

## H5N2509P

Silicon N Channel MOS FET  
High Speed Power Switching

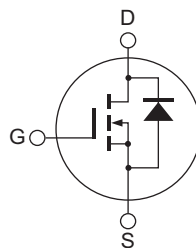
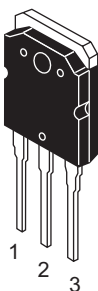
REJ03G1109-0200  
(Previous: ADE-208-1378)  
Rev.2.00  
Sep 07, 2005

### Features

- Low on-resistance:  $R_{DS(on)} = 0.053 \Omega$  typ.
- Low leakage current:  $I_{DSS} = 1 \mu A$  max (at  $V_{DS} = 250 V$ ,  $V_{GS} = 0 V$ )
- High speed switching:  $t_f = 110 ns$  typ (at  $I_D = 15 A$ ,  $R_L = 8.3 \Omega$ ,  $V_{GS} = 10 V$ )
- Low gate charge:  $Q_g = 110 nC$  typ (at  $V_{DD} = 200 V$ ,  $V_{GS} = 10 V$ ,  $I_D = 30 A$ )
- Avalanche ratings

### Outline

RENESAS Package code: PRSS0004ZE-A  
(Package name: TO-3P)



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

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V <sub>DSS</sub>	250	V
Gate to source voltage	V <sub>GSS</sub>	±30	V
Drain current	I <sub>D</sub>	30	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	120	A
Body-drain diode reverse drain current	I <sub>DR</sub>	30	A
Body-drain diode reverse drain peak current	I <sub>DR (pulse)</sub> <sup>Note 1</sup>	120	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	30	A
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	150	W
Channel to case thermal Impedance	θ <sub>ch-c</sub>	0.833	°C/W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

- Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%  
 2. Value at T<sub>c</sub> = 25°C  
 3. T<sub>ch</sub> ≤ 150°C

