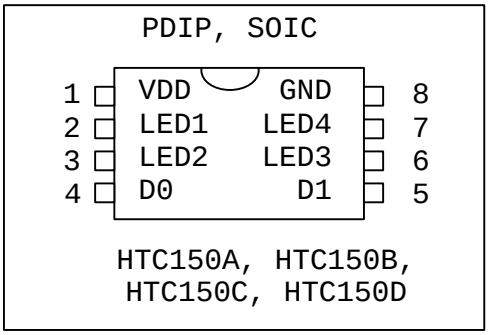
LED FLASHERS

1.0 General description.

This circuit is designed to work as led flasher. LED's sequentially turn on and off according to part used. D0 and D1 inputs are used to control flashing frequency. There are four different frequencies selectable. See D[0:1] versus frequency table. HTC150 Can control up to 32 LED's (eight LED's per output @ 3mA each).



Features

- Minimal external components.
- Easy selection of alternating frequency.
- Predictability and design ease.

Pin out description.

Abbreviations used: O - output, I - input, P - power.

Pin number	Name	I / O	Description	Notes
1	VDD	P	Power	+2.5V to +5.5V
2	LED 1	O	Output for LED1	Can source up to 25mA
3	LED 2	O	Output for LED2	Can source up to 25mA
4	D0	I	Frequency selector D0	Tie it to VDD or GND(see table below)
5	D1	I	Frequency selector D1	Tie it to VDD or GND(see table below)
6	LED 3	O	Output for LED3	Can source up to 25mA
7	LED 4	O	Output for LED4	Can source up to 25mA
8	GND	P	Ground	Connects to digital ground.

Frequency selection per D[0:1]

Abbreviations used: 0 – connection to GND, 1 – connection to VDD.

D1	D0	Switching frequency
0	0	2Hz
0	1	4Hz
1	0	8Hz
1	1	16Hz

Please note that those values are for reference only. Actual frequency can vary up to 10 percent depending upon VDD voltage and operational temperature.

2.0 Functional description.

HTC150 has several variations determined by part number. Common to all models of HTC150 is alternating frequency selection and pin-out. Please refer to “Typical connection diagram” used as reference. Frequency is changed when state of D[0:1] input pins change. Refer to “Frequency selection per D[0:1]” table for frequency selection. Note that Dip Switch could be omitted by hard wiring D[0:1] inputs to GND or VDD. This section describes operation of each HTC150 model separately. Each part uses different alternating algorithm.

HTC150A
States:
1. LED1 is turned on and all others are off.
2. LED2 is turned on and all others are off.
3. LED3 is turned on and all others are off.
4. LED4 is turned on and all others are off.

State is changed at frequency selected by D[0:1].

HTC150B (Ping-Pong)
States:
1. LED1 is turned on and all others are off.
2. LED2 is turned on and all others are off.
3. LED3 is turned on and all others are off.
4. LED4 is turned on and all others are off.
5. LED3 is turned on and all others are off.
6. LED2 is turned on and all others are off.

State is changed at frequency selected by D[0:1].

