

HAT2164H

Silicon N Channel Power MOS FET Power Switching

REJ03G0003-0500

Rev.5.00

Sep 26, 2005

Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 2.5 \text{ m}\Omega$ 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}	30	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	60	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	240	A
Body-drain diode reverse drain current	I_{DR}	60	A
Avalanche current	I_{AP} ^{Note 2}	30	A
Avalanche energy	E_{AR} ^{Note 2}	90	mJ
Channel dissipation	P_{ch} ^{Note 3}	30	W
Channel to Case Thermal Resistance	θ_{ch-C}	4.17	$^\circ\text{C}/\text{W}$
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. $T_c = 25^\circ\text{C}$

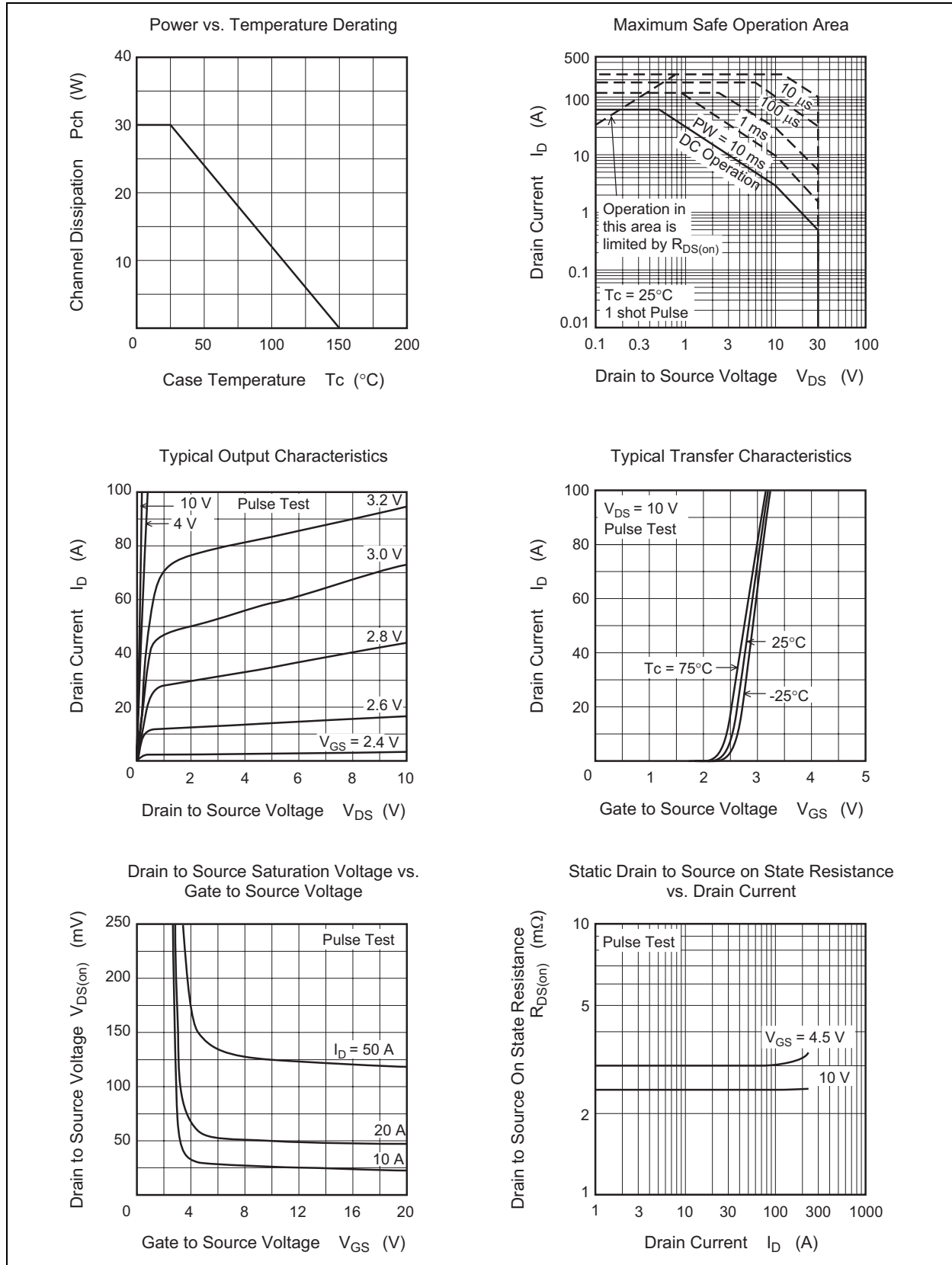
Electrical Characteristics

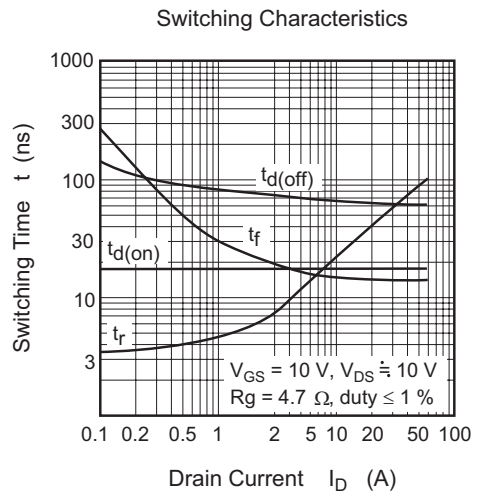
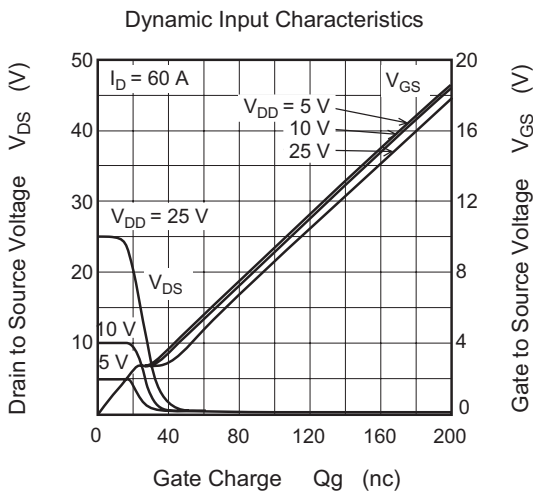
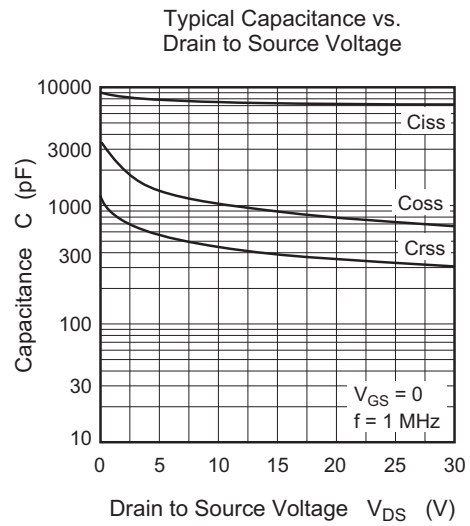
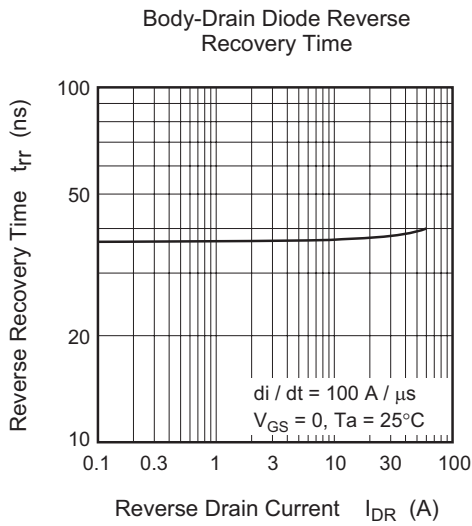
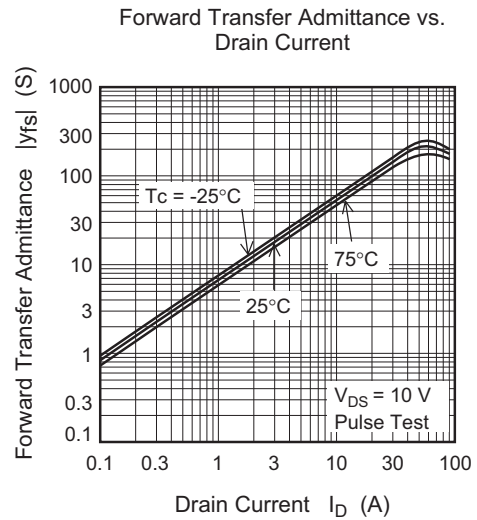
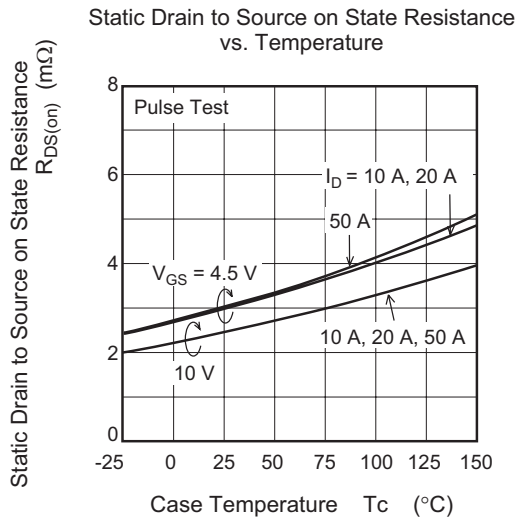
(Ta = 25°C)

