \text{ V}$, $I_D = 12.5 \text{ A}$, $V_{DD} \cong 30 \text{ V}$, $R_L = 2.4 \text{ }\Omega$, $R_g = 4.7 \text{ }\Omega$ |
| Rise time | t_r | — | 15 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 37 | — | ns | |
| Fall time | t_f | — | 5.7 | — | ns | |
| Body-drain diode forward voltage | V_{DF} | — | 0.82 | 1.07 | V | $I_F = 25 \text{ A}$, $V_{GS} = 0$ ^{Note4} |
| Body-drain diode reverse recovery time | t_{rr} | — | 55 | — | ns | $I_F = 25 \text{ A}$, $V_{GS} = 0$, $di_F/dt = 100 \text{ A}/\mu\text{s}$ |

Notes: 4. Pulse test

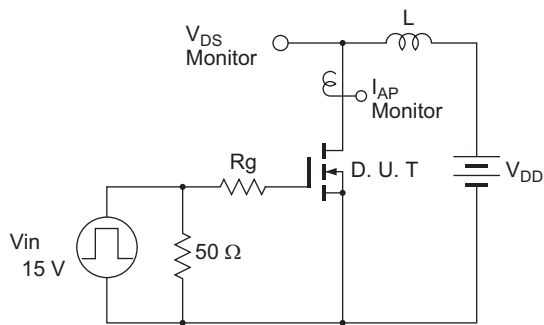
Main Characteristics





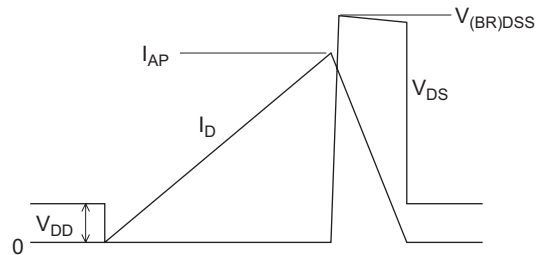


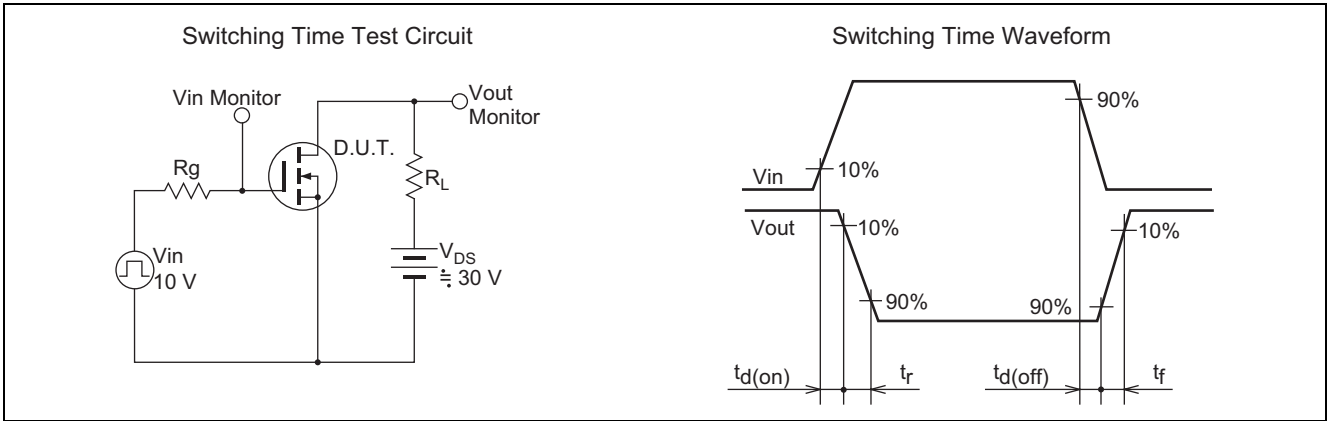
Avalanche Test Circuit



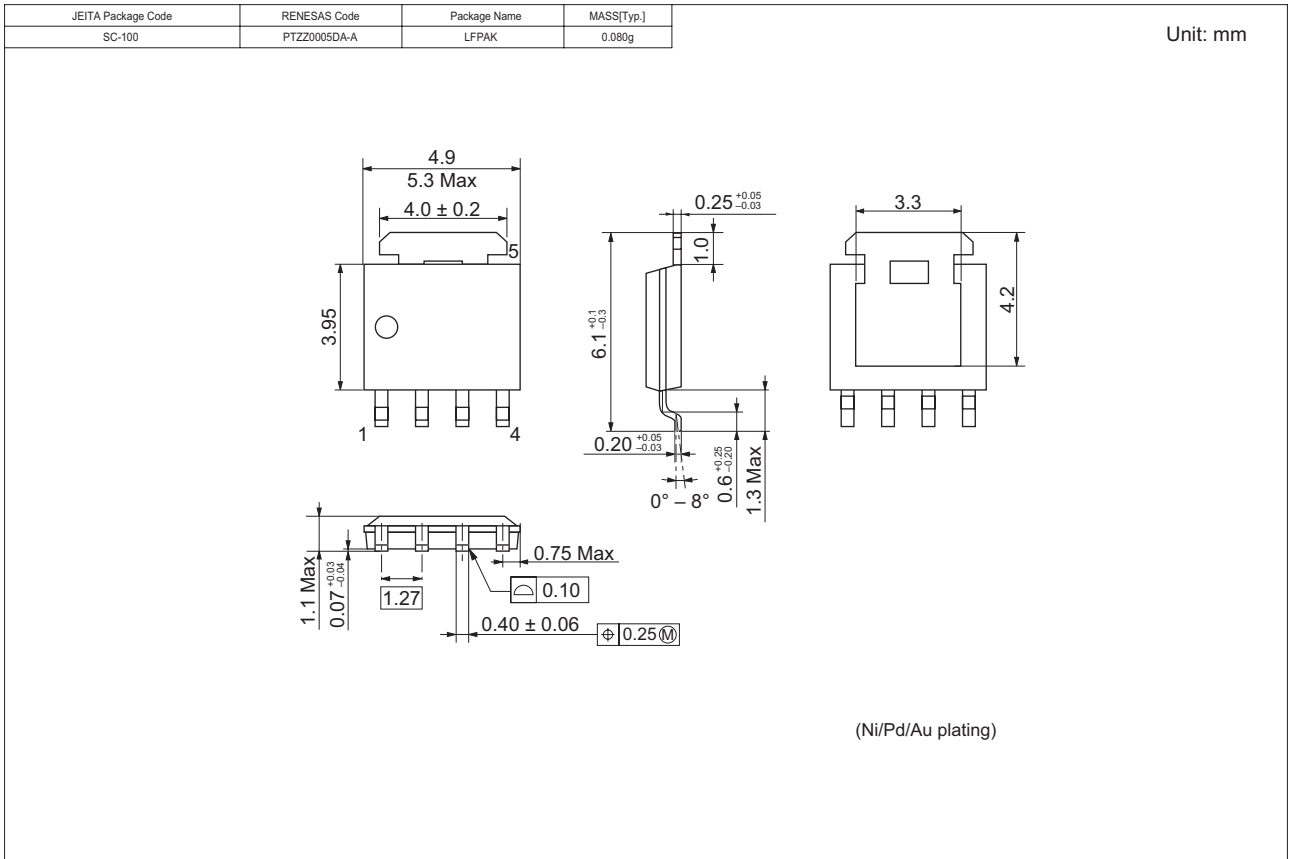
Avalanche Waveform

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





Package Dimensions



Ordering Information

| Part Name | Quantity | Shipping Container |
|---------------|----------|--------------------|
| HAT2173H-EL-E | 2500 pcs | Taping |

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