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# 4AM17

Silicon N/P Channel MOS FET  
High Speed Power Switching

# HITACHI

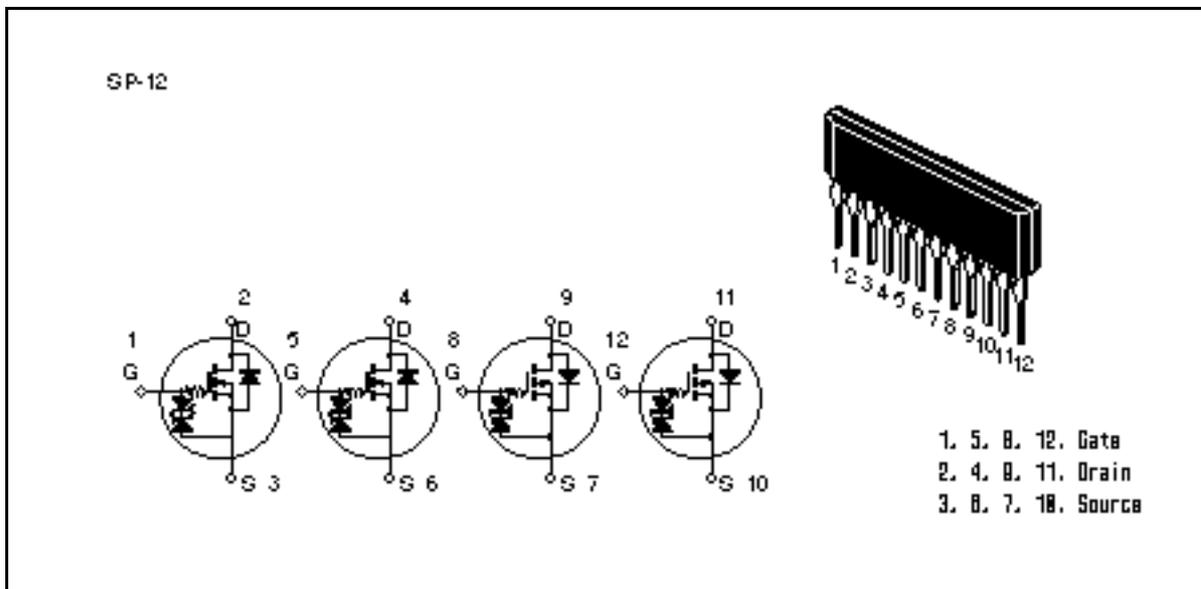
ADE-208-729 (Z)  
1st. Edition  
January 1999

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## Features

- Low on-resistance  
N Channel :  $R_{DS(on)} = 0.17 \Omega$ ,  $V_{GS} = 10V$ ,  $I_D = 4A$   
P Channel :  $R_{DS(on)} = 0.2 \Omega$ ,  $V_{GS} = -10V$ ,  $I_D = -4A$
- 4V gate drive devices.
- High density mounting

## Outline



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## 4AM17

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### Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings		Unit
		Nch	Pch	
Drain to source voltage	V <sub>DSS</sub>	60	-60	V
Gate to source voltage	V <sub>GSS</sub>	±20	±20	V
Drain current	I <sub>D</sub>	8	-8	A
Drain peak current	I <sub>D(pulse)</sub> <sup>Note1</sup>	32	-32	A
Body-drain diode reverse drain current	I <sub>DR</sub>	8	-8	A
Channel dissipation	Pch (Tc=25°C) <sup>Note2</sup>		28	W
Channel dissipation	Pch <sup>Note2</sup>		4.0	W
Channel temperature	Tch		150	°C
Storage temperature	Tstg		-55 to +150	°C

