

H7N1002LD, H7N1002LS, H7N1002LM

Silicon N Channel MOS FET
High Speed Power Switching

REJ03G1131-0800

Rev.8.00

Nov 13, 2009

Features

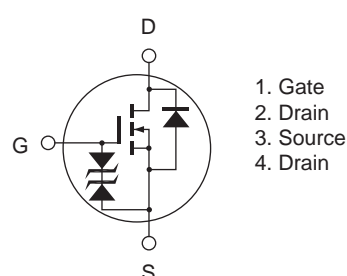
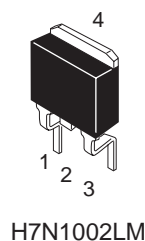
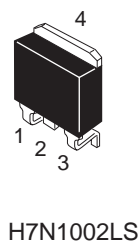
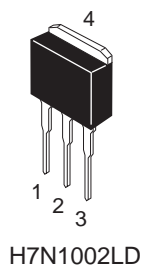
- Low on-resistance
 $R_{DS(on)} = 8 \text{ m}\Omega$ typ.
- Low drive current
- Available for 4.5 V gate drive

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}	± 20	V
Drain current	I_D	75	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	300	A
Body to drain diode reverse drain current	I_{DR}	75	A
Avalanche current	I_{AP} ^{Note 3}	50	A
Avalanche energy	E_{AR} ^{Note 3}	166	mJ
Channel dissipation	P_{ch} ^{Note 2}	100	W
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$

2. Value at $T_c = 25^\circ\text{C}$

3. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$

Electrical Characteristics

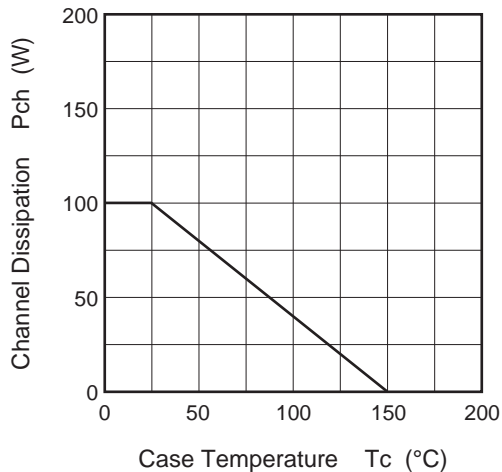
(Ta = 25°C)

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	$V_{(BR) GSS}$	± 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}	—	—	10	μA	$V_{DS} = 100 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Static drain to source on state resistance	$R_{DS(on)}$	—	8	10	$\text{m}\Omega$	$I_D = 37.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
		—	10	15	$\text{m}\Omega$	$I_D = 37.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	57	95	—	S	$I_D = 37.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
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	$I_F = 75 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

