

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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# H7N1002LD, H7N1002LS, H7N1002LM

Silicon N Channel MOS FET  
High Speed Power Switching

REJ03G1131-0800

Rev.8.00

Nov 13, 2009

## Features

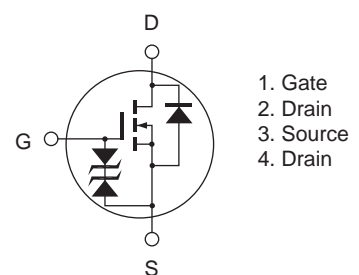
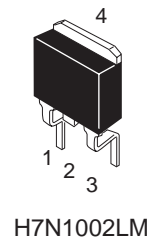
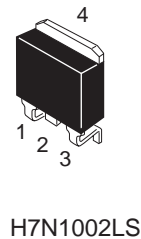
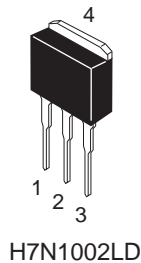
- Low on-resistance  
 $R_{DS(on)} = 8\text{ m}\Omega$  typ.
- Low drive current
- Available for 4.5 V gate drive

## Outline

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

: PRSS0004AE-B  
: LDKPAK (S)-(1) )

: PRSS0004AE-C  
: LDKPAK (S)-(2) )



## Absolute Maximum Ratings

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

Item	Symbol	Value	Unit
Drain to source voltage	$V_{DS}$	100	V
Gate to source voltage	$V_{GS}$	$\pm 20$	V
Drain current	$I_D$	75	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	300	A
Body to drain diode reverse drain current	$I_{DR}$	75	A
Avalanche current	$I_{AP}$ <sup>Note 3</sup>	50	A
Avalanche energy	$E_{AR}$ <sup>Note 3</sup>	166	mJ
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	100	W
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

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

## Electrical Characteristics

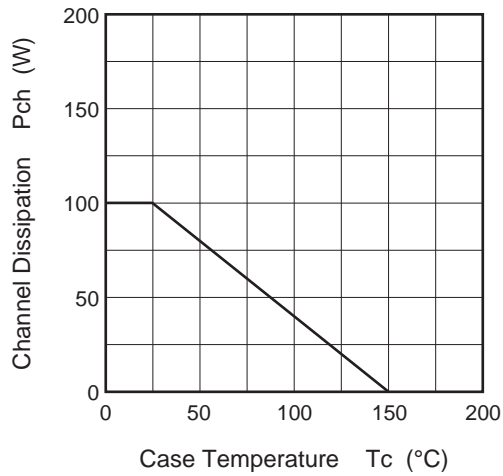
(Ta = 25°C)

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	$V_{(BR) GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu\text{A}$	$V_{DS} = 100 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	8	10	$\text{m}\Omega$	$I_D = 37.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 4</sup>
		—	10	15	$\text{m}\Omega$	$I_D = 37.5 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note 4</sup>
Forward transfer admittance	$ y_{fs} $	57	95	—	S	$I_D = 37.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Input capacitance	$C_{iss}$	—	9700	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	740	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	330	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	155	—	nC	$V_{DD} = 50 \text{ V}$
Gate to source charge	$Q_{gs}$	—	35	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	33	—	nC	$I_D = 75 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	43	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 37.5 \text{ A}$
Rise time	$t_r$	—	245	—	ns	$R_L = 0.8 \text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	—	130	—	ns	$R_g = 4.7 \text{ }\Omega$
Fall time	$t_f$	—	25	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	0.93	—	V	$I_F = 75 \text{ A}$ , $V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	70	—	ns	$I_F = 75 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

