HA17555 Series

Precision Timer

HITACHI

ADE-204-064 (Z)
Rev. 0
Dec. 2000

Description

HA17555 Series are ICs designed for accurate time delays or oscillations. It provides both of trigger terminal and reset terminal in order to enable a wide scope of application including Mono Multi Vibrator and Astable Multi Vibrator, and the number of external components is fewer. Further, it's compatible with NE555 of singnetics.

Features

- Mono multi vibrator can be constructed with one resistor and one capacitor.
- Astable multi vibrator can be constructed with two resistors and one capacitor.
- Delay time can be established widely from several µ seconds to several hours.
- Pulse Duty can be controlled.
- The maximum value of both sink current and source current is 200mA.
- Direct connection of output to TTL is possible.
- Temperature/delay time ratio is 50 ppm/°C (typ).
- Output is normally in the on and off states.

Ordering Information

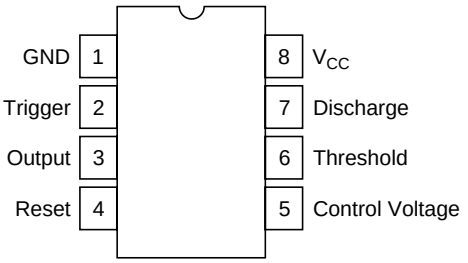
Application	Type No.	Package
Industrial use	HA17555PS	DP-8
	HA17555FP	FP-8D
Commercial use	HA17555	DP-8
	HA17555F	FP-8D

Hitachi semiconductor

Applications

- Delay Time Generator (Mono Multi Vibrator)
- Pulse Generator (Astable Multi Vibrator)
- Pulse Width Modulator
- Pulse Location Modulator
- Miss Pulse Detector

