

1W Fully Differential Audio Power Amplifier with Internal Feedback Resistors

CE0010

■ INTRODUCTION

The CE0010 is a fully differential audio power amplifier designed for portable communication device applications. It is capable of delivering 1 watt of continuous average power to an 8Ω BTL load with less than 1% distortion (THD+N) from 5V battery voltage. It operates from 2.0 to 5.0V. Features like 83dB PSRR at 217Hz, improved RF-rectification immunity, the space-saving 8-pin MSOP8 and SOP8 package, the advanced pop & click circuitry, a minimal count of external components and low-power shutdown mode make CE0010 ideal for wireless handsets. The CE0010 is unity-gain stable, and the gain can be configured by external input resistors and internal feedback resistors.

■ FEATURES

- Fully differential amplifier
- Improved PSRR at 217Hz ($V_{DD}>3.0V$) 83dB (Typ.)
- Power output at 5.0V & 1% THD 1W (Typ.)
- Power output at 3.6V & 1% THD 0.5W (Typ.)
- Power output at 2.4V & 1% THD 0.16W (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 & DICE

■ APPLICATIONS

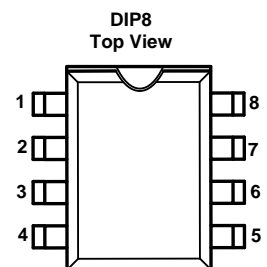
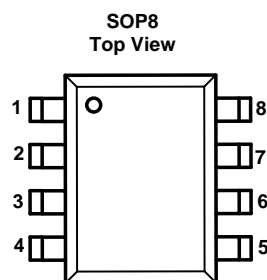
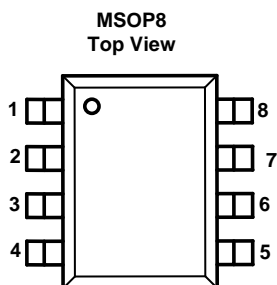
- Toys
- Mini sound panel
- Baby Monitor
- Portable audio devices

■ ORDER INFORMATION

CE0010①

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

■ PIN DIAGRAM



■ PIN CONFIGURATION

MSOP8	SOP8	DIP8	SYMBOL	TYPE	FUNCTION
1	1	1	INN	I	Positive input.
2	2	2	ACIN	I	Negative input.
3	3	3	V _{SS}	I	Ground.
4	4	4	VREF	O	Common-mode voltage, connect a Bypass capacitor to Ground.
5	5	5	CE	I	Chip Enable Logical Control, "High" is active.
6	6	6	SPP	O	Positive output.
7	7	7	V _{DD}	O	Power Supply.
8	8	8	SPN	O	Negative output.

