Universal time base circuit

summary

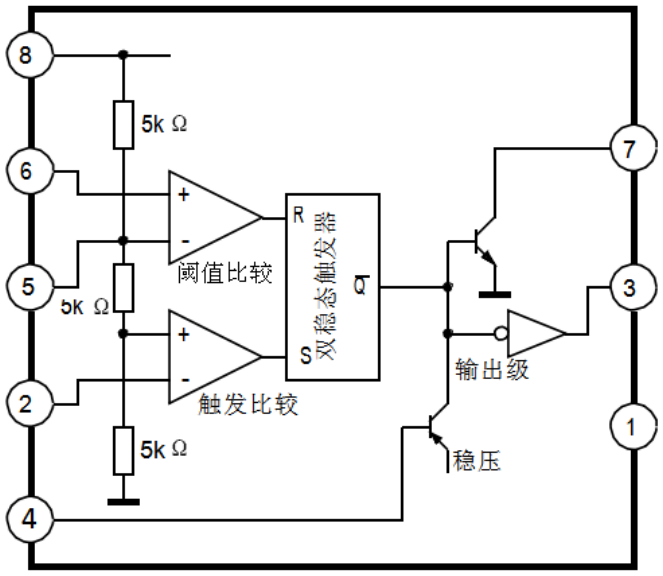
NE555 is a universal timing circuit, an analog integrated circuit that combines analog signals with logical functions to generate precise time delays and oscillations. This timing circuit can be applied in many areas such as electronic control, electronic detection, and electronic alarms. For example, it can form accurate timers, pulse generators, time delay generators, pulse width modulation, phase modulation, and sawtooth voltage generators. In peripheral devices of microcomputers, it can be used to form clock generators to produce the required clock pulses.

main features

- Static current is small, typical value 2.7mA.
- The chip's forbidden input end can cause the IC to drop power
- The static current is small when the power is off, typical value is 65uA.
- Can drive a variety of impedance speakers 8 Ω or more
- Output power exceeds 250mW when using 32 Ω load
- Distortion small 0.5% TYP.
- In the voice frequency band, the gain can be adjusted from 0dB to 46dB
- Few peripheral components
- Packaging form SOP8/DIP8

Function block diagram and pin description

1.1 Function block diagram



1.2 Pin description

Pin	Symbol	Function	Pin	Symbol	Function
1	GND	The earth	5	CONTRIG	Trigger control
2	RTIG	Detonate by contact	6	CONTH	Threshold control

3	OUT	Output	7	DIS	Discharge
4	R	Reset	8	V_{CC}	Source

electrical characteristics

2.1 Limiting parameters Unless otherwise specified, Tamb = 25

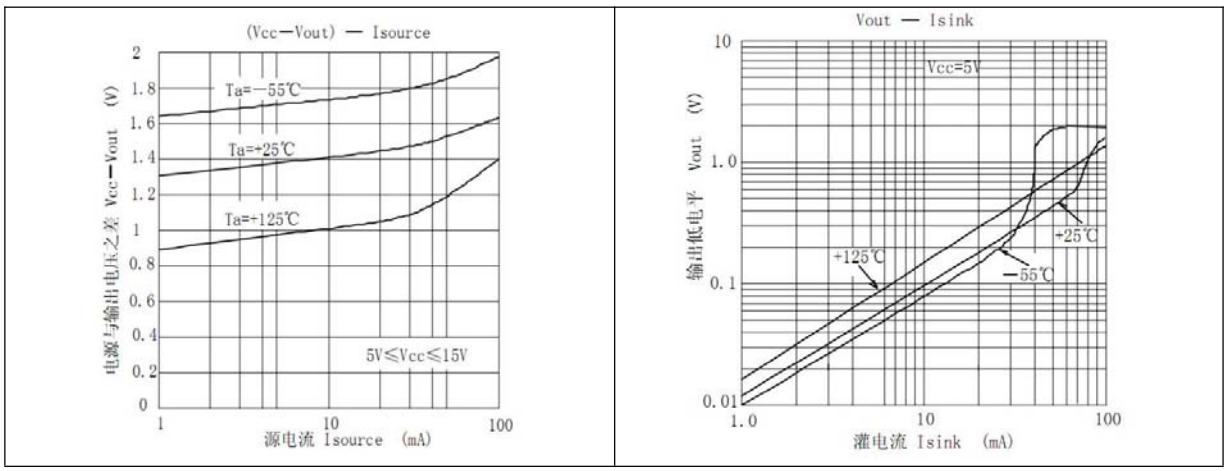
Parameter Name	Symbol	Rating	Unit
Supply voltage	VCC	18	V
Power dissipation (DIP)	PD	600	mW
Operating ambient temperature	Tamb	0 ~ 70	℃
Storage temperature	Tstg	-65 ~ 150	℃

