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Dual Comparator



ADE-204-048 (Z) Rev. 0 Dec. 2000

Description

HA17903 and HA17393 are comparators designed for car use and control system use.

They provide wide voltage range with single power source, and the change of supply current is small, because it is independent of the supply voltage. They can be widely applied, such as limit comparator, simple analog/digital converter, pulse/square wave/time delay generator, wide range VCO, MOS clock timer, multivibrator, high voltage logic gate, etc.

Features

Wide supply voltage: 2 to 36VVery low supply current: 0.8mA

• Small input bias: 25nA

Small input offset current: 3nASmall input offset voltage: 2mV

Common mode input voltage range including ground.

• Small output saturation voltage: 1mV (5μA)

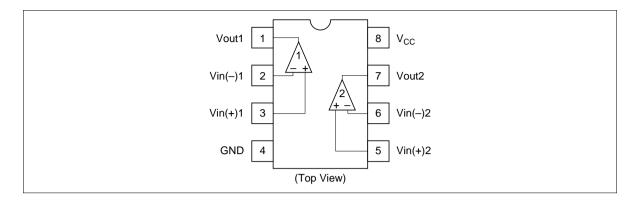
70mV (1mA)

Output voltage is compatible with CMOS logic system.

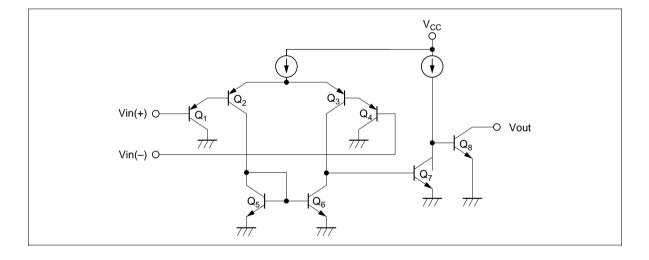
Ordering Information

Type No.	Application	Package		
HA17903PSJ	Car use	DP-8		
HA17903FPJ		FP-8D		
HA17903FPK		FP-8D		
HA17903PS	Industrial use	DP-8		
HA17903FP		FP-8D		
HA17393	Commercial use	DP-8		
HA17393F		FP-8D		

Pin Arrangement



Circuit Schematic (1/2)



Absolute Maximum Ratings ($Ta = 25^{\circ}C$)

Ratings									
Item	Symbol	HA17903 PS	HA17903 PSJ	HA17903 FP	HA17903 FPJ	HA17903 FPK	HA17393	HA17393 F	Unit
Supply voltage	V _{cc}	36	36	36	36	36	36	36	V
Dfferential input voltage	$V_{IN(diff)}$	V _{cc}	V						
Input voltage	V _{IN}	-0.3 to + V _{cc}	V						
Output short current	l os*3	constant							
Power dissipation	P_{T}	570* ¹	570* ¹	385*2	385* ¹	385*2	570* ¹	385*2	mW
Operating temperature	Topr	–20 to +75	-40 to +85	–20 to +75	-40 to +85	-40 to +125	–20 to +75	-20 to +75	°C
Storage temperature	Tstg	-55 to +125	-55 to +125	-55 to +125	-55 to +125	-55 to +150	-55 to +125	-55 to +125	°C

Note: 1. These are the allowable values up to Ta = 55 °C. Derate by 8.3mW/°C above that temperature.

- 2. These are the allowable values up to Ta = 45 °C mounting on 30% wiring density glass epoxy board. Derate by 7.14mW/°C above that temperature.
- 3. Short circuit between the output and VCC will be a cause to destory the circuit. The maximum output current is about 20mA for any supply voltage.

Electrical Characteristics-1 ($V_{CC} = 5V$, Ta = 25°C)

ур Мах	ax Unit Test condition
.0 5.0	0 mV
5 250	60 nA I _{IN (+)} or I _{IN (-)}
50	nA $ I_{\text{IN}(+)} - I_{\text{IN}(-)} $
	V
- 0	V
.8 2.0	0 mA All comparators: $R_L = \infty$, All channels on
00 —	$V/mV V_{CC} = 15V, R_L \ge 15k\Omega$
.3 —	$V_{RL} = 5V, R_L = 5.1k\Omega$
00 —	ns $V_{IN} = TTL$ Threshold width, $V_{REF} = 1.4V$
6 —	mA $V_{IN(-)} \ge 1V, V_{IN(+)} = 0, V_0 \le 1.5V$
- 400	00 mA $V_{IN(-)} \ge 1V, V_{IN(+)} = 0,$ Iosink = 4mA
.1 —	nA $V_{IN(-)} = 0, V_{IN(+)} \ge 1V, V_{O} = 5V$
	00 — 3 — 00 — 6 —

Notes: 1. $V_{REF} = 1.4V$ and $R_S = 50\Omega$, when $V_O = 1.4V$ at output switching point.