■ BLOCK DIAGRAM AND TYPICAL APPLICATION

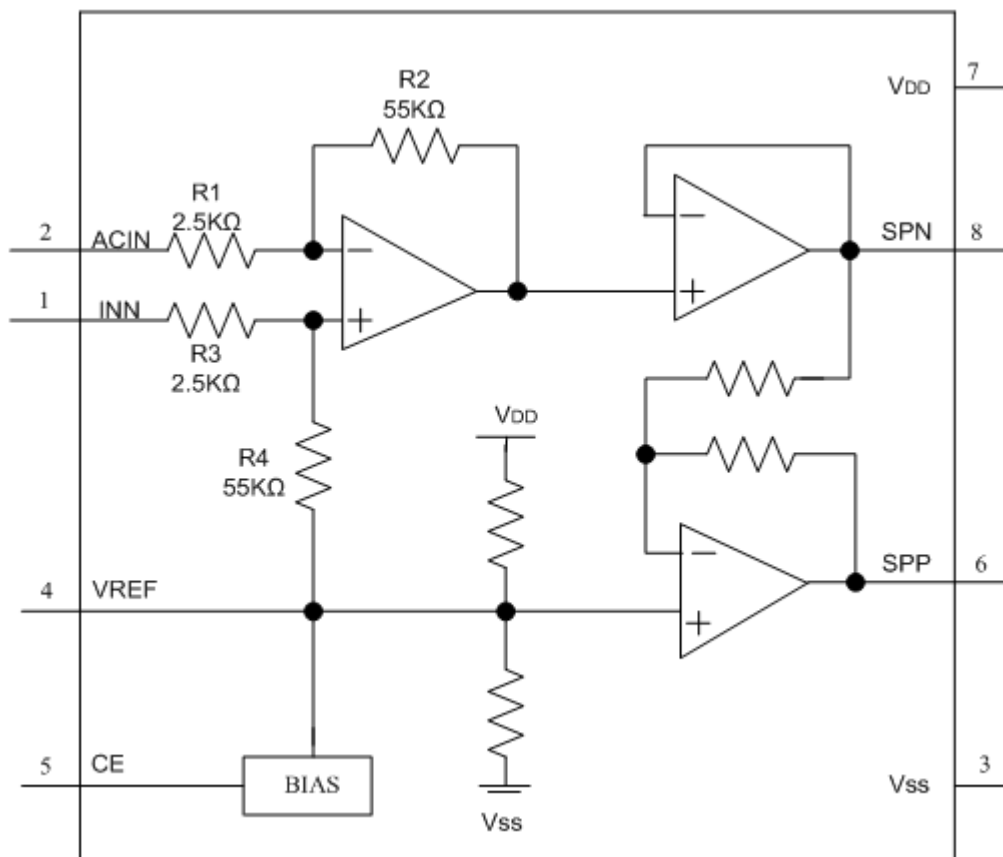


Fig1 BLOCK DIAGRAM

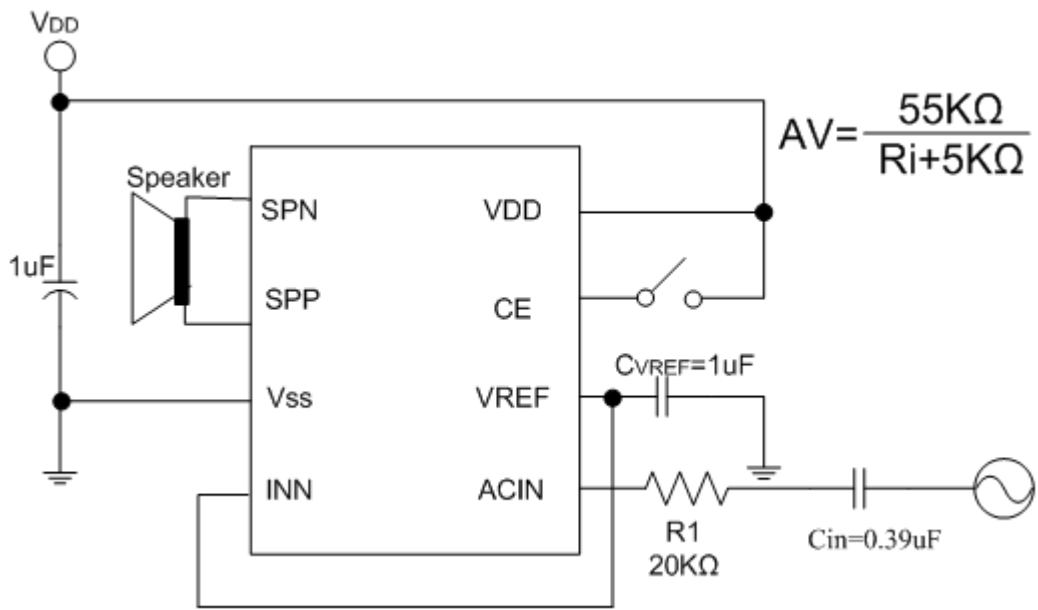


Fig2 SINGLE END APPLICATION

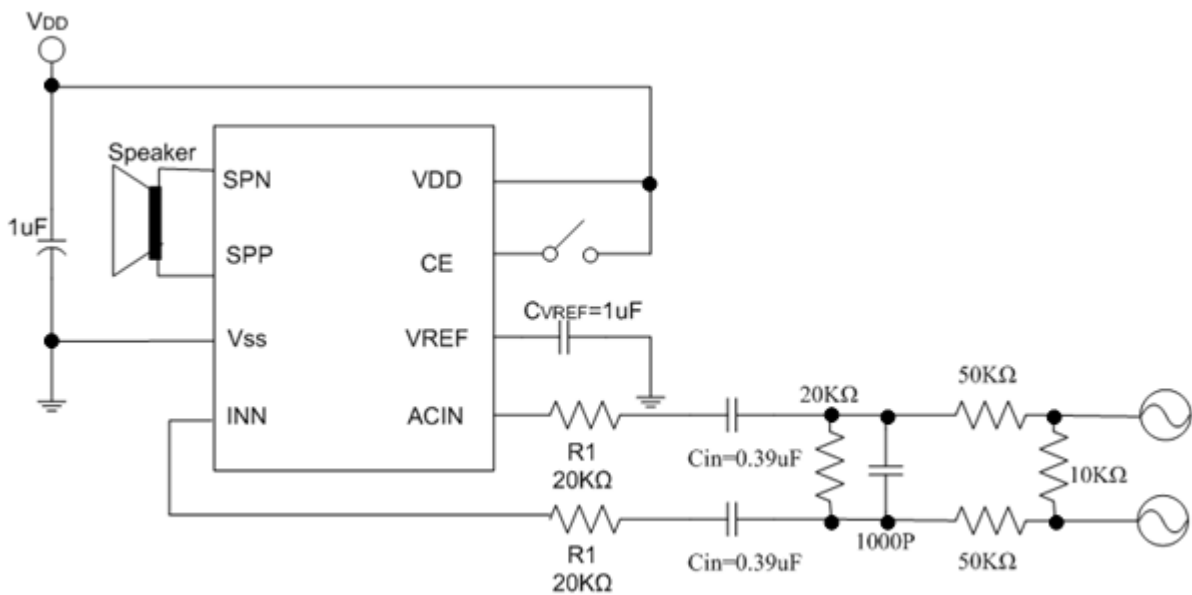


Fig3 DOUBLE END APPLICATION (With Input Filter Circuit)

