HA17393B Series

Dual Comparators

REA03D0002-0100
Rev.1.00
Dec 25, 2006

Description

HA17393B is dual comparators designed for general purpose, especially for power control systems. This IC operates from a single power-supply voltage over a wide range of voltages. Operation from split power supply current is also possible and the low power supply current drain is independent of the magnitude of the power 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.

Features

- Wide range of supply voltage
  Single supply: 2 V to 36 V, Dual supplies: ±1 V to ±18 V
- Very low supply current: 0.6 mA
- Small input bias current: 25 nA
- Small input offset voltage: 2 mV
- Common mode input voltage range includes ground.
- Low output saturation voltage: 200 mV at 4 mA
- Open collector output
- Package outline available in Pb free lead frame:
  DP-8
  SOP-8 (JEITA)
  SOP-8 (JEDEC)

Applications

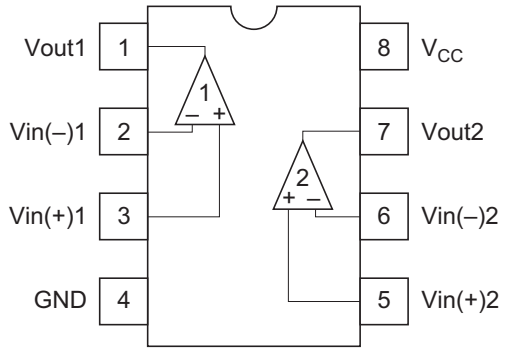
- Battery charger
- Cordless telephone
- Switching power supply
- DC/DC module
- PC motherboard
- Communication equipment

Ordering Information

Type No.	Application	Package Code (Package Name)
HA17393B	Commercial use	PRDP0008AF-B (DP-8FV)
HA17393BF		PRSP0008DE-B (FP-8DGV)
HA17393BRP		PRSP0008DD-C (FP-8DCV)

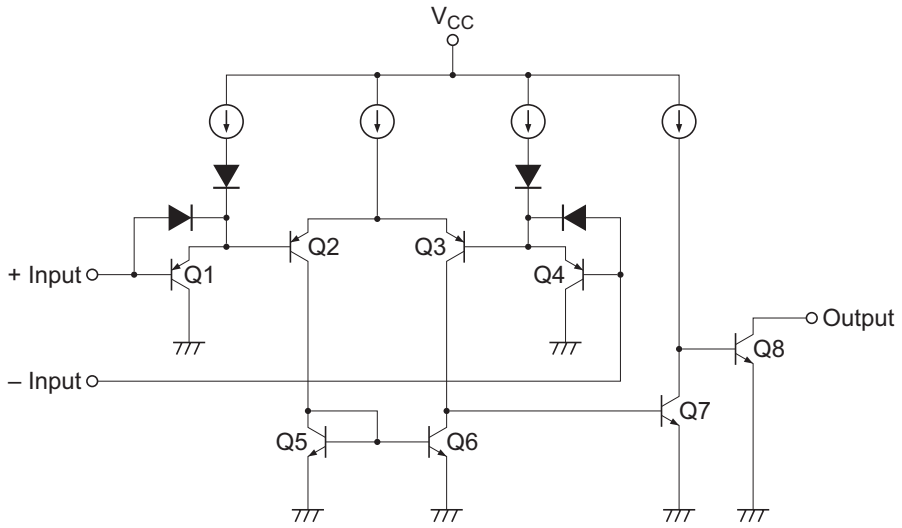
Note: This product is designed for consumer use and not for automotive.

Pin Arrangement



(Top view)

Circuit Schematic (1/2)



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings			Unit
		HA17393B	HA17393BF	HA17393BRP	
Supply Voltage	V_{CC}	36	36	36	V
Differential input voltage	V_{IN} (diff)	V_{CC}	V_{CC}	V_{CC}	V
Input voltage	V_{IN}	–0.3 to V_{CC}	–0.3 to V_{CC}	–0.3 to V_{CC}	V
Input current (V_{IN} < –0.3 V)	I_{IN}	50	50	50	mA
Power dissipation	P_T	570 *1	385 *2	385 *2	mW
Output short-circuit to ground		Continuous	Continuous	Continuous	
Operating temperature	Topr	–40 to +85	–40 to +85	–40 to +85	°C
Storage temperature	Tstg	–55 to +125	–55 to +125	–55 to +125	°C

Notes: 1. This is the allowable value up to Ta = 55°C. Derate by 8.3 mW/°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 mm (t) 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.

