

# 2SK2928

Silicon N Channel MOS FET  
High Speed Power Switching

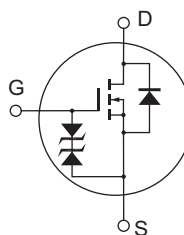
REJ03G1042-0400  
(Previous: ADE-208-551B)  
Rev.4.00  
Sep 07, 2005

## Features

- Low on-resistance  
 $R_{DS(on)} = 0.040 \Omega$  typ.
- 4 V gate drive devices.
- High speed switching

## Outline

RENESAS Package code: PRSS0004AC-A  
(Package name: TO-220AB)



1. Gate
2. Drain  
(Flange)
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

| Item                                   | Symbol                          | Ratings     | Unit |
|----------------------------------------|---------------------------------|-------------|------|
| Drain to source voltage                | $V_{DSS}$                       | 60          | V    |
| Gate to source voltage                 | $V_{GSS}$                       | ±20         | V    |
| Drain current                          | $I_D$                           | 15          | A    |
| Drain peak current                     | $I_{D(pulse)}$ <sup>Note1</sup> | 60          | A    |
| Body-drain diode reverse drain current | $I_{DR}$                        | 15          | A    |
| Avalanche current                      | $I_{AP}$ <sup>Note3</sup>       | 15          | A    |
| Avalanche energy                       | $E_{AR}$ <sup>Note3</sup>       | 19          | mJ   |
| Channel dissipation                    | $P_{ch}$ <sup>Note2</sup>       | 40          | 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  $T_a = 25^\circ C$   
 3. Value at  $T_{ch} = 25^\circ C$ ,  $R_g \geq 50 \Omega$

