

RJK60S4DPE

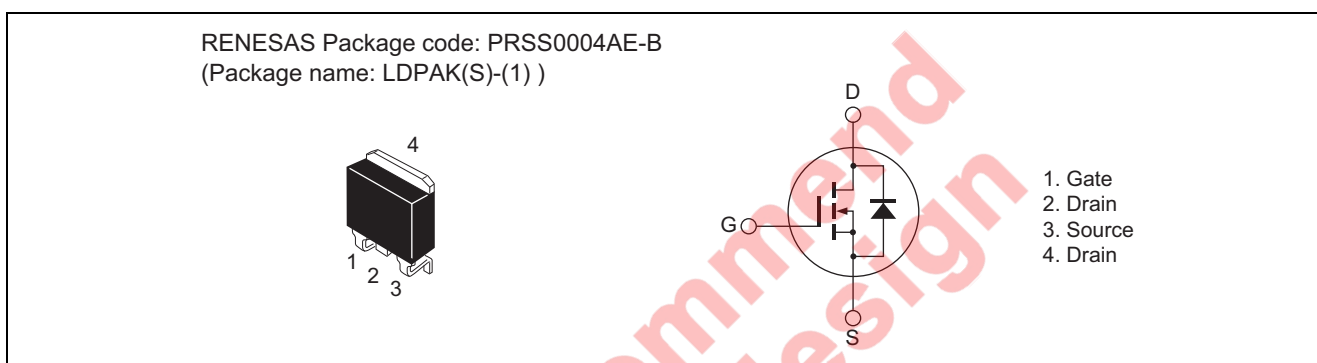
600V - 16A - SJ MOS FET
High Speed Power Switching

R07DS0733EJ0200
Rev.2.00
Oct 12, 2012

Features

- Superjunction MOSFET
- Low on-resistance
 $R_{DS(on)} = 0.23 \Omega$ typ. (at $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$, $T_a = 25^\circ\text{C}$)
- High speed switching
 $t_f = 21 \text{ ns}$ typ. (at $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_L = 37.5 \Omega$, $R_g = 10 \Omega$, $T_a = 25^\circ\text{C}$)

Outline



Absolute Maximum Ratings

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

| Item | Symbol | Ratings | Unit |
|---|---|-------------|---------------------------|
| Drain to source voltage | V_{DSS} | 600 | V |
| Gate to source voltage | V_{GSS} | +30, -20 | V |
| Drain current | $T_c = 25^\circ\text{C}$ I_D ^{Note1} | 16 | A |
| | $T_c = 100^\circ\text{C}$ I_D ^{Note1} | 10.1 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | 32 | A |
| Body-drain diode reverse drain current | I_{DR} ^{Note1} | 16 | A |
| Body-drain diode reverse drain peak current | $I_{DR(pulse)}$ ^{Note1} | 32 | A |
| Avalanche current | I_{AP} ^{Note2} | 4 | A |
| Avalanche energy | E_{AR} ^{Note2} | 0.87 | mJ |
| Channel dissipation | P_{ch} ^{Note3} | 104.1 | W |
| Channel to case thermal impedance | θ_{ch-c} | 1.2 | $^\circ\text{C}/\text{W}$ |
| Channel temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

- Notes: 1. Limited by T_{ch} max.
2. $ST_{ch} = 25^\circ\text{C}$, $T_{ch} \leq 150^\circ\text{C}$
3. Value at $T_c = 25^\circ\text{C}$

