To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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H7N0602LD, H7N0602LS, H7N0602LM

Silicon N Channel MOS FET
High Speed Power Switching

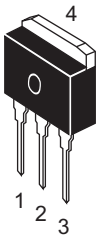
REJ03G1130-0600
Rev.6.00
Oct 16, 2006

Features

- Low on-resistance
  $R_{DS\ (on)}$ = 4.1 mΩ typ.
- 4.5 V gate drive devices
- High Speed Switching

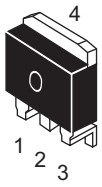
Outline

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



H7N0602LD

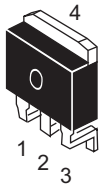
RENESAS Package code: PRSS0004AE-B
(Package name: LDPAK (S)-(1))



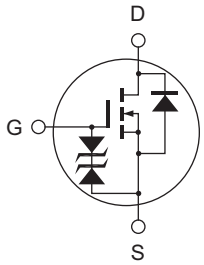
H7N0602LS

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

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



H7N0602LM



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Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	85	A
Drain peak current	$I_{D\ (pulse)}$ Note 1	340	A
Body to drain diode reverse drain current	I_{DR}	85	A
Avalanche current	I_{AP} Note 3	65	A
Avalanche energy	E_{AR} Note 3	362	mJ
Channel dissipation	Pch Note 2	100	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. Value at Tch = 25°C, Rg ≥ 50 Ω

Electrical Characteristics

(Ta = 25°C)

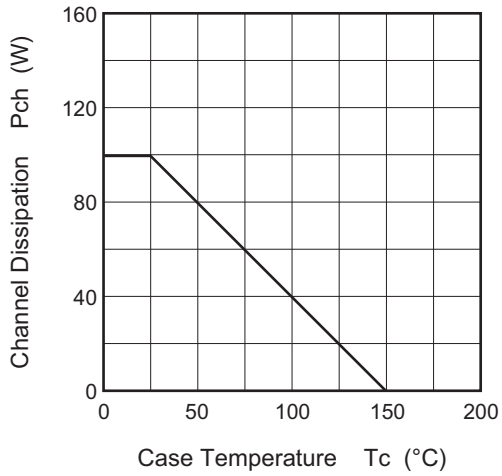
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)\ DSS}$	60	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)\ GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 60 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS\ (off)}$	1.5	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA Note 4
Forward transfer admittance	$\|y_{fs}\|$	70	120	—	S	I_D = 45 A, V_{DS} = 10 V Note 4
Static drain to source on state resistance	$R_{DS\ (on)}$	—	4.1	5.2	mΩ	I_D = 45 A, V_{GS} = 10 V Note 4
		—	6.2	9.0	mΩ	I_D = 45 A, V_{GS} = 4.5 V Note 4
Input capacitance	Ciss	—	9000	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	1000	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	470	—	pF	f = 1 MHz
Total gate charge	Qg	—	140	—	nC	V_{DD} = 25 V
Gate to source charge	Qgs	—	30	—	nC	V_{GS} = 10 V
Gate to drain charge	Qgd	—	30	—	nC	I_D = 85 A
Turn-on delay time	$t_{d\ (on)}$	—	55	—	ns	V_{GS} = 10 V
Rise time	t_r	—	290	—	ns	I_D = 45 A
Turn-off delay time	$t_{d\ (off)}$	—	140	—	ns	R_L = 0.67 Ω
Fall time	t_f	—	50	—	ns	Rg = 4.7 Ω
Body to drain diode forward voltage	V_{DF}	—	0.95	—	V	I_F = 85 A, V_{GS} = 0
Body to drain diode reverse recovery time	t_{rr}	—	45	—	ns	I_F = 85 A, V_{GS} = 0 di_F/dt = 100 A/µs

Note: 4. Pulse test

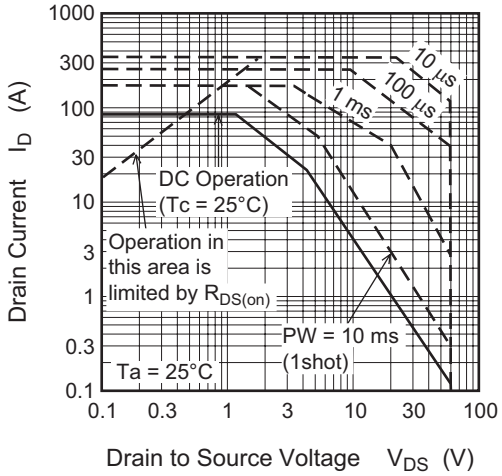
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Main Characteristics