Note: 1. PW 10μs, duty cycle 1 %

2. 4 devices operation

## Electrical Characteristics (Ta = 25°C)

## ( N Channel )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10\text{mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100\mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16\text{V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	250	$\mu\text{A}$	$V_{DS} = 50\text{V}, V_{GS} = 0$
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	$R_{DS(on)}$	—	0.13	0.17		$I_D = 4\text{A}, V_{GS} = 10\text{V}^{\text{Note3}}$
	$R_{DS(on)}$	—	0.19	0.24		$I_D = 4\text{A}, V_{GS} = 4\text{V}^{\text{Note3}}$
Forward transfer admittance	$ y_{fs} $	3.5	5.5	—	S	$I_D = 4\text{A}, V_{DS} = 10\text{V}^{\text{Note3}}$
Input capacitance	$C_{iss}$	—	33	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	$C_{oss}$	—	220	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	5.2	—	pF	$f = 1\text{MHz}$
Gate series resistance	$R_g$	—	1.5	—	k	$V_{DS} = 10\text{V}, V_{GS} = 0$ $f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	0.15	—	$\mu\text{s}$	$V_{GS} = 10\text{V}, I_D = 4\text{A}$
Rise time	$t_r$	—	0.5	—	$\mu\text{s}$	$R_L = 7.5$
Turn-off delay time	$t_{d(off)}$	—	3.2	—	$\mu\text{s}$	
Fall time	$t_f$	—	1.4	—	$\mu\text{s}$	
Body-drain diode forward voltage	$V_{DF}$	—	1.5	—	V	$I_F = 8\text{A}, V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	850	—	ns	$I_F = 8\text{A}, V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$