Electrical Characteristics

(Ta = 25°C, V_{CC} = +5 V, unless otherwise specified)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input offset voltage	V_{IO}	—	2	5	mV	V_O = 1.4 V, R_S = 0 Ω V_{CC} = 5 V to 30 V
Input offset current	I_{IO}	—	5	50	nA	V_{CM} = 0 V
Input bias current	I_{IB}	—	25	250	nA	V_{CM} = 0 V, $I_{IN(+)}$ or $I_{IN(–)}$ with output in linear range
Voltage gain	A_V	—	200	—	dB	V_{CC} = 15 V, R_L ≥ 15 kΩ, V_O = 1 V to 11 V
Common mode input voltage range	V_{IR}	0	—	V_{CC}–1.5	V	V_{CC} = 30 V
Supply current	I_{CC}	—	0.6	1.0	mA	V_{CC} = 5 V, R_L = ∞
		—	0.8	1.7	mA	V_{CC} = 36 V, R_L = ∞
Response time	t_R	—	1.3	—	µs	V_{RL} = 5 V, R_L = 5.1 kΩ
Large signal response time	t_{RL}	—	200	—	ns	V_{IN} = TTL logic swing, V_{REF} = 1.4 V, V_{RL} = 5 V, R_L = 5.1 kΩ
Output sink current	I_{OSINK}	6	16	—	mA	$V_{IN(–)}$ = 1 V, $V_{IN(+)}$ = 0 V, V_O = 1.5 V
Output saturation voltage	$V_{O(SAT)}$	—	200	400	mV	$V_{IN(–)}$ = 1 V, $V_{IN(+)}$ = 0 V, I_{OSINK} ≤ 4 mA
Output leakage current	I_{LO}	—	0.1	—	nA	$V_{IN(–)}$ = 0 V, $V_{IN(+)}$ = 1 V, V_O = 5 V

Table of Graphs

Electrical Characteristics		Figure
Supply current	vs. Supply voltage $\pm V_{CC}$	1
Input bias current	vs. Supply voltage $\pm V_{CC}$	2
Saturation voltage	vs. Supply voltage $\pm V_{CC}$	3
Response time (Positive transition)	vs. Time s	4
Response time (Negative transition)	vs. Time s	5

