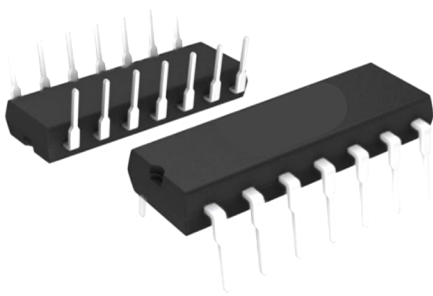
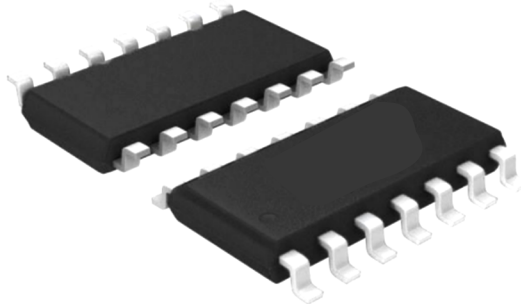


Descriptions

XBLW NE556 dual monolithic timing circuit is a highly stable controller capable of producing accurate time delays or oscillation. In the time delay mode of operation, the time is precisely controlled by one external resistor and capacitor. For a stable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled with two external resistors and one capacitor. The circuit may be triggered and reset on falling waveforms, and the output structure can source or sink up to 200mA.



DIP-14



SOP-14

Feature

- Low Turn Off Time
- Maximum Operating Frequency Greater Than 500kHz
- Timing From Microseconds To Hours
- Operates In Both a Stable And Monostable Modes
- High Output Current Can Source Or Sink 200mA
- Adjustable Duty Cycle
- TTL Compatible
- Temperature Stability Of 0.005% /°c

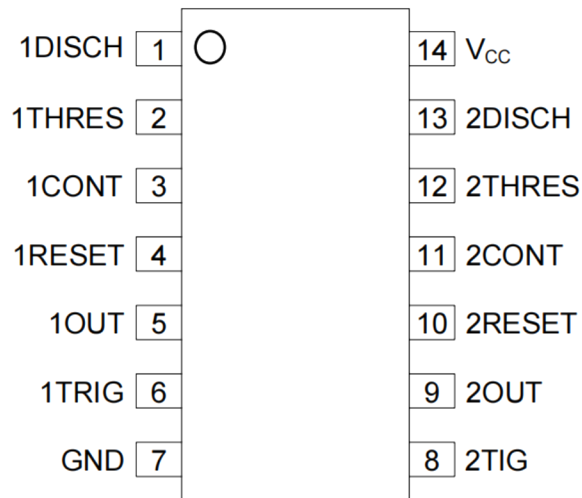
Applications

- Pulse Generation
- Sequential Timing
- Time Delay Generation
- Pulse Width Modulation

