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

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HAT2077R

Silicon N Channel MOS FET
High Speed Power Switching

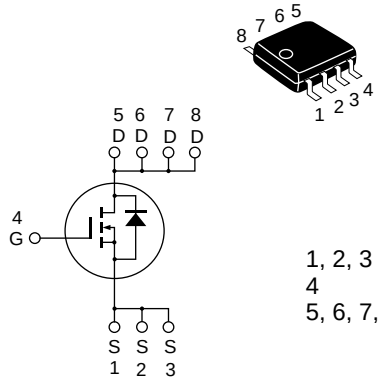
ADE-208-1228 (Z)
1st. Edition
Mar. 2001

Features

- Low on-resistance
- Low drive 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	3	A
Drain peak current	$I_{D(pulse)}$ Note1	24	A
Body-drain diode reverse drain current	I_{DR}	3	A
Channel dissipation	Pch Note2	2.5	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

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

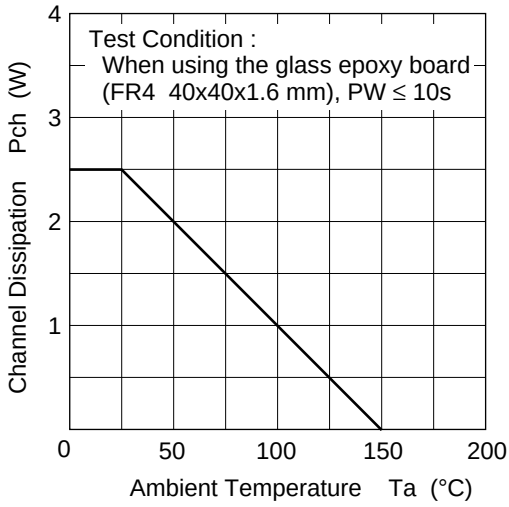
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	200	—	—	V	I_D = 10mA, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	µA	V_{GS} = ±30V, V_{DS} = 0
Zero gate voltege drain current	I_{DSS}	—	—	1	µA	V_{DS} = 200 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	I_D = 1mA, V_{DS} = 10V
Static drain to source on state resistance	$R_{DS(on)}$	—	0.18	0.235	Ω	I_D = 1.5A, V_{GS} = 10V Note3
Forward transfer admittance	$\|y_{fs}\|$	2.3	3.8	—	S	I_D = 1.5A, V_{DS} = 10V Note3
Input capacitance	Ciss	—	830	—	pF	V_{DS} = 25V
Output capacitance	Coss	—	115	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	23	—	pF	f = 1MHz
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	V_{DD} ≅ 100V, I_D = 1.5A
Rise time	t_r	—	10	—	ns	V_{GS} = 10V
Turn-off delay time	$t_{d(off)}$	—	70	—	ns	R_L = 66.7Ω
Fall time	t_f	—	10	—	ns	R_g = 10Ω
Total gate charge	Qg	—	23	—	nC	V_{DD} = 160V
Gate to source charge	Qgs	—	3.5	—	nC	V_{GS} = 10V
Gate to drain charge	Qgd	—	10	—	nC	I_D = 3A
Body–drain diode forward voltage	V_{DF}	—	0.75	1.15	V	I_F = 3A, V_{GS} = 0 Note3
Body–drain diode reverse recovery time	t_{rr}	—	75	—	ns	I_F = 3A, V_{GS} = 0 diF/ dt =100A/µs