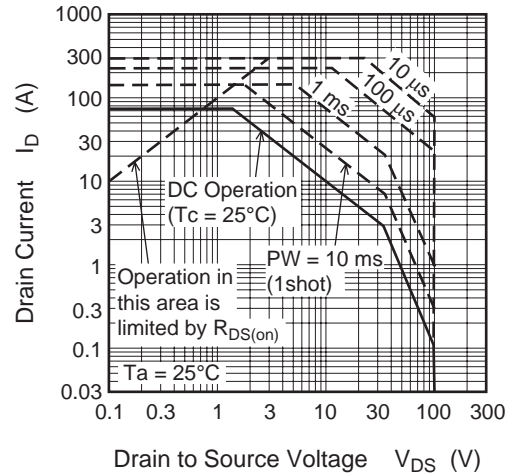
Note: 4. Pulse test

Main Characteristics

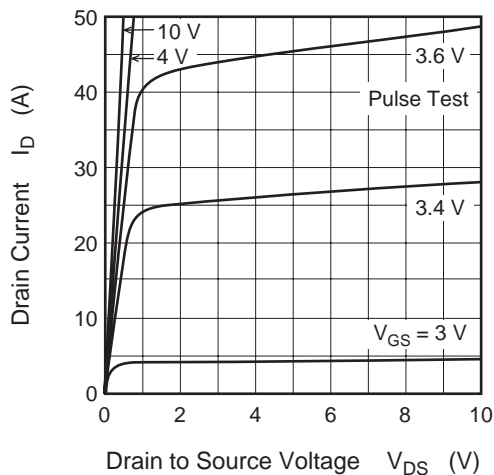
Power vs. Temperature Derating



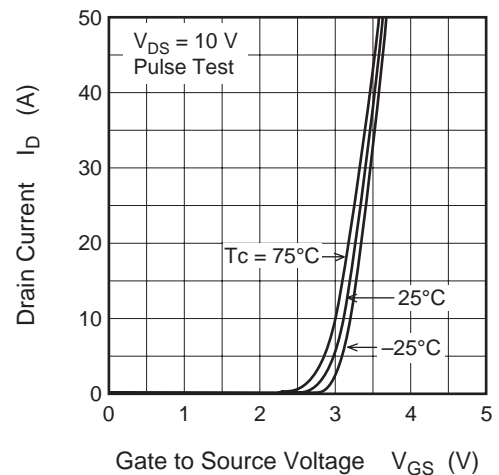
Maximum Safe Operation Area



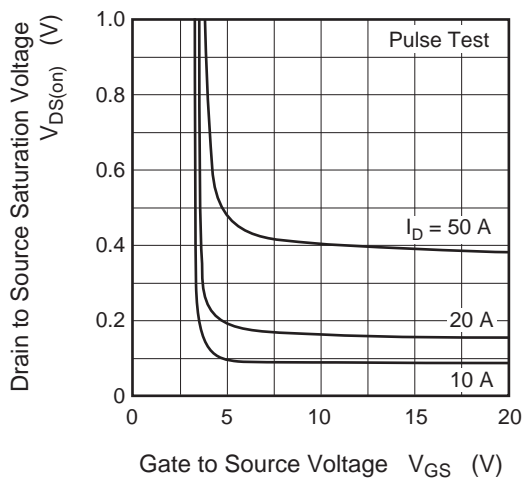
Typical Output Characteristics



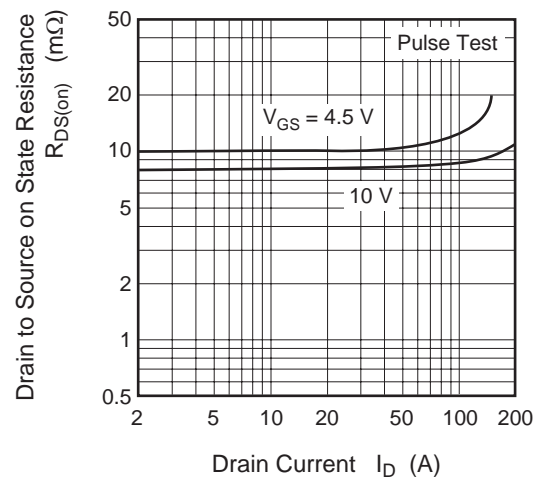
Typical Transfer Characteristics



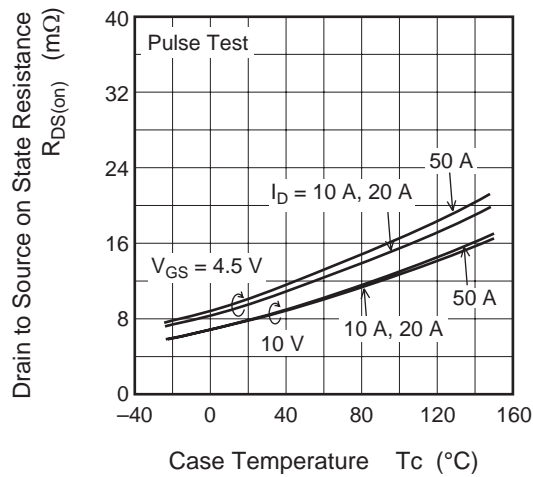
Drain to Source Saturation Voltage vs. Gate to Source Voltage