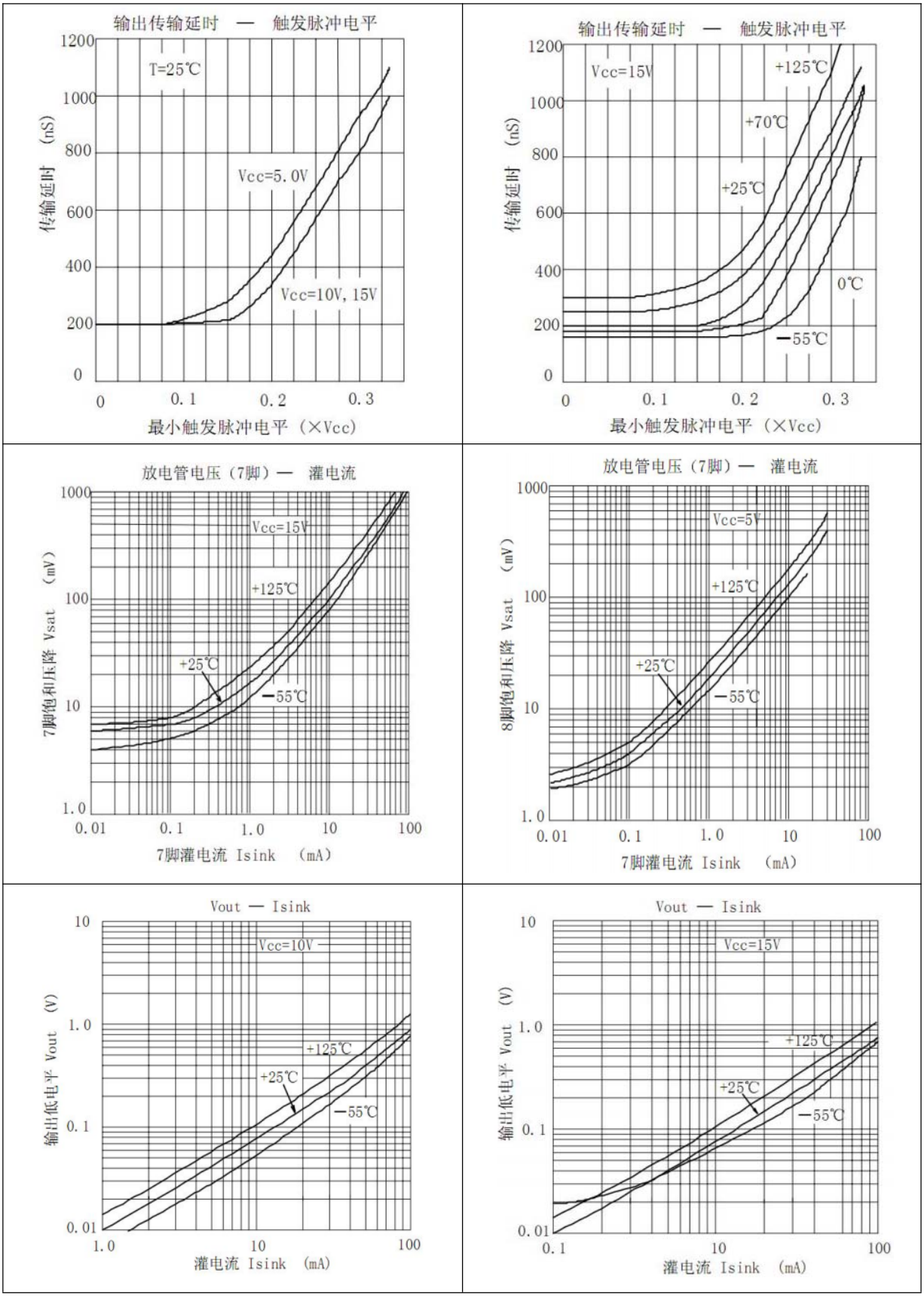
2. 2 Electrical characteristics Unless otherwise specified, Tamb = 25

