HAT2027R

Silicon N Channel Power MOS FET
High Speed Power Switching

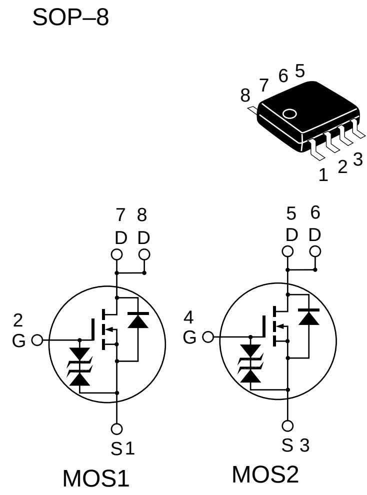
HITACHI

ADE-208-458 B (Z)
3rd. Edition
December. 1996

Features

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

Outline



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	VDSS	20	V
Gate to source voltage	VGSS	±12	V
Drain current	ID	7	A
Drain peak current	ID(pulse)Note1	56	A
Body-drain diode reverse drain current	IDR	7	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

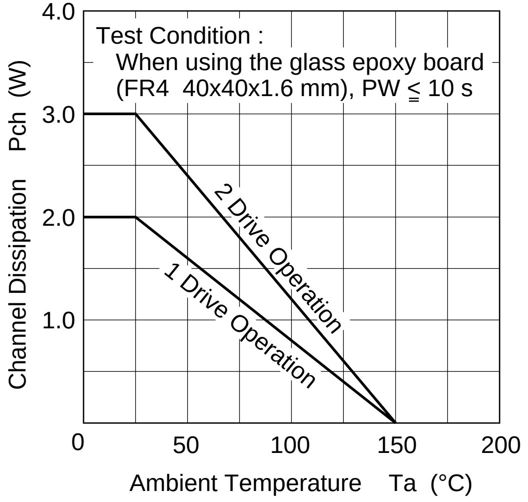
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V(BR)DSS	20	—	—	V	ID = 10mA, VGS = 0
Gate to source breakdown voltage	V(BR)GSS	±12	—	—	V	IG = ±100μA, VDS = 0
Gate to source leak current	IGSS	—	—	±10	μA	VGS = ±10V, VDS = 0
Zero gate voltege drain current	IDSS	—	—	10	μA	VDS = 20 V, VGS = 0
Gate to source cutoff voltage	VGS(off)	0.5	—	1.5	V	VDS = 10V, I D = 1mA
Static drain to source on state	RDS(on)	—	0.03	0.038	Ω	ID = 4A, VGS = 4V Note4
resistance	RDS(on)	—	0.038	0.053	Ω	ID = 4A, VGS = 2.5V Note4
Forward transfer admittance	|yfs|	9	14	—	S	ID = 4A, VDS = 10V Note4
Input capacitance	Ciss	—	720	—	pF	VDS = 10V
Output capacitance	Coss	—	450	—	pF	VGS = 0
Reverse transfer capacitance	Crss	—	185	—	pF	f = 1MHz
Turn-on delay time	td(on)	—	28	—	ns	VGS = 4V, ID = 4A
Rise time	tr	—	145	—	ns	VDD Å‡ 10V
Turn-off delay time	td(off)	—	100	—	ns	
Fall time	tf	—	125	—	ns	
Body–drain diode forward voltage	VDF	—	0.9	1.4	V	IF = 7A, VGS = 0 Note4

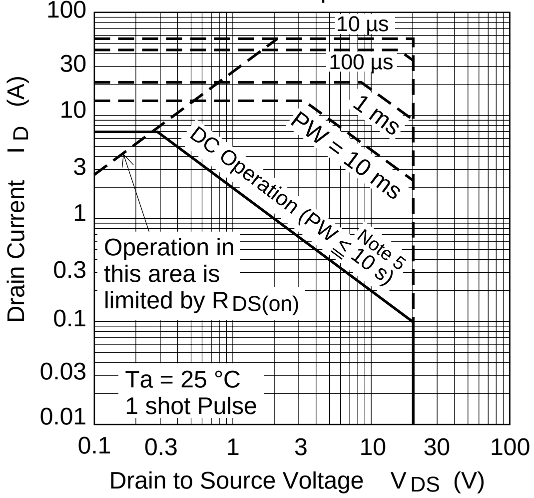
Body–drain diode reverse recovery time	trr	—	60	—	ns	IF = 7A, VGS = 0 diF/ dt =20A/µs