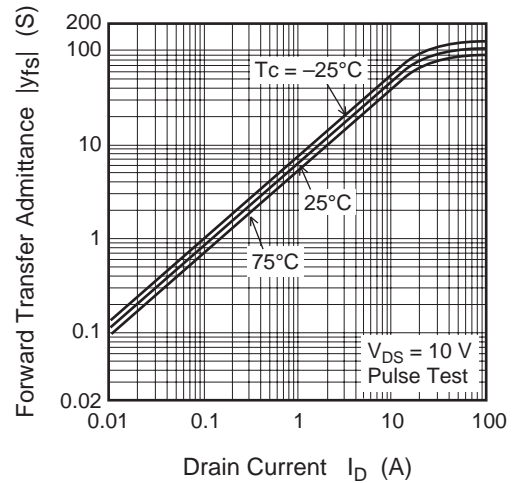
Static Drain to Source on State Resistance vs. Drain Current



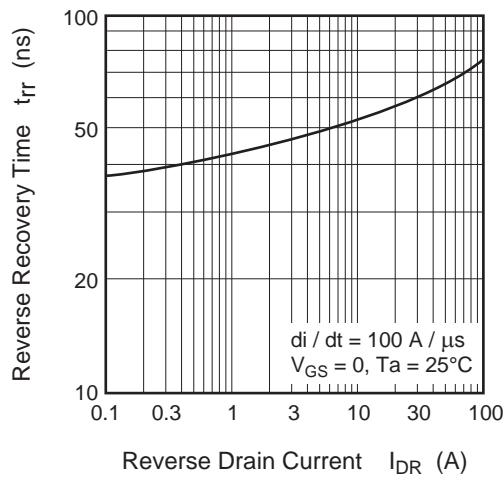
Static Drain to Source on State Resistance vs. Temperature



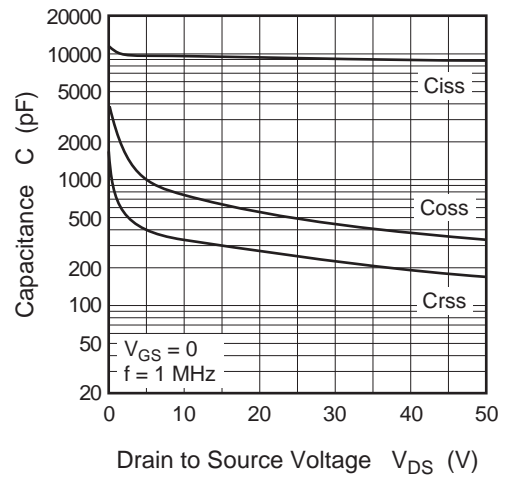
Forward Transfer Admittance vs. Drain Current



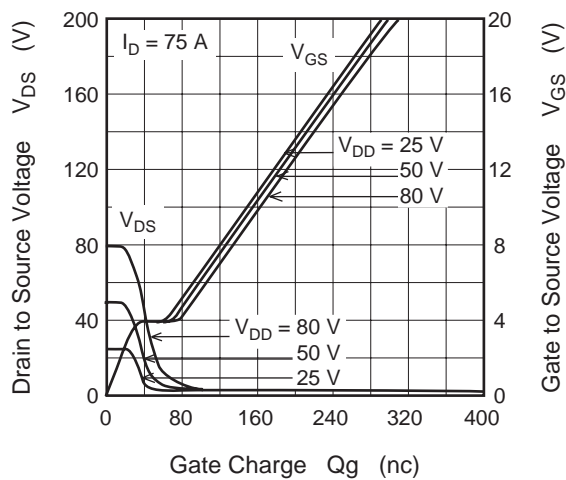
Body to Drain Diode Reverse Recovery Time



