

**LOW VOLTAGE AUDIO POWER AMPLIFIER****AZ386****General Description**

The AZ386 is a power amplifier designed for use in low voltage consumer applications. The gain is internally set to 20 to keep external part count low, but the addition of an external resistor and capacitor between pin 1 and pin 8 will increase the gain to any value from 20 to 200.

The inputs are ground referenced while the output automatically biases to one-half the supply voltage. The quiescent power drain is only 24mW when operating from a 5V supply, making the AZ386 ideal for battery operation.

This IC is available in SOIC-8 and DIP-8 packages.

Features

- Wide Supply Voltage Range: 4V to 16V
- Low Quiescent Current Drain: 6mA
- Voltage Gains from 20 to 200
- Battery Operation
- Minimum External Parts
- Low Power Dissipation
- Low Distortion

Applications

- AM-FM Radio Amplifier
- Cordless Phone
- TV Sound Systems
- Portable Tape Player Amplifier
- Intercoms
- Line Drivers
- Ultrasonic Drivers
- Small Servo Drivers
- Power Converters

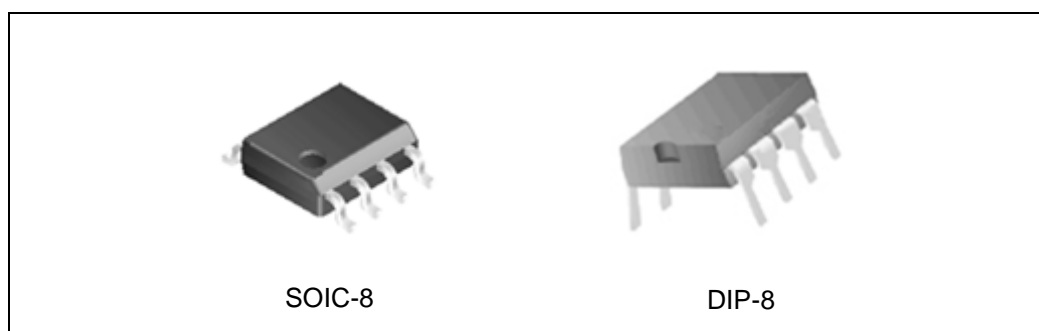


Figure 1. Package Types of AZ386



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AZ386

Pin Configuration

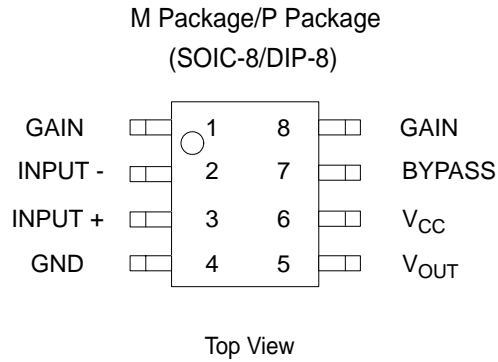


Figure 2. Pin Configuration of AZ386