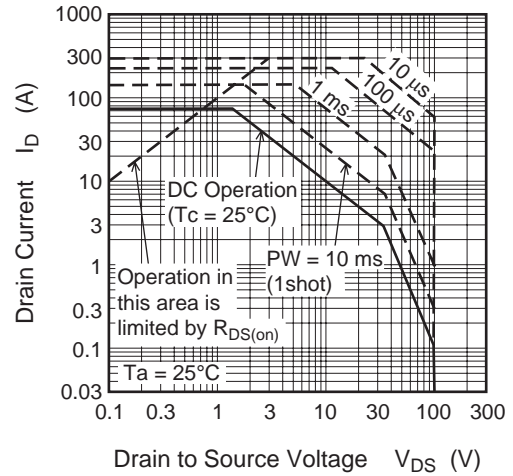
Note: 4. Pulse test

## Main Characteristics

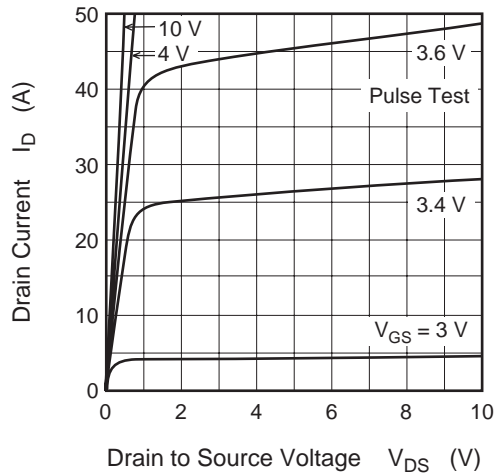
Power vs. Temperature Derating



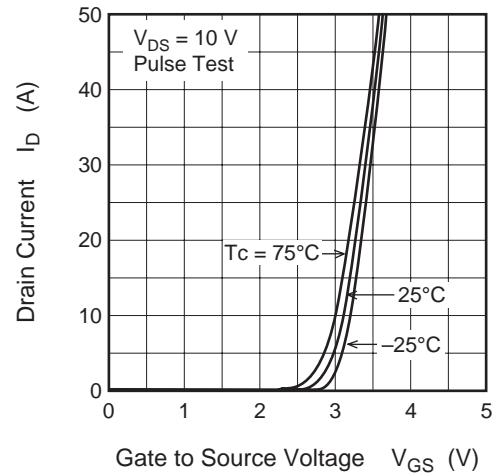
Maximum Safe Operation Area



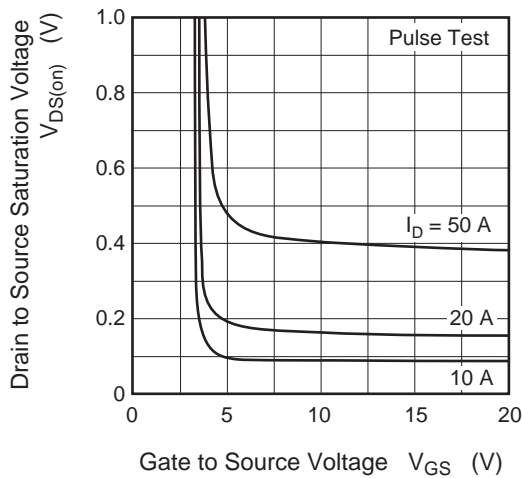
Typical Output Characteristics



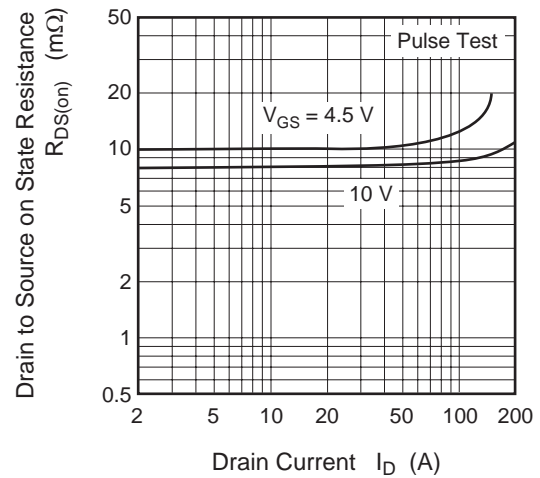
Typical Transfer Characteristics



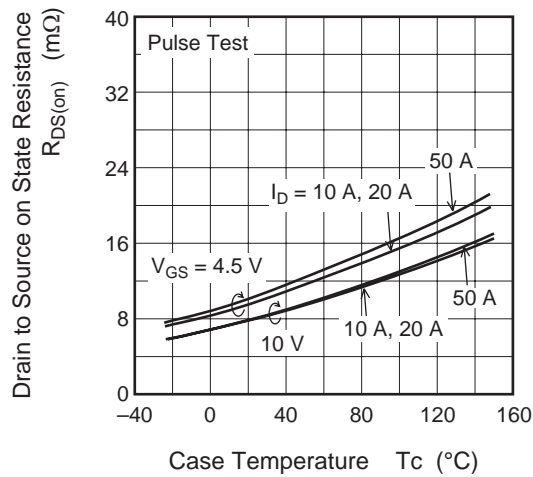
Drain to Source Saturation Voltage vs. Gate to Source Voltage