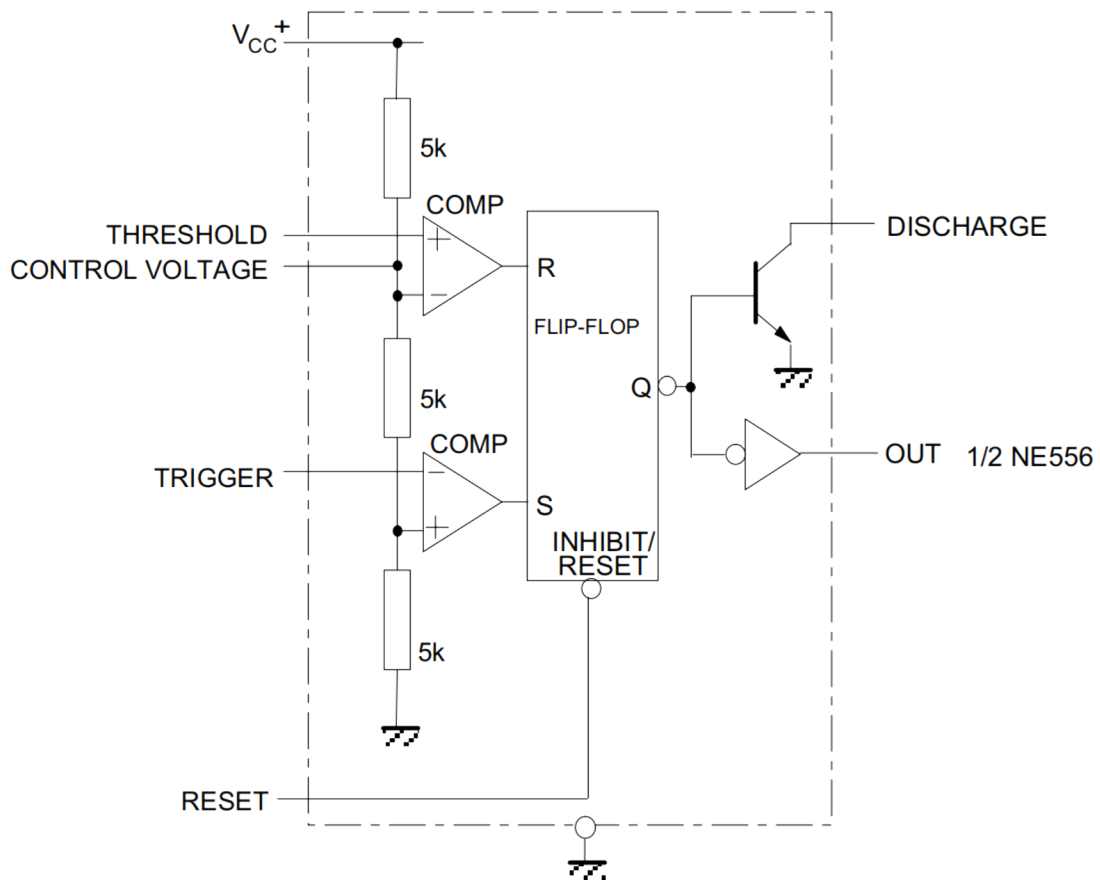
Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW NE556N	DIP-14	NE556N	Tube	1000Pcs/Box
XBLW NE556DTR	SOP-14	NE556	Tape	2500Pcs/Reel