Pin Arrangement

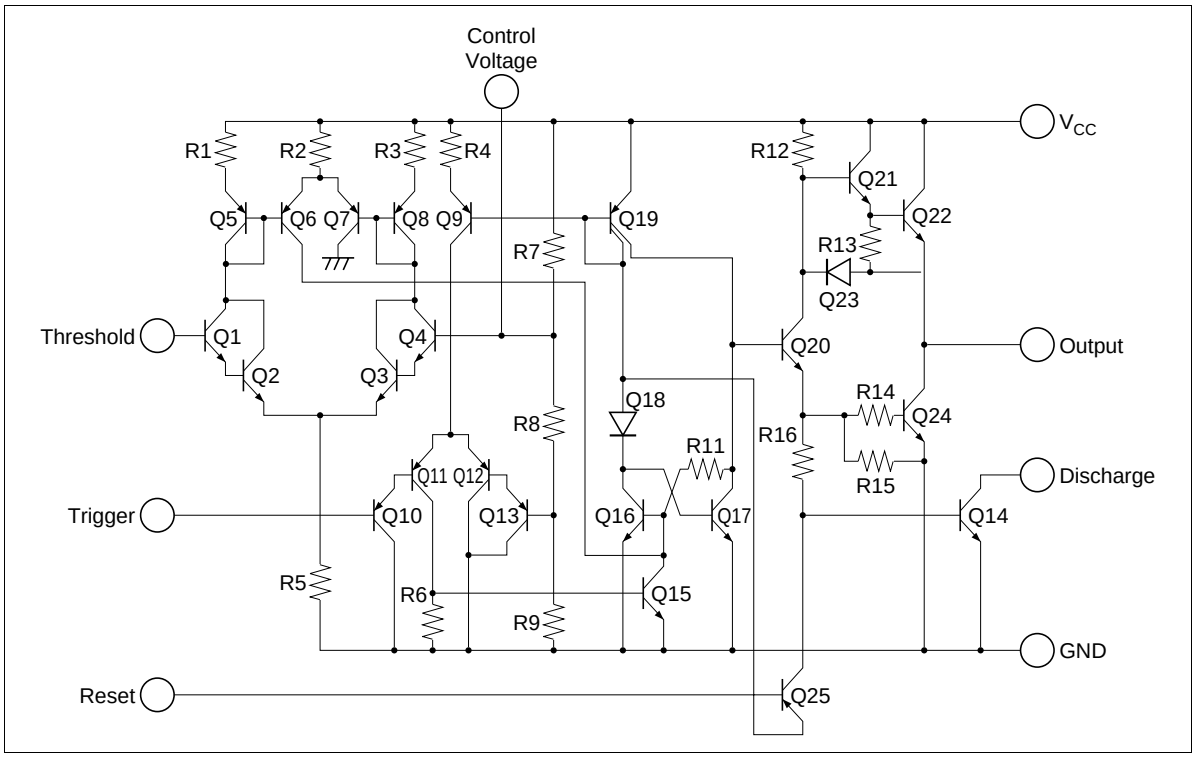


(Top View)

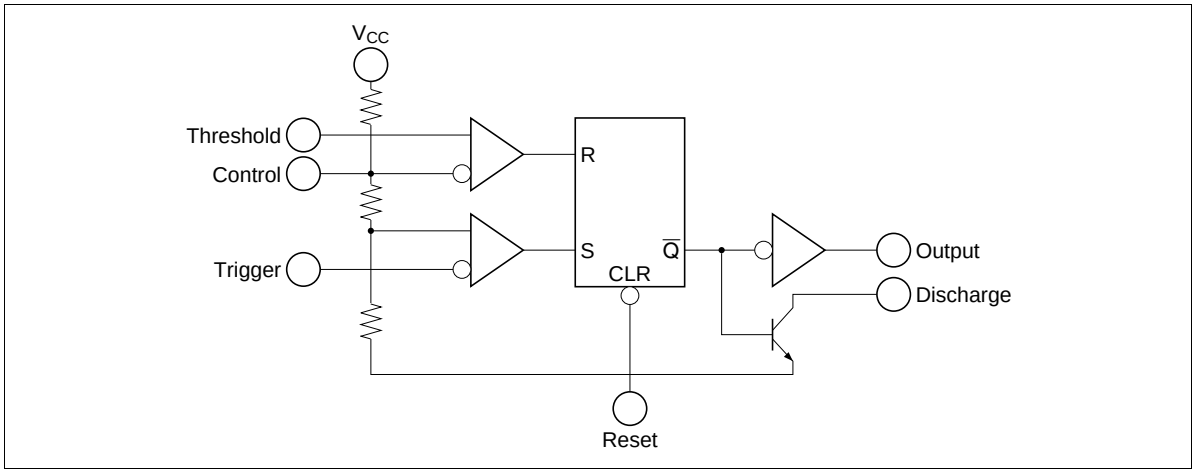
Pin Description

Pin No.	Function
1	Ground pin
2	Trigger pin
3	Output pin
4	Reset pin
5	Control voltage pin
6	Threshold pin
7	Discharge pin
8	V_{CC} pin