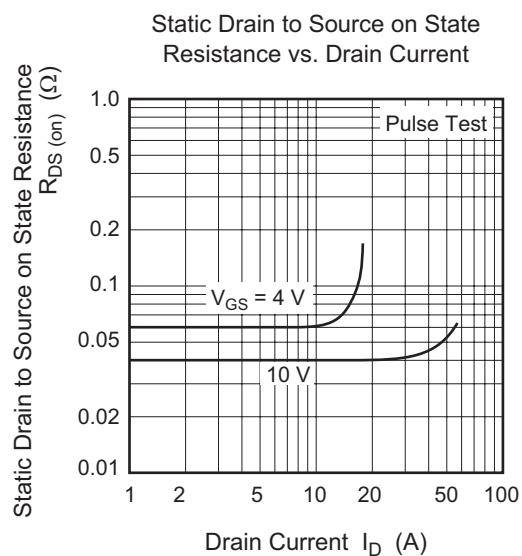
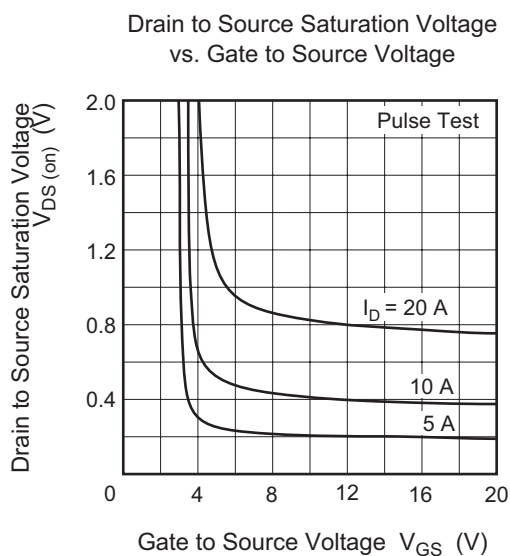
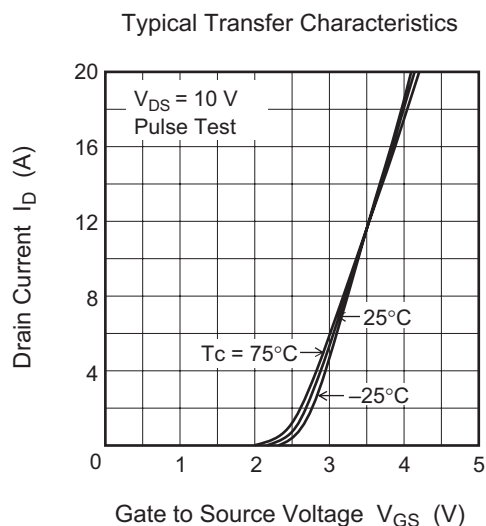
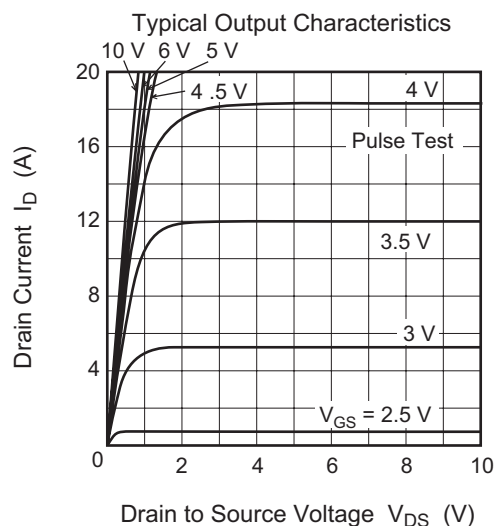
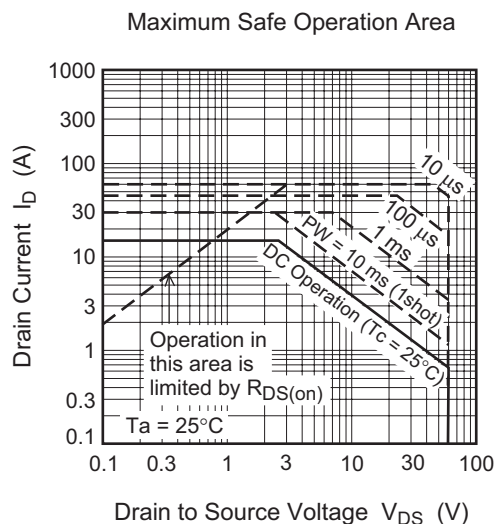
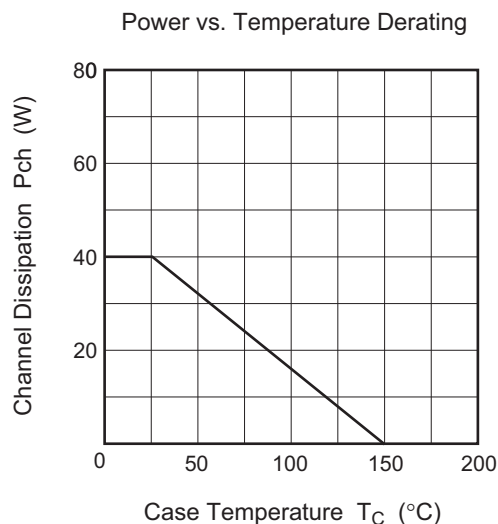
## Electrical Characteristics

