To all our customers

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

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   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HA17393/A Series

Dual Comparators

ADE-204-066A (Z)
Rev. 1
Mar. 2001

Description

The HA17393A and HA17393 series products are comparators designed for general purpose, especially for power control systems.

These ICs operate from a single power-supply voltage over a wide range of voltages, and feature a reduced power-supply current since the supply current is independent of the supply voltage.

These comparators have the merit which ground is included in the common-mode input voltage range at a single-voltage power supply operation. These products have a wide range of applications, including limit comparators, simple A/D converters, pulse/square-wave/time delay generators, wide range VCO circuits, MOS clock timers, multivibrators, and high-voltage logic gates.

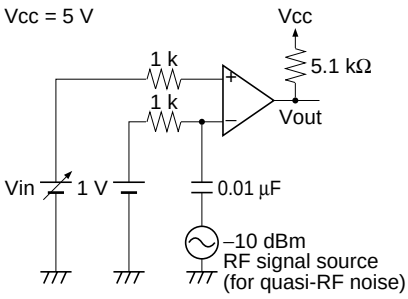
Features

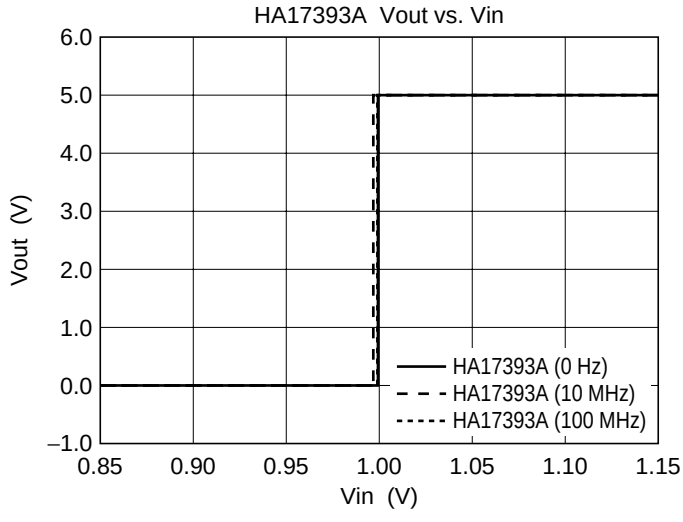
- Wide supply voltage: 2 to 36 V
- Very low supply current: 0.8 mA
- Small input bias: 25 nA
- Small input offset current: 3 nA
- Small input offset voltage: 2 mV
- Common mode input voltage range including ground.
- Small output saturation voltage: 1 mV (5 μA)
  70 mV (1 mA)
- Output voltage is compatible with CMOS logic system.

