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

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HAT3006R

Silicon N Channel / P Channel Power MOS FET
High Speed Power Switching

RENESAS

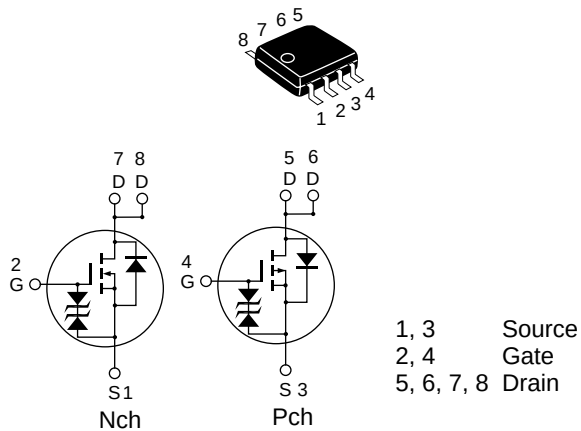
ADE-208-480F (Z)
7th. Edition
Feb. 1999

Features

- Low on-resistance
- Capable of 4 V gate drive
- Low drive current
- High density mounting

Outline

SOP-8



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings		Unit
		Nch	Pch	
Drain to source voltage	V_{DSS}	30	– 30	V
Gate to source voltage	V_{GSS}	± 20	± 20	V
Drain current	I_D	6.5	– 4.5	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	52	– 36	A
Body-drain diode reverse drain current	I_{DR}	6.5	– 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. $PW \leq 10\mu s$, duty cycle $\leq 1\%$

2. 1 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), $PW \leq 10s$

3. 2 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), $PW \leq 10s$

Electrical Characteristics (N channel) (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10\text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100\text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 30\text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.03	0.045	Ω	$I_D = 4\text{ A}$, $V_{GS} = 10\text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	0.05	0.08	Ω	$I_D = 4\text{ A}$, $V_{GS} = 4\text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	5	8	—	S	$I_D = 4\text{ A}$, $V_{DS} = 10\text{ V}$ ^{Note4}
Input capacitance	Ciss	—	560	—	pF	$V_{DS} = 10\text{ V}$
Output capacitance	Coss	—	380	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	170	—	pF	$f = 1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$V_{GS} = 4\text{ V}$, $I_D = 4\text{ A}$
Rise time	t_r	—	270	—	ns	$V_{DD} \cong 10\text{ V}$
Turn-off delay time	$t_{d(off)}$	—	40	—	ns	
Fall time	t_f	—	65	—	ns	
Body–drain diode forward voltage	V_{DF}	—	0.9	1.4	V	$I_F = 6.5\text{ A}$, $V_{GS} = 0$ ^{Note4}
Body–drain diode reverse recovery time	t_{rr}	—	45	—	ns	$I_F = 6.5\text{ A}$, $V_{GS} = 0$ $diF/dt = 20\text{ A}/\mu s$

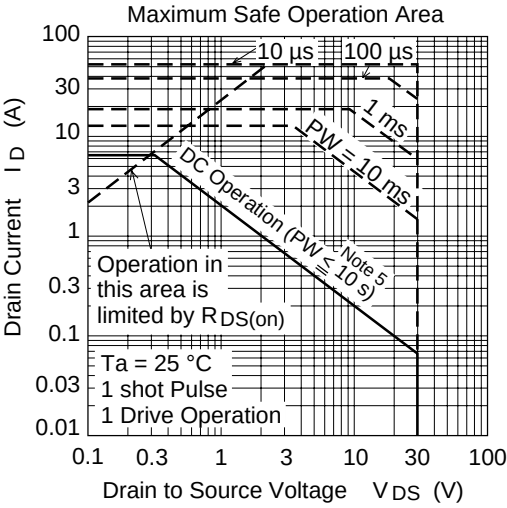
Note: 4. Pulse test

Electrical Characteristics (P channel) (Ta = 25°C)