Typical Characteristics Curves

Figure 1. Supply Current vs. Supply Voltage

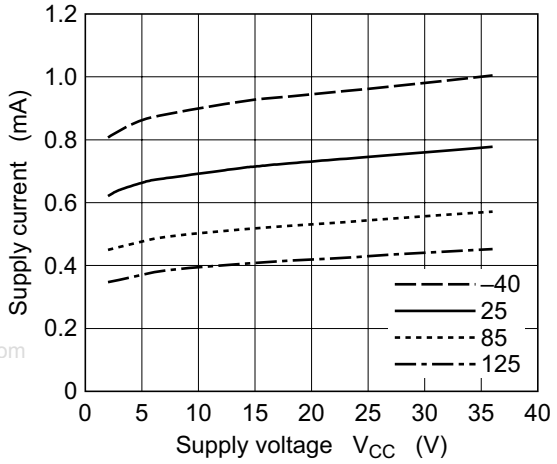


Figure 2. Input Bias Current vs. Supply Voltage

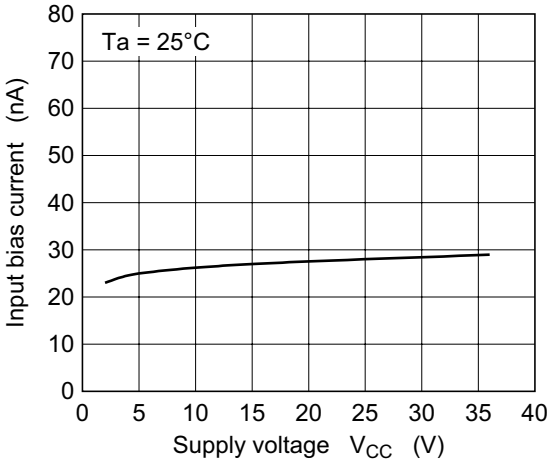


Figure 3. Saturation Voltage vs. Supply Voltage

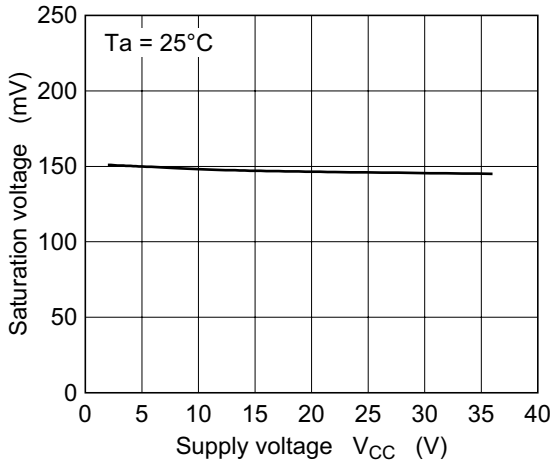


Figure 4. Response Time (Positive Transition)

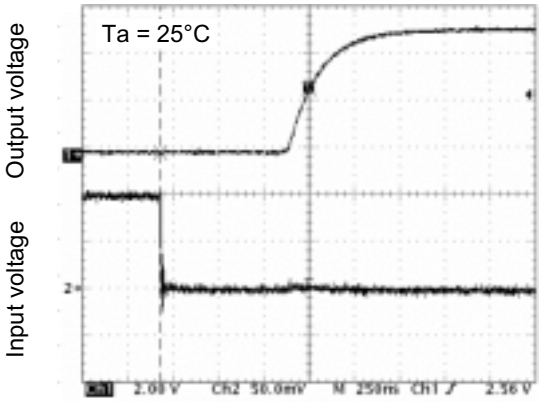
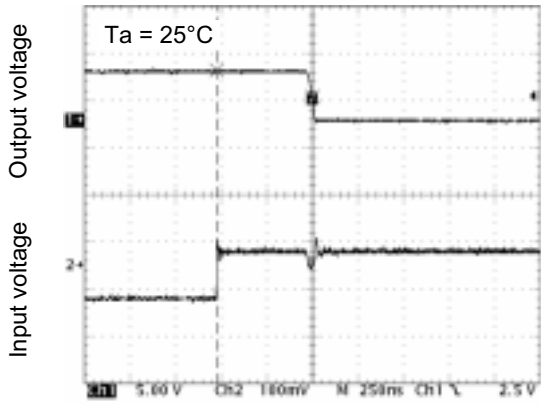
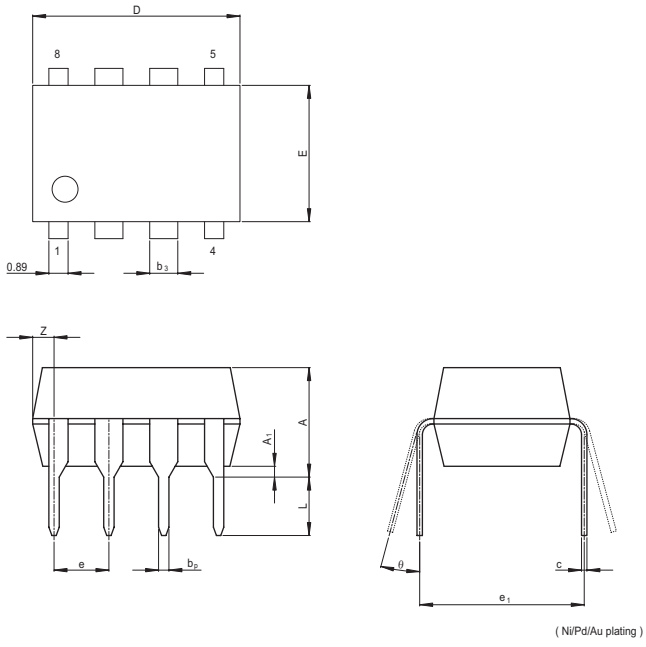


Figure 5. Response Time (Negative Transition)



