

H5N5006LD, H5N5006LS, H5N5006LM

Silicon N Channel MOS FET
High Speed Power Switching

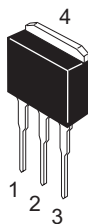
REJ03G1115-0100
(Previous: ADE-208-1549)
Rev.1.00
Apr 07, 2006

Features

- Low on-resistance
- Low leakage current
- High speed switching
- Low gate charge
- Avalanche ratings

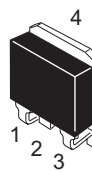
Outline

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



H5N5006LD

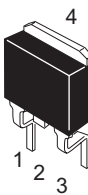
RENESAS Package code: PRSS0004AE-B
(Package name: LDKPAK (S)-(1))



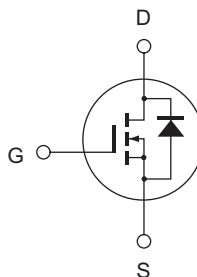
H5N5006LS

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

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



H5N5006LM



Absolute Maximum Ratings

(Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|---|-----------------------------------|-------------|------|
| Drain to source voltage | V_{DS} | 500 | V |
| Gate to source voltage | V_{GS} | ± 30 | V |
| Drain current | I_D | 3.5 | A |
| Drain peak current | $I_{D (pulse)}$ ^{Note 1} | 14 | A |
| Body to drain diode reverse drain current | I_{DR} | 3.5 | A |
| Avalanche current | I_{AP} ^{Note 3} | 3.5 | A |
| Channel dissipation | P_{ch} ^{Note 2} | 50 | W |
| Channel to case Thermal Impedance | θ_{ch-c} | 2.5 | °C/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. $T_{ch} \leq 150^\circ C$

Electrical Characteristics

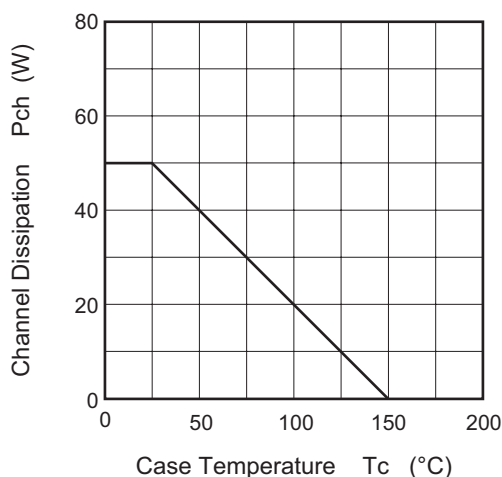
(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|----------------|-----|------|-----------|----------|---|
| Drain to source breakdown voltage | $V_{(BR) DSS}$ | 500 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 0.1 | μA | $V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 500 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS (off)}$ | 3.0 | — | 4.5 | V | $I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ |
| Static drain to source on state resistance | $R_{DS (on)}$ | — | 2.5 | 3.0 | Ω | $I_D = 1.75 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4} |
| Forward transfer admittance | $ y_{fs} $ | 1.8 | 3.0 | — | S | $I_D = 1.75 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4} |
| Input capacitance | C_{iss} | — | 365 | — | pF | $V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 35 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 8 | — | pF | |
| Turn-on delay time | $t_{d (on)}$ | — | 20 | — | ns | $V_{DD} \cong 250 \text{ V}$, $I_D = 1.75 \text{ A}$ $R_L = 143 \Omega$ $V_{GS} = 10 \text{ V}$ $R_g = 10 \Omega$ |
| Rise time | t_r | — | 13 | — | ns | |
| Turn-off delay time | $t_{d (off)}$ | — | 48 | — | ns | |
| Fall time | t_f | — | 14 | — | ns | |
| Total gate charge | Q_g | — | 14 | — | nC | $V_{DD} = 400 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 3.5 \text{ A}$ |
| Gate to source charge | Q_{gs} | — | 2 | — | nC | |
| Gate to drain charge | Q_{gd} | — | 8 | — | nC | |
| Body to drain diode forward voltage | V_{DF} | — | 0.85 | 1.3 | V | $I_F = 3.5 \text{ A}$, $V_{GS} = 0$ |
| Body to drain diode reverse recovery time | t_{rr} | — | 280 | — | ns | $I_F = 3.5 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu s$ |
| Body to drain diode reverse recovery charge | Q_{rr} | — | 0.8 | — | μC | |

