HAT1025R

Silicon P Channel Power MOS FET
High Speed Power Switching

HITACHI

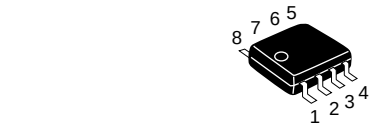
ADE-208-437 F (Z)
7th. Edition
December. 1996

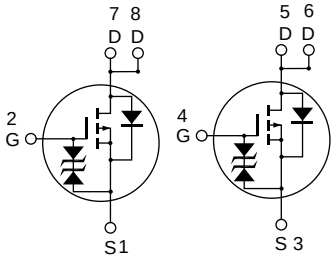
Features

- Low on-resistance
- Capable of 2.5 V gate drive
- Low drive current
- High density mounting

Outline

SOP–8





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

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	–20	V
Gate to source voltage	V_{GSS}	±10	V
Drain current	I_D	–4.5	A
Drain peak current	$I_{D(pulse)}$ Note1	–36	A
Body–drain diode reverse drain current	I_{DR}	–4.5	A
Channel dissipation	Pch Note2	2	W
Channel dissipation	Pch Note3	3	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: 1. PW ≤ 10µs, duty cycle ≤ 1 %
2. 1 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s
3. 2 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s

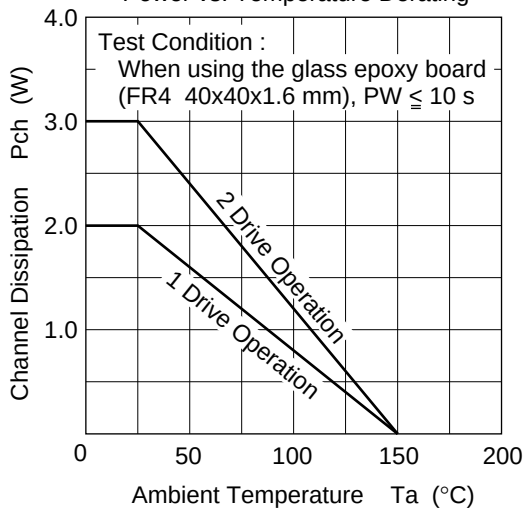
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	–20	—	—	V	I_D = –10mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±10	—	—	V	I_G = ±100µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0
Zero gate voltege drain current	I_{DSS}	—	—	–10	µA	V_{DS} = –20 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	–0.5	—	–1.5	V	V_{DS} = –10V, I_D = –1mA
Static drain to source on state resistance	$R_{DS(on)}$	—	0.065	0.095	Ω	I_D = –3A, V_{GS} = –4V Note4
	$R_{DS(on)}$	—	0.09	0.15	Ω	I_D = –3A, V_{GS} = –2.5V Note4
Forward transfer admittance	$\|y_{fs}\|$	4.5	7	—	S	I_D = –3A, V_{DS} = –10V Note4
Input capacitance	Ciss	—	860	—	pF	V_{DS} = –10V
Output capacitance	Coss	—	450	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	150	—	pF	f = 1MHz
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	V_{GS} = –4V, I_D = –3A
Rise time	t_r	—	120	—	ns	V_{DD} ≅ –10V
Turn-off delay time	$t_{d(off)}$	—	120	—	ns	
Fall time	t_f	—	100	—	ns	
Body–drain diode forward voltage	V_{DF}	—	–0.9	–1.4	V	IF = –4.5A, V_{GS} = 0 Note4
Body–drain diode reverse recovery time	t_{rr}	—	60	—	ns	IF = –4.5A, V_{GS} = 0 diF/ dt =20A/µs

