1.25W Fully Differential Audio Power Amplifier with External Feedback Resistors

CE4890

■ INTRODUCTION

The CE4890 is a fully differential audio power amplifier designed for portable communication device applications. It is capable of delivering 1.25 watt of continuous average power to an 8Ω BTL load with less than 1% distortion (THD+N) from a 5V battery voltage. It operates from 2.2 to 5.5V. Features like 86dB PSRR at 217Hz, improved RF-rectification immunity, the space-saving 8-pin MSOP8 ， SOP8 and DIP8 package, the advanced pop & click circuitry, a minimal count of external components and low-power shutdown mode make CE4890 ideal for wireless handsets.

The CE4890 is unity-gain stable, and the gain can be configured by external input resistors and external feedback resistors.

■ FEATURES

- Fully differential amplifier
- Improved PSRR at 217Hz(V_{DD}>3.0V) 86dB (Typ.)
- Power output at 5.0V & 1% THD 1.25W (Typ.)
- Power output at 3.6V & 1% THD 0.5W (Typ.)
- Ultra low shutdown current 0.1μA (Typ.)
- Improved pop & click circuitry eliminates noises during turn-on and turn-off transitions
- Thermal overload protection circuitry
- No output coupling capacitors, bootstrap capacitors required
- Unity-gain stable
- External gain configuration capability
- Available in space-saving packages: 8-pin MSOP8,SOP8,DIP8

■ APPLICATIONS

- Wireless handsets
- Portable audio devices
- PDAs
- Notebook computer

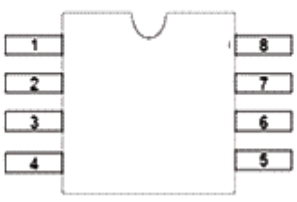
■ ORDER INFORMATION

CE4890①

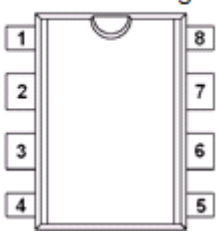
DESIGNATOR	SYMBOL	DESCRIPITION
①	SM	Package: MSOP8
	S	Package: SOP8
	D	Package: DIP8
	—	Package: DICE

■ PIN DIAGRAM

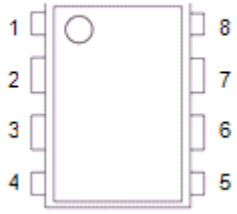
MSOP-8 Package



SOP-8 Package



DIP-8 Package



■ PIN CONFIGURATION

MSOP8	SOP8	DIP8	SYMBOL	TYPE	FUNCTION
1	1	1	SHUTDOWN	I	Shut-down Logical Control , “0” is active
2	2	2	BYPASS	I	Common-mode voltage，connect a Bypass capacitor to ground
3	3	3	IN+	I	Positive input.
4	4	4	IN-	I	Negative input.
5	5	5	VO1	O	Positive output.
6	6	6	V_{DD}	I	Power Supply.
7	7	7	V_{SS}	I	Ground.
8	8	8	VO2	O	Negative output.