Functional Block Diagram

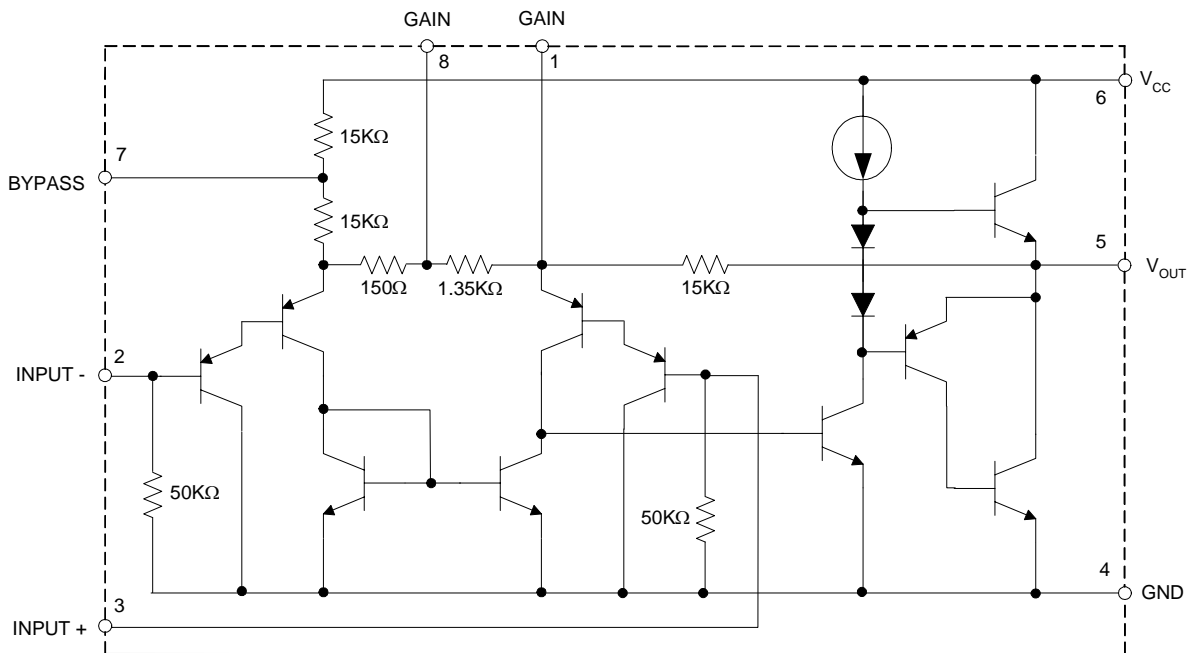
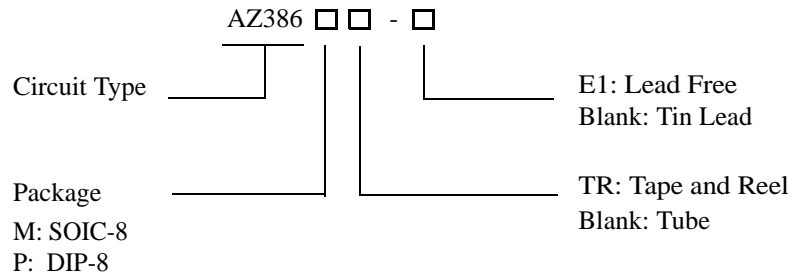


Figure 3. Functional Block Diagram of AZ386



LOW VOLTAGE AUDIO POWER AMPLIFIER **AZ386**

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
SOIC-8	0 to 70°C	AZ386M	AZ386M-E1	386M	386M-E1	Tube
		AZ386MTR	AZ386MTR-E1	386M	386M-E1	Tape & Reel
DIP-8	0 to 70°C	AZ386P	AZ386P-E1	AZ386P	AZ386P-E1	Tube

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

**LOW VOLTAGE AUDIO POWER AMPLIFIER****AZ386****Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Value		Unit
Power Supply Voltage	V_{CC}	18		V
Package Dissipation (Note 2)	P_D	AZ386P	1.25	W
		AZ386M	0.73	W
Input Voltage	V_{IN}	-0.4 to 0.4		V
Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{STG}	-55 to 150		°C
Soldering Information		DIP-8 Soldering (10 sec.)	260	°C
		SOIC-8 (15 sec.)	215	
Thermal Resistance	θ_{JA}	DIP-8	107	°C/W
		SOIC-8	172	

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Note 2: For operation in ambient temperatures (T_A) above 25°C, the device must be derated based on a 150°C maximum junction temperature and 1) a thermal resistance of 107°C/W junction to ambient for the Dual-in-Line package and 2) a thermal resistance of 172°C/W for the small outline package.