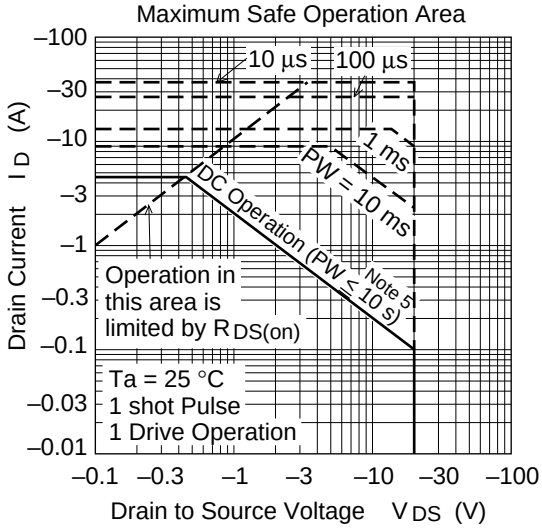
Note: 4. Pulse test

Main Characteristics

Power vs. Temperature Derating

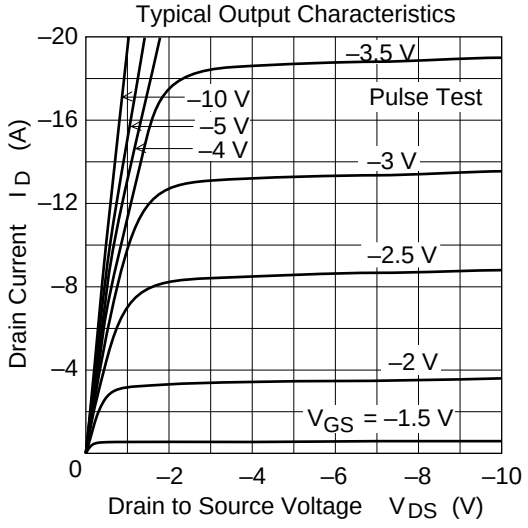


Maximum Safe Operation Area

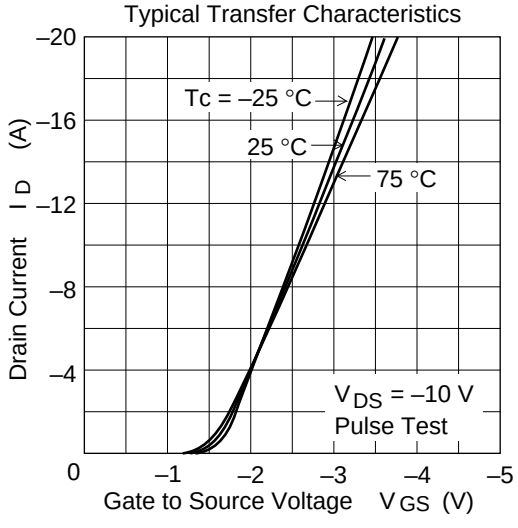


Note 5 :
When using the glass epoxy board
(FR4 40x40x1.6 mm)