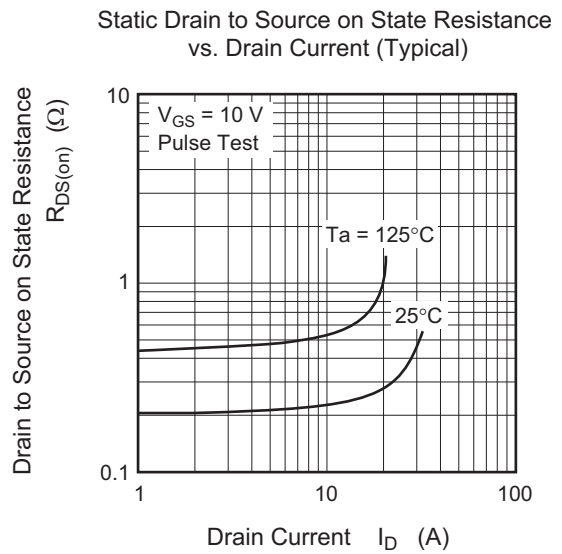
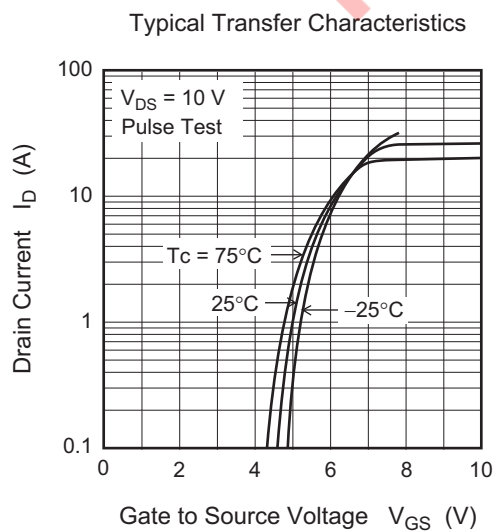
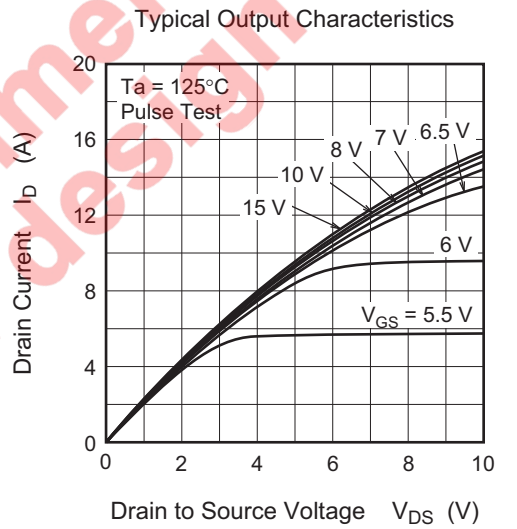