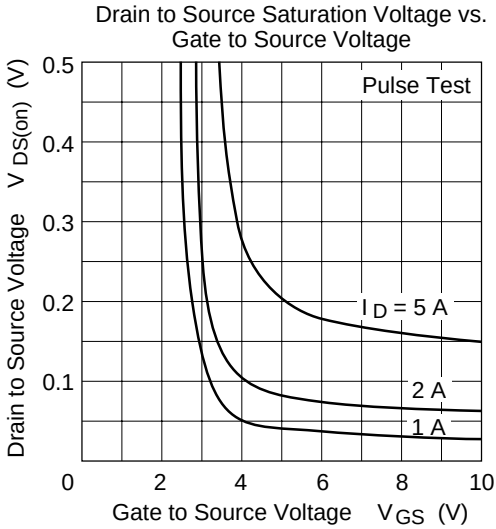
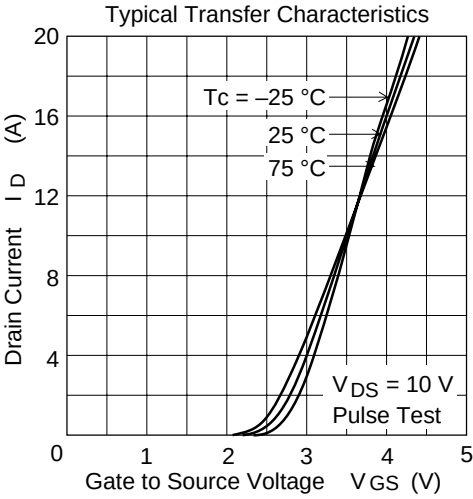
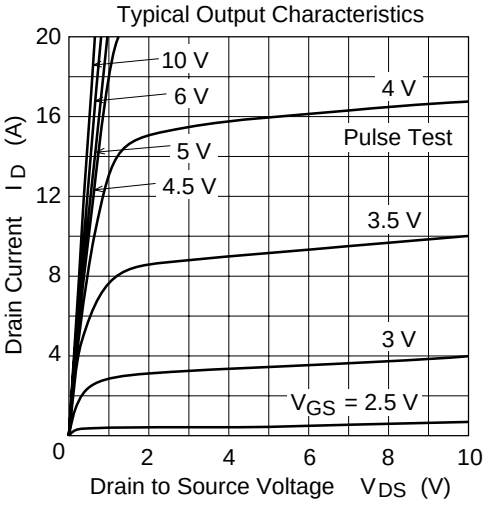
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	- 30	—	—	V	$I_D = -10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	- 10	μA	$V_{DS} = -30 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	- 1.0	—	- 2.5	V	$V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.07	0.09	Ω	$I_D = -3 \text{ A}$, $V_{GS} = -10 \text{ V}$ ^{Note5}
	$R_{DS(on)}$	—	0.11	0.18	Ω	$I_D = -3 \text{ A}$, $V_{GS} = -4 \text{ V}$ ^{Note5}
Forward transfer admittance	$ y_{fs} $	4	6	—	S	$I_D = -3 \text{ A}$, $V_{DS} = -10 \text{ V}$ ^{Note5}
Input capacitance	C_{iss}	—	660	—	pF	$V_{DS} = -10 \text{ V}$
Output capacitance	C_{oss}	—	440	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	140	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	24	—	ns	$V_{GS} = -4 \text{ V}$, $I_D = -3 \text{ A}$
Rise time	t_r	—	165	—	ns	$V_{DD} \cong -10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	35	—	ns	
Fall time	t_f	—	70	—	ns	
Body-drain diode forward voltage	V_{DF}	—	- 0.9	- 1.4	V	$I_F = -4.5 \text{ A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	60	—	ns	$I_F = -4.5 \text{ A}$, $V_{GS} = 0$ $diF/dt = 20 \text{ A}/\mu\text{s}$

