

H7N0312LD, H7N0312LS, H7N0312LM

Silicon N Channel MOS FET
High Speed Power Switching

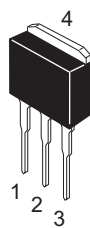
REJ03G1128-0300
(Previous: ADE-208-1572A)
Rev.3.00
Apr 07, 2006

Features

- Low on-resistance
 $R_{DS(on)} = 2.6 \text{ m}\Omega$ typ.
- Low drive current
- 4.5 V gate drive device can be driven from 5 V source

Outline

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



H7N0312LD

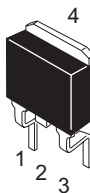
RENESAS Package code: PRSS0004AE-B
(Package name: LDKPAK (S)-(1))



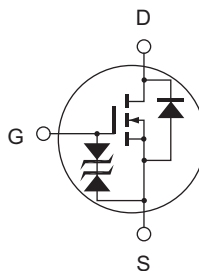
H7N0312LS

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

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



H7N0312LM



Absolute Maximum Ratings

(Ta = 25°C)

| Item | Symbol | Value | Unit |
|---|----------------------------------|-------------|------|
| Drain to source voltage | V_{DS} | 30 | V |
| Gate to source voltage | V_{GS} | ±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 |
| Channel dissipation | P_{ch} ^{Note 2} | 125 | W |
| Channel to case thermal impedance | θ_{ch-c} | 1.0 | °C/W |
| Channel temperature | T_{ch} | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

2. Value at Tc = 25°C

Electrical Characteristics

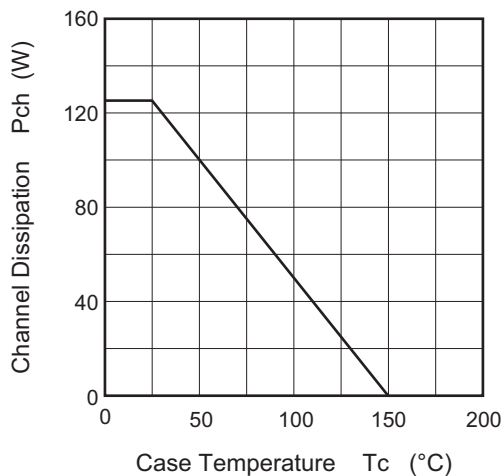
(Ta = 25°C)

| 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 | $I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$ |
| 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 | $V_{DS} = 30 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 1.0 | — | 2.5 | V | $I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ ^{Note 3} |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 2.6 | 3.3 | mΩ | $I_D = 42.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 3} |
| | | — | 4.0 | 5.8 | mΩ | $I_D = 42.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note 3} |
| Forward transfer admittance | $ y_{fs} $ | 75 | 125 | — | S | $I_D = 42.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 3} |
| Input capacitance | C_{iss} | — | 6900 | — | pF | $V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 1750 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 820 | — | pF | |
| Total gate charge | Q_g | — | 115 | — | nC | $V_{DD} = 10 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 85 \text{ A}$ |
| Gate to source charge | Q_{gs} | — | 24 | — | nC | |
| Gate to drain charge | Q_{gd} | — | 24 | — | nC | |
| Turn-on delay time | $t_{d(on)}$ | — | 45 | — | ns | $V_{GS} = 10 \text{ V}$, $I_D = 42.5 \text{ A}$ $R_L = 0.24 \text{ }\Omega$ $R_g = 4.7 \text{ }\Omega$ |
| Rise time | t_r | — | 380 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 125 | — | ns | |
| Fall time | t_f | — | 50 | — | ns | |
| Body to drain diode forward voltage | V_{DF} | — | 0.92 | — | V | $I_F = 85 \text{ A}$, $V_{GS} = 0$ |
| Body to drain diode reverse recovery time | t_{rr} | — | 75 | — | ns | $I_F = 85 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu\text{s}$ |