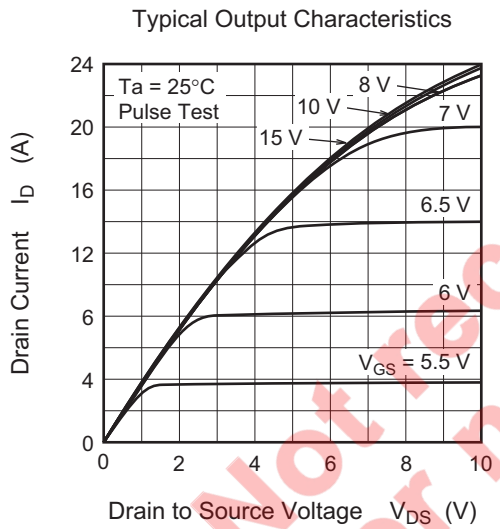
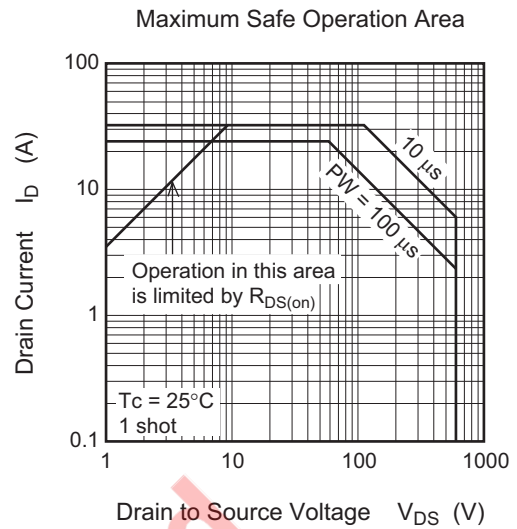
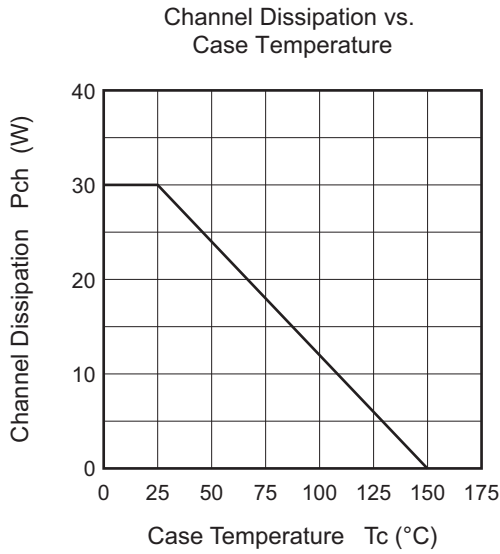
Electrical Characteristics