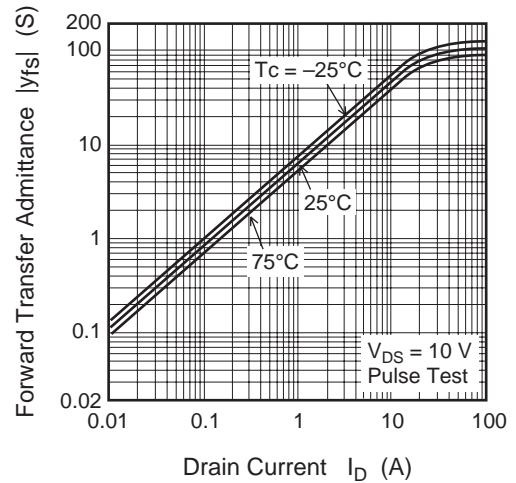
Static Drain to Source on State Resistance vs. Drain Current



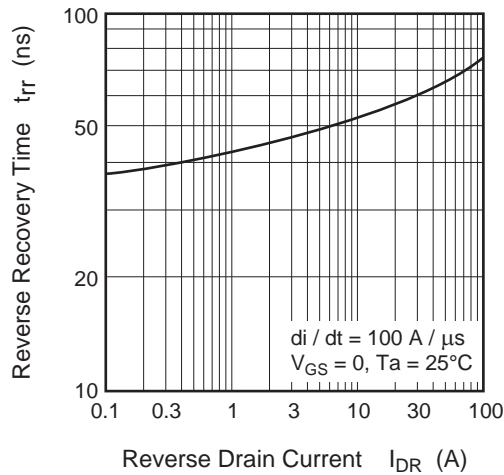
Static Drain to Source on State Resistance vs. Temperature



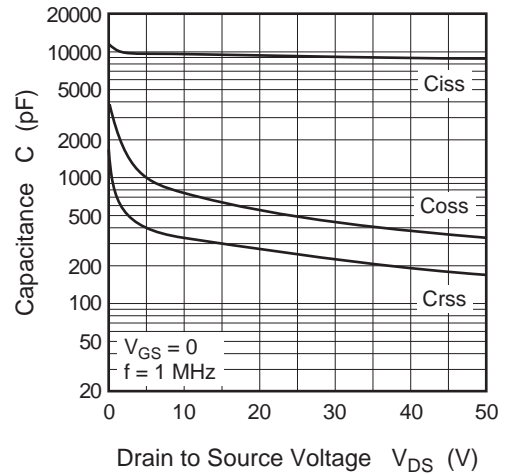
Forward Transfer Admittance vs. Drain Current



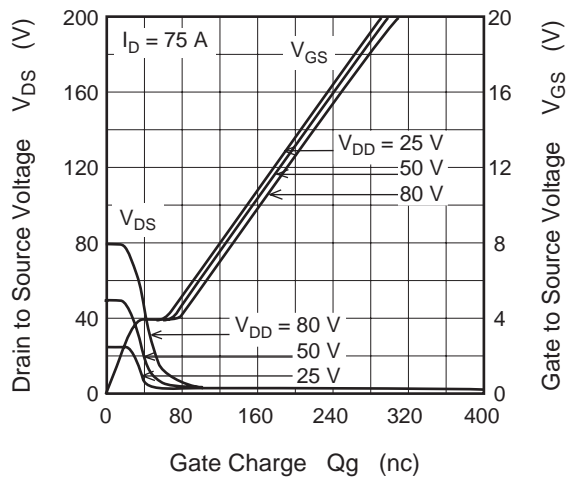
Body to Drain Diode Reverse Recovery Time