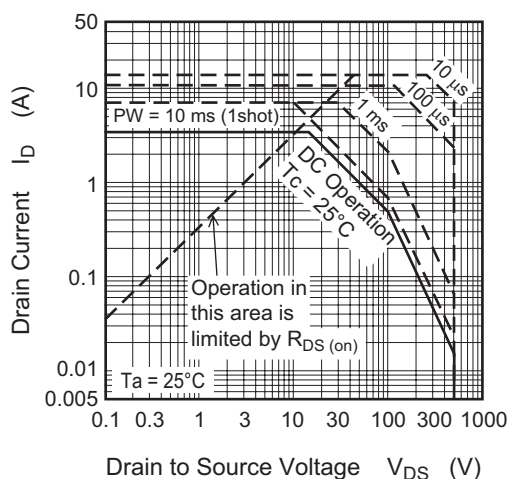
Note: 4. Pulse test

Main Characteristics

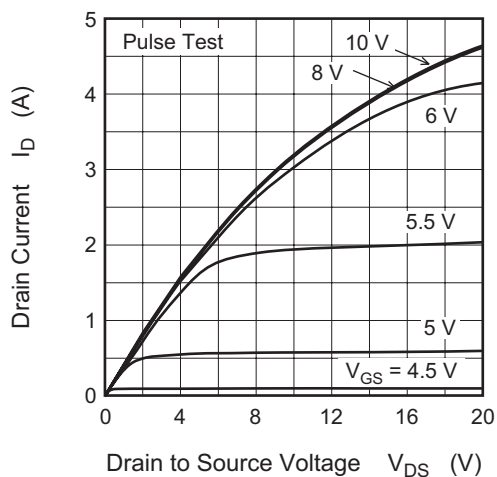
Power vs. Temperature Derating



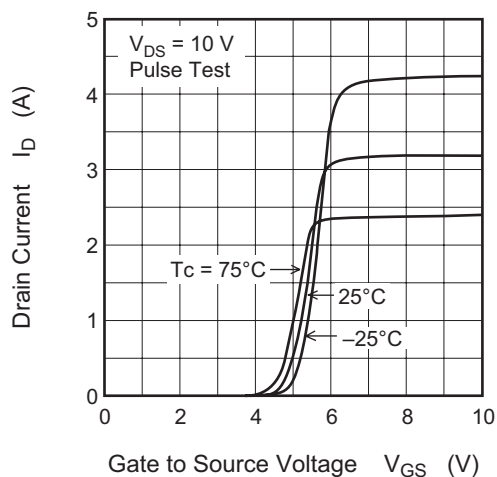
Maximum Safe Operation Area



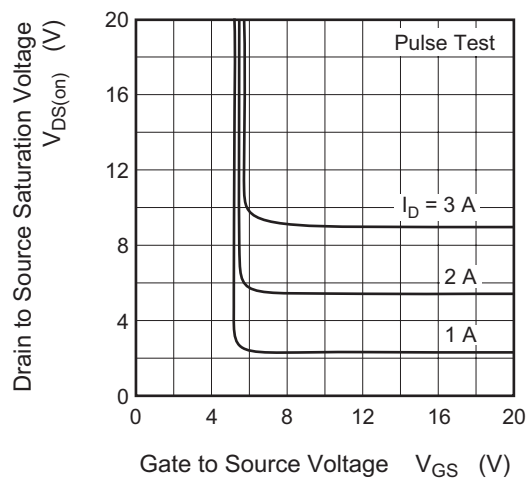
Typical Output Characteristics