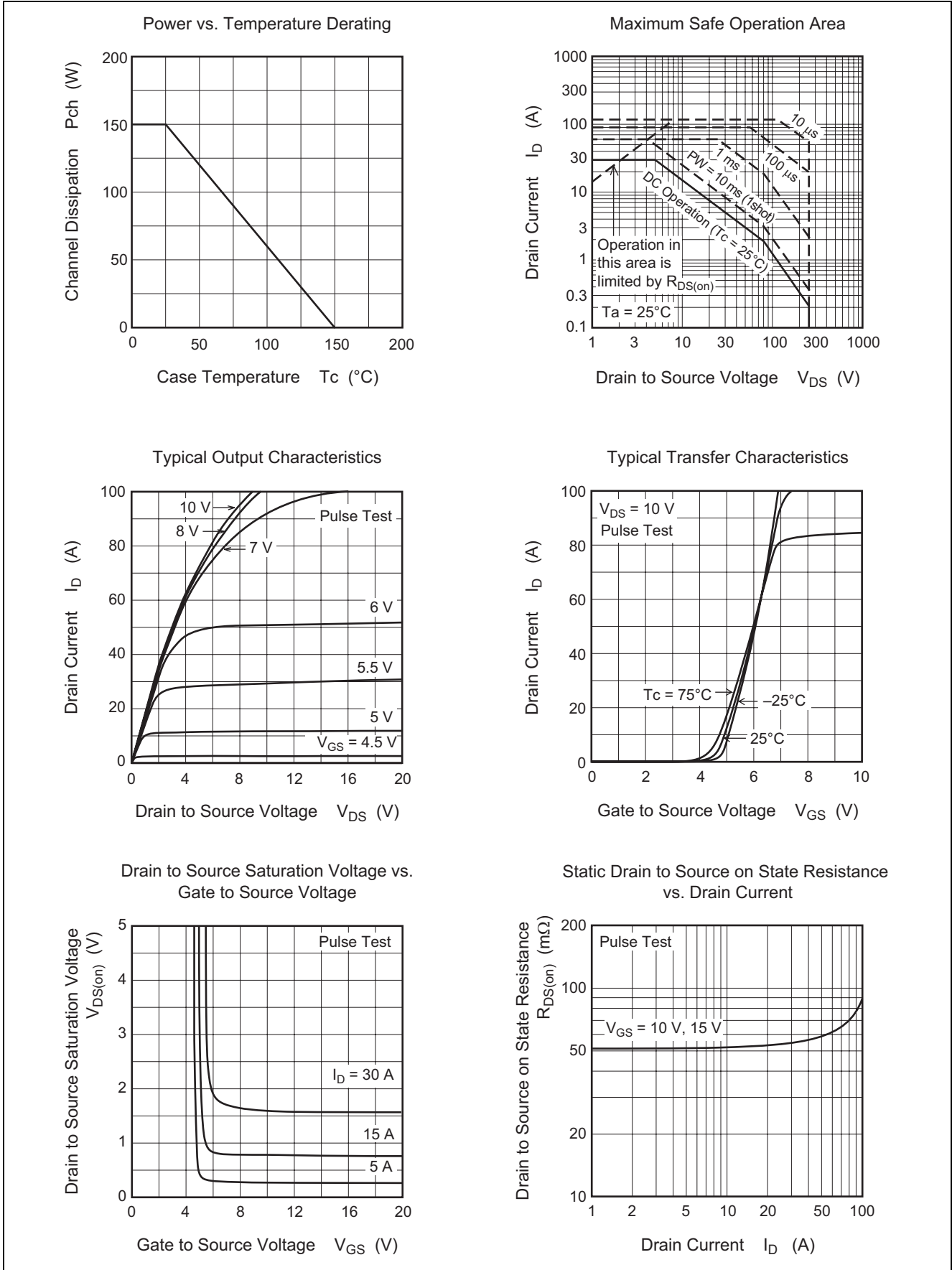
## Electrical Characteristics

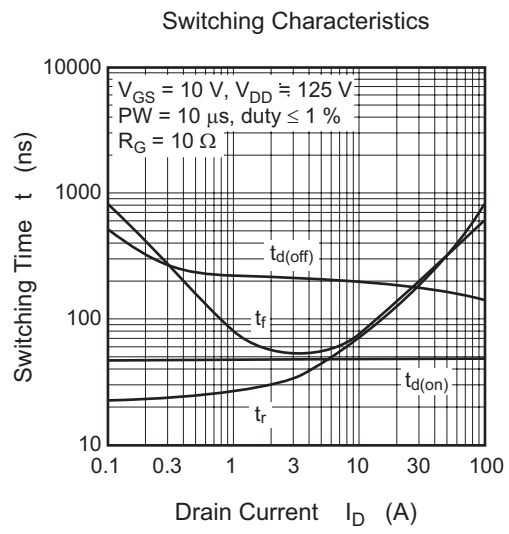
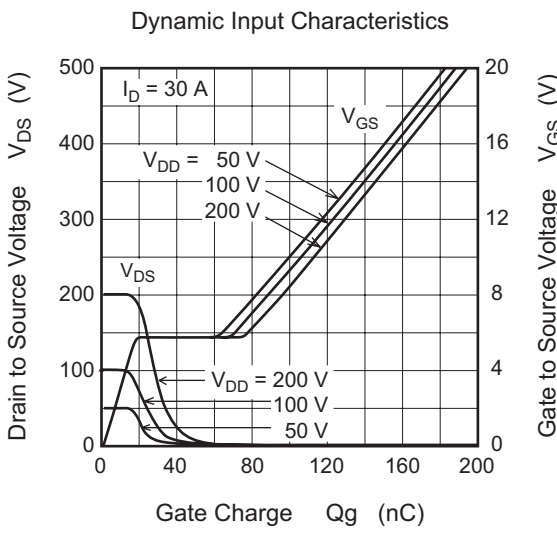