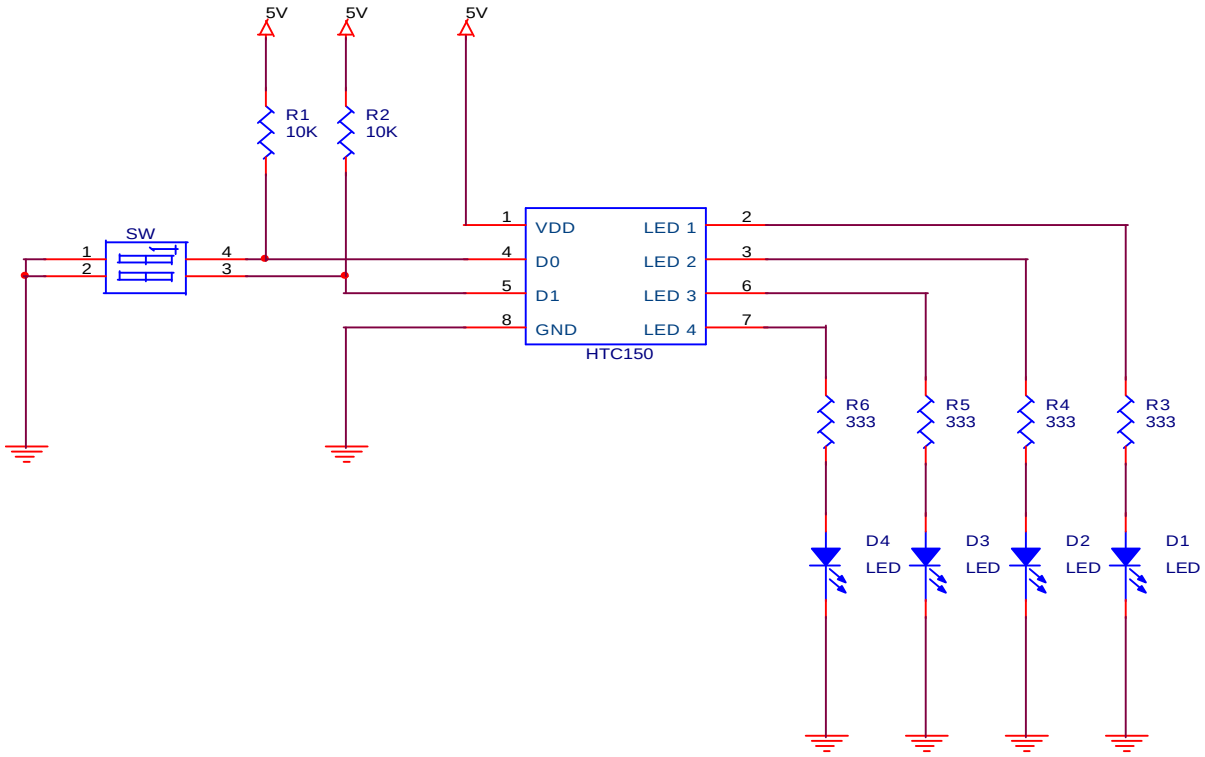
HTC150C (Accumulate)
States:
1. LED1 is turned on and all others are off.
2. LED2 is turned on and all others are off.
3. LED3 is turned on and all others are off.
4. LED4 is turned on and all others are off.
5. LED1 and LED4 are turned on and all others are off.
6. LED2 and LED4 are turned on and all others are off.
7. LED3 and LED4 are turned on and all others are off.
8. LED1 and LED4 and LED3 are turned on and all others are off.
9. LED2 and LED4 and LED3 are turned on and all others are off.
10. All LED’s are turned on.
11. All LED’s are turned off.

State is changed at frequency selected by D[0:1].

HTC150D (Binary count)
States of LED’s is similar to four bit binary counter.
State is changed at frequency selected by D[0:1].

The circuit will change the flashing frequency as soon as the DO or D1 input pin state is changed. From that time next LED's start flashing at new frequency. The first LED starts over with the new frequency and it continues until the D0 or D1 state is changed again.