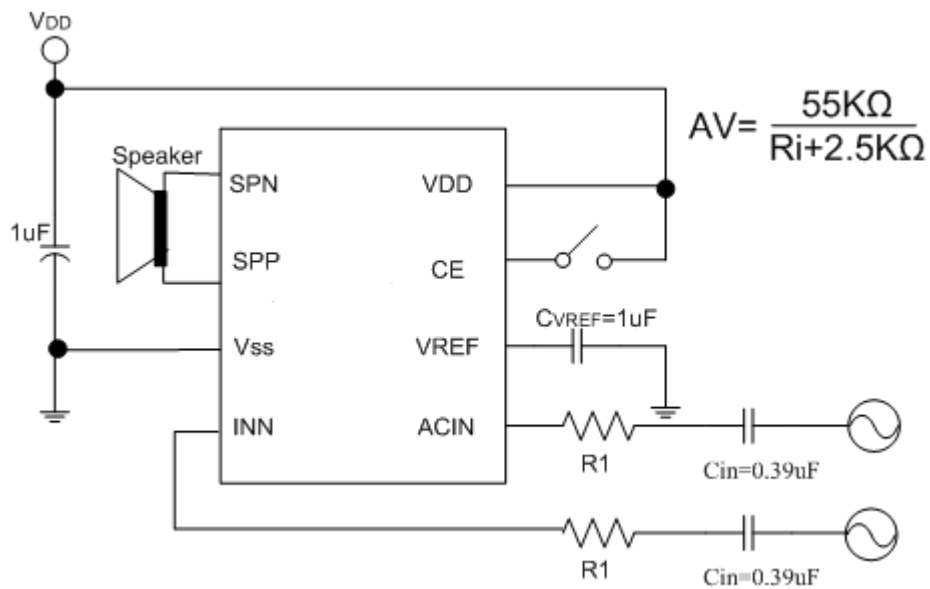


Fig4 DOUBLE END APPLICATION (Without Input Filter Circuit)

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

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, Ta=25°C)