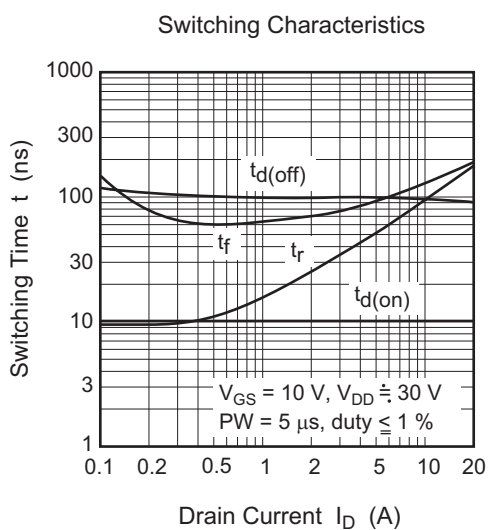
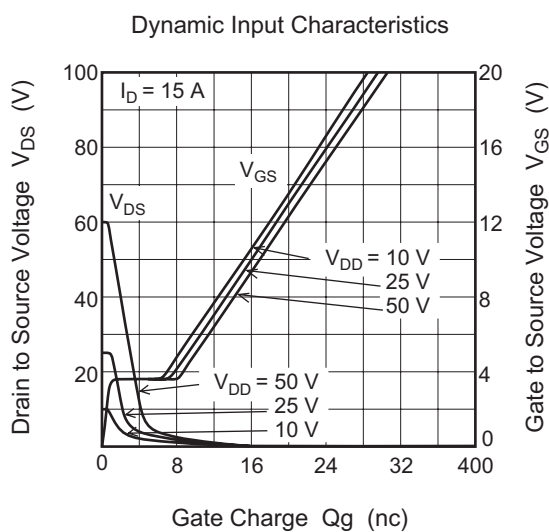
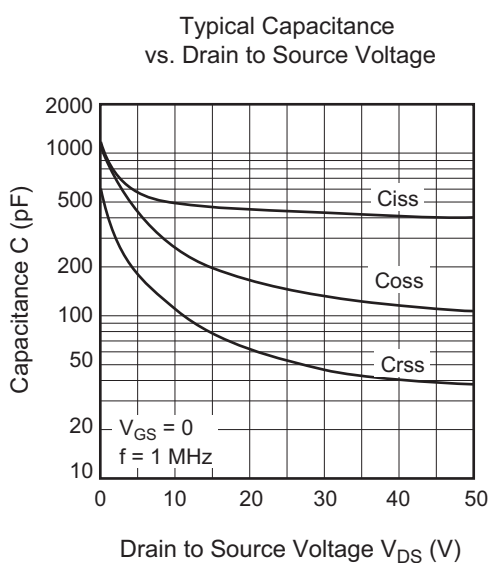
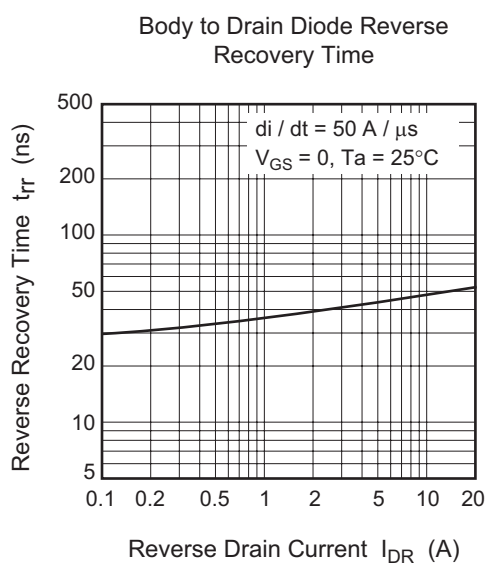
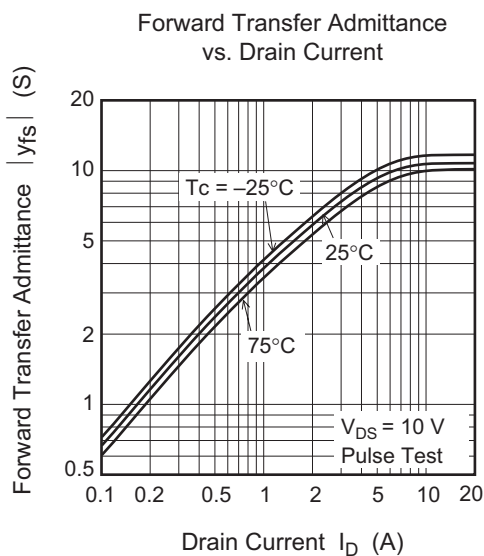
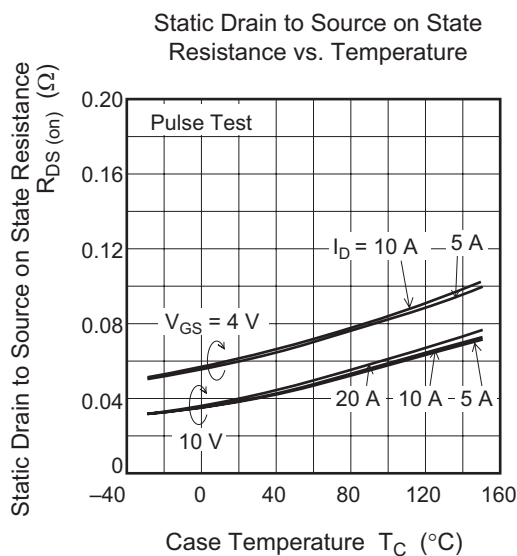
(Ta = 25°C)