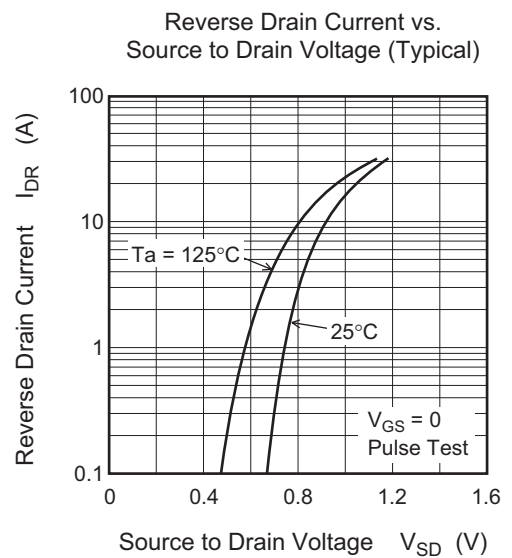
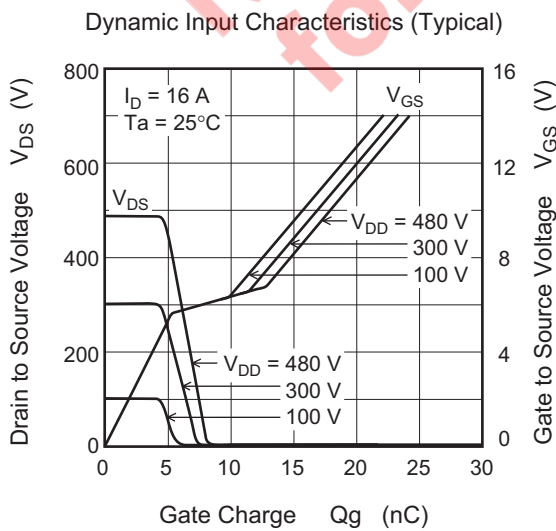
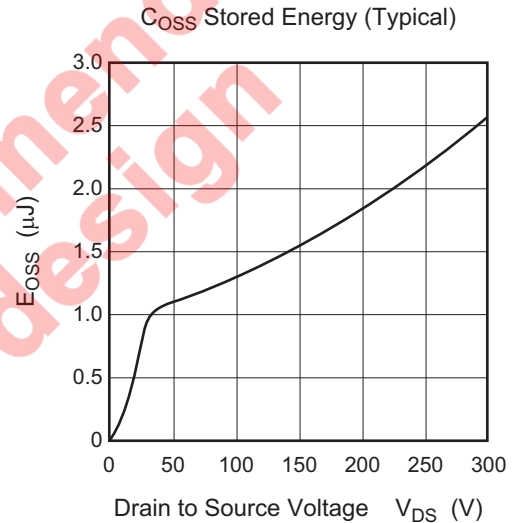
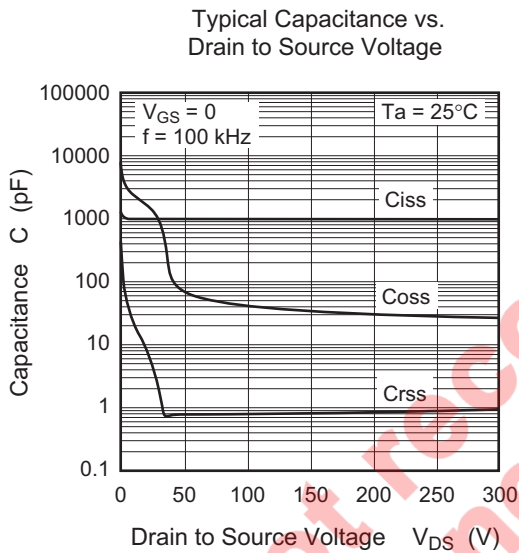
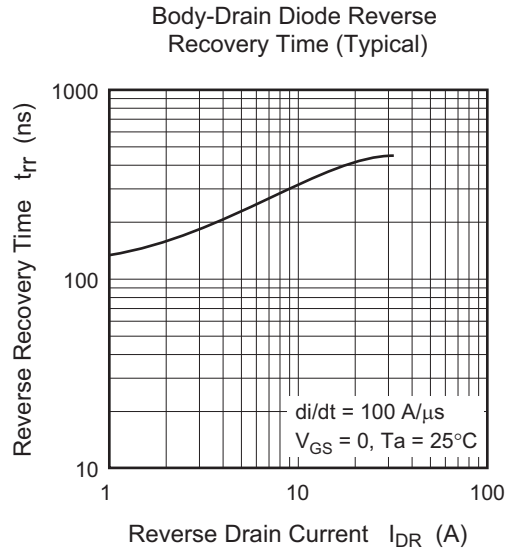
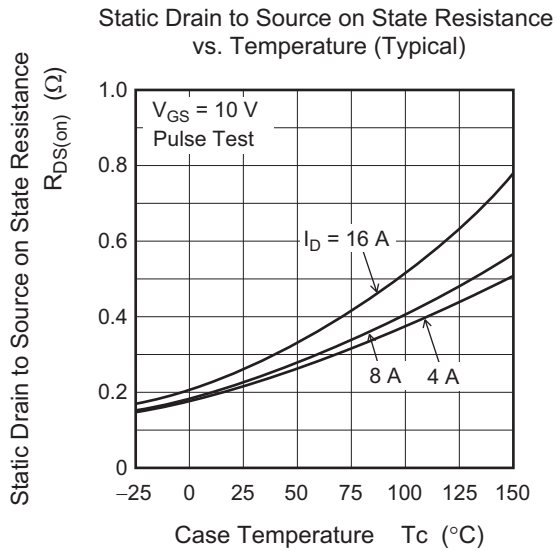
(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|--|---------------|-----|------|-----------|---------------|--|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 600 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 1 | mA | $V_{DS} = 600 \text{ V}$, $V_{GS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 0.1 | μA | $V_{GS} = +30\text{V}$, -20 V , $V_{DS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 3 | — | 5 | V | $V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 0.23 | 0.29 | Ω | $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 0.57 | — | Ω | Ta = 150°C $I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| Gate resistance | Rg | — | 2 | — | Ω | f = 1 MHz $V_{DS} = 25 \text{ V}$, $V_{GS} = 0$ |
| Input capacitance | Ciss | — | 988 | — | pF | $V_{DS} = 25 \text{ V}$ |