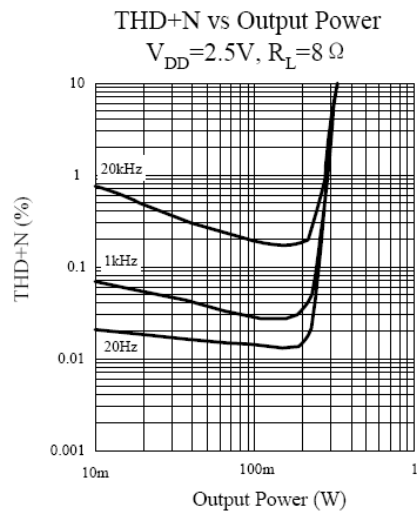
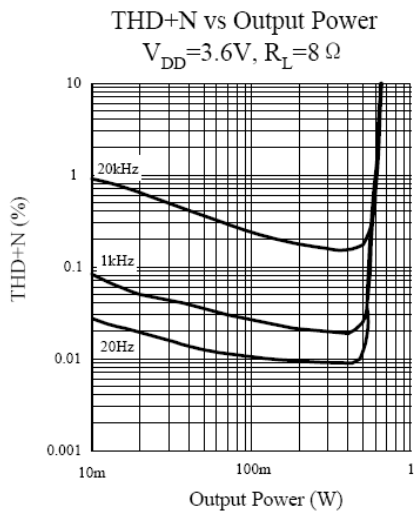
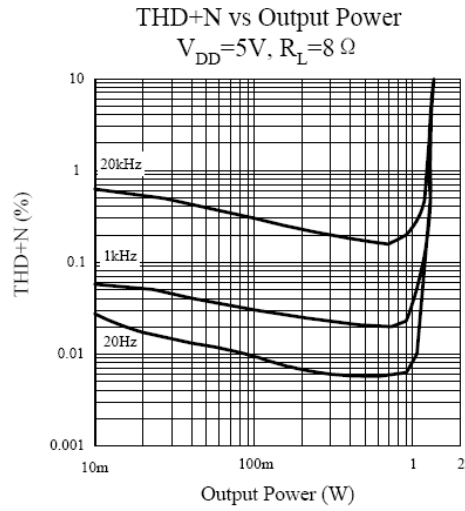
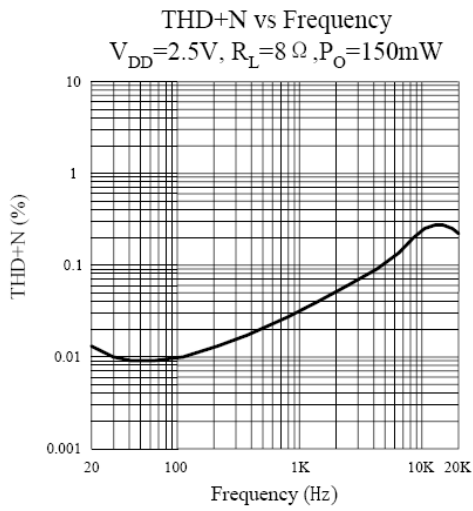
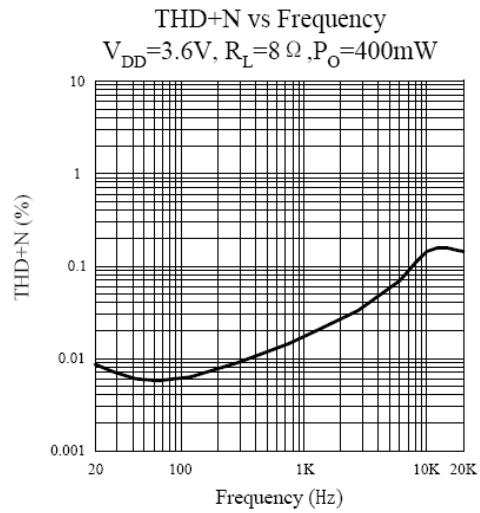
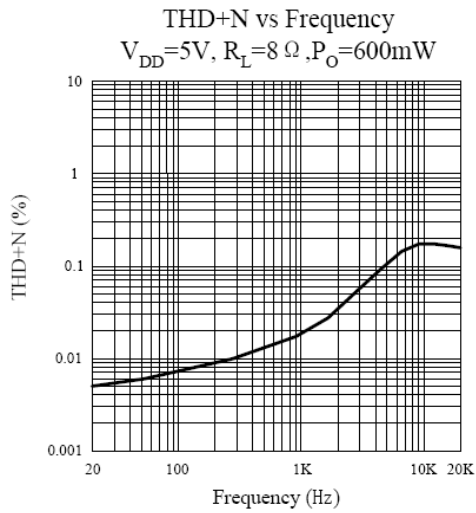
PARAMETER		SYMBOL	RATINGS	UNITS
V _{DD} pin voltage		V _{DD}	V _{SS} -0.3 ~ V _{SS} +8	V
Power dissipation	MSOP8	PD	500	mW
	SOP8	PD	300	mW
	DIP8	PD	500	mW
Operating temperature		T _{opr}	-40 ~ +85	°C
Storage temperature		T _{stg}	-40 ~ +125	°C
Soldering Temperature & Time		T _{solder}	260°C, 10s	