Note: 4. Pulse test

Main Characteristics

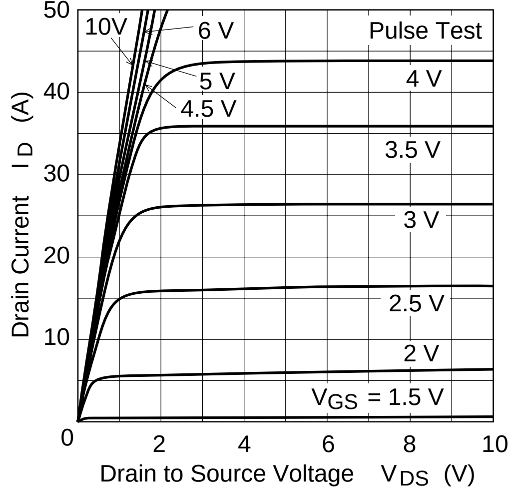


Power vs. Temperature Derating

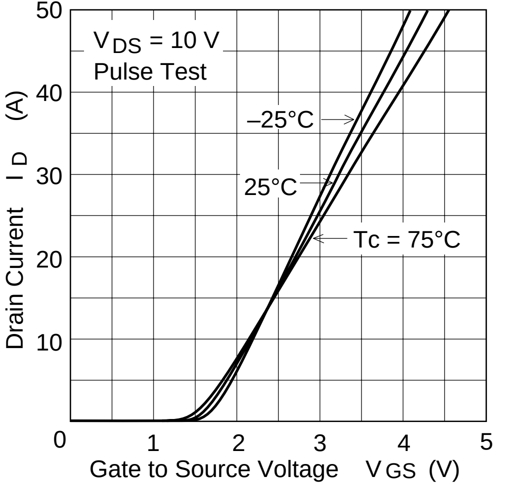


Maximum Safe Operation Area

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

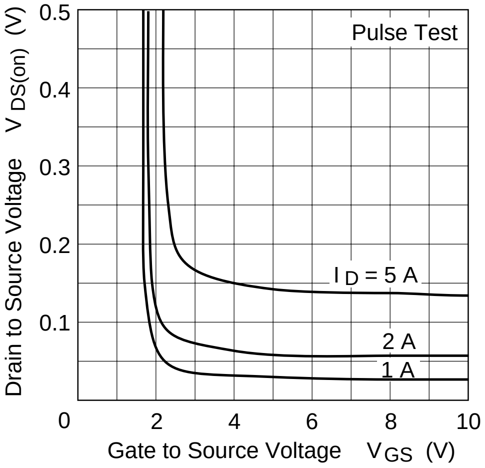


Typical Output Characteristics

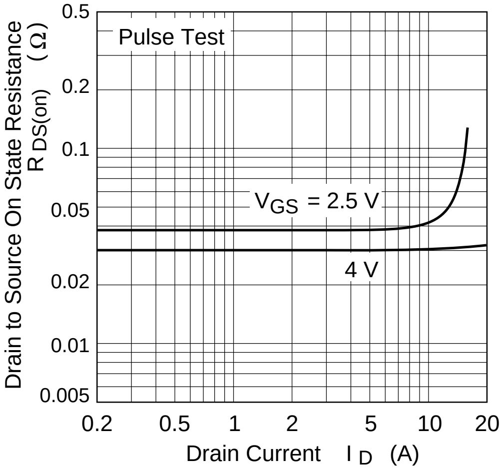


Typical Transfer Characteristics

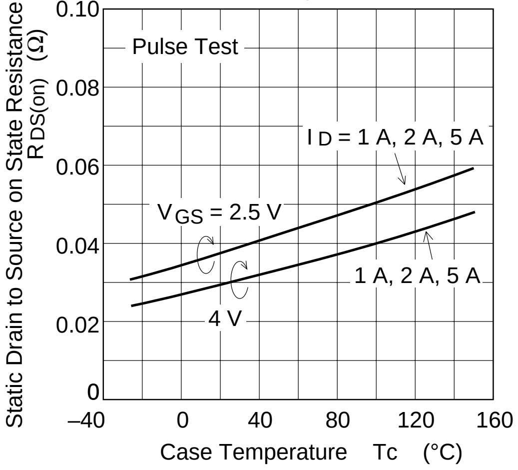
Drain to Source Saturation Voltage vs. Gate to Source Voltage



