

# HAT1041T

Silicon P Channel Power MOS FET  
High Speed Power Switching

# HITACHI

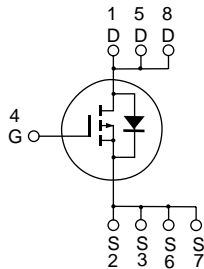
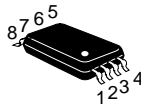
ADE-208-1238F (Z)  
7th. Edition  
Jan. 2001

## Features

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

## Outline

TSSOP-8



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

**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{\text{DSS}}$	-20	V
Gate to source voltage	$V_{\text{GSS}}$	$\pm 12$	V
Drain current	$I_{\text{D}}$	-6.0	A
Drain peak current	$I_{\text{D(pulse)}}$ <sup>Note1</sup>	-48	A
Body-drain diode reverse drain current	$I_{\text{DR}}$	-6.0	A
Channel dissipation	Pch <sup>Note2</sup>	1.3	W
Channel temperature	Tch	150	$^\circ\text{C}$
Storage temperature	Tstg	-55 to +150	$^\circ\text{C}$

Note: 1.  $PW \leq 10\mu\text{s}$ , duty cycle  $\leq 1\%$

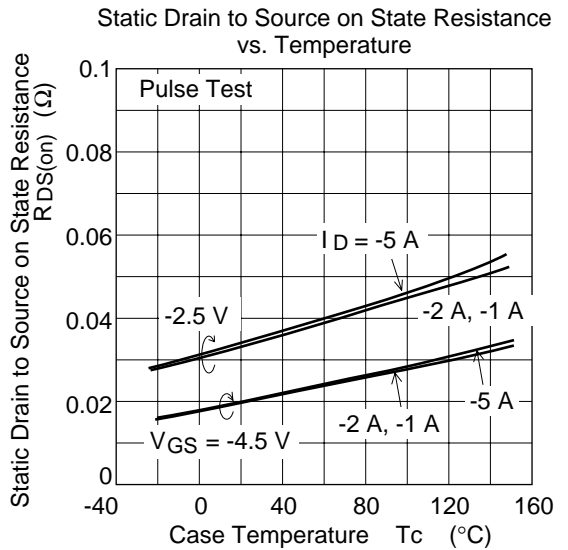
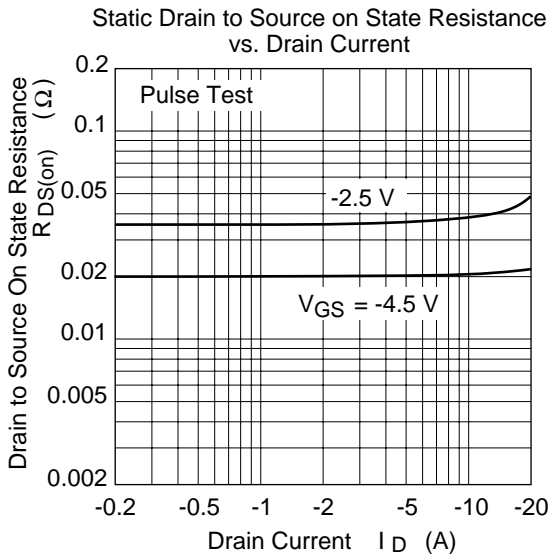
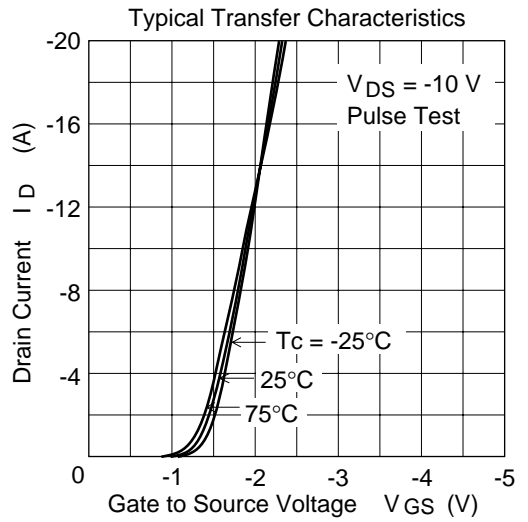
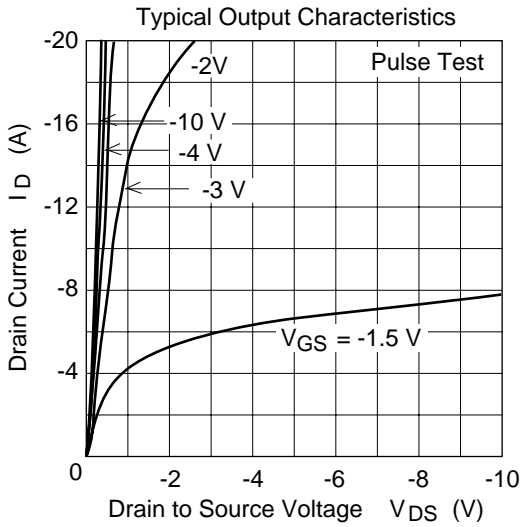
2. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW \leq 10\text{s}$