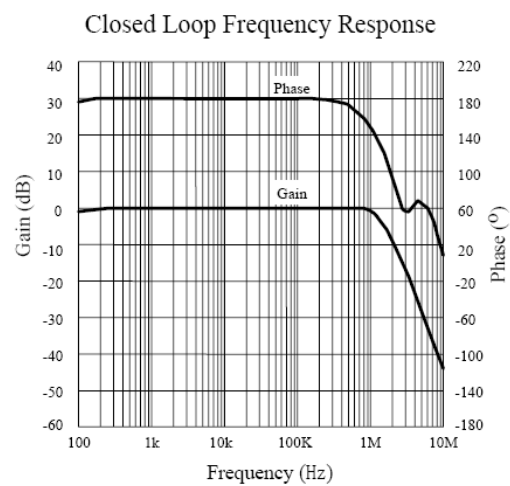
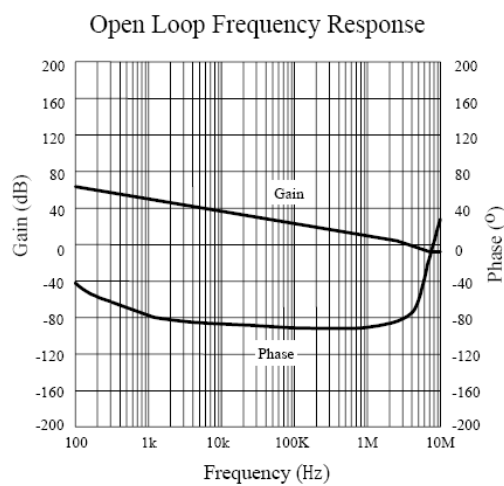
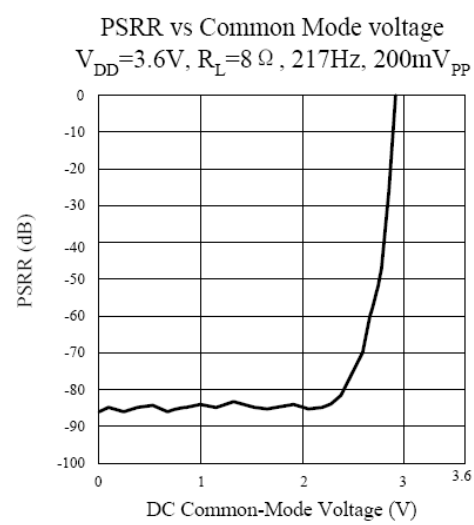
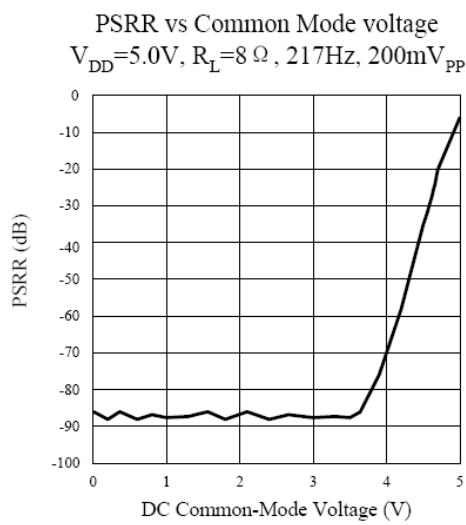
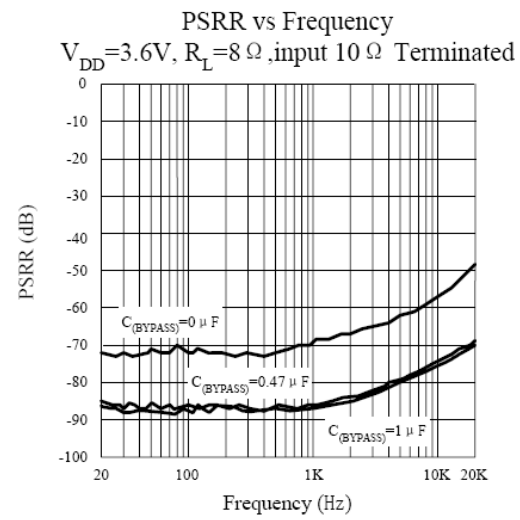
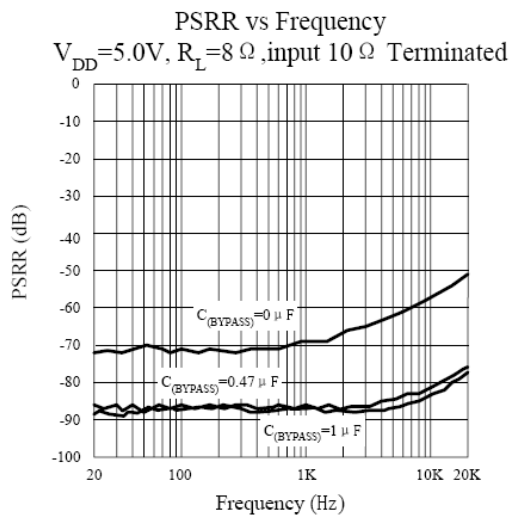
■ ELECTRICAL CHARACTERISTICS