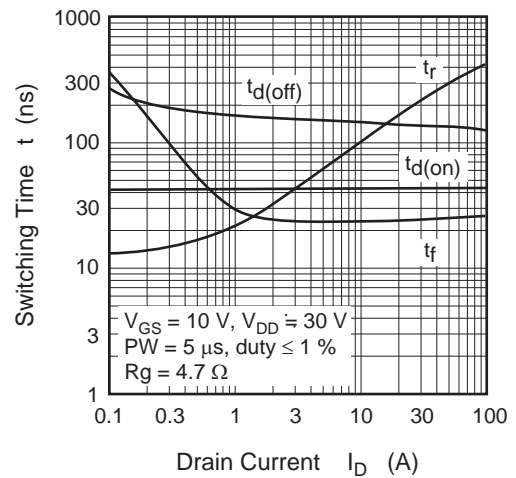
Typical Capacitance vs. Drain to Source Voltage

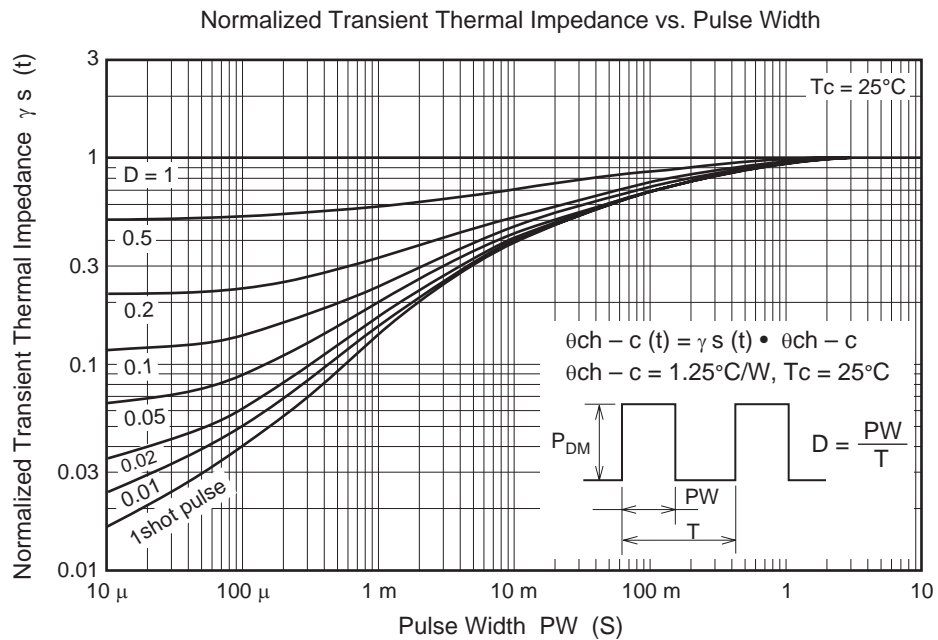
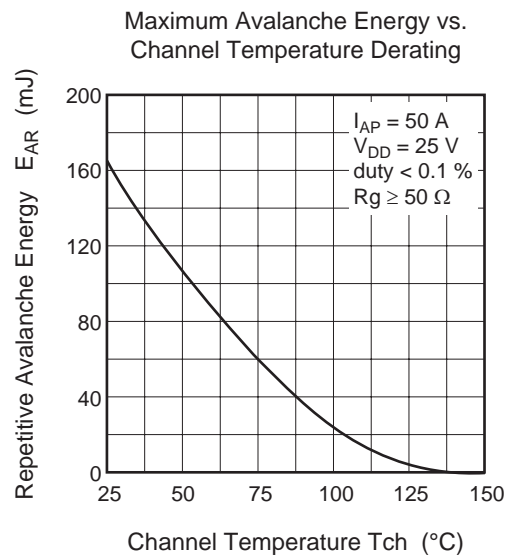
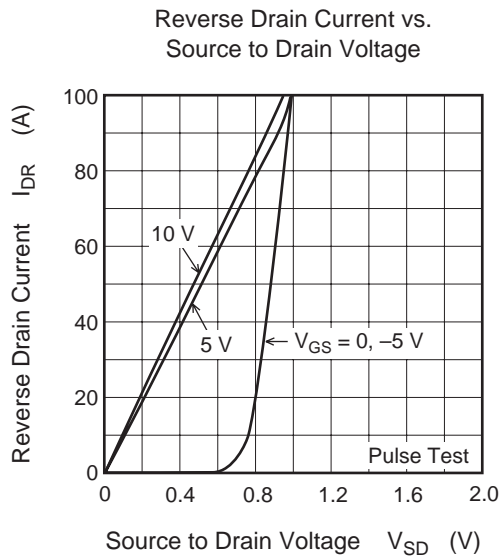