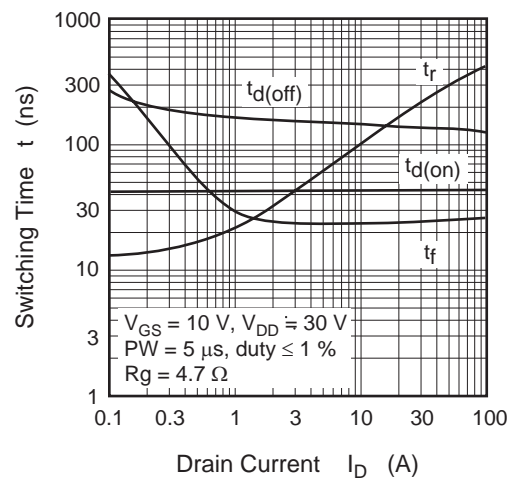
Typical Capacitance vs. Drain to Source Voltage

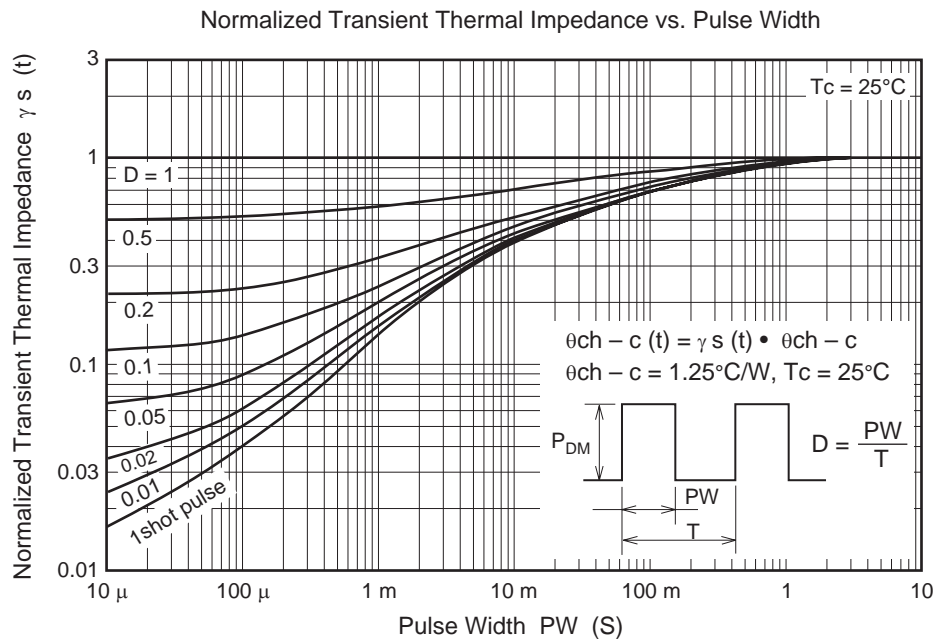
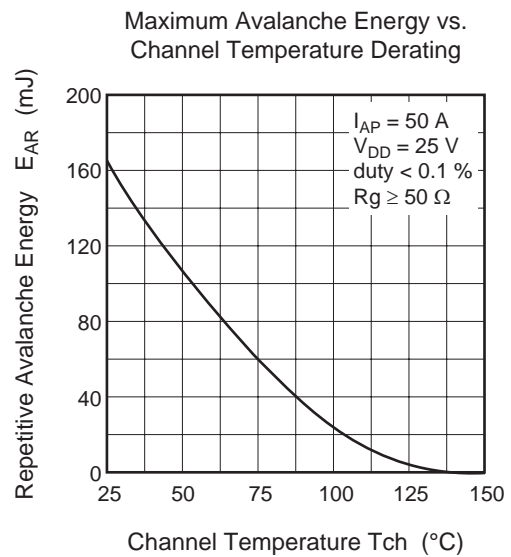
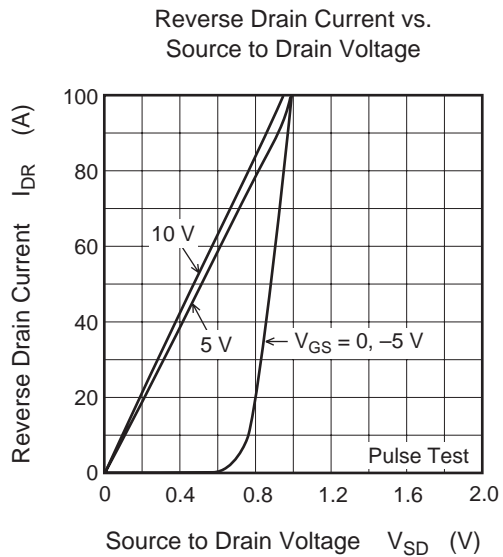


