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

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HAT2088R

Silicon N Channel MOSFET
High Speed Power Switching

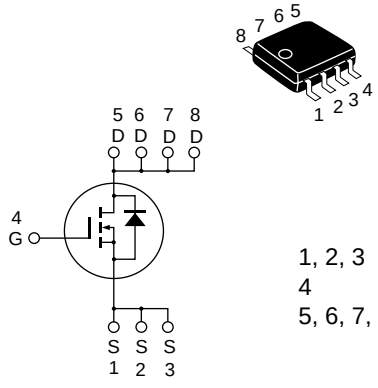
ADE-208-1234 (Z)
1st. Edition
Mar. 2001

Features

- Low on-resistance
- Low leakage current
- High density mounting

Outline

SOP–8



1, 2, 3	Source
4	Gate
5, 6, 7, 8	Drain

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	200	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	2	A
Drain peak current	$I_{D\ (pulse)}$ Note1	16	A
Body-drain diode reverse drain current	I_{DR}	2	A
Channel dissipation	Pch Note 2	2.5	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs and duty cycle ≤ 1%
2. When using the glass epoxy board (FR4 40 × 40 ×1.6 mm), PW ≤ 10 s

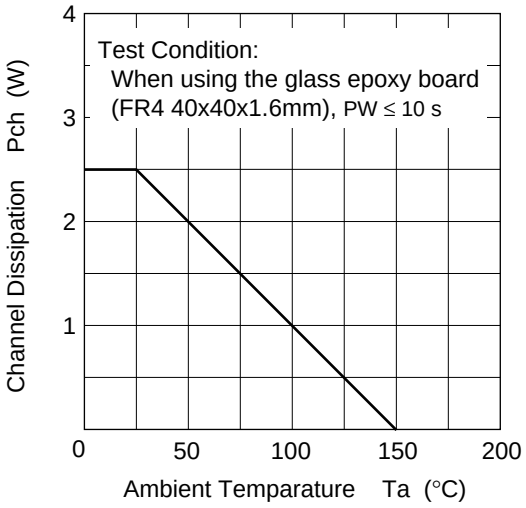
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	200	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	µA	V_{GS} = ±30V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	µA	V_{DS} = 200V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	V_{DS} = 10V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	0.35	0.44	Ω	I_D = 1A, V_{GS} = 10V Note3
Forward transfer admittance	$\|y_{fs}\|$	1.5	2.5	—	S	I_D = 1A, V_{DS} = 10V Note3
Input capacitance	Ciss	—	450	—	pF	V_{DS} = 25V, V_{GS} = 0
Output capacitance	Coss	—	65	—	pF	f = 1 MHz
Reverse transfer capacitance	Crss	—	13	—	pF	
Total gate charge	Qg	—	13	—	nC	V_{DD} = 160 V
Gate to source charge	Qgs	—	2	—	nC	V_{GS} = 10 V
Gate to drain charge	Qgd	—	6	—	nC	I_D = 2 A
Turn-on delay time	td(on)	—	19	—	ns	V_{GS} = 10V, I_D = 1A
Rise time	tr	—	8.5	—	ns	V_{DD} ≅ 100V
Turn-off delay time	td(off)	—	48	—	ns	R_L = 100Ω
Fall time	tf	—	11	—	ns	R_g = 10Ω
Body-drain diode forward voltage	V_{DF}	—	0.8	1.2	V	I_F = 2A, V_{GS} = 0 Note 3
Body-drain diode reverse recovery time	trr	—	65	—	ns	I_F = 2A, V_{GS} = 0 diF/dt = 100A/µs

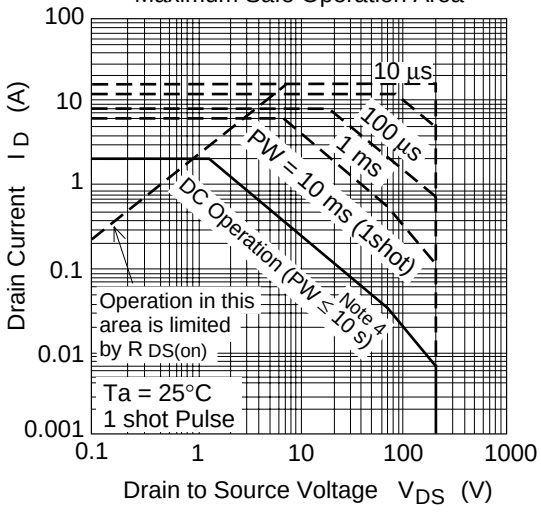
Note: 3. Pulse test

Main Characteristics

Power vs. Temparature Derating

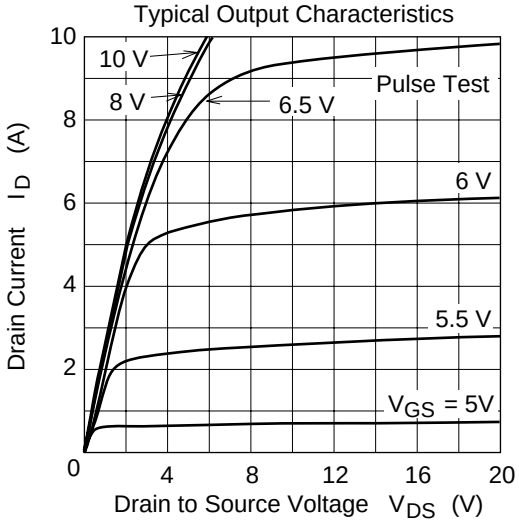


Maximum Safe Operation Area

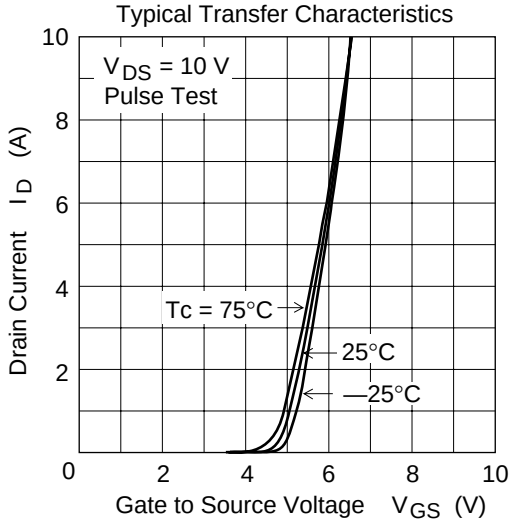


Notes 4:
When using the glass epoxy board
(FR4 40x40x1.6mm)

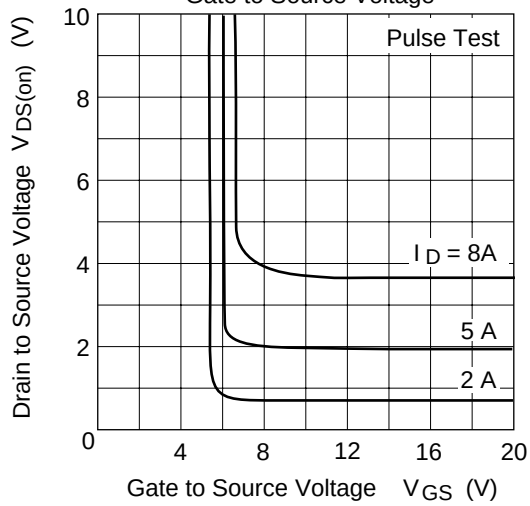
Typical Output Characteristics



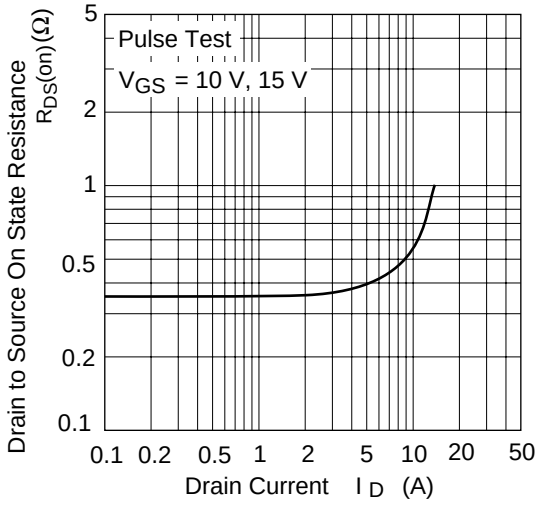
Typical Transfer Characteristics



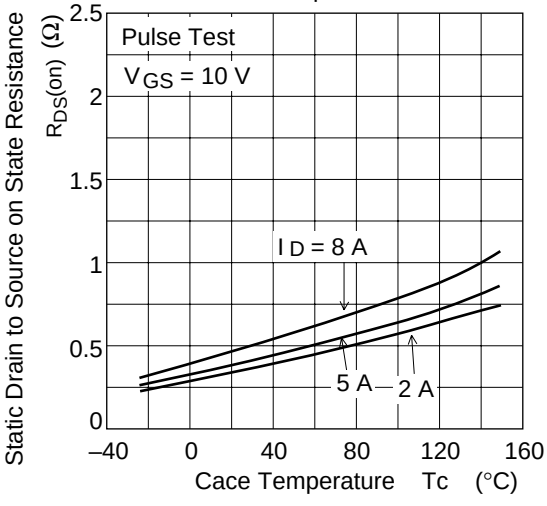
Drain to Source Saturation Voltage vs Gate to Source Voltage



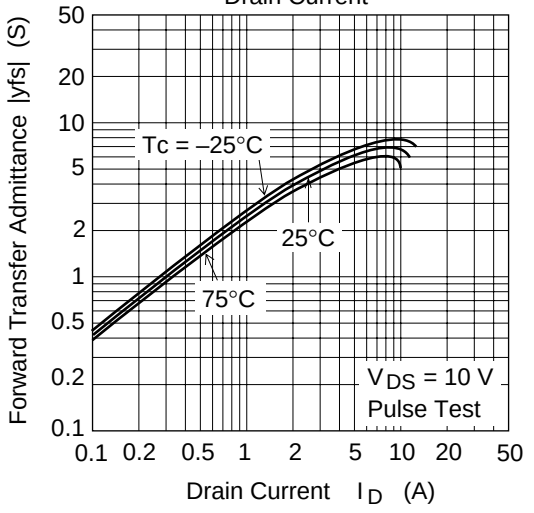
Static Drain to Source on State Resistance vs. Drain Current



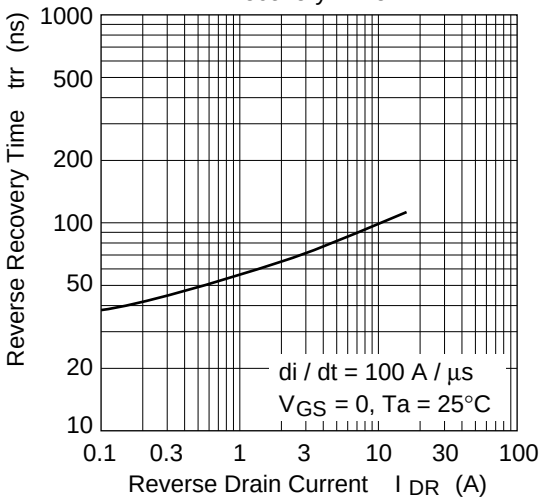
Static Drain to Source on State Resistance vs. Temperature



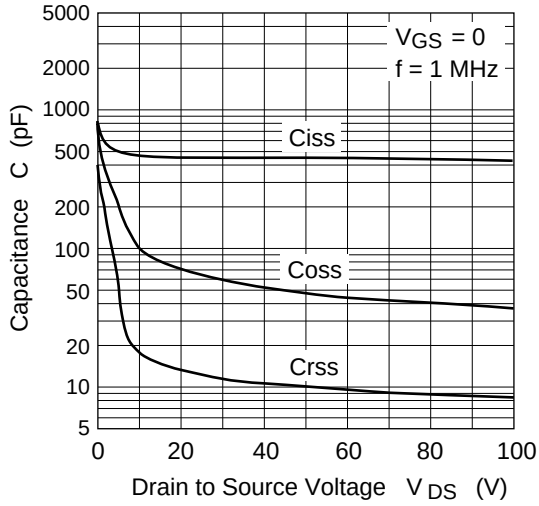
Forward Transfer Admittance vs. Drain Current



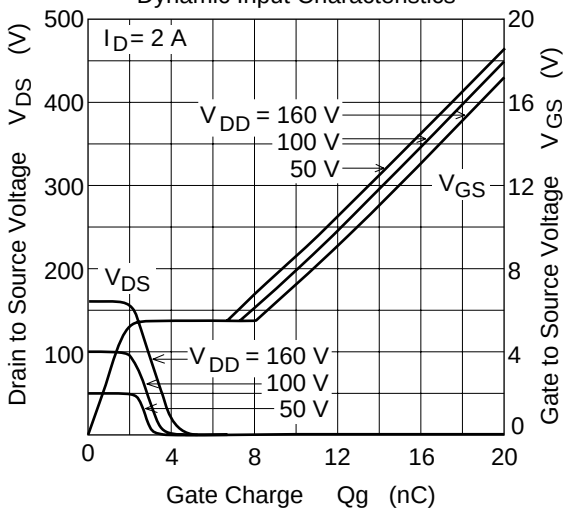
Body-Drain Diode Reverse Recovery Time



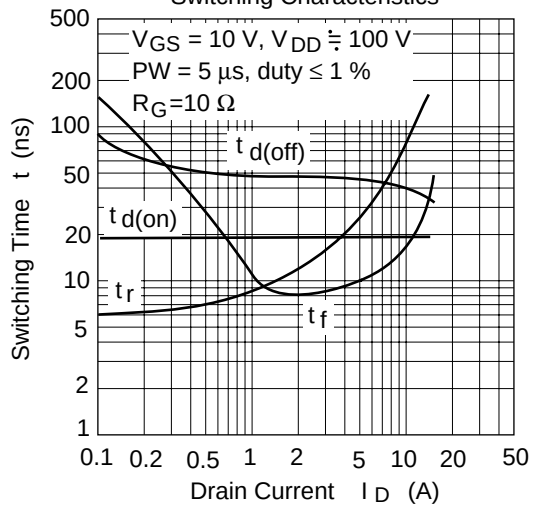
Typical Capacitance vs. Drain to Source Voltage



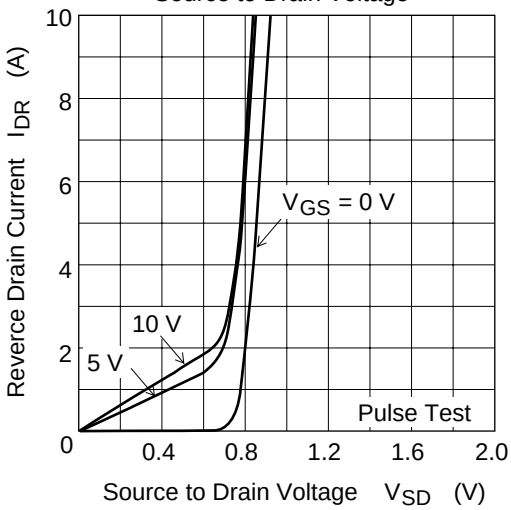
Dynamic Input Characteristics



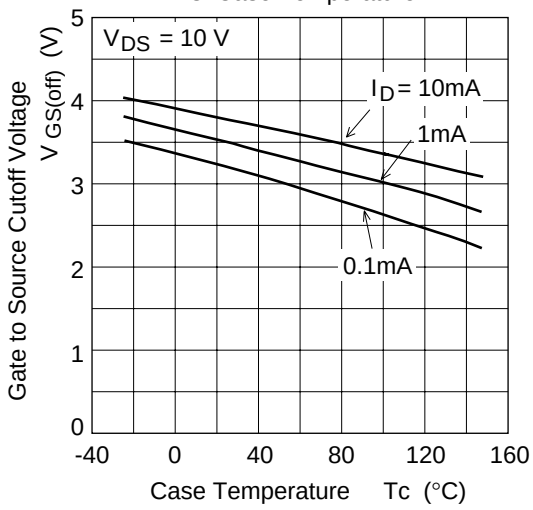
Switching Characteristics



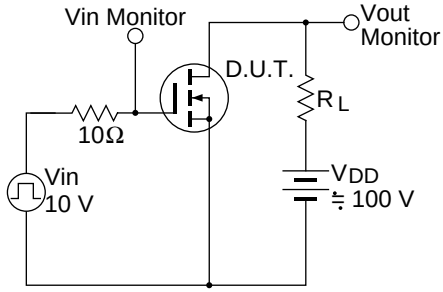
Reverce Drain Current vs.
Source to Drain Voltage



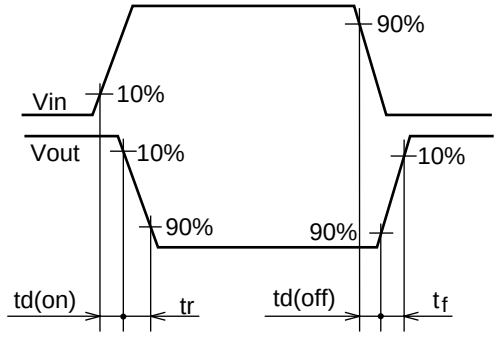
Gate to Source Cutoff voltage
vs. Case Temperature

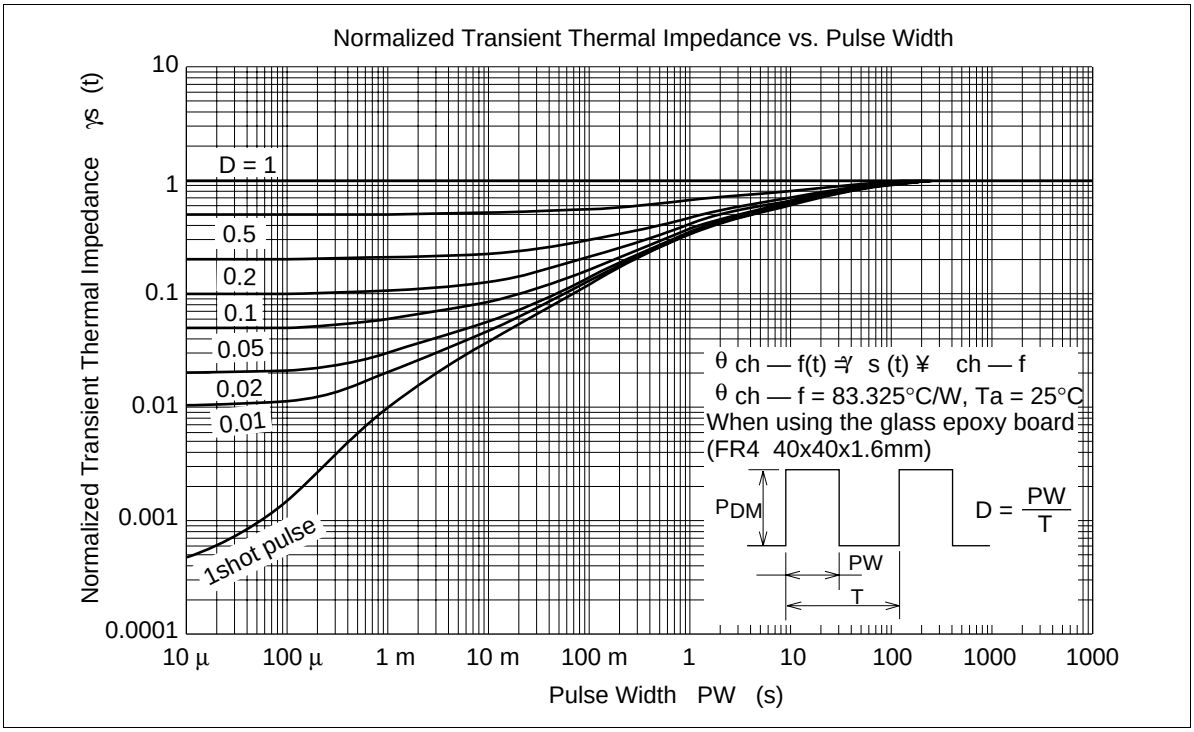


Switching Time Test Circuit



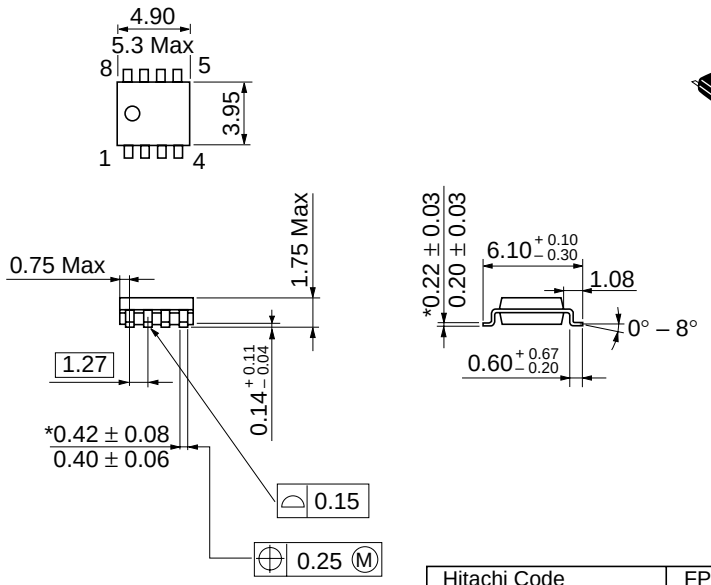
Switching Time Waveform




Normalized Transient Thermal Impedance vs. Pulse Width
Normalized Transient Thermal Impedance γs (t)
10
1
0.1
0.01
0.001
0.0001
D = 1
0.5
0.2
0.1
0.05
0.02
0.01
1shot pulse
θ ch — f(t) = γ s (t) ¥ θ ch — f
θ ch — f = 83.325°C/W, Ta = 25°C
When using the glass epoxy board
(FR4 40x40x1.6mm)
PDM
D = PW / T
PW
T
10 µ
100 µ
1 m
10 m
100 m
1
10
100
1000
1000
Pulse Width PW (s)

Package Dimensions

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-8DA
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.085 g

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