Dynamic Input Characteristics

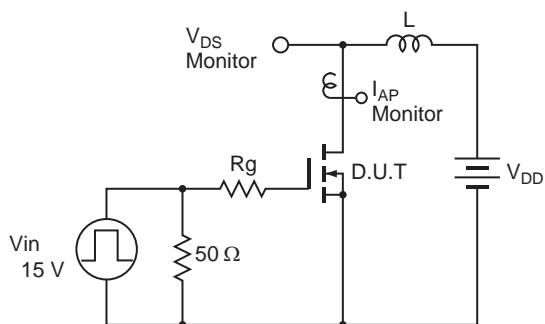


Switching Characteristics



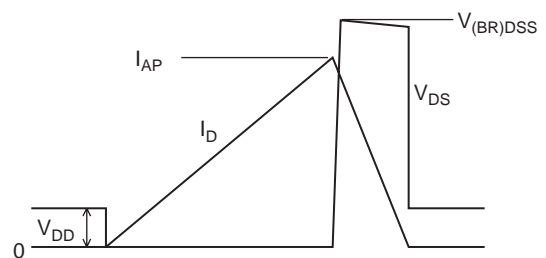


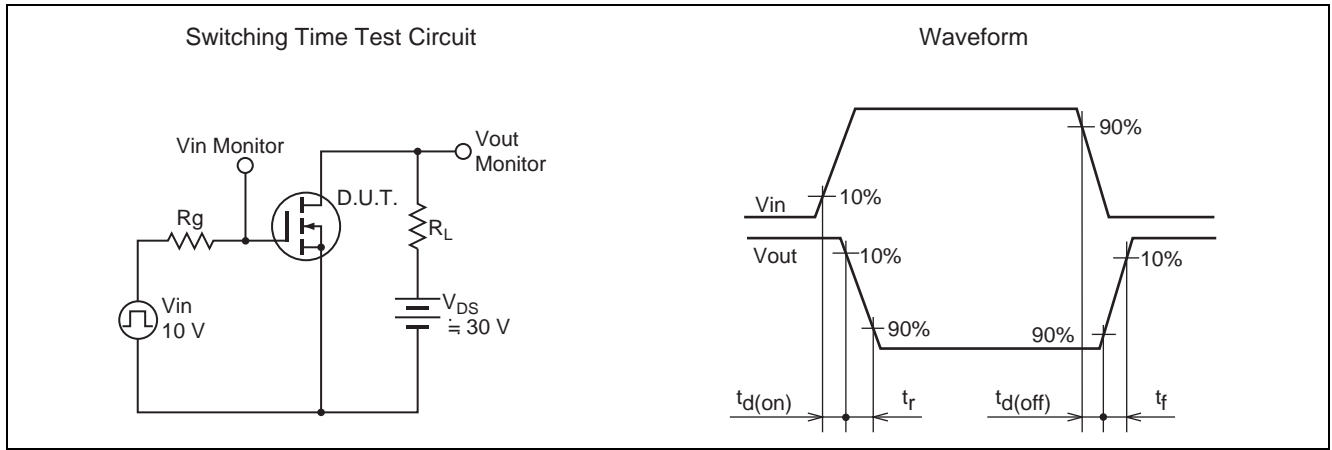