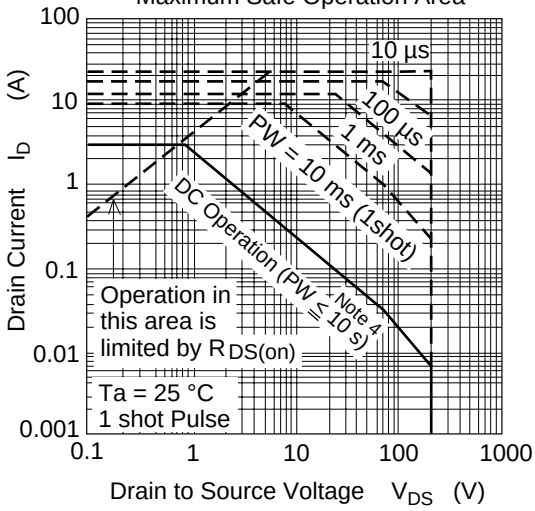
Note: 3. Pulse test

Main Characteristics

Power vs. Temperature Derating

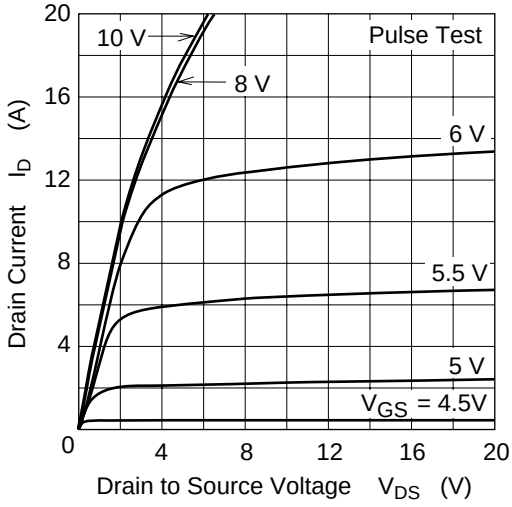


Maximum Safe Operation Area

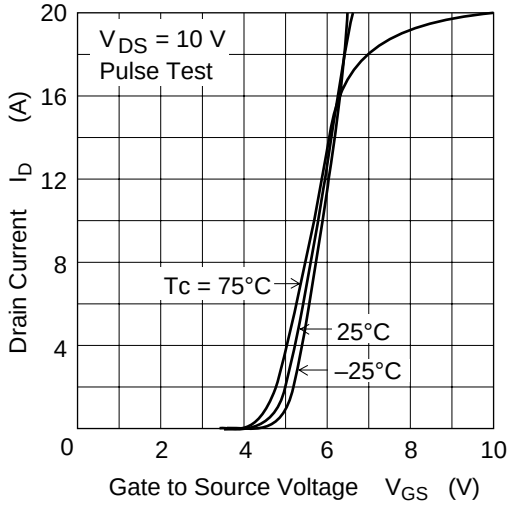


Note 4 :
When using the glass epoxy board
(FR4 40x40x1.6 mm)

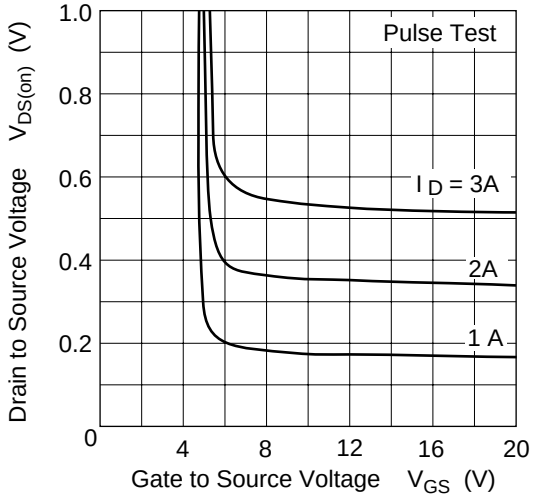
Typical Output Characteristics



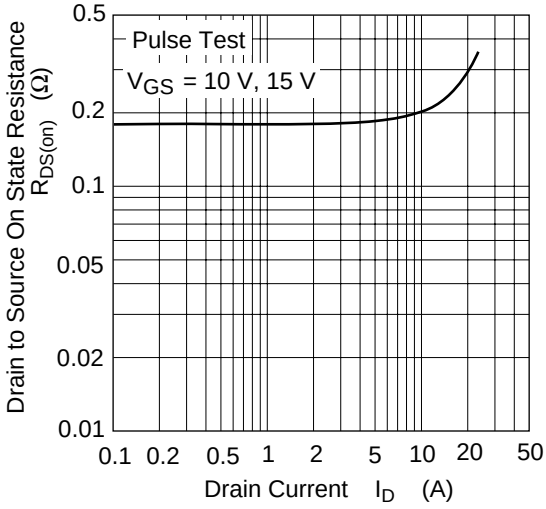
Typical Transfer Characteristics



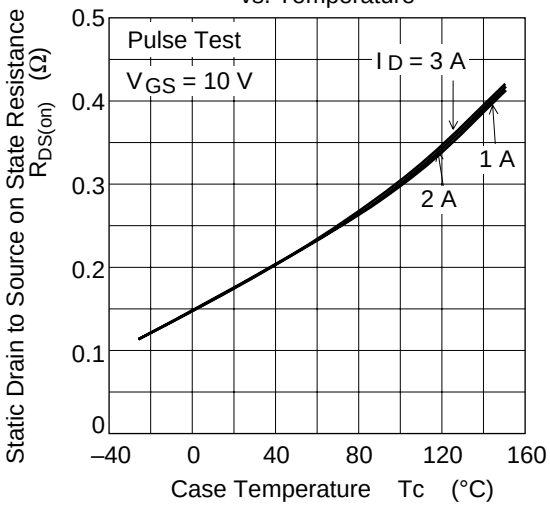
Drain to Source Saturation Voltage vs. Gate to Source Voltage