 $V_{DD}=5V(8\Omega \text{ load}, AV=1V, Ta=25^{\circ}C)$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operation Voltage	V_{DD}		2.0		5.0	V
Current consumption	I_{DD}	$V_{DD}=5V, V_{CE}=V_{DD}$, No Load		2.5		mA
		$V_{DD}=5V, V_{CE}=V_{DD}$, $R_L=8\Omega$		4		mA
Current consumption during shutdown	I_{SHDN}	Shutdown= V_{SS}		0.1	1.0	μA
Output Power	P_O	THD=1% (max) ; f=1KHz		1		W
Total Harmonic Distortion Noise	THD+N	$P_O=0.6W_{rms}$; f=1KHz		0.1		%
Power Supply Rejection Ratio	PSRR	$V_{ripple}=200mV$ sine P-P				
		f=217Hz		-83		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		$\frac{50K\Omega}{R_i+2.5K\Omega}$	$\frac{55K\Omega}{R_i+2.5K\Omega}$	$\frac{60K\Omega}{R_i+2.5K\Omega}$	V/V
Enable Time	T_{ON}	$V_{DD}=5V, C_{IN}=0.39\mu F$, $C_{VREF}=0.33\mu F$		50		ms
		$V_{DD}=3V, C_{IN}=0.39\mu F$, $C_{VREF}=0.33\mu F$		35		ms

