

HAT2040R

Silicon N Channel Power MOS FET
Power Switching

HITACHI

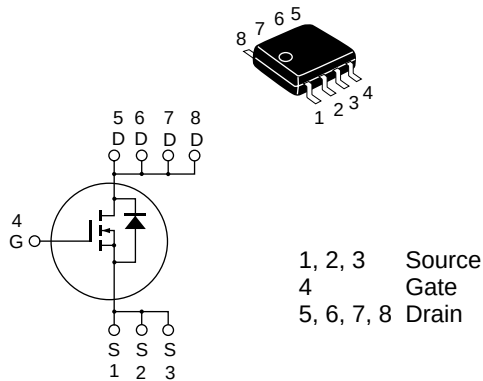
ADE-208-565D (Z)
5th. Edition
February 1999

Features

- Capable of 4 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)}=6.2\text{m typ}$

Outline

SOP-8



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	30	V
Gate to source voltage	V _{GSS}	±20	V
Drain current	I _D	15	A
Drain peak current	I _{D(pulse)} ^{Note1}	120	A
Body-drain diode reverse drain current	I _{DR}	15	A
Channel dissipation	Pch ^{Note2}	2.5	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	−55 to +150	°C

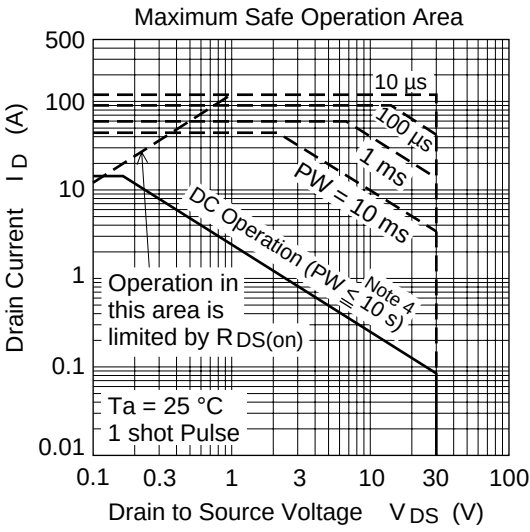
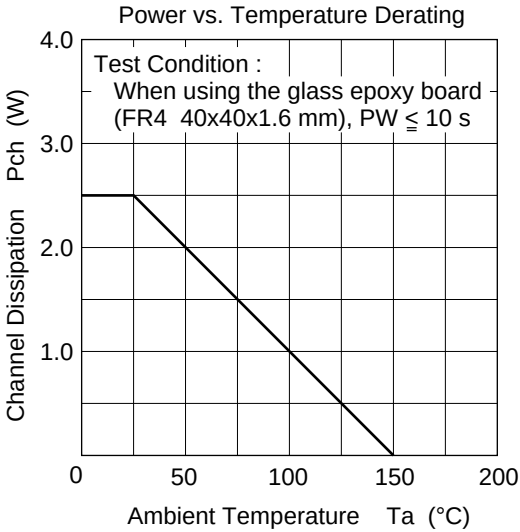
Note: 1. PW ≤ 10μs, duty cycle ≤ 1 %
2. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW≤ 10s

Electrical Characteristics (Ta = 25°C)