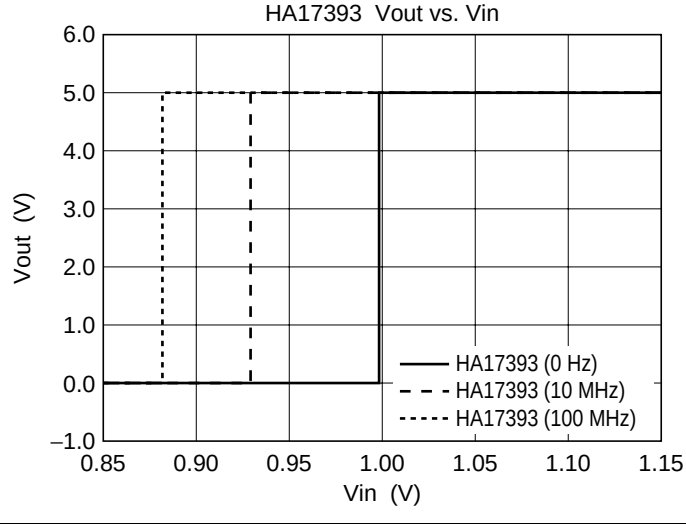
Features only for “A” series

- Low electro-magnetic susceptibility

Measurement Condition



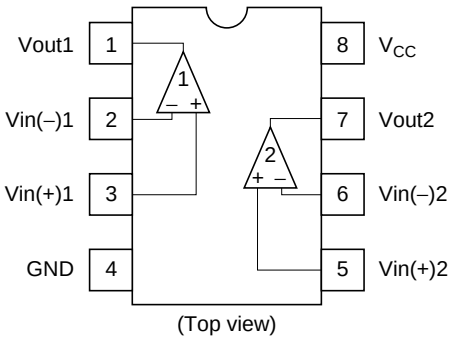




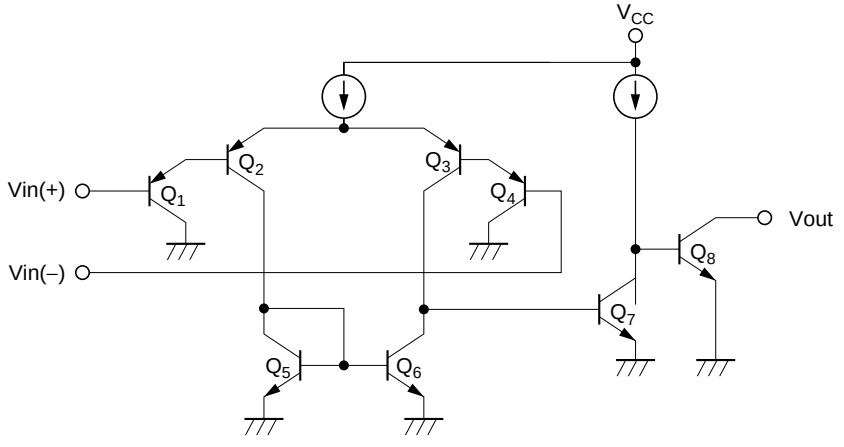
Ordering Information

Type No.	Application	Package
HA17393APS	Industrial use	DP-8B
HA17393ARP	Commercial use	FP-8DC
HA17393AFP		FP-8D
HA17393	Commercial use	DP-8B
HA17393F		FP-8D

Pin Arrangement



Circuit Schematic (1/2)



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings					Unit
		17393APS	17393AFP	17393ARP	17393	17393F	
Power supply voltage	V_{CC}	36	36	36	36	36	V
Differential input voltage	Vin(diff)	V_{CC}	V_{CC}	V_{CC}	V_{CC}	V_{CC}	V
Input voltage	Vin	–0.3 to +V_{CC}	–0.3 to +V_{CC}	–0.3 to +V_{CC}	–0.3 to +V_{CC}	–0.3 to +V_{CC}	V
Output short current	Ios *3	constant	constant	constant	constant	constant	
Allowable power dissipation	P_T	570 *1	385 *2	385 *2	570 *1	385 *2	mW
Operating temperature	Topr	–40 to +85	–40 to +85	–40 to +85	–20 to +75	–20 to +75	°C
Storage temperature	Tstg	–55 to +125	–55 to +125	–55 to +125	–55 to +125	–55 to +125	°C

Notes: 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 = 25°C mounting in air.

   When it is mounted on glass epoxy board of 40 mm × 40 mm × 1.5 mmt with 30% wiring density, the allowable value is 570 mW up to Ta = 45°C. If Ta > 45°C, derate by 7.14 mW/°C.

3. Short circuit between the output and V_{CC} will be a cause to destory the circuit. The maximum output current is about 20 mA for any supply voltage.

