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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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H5N2503P

Silicon N Channel MOS FET
High Speed Power Switching

RENESAS

ADE-208-1374A (Z)

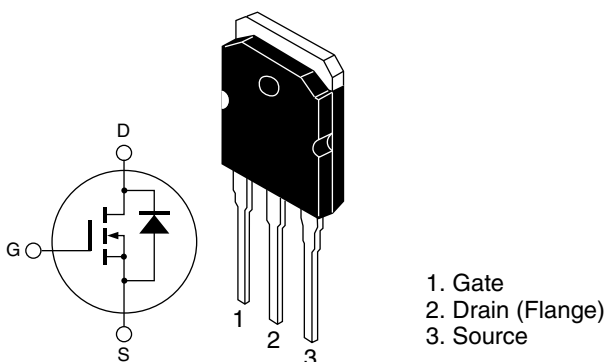
2nd. Edition
Jun. 2002

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

TO-3P



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	50	A
Drain peak current	$I_{D (pulse)}$ ^{Note1}	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Body-drain diode reverse drain peak current	$I_{DR (pulse)}$ ^{Note1}	200	A
Avalanche current	I_{AP} ^{Note3}	50	A
Channel dissipation	P_{ch} ^{Note2}	150	W
Channel to case Thermal Impedance	θ_{ch-c}	0.833	°C/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 $T_c = 25^\circ C$

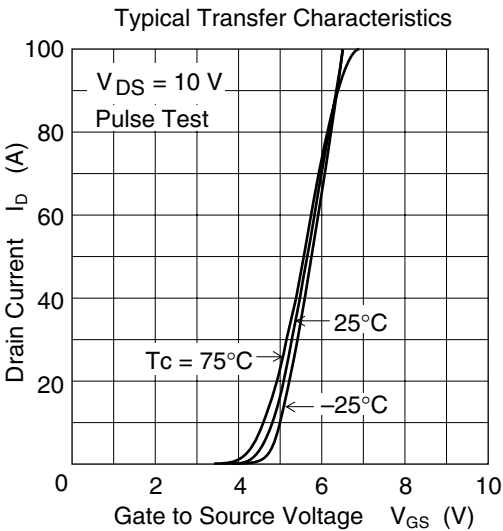
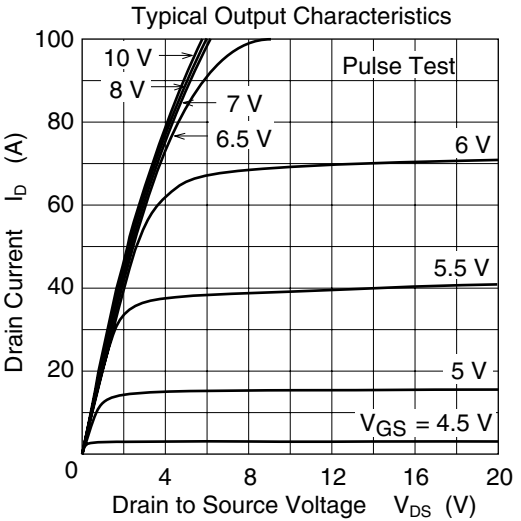
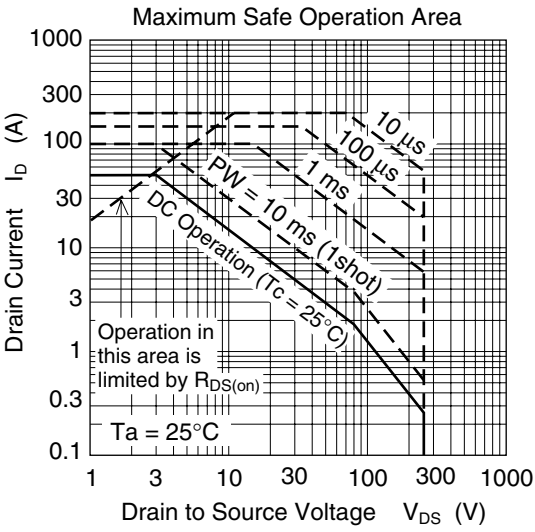
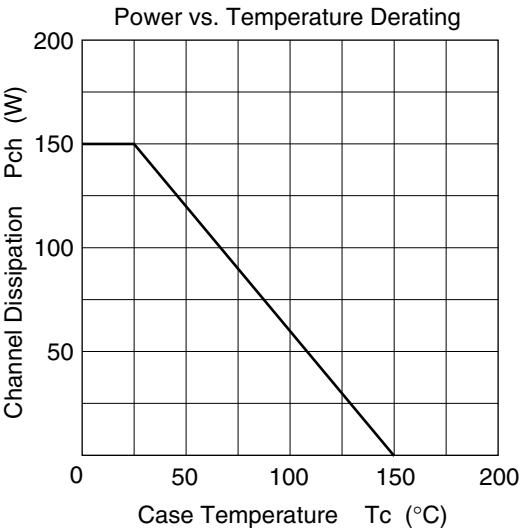
3. $T_{ch} \leq 150^\circ C$