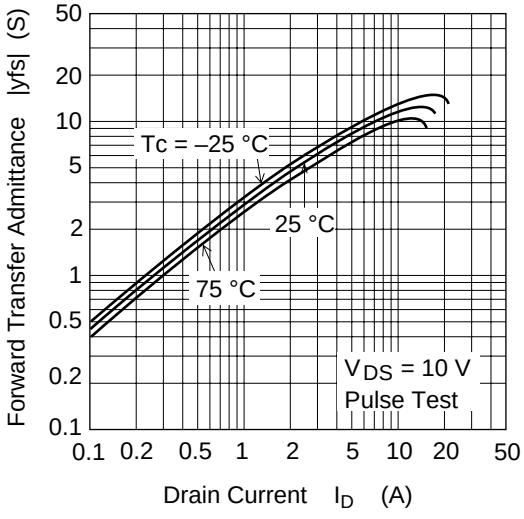
Static Drain to Source on State Resistance vs. Drain Current



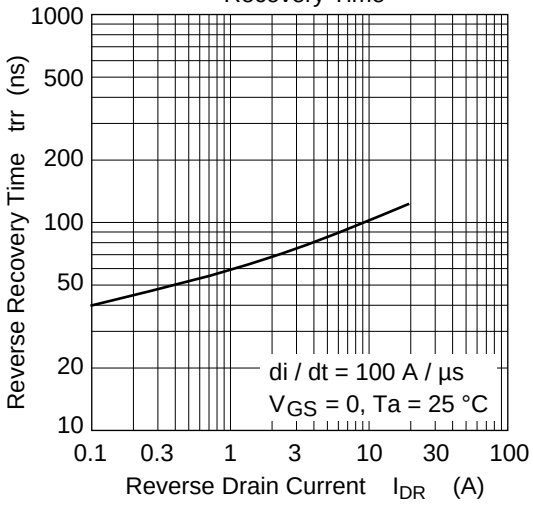
Static Drain to Source on State Resistance vs. Temperature



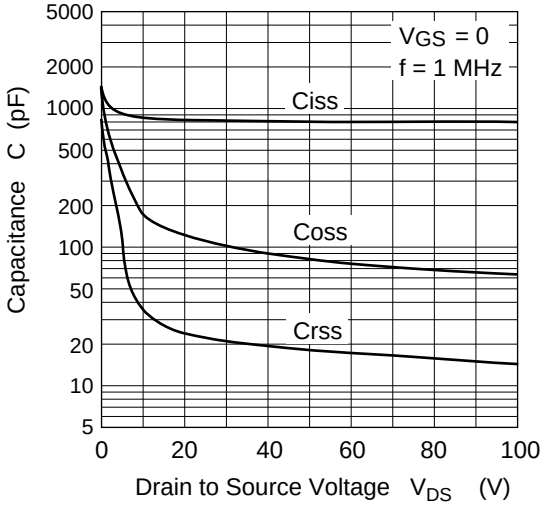
Forward Transfer Admittance vs. Drain Current