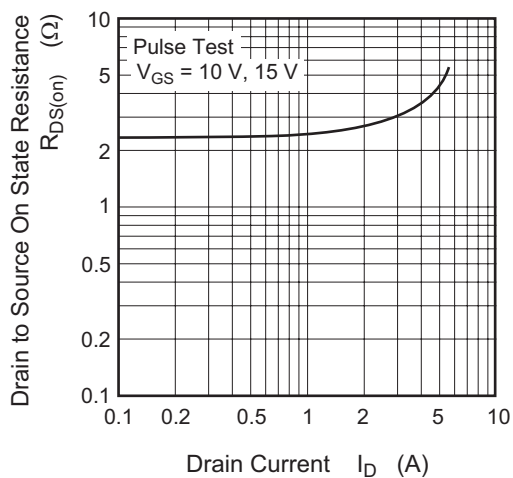
Typical Transfer Characteristics

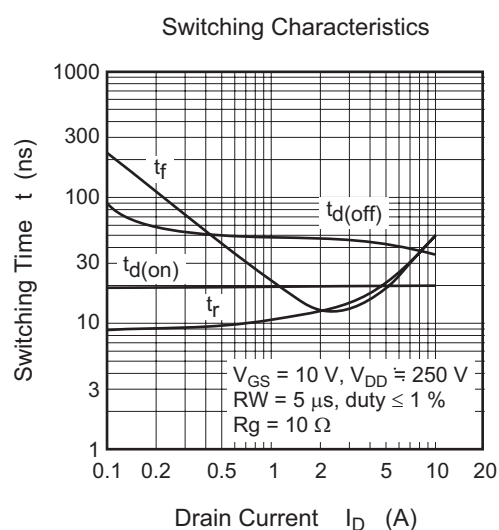
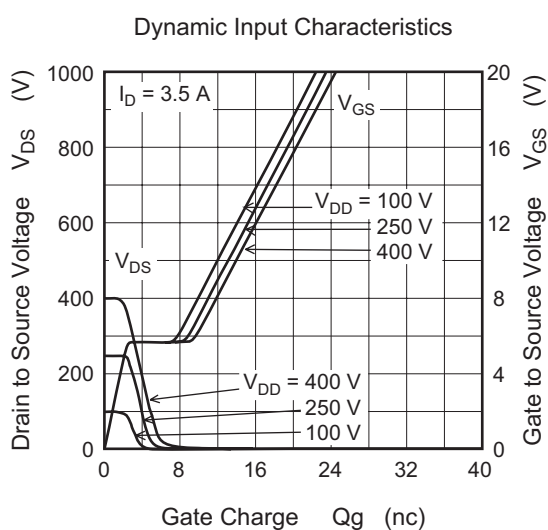
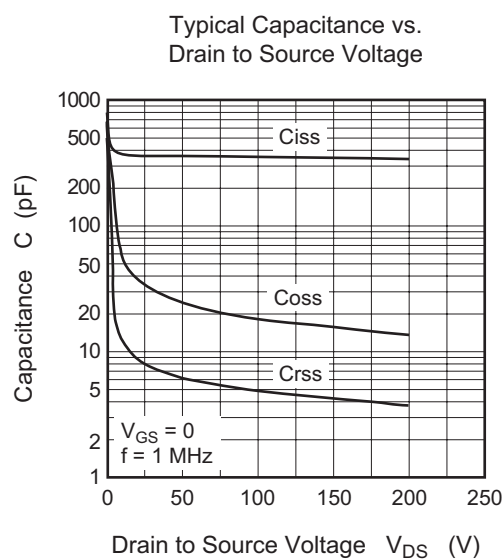
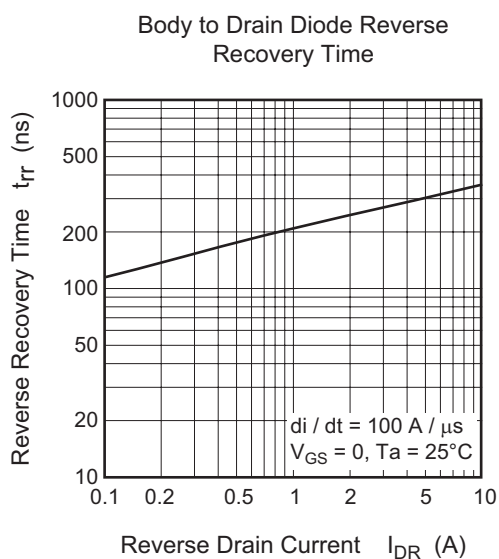
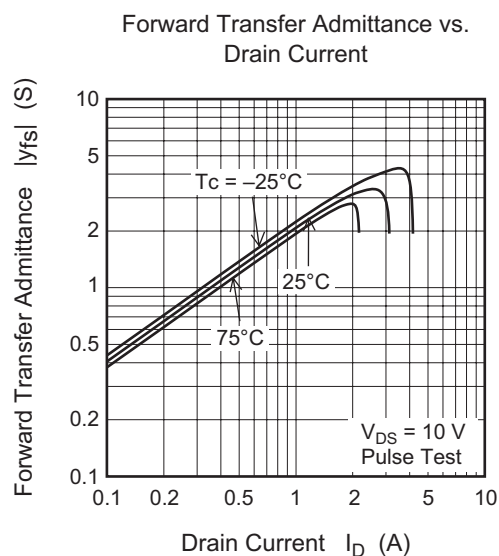
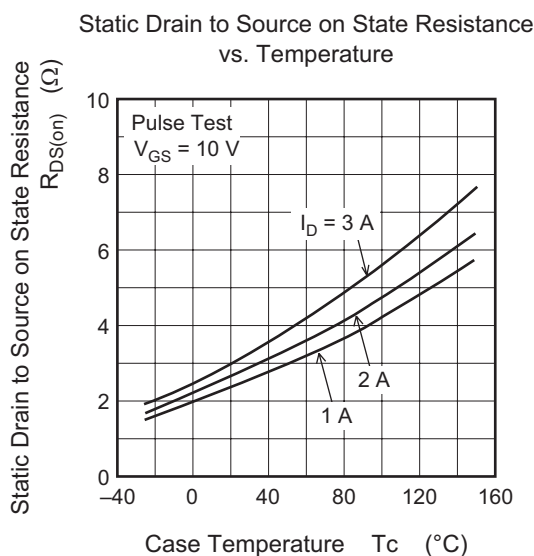