■ TYPICAL APPLICATION

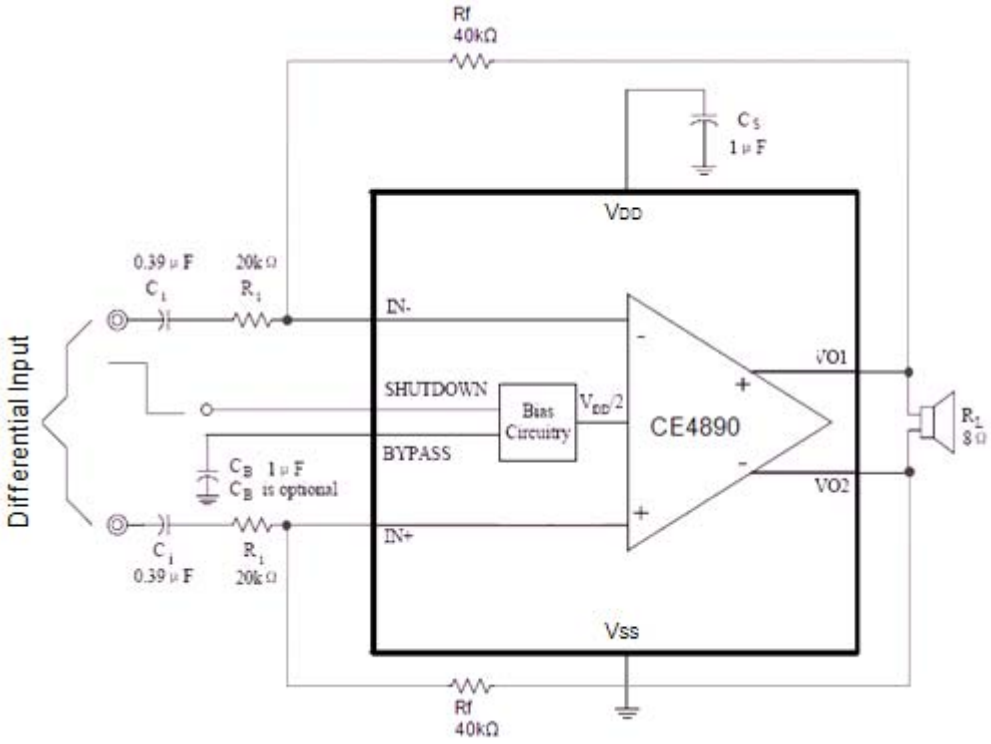


Fig1. Differential Input Application

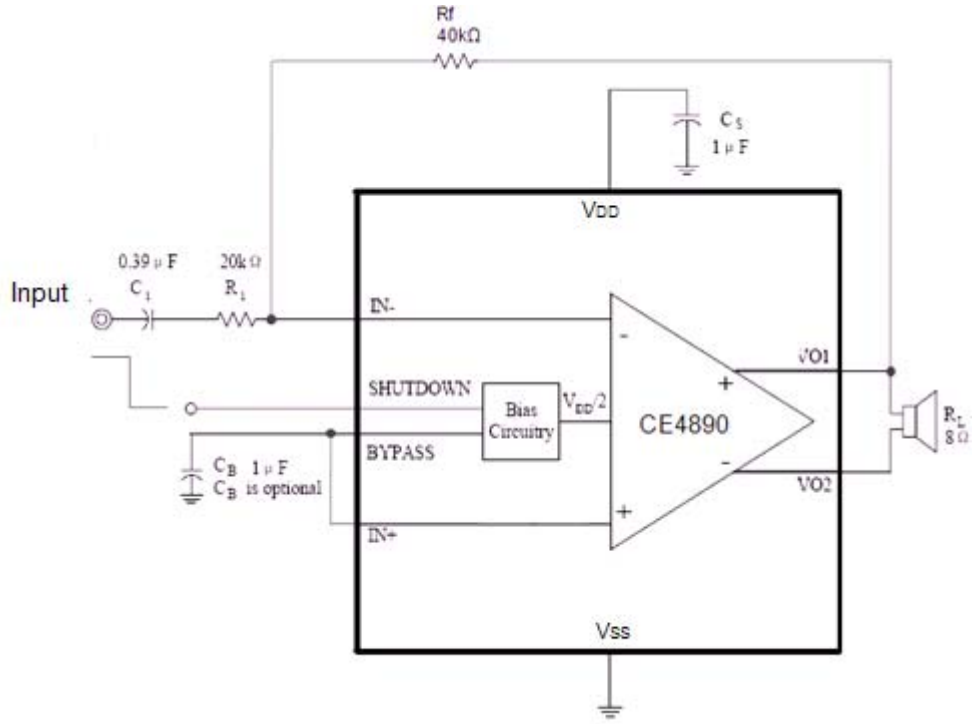


Fig2. Single-Ended Input Application

Note： Capacitor in the application can be Tantalum, Electrolytic and Ceramic etc.

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, Ta=25°C)

PARAMETER		SYMBOL	RATINGS	UNITS
V_{DD} pin voltage		V_{DD}	$V_{SS}-0.3$ ~ $V_{SS}+8$	V
Power dissipation	MSOP8	PD	500	mW
	SOP8		300	mW
	DIP8		500	mW
Operating temperature		T_{opr}	−40 ~+85	°C
Storage temperature		T_{stg}	−40 ~+125	°C
Soldering Temperature & Time		T_{solder}	260℃, 10s	