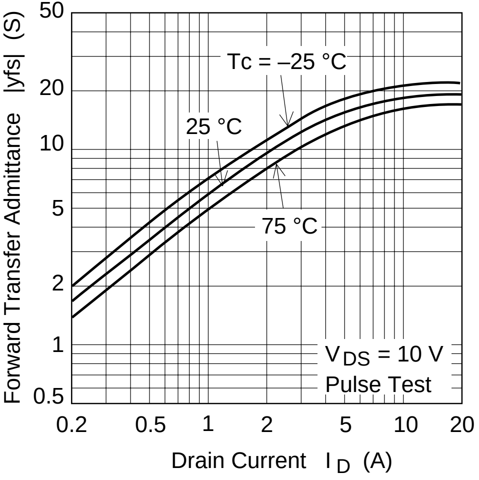
Static Drain to Source on State Resistance vs. Drain Current

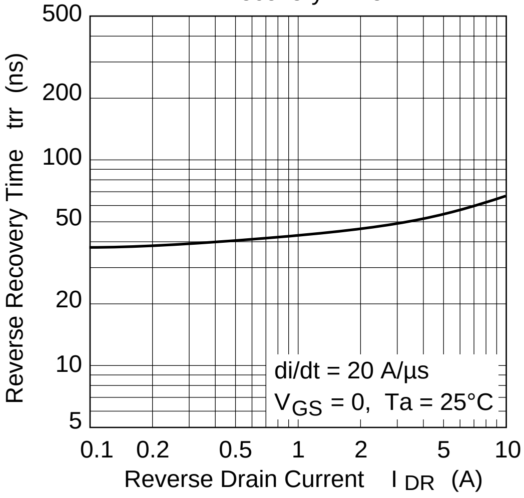


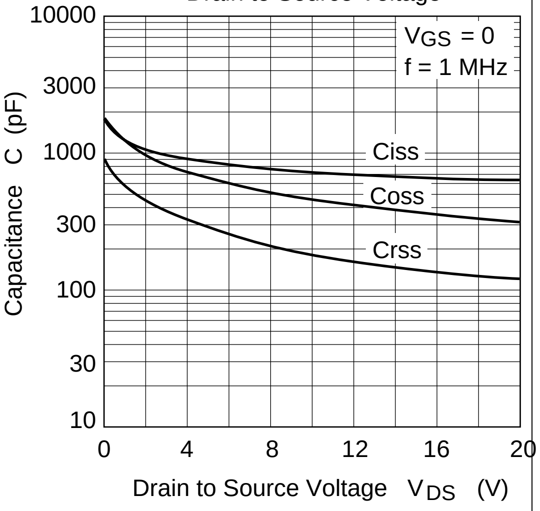
Static Drain to Source on State Resistance vs. Temperature

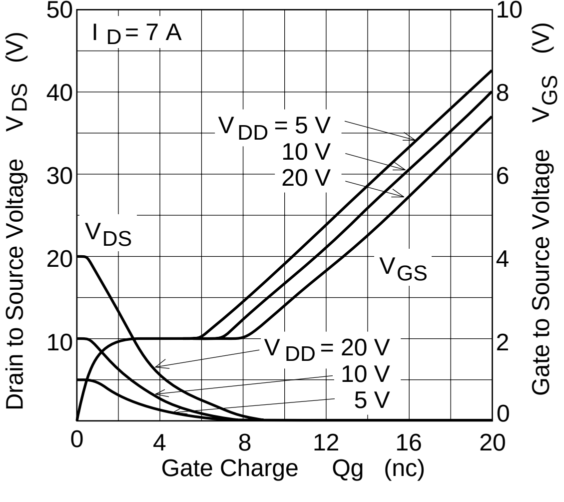


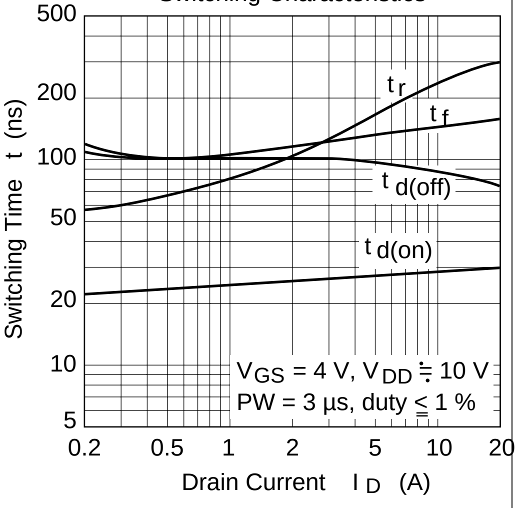
Forward Transfer Admittance vs. Drain Current