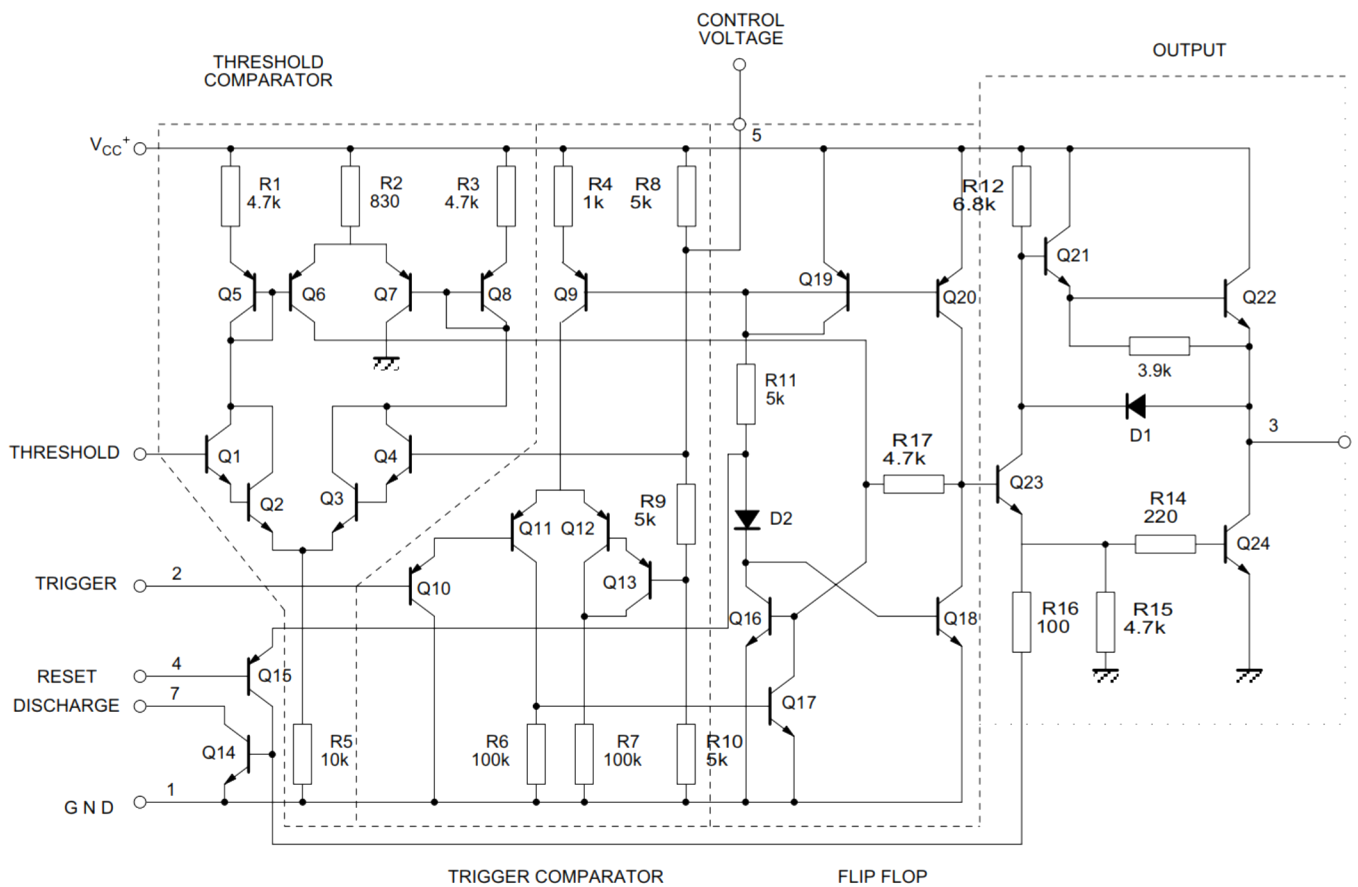
Pins Configurations



Block Diagram



Schematic Diagram



Extreme Ratings

Symbol	Parameter	Value	Unit
V _{cc}	Supply Voltage	18	V
T _{oper}	Operating Temperature	0 ~ 70	°C
T _j	Junction Temperature	150	°C
T _{stg}	Storage Temperature Range	-65 ~ 150	°C

Recommended Operating Conditions(T_a=25°C)

Symbol	Parameter	Value	Unit
V _{cc}	Supply Voltage	4.5-18	V
V _{th} , V _{trig} , V _{CTRL} , V _{reset}	Maximum Input Voltage	V _{cc}	V

Electrical Characteristics

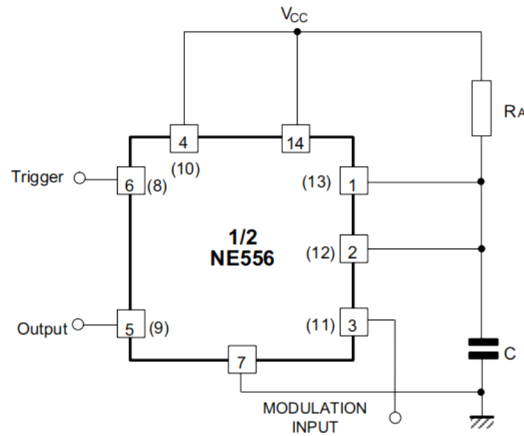
TA=25°C, V_{CC}=+5V to +15V, unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _{CC}	Supply Current (R _L ∞)(note ¹)(2 timers)	Low Stage, V _{CC} =+5V		6	10	mA
		V _{CC} =+15V		20	24	
		High State, V _{CC} =+5V		4		
	Timing Error (monostable) (R _A =2k to 100kΩ, C=0.1cF)	Initial Accuracy(note ²)		0.5	2	%
		Drift with Temperature		30	100	ppm/°C
		Drift with Supply Voltage		0.05	0.2	%/V
	Timing Error (astable)(R _A ,R _B =1kΩ to 100kΩ, C=0.1μF, V _{CC} =+15V)	Initial Accuracy -see (note 2)		1.5		%
		Drift with Temperature		90		ppm/°C
		Drift with Supply Voltage		0.15		%/V
V _{CL}	Control Voltage Level	V _{CC} =+15V	9.6	10	10.4	V
		V _{CC} =+5V	2.9	3.33	3.8	
V _{TH}	Threshold Voltage	V _{CC} =+15V	9.4	10	10.6	V
		V _{CC} =+5V	2.7	3.33	4	
I _{TH}	Threshold Current (note 3)			0.1	0.25	μA
V _{TRIG}	Trigger Voltage	V _{CC} =+15V	4.8	5	5.2	V
		V _{CC} =+5V	1.45	1.67	1.9	
I _{TRIG}	Trigger Current (V _{trig} =0V)			0.5	0.9	μA
I _{DIS(OFF)}	Discharge Pin Leakage Current (output high)(V _{dis} =10V)			20	100	nA
V _{DIS(SAT)}	Discharge pin Saturation Voltage(output low)-(note 5)	V _{CC} =+15V, I _{dis} =15mA		180	480	mV
		V _{CC} =+5V, I _{dis} =4.5mA		80	200	
T _R	Output rise Time			100	200	ns
T _F	Output Fall Time			100	200	
T _{OFF}	Turn off Time (note 6)(V _{reset} =V _{CC})			0.5		μs

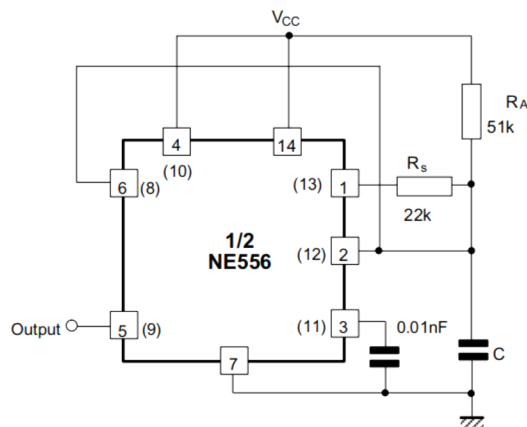
Note:

1. Supply current when output is high is typically 1mA less.
2. Tested at V_{CC}=+5V and V_{CC}=+15V
3. This will determine the maximum value of R_A+R_B for +15V operation the max total is R=20MΩ and for 5V operation the max total R=3.5MΩ
4. Specified with trigger input high
5. No protection against excessive pin 7 current is necessary, providing the package dissipation rating will not be exceeded
6. Time measured from a positive going input pulse from 0 to 0.8xV_{CC} into the threshold to the drop from high to low of the output trigger is tied to threshold

Typical application



PULSE WIDTH MODULATOR

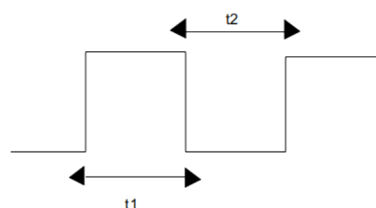


50% DUTY CYCLE OSCILLATOR

$$t_1 = 0.693 R_A \cdot C$$

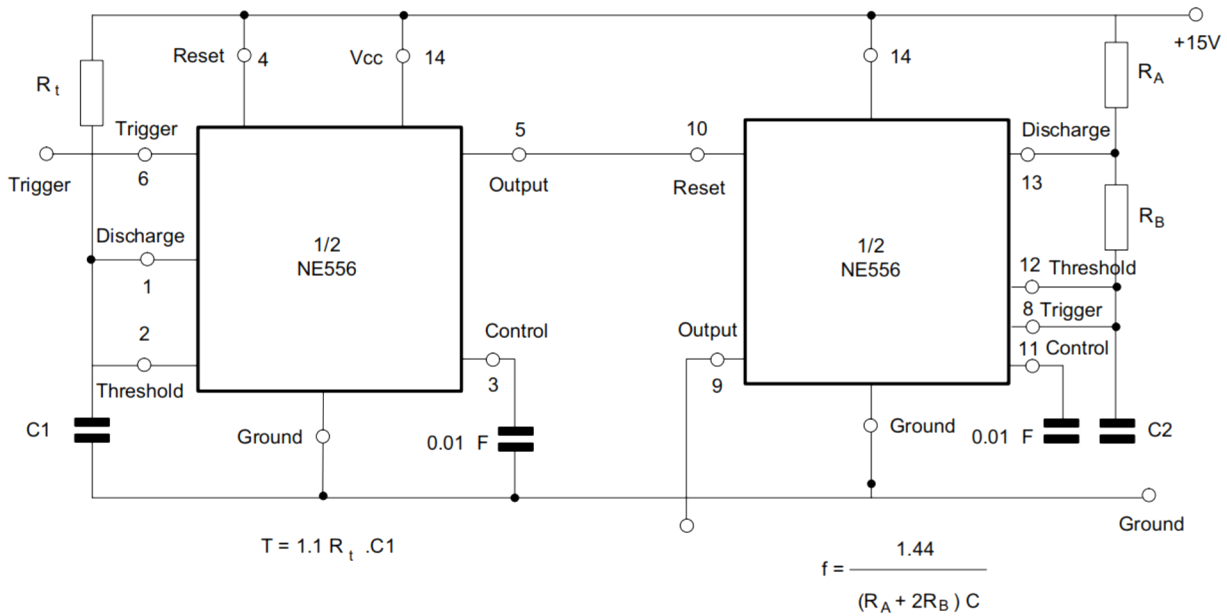
$$t_2 = \left[\frac{R_A R_B}{R_A + R_B} \right] C \ln \left[\frac{R_B - 2R_A}{2R_B - R_A} \right]$$