3.0 Typical connection diagram.

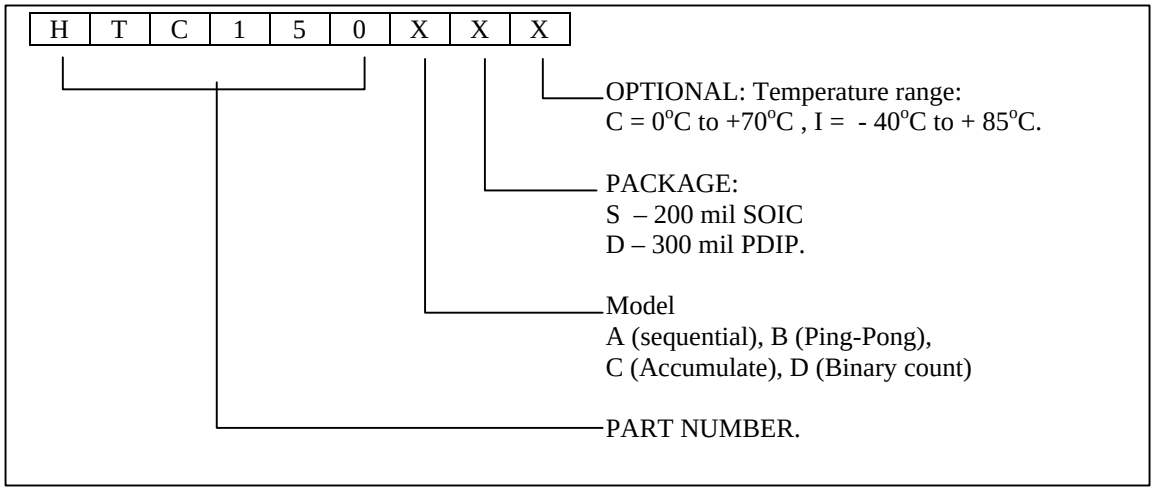


4.0 Electrical characteristics.

Operational Voltage.	+2.5 to +5.5V
Current consumption with no load attached	3 mA[1]
LEDx output low voltage (5mA load)	0.4V[1]
LEDx output low voltage (25mA load)	0.75V[1]
LEDx output high voltage (5mA source)	VDD-0.7V[1]
LEDx output source current max	25mA[1]
LEDx output sink current max	25mA[1]

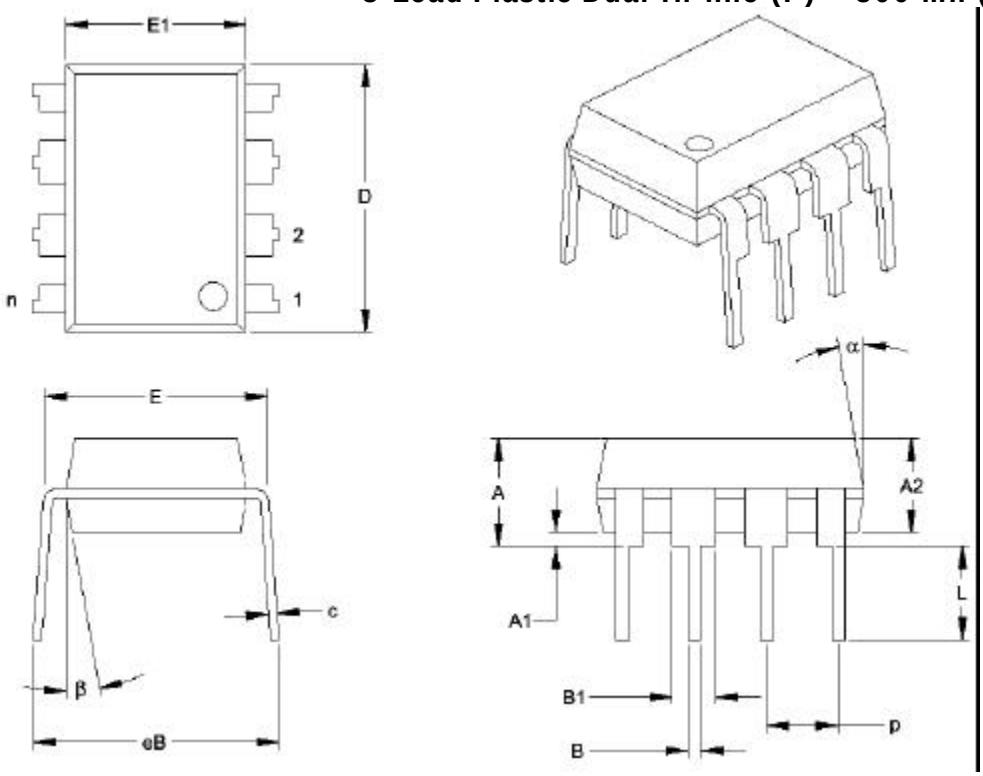
NOTES:
1. Those values are characterized but not tested.