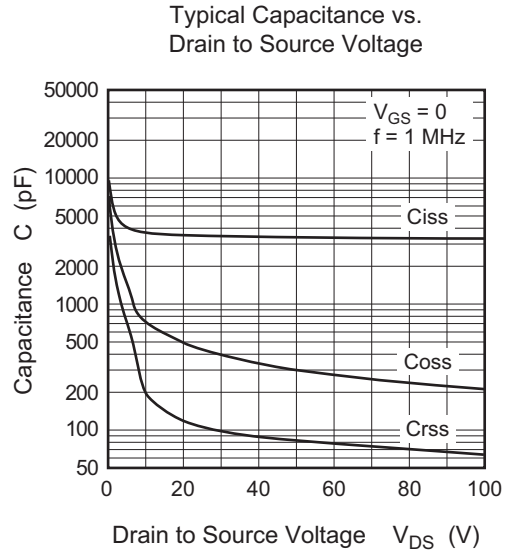
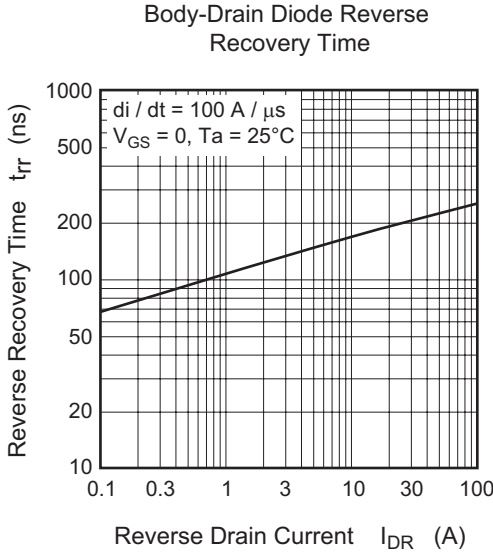
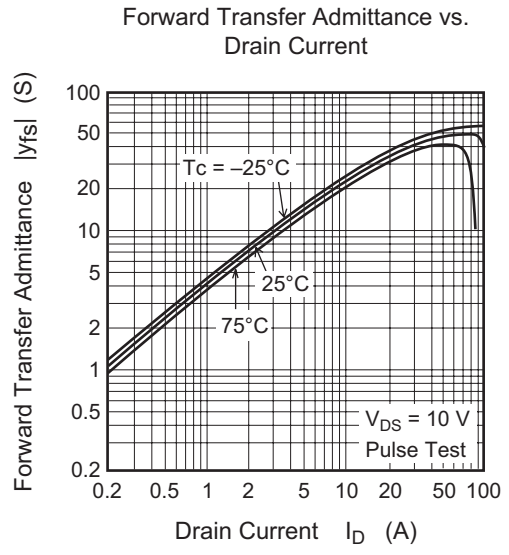
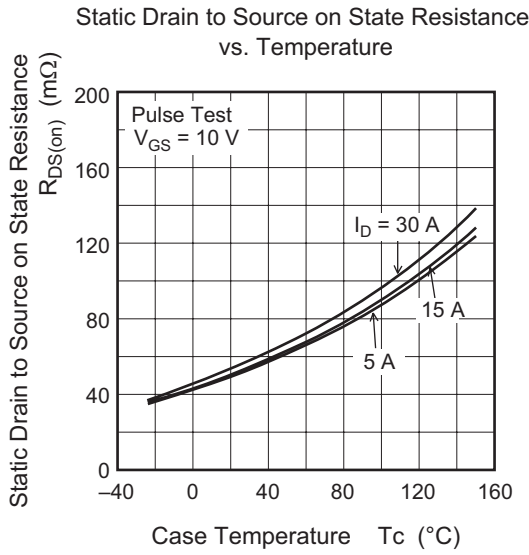
(Ta = 25°C)