Dynamic Input Characteristics

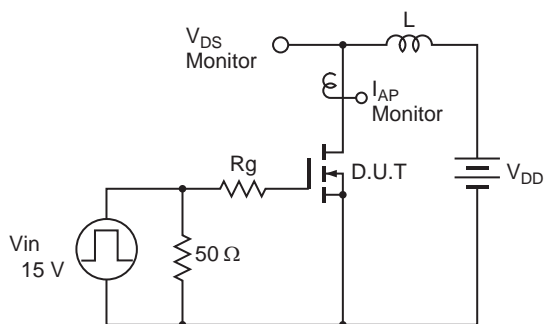


Switching Characteristics



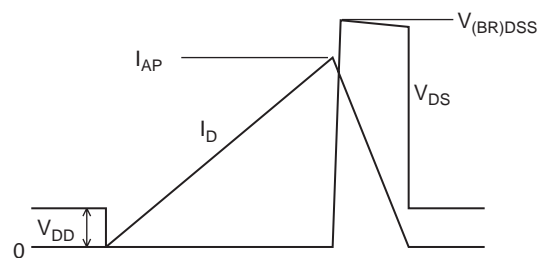


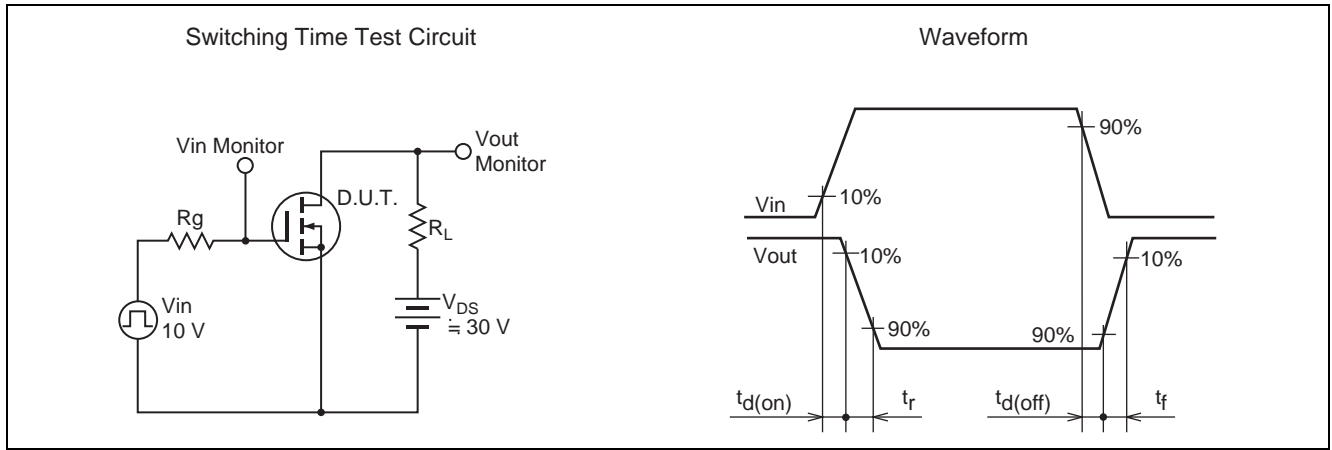