$$f = \frac{t_1}{t_1 + t_2} \quad R_B < \frac{1}{2} R_A \quad t_i$$

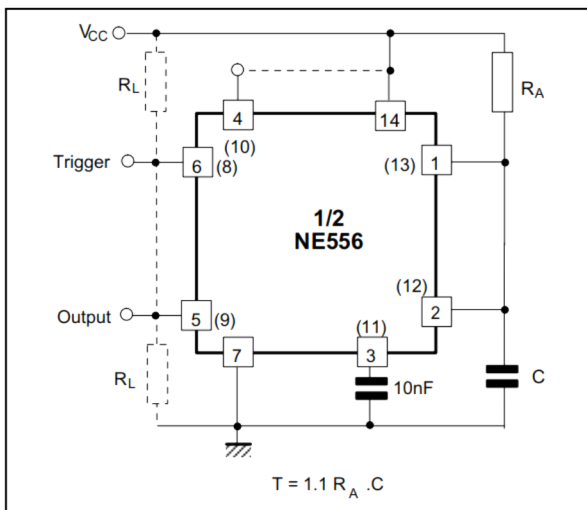


Tone Burst Generator

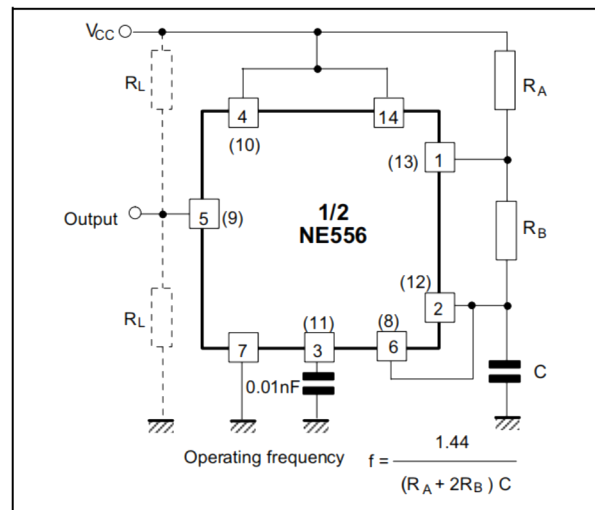
For a tone burst generator the first timer is used as a monostable and determines the tone duration when triggered by a positive pulse at pin 6. The second timer is enabled by the high output or the monostable. It is connected as an astable and determines the frequency of the tone.