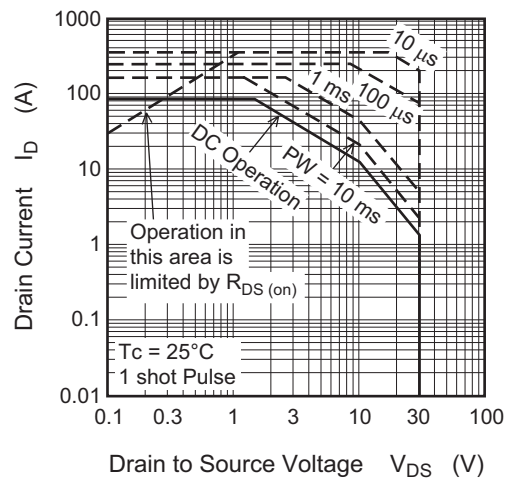
Note: 3. Pulse test

Main Characteristics

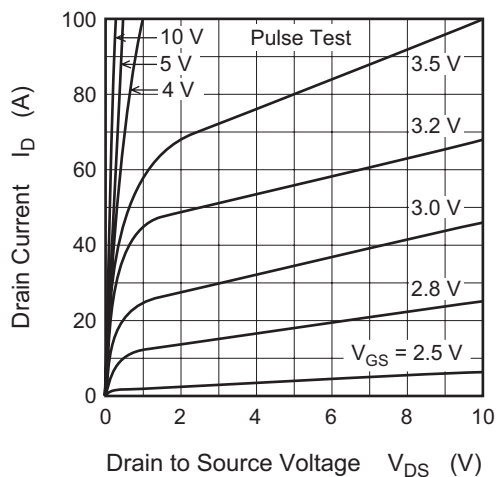
Power vs. Temperature Derating



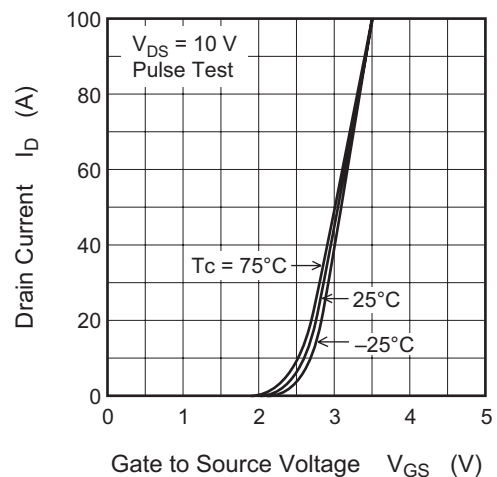
Maximum Safe Operation Area



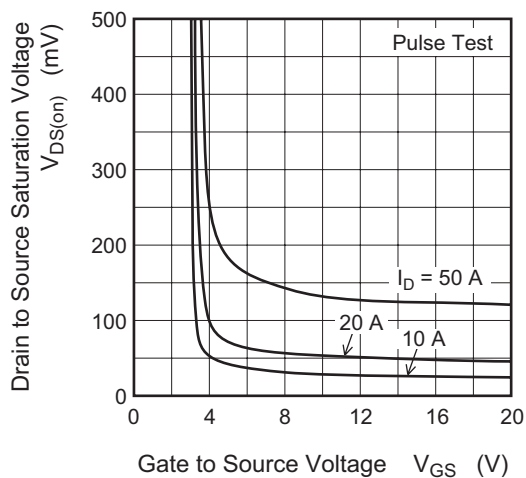
Typical Output Characteristics