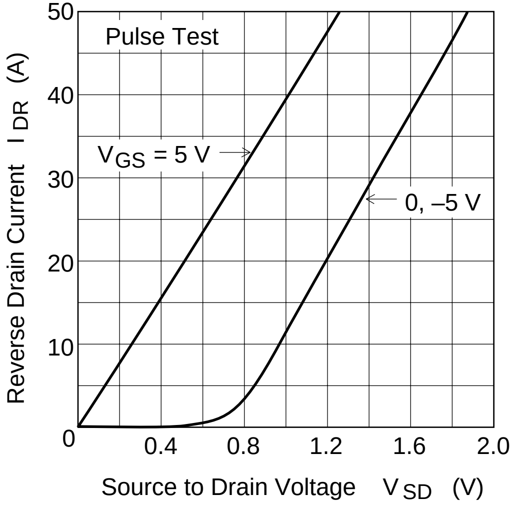

Body–Drain Diode Reverse Recovery Time


Typical Capacitance vs. Drain to Source Voltage

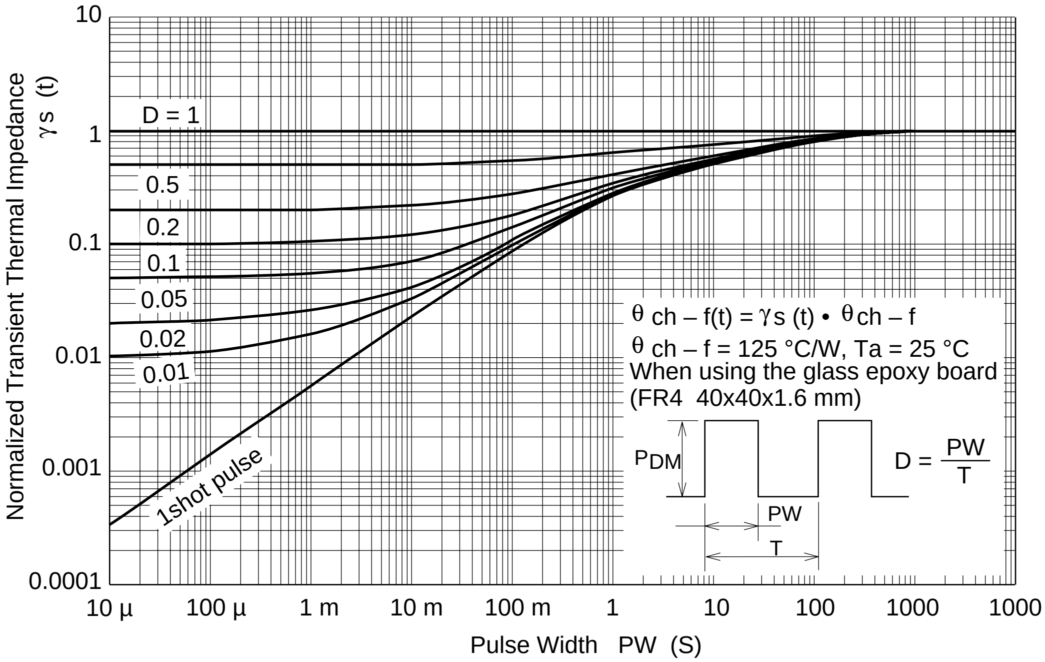

Dynamic Input Characteristics


Switching Characteristics

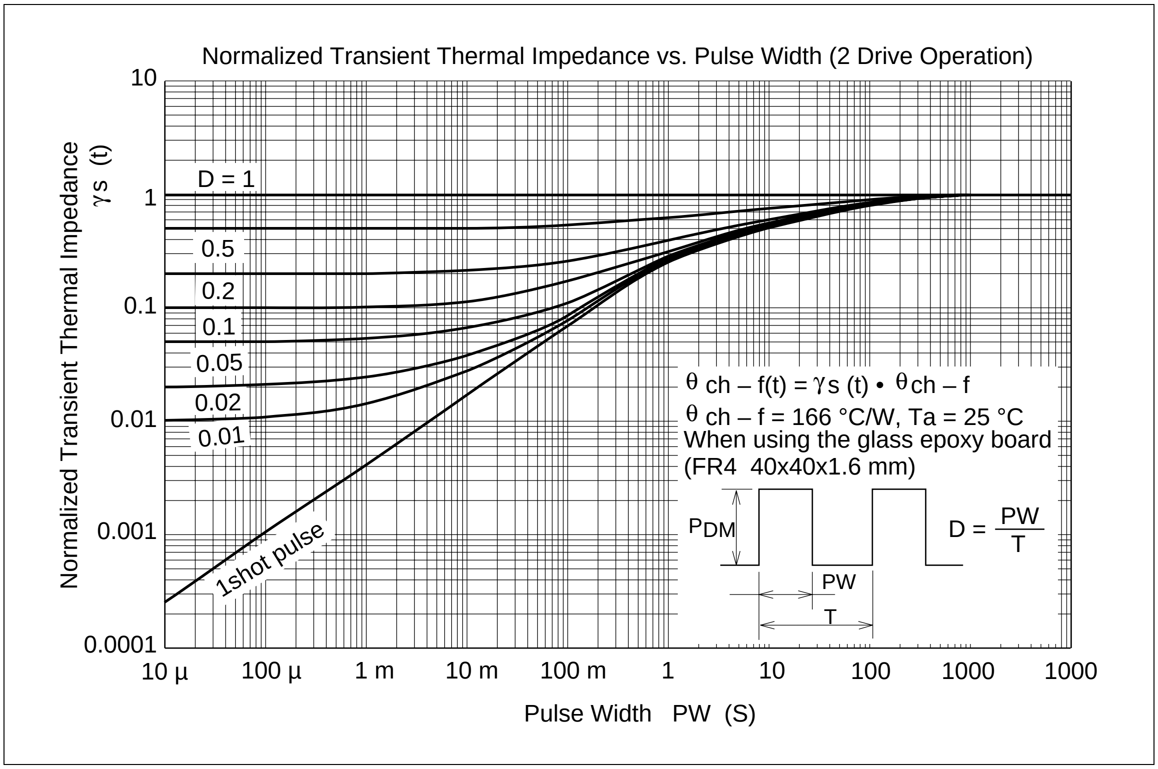
Reverse Drain Current vs.
Souece to Drain Voltage