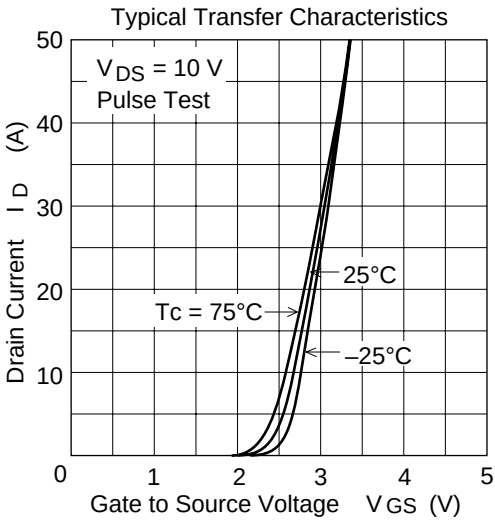
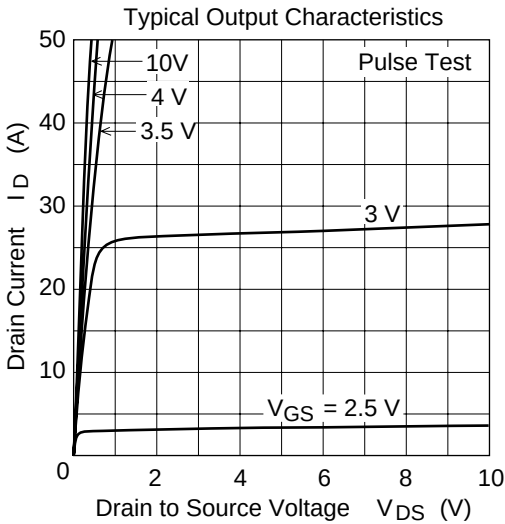
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10\text{mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}$, $V_{GS} = 0$
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	$R_{DS(on)}$	—	6.2	8.0	$\text{m}\Omega$	$I_D = 8\text{A}$, $V_{GS} = 10\text{V}$ ^{Note3}
	$R_{DS(on)}$	—	9.0	13.0	$\text{m}\Omega$	$I_D = 8\text{A}$, $V_{GS} = 4\text{V}$ ^{Note3}
Forward transfer admittance	$ y_{fs} $	18	30	—	S	$I_D = 8\text{A}$, $V_{DS} = 10\text{V}$ ^{Note3}
Input capacitance	C_{iss}	—	4400	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	—	950	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	400	—	pF	$f = 1\text{MHz}$
Total gate charge	Q_g	—	90	—	nc	$V_{DD} = 10\text{V}$
Gate to source charge	Q_{gs}	—	15	—	nc	$V_{GS} = 10\text{V}$
Gate to drain charge	Q_{gd}	—	18	—	nc	$I_D = 15\text{A}$
Turn-on delay time	$t_{d(on)}$	—	110	—	ns	$V_{GS} = 4\text{V}$, $I_D = 8\text{A}$
Rise time	t_r	—	440	—	ns	$V_{DD} \cong 10\text{V}$
Turn-off delay time	$t_{d(off)}$	—	160	—	ns	
Fall time	t_f	—	170	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.9	1.17	V	$I_F = 15\text{A}$, $V_{GS} = 0$ ^{Note3}
Body-drain diode reverse recovery time	t_{rr}	—	55	—	ns	$I_F = 15\text{A}$, $V_{GS} = 0$ $diF/dt = 20\text{A}/\mu\text{s}$