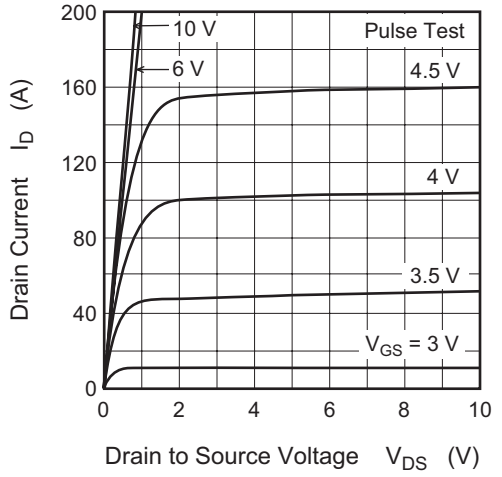
Power vs. Temperature Derating



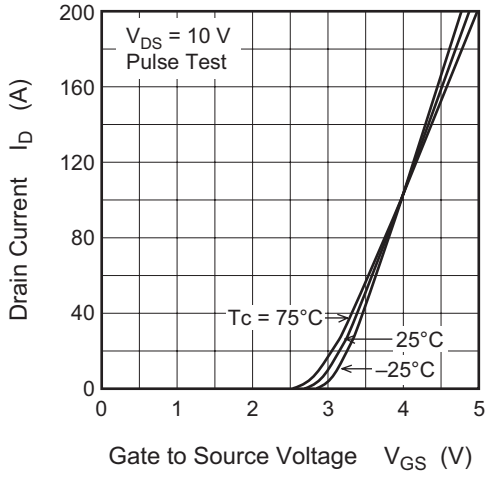
Maximum Safe Operation Area



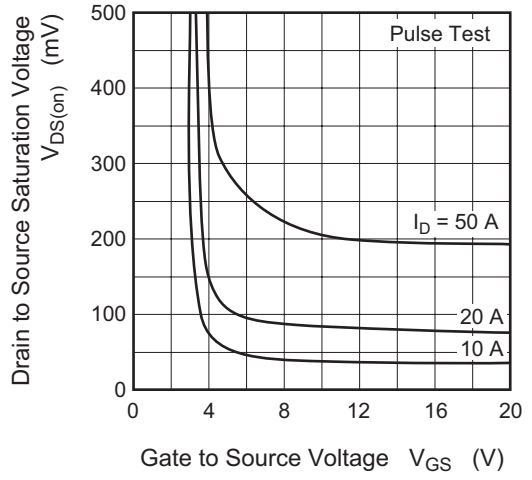
Typical Output Characteristics



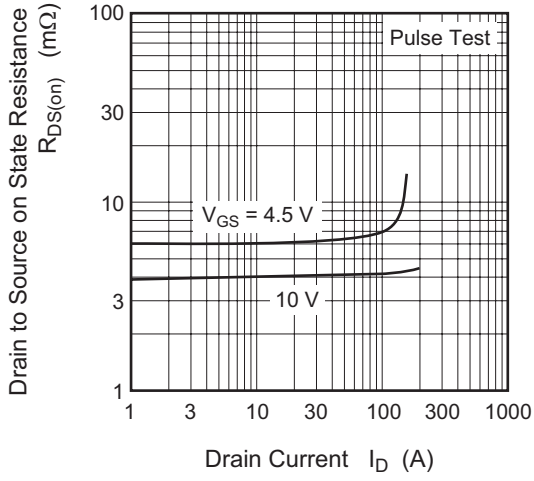
Typical Transfer Characteristics



Drain to Source Saturation Voltage vs.
Gate to Source Voltage

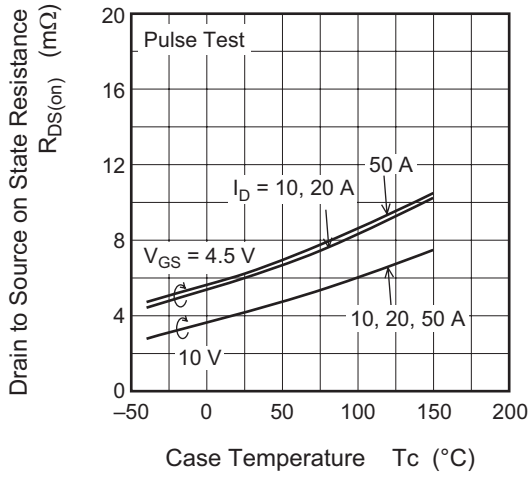


Static Drain to Source on State Resistance
vs. Drain Current