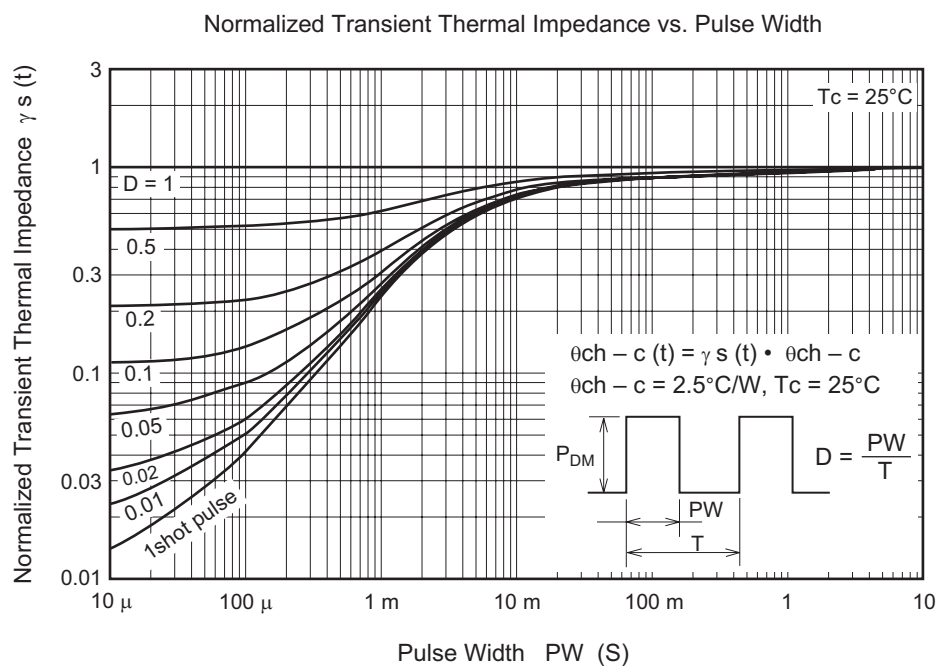
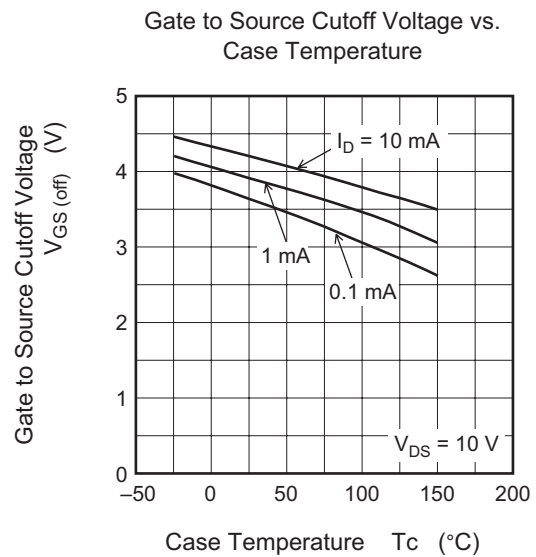
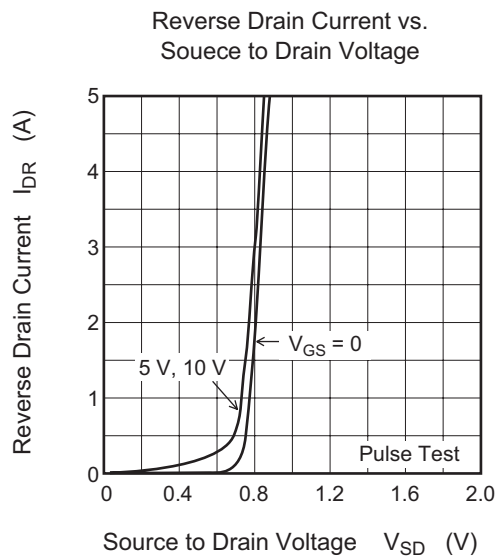
Drain to Source Saturation Voltage vs. Gate to Source Voltage