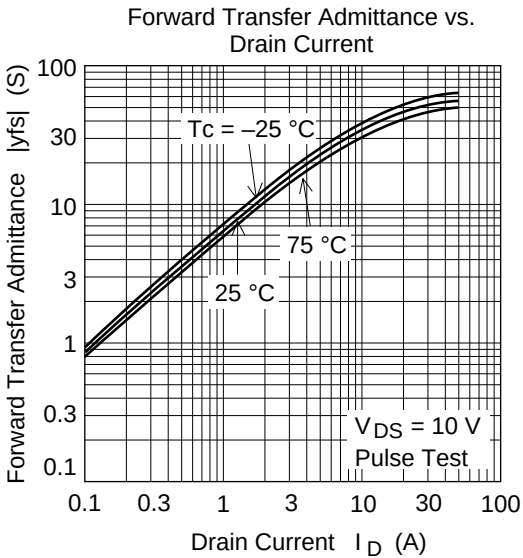
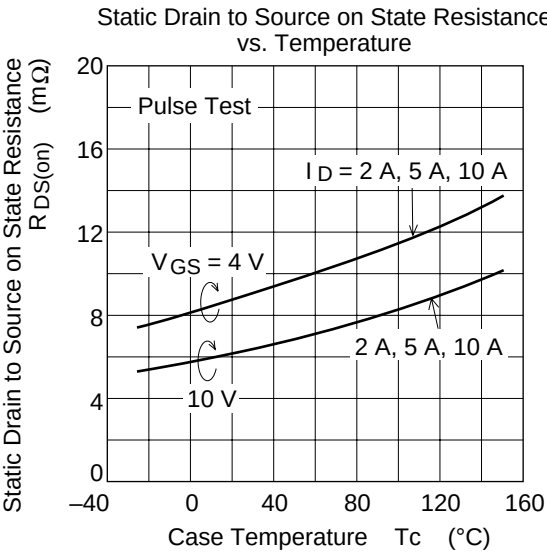
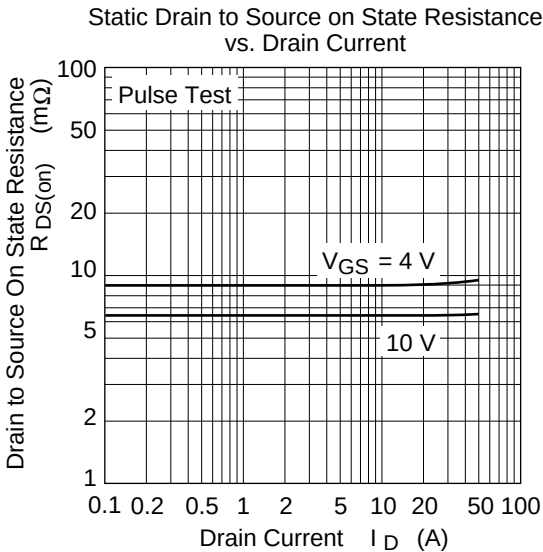
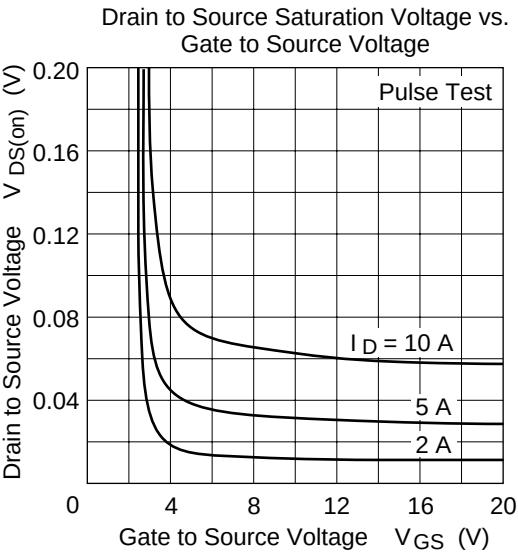
Note: 3. Pulse test

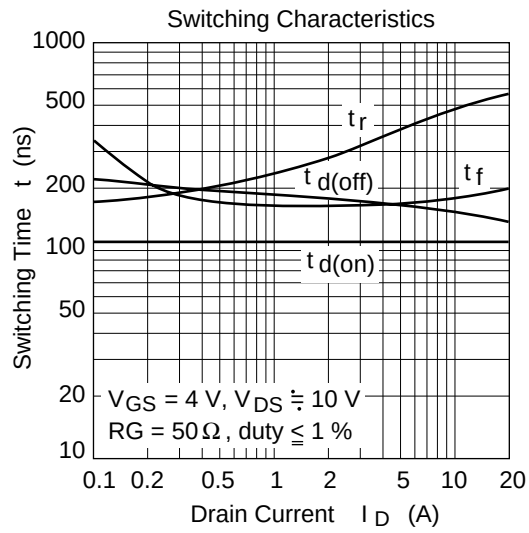
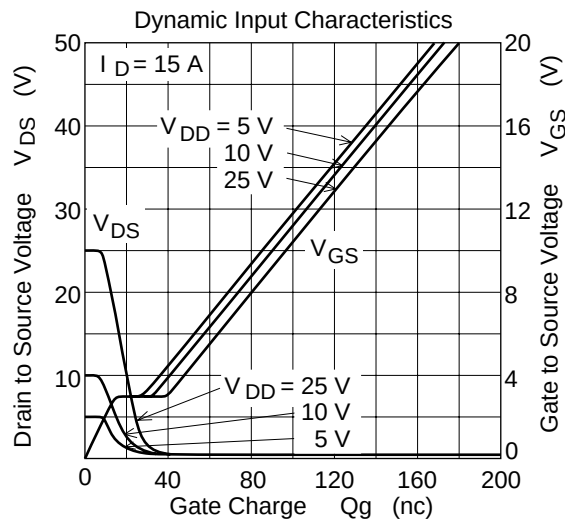
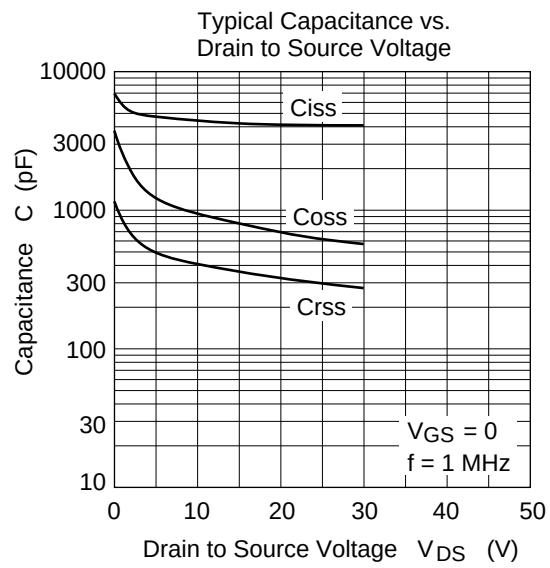
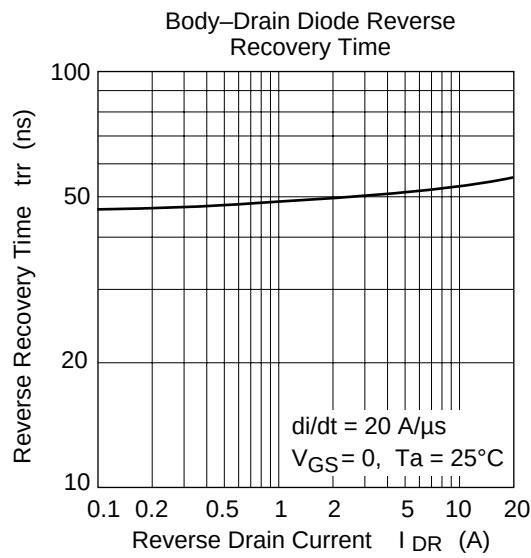
Main Characteristics