| Output capacitance | Coss | — | 1415 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | Crss | — | 5.1 | — | pF | f = 100kHz |
| Turn-on delay time | $t_{d(on)}$ | — | 15 | — | ns | $I_D = 8 \text{ A}$ |
| Rise time | t_r | — | 19 | — | ns | $V_{GS} = 10 \text{ V}$ |
| Turn-off delay time | $t_{d(off)}$ | — | 30 | — | ns | $R_L = 37.5 \Omega$ |
| Fall time | t_f | — | 17 | — | ns | $R_g = 10 \Omega$ ^{Note4} |
| Total gate charge | Qg | — | 18 | — | nC | $V_{DD} = 480 \text{ V}$ |
| Gate to source charge | Qgs | — | 7 | — | nC | $V_{GS} = 10 \text{ V}$ |
| Gate to drain charge | Qgd | — | 6 | — | nC | $I_D = 16 \text{ A}$ ^{Note4} |
| Body-drain diode forward voltage | V_{DF} | — | 1.0 | 1.6 | V | $I_F = 16 \text{ A}$, $V_{GS} = 0$ ^{Note4} |
| Body-drain diode reverse recovery time | t_{rr} | — | 363 | — | ns | $I_F = 16 \text{ A}$ |
| Body-drain diode reverse recovery current | I_{rr} | — | 23 | — | A | $V_{GS} = 0$ |
| Body-drain diode reverse recovery charge | Q_{rr} | — | 4.9 | — | μC | $di_F/dt = 100 \text{ A}/\mu\text{s}$ ^{Note4} |

