

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## H5N2503P

Silicon N Channel MOS FET  
High Speed Power Switching

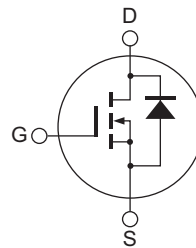
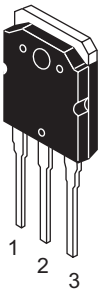
REJ03G1105-0200  
(Previous: ADE-208-1374A)  
Rev.2.00  
Sep 07, 2005

### Features

- Low on-resistance:  $R_{DS(on)} = 0.04 \Omega$  typ.
- Low leakage current:  $I_{DSS} = 1 \mu A$  max (at  $V_{DS} = 250 V$ )
- High speed switching:  $t_f = 190 ns$  typ (at  $V_{GS} = 10 V$ ,  $V_{DD} = 125 V$ ,  $I_D = 25 A$ )
- Low gate charge:  $Q_g = 140 nC$  typ (at  $V_{DD} = 200 V$ ,  $V_{GS} = 10 V$ ,  $I_D = 50 A$ )
- 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>	50	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	200	A
Body-drain diode reverse drain current	I <sub>DR</sub>	50	A
Body-drain diode reverse drain peak current	I <sub>DR (pulse)</sub> <sup>Note 1</sup>	200	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	50	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

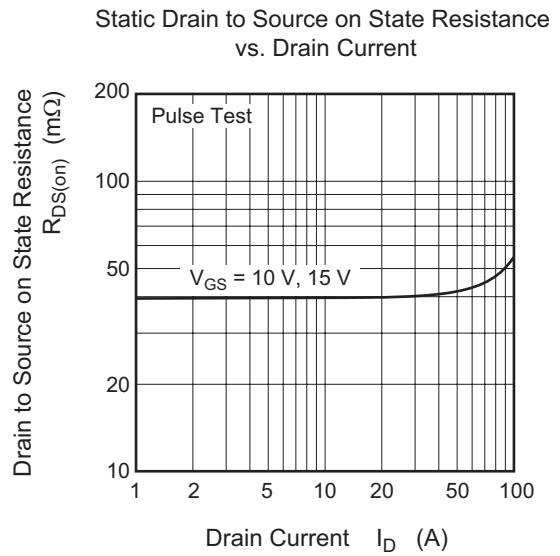
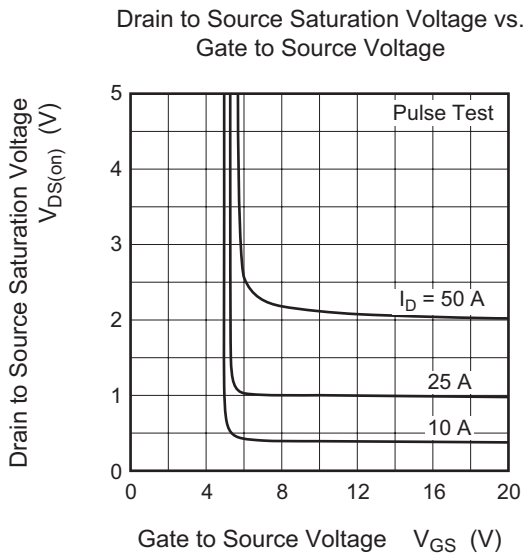
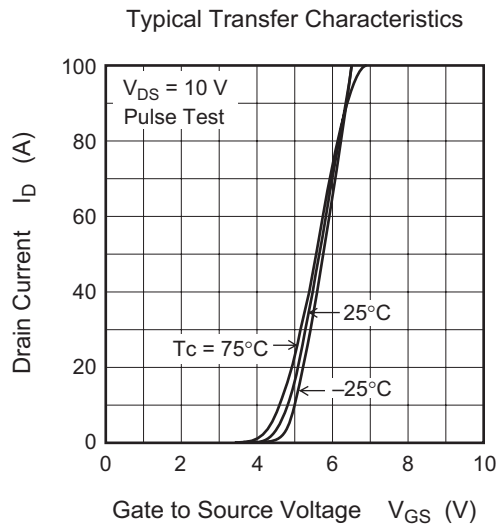
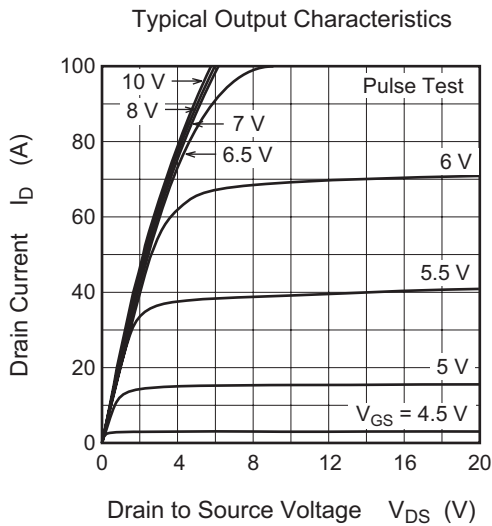
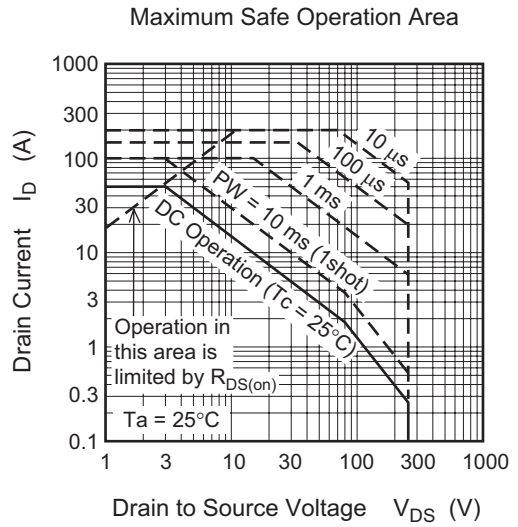
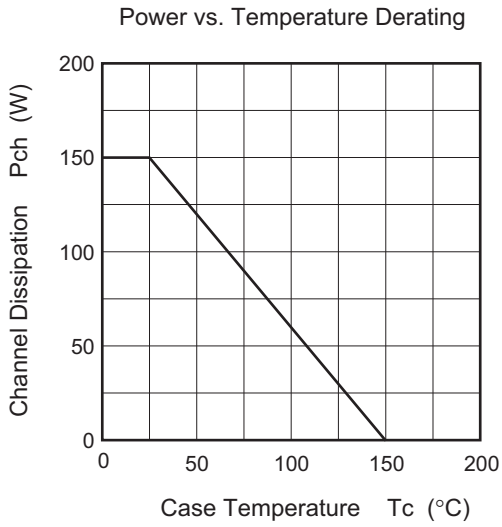
## Electrical Characteristics

(Ta = 25°C)

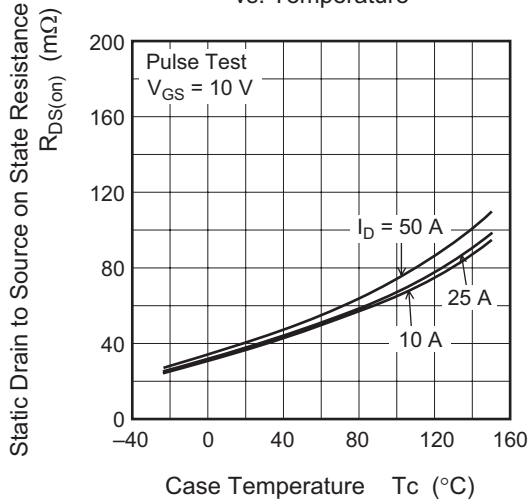
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	250	—	—	V	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±0.1	μA	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	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>	—	0.040	0.055	Ω	I <sub>D</sub> = 25 A, V <sub>GS</sub> = 10 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	25	40	—	S	I <sub>D</sub> = 25 A, V <sub>DS</sub> = 10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	5150	—	pF	V <sub>DS</sub> = 25 V
Output capacitance	C <sub>oss</sub>	—	620	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	105	—	pF	f = 1 MHz
Turn-on delay time	t <sub>d (on)</sub>	—	58	—	ns	I <sub>D</sub> = 25 A
Rise time	t <sub>r</sub>	—	210	—	ns	V <sub>GS</sub> = 10 V
Turn-off delay time	t <sub>d (off)</sub>	—	220	—	ns	R <sub>L</sub> = 5 Ω
Fall time	t <sub>f</sub>	—	190	—	ns	R <sub>g</sub> = 10 Ω
Total gate charge	Q <sub>g</sub>	—	140	—	nC	V <sub>DD</sub> = 200 V
Gate to source charge	Q <sub>gs</sub>	—	25	—	nC	V <sub>GS</sub> = 10 V
Gate to drain charge	Q <sub>gd</sub>	—	60	—	nC	I <sub>D</sub> = 50 A
Body-drain diode forward voltage	V <sub>DF</sub>	—	1.0	1.5	V	I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	210	—	ns	I <sub>F</sub> = 50 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