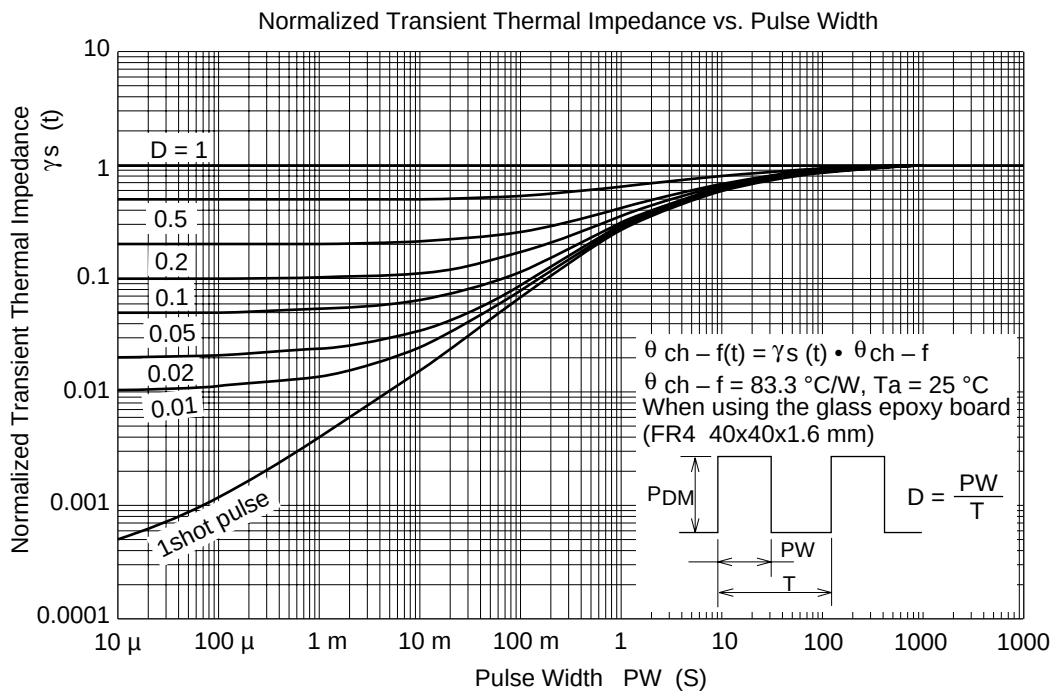
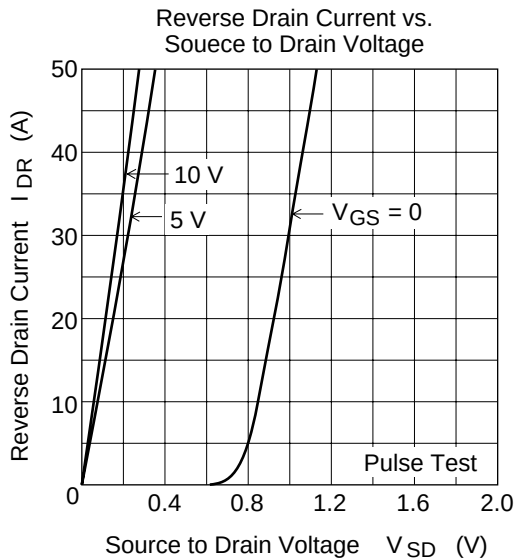