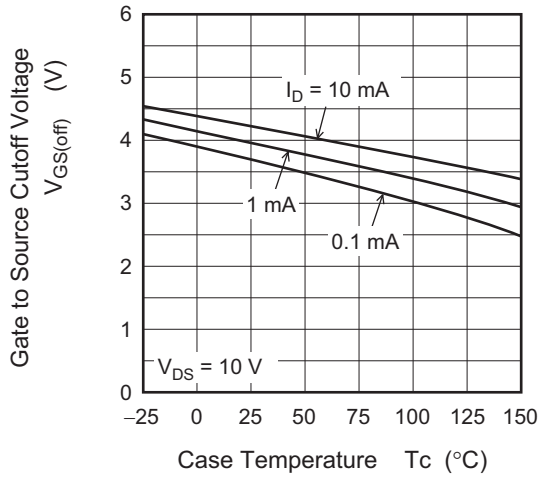
Notes: 4. Pulse test

Main Characteristics

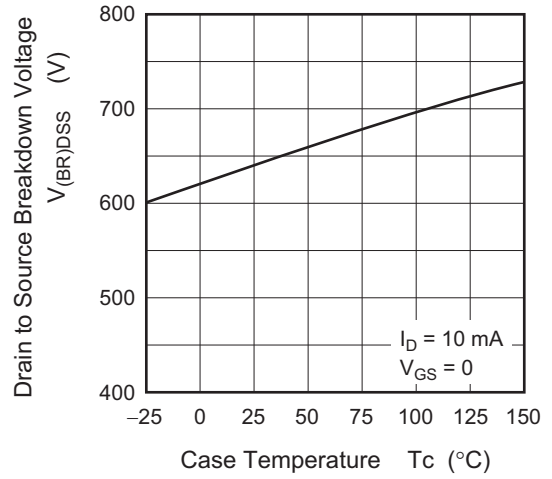




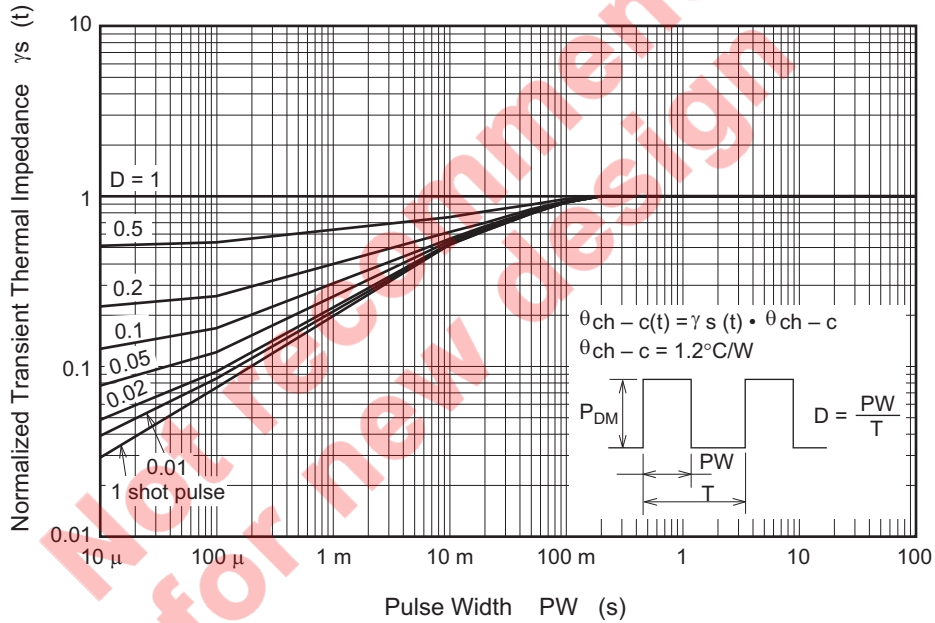
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



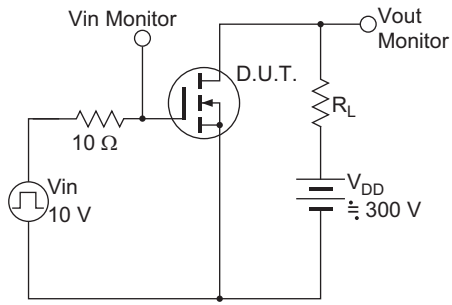
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



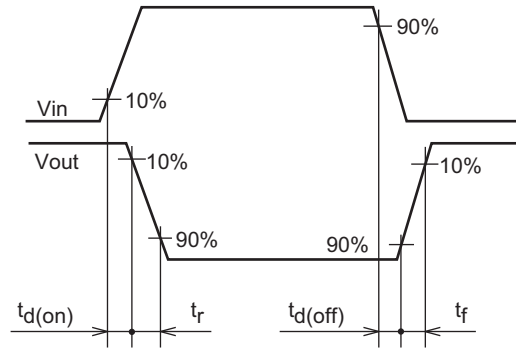
Normalized Transient Thermal Impedance vs. Pulse Width



