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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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2SK3148

Silicon N Channel MOS FET
High Speed Power Switching

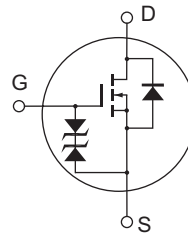
REJ03G1073-0200
(Previous: ADE-208-748)
Rev.2.00
Sep 07, 2005

Features

- Low on-resistance
 $R_{DS} = 45 \text{ m}\Omega$ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

Outline

RENESAS Package code: PRSS0003AD-A
(Package name: TO-220FM)



1. Gate
2. Drain
3. Source

Absolute Maximum Ratings

(Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|--|---------------------------------|-------------|------|
| Drain to source voltage | V_{DSS} | 100 | V |
| Gate to source voltage | V_{GSS} | ±20 | V |
| Drain current | I_D | 20 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | 80 | A |
| Body-drain diode reverse drain current | I_{DR} | 20 | A |
| Avalanche current | I_{AP} ^{Note3} | 20 | A |
| Avalanche energy | E_{AR} ^{Note3} | 40 | mJ |
| Channel dissipation | P_{ch} ^{Note2} | 30 | 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. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

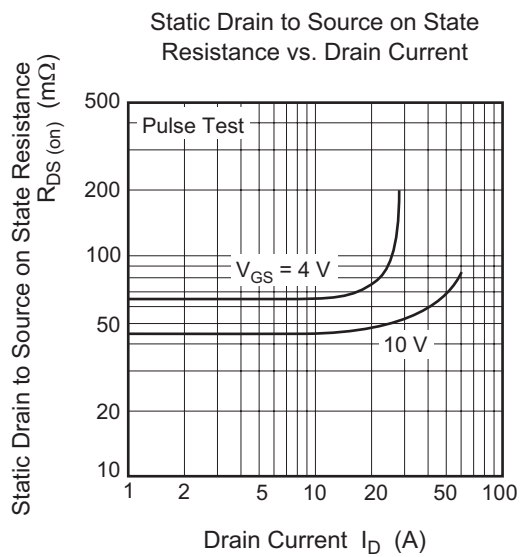
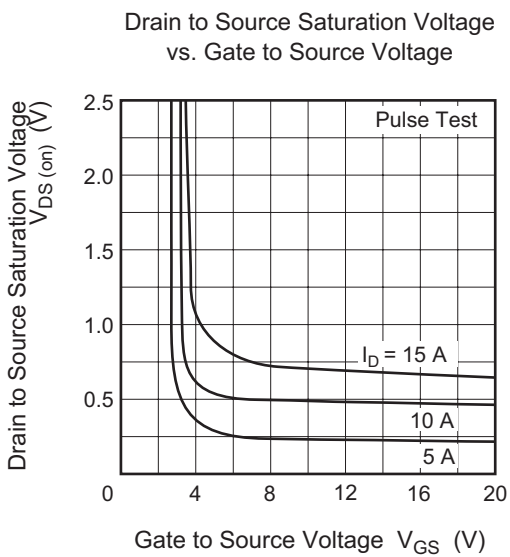
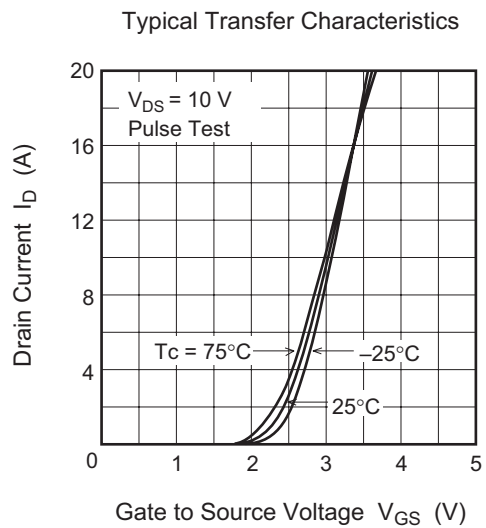
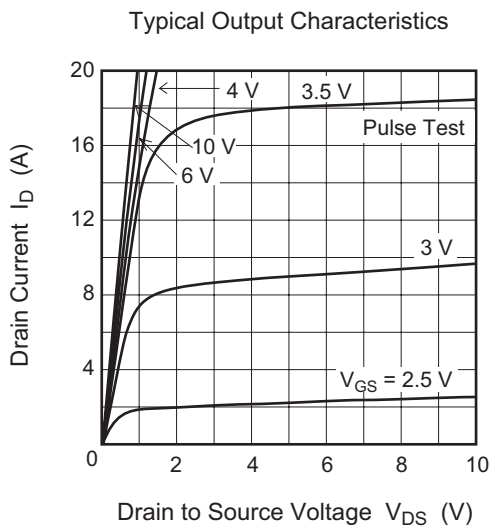
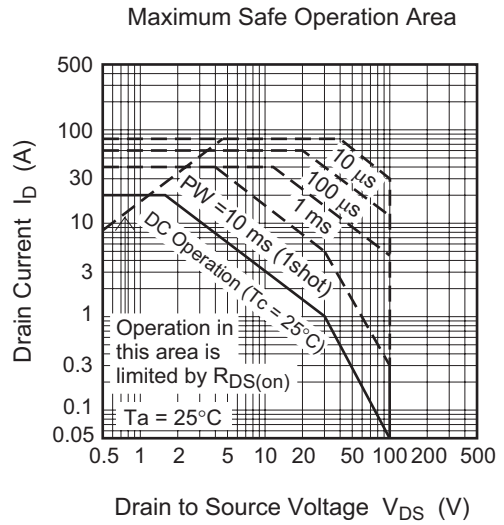
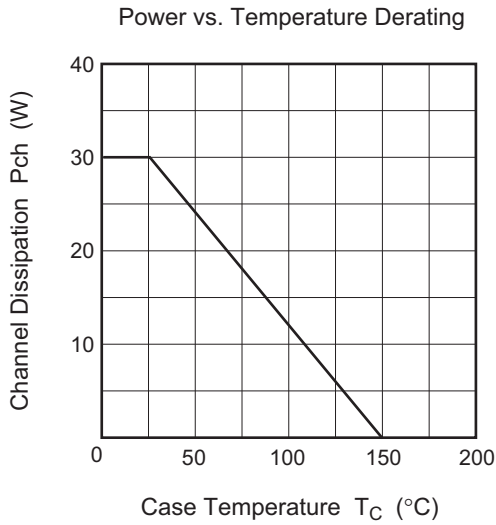
Electrical Characteristics