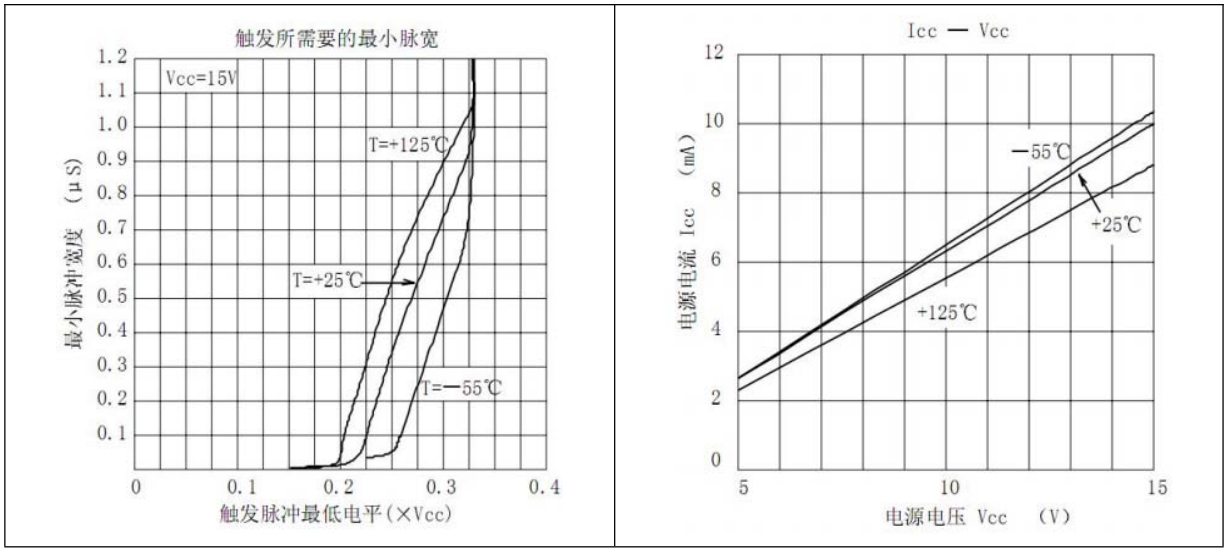
Parameter Name	Symbol	Test condition	Standard values			Unit
			Minimum	Typical case	Maximum	
Quiescent current		VCC=5V RL = ∞		3	6	mA
	I	VCC=15V RL= ∞		10	15	
Supply voltage	VCC		4.5		16	V
Threshold voltage	VTH			0.667		*Vcc
Threshold current	ITH			0.1	0.25	uA
Trigger voltage	VTR	VCC=15V		5		V
		VCC=5V		1.67		
Trigger current	ITR			0.5	2	uA
Reset voltage	VR		0.4	0.5	1	V
Reset current	IR			0.1	0.4	mA
Control voltage	VCON	VCC=15V	9	10	11	V
		VCC=5V	2.6	3.33	4	
7 Terminal leakage current	I7(IEAK)	Output high level		20	100	nA
7 Terminal saturation voltage drop	V7(SAT)	Output low level Vcc= 15V I7 = 15mA		180		mV
		Output low level Vcc= 4.5V I7 = 4.5mA		80	200	
Output high level electrical Press	VOH	VCC= 15V IS = 200mA		12.5		V
		VCC = 15V IS = 100mA	12.75	13.3		
		VCC = 5V IS = 100mA	2.75	3.3		
Output low level electrical Press	VOL	VCC=15V ISINK=10mA		0.1	0.25	V
		VCC=15V ISINK=50mA		0.4	0.75	
		VCC=15V ISINK=100mA		2	2.5	
		VCC=15V ISINK=200mA		2.5		

		VCC=5V ISINK=5mA		0.25	0.35	
Increase the output rise time	tr					
Reduce the time of output decline	tf			100		nS
Initial accuracy	Δ tE	Monostable state RA. RB=1~100k C= 0.1 uF VCC= 5V(15V)		1		%
It changes with temperature drift Conversion rate	Δ tT			50		ppm/℃
Change with voltage drift Conversion rate	Δ tV			0.1		%/V
Operating temperature range Internal accuracy	Δ tOPr			1.5		%
Initial accuracy	Δ tE1	Oscillatory regime RA. RB=1~100k C=0.1 uF Vcc= 5V(15V)		2.25		%
It changes with temperature drift Conversion rate	Δ tT1			150		ppm/℃
Change with voltage drift Conversion rate	Δ tV1			0.3		%/V
Operating temperature range Internal accuracy	Δ tOpr1			3		%