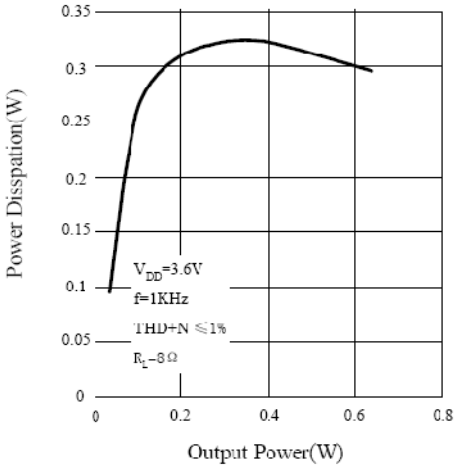
■ ELECTRICAL CHARACTERISTICS

V_{DD}＝5V(8Ωload，AV＝1V，Ta＝25℃)

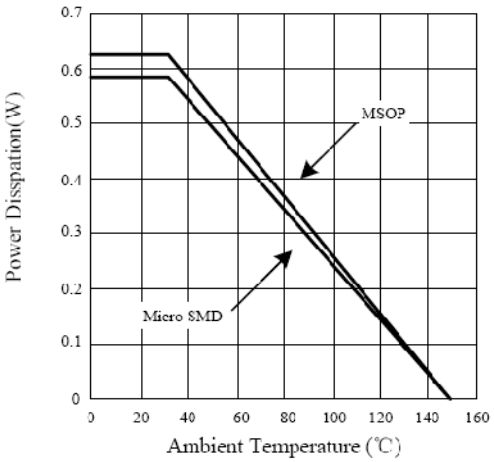
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Current consumption	I_{DD}	V_{IN}＝0V，no load		2.5		mA
		V_{IN}＝0V，RL＝8Ω		4		mA.
Current consumption during shutdown	I_{SHDN}	Shutdown＝V_{SS}		0.1	1.0	uA
Output Power	P_O	THD＝1％（max）；f＝1KHz		1.25		W
Total Harmonic Distortion+ Noise	THD+N	Po=0.6Wrms；f=1KHz		0.02		%
Power Supply Rejection Ratio	PSRR	V_{ripple}＝200mV sine P-P				
		f＝217Hz		-86		dB
		f＝1KHz		-83		dB
Common Mode Rejection Ratio	CMRR	f=217Hz，V_{CM}＝200mV_{pp}		-78		dB
Output Offset Voltage	V_{OS}	V_{IN}＝0V		2		mV
Shutdown Voltage Input High	V_{SDIH}		1.5			V
Shutdown Voltage Output Low	V_{SDIL}				0.3	V
Closed Loop Gain	A_V			$\frac{Rf}{Ri}$		V/V

■ TYPICAL PERFORMANCE CHARACTERISTICS

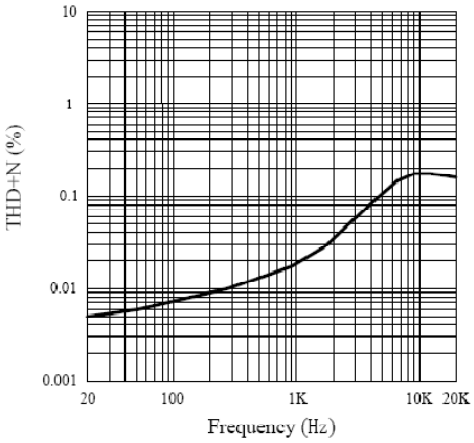
Power Dissipation vs Output Power



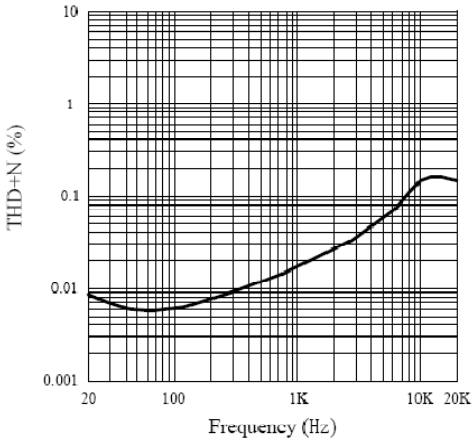
Power Derating Curve



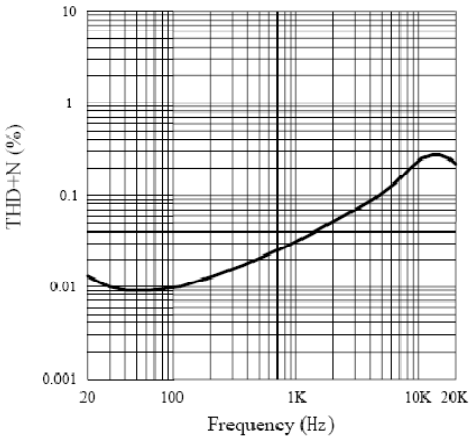
THD+N vs Frequency
V_{DD}=5V, R_L=8Ω, P_O=600mW