Recommended Operating Conditions

Parameter	Min	Max	Unit
Operating Temperature Range	0	70	°C

**LOW VOLTAGE AUDIO POWER AMPLIFIER****AZ386****Electrical Characteristics (Note 3)**Operating Conditions: $T_A=25^{\circ}\text{C}$ unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		4		16	V
Quiescent Current	I_Q	$V_{CC}=6\text{V}$, $V_{IN}=0$		6	8	mA
Output Power	P_{OUT}	$V_{CC}=6\text{V}$, $R_L=8\Omega$, THD=10%	250	300		mW
		$V_{CC}=9\text{V}$, $R_L=8\Omega$, THD=10%	500	800		mW
		$V_{CC}=16\text{V}$, $R_L=32\Omega$, THD=10%	700	1000		mW
Voltage Gain	G_V	$V_{CC}=6\text{V}$, $f=1\text{KHz}$ $10\mu\text{F}$ from Pin 1 to 8		26		dB
					45	
Bandwidth	BW	$V_{CC}=6\text{V}$, Pins 1 and 8 open		500		KHz
Total Harmonic Distortion	THD	$V_{CC}=6\text{V}$, $R_L=8\Omega$, $P_{OUT}=125\text{mW}$ $f=1\text{KHz}$, Pins 1 and 8 open		0.27		%
Power Supply Rejection Ratio	PSRR	$V_{CC}=6\text{V}$, $f=1\text{KHz}$, $C_{BYPASS}=10\mu\text{F}$, Pins 1 and 8 open, Referred to Output		45		dB
Input Resistance	R_{IN}			70		$\text{K}\Omega$
Input Bias Current	I_{BIAS}	$V_{CC}=6\text{V}$, Pins 2 and 3 open		10		nA

Note 3: All voltages are measured with respect to the ground pin, unless otherwise specified.



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Typical Performance Characteristics