characteristic curve

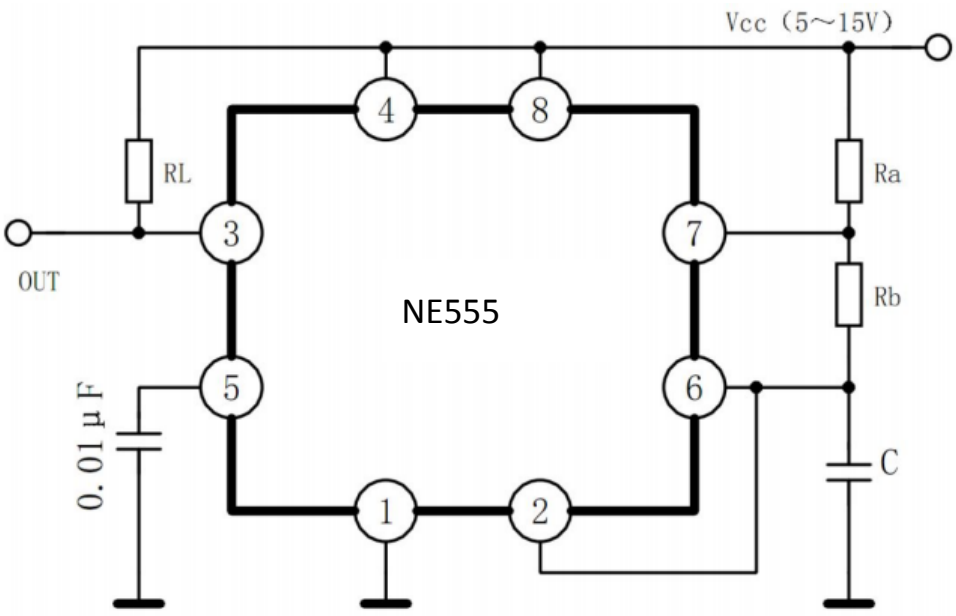



输出传输延时 — 触发脉冲电平
传输延时 (nS)
1200
1000
800
600
400
200
0
T=25℃
Vcc=5.0V
Vcc=10V, 15V
0
0.1
0.2
0.3
最小触发脉冲电平 (×Vcc)
输出传输延时 — 触发脉冲电平
传输延时 (nS)
Vcc=15V
+125℃
+70℃
+25℃
0℃
—55℃
最小触发脉冲电平 (×Vcc)
放电管电压（7脚）— 灌电流
7脚饱和压降 Vsat (mV)
1000
100
10
1.0
Vcc=15V
+125℃
+25℃
—55℃
0.01
0.1
1.0
10
100
7脚灌电流 Isink (mA)
放电管电压（7脚）— 灌电流
8脚饱和压降 Vsat (mV)
Vcc=5V
+125℃
+25℃
—55℃
7脚灌电流 Isink (mA)
Vout — Isink
输出低电平 Vout (V)
10
1.0
0.1
0.01
Vcc=10V
+125℃
+25℃
—55℃
灌电流 Isink (mA)
Vout — Isink
输出低电平 Vout (V)
Vcc=15V
+125℃
+25℃
—55℃
灌电流 Isink (mA)