Note: 5. Pulse test

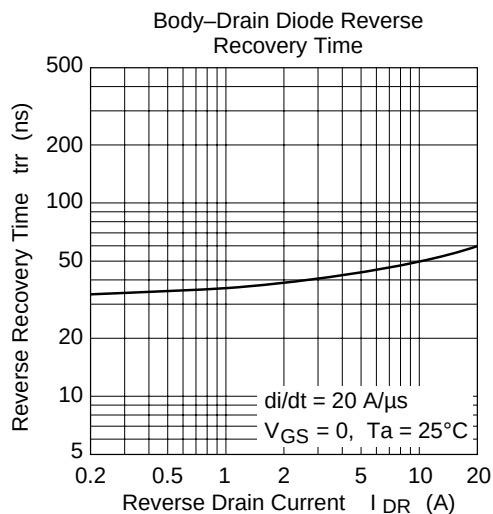
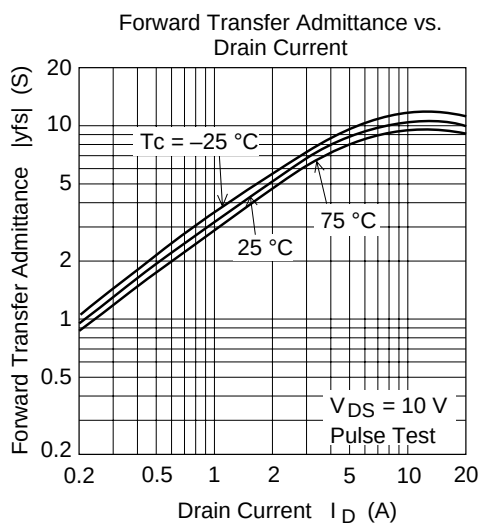
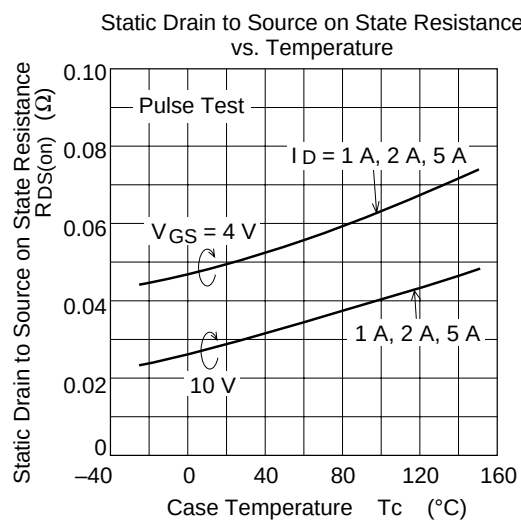
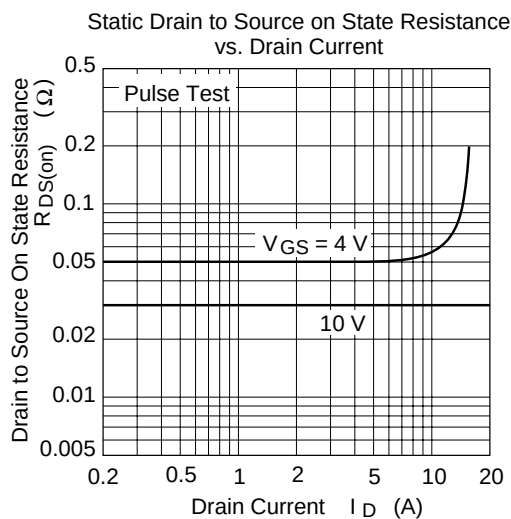
Main Characteristics (N channel)



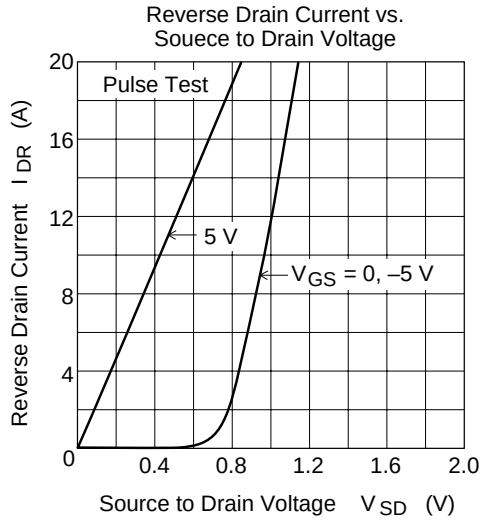
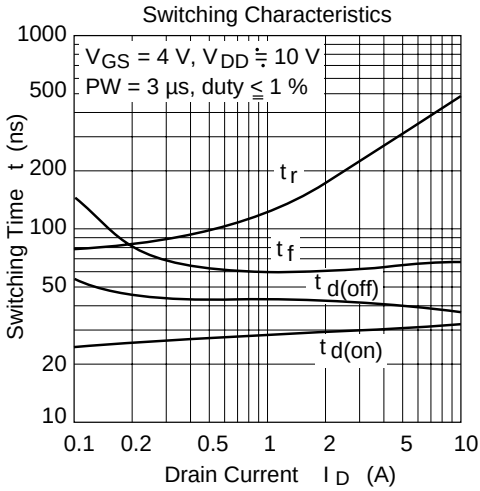
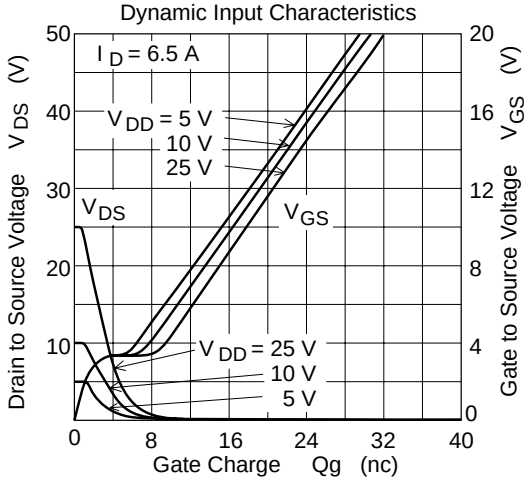
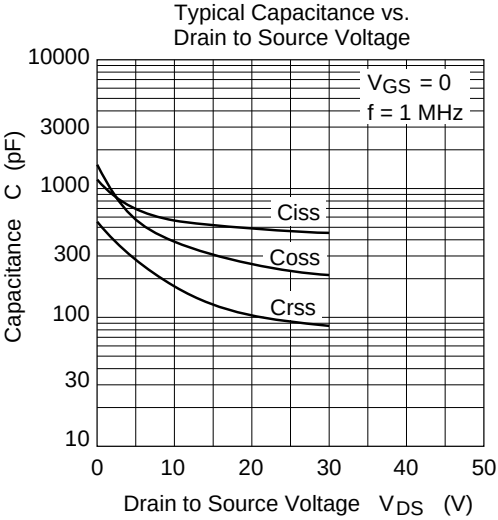
Note 5 :
When using the glass epoxy board
(FR4 40x40x1.6 mm)