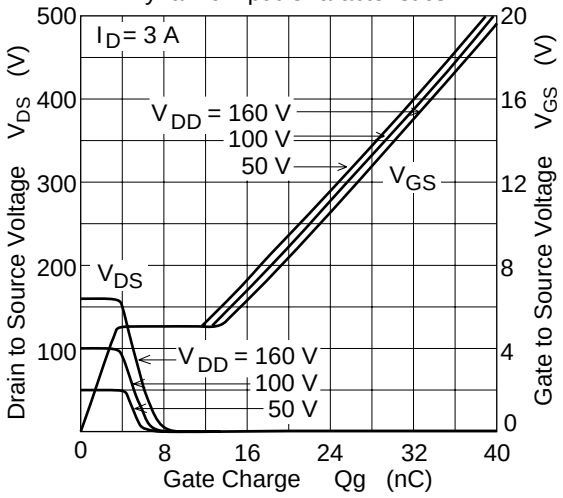
Body–Drain Diode Reverse Recovery Time



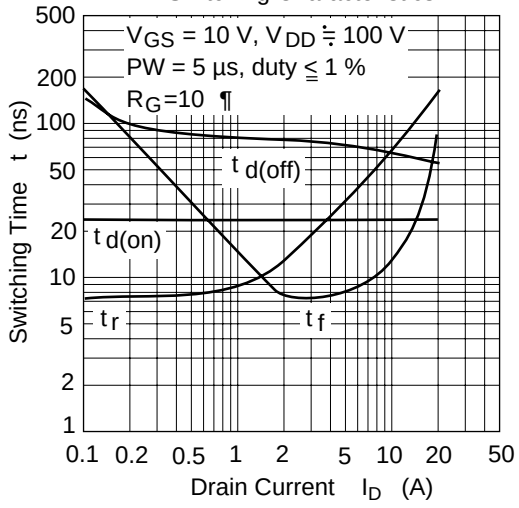
Typical Capacitance vs. Drain to Source Voltage



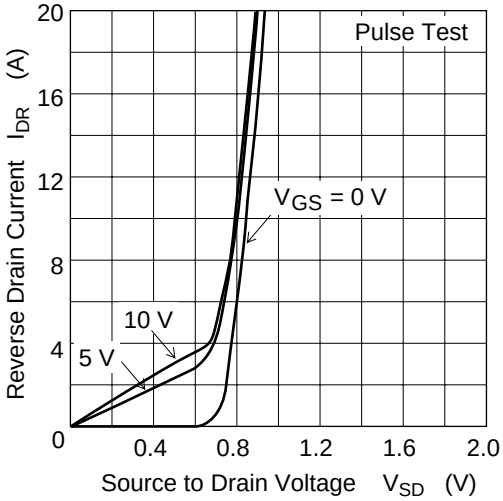
Dynamic Input Characteristics



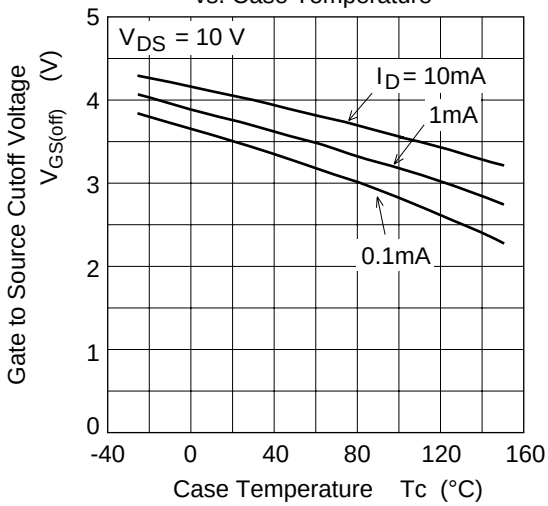
Switching Characteristics



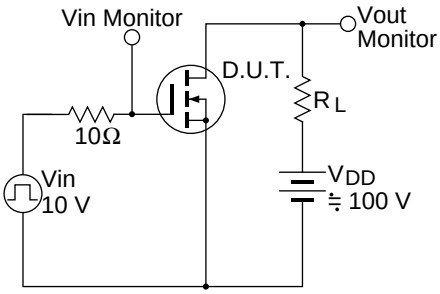
Reverse Drain Current vs.
Souece to Drain Voltage



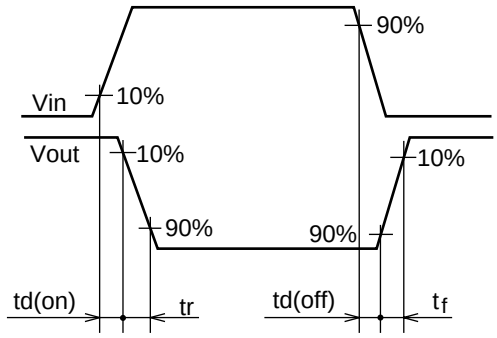
Gate to Source Cutoff Voltage
vs. Case Temperature