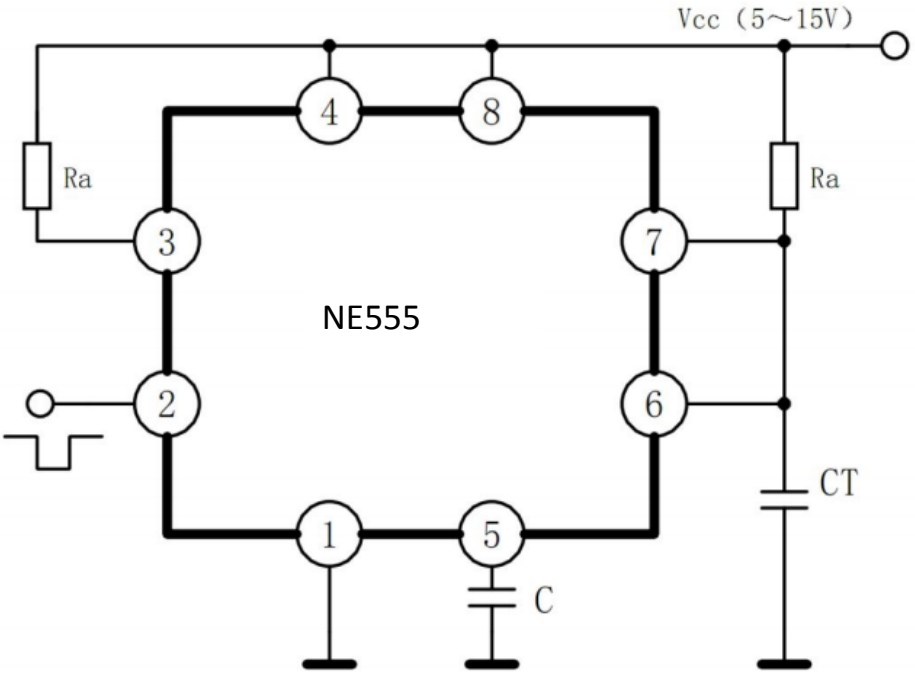


Application lines and application instructions

3.1 Oscillator application circuit

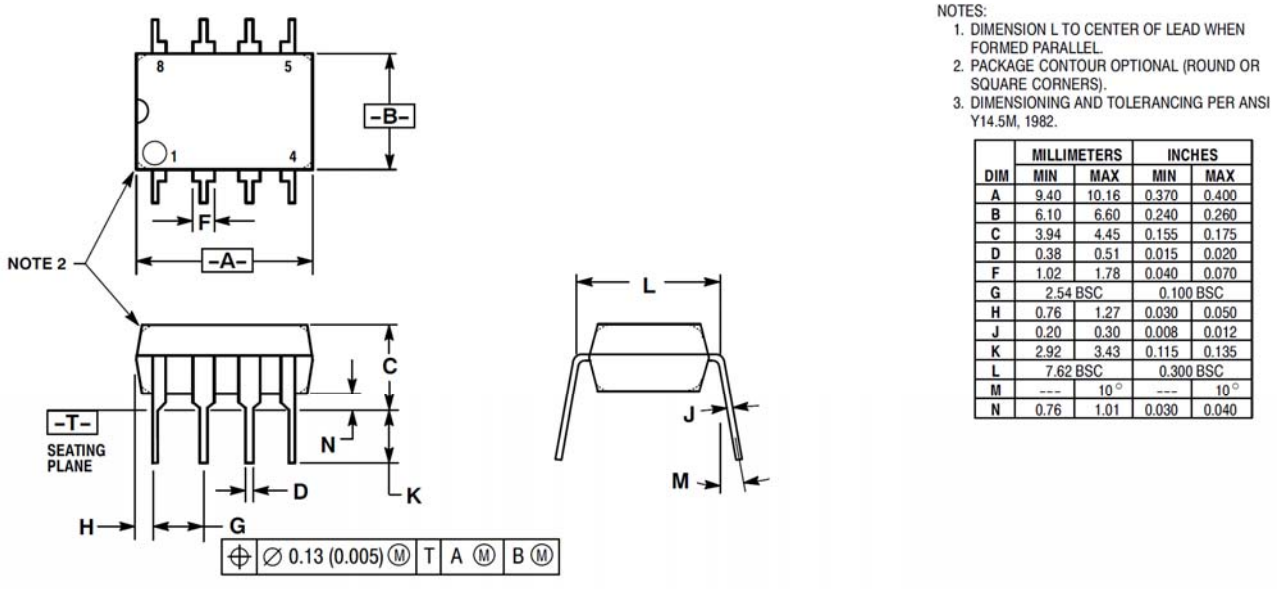


3. 2 Single-stable state application circuit



outline dimension

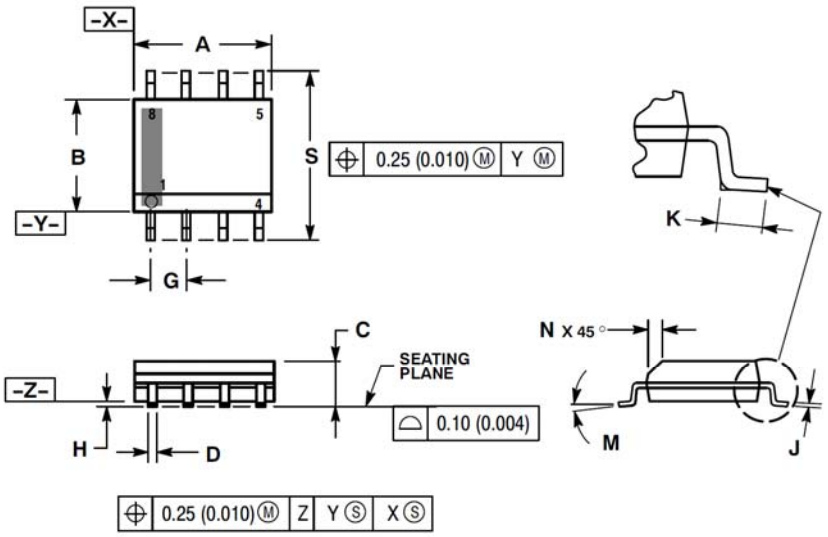
Package information



NOTES:
1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	---	10°	---	10°
N	0.76	1.01	0.030	0.040

DIP8



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOP8