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April 1st, 2010
Renesas Electronics Corporation

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H7N0401LD, H7N0401LS, H7N0401LM

Silicon N Channel MOS FET
High Speed Power Switching

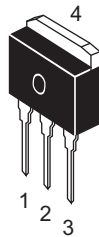
REJ03G1129-0500
(Previous: ADE-208-1527C)
Rev.5.00
Apr 07, 2006

Features

- Low on-resistance
 $R_{DS(on)} = 3.1 \text{ m}\Omega$ typ.
- 4.5 V gate drive devices
- High Speed Switching

Outline

RENESAS Package code: PRSS0004AE-A
(Package name: LDKPAK (L))



H7N0401LD

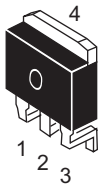
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(Package name: LDKPAK (S)-(1))



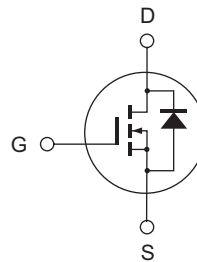
H7N0401LS

1. Gate
2. Drain
3. Source
4. Drain

RENESAS Package code: PRSS0004AE-C
(Package name: LDKPAK (S)-(2))



H7N0401LM



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V_{DSS}	40	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	95	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	380	A
Body to drain diode reverse drain current	I_{DR}	95	A
Avalanche current	I_{AP} ^{Note 3}	65	A
Avalanche energy	E_{AR} ^{Note 3}	560	mJ
Channel dissipation	P_{ch} ^{Note 2}	100	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