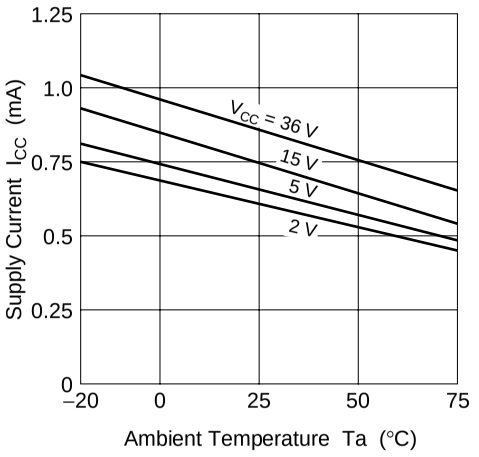
Electrical Characteristics (V_{CC} = 5 V, Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test condition
Input offset voltage *1	V_{IO}	—	2.0	5.0	mV	
Input bias current *2	I_{IB}	—	25	250	nA	$I_{IN(+)}$ or $I_{IN(-)}$
Input offset current	I_{IO}	—	3	50	nA	$\lvert I_{IN(+)} - I_{IN(-)} \rvert$
Common mode input voltage *3	V_{CM}+	3.5	—	—	V	
	V_{CM}–	—	—	0	V	
Supply current	I_{CC}	—	0.8	2.0	mA	All comparators: $R_L = \infty$, All channels on
Voltage gain	A_V	—	200	—	V/mV	V_{CC} = 15V, $R_L \geq 15k\Omega$
Response time *4	t_R	—	1.3	—	µs	V_{RL} = 5V, R_L = 5.1kΩ
Large signal response time	t_{RI}	—	300	—	ns	V_{IN} = TTL Threshold width, V_{REF} = 1.4V
Out put sink current	Iosink	6	16	—	mA	$V_{IN(-)} \geq 1V$, $V_{IN(+)} = 0$, $V_O \leq 1.5V$
Output saturation voltage	V_O (sat)	—	—	400	mA	$V_{IN(-)} \geq 1V$, $V_{IN(+)} = 0$, Iosink = 4mA
Output leak current	I_{LO}	—	0.1	—	nA	$V_{IN(-)} = 0$, $V_{IN(+)} \geq 1V$, V_O = 5V

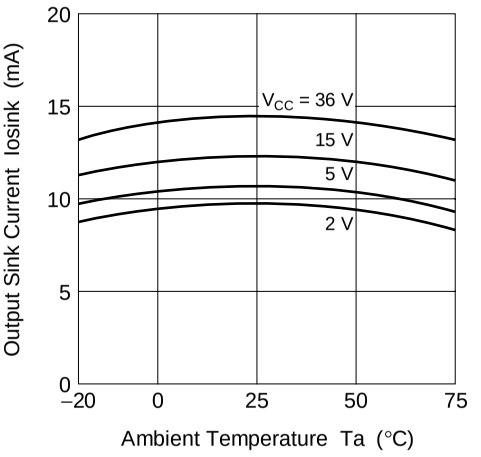
Notes: 1. V_{REF} = 1.4 V and R_S = 50 Ω, when V_O = 1.4 V at output switching point.
2. Under linear operation.
3. Common mode input voltage or each one of the input signal should not be less than –0.3 V.
4. This is a value to 100 mV input step voltage with 5 mV over drive.

Characteristic Curves

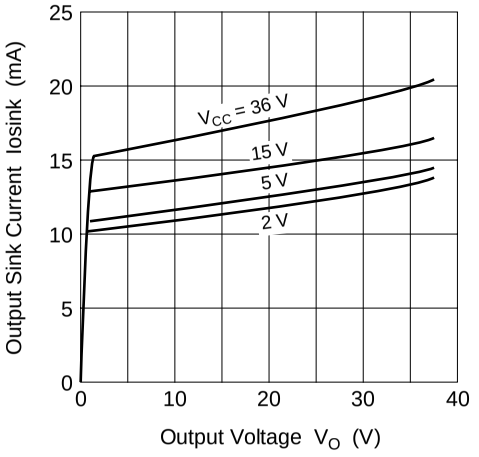
Supply Current vs. Ambient Temperature



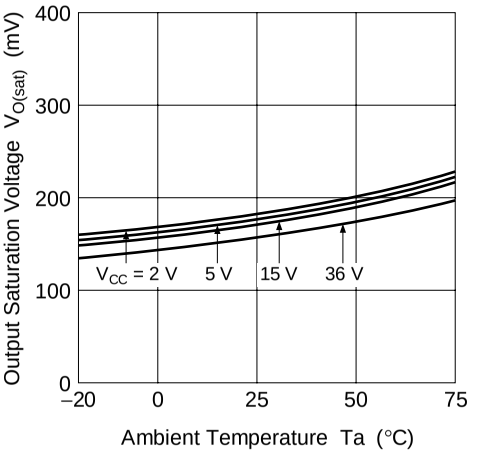
Output Sink Current vs. Ambient Temperature