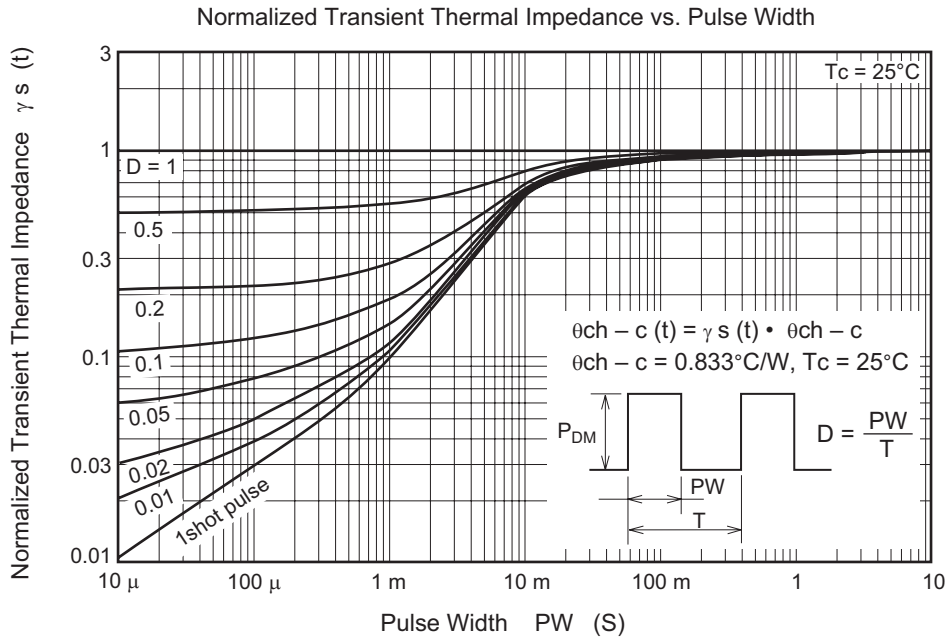
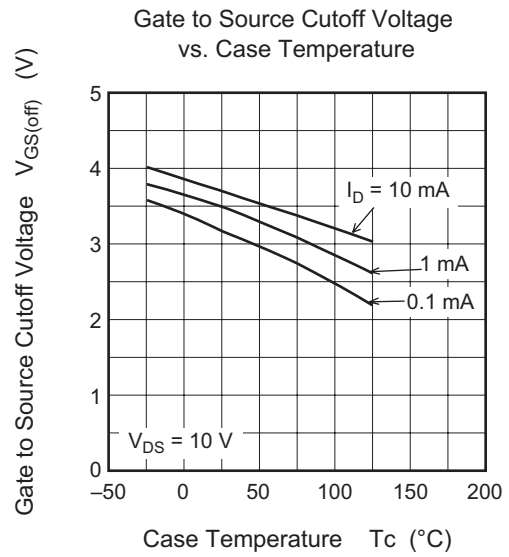
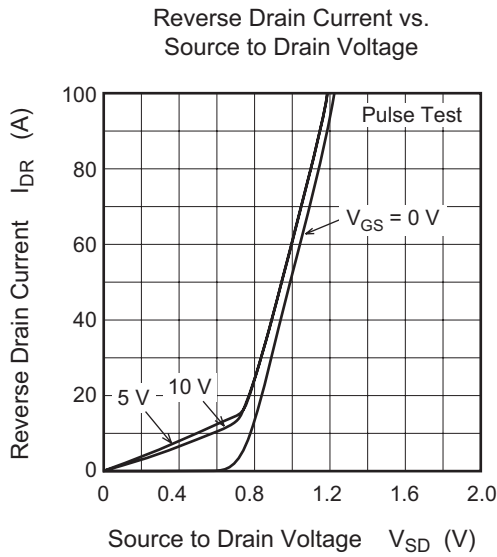
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	250	—	—	V	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±0.1	μA	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 250 V, V <sub>GS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	3.0	—	4.0	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Static drain to source on state resistance	R <sub>DS (on)</sub>	—	0.053	0.069	Ω	I <sub>D</sub> = 15 A, V <sub>GS</sub> = 10 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	17	28	—	S	I <sub>D</sub> = 15 A, V <sub>DS</sub> = 10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	3600	—	pF	V <sub>DS</sub> = 25 V
Output capacitance	C <sub>oss</sub>	—	450	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	115	—	pF	f = 1 MHz
Turn-on delay time	t <sub>d (on)</sub>	—	48	—	ns	I <sub>D</sub> = 15 A
Rise time	t <sub>r</sub>	—	120	—	ns	V <sub>GS</sub> = 10 V
Turn-off delay time	t <sub>d (off)</sub>	—	190	—	ns	R <sub>L</sub> = 8.3 Ω
Fall time	t <sub>f</sub>	—	110	—	ns	R <sub>g</sub> = 10 Ω
Total gate charge	Q <sub>g</sub>	—	110	—	nC	V <sub>DD</sub> = 200 V
Gate to source charge	Q <sub>gs</sub>	—	19	—	nC	V <sub>GS</sub> = 10 V
Gate to drain charge	Q <sub>gd</sub>	—	53	—	nC	I <sub>D</sub> = 30 A
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.9	1.35	V	I <sub>F</sub> = 30 A, V <sub>GS</sub> = 0
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	210	—	ns	I <sub>F</sub> = 30 A, V <sub>GS</sub> = 0
Body-drain diode reverse recovery charge	Q <sub>rr</sub>	—	1.8	—	μC	di <sub>F</sub> /dt = 100 A/μs