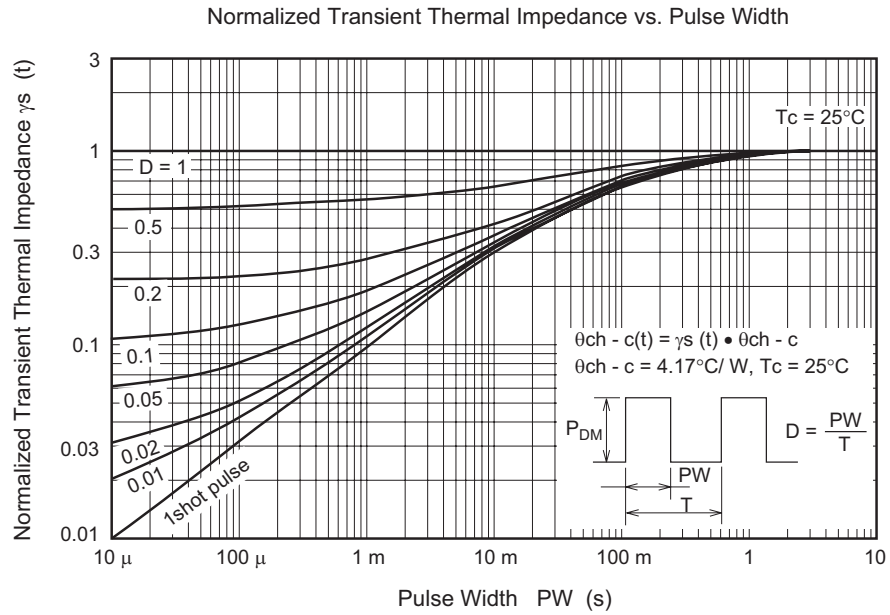
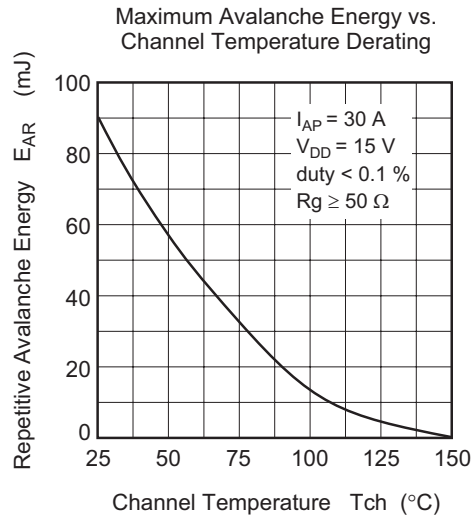
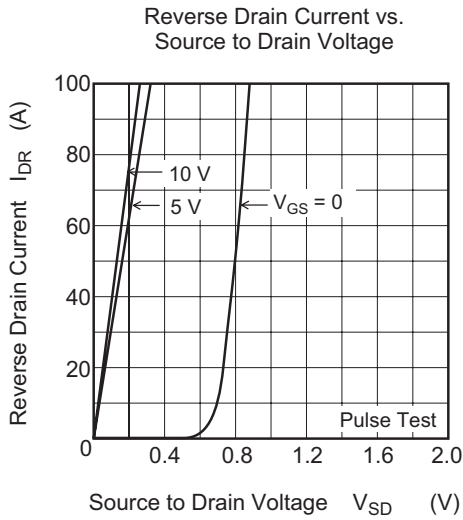
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \mu\text{A}, V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 30 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.8	—	2.3	V	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	2.5	3.1	$\text{m}\Omega$	$I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	3.0	4.4	$\text{m}\Omega$	$I_D = 30 \text{ A}, V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	78	130	—	S	$I_D = 30 \text{ A}, V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	7600	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	1050	—	pF	
Reverse transfer capacitance	C_{rss}	—	470	—	pF	
Gate Resistance	R_g	—	0.5	—	Ω	
Total gate charge	Q_g	—	50	—	nC	$V_{DD} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 60 \text{ A}$
Gate to source charge	Q_{gs}	—	22	—	nC	
Gate to drain charge	Q_{gd}	—	10	—	nC	
Turn-on delay time	$t_{d(on)}$	—	18	—	ns	$V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}, V_{DD} = 10 \text{ V}, R_L = 0.33 \Omega, R_g = 4.7 \Omega$
Rise time	t_r	—	60	—	ns	
Turn-off delay time	$t_{d(off)}$	—	65	—	ns	
Fall time	t_f	—	15	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.82	1.07	V	$I_F = 60 \text{ A}, V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 60 \text{ A}, V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