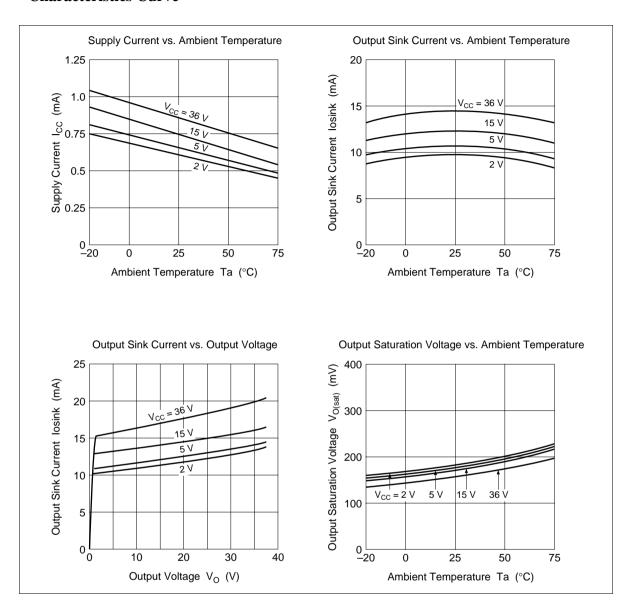
- 2. Under linear operation.
- 3. Common mode input voltage or each one of the input signal should not be less than -0.3V.
- 4. This is a value to 100mV input step voltage with 5mV over drive.

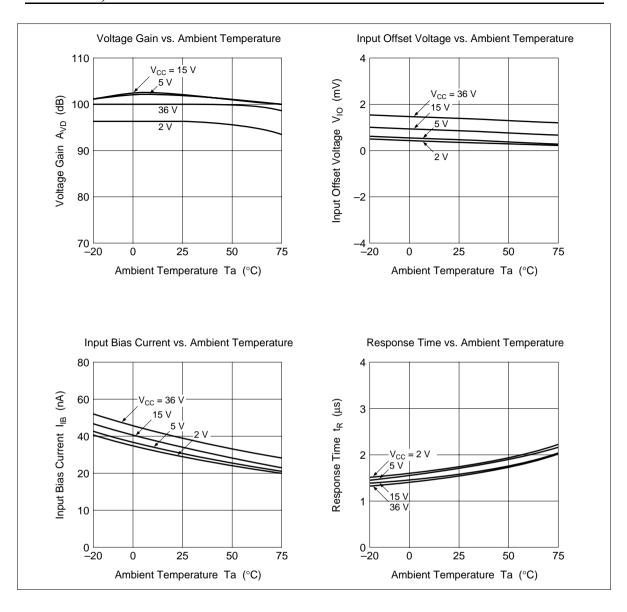
Electrical Characteristics-2 ($V_{CC} = 5V$, Ta = -40 to +125°C)

Item	Symbol	Min	Тур	Max	Unit	Test condition
Input offset voltage*1	V _{IO}	_	_	5.0	mV	
Input offset current	I _{IO}	_	_	200	nA	$\mid \mathbf{I}_{IN\;(+)} - \mathbf{I}_{IN\;(-)}\mid$
Input bias current	I _{IB}	_	_	500	nA	Output linear range
Common mode input voltage	V_{CM}	0	_	V _{cc} – 2.0	V	
Output saturation voltage	V _o (sat)	_	_	440	mV	$V_{IN(-)} \ge 1V$, $V_{IN(+)} = 0$, $Iosink \le 4mA$
Output leak current	I _{LO}	_	1.0	_	μΑ	$V_{IN (-)} = 0, \ V_{IN (+)} \ge 1 \ V, \ V_O = 30V$
Supply current	I _{cc}	_	_	4.0	mA	All comparators: $R_L = \infty$, All channels on

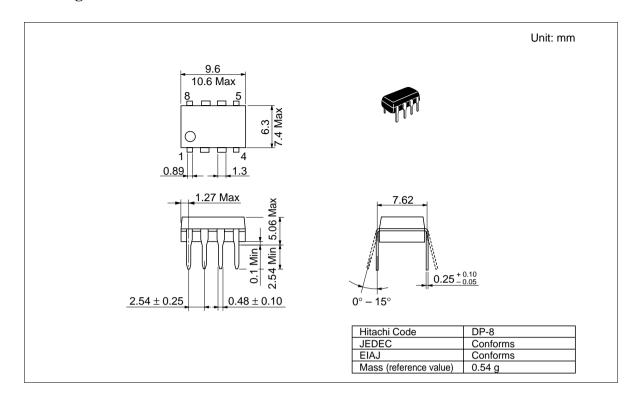
Note: 1. $V_{REF} = 1.4V$ and $R_S = 50\Omega$, when $V_O = 1.4V$ at the output switching point.

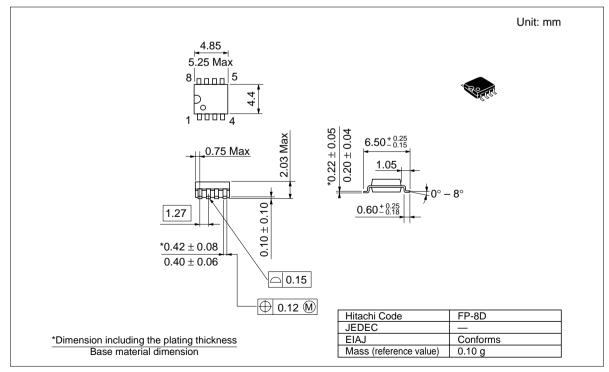
Characteristics Curve





Package Dimensions





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