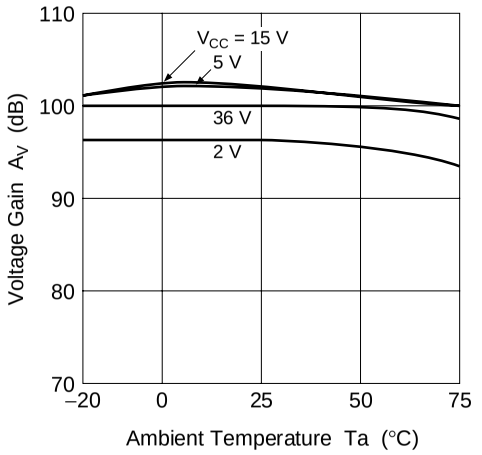
Output Sink Current vs. Output Voltage



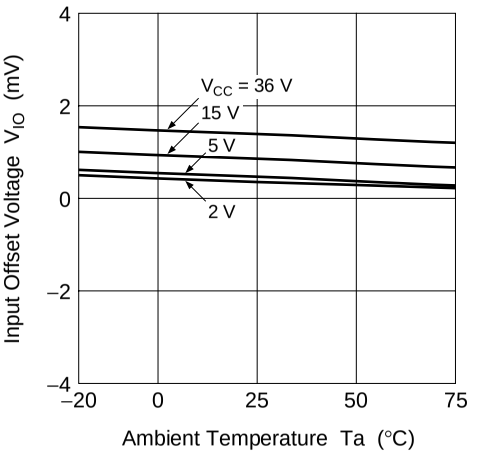
Output Saturation Voltage vs. Ambient Temperature



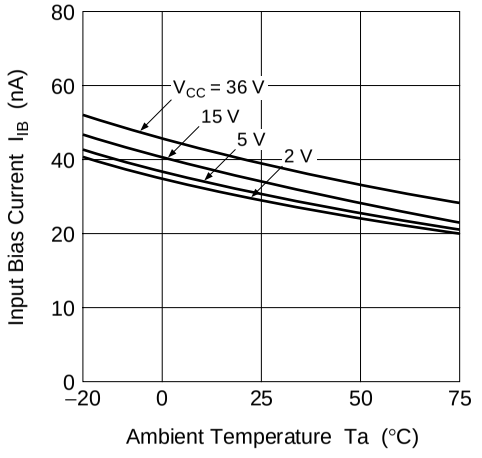
Voltage Gain vs. Ambient Temperature



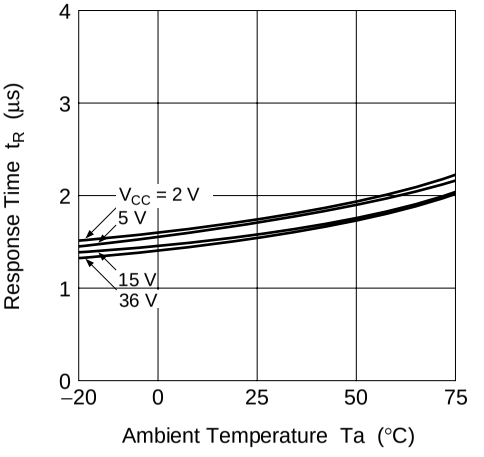
Input Offset Voltage vs. Ambient Temperature