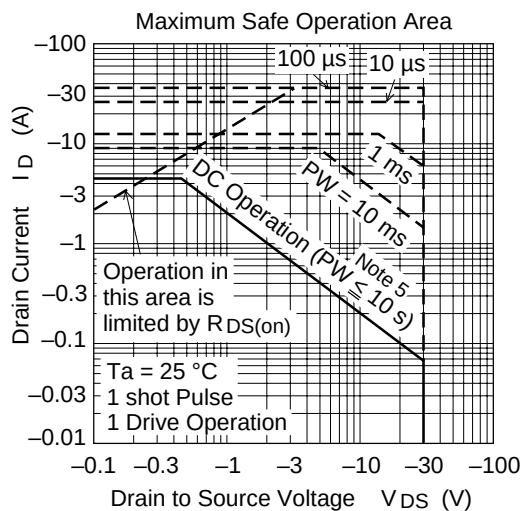
Main Characteristics (N channel)



Main Characteristics (N channel)

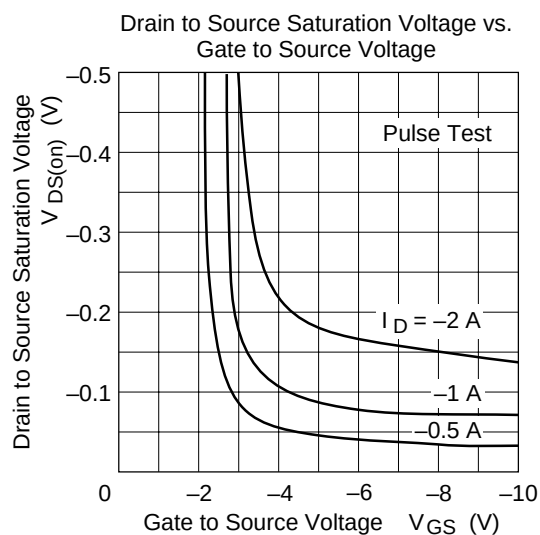
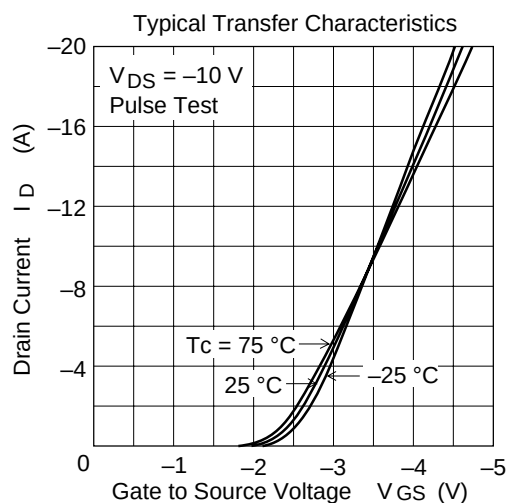
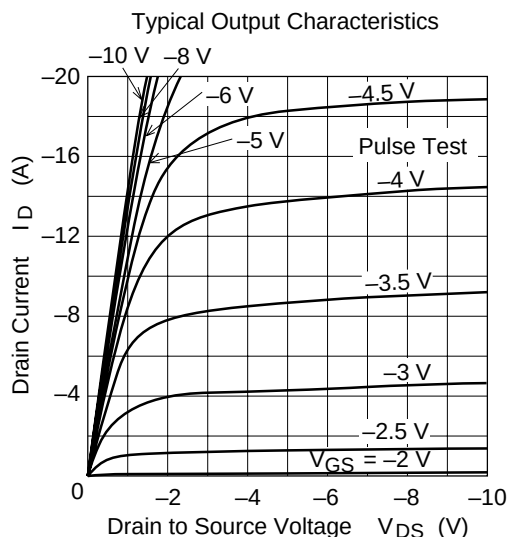