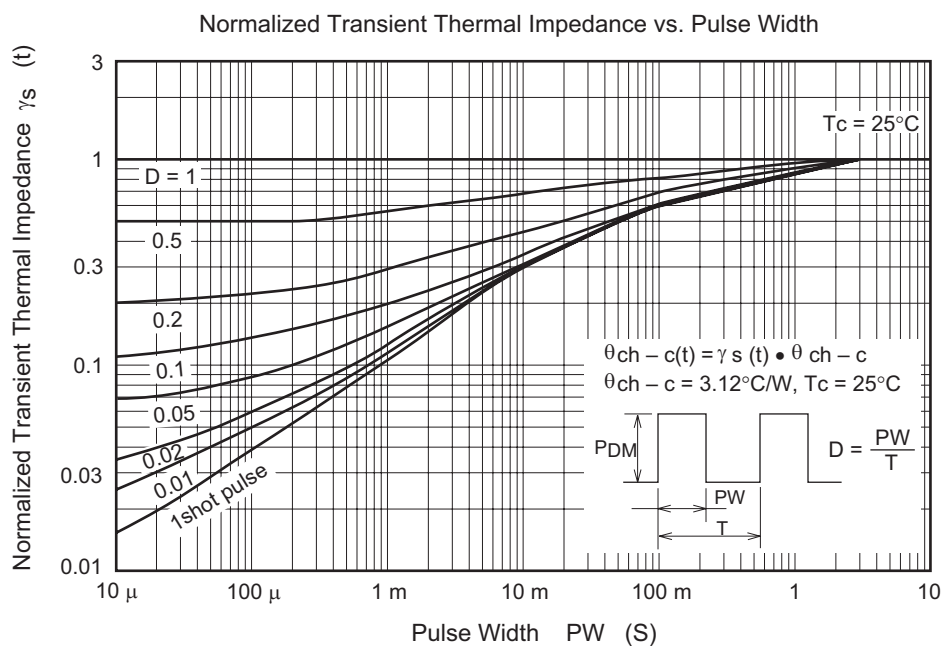
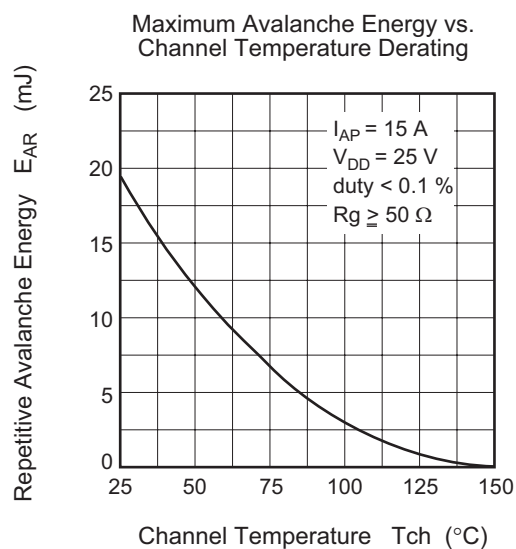
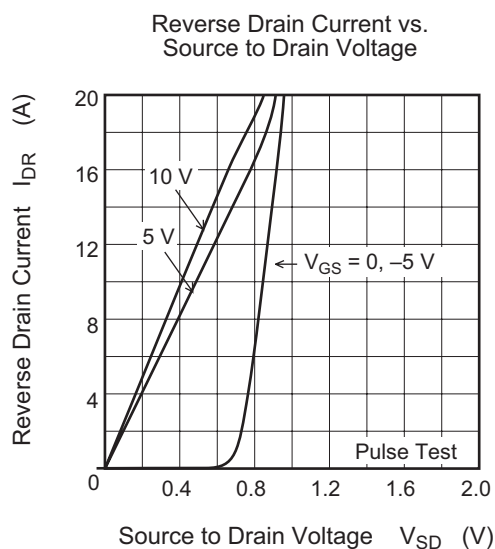
| Item                                       | Symbol        | Min | Typ   | Max   | Unit     | Test Conditions                                                        |
|--------------------------------------------|---------------|-----|-------|-------|----------|------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 60  | —     | —     | V        | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$                                   |
| Gate to source breakdown voltage           | $V_{(BR)GSS}$ | ±20 | —     | —     | V        | $I_G = \pm 100 \mu A$ , $V_{DS} = 0$                                   |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —     | 10    | $\mu A$  | $V_{DS} = 60 \text{ V}$ , $V_{GS} = 0$                                 |
| Gate to source leak current                | $I_{GSS}$     | —   | —     | ±10   | $\mu A$  | $V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$                             |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.5 | —     | 2.5   | V        | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                         |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.040 | 0.052 | $\Omega$ | $I_D = 8 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>         |
|                                            | $R_{DS(on)}$  | —   | 0.060 | 0.105 | $\Omega$ | $I_D = 8 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note4</sup>          |
| Forward transfer admittance                | $ y_{fs} $    | 7   | 11    | —     | S        | $I_D = 8 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>         |
| Input capacitance                          | $C_{iss}$     | —   | 500   | —     | pF       | $V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1 \text{ MHz}$        |
| Output capacitance                         | $C_{oss}$     | —   | 260   | —     | pF       |                                                                        |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 110   | —     | pF       |                                                                        |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 10    | —     | ns       | $V_{GS} = 10 \text{ V}$ , $I_D = 8 \text{ A}$ ,<br>$R_L = 3.75 \Omega$ |
| Rise time                                  | $t_r$         | —   | 80    | —     | ns       |                                                                        |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 100   | —     | ns       |                                                                        |
| Fall time                                  | $t_f$         | —   | 110   | —     | ns       |                                                                        |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 0.9   | —     | V        | $I_F = 15 \text{ A}$ , $V_{GS} = 0$                                    |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 50    | —     | ns       | $I_F = 15 \text{ A}$ , $V_{GS} = 0$<br>$di_F/dt = 50 \text{ A}/\mu s$  |