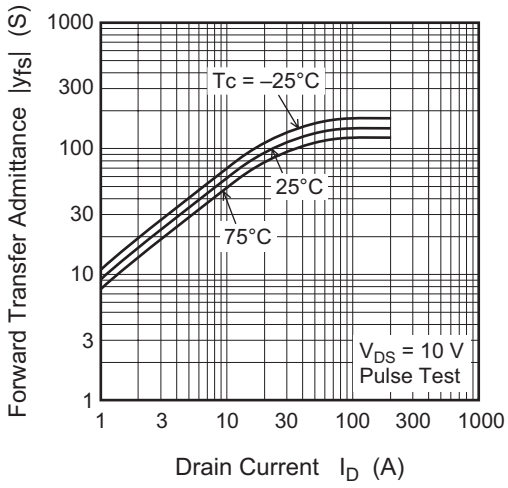


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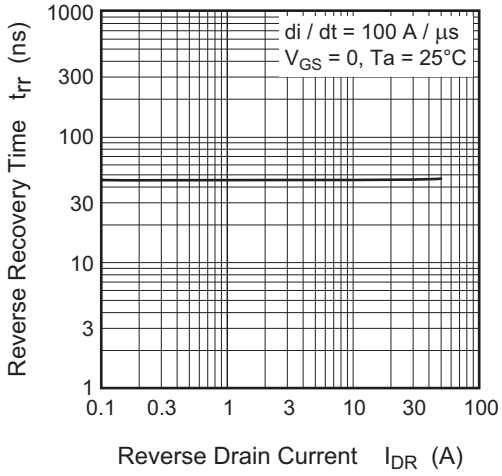
Static Drain to Source on State Resistance vs. Temperature



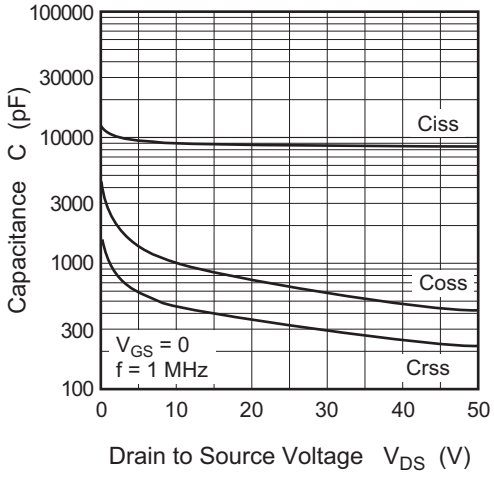
Forward Transfer Admittance vs. Drain Current



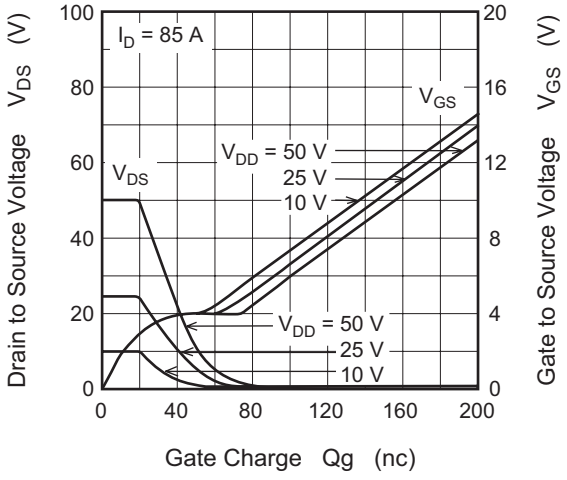
Body to Drain Diode Reverse Recovery Time



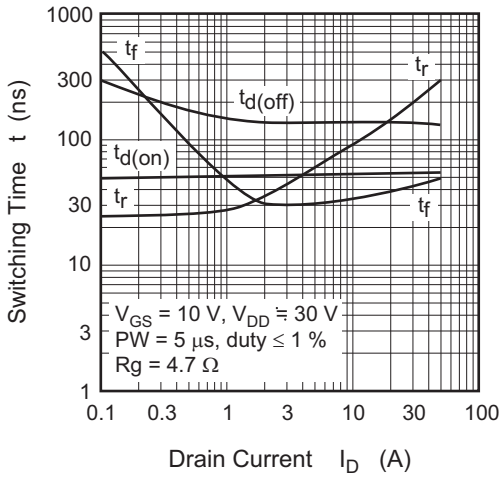
Typical Capacitance vs. Drain to Source Voltage