Avalanche Test Circuit



Avalanche Waveform

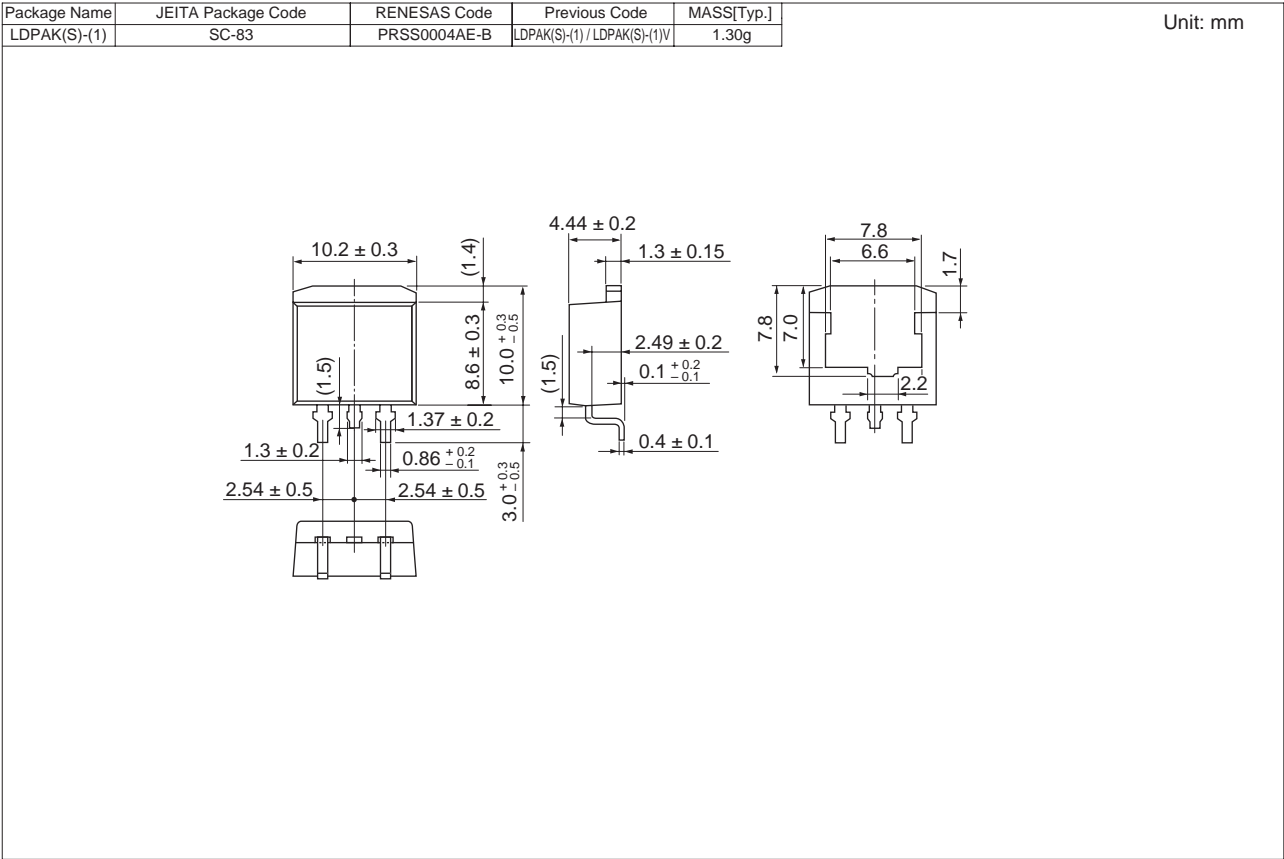
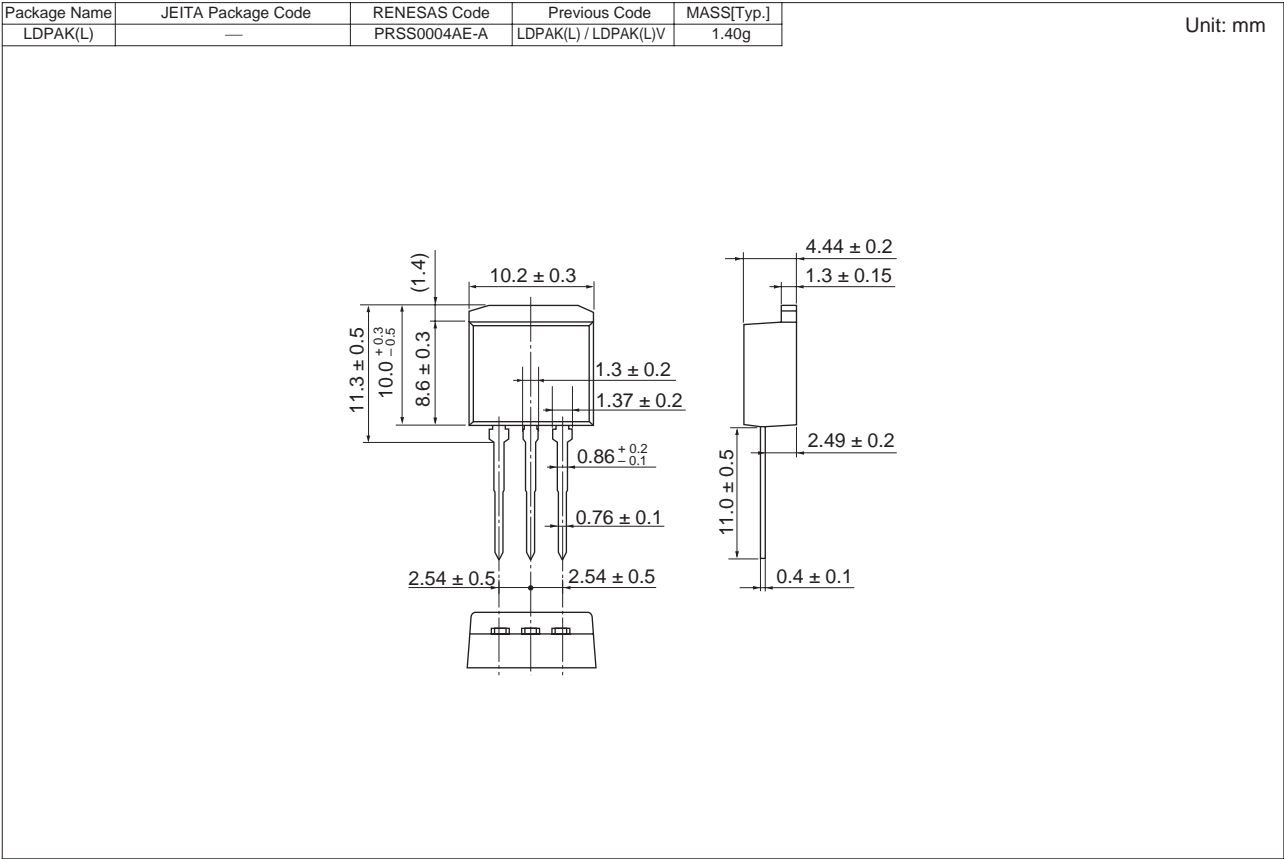
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$