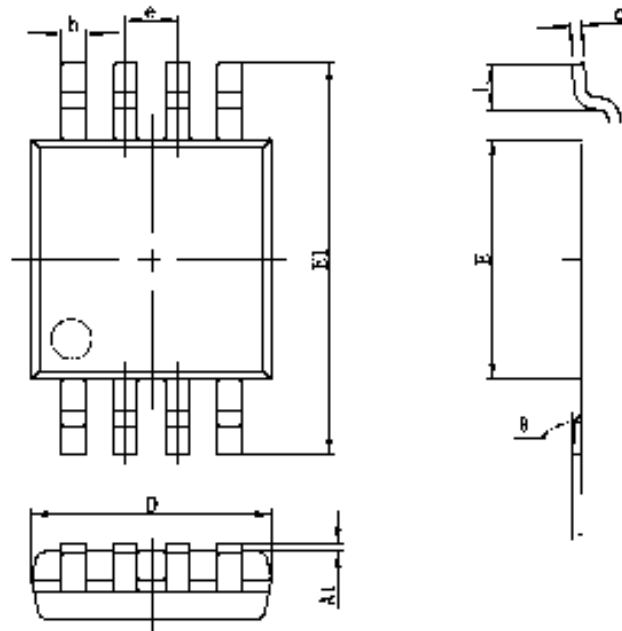
■ TYPICAL PERFORMANCE CHARACTERISTICS





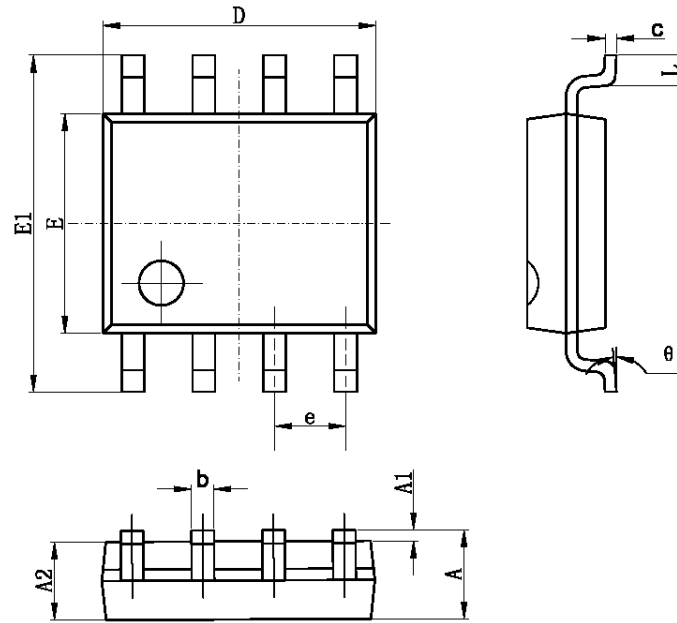
■ PACKAGING INFORMATION

● MSOP8 PACKAGE OUTLINE DIMENSIONS



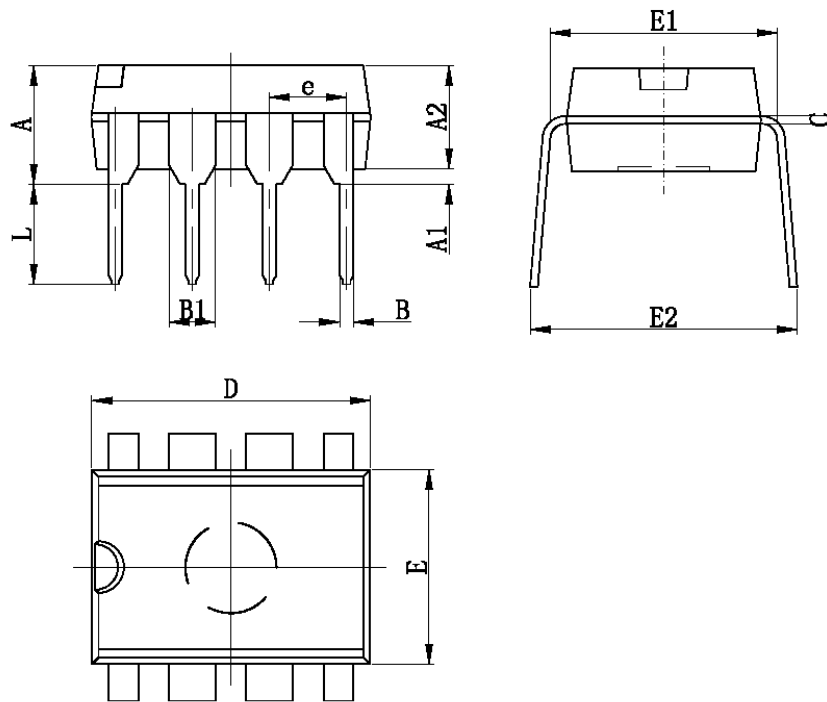
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187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