Circuit Schematic



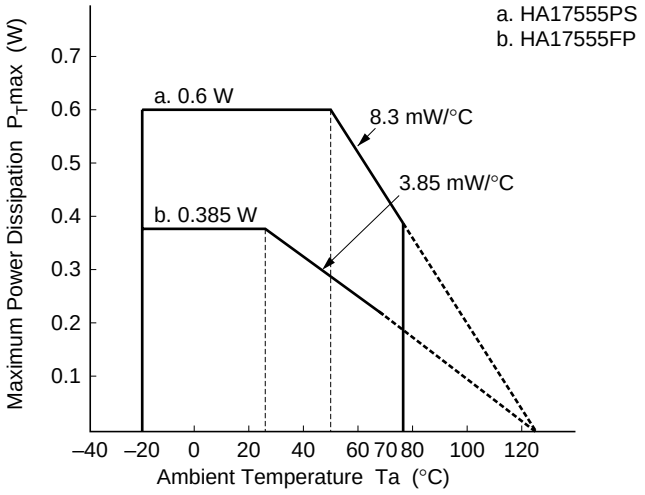
Block Diagram

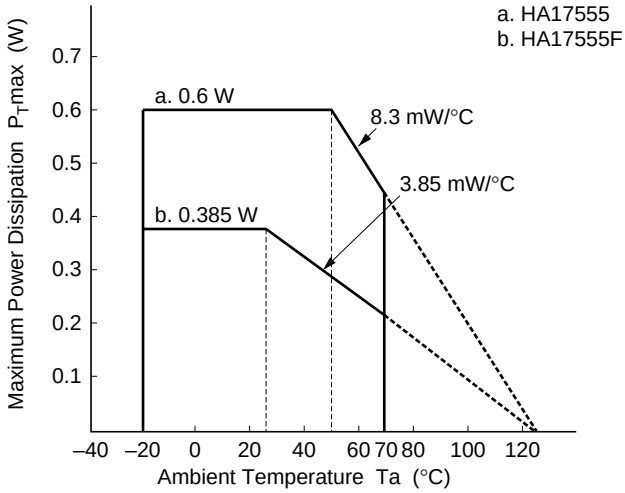


Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	HA17555PS/FP	HA17555/F	Unit
Supply voltage	V_{CC}	18	18	V
Discharge current	I_T	200	200	mA
Output source current	Isource	200	200	mA
Output sink current	Isink	200	200	mA
Power dissipation*[1]	P_T	600/385	600/385	mW
Operating temperature	Topr	–20 to +75	–20 to +70	°C
Storage temperature	Tstg	–55 to +125	–55 to +125	°C

Note: 1. For the HA17555/PS,
This value applies up to Ta = 50°C; at temperatures above this, 8.3mW/°C derating should be applied.
For the HA17555F/FP,
This value applies up to Ta = 25°C; at temperatures above this, 3.85mW/°C derating should be applied.
See notes on SOP Package Usage in Reliability section.


a. HA17555PS
b. HA17555FP
Maximum Power Dissipation $P_T$max (W)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
a. 0.6 W
8.3 mW/°C
3.85 mW/°C
b. 0.385 W
–40 –20 0 20 40 60 70 80 100 120
Ambient Temperature Ta (°C)


a. HA17555
b. HA17555F
Maximum Power Dissipation $P_T$max (W)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
a. 0.6 W
8.3 mW/°C
3.85 mW/°C
b. 0.385 W
–40 –20 0 20 40 60 70 80 100 120
Ambient Temperature Ta (°C)

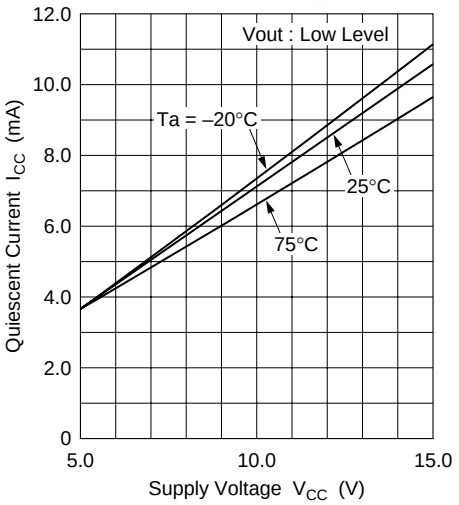
Electrical Characteristics (V_{CC} = 5 to 15 V, Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Supply voltage*[1]	V_{CC}	4.5	—	16.0	V	
Supply current	I_{CC}	—	3.0	6.0	mA	V_{CC} = 5 V, R_L = ∞
	I_{CC}	—	10	15	mA	V_{CC} = 15 V, R_L = ∞
Timing error*[2] (Inherent error)	Et	—	1.0	—	%	
Timing error*[2] (Ta dependency)	Et	—	50	—	ppm/°C	Ta = –20 to + 75°C
Timing error*[2] (Voltage dependency)	Et	—	0.01	—	%/V	V_{CC} = 5 to 15 V
Threshold voltage	Vth	—	2/3	—	V × V_{CC}	
Trigger voltage	V_T	—	5.0	—	V	V_{CC} = 15 V
	V_T	—	1.67	—	V	V_{CC} = 5 V
Trigger current	I_T	—	0.5	—	µA	
Reset voltage	V_R	0.2	0.5	1.0	V	
Reset current	I_R	—	0.1	—	mA	
Threshold current	Ith*[3]	—	0.1	0.25	µA	
Control voltage	V_{CL}	9	10	11	V	V_{CC} = 15 V
	V_{CL}	2.6	3.33	4.0	V	V_{CC} = 5 V
Output voltage	V_{OL}	—	0.1	0.25	V	V_{CC} = 15 V, Isink = 10 mA
		—	0.4	0.75	V	V_{CC} = 15 V, Isink = 50 mA
		—	2.0	2.5	V	V_{CC} = 15 V, Isink = 100 mA
		—	2.5	—	V	V_{CC} = 15 V, Isink = 200 mA
		—	0.25	0.35	V	V_{CC} = 5 V, Isink = 5 mA
Output voltage	V_{OH}	—	12.5	—	V	V_{CC} = 15 V, Isource = 200 mA
		12.75	13.3	—	V	V_{CC} = 15 V, Isource = 100 mA
		2.75	3.3	—	V	V_{CC} = 5 V, Isource = 100 mA
Output rise time	t_r	—	100	—	ns	No loading
Output fall time	t_f	—	100	—	ns	No loading
Oscillation pulse width*[4]	tw	10.0	—	—	ns	

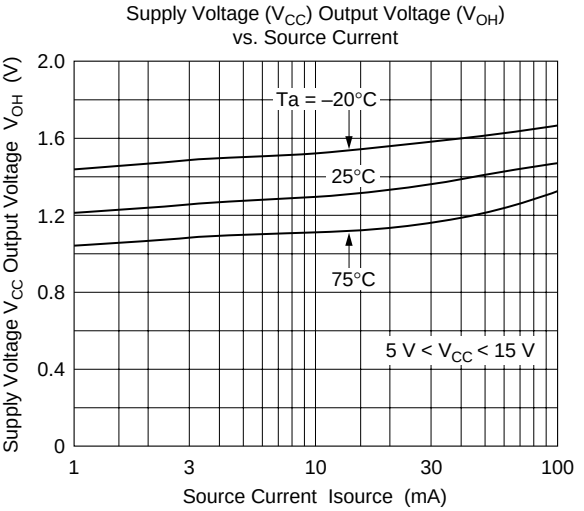
Notes: 1. When output is low (When it is high, I_{CC} is lower by 1 mA typically.)
2. R_A, R_B = 1 k to 100 kΩ, C = 0.1 µF, V_{CC} = 5 V or 15 V.
3. (R_A + R_B) at V_{CC} = 15 V is determined by the value of Ith. It is 20 MΩ Max.
4. Output pulse width at mono multi circuit. Output high level pulse width at astable circuit.