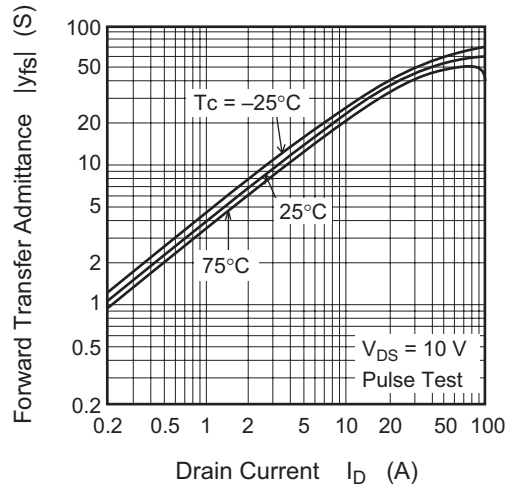
Main Characteristics



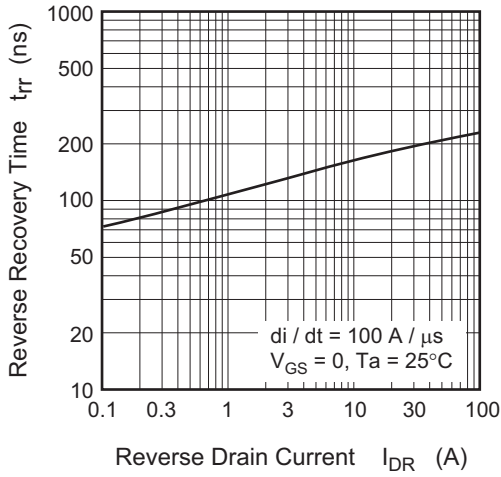
Static Drain to Source on State Resistance vs. Temperature



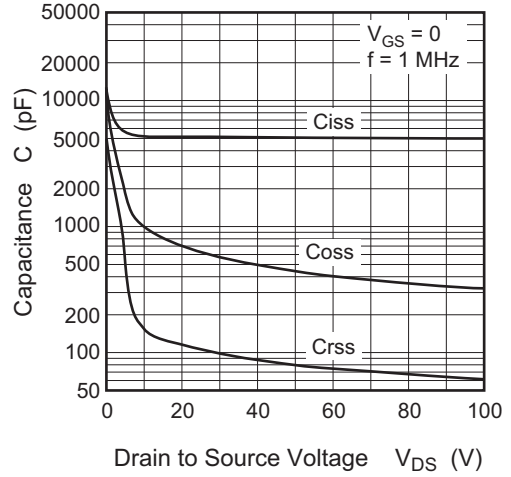
Forward Transfer Admittance vs. Drain Current



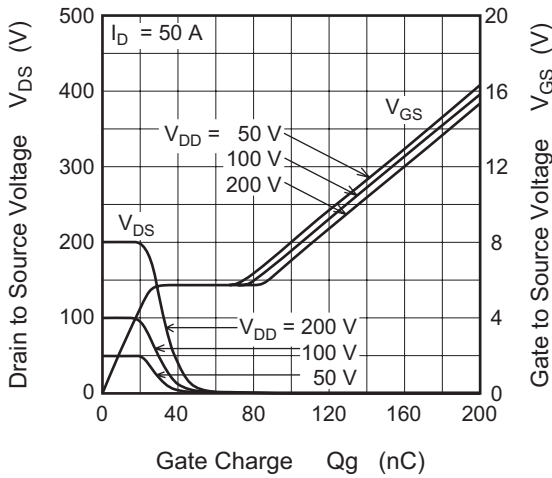
Body-Drain Diode Reverse Recovery Time



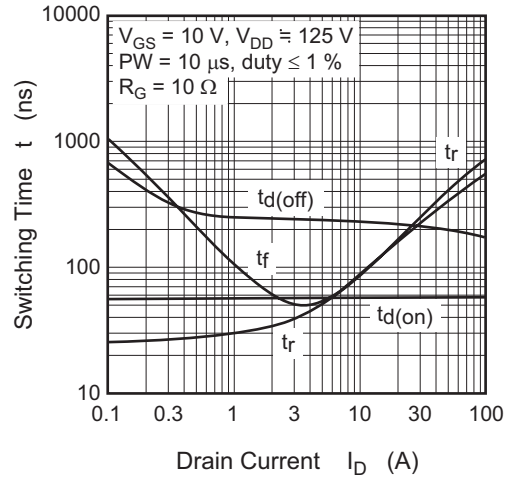
Typical Capacitance vs. Drain to Source Voltage