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

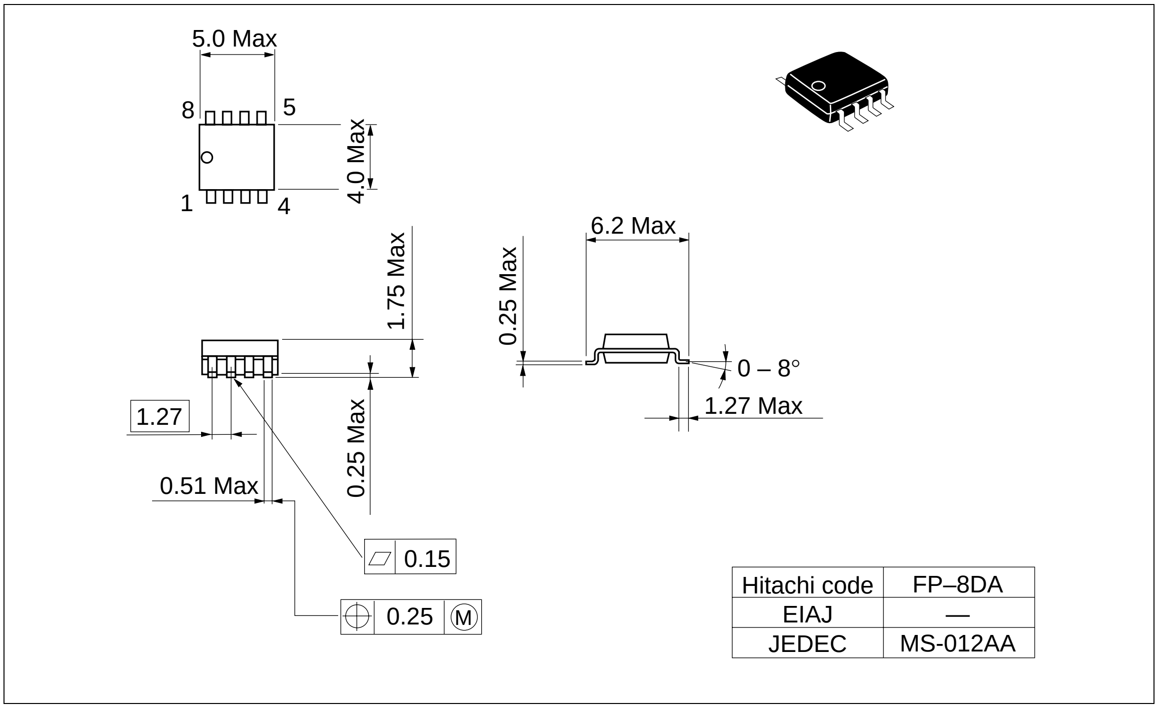


θ ch – f(t) = γs (t) • θch – f
θ ch – f = 125 °C/W, Ta = 25 °C
When using the glass epoxy board
(FR4 40x40x1.6 mm)


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



Hitachi code	FP–8DA
EIAJ	—
JEDEC	MS-012AA