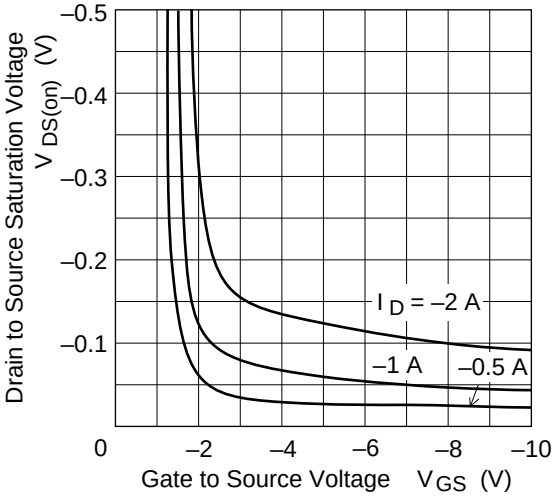
Typical Output Characteristics



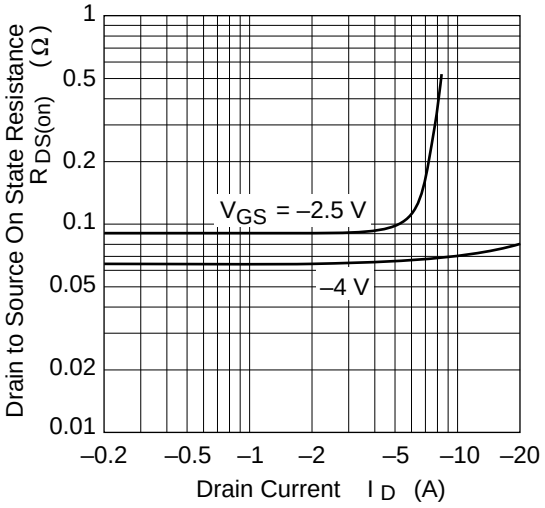
Typical Transfer Characteristics



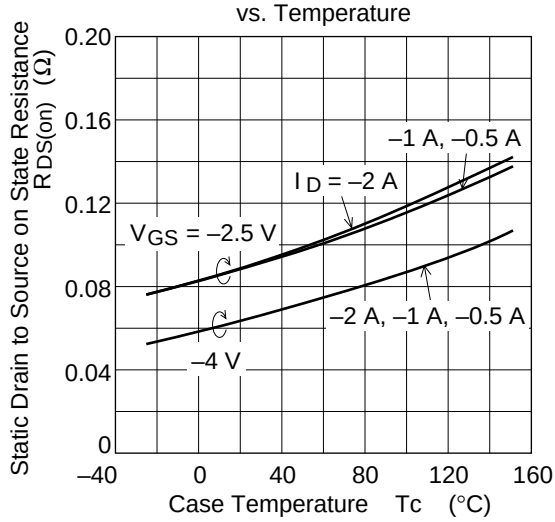
Drain to Source Saturation Voltage vs. Gate to Source Voltage



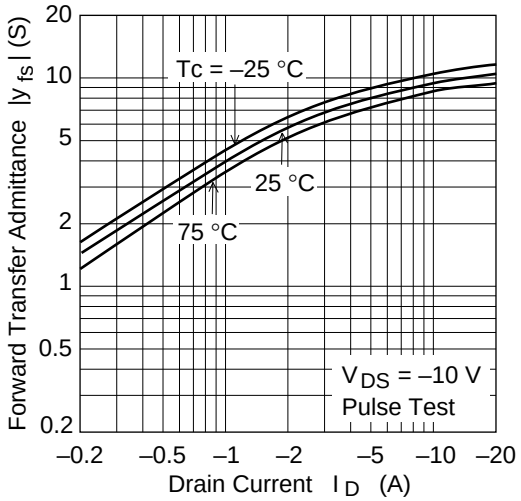
Static Drain to Source on State Resistance vs. Drain Current



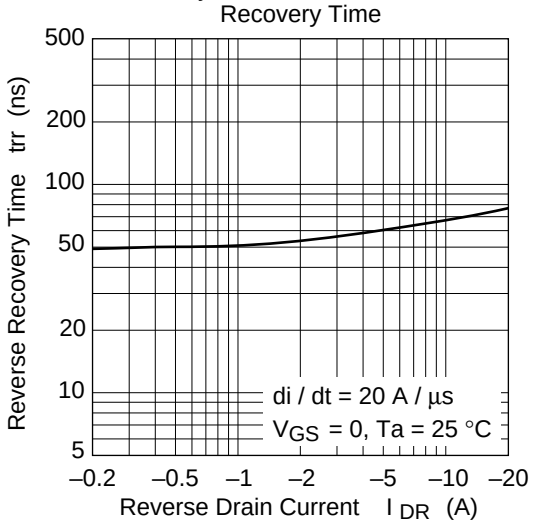
Static Drain to Source on State Resistance vs. Temperature



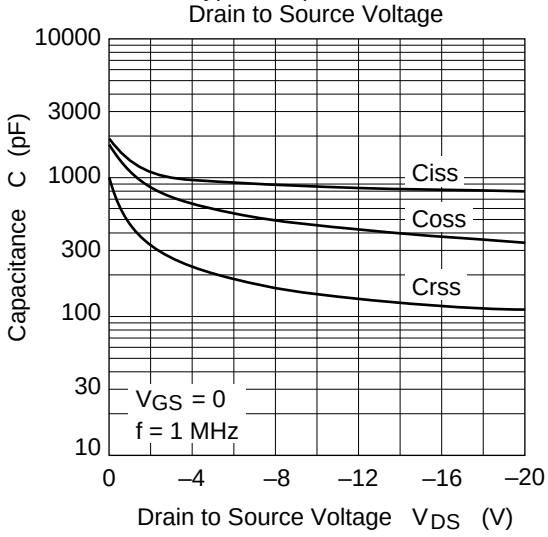
Forward Transfer Admittance vs. Drain Current