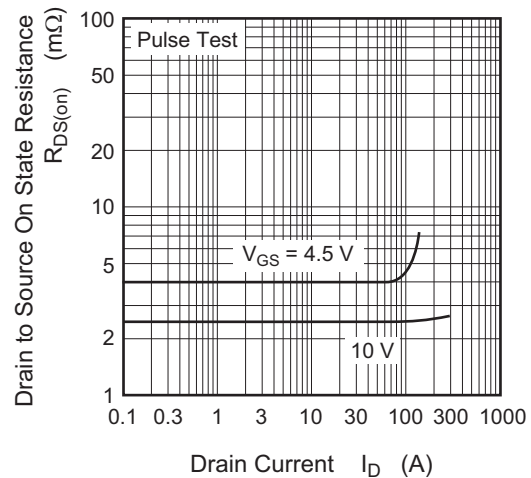
Typical Transfer Characteristics

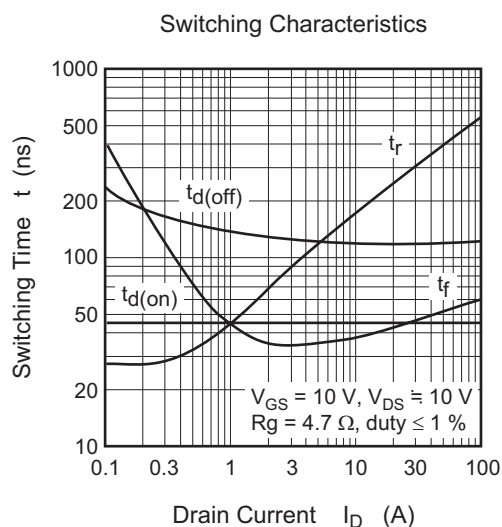
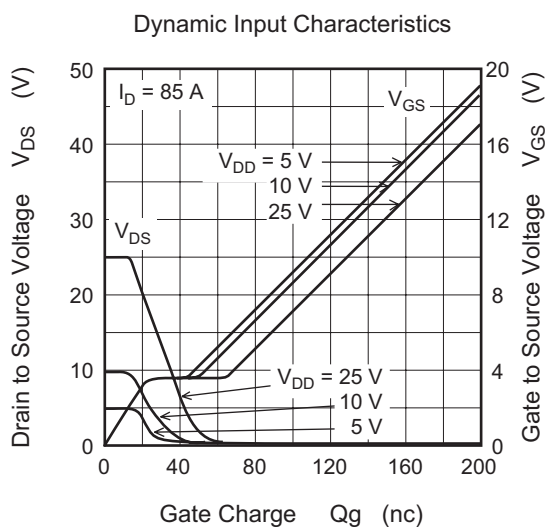
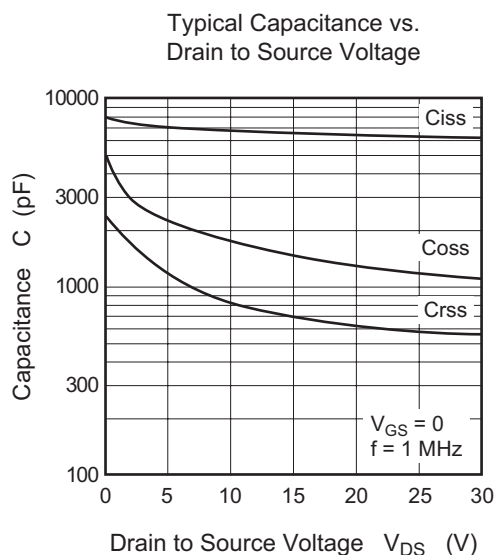
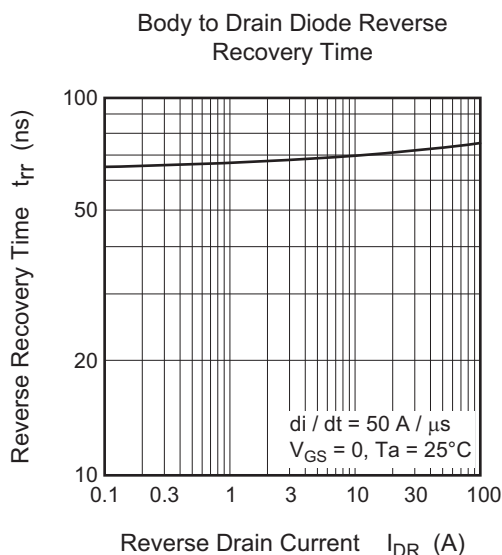
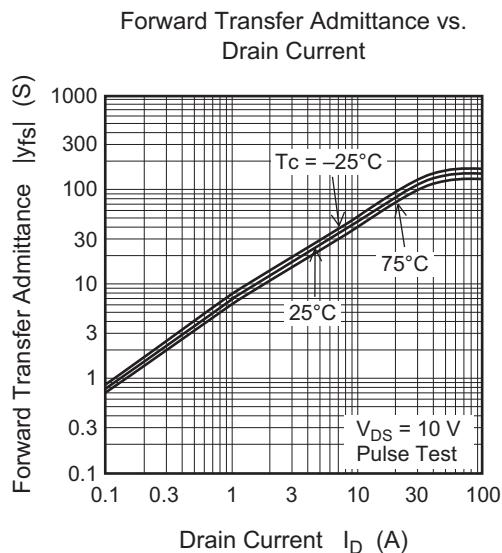
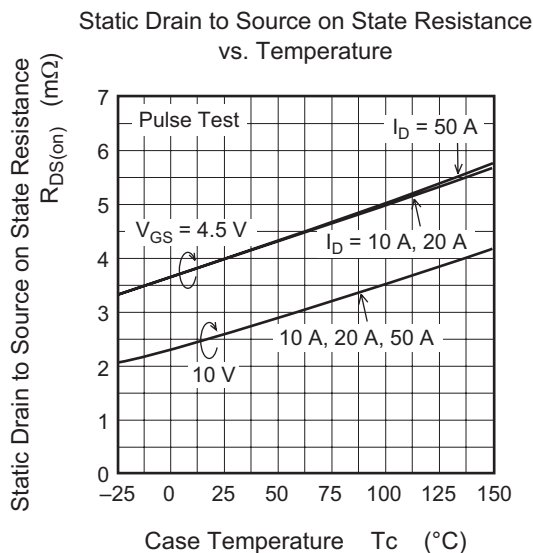