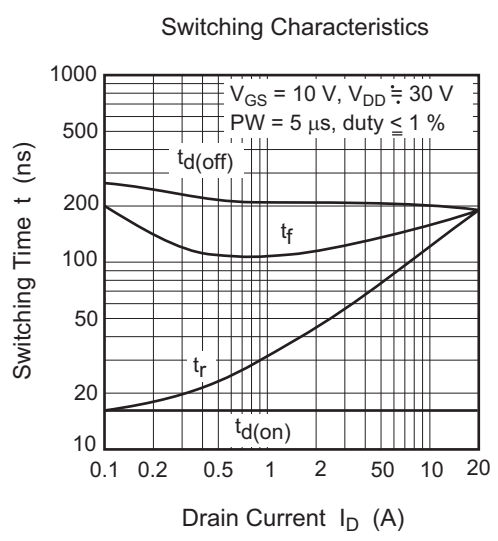
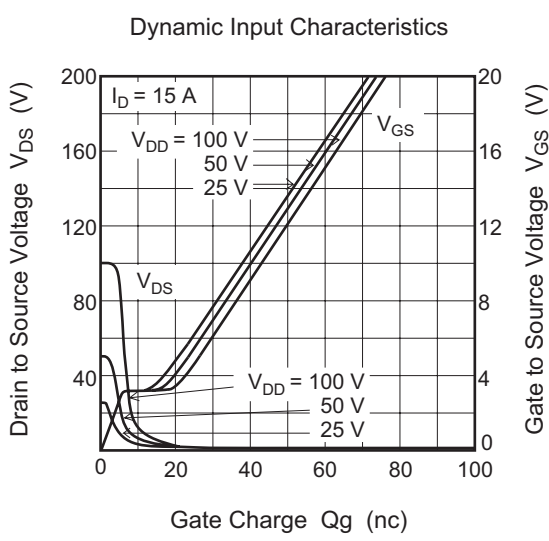
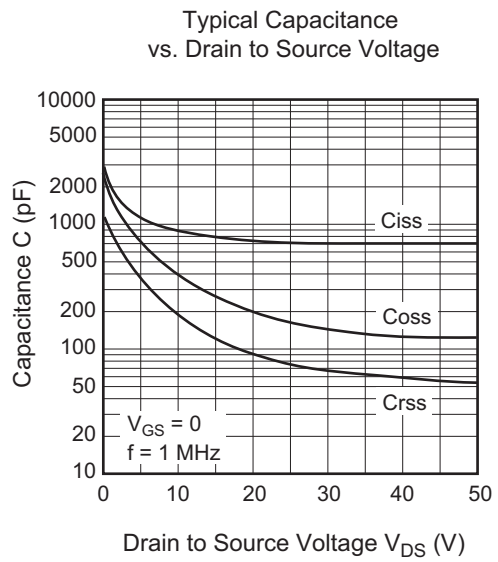
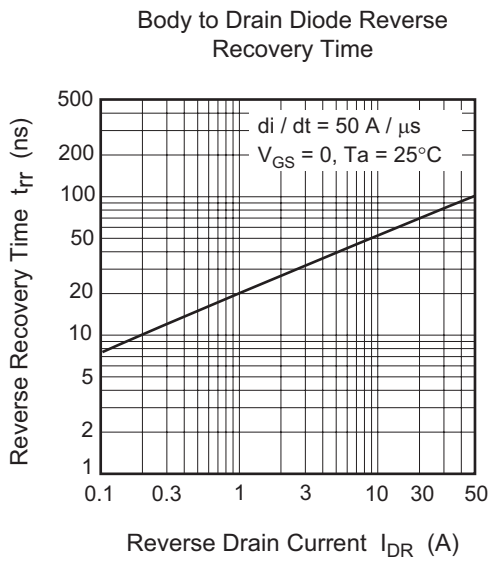
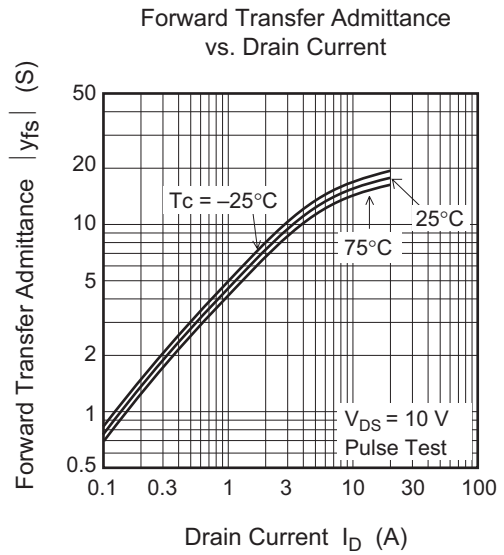
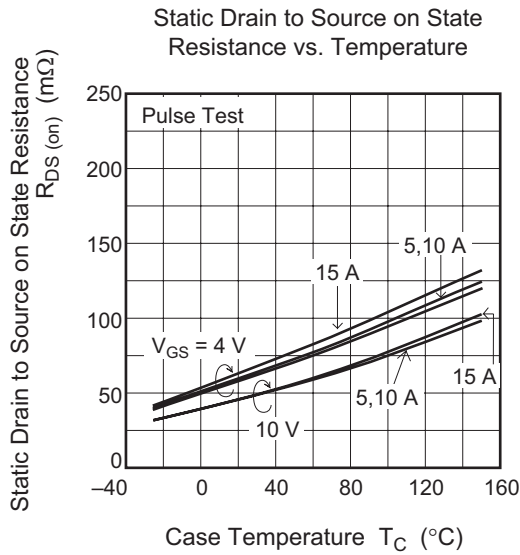
(Ta = 25°C)