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

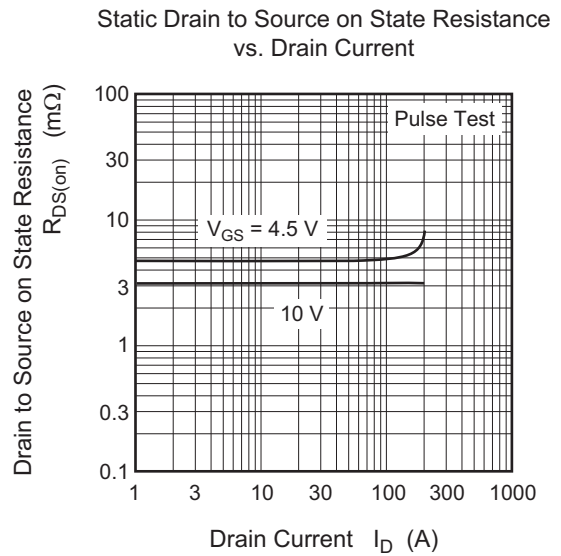
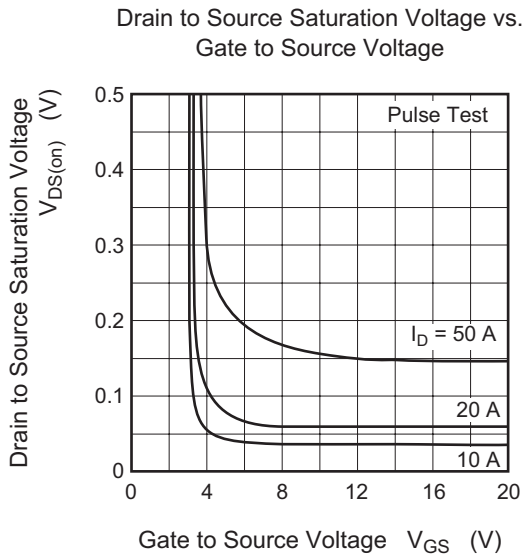
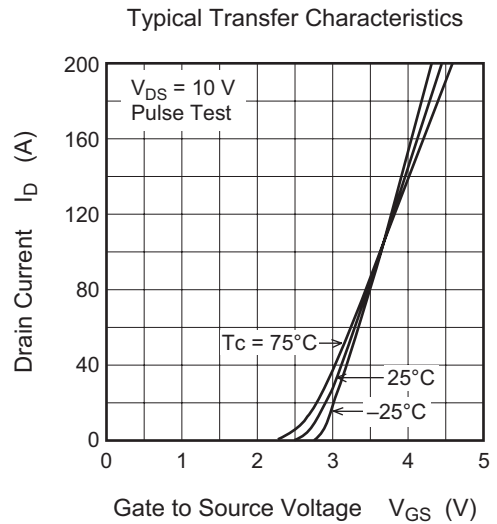
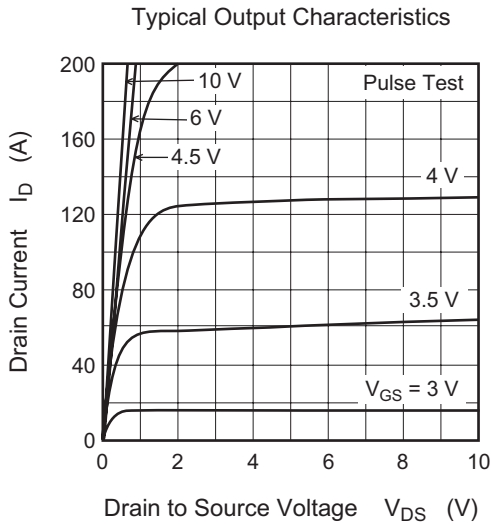
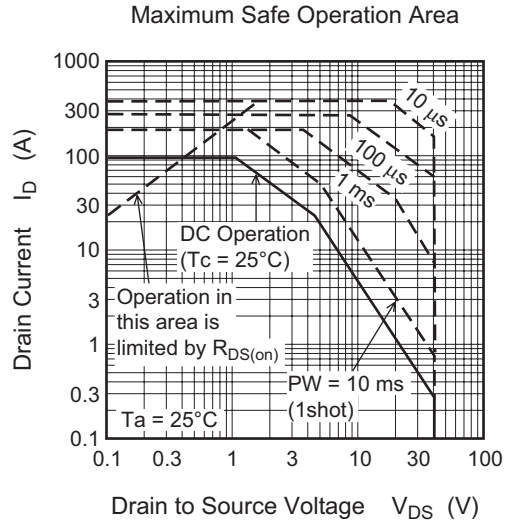
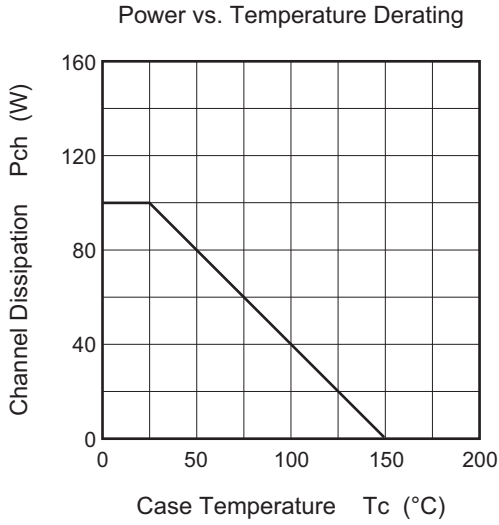
Electrical Characteristics

(Ta = 25°C)