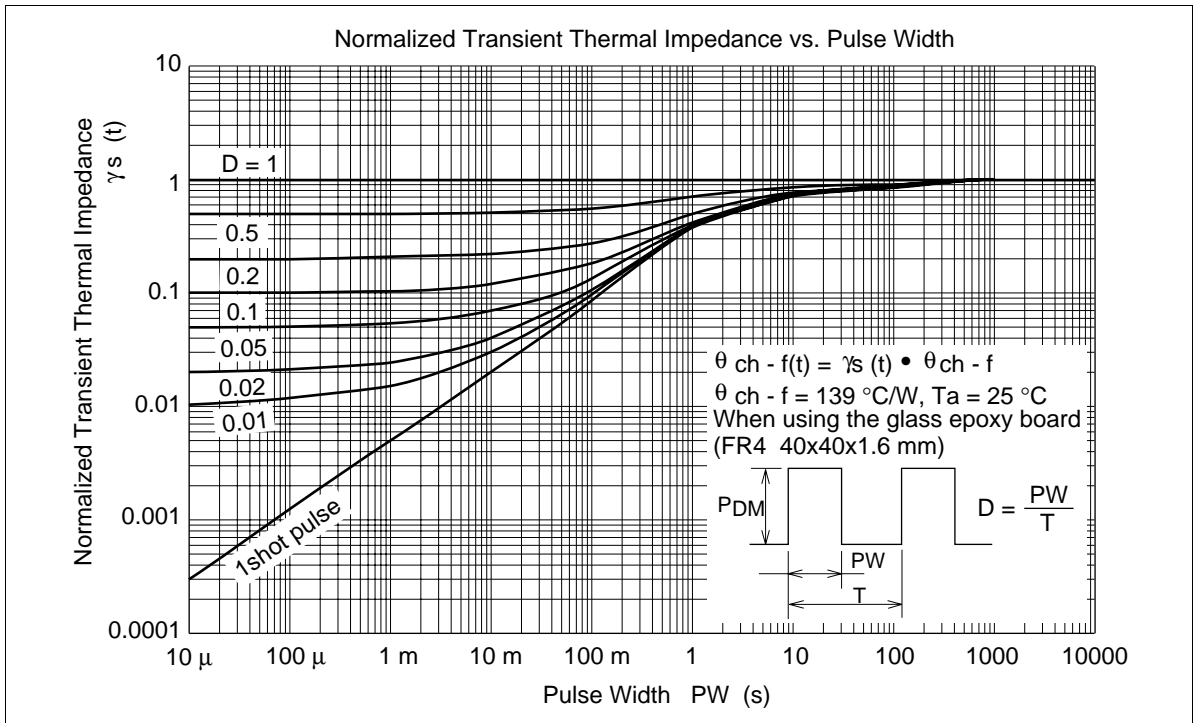
**Electrical Characteristics** ( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	-20	—	—	V	$I_{\text{D}} = -10\text{mA}$ , $V_{\text{GS}} = 0$
Gate to source leak current	$I_{\text{GSS}}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{\text{GS}} = \pm 12\text{V}$ , $V_{\text{DS}} = 0$
Zero gate voltage drain current	$I_{\text{DSS}}$	—	—	1	$\mu\text{A}$	$V_{\text{DS}} = -20\text{V}$ , $V_{\text{GS}} = 0$
Gate to source cutoff voltage	$V_{\text{GS(off)}}$	-0.4	—	-1.4	V	$V_{\text{DS}} = -10\text{V}$ , $I_{\text{D}} = -1\text{mA}$
Static drain to source on state resistance	$R_{\text{DS(on)}}$	—	0.020	0.026	$\Omega$	$I_{\text{D}} = -3\text{A}$ , $V_{\text{GS}} = -4.5\text{V}$ <sup>Note3</sup>
	$R_{\text{DS(on)}}$	—	0.035	0.045	$\Omega$	$I_{\text{D}} = -3\text{A}$ , $V_{\text{GS}} = -2.5\text{V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{\text{fs}} $	6.5	11	—	S	$I_{\text{D}} = -3\text{A}$ , $V_{\text{DS}} = -10\text{V}$ <sup>Note3</sup>
Input capacitance	Ciss	—	1850	—	pF	$V_{\text{DS}} = -10\text{V}$
Output capacitance	Coss	—	590	—	pF	$V_{\text{GS}} = 0$
Reverse transfer capacitance	Crss	—	380	—	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{\text{d(on)}}$	—	30	—	ns	$V_{\text{GS}} = -4\text{V}$ , $I_{\text{D}} = -3\text{A}$
Rise time	$t_{\text{r}}$	—	145	—	ns	$V_{\text{DD}} \cong -10\text{V}$
Turn-off delay time	$t_{\text{d(off)}}$	—	210	—	ns	
Fall time	$t_{\text{f}}$	—	170	—	ns	
Body-drain diode forward voltage	$V_{\text{DF}}$	—	-0.85	-1.10	V	$I_{\text{F}} = -6.0\text{A}$ , $V_{\text{GS}} = 0$ <sup>Note3</sup>
Body-drain diode reverse recovery time	$t_{\text{rr}}$	—	70	—	ns	$I_{\text{F}} = -6.0\text{A}$ , $V_{\text{GS}} = 0$ $di_{\text{F}}/dt = 20\text{A}/\mu\text{s}$