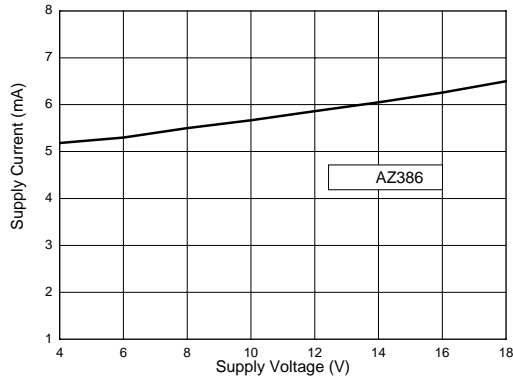


Figure 4. Quiescent Supply Current vs. Supply Voltage

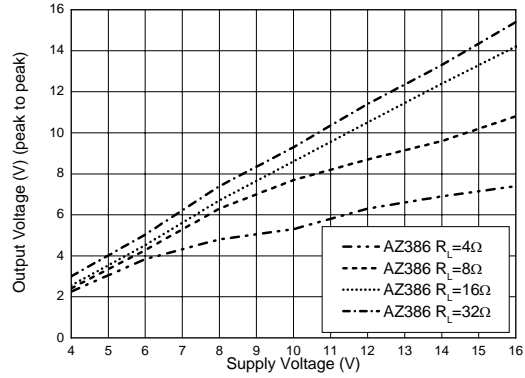


Figure 5. Peak-to-Peak Output Voltage Swing vs. Supply Voltage

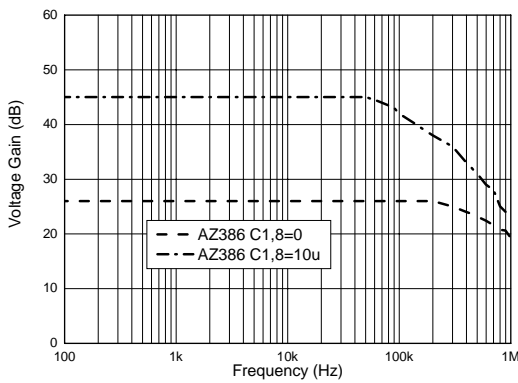


Figure 6. Voltage Gain vs. Frequency

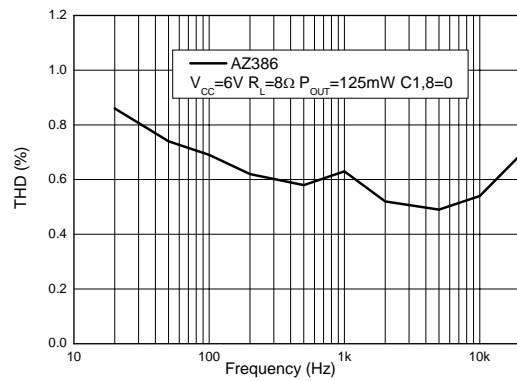


Figure 7. Distortion vs. Frequency

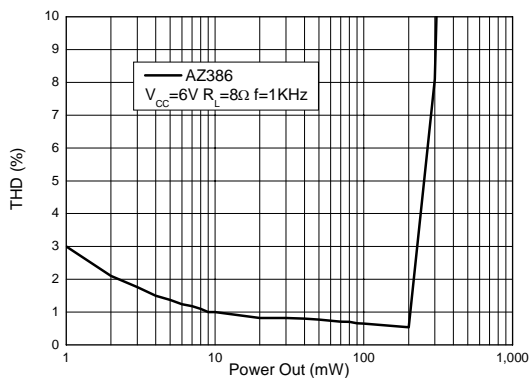


Figure 8. Distortion vs. Output Power

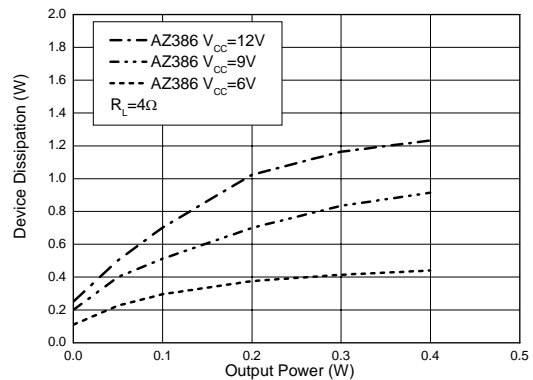


Figure 9. Device Dissipation vs. Output Power (4Ω Load)



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Typical Performance Characteristics (Continued)

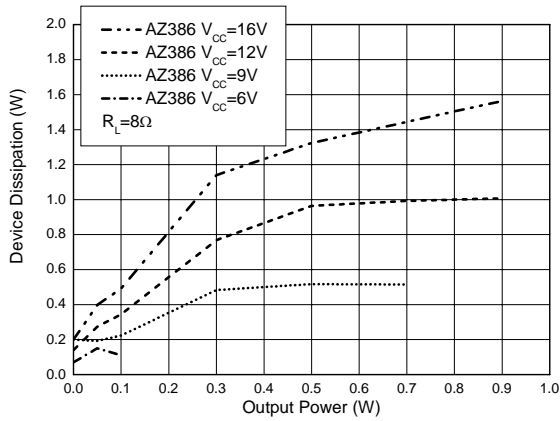


Figure 10. Device Dissipation vs. Output Power (8Ω Load)

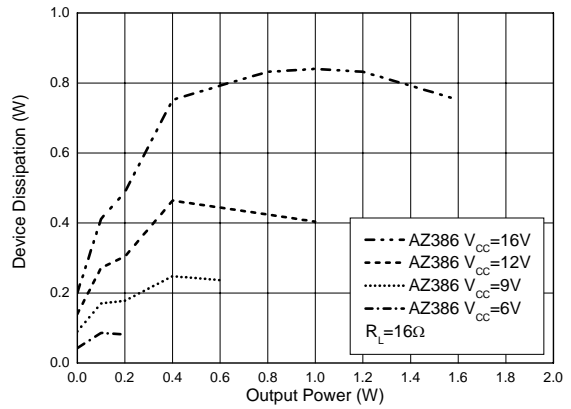


Figure 11. Device Dissipation vs. Output Power (16Ω Load)

Typical Applications (Note 4)