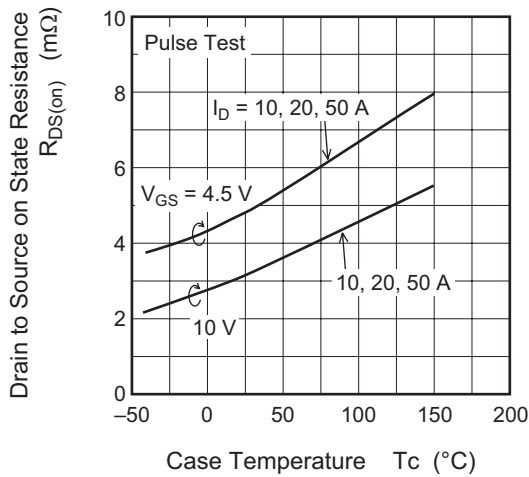
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	40	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 40 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	±0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	60	100	—	S	$I_D = 47.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Static drain to source on state resistance	$R_{DS(on)}$	—	3.1	4.2	m Ω	$I_D = 47.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
		—	4.8	7.0	m Ω	$I_D = 47.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	9300	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1300	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	670	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	160	—	nC	$V_{DD} = 25 \text{ V}$
Gate to source charge	Q_{gs}	—	36	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	40	—	nC	$I_D = 95 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	45	—	ns	$V_{GS} = 10 \text{ V}$
Rise time	t_r	—	270	—	ns	$I_D = 47.5 \text{ A}$
Turn-off delay time	$t_{d(off)}$	—	130	—	ns	$R_L = 0.63 \Omega$
Fall time	t_f	—	85	—	ns	$R_g = 4.7 \Omega$
Body to drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 95 \text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	50	—	ns	$I_F = 95 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu s$

Note: 4. Pulse test

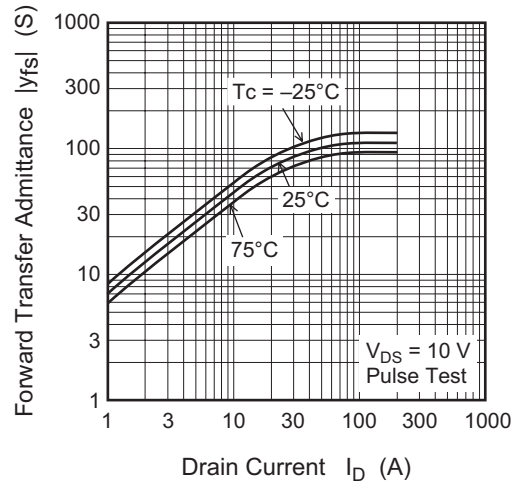
Main Characteristics



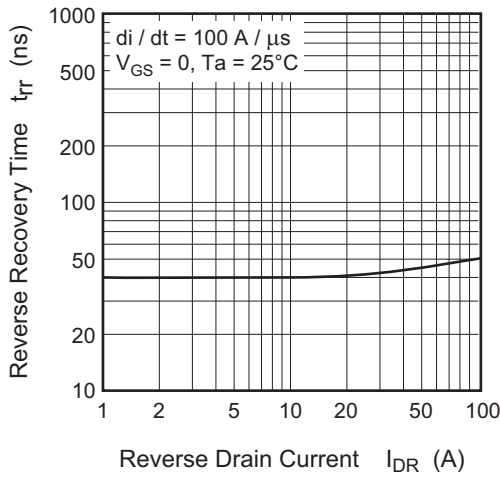
Static Drain to Source on State Resistance vs. Temperature



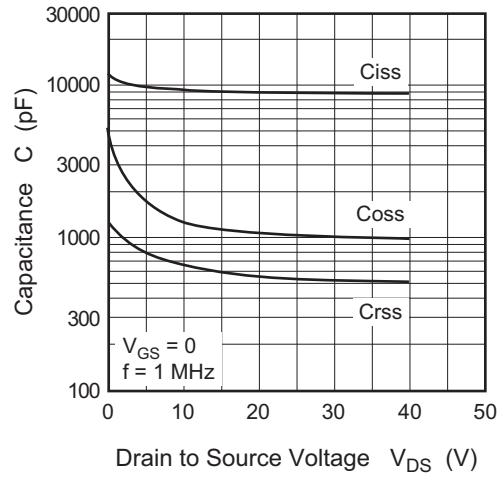
Forward Transfer Admittance vs. Drain Current