Main Characteristics (P channel)

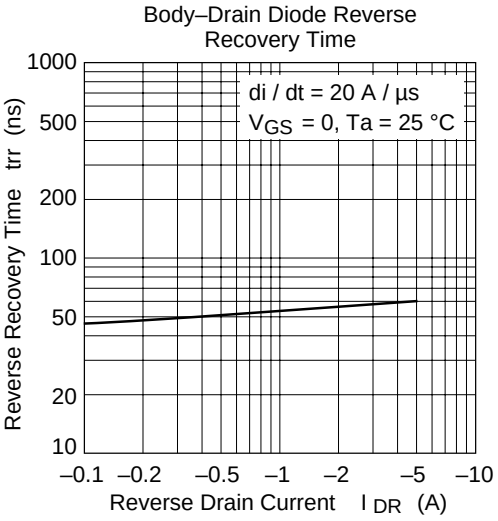
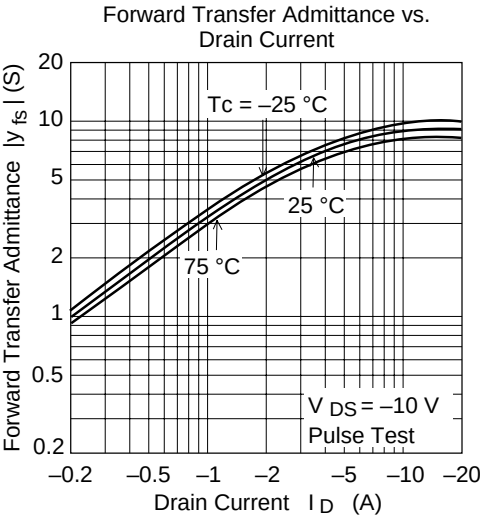
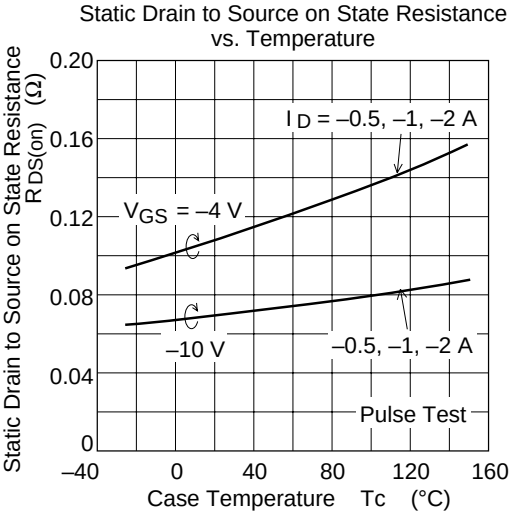
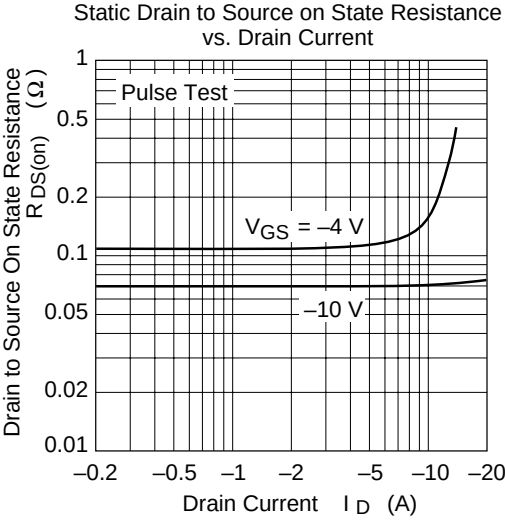