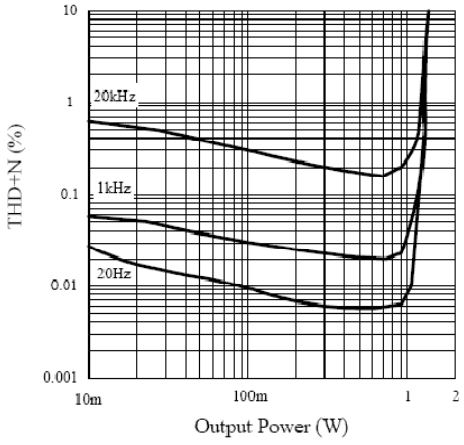
THD+N vs Frequency
V_{DD}=3.6V, R_L=8Ω, P_O=400mW



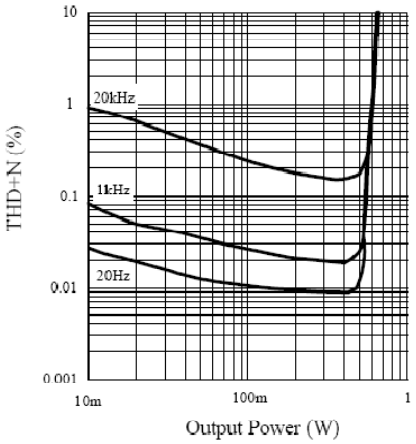
THD+N vs Frequency
V_{DD}=2.5V, R_L=8Ω, P_O=150mW



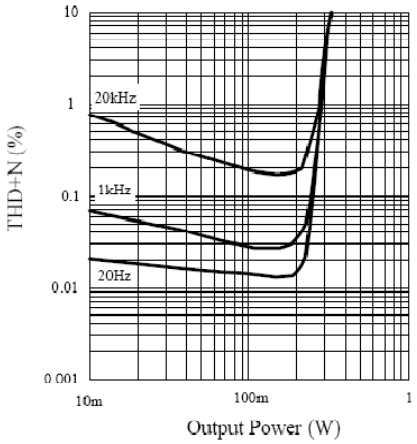
THD+N vs Output Power
V_{DD}=5V, R_L=8Ω



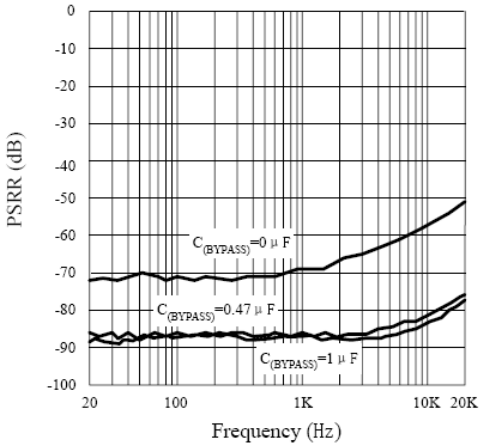
THD+N vs Output Power
V_{DD}=3.6V, R_L=8 Ω



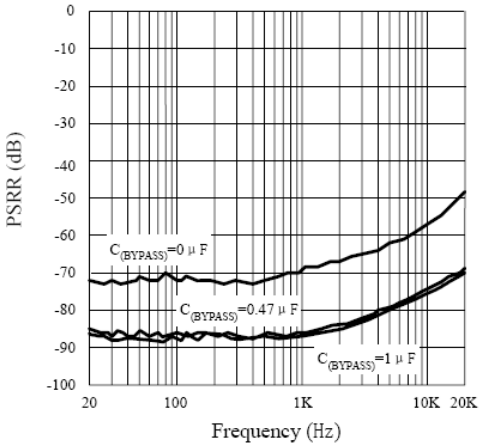
THD+N vs Output Power
V_{DD}=2.5V, R_L=8 Ω