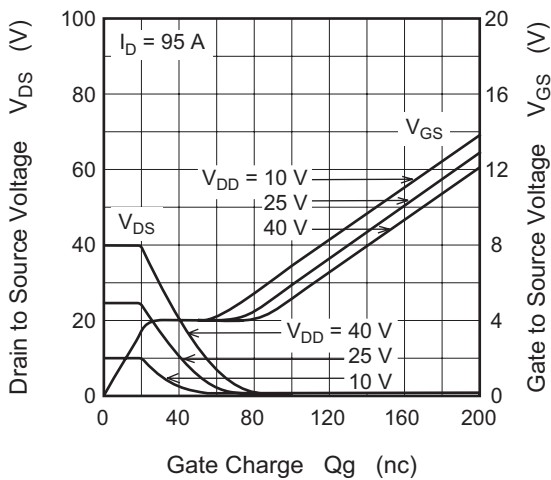
Body to Drain Diode Reverse Recovery Time



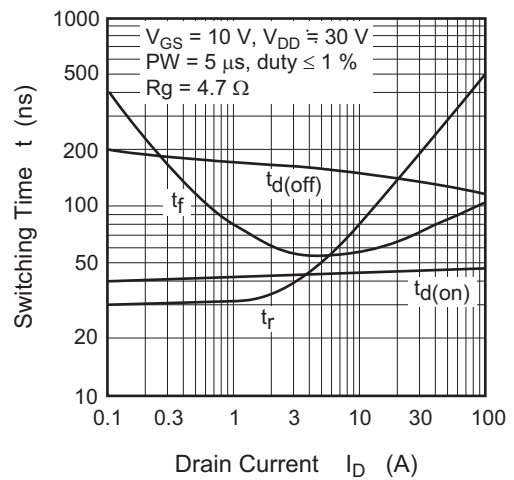
Typical Capacitance vs. Drain to Source Voltage

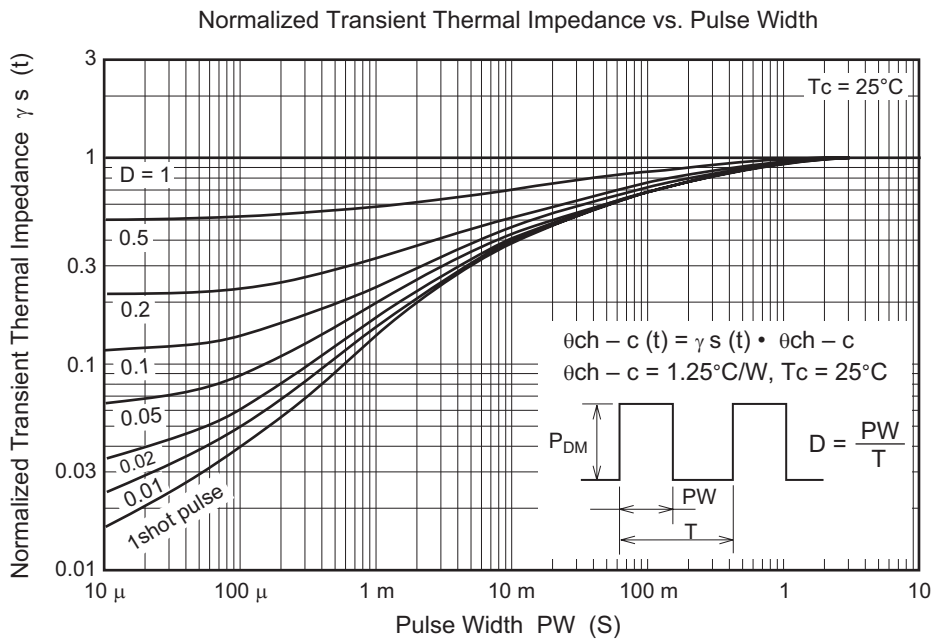
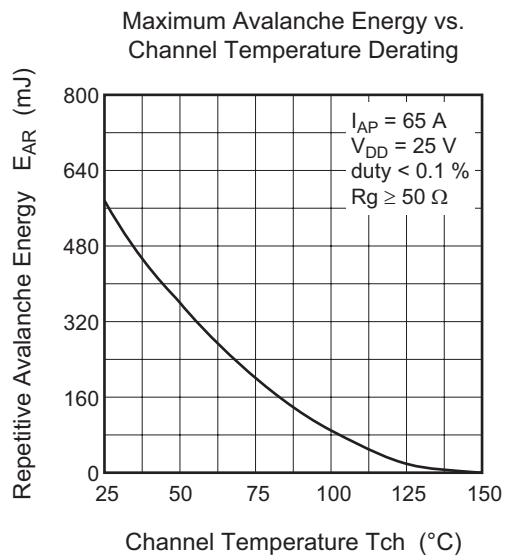
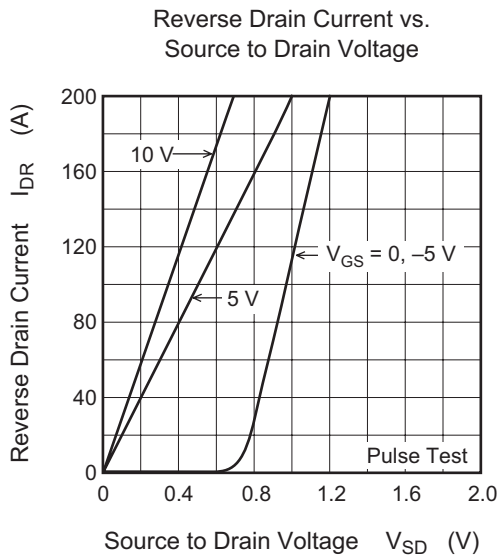