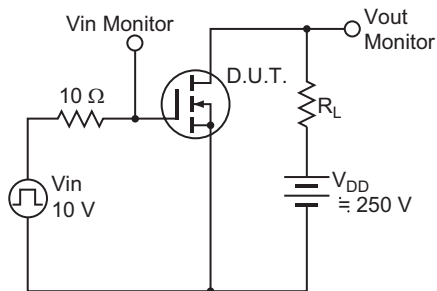
Static Drain to Source on State Resistance vs. Drain Current



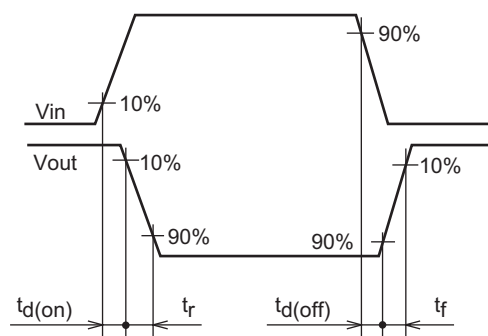




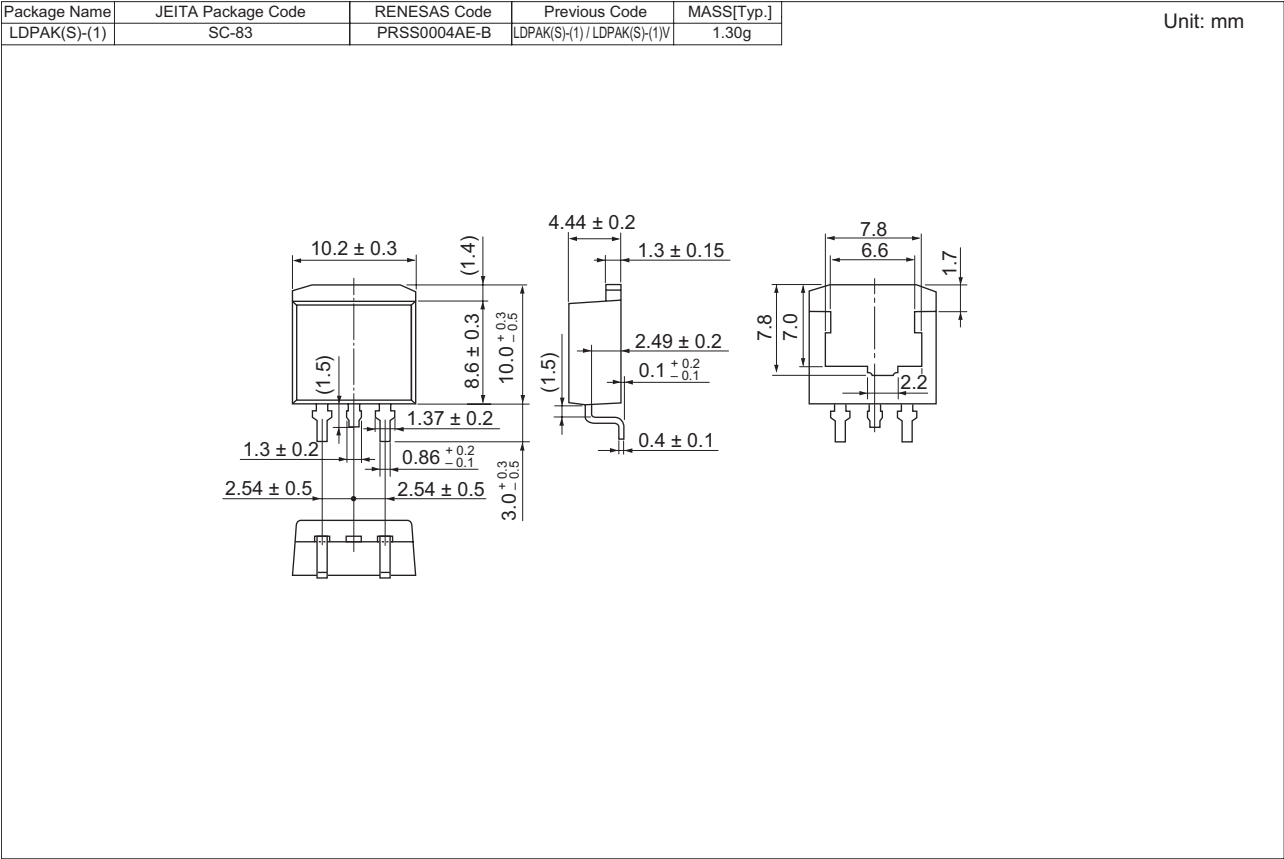
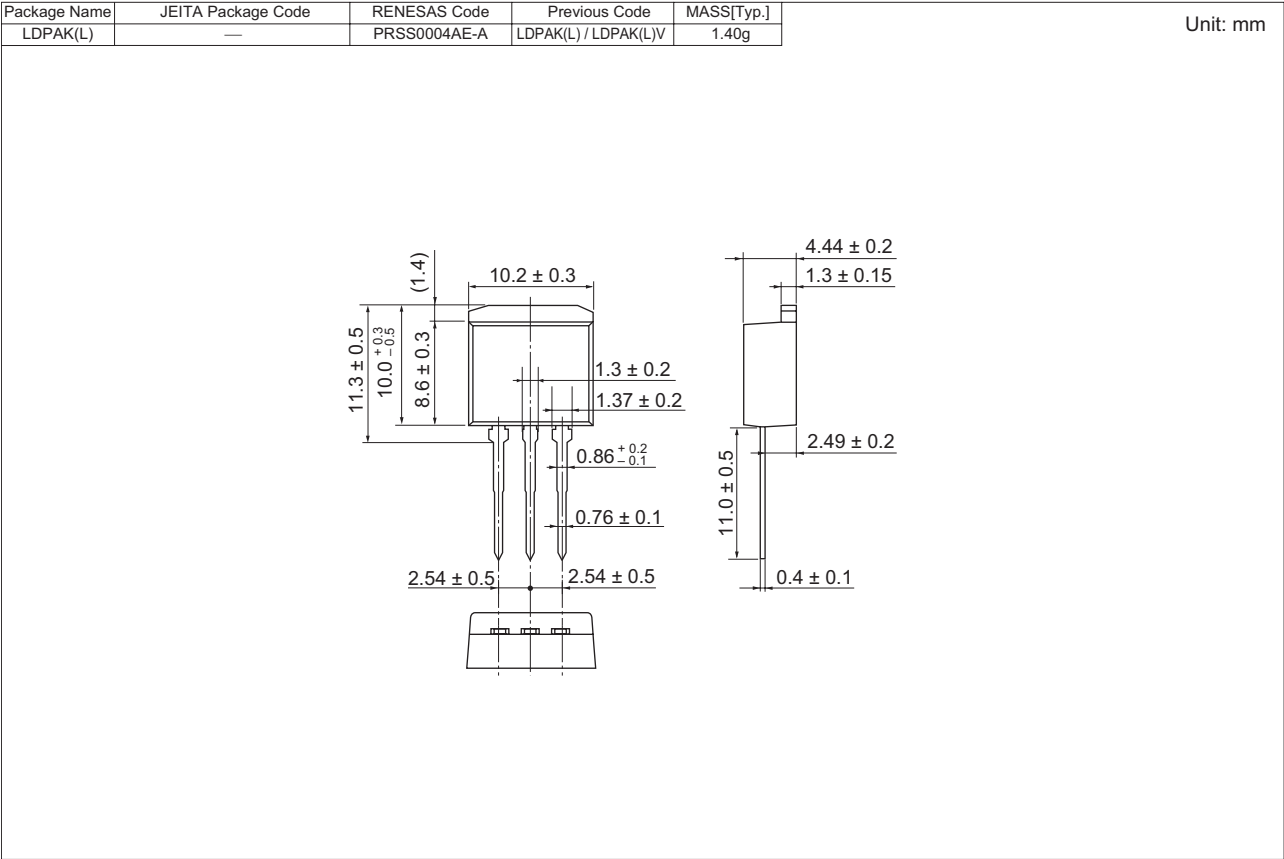
Switching Time Test Circuit