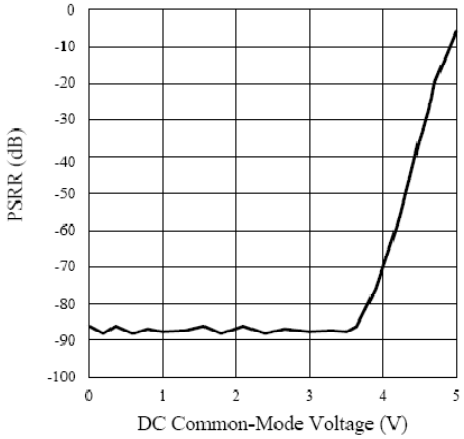
PSRR vs Frequency
V_{DD}=5.0V, R_L=8 Ω ,input 10 Ω Terminated



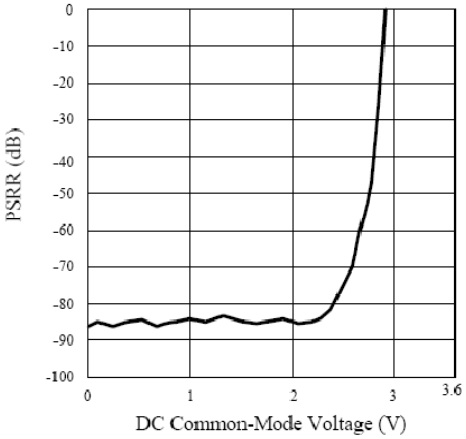
PSRR vs Frequency
V_{DD}=3.6V, R_L=8 Ω ,input 10 Ω Terminated



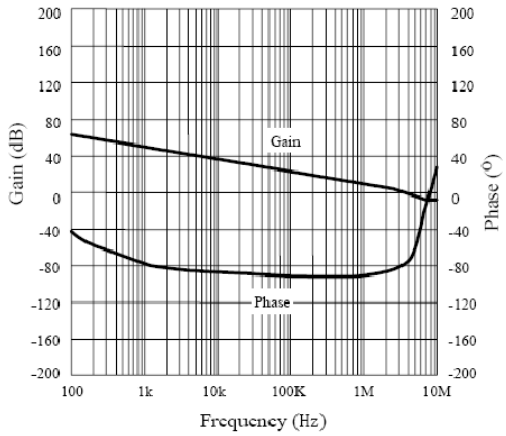
PSRR vs Common Mode voltage
V_{DD}=5.0V, R_L=8 Ω , 217Hz, 200mV_{PP}



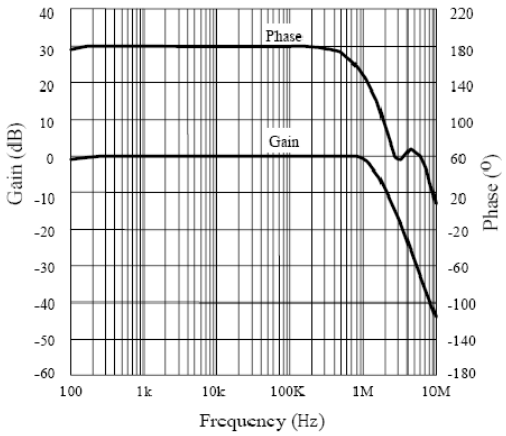
PSRR vs Common Mode voltage
V_{DD}=3.6V, R_L=8 Ω , 217Hz, 200mV_{PP}