Note: 4. Pulse test

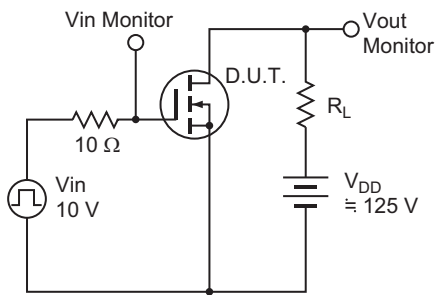
### Main Characteristics



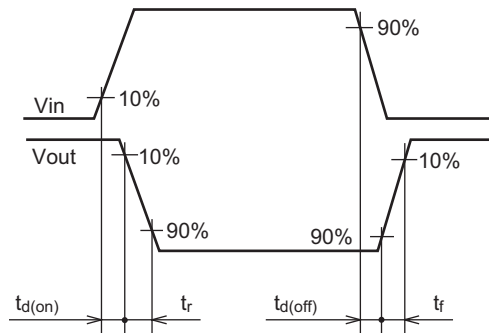




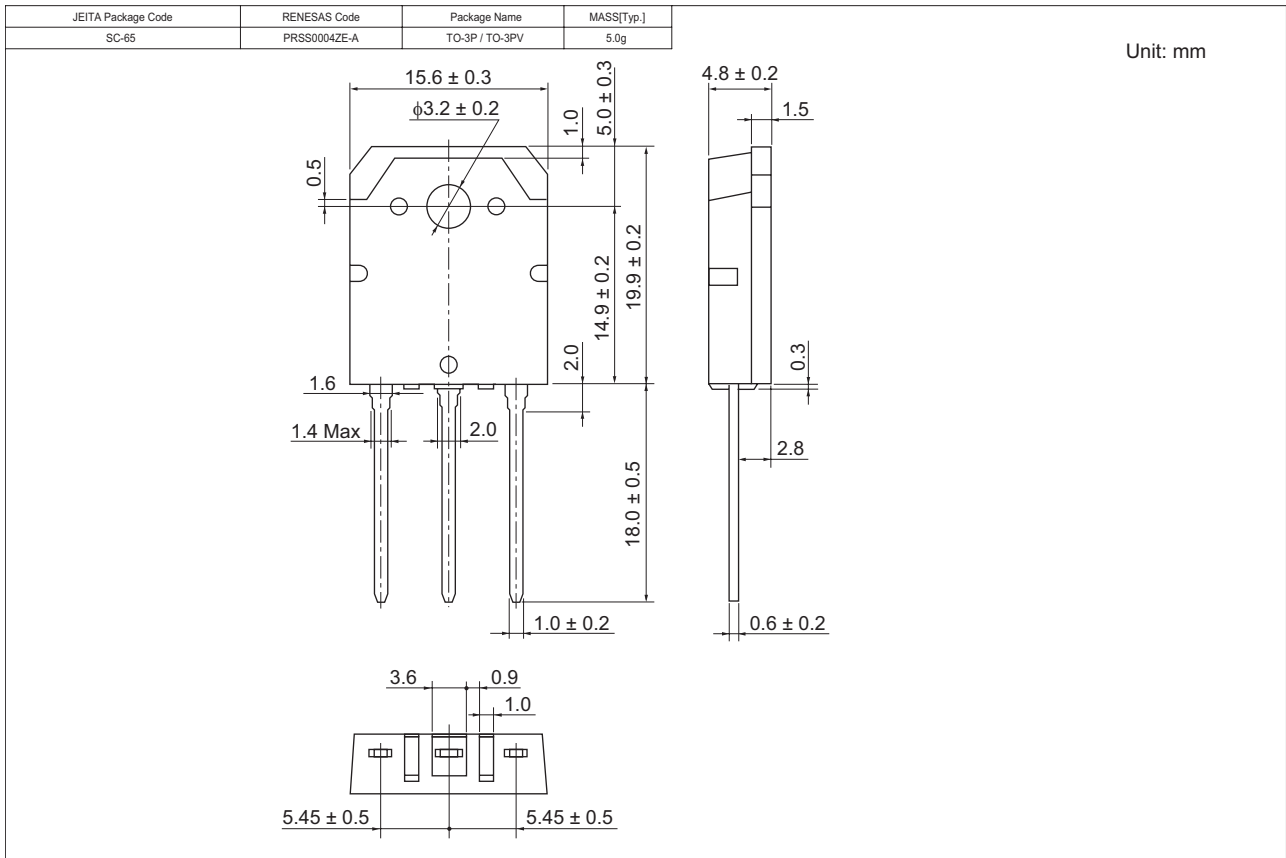
Switching Time Test Circuit



Waveform



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
H5N2509P-E	360 pcs	Box (Tube)

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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Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

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#### **Renesas Technology Taiwan Co., Ltd.**

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#### **Renesas Technology (Shanghai) Co., Ltd.**

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China  
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

#### **Renesas Technology Singapore Pte. Ltd.**

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Tel: <65> 6213-0200, Fax: <65> 6278-8001

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#### **Renesas Technology Malaysia Sdn. Bhd.**

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
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