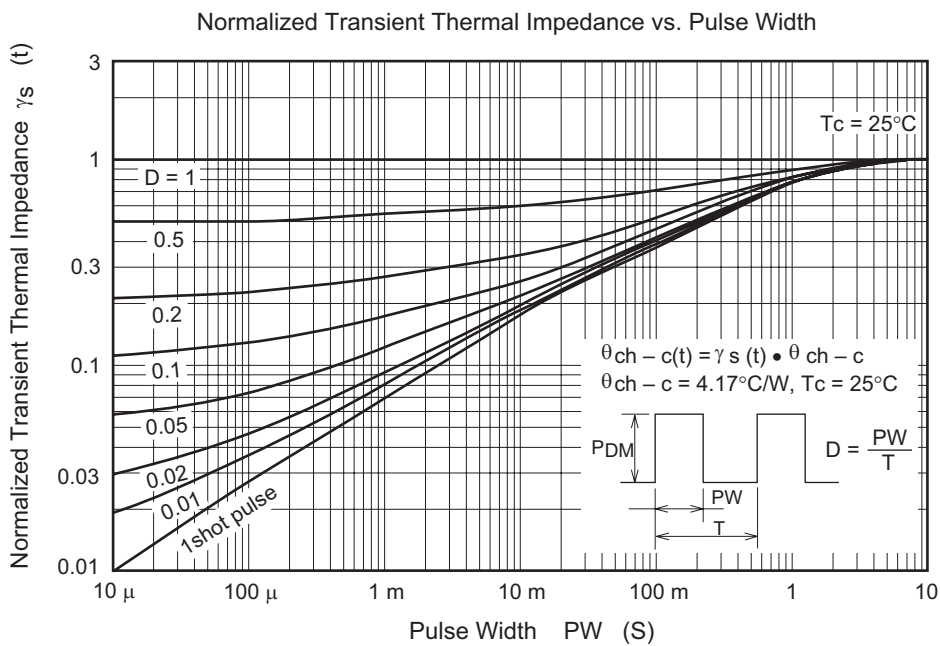
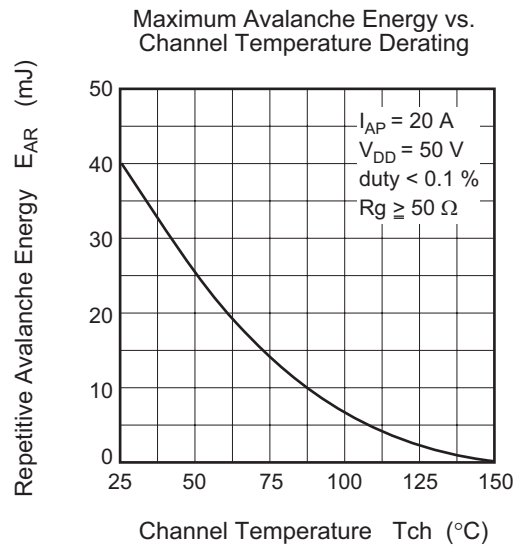
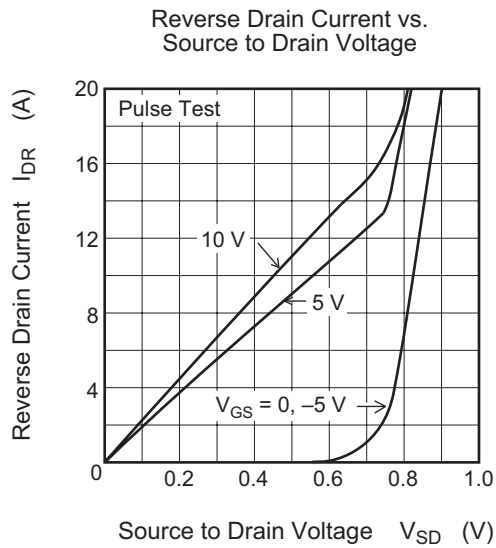
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|-----|-----|-----|------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 100 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ±20 | — | — | V | $I_G = \pm 100 \mu A$, $V_{DS} = 0$ |
| 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 | $V_{GS(off)}$ | 1.0 | — | 2.5 | V | $I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 45 | 60 | mΩ | $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4} |
| | $R_{DS(on)}$ | — | 65 | 85 | mΩ | $I_D = 10 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | 8.5 | 14 | — | S | $I_D = 10 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4} |
| Input capacitance | C_{iss} | — | 900 | — | pF | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 400 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 210 | — | pF | |
| Turn-on delay time | $t_{d(on)}$ | — | 15 | — | ns | $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_L = 3 \Omega$ |
| Rise time | t_r | — | 120 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 200 | — | ns | |
| Fall time | t_f | — | 150 | — | ns | |
| Body-drain diode forward voltage | V_{DF} | — | 0.9 | — | V | $I_F = 20 \text{ A}$, $V_{GS} = 0$ |
| Body-drain diode reverse recovery time | t_{rr} | — | 90 | — | ns | $I_F = 20 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu s$ |