Note 5 :

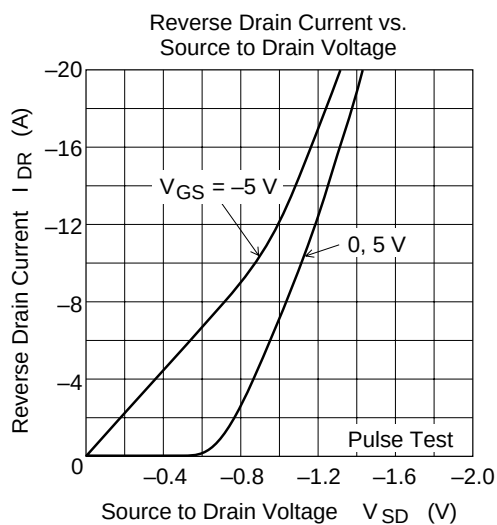
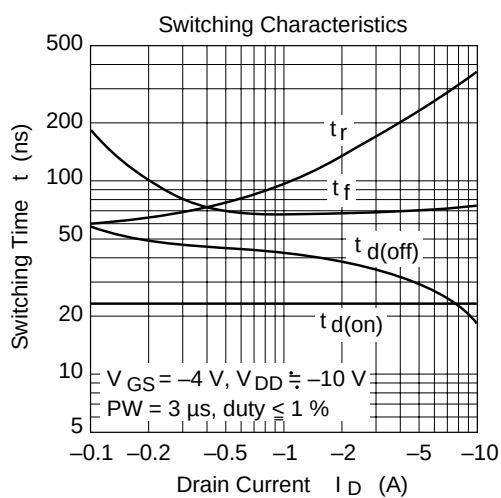
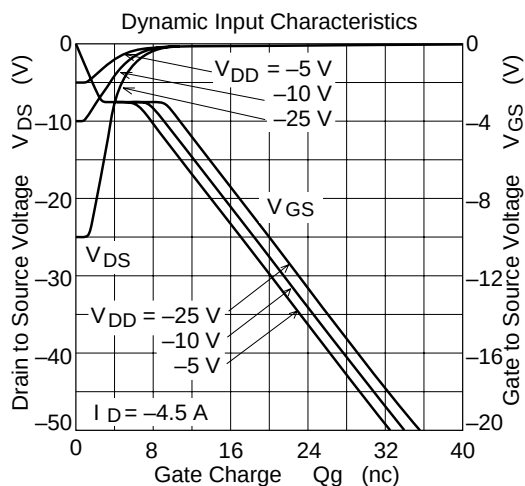
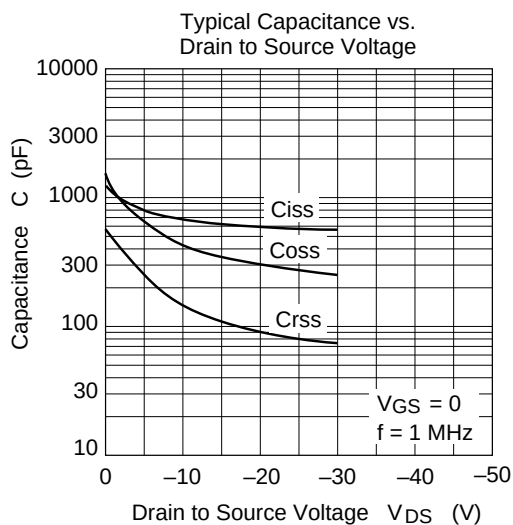
When using the glass epoxy board
(FR4 40 x 40 x 1.6 mm)

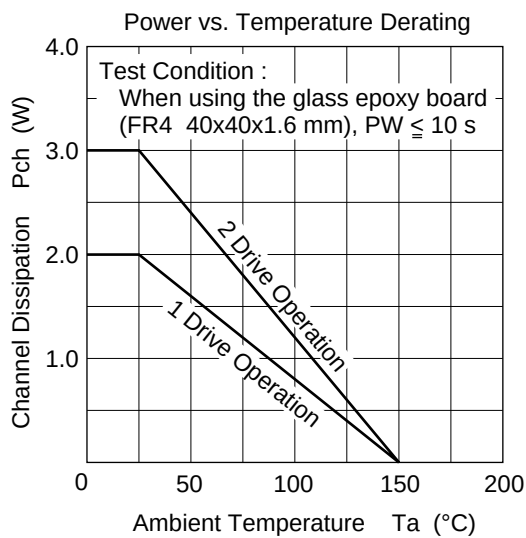


Main Characteristics (P channel)