Note: 4. Pulse test

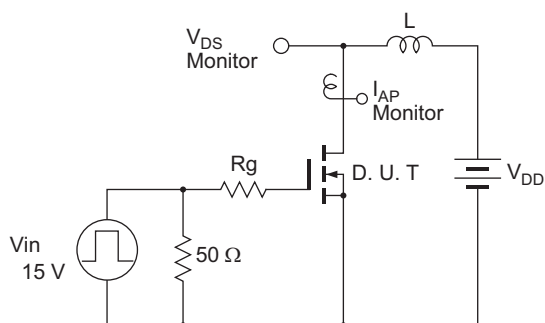
## Main Characteristics



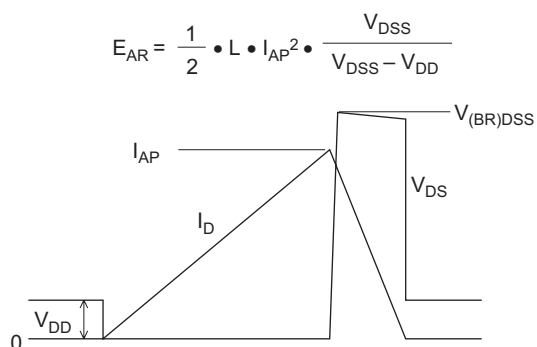




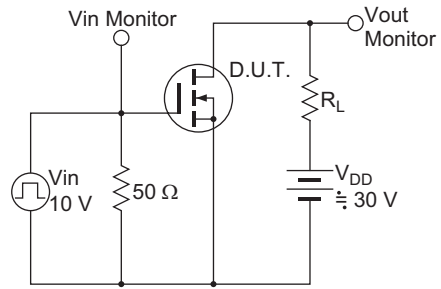
Avalanche Test Circuit



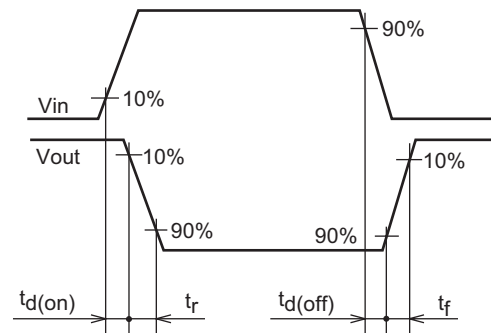
Avalanche Waveform



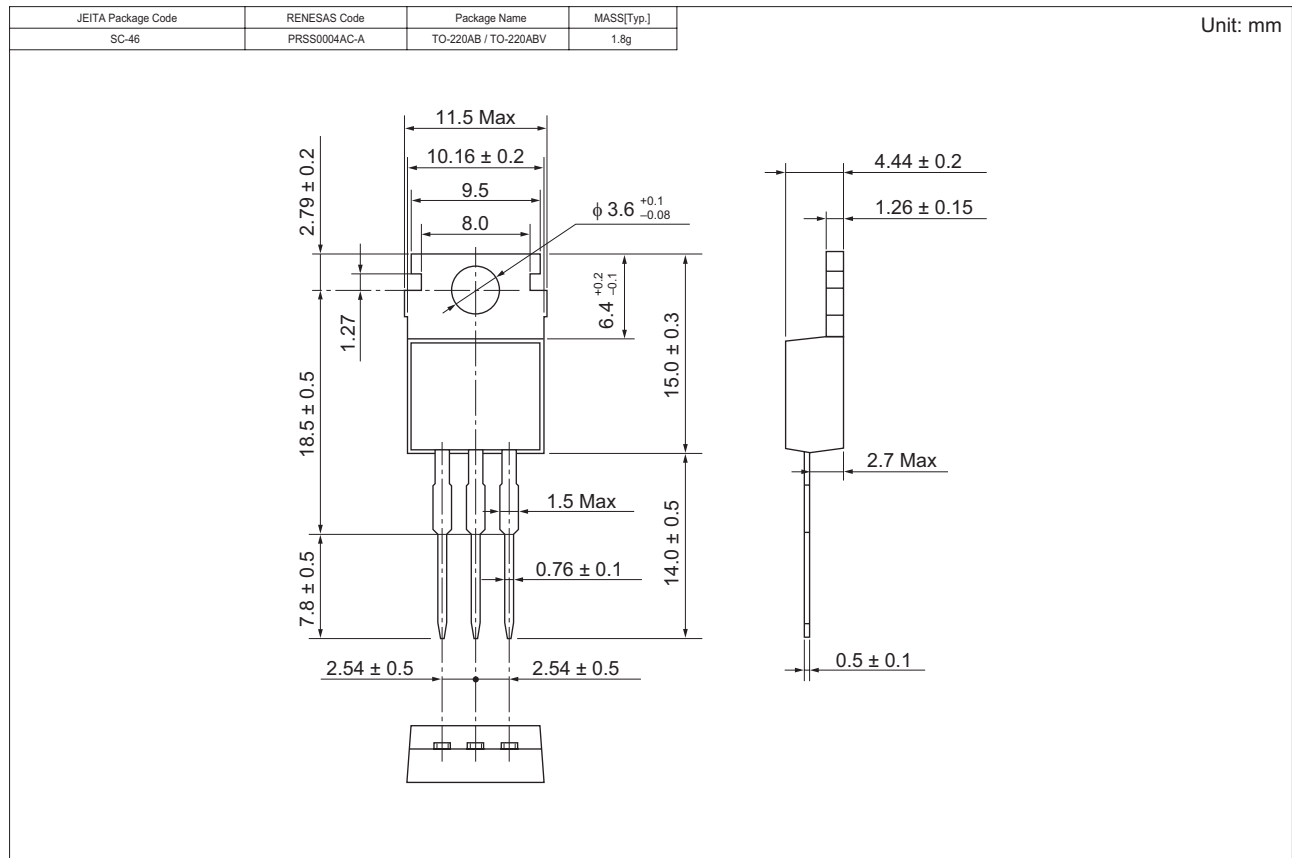
Switching Time Test Circuit



Switching Time Waveforms



## Package Dimensions



## Ordering Information

| Part Name | Quantity | Shipping Container |
|-----------|----------|--------------------|
| 2SK2928-E | 500 pcs  | Box (Sack)         |

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