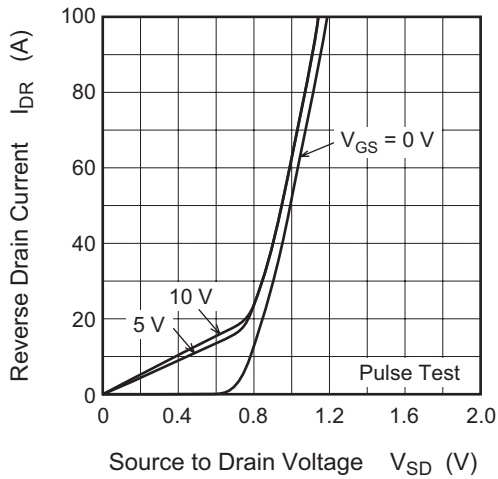
Dynamic Input Characteristics



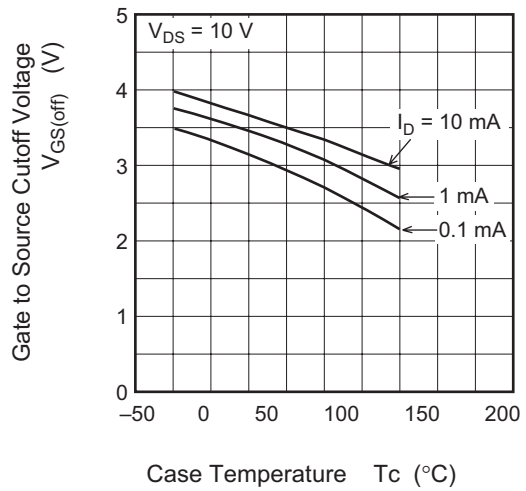
Switching Characteristics



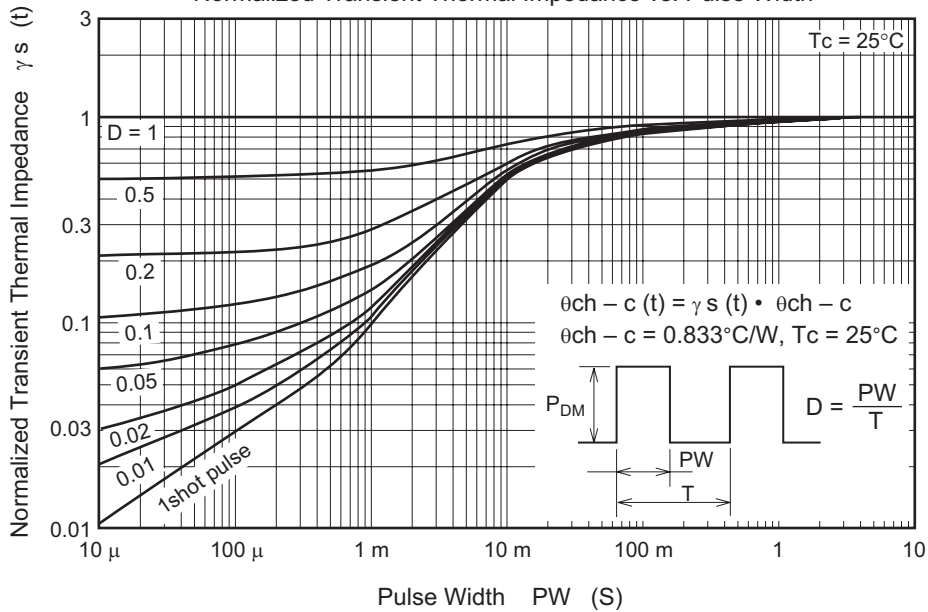
Reverse Drain Current vs. Source to Drain Voltage



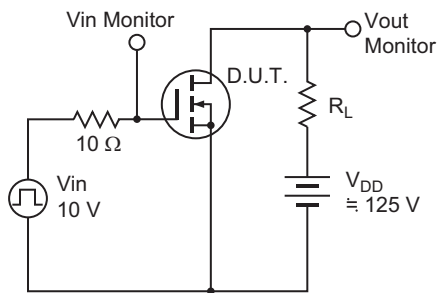
Gate to Source Cutoff Voltage vs. Case Temperature