Note 4 :
When using the glass epoxy board
(FR4 40x40x1.6 mm)

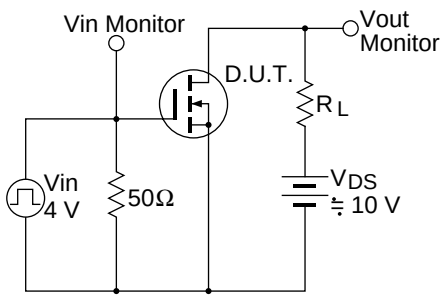




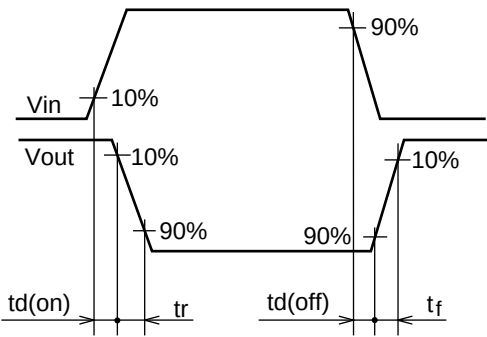




Switching Time Test Circuit

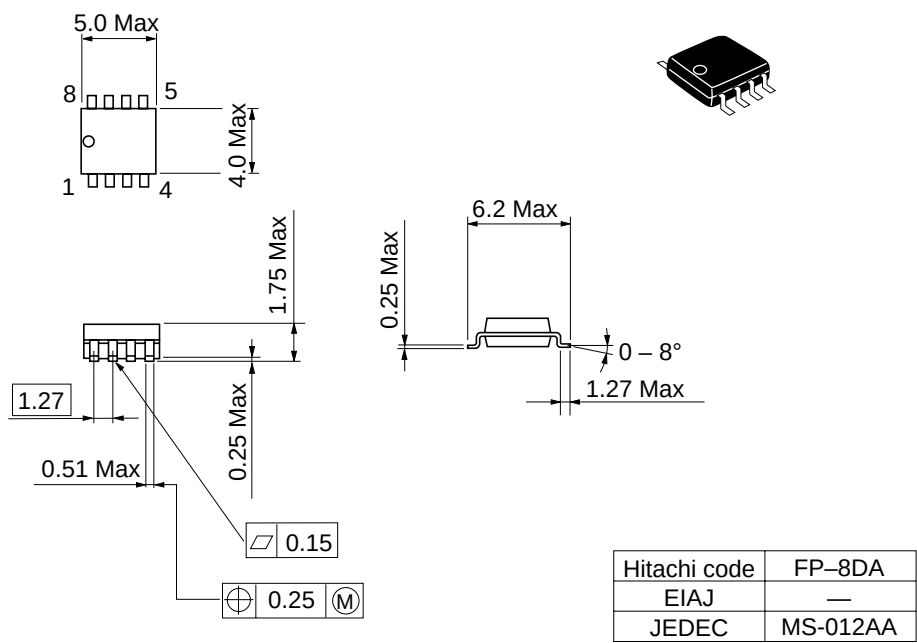


Switching Time Waveform



Package Dimensions

Unit: mm



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