5.0 Ordering information.



6.0 Mechanical information.

8-Lead Plastic Dual In-line (P) – 300 mil (PDIP)



Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	P		.100			2.54	
Top of Seating Plane	A	.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2	.115	.130	.145	2.92	3.30	3.68
Base of Seating Plane	A1	.015			0.38		
Shoulder to Shoulder Width	E	.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1	.240	.250	260	6.10	6.35	6.60
Overall Length	D	.360	.373	.385	9.14	9.46	9.78
Tip to Seating Plane	L	.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c	.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1	.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B	.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing	eB	.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α	5	10	15	5	10	15
Mold Draft Angle Bottom	β	5	10	15	5	10	15

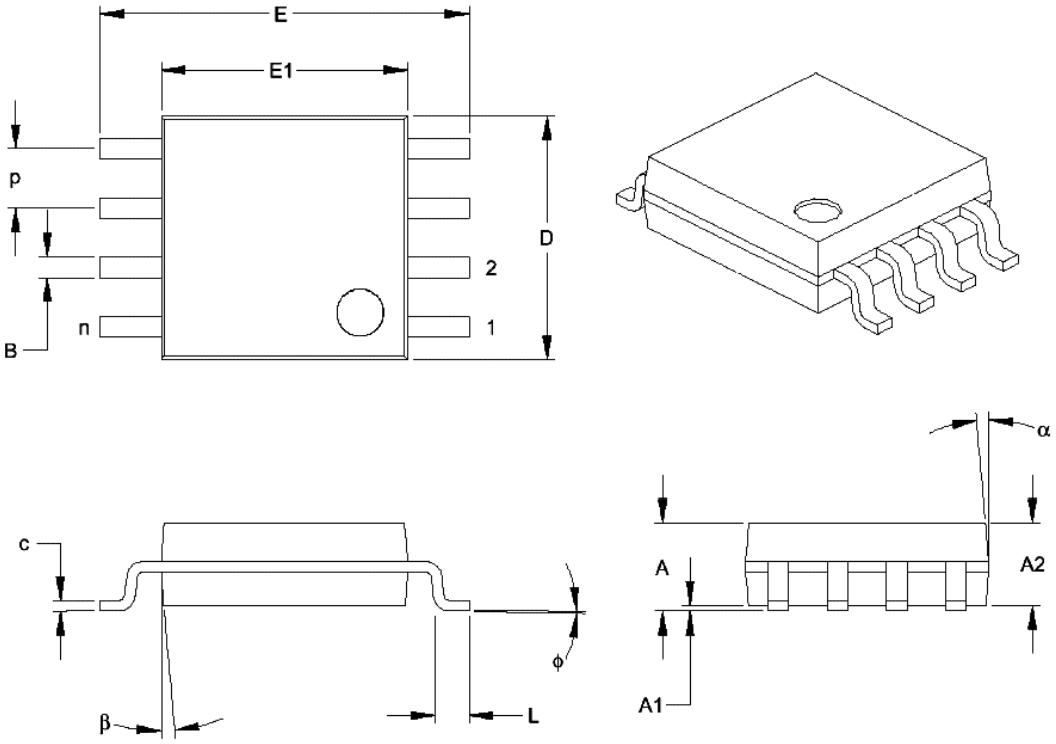
*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shell not exceed .010” (0.254mm)per side.

JEDEC Equivalent:MS-001

8-Lead Plastic Small Outline (SM) – Medium, 208 mil (SOIC)



Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	P		.050			1.27	
Overall Height	A	.070	.075	.080	1.78	1.97	2.03
Molded Package Thickness	A2	.069	.074	.078	1.75	1.88	1.98
Standoff	A1	.002	.005	.010	0.05	0.13	0.25
Overall Width	E	.300	.313	.325	7.62	7.95	8.26
Molded Package Width	E1	.201	.208	.212	5.11	5.28	5.38
Overall Length	D	.202	.205	.210	5.13	5.21	5.33
Foot Length	L	.020	.025	.030	0.51	0.64	0.76
Foot Angle	φ	.0	.4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.014	.017	.020	0.36	0.43	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

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