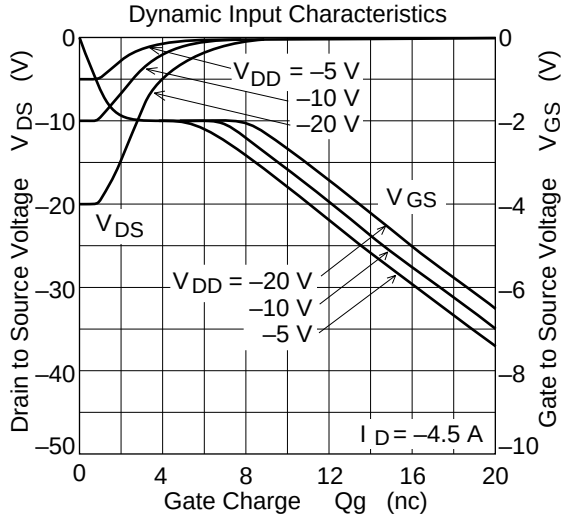
Body–Drain Diode Reverse Recovery Time



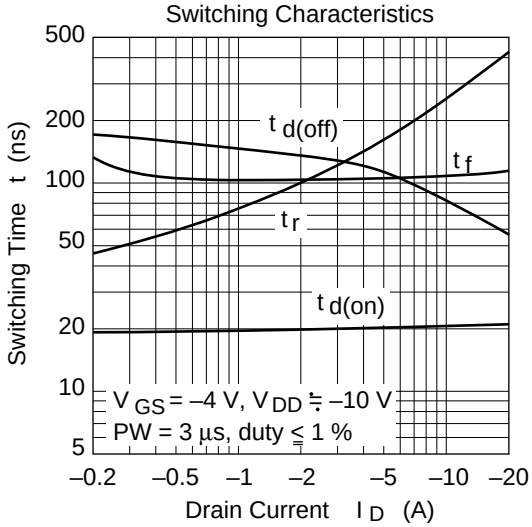
Typical Capacitance vs. Drain to Source Voltage