Dynamic Input Characteristics

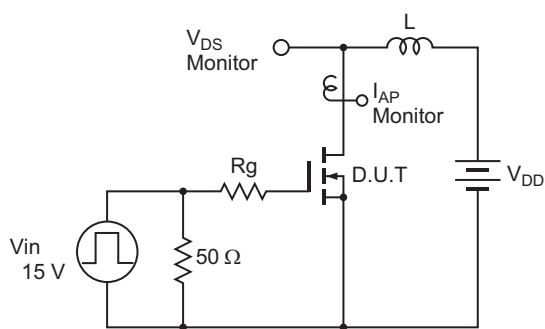


Switching Characteristics



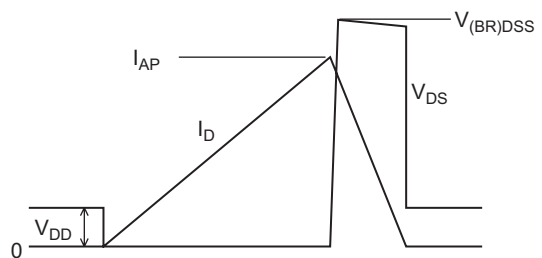


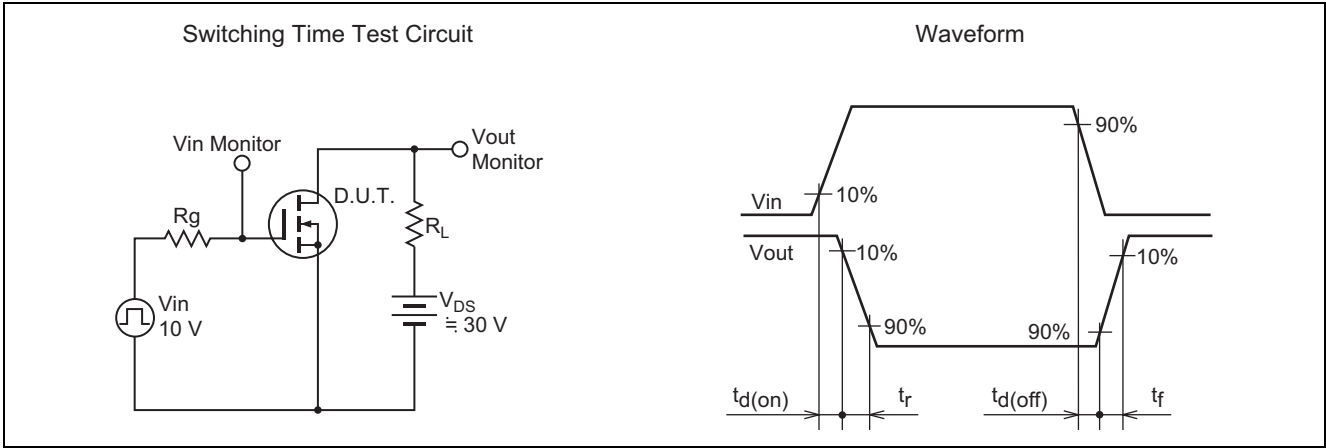
Avalanche Test Circuit



Avalanche Waveform

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

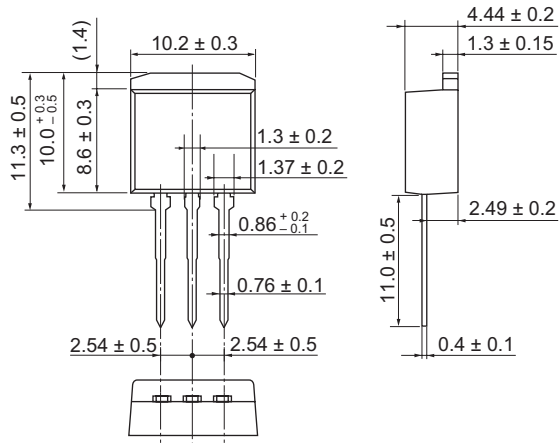




Package Dimensions

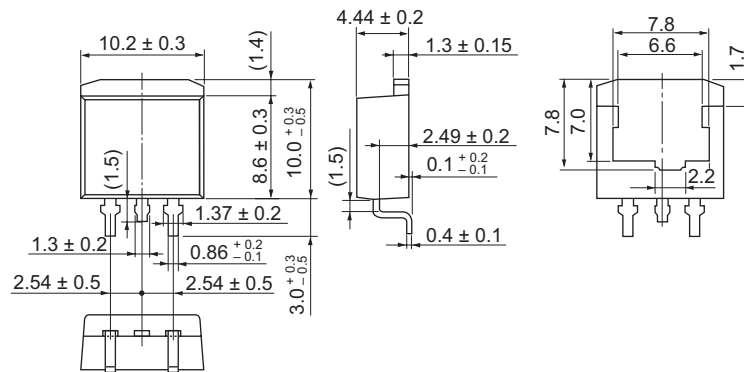
Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
LDBPAK(L)	—	PRSS0004AE-A	LDBPAK(L) / LDBPAK(L)V	1.40g

Unit: mm



Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
LDBPAK(S)-(1)	SC-83	PRSS0004AE-B	LDBPAK(S)-(1) / LDBPAK(S)-(1)V	1.30g

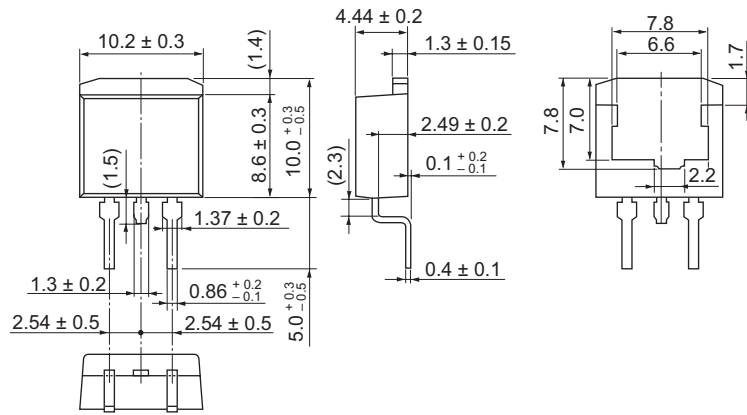
Unit: mm



H7N0401LD, H7N0401LS, H7N0401LM

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
LDBPAK(S)-(2)	—	PRSS0004AE-C	LDBPAK(S)-(2) / LDBPAK(S)-(2)V	1.35g

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
H7N0401LD-E	500 pcs	Box (Conductive Sack)
H7N0401LSTL-E	1000 pcs	Taping
H7N0401LMTL-E	1000 pcs	Taping

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