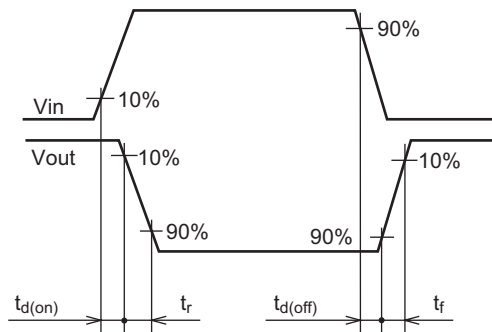
Normalized Transient Thermal Impedance vs. Pulse Width



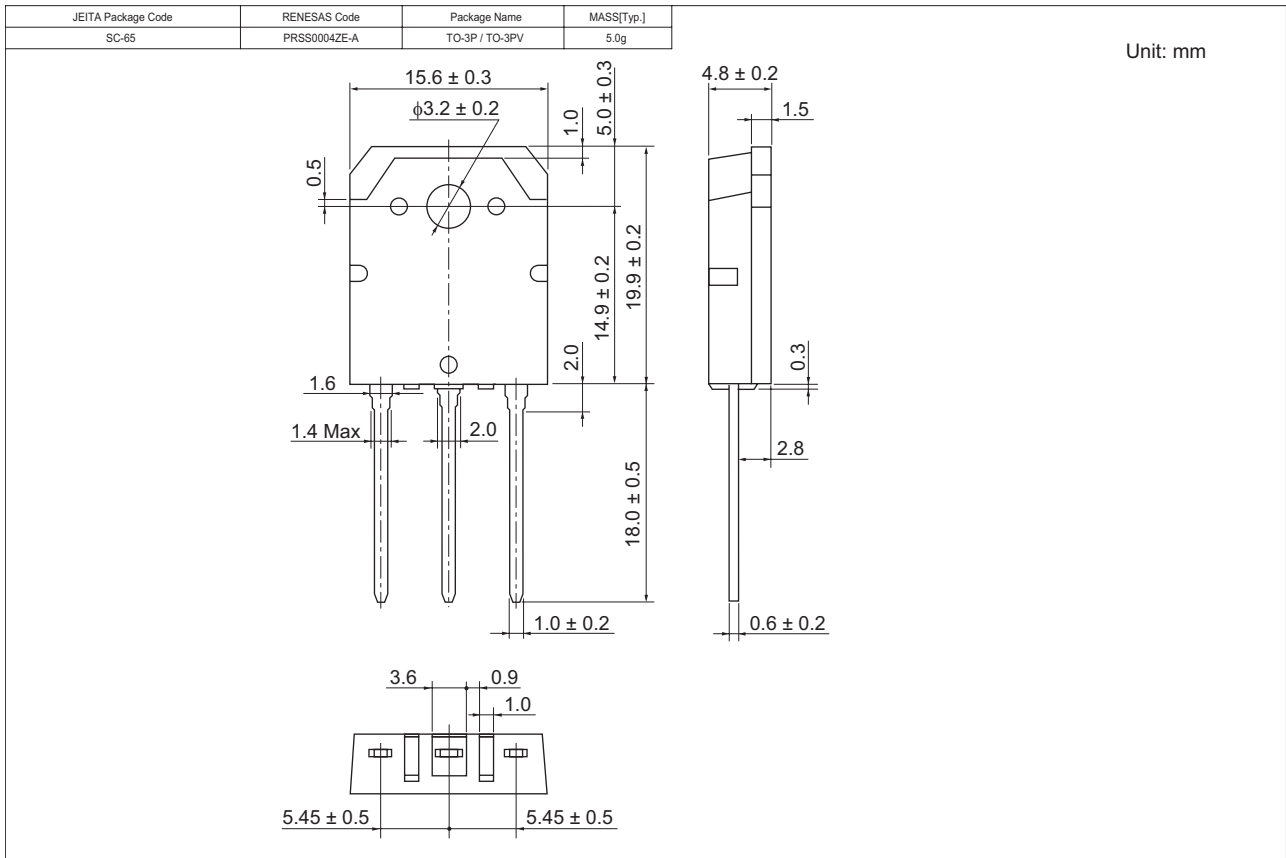
Switching Time Test Circuit



Waveform



### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
H5N2503P-E	360 pcs	Box (Tube)

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