Dynamic Input Characteristics

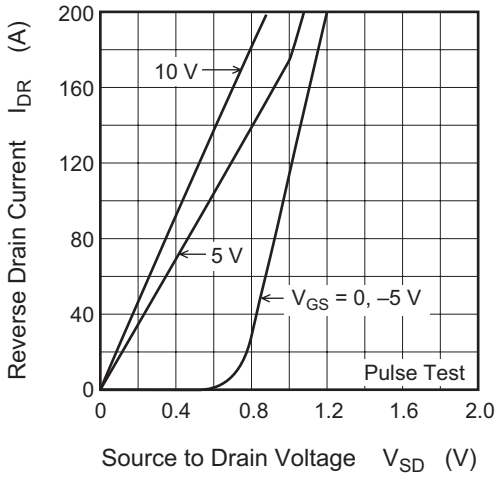


Switching Characteristics

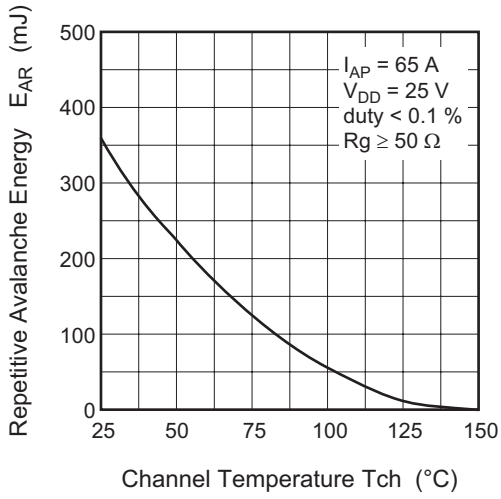


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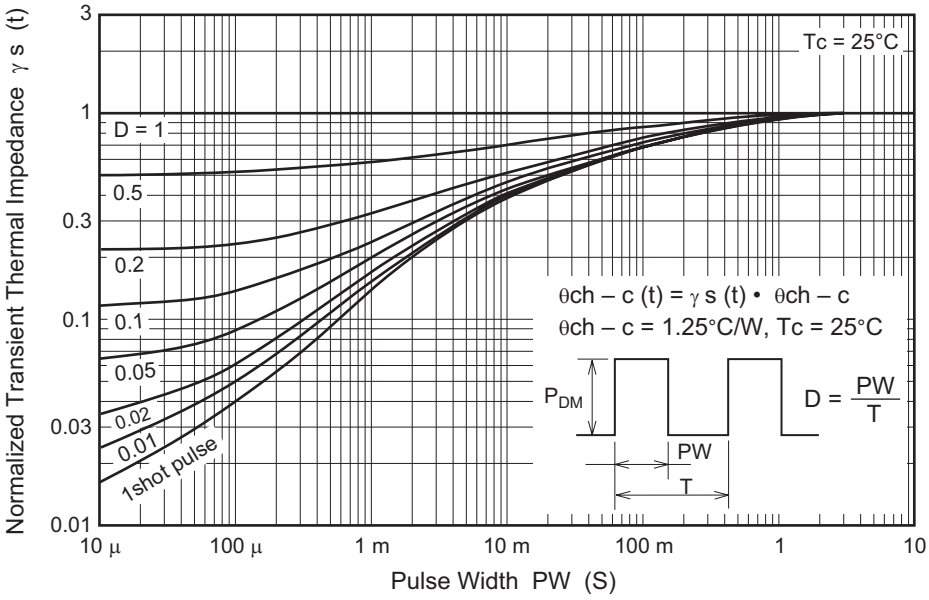
Reverse Drain Current vs. Source to Drain Voltage



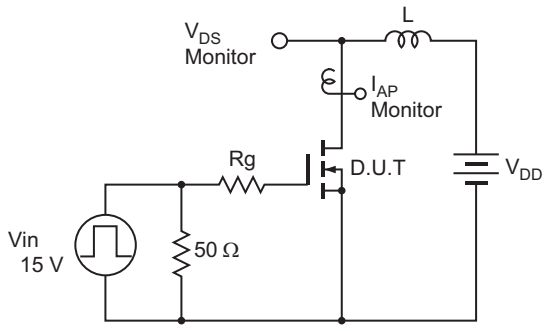
Maximum Avalanche Energy vs. Channel Temperature Derating