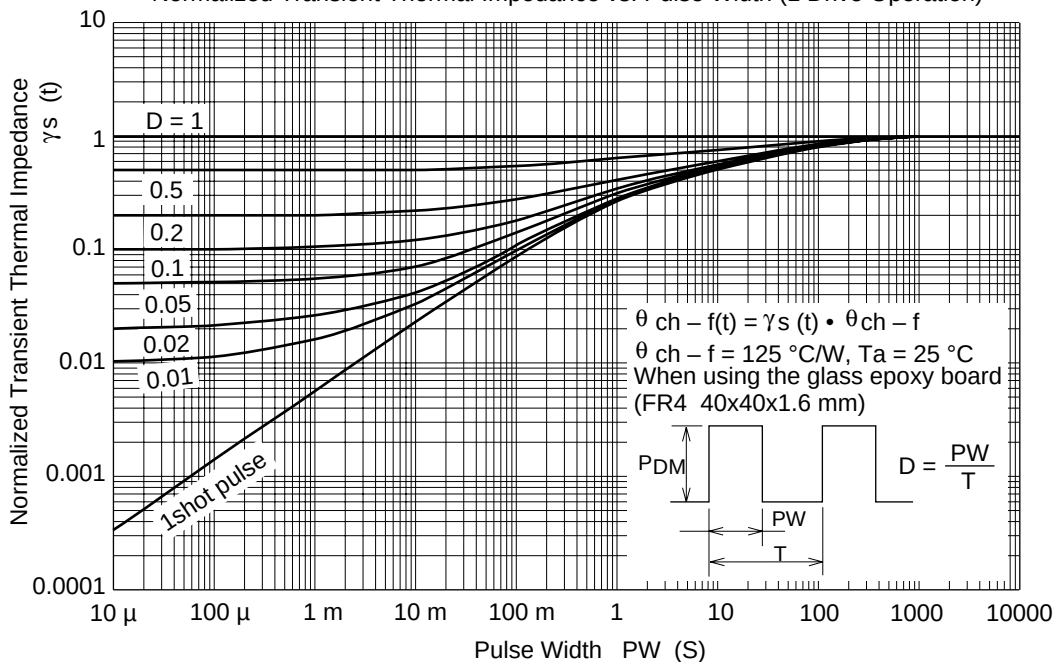


Main Characteristics (P channel)