Note: 4. Pulse test

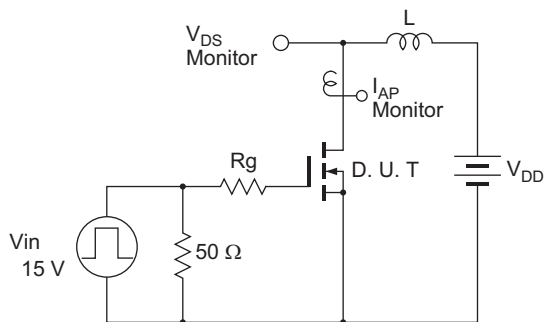
Main Characteristics



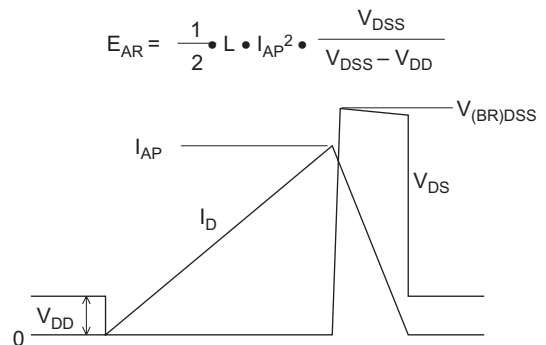


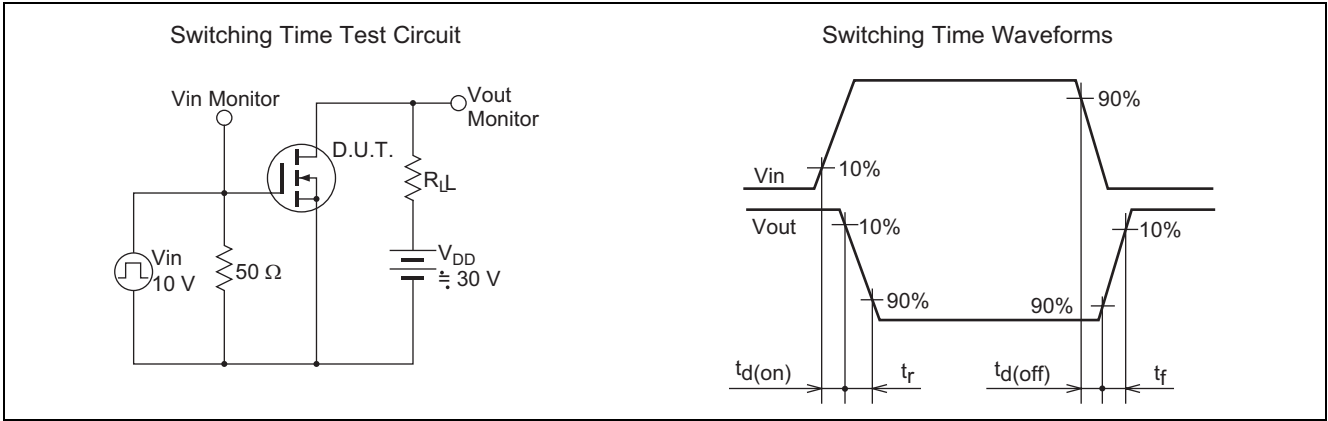


Avalanche Test Circuit

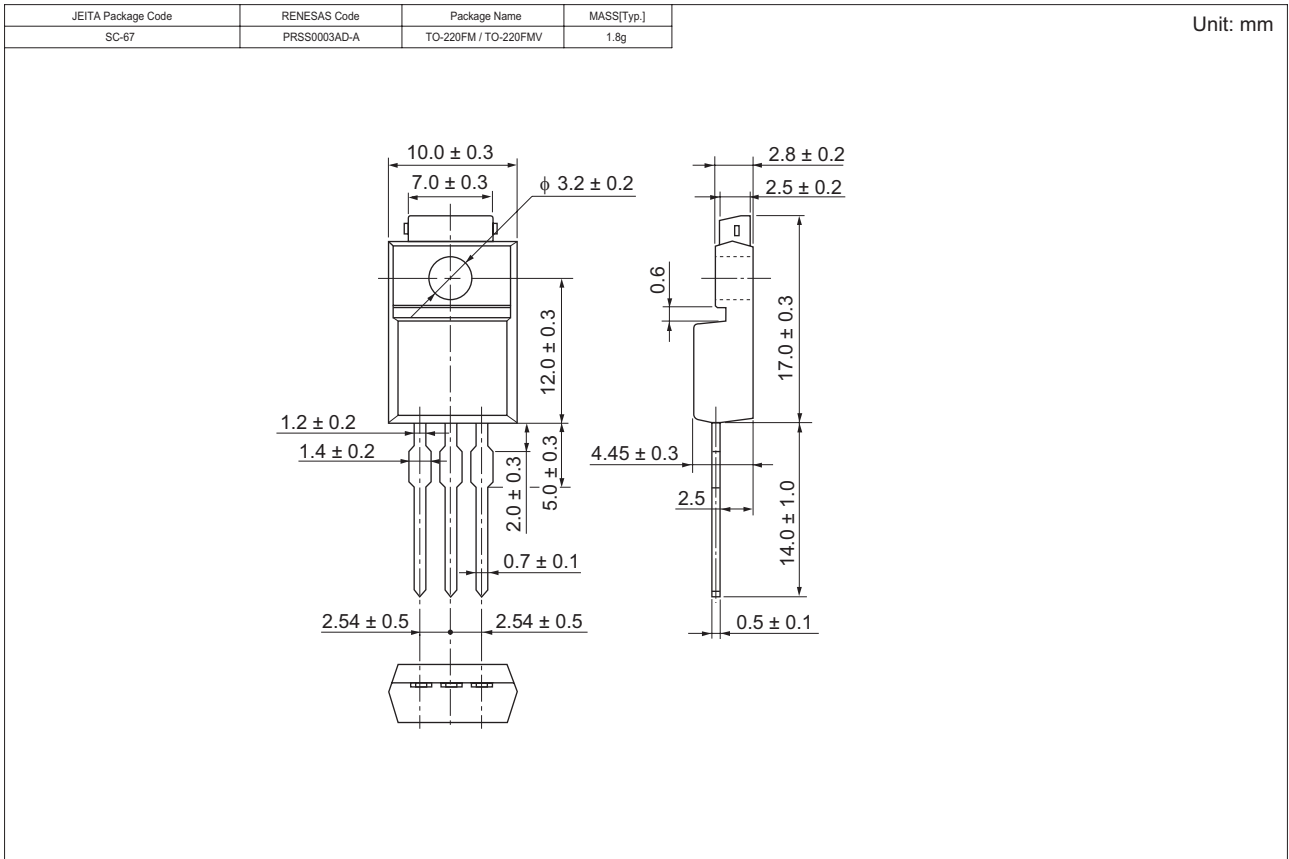


Avalanche Waveform





Package Dimensions



Ordering Information

| Part Name | Quantity | Shipping Container |
|-----------|----------|--------------------|
| 2SK3148-E | 500 pcs | Box (Sack) |

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