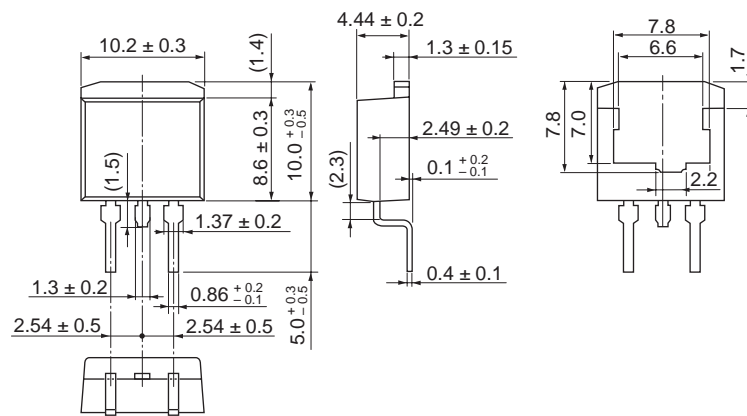
Package Dimensions



## H7N1002LD, H7N1002LS, H7N1002LM

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

Unit: mm



## Ordering Information

Part Name	Quantity	Shipping Container
H7N1002LD-E	500 pcs	Box (Conductive Sack)
H7N1002LSTL-E	1000 pcs	Taping
H7N1002LMTL-E	1000 pcs	Taping

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