Switching Time Waveform

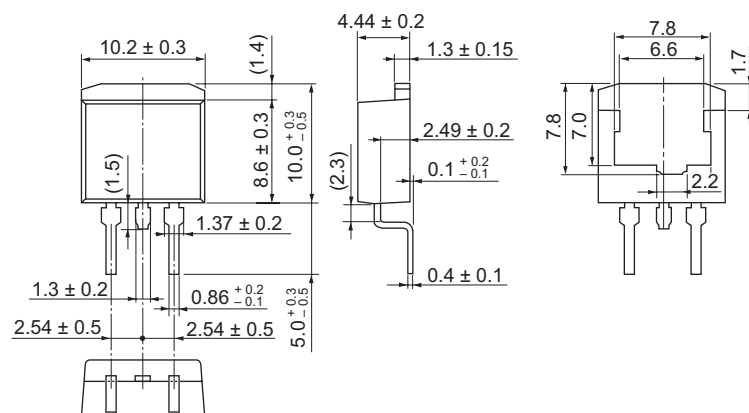


Package Dimensions



| 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 |
|---------------|----------|-----------------------|
| H5N5006LD-E | 500 pcs | Box (Conductive Sack) |
| H5N5006LSTL-E | 1000 pcs | Taping |
| H5N5006LMTL-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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