Electrical Characteristics (Ta = 25°C)

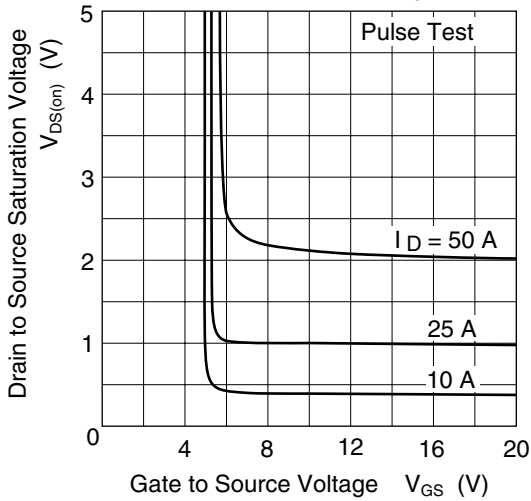
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 250 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.040	0.055	Ω	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	25	40	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	5150	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	C_{oss}	—	620	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	105	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_d(on)$	—	58	—	ns	$I_D = 25 \text{ A}$
Rise time	t_r	—	210	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_d(off)$	—	220	—	ns	$R_L = 5 \Omega$
Fall time	t_f	—	190	—	ns	$R_g = 10 \Omega$
Total gate charge	Q_g	—	140	—	nC	$V_{DD} = 200 \text{ V}$
Gate to source charge	Q_{gs}	—	25	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	60	—	nC	$I_D = 50 \text{ A}$
Body-drain diode forward voltage	V_{DF}	—	1.0	1.5	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	210	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery charge	Q_{rr}	—	1.8	—	μC	$diF/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

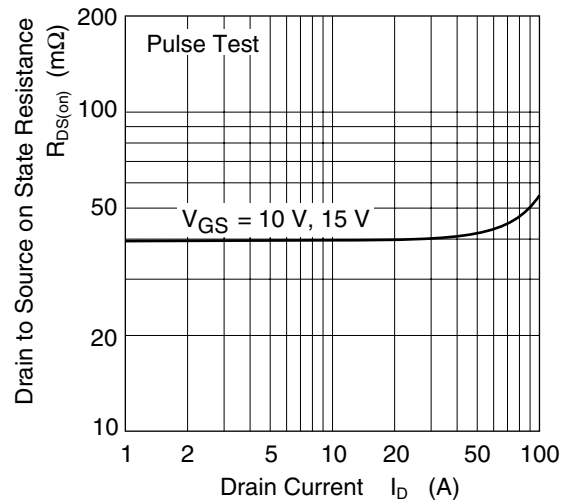
Main Characteristics



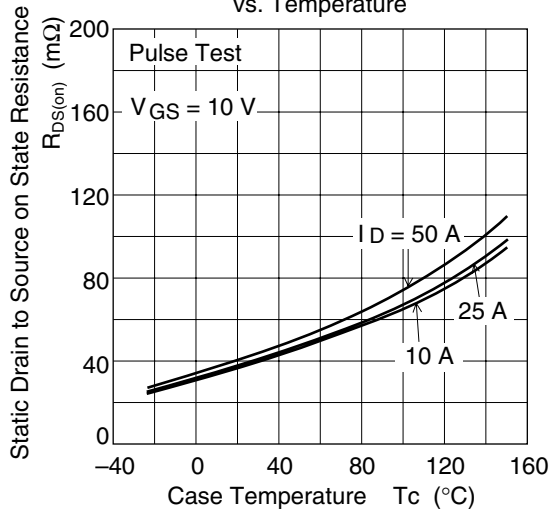
Drain to Source Saturation Voltage vs.
Gate to Source Voltage



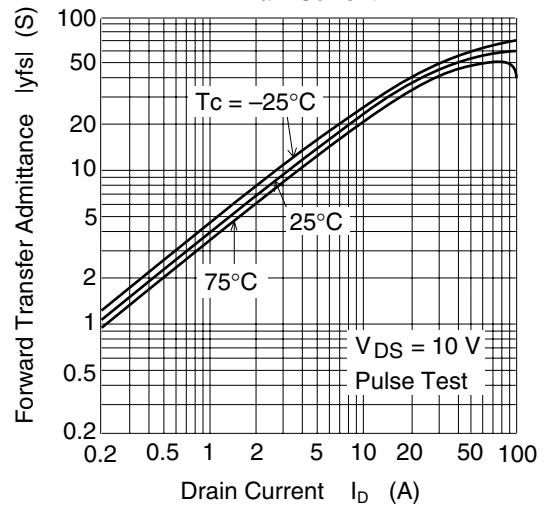
Static Drain to Source on State Resistance
vs. Drain Current