Characteristic Curves

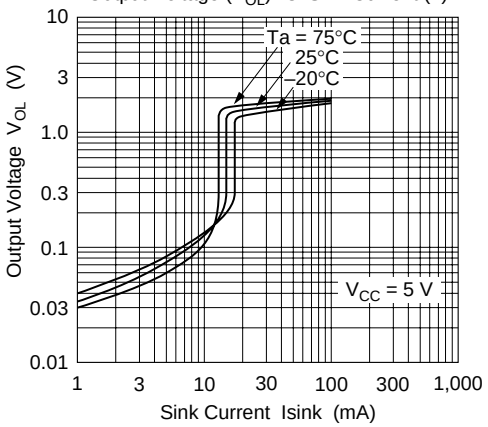
Quiescent Current vs. Supply Voltage



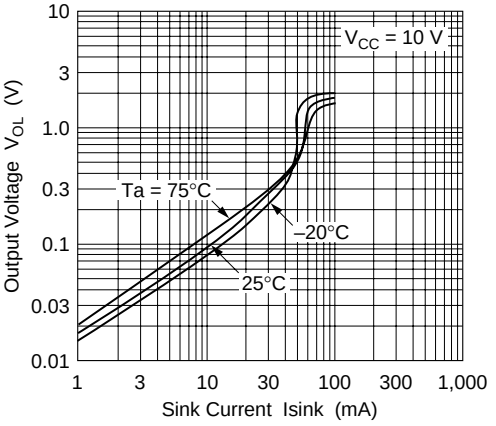
Supply Voltage (V_{CC}) Output Voltage (V_{OH}) vs. Source Current



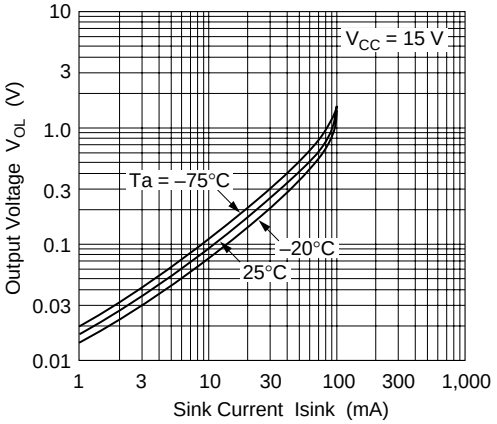
Output Voltage (V_{OL}) vs. Sink Current (1)



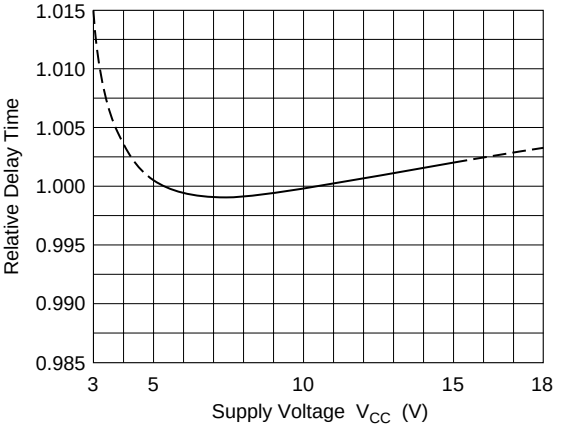
Output Voltage (V_{OL}) vs. Sink Current (2)



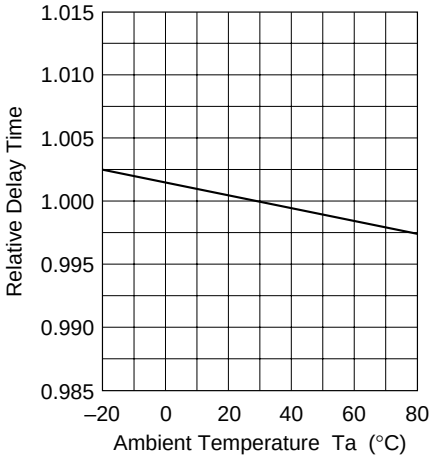
Output Voltage (V_{OL}) vs. Sink Current (3)