Open Loop Frequency Response

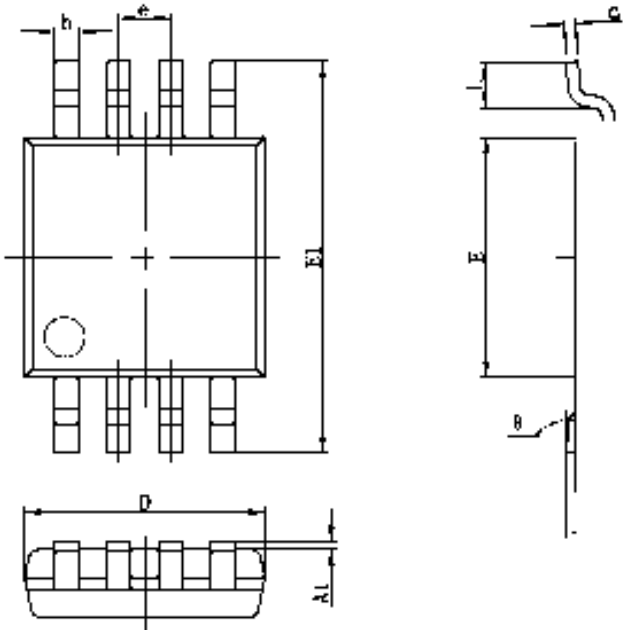


Closed Loop Frequency Response



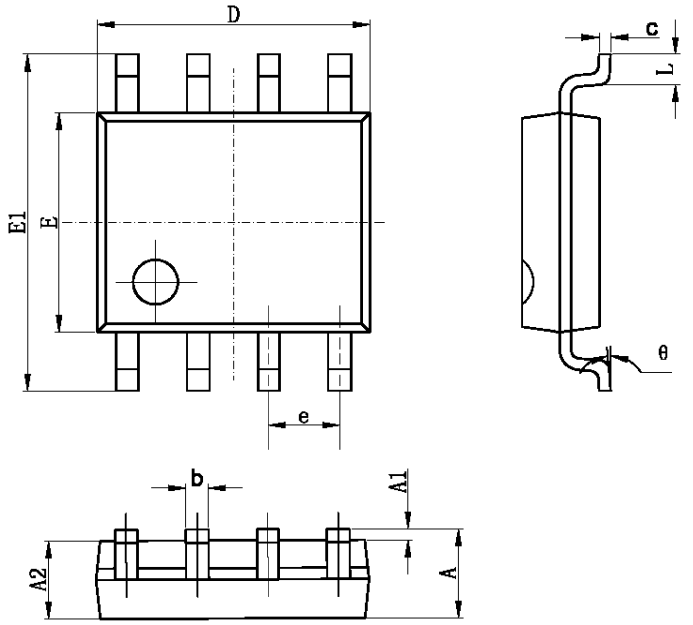
■ PACKAGING INFORMATION

● MSOP8 PACKAGE OUTLINE DIMENSIONS



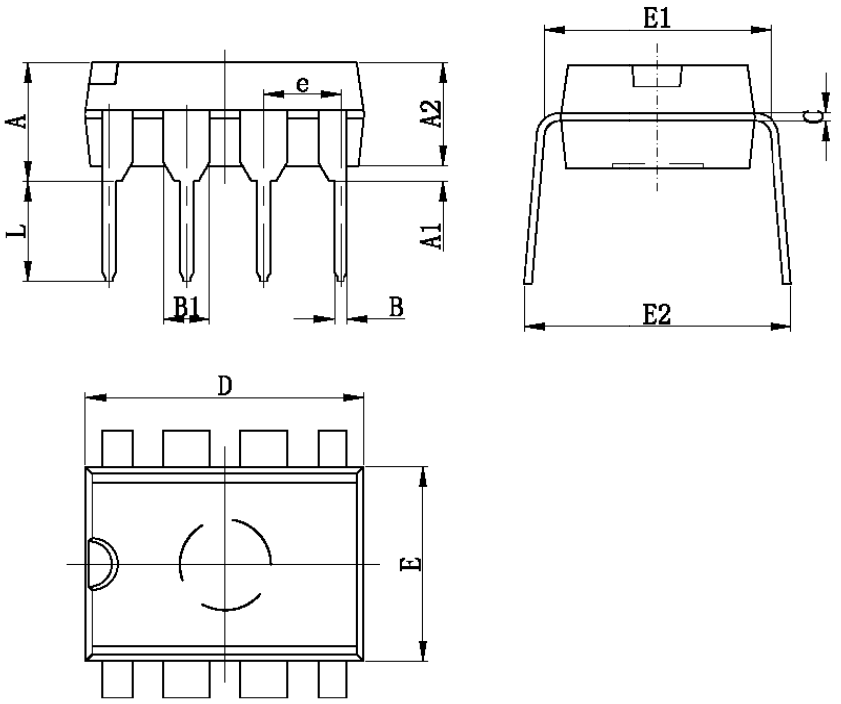
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

- **SOP8 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

- **DIP8 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524 (BSC)		0.060 (BSC)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540 (BSC)		0.100 (BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

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