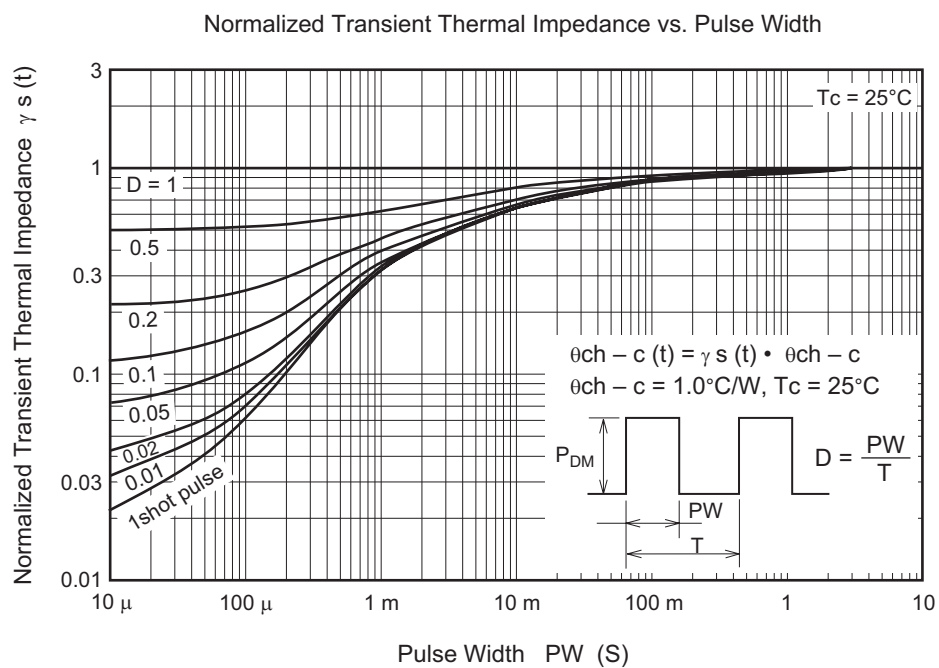
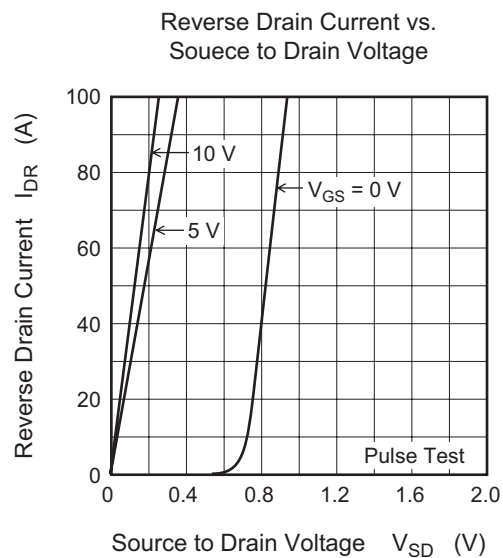
Drain to Source Saturation Voltage vs. Gate to Source Voltage