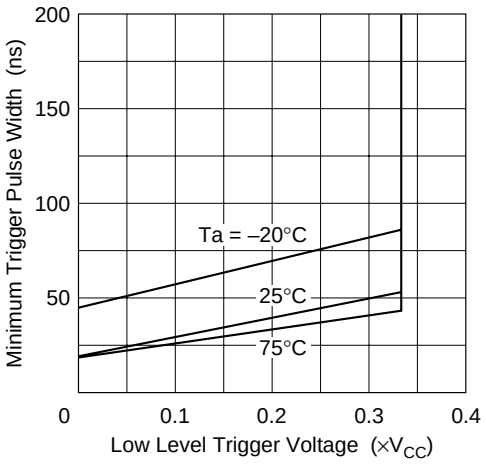
Relative Delay Time vs. Supply Voltage



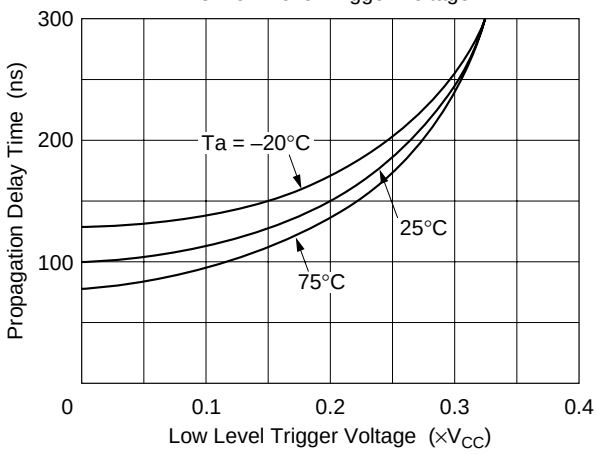
Relative Delay Time
vs. Ambient Temperature



Minimum Trigger Pulse Width
vs. Low Level Trigger Voltage

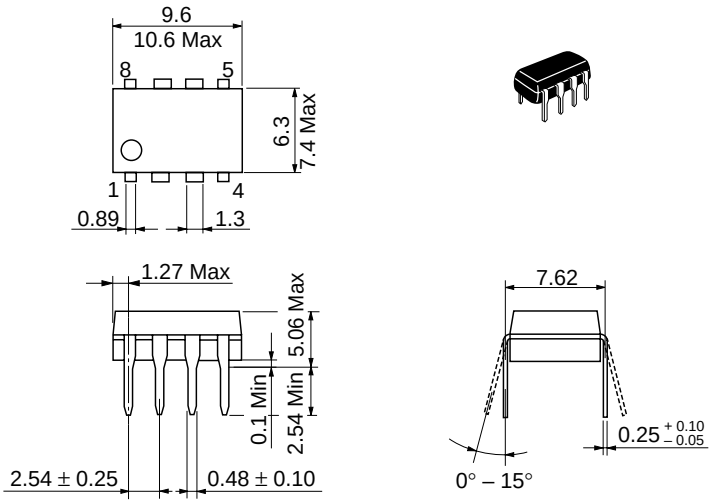


Propagation Delay Time
vs. Low Level Trigger Voltage



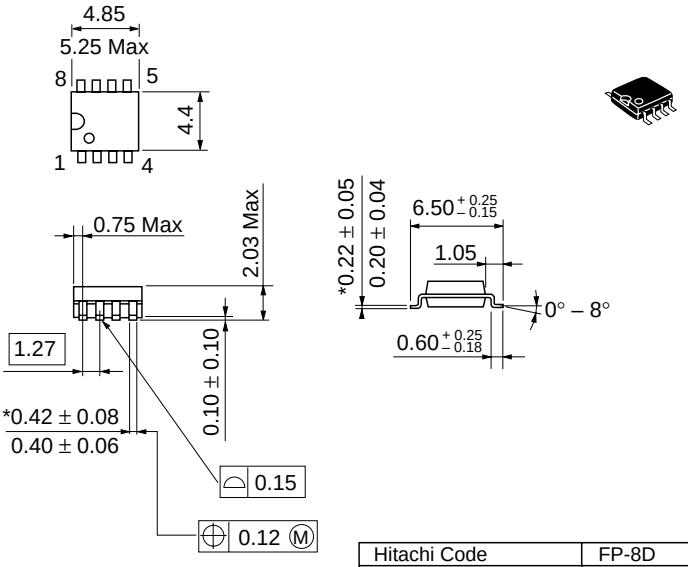
Package Dimensions

Unit: mm



Hitachi Code	DP-8
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.54 g

Unit: mm



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

*Dimension including the plating thickness
Base material dimension

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