Avalanche Test Circuit



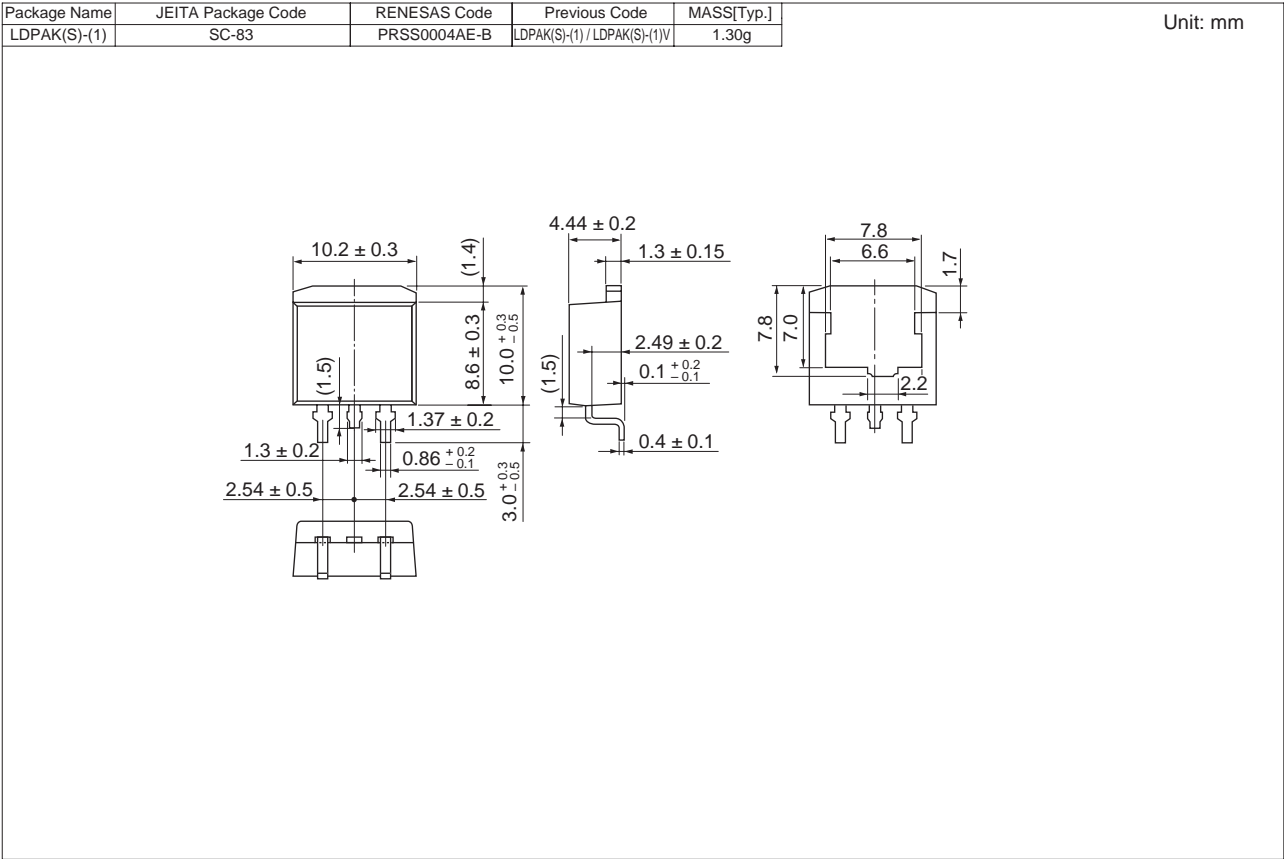
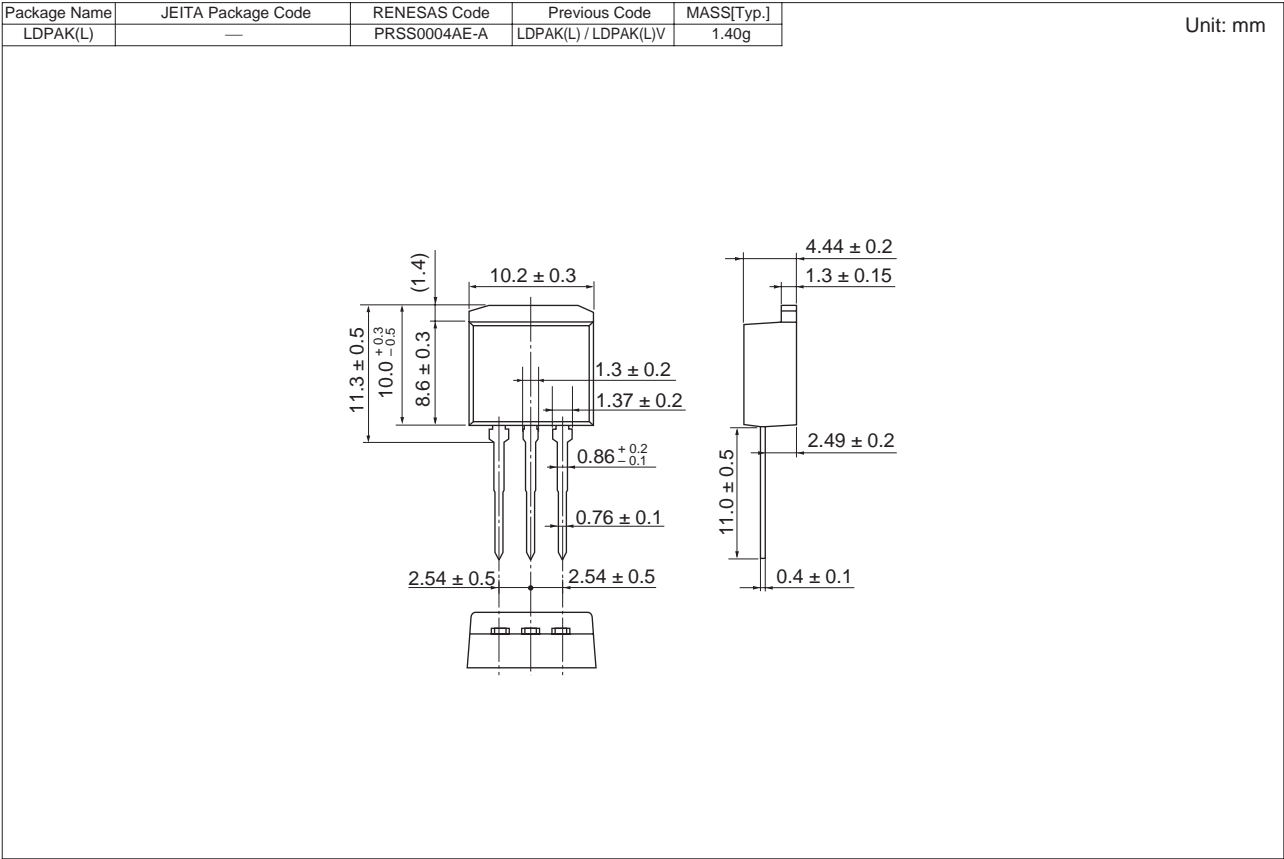
Avalanche Waveform

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





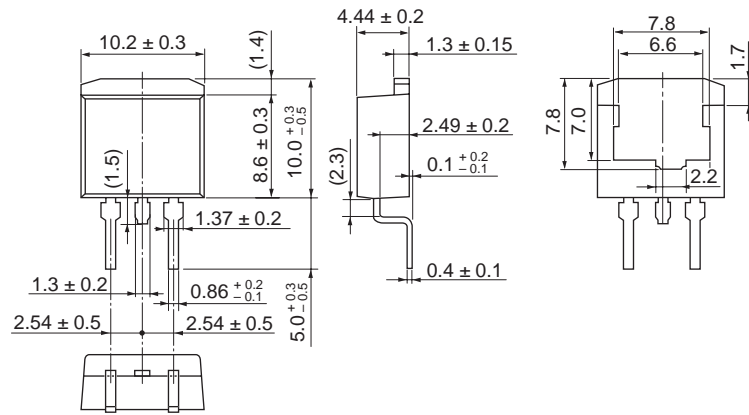
Package Dimensions



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

Notes:

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