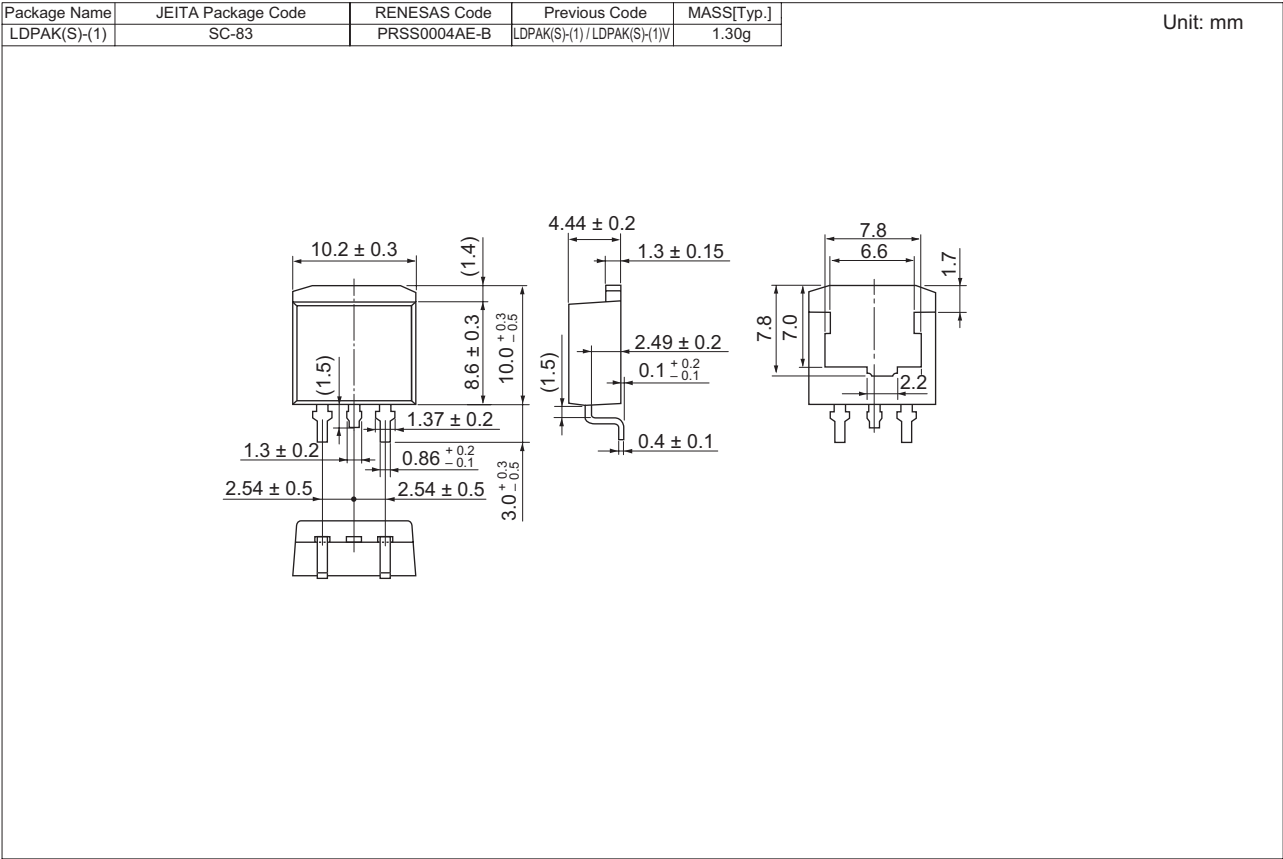
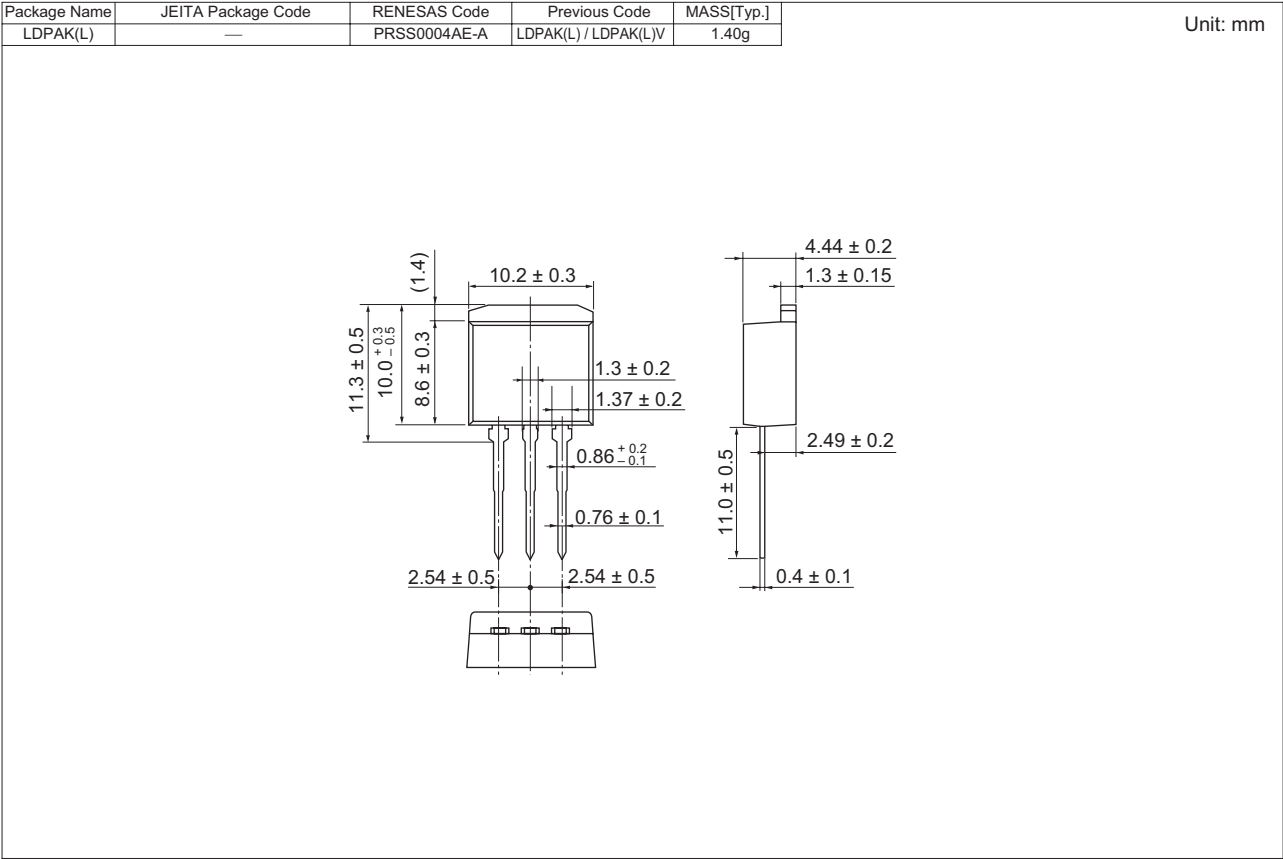
Static Drain to Source on State Resistance vs. Drain Current