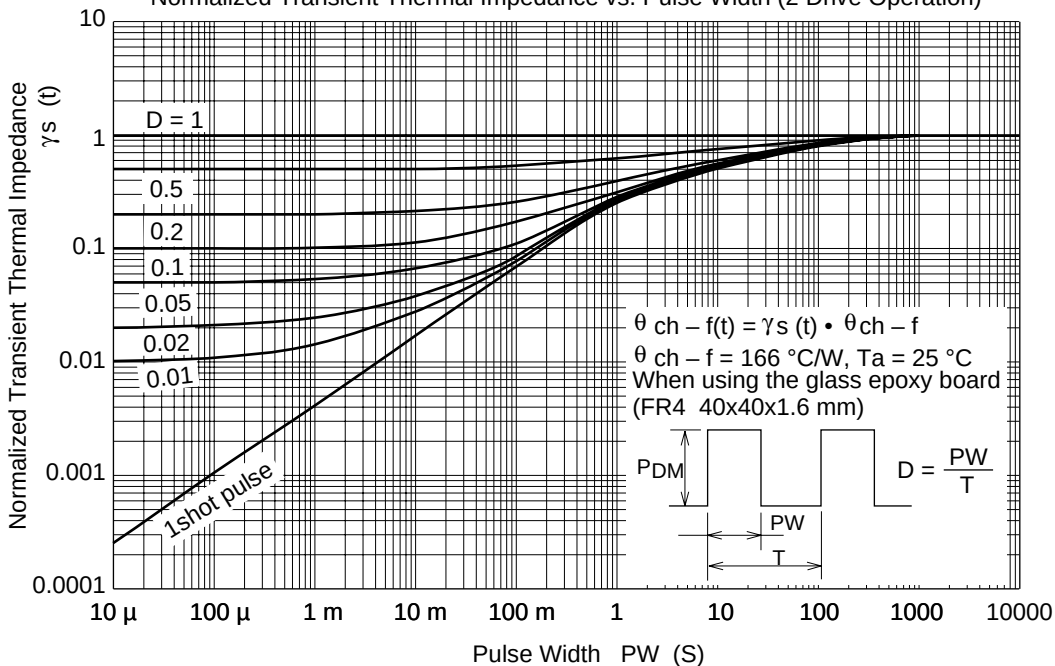




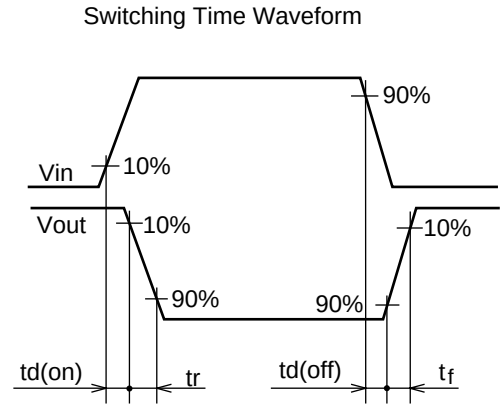
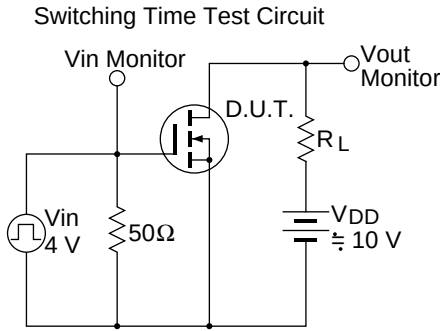
Normalized Transient Thermal Impedance vs. Pulse Width (1 Drive Operation)



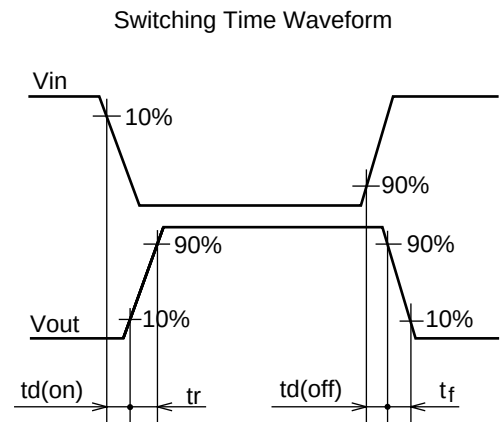
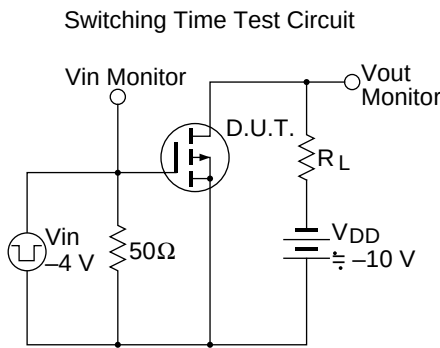
Normalized Transient Thermal Impedance vs. Pulse Width (2 Drive Operation)



N channel



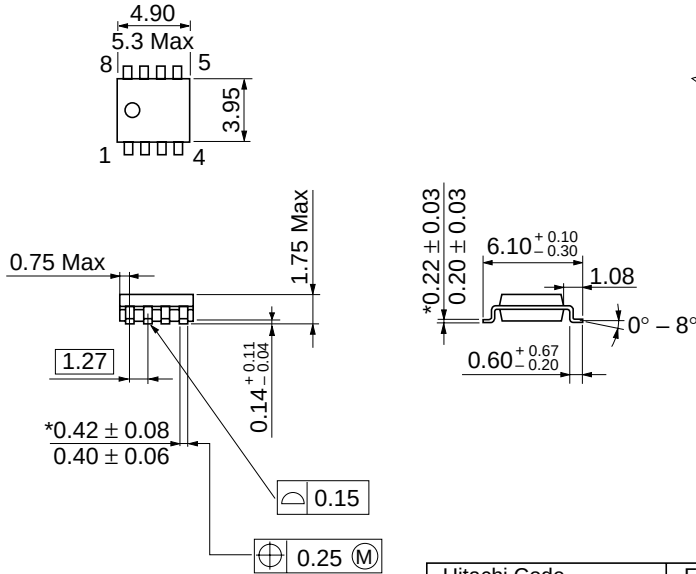
P channel



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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