Note: 3. Pulse test

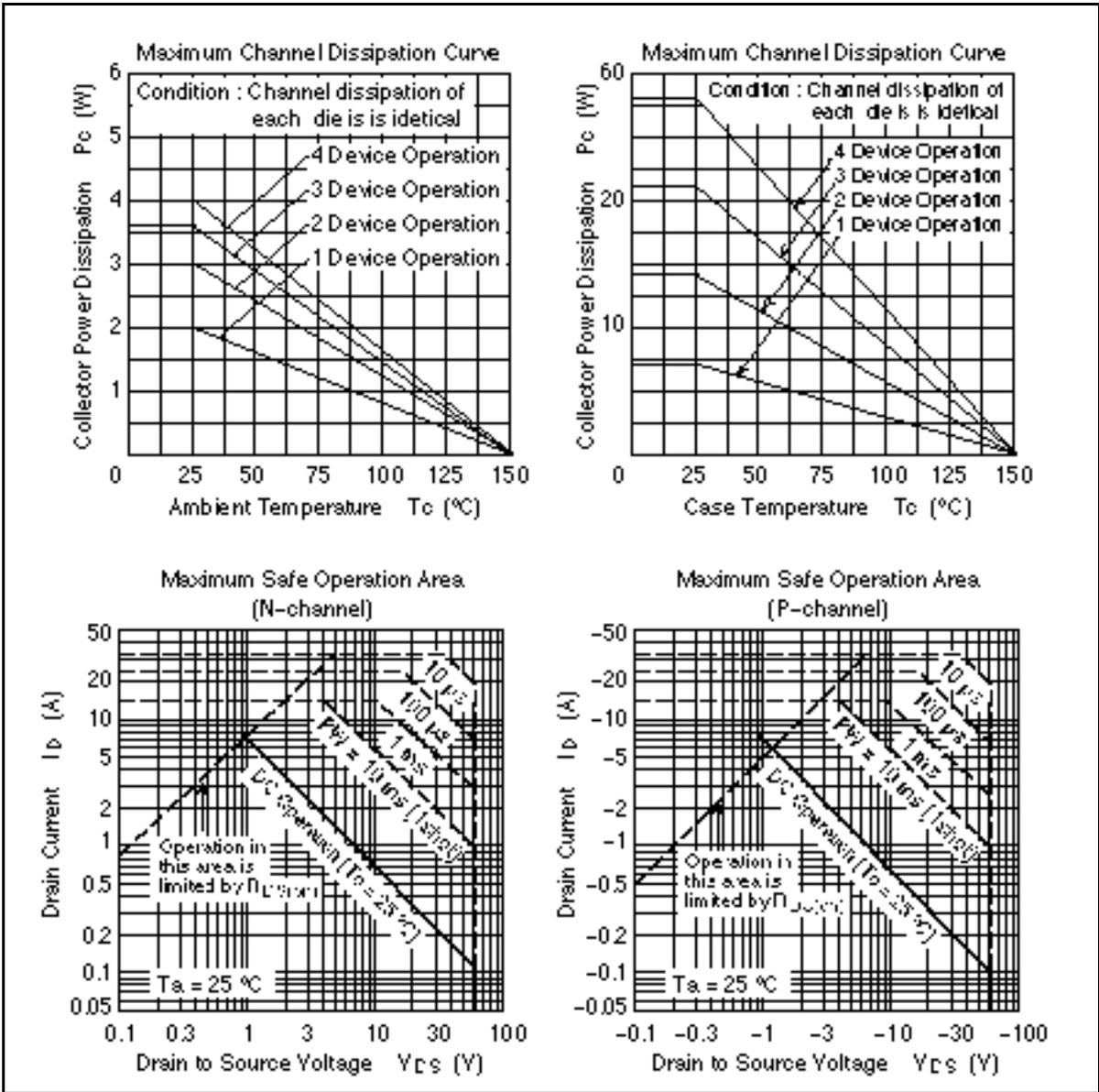
## 4AM17

( P Channel )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -10\text{mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100\mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16\text{V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-250	$\mu\text{A}$	$V_{DS} = -50\text{V}, V_{GS} = 0$
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	$R_{DS(on)}$	—	0.15	0.2		$I_D = -4\text{A}, V_{GS} = -10\text{V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	0.2	0.27		$I_D = -4\text{A}, V_{GS} = -4\text{V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	3.5	6.0	—	S	$I_D = -4\text{A}, V_{DS} = -10\text{V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	17	—	pF	$V_{DS} = -10\text{V}$
Output capacitance	$C_{oss}$	—	460	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	1.2	—	pF	$f = 1\text{MHz}$
Gate series resistance	$R_g$	—	3.2	—	k	$V_{DS} = 0, V_{GS} = 0$ $f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}$	—	0.6	—	$\mu\text{s}$	$V_{GS} = -10\text{V}, I_D = -4\text{A}$
Rise time	$t_r$	—	2.1	—	$\mu\text{s}$	$R_L = 7.5$
Turn-off delay time	$t_{d(off)}$	—	12	—	$\mu\text{s}$	
Fall time	$t_f$	—	5.8	—	$\mu\text{s}$	
Body-drain diode forward voltage	$V_{DF}$	—	-1.2	—	V	$I_F = -8\text{A}, V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	2.5	—	ns	$I_F = -8\text{A}, V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$

Note: 3. Pulse test

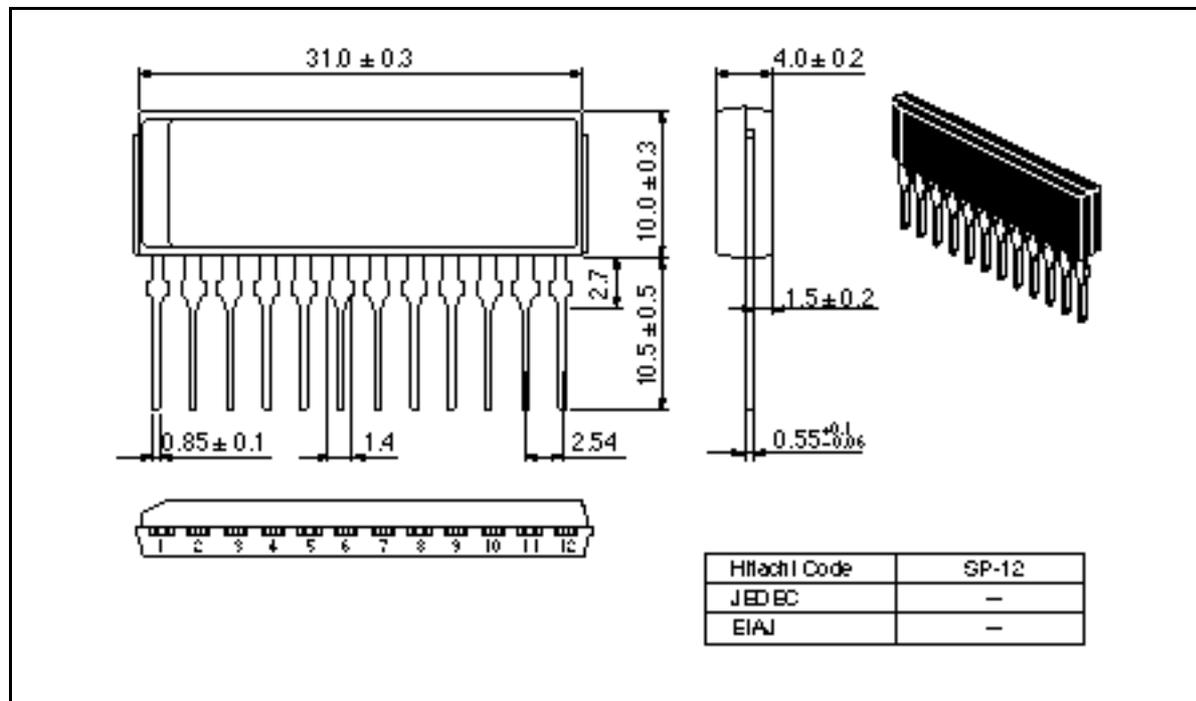
Main Characteristics



# 4AM17

## Package Dimensions

Unit: mm



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