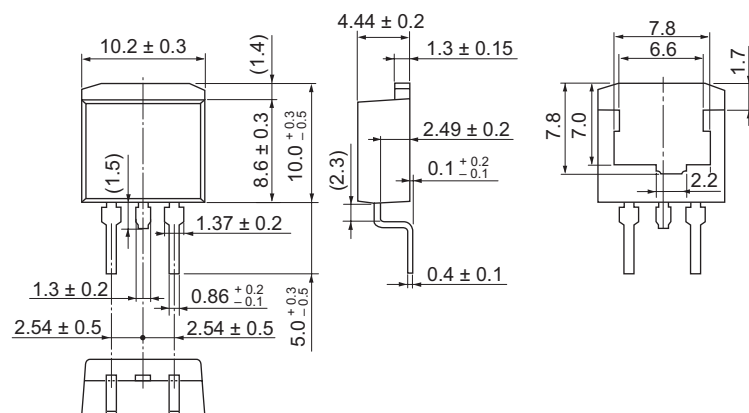
Package Dimensions



H7N0312LD, H7N0312LS, H7N0312LM

| 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 |
|---------------|----------|-----------------------|
| H7N0312LD-E | 500 pcs | Box (Conductive Sack) |
| H7N0312LSTL-E | 1000 pcs | Taping |
| H7N0312LMTL-E | 1000 pcs | Taping |

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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