Note: 3. Pulse test

Main Characteristics

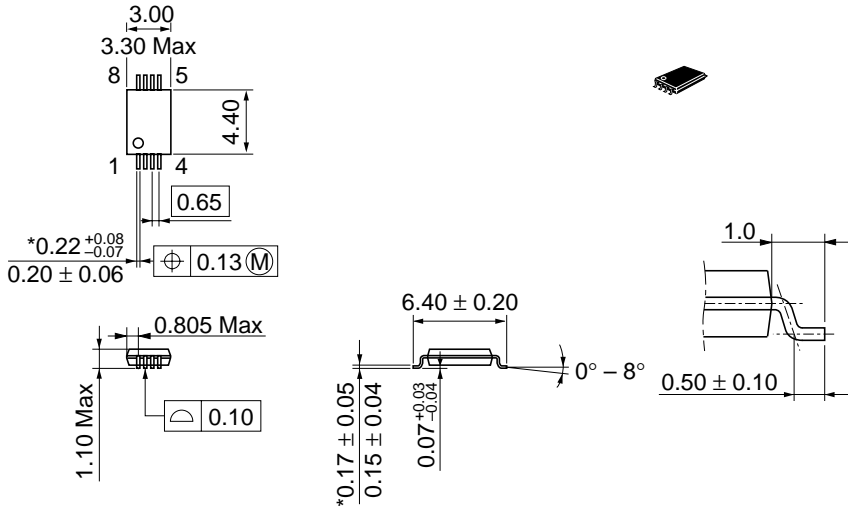




Package Dimensions

As of January, 2001

Unit: mm



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	TTP-8D
JEDEC	—
EIAJ	—
Mass (reference value)	—

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