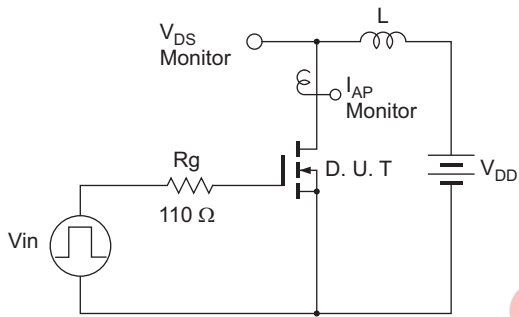
Switching Time Test Circuit



Waveform

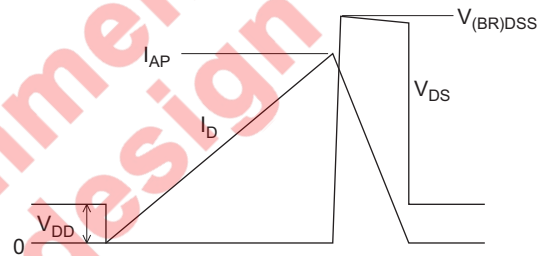


Avalanche Test Circuit



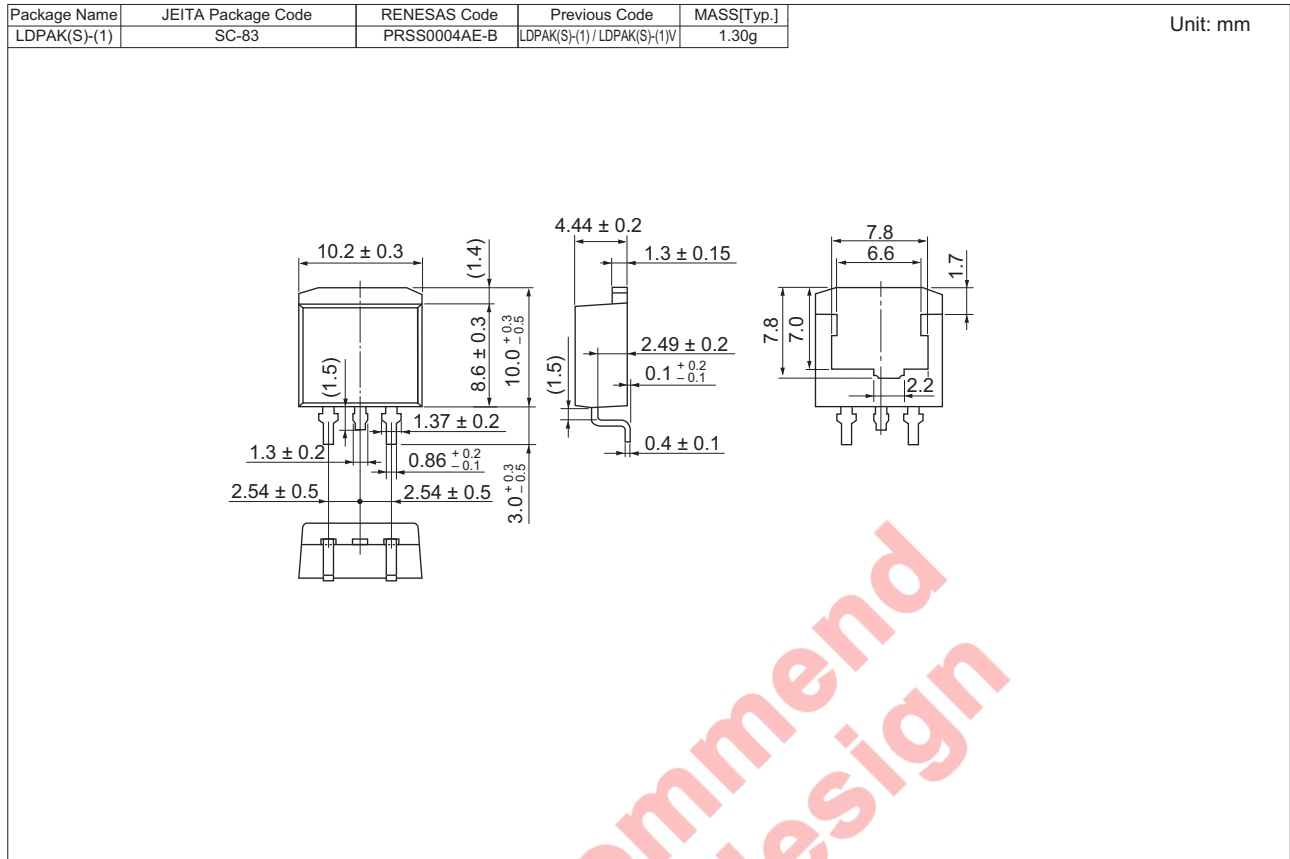
Avalanche Waveform

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



Not recommended for new design

Package Dimension



Ordering Information

| Orderable Part No. | Quantity | Shipping Container |
|--------------------|----------|--------------------|
| RJK60S4DPE-00#J3 | 1000 pcs | Taping |

Not recommend
for new design

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