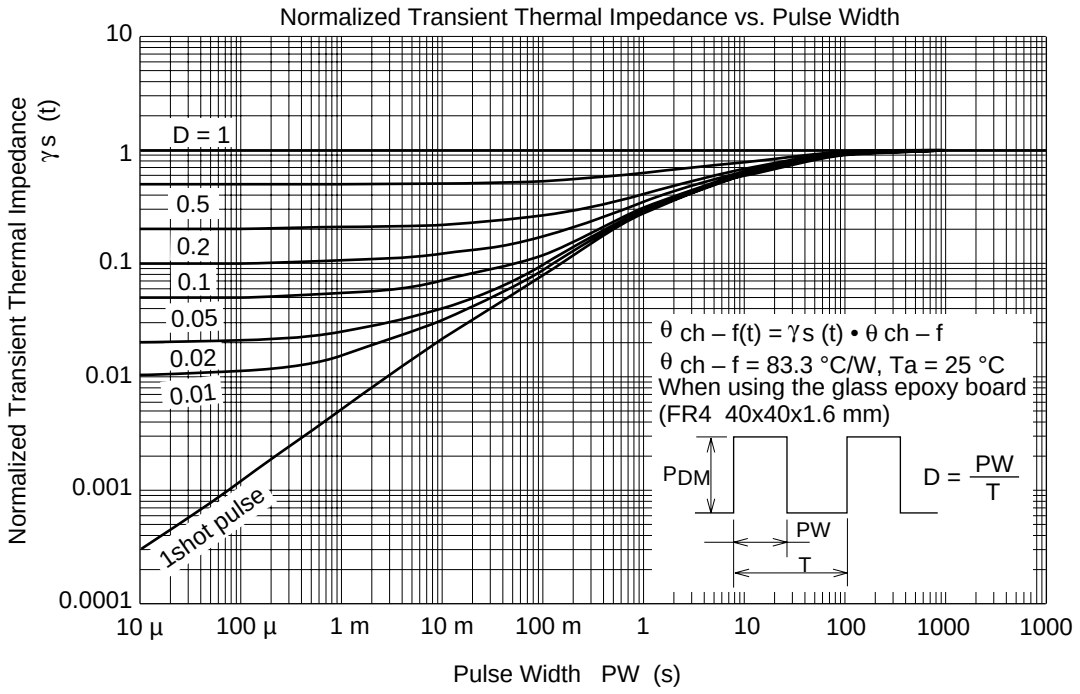


Switching Time Test Circuit



Switching Time Waveform

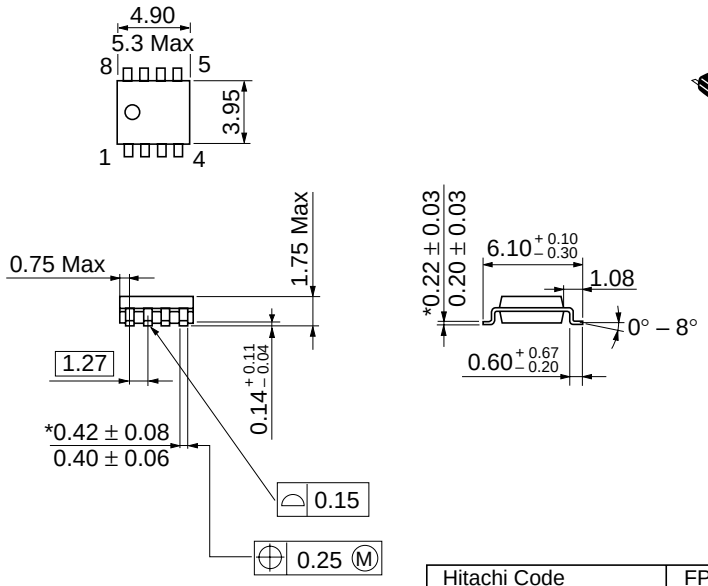



Normalized Transient Thermal Impedance vs. Pulse Width
Normalized Transient Thermal Impedance γs (t)
10
1
0.1
0.01
0.001
0.0001
D = 1
0.5
0.2
0.1
0.05
0.02
0.01
1shot pulse
θ ch – f(t) = γs (t) • θ ch – f
θ ch – f = 83.3 °C/W, Ta = 25 °C
When using the glass epoxy board
(FR4 40x40x1.6 mm)
PDM
D = PW / T
PW
T
10 µ
100 µ
1 m
10 m
100 m
1
10
100
1000
1000
Pulse Width PW (s)

Package Dimensions

As of January, 2001

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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