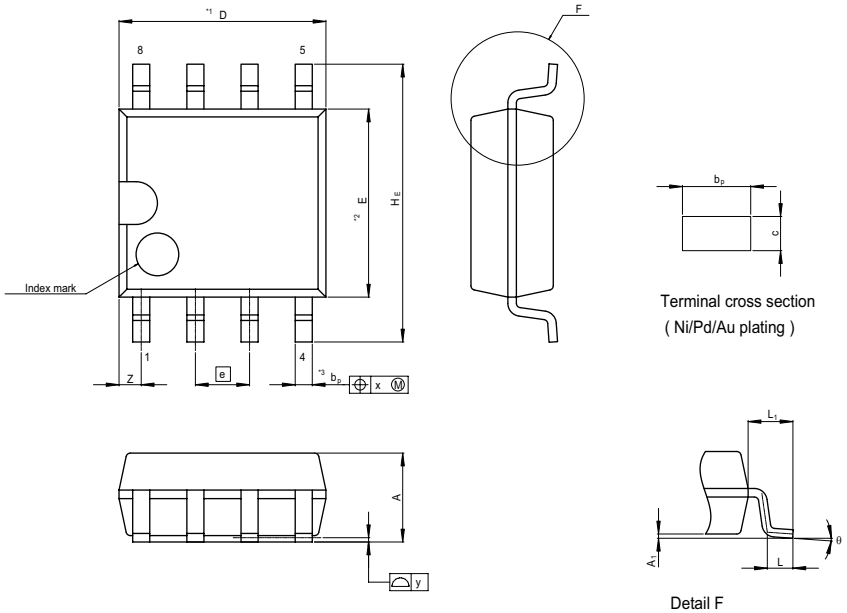
Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP8-6.3x9.6-2.54	PRDP0008AF-B	DP-8FV	0.54g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	—	7.62	—
D	—	9.60	10.6
E	—	6.30	7.4
A	—	—	5.06
A_1	0.5	—	—
b_p	0.40	0.48	0.56
b_3	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.27
L	2.54	—	—

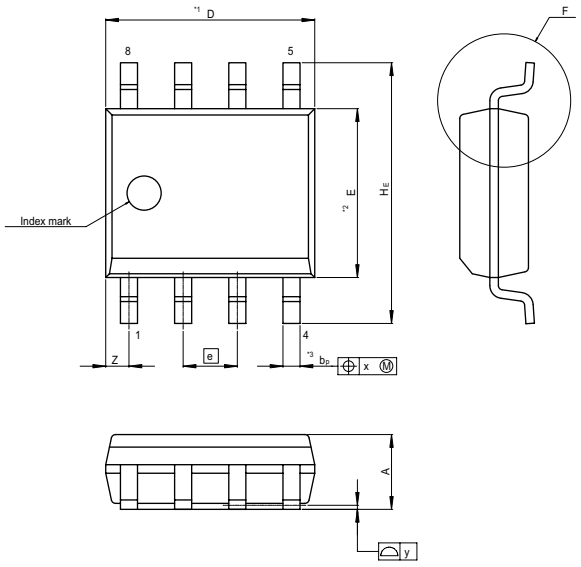
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-B	FP-8DGV	0.1g

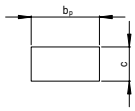


NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.

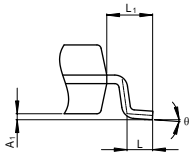
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.85	5.25
E	—	4.4	—
A_2	—	—	—
A_1	0.00	0.1	0.20
A	—	—	2.03
b_p	0.35	0.4	0.45
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	6.35	6.5	6.75
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.75
L	0.42	0.60	0.85
L_1	—	1.05	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-3.95x4.9-1.27	PRSP0008DD-C	FP-8DCV	0.085g





Terminal cross section
(Ni/Pd/Au plating)



Detail F

NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.90	5.30
E	—	3.95	—
A_2	—	—	—
A_1	0.10	0.14	0.25
A	—	—	1.75
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.10
Z	—	—	0.75
L	0.40	0.60	1.27
L_1	—	1.08	—

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

RENESAS SALES OFFICES

http://www.renesas.com

Refer to "**http://www.renesas.com/en/network**" for the latest and detailed information.

Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.
Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7898

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology Singapore Pte. Ltd.
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510