Normalized Transient Thermal Impedance vs. Pulse Width

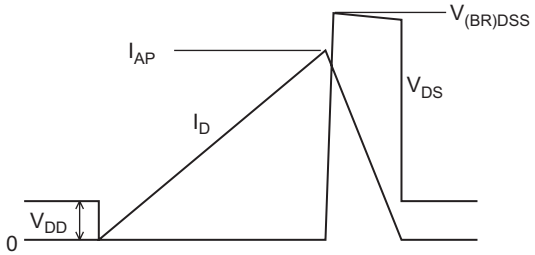


Avalanche Test Circuit



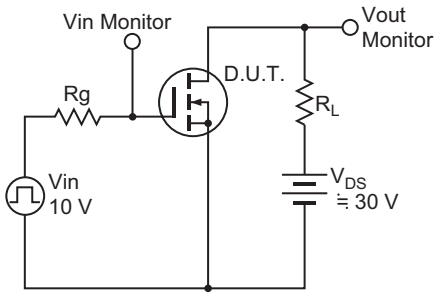
Avalanche Waveform

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

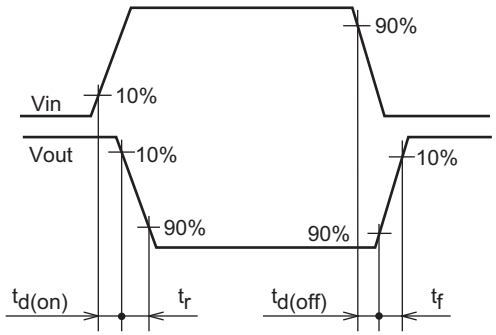


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Switching Time Test Circuit



Waveform

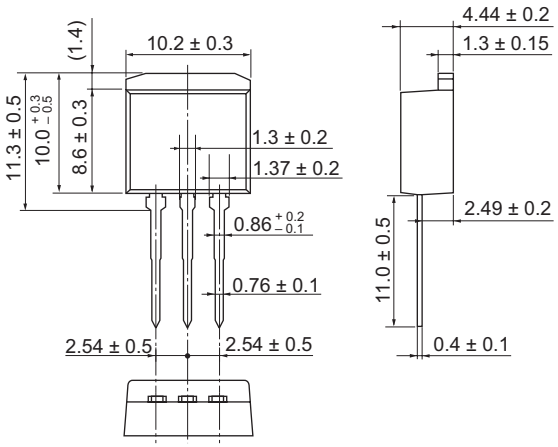


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Package Dimensions

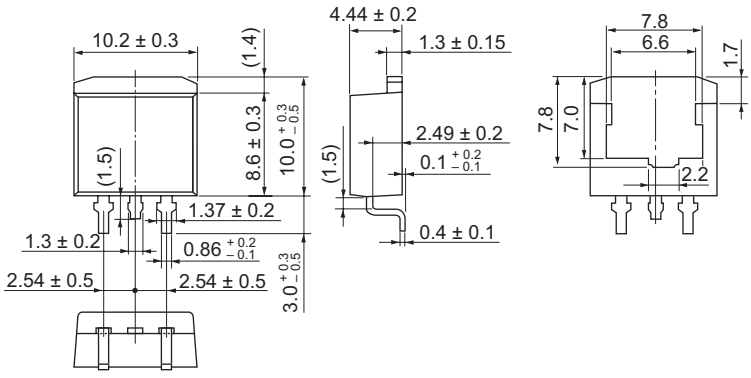
Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
LDPAK(L)	—	PRSS0004AE-A	LDPAK(L) / LDPAK(L)V	1.40g

Unit: mm



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

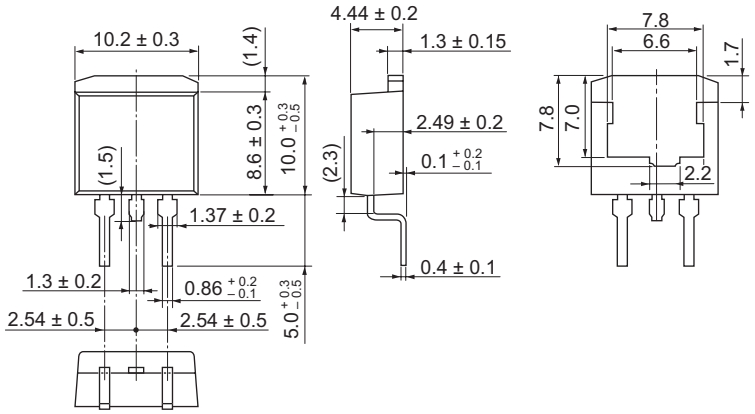
Unit: mm



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

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
H7N0602LD-E	500 pcs	Box (Conductive Sack)
H7N0602LSTL-E	1000 pcs	Taping
H7N0602LMTL-E	1000 pcs	Taping

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