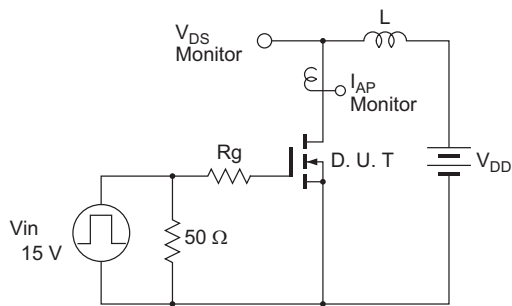
Main Characteristics



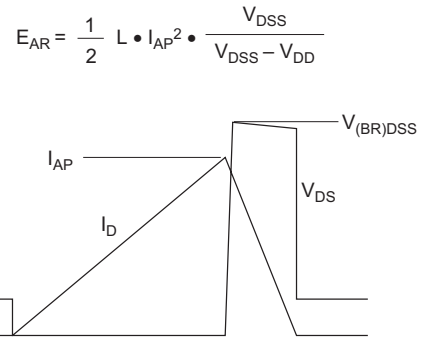


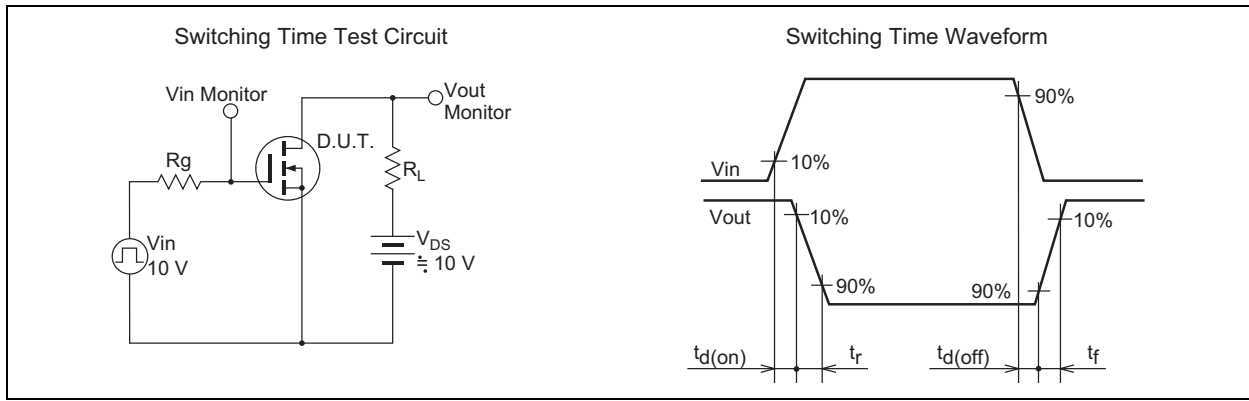


Avalanche Test Circuit

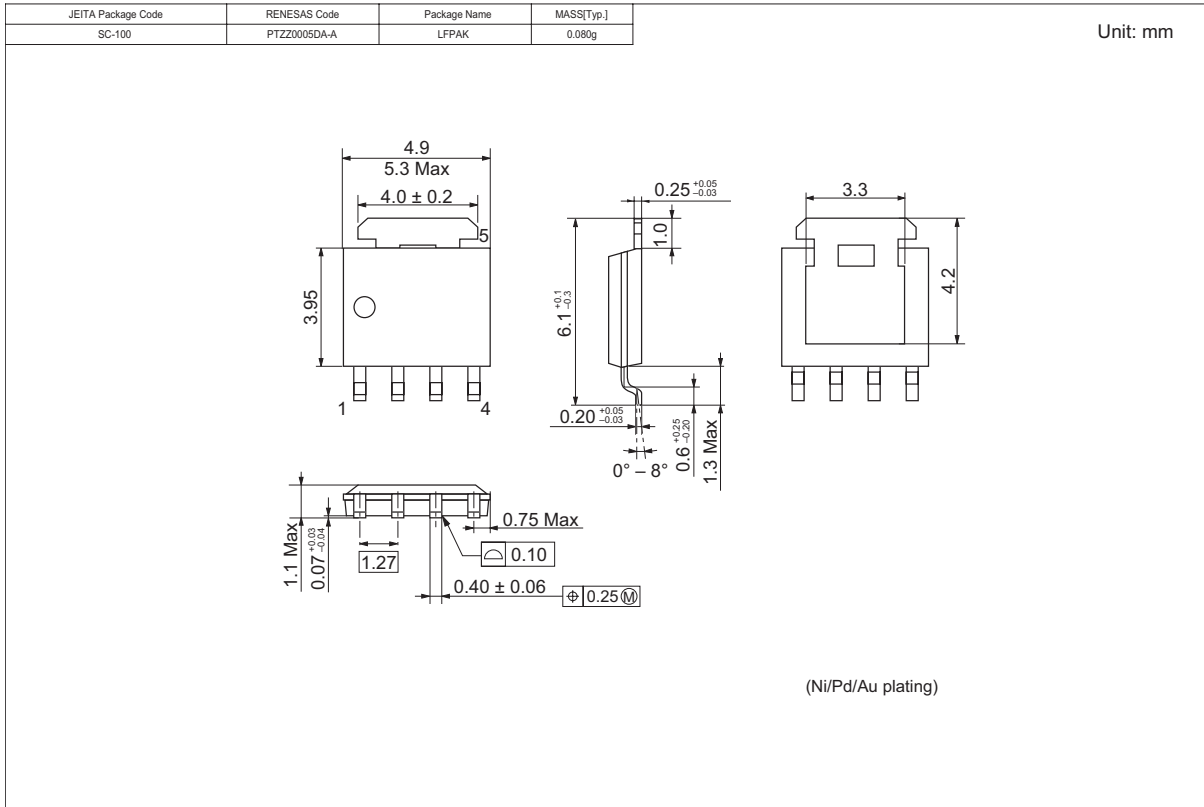


Avalanche Waveform





Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT2164H-EL-E	2500 pcs	Taping

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Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

RENESAS Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

RENESAS Technology Hong Kong Ltd.

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

RENESAS Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

RENESAS Technology (Shanghai) Co., Ltd.

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

RENESAS Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

RENESAS Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

RENESAS Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510