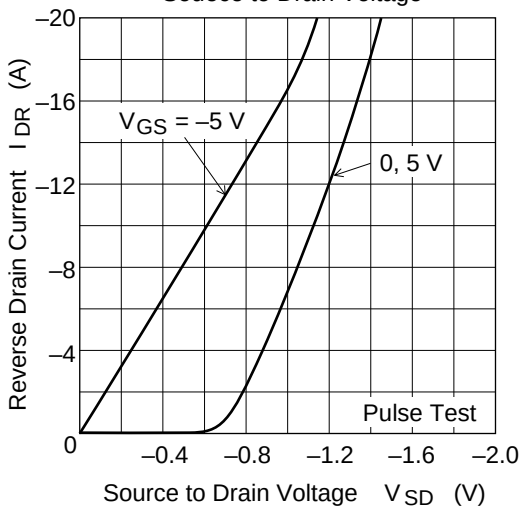
Dynamic Input Characteristics



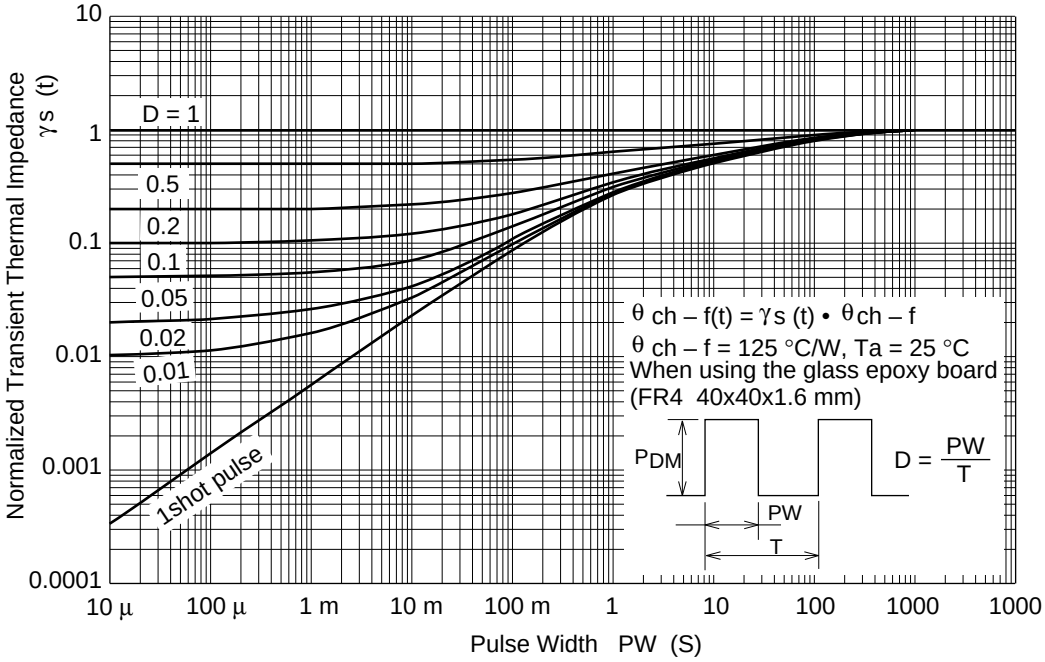
Switching Characteristics

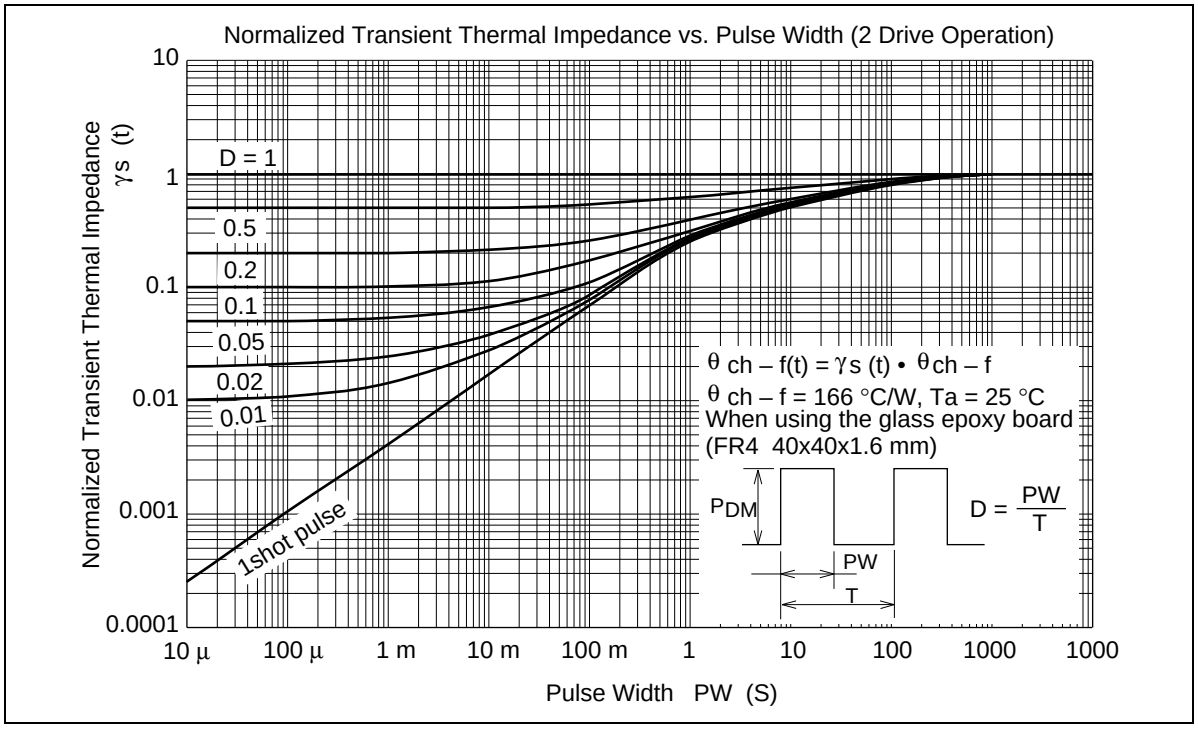


Reverse Drain Current vs.
Souece to Drain Voltage



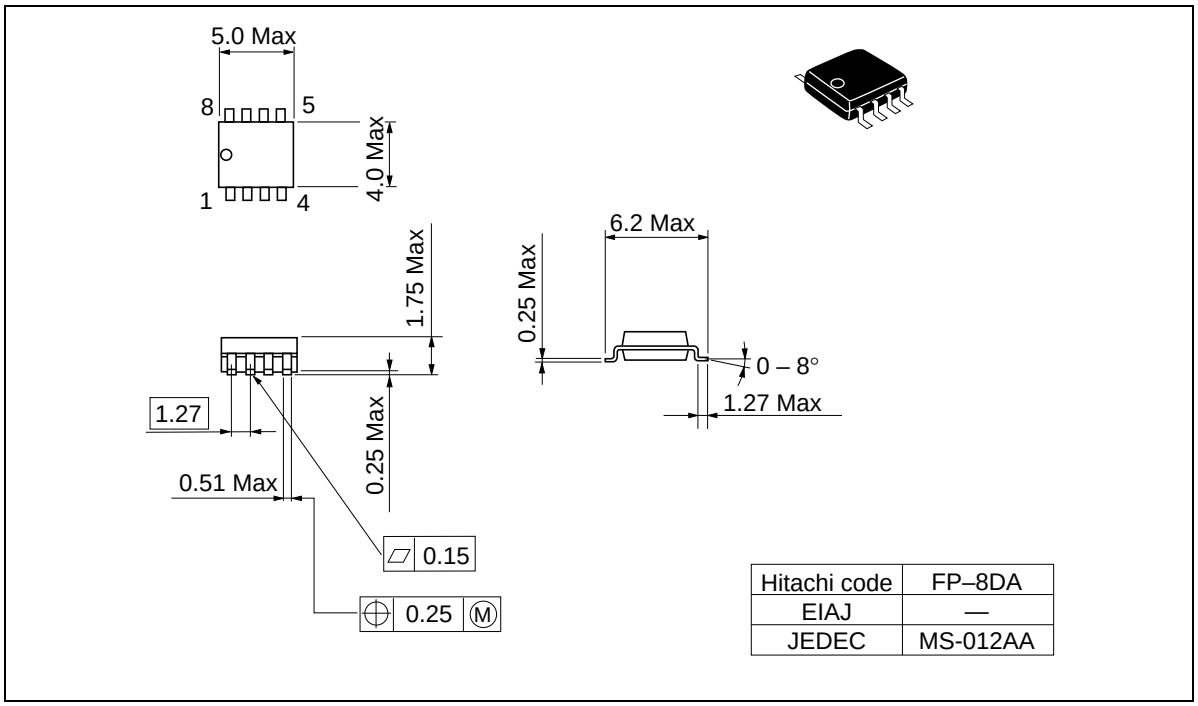
Normalized Transient Thermal Impedance vs. Pulse Width (1 Drive Operation)




Normalized Transient Thermal Impedance vs. Pulse Width (2 Drive Operation)
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) • θch – f
θ ch – f = 166 °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

Unit: mm



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HITACHI

Hitachi, Ltd.
Semiconductor & IC Div.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100, Japan
Tel: Tokyo (03) 3270-2111
Fax: (03) 3270-5109

For further information write to:

Hitachi America, Ltd.
Semiconductor & IC Div.
2000 Sierra Point Parkway
Brisbane, CA. 94005-1835
U S A
Tel: 415-589-8300
Fax: 415-583-4207

Hitachi Europe GmbH
Electronic Components Group
Continental Europe
Dornacher Straße 3
D-85622 Feldkirchen
München
Tel: 089-9 91 80-0
Fax: 089-9 29 30 00

Hitachi Europe Ltd.
Electronic Components Div.
Northern Europe Headquarters
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA
United Kingdom
Tel: 0628-585000
Fax: 0628-778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 0104
Tel: 535-2100
Fax: 535-1533

Hitachi Asia (Hong Kong) Ltd.
Unit 706, North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon
Hong Kong
Tel: 27359218
Fax: 27306071