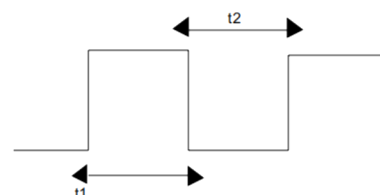
MONOSTABLE OPERATION



ASTABLE OPERATION



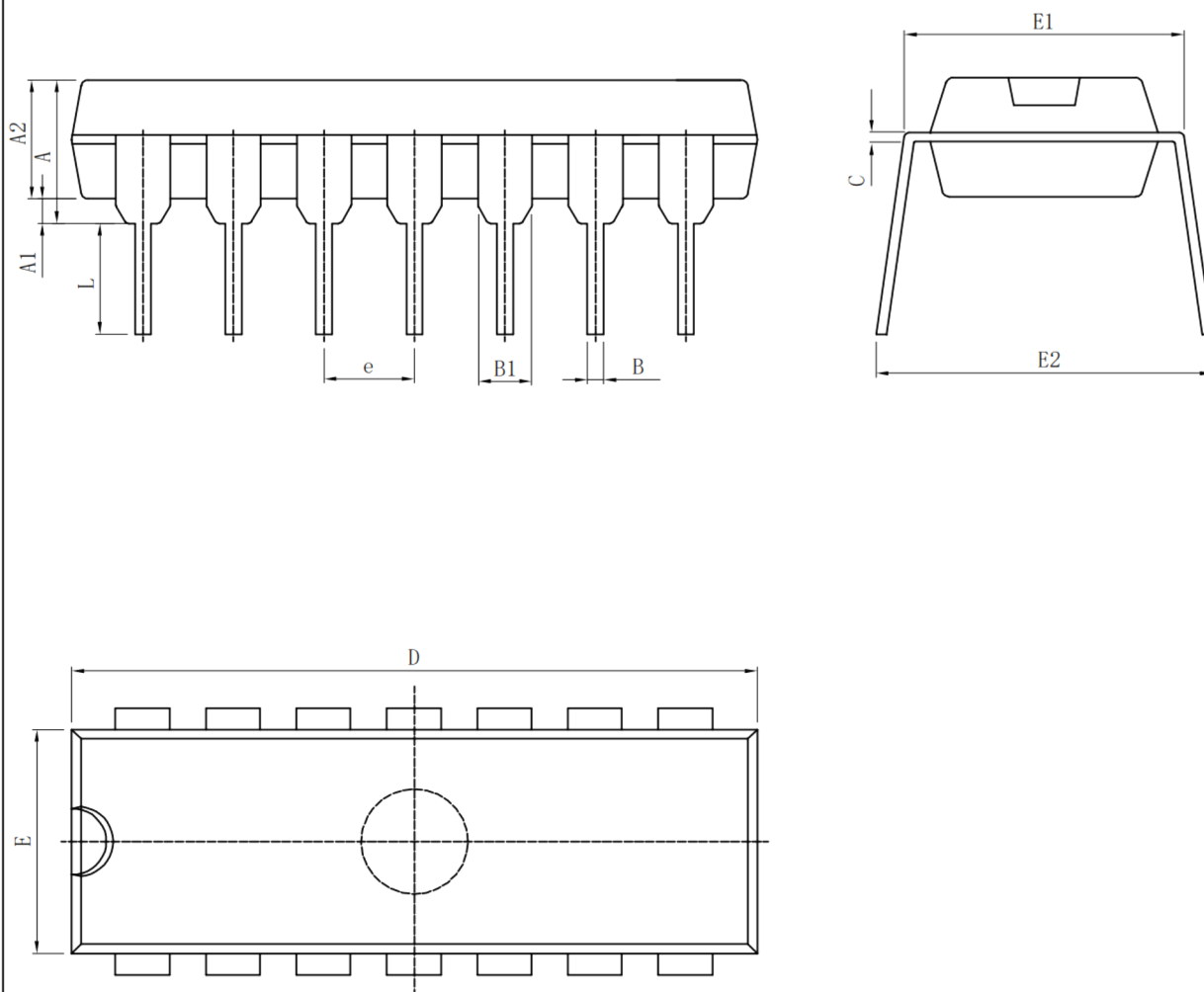
$t_1 = 0.693 (R_A + R_B) C$ Output High
 $t_2 = 0.693 R_B C$ Output Low



Package Information

· DIP-14

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524 (BSC)		B1	0.060 (BSC)	
C	0.204	0.360	C	0.008	0.014
D	18.800	19.200	D	0.740	0.756
E	6.200	6.600	E	0.244	0.260
E1	7.320	7.920	E1	0.288	0.312
e	2.540 (BSC)		e	0.100 (BSC)	
L	3.000	3.600	L	0.118	0.142
E2	8.400	9.000	E2	0.331	0.354



• SOP-14

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A	1.350	1.750	A	0.050	0.068
A1	0.100	0.250	A1	0.004	0.009
A2	1.100	1.650	A2	0.040	0.060
B	0.330	0.510	B	0.010	0.020
C	0.190	0.250	C	0.007	0.009
D	8.550	8.750	D	0.330	0.340
E	3.800	4.000	E	0.150	0.150
e	1.27		e	0.05	
H	5.800	6.200	H	0.220	0.240
h	0.250	0.500	h	0.009	0.020
L	0.400	1.270	L	0.015	0.050
k	8° (max)		k	8° (max)	