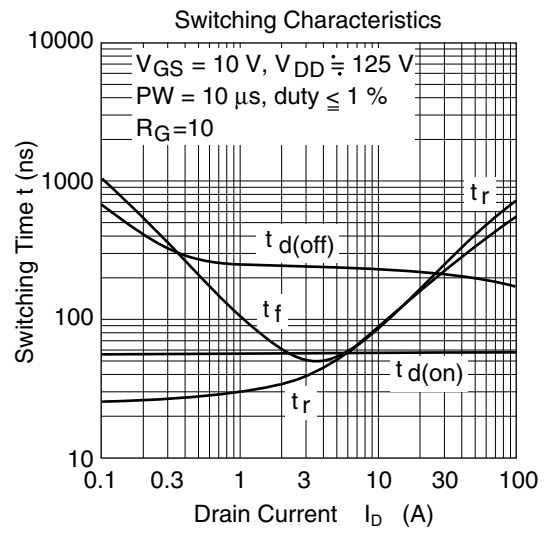
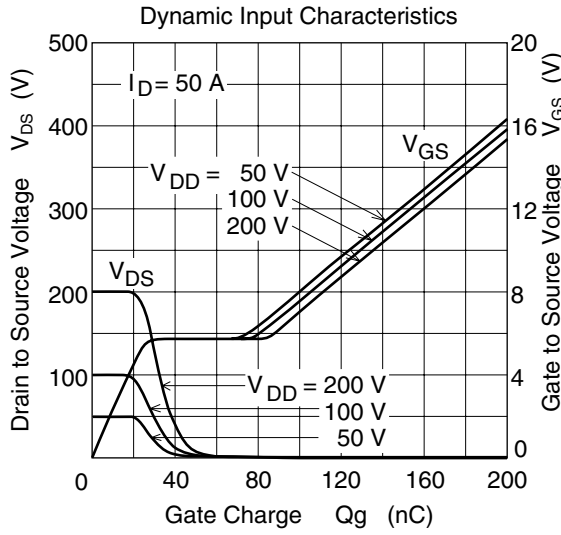
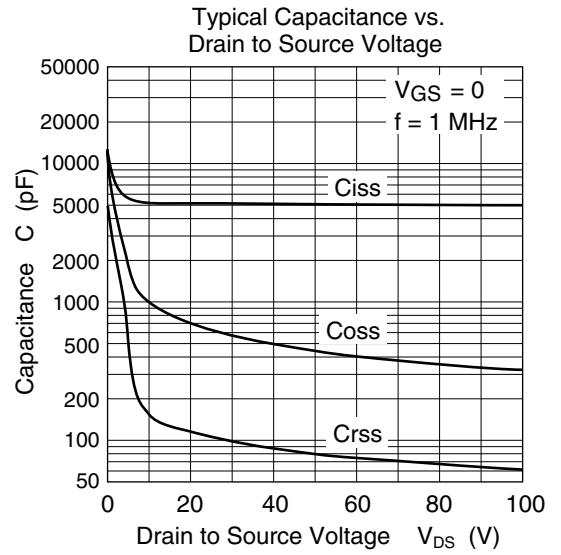
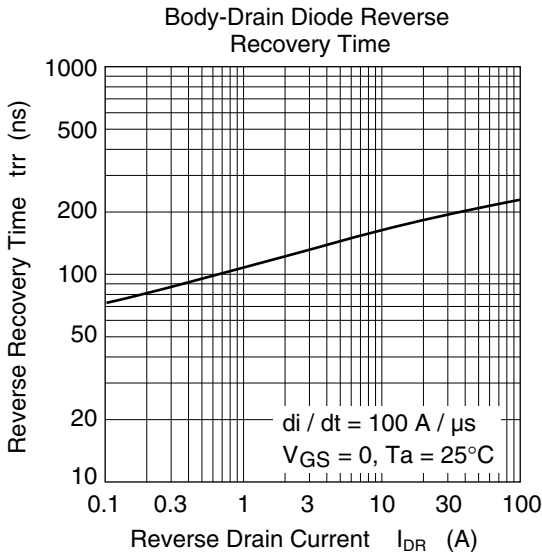


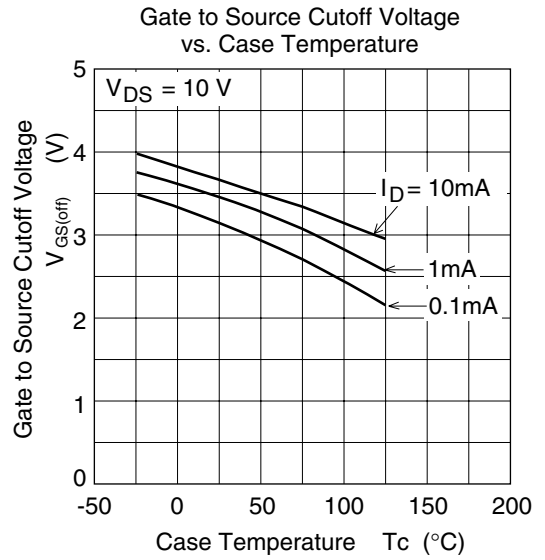
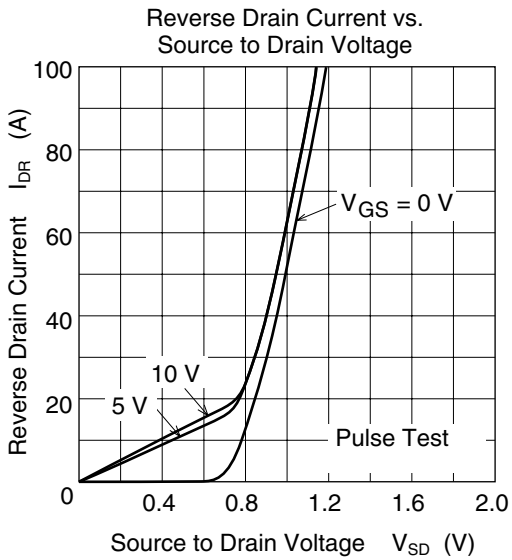
Static Drain to Source on State Resistance
vs. Temperature