Input Bias Current vs. Ambient Temperature

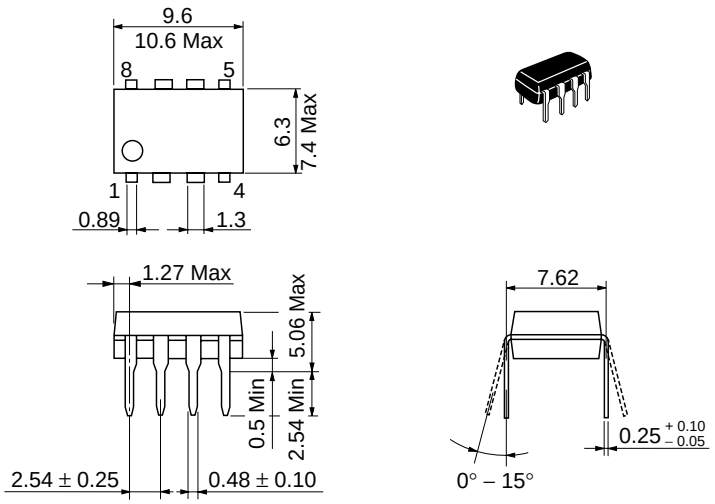


Response Time vs. Ambient Temperature



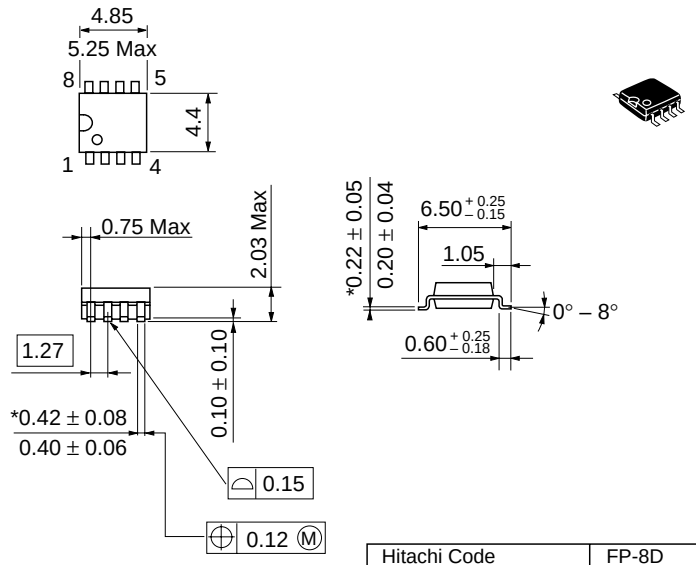
Package Dimensions

Unit: mm



Hitachi Code	DP-8B
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.51 g

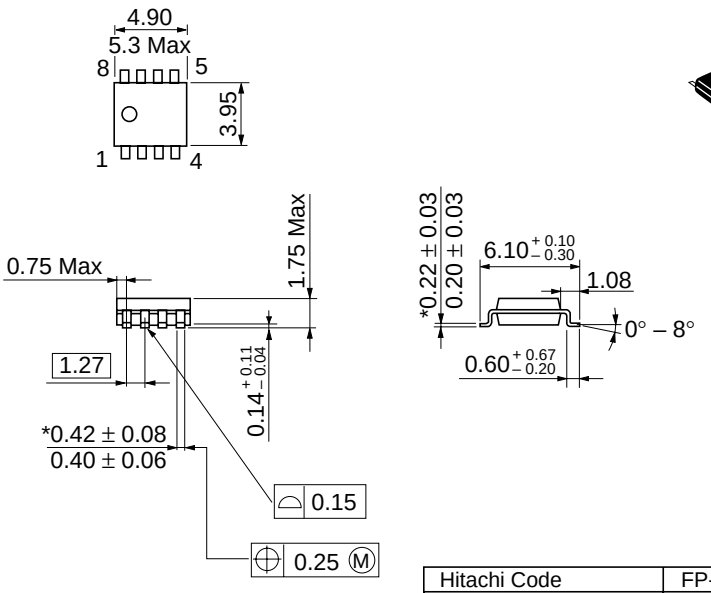
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-8D
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.10 g

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-8DC
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.085 g

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