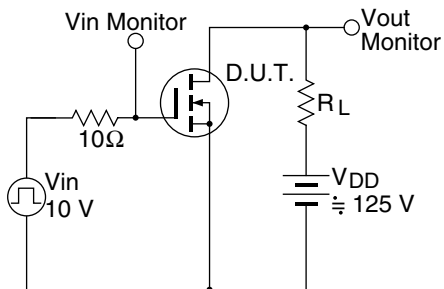
Forward Transfer Admittance vs.
Drain Current



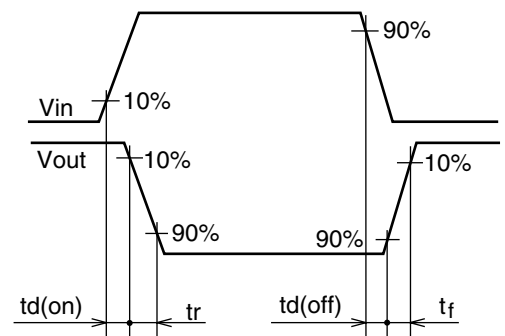


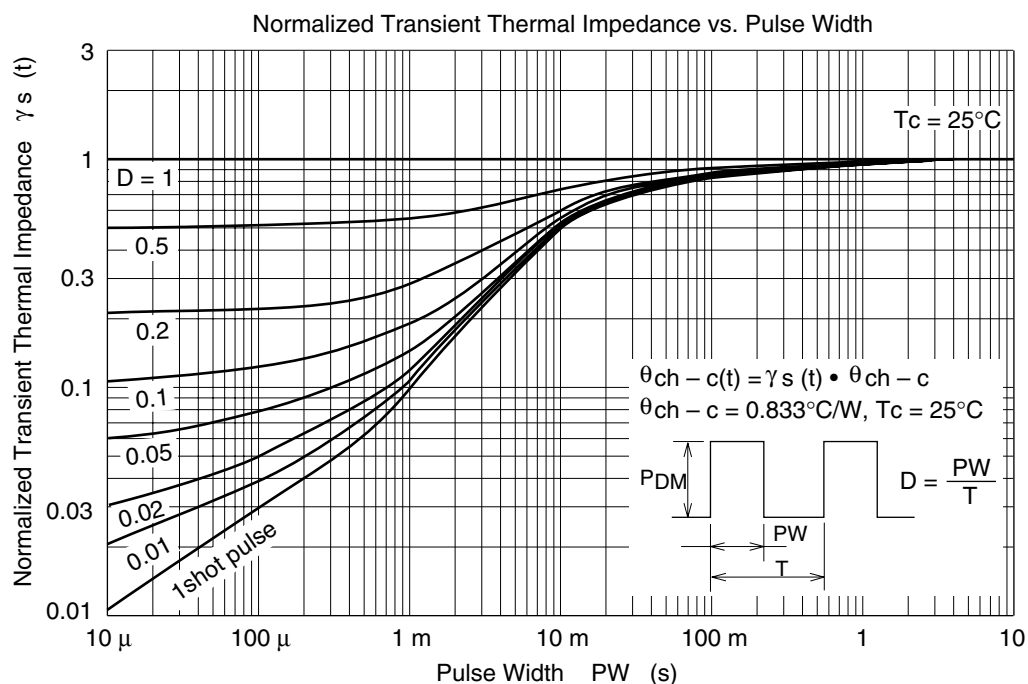


Switching Time Test Circuit



Waveform





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