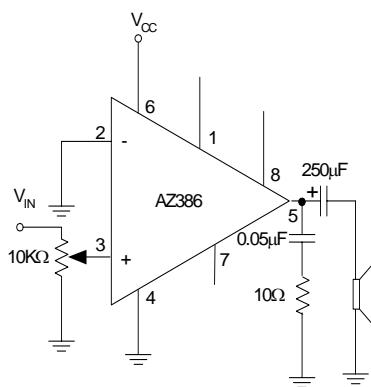


Figure 12. Amplifier With Gain=20

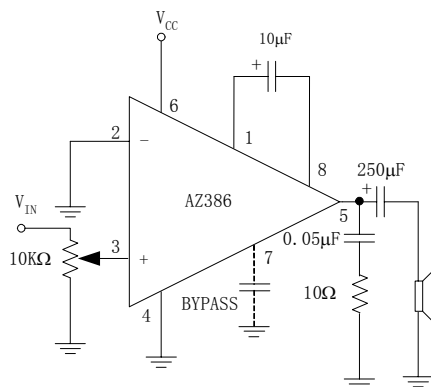


Figure 13. Amplifier With Gain=200



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Typical Applications (Note 4) (Continued)

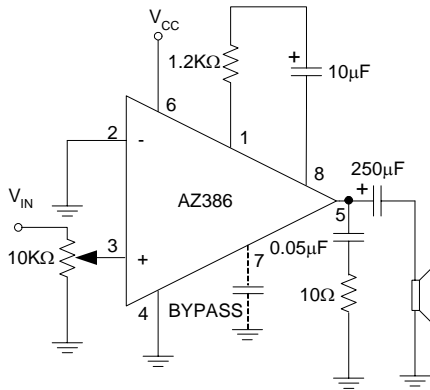


Figure 14. Amplifier With Gain=50

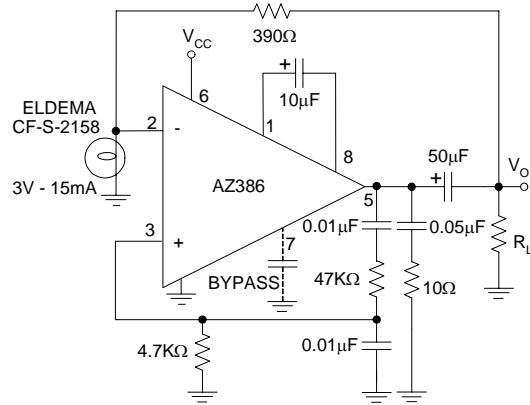


Figure 15. Low Distortion Power Wienbridge Oscillator

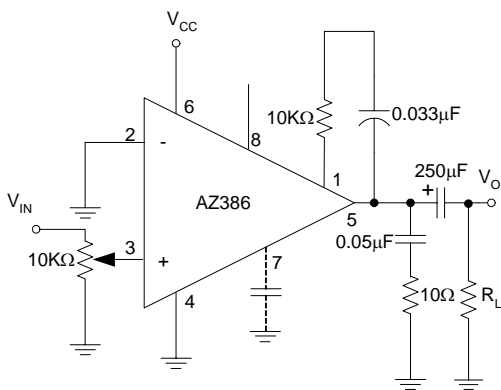


Figure 16. Amplifier With Bass Boost

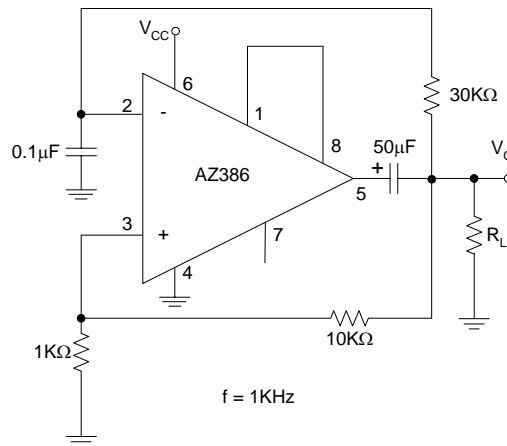


Figure 17. Square Wave Oscillator

Note 4: The R-C series circuit from output to ground, which will make the output stable, is depended on the different capacitive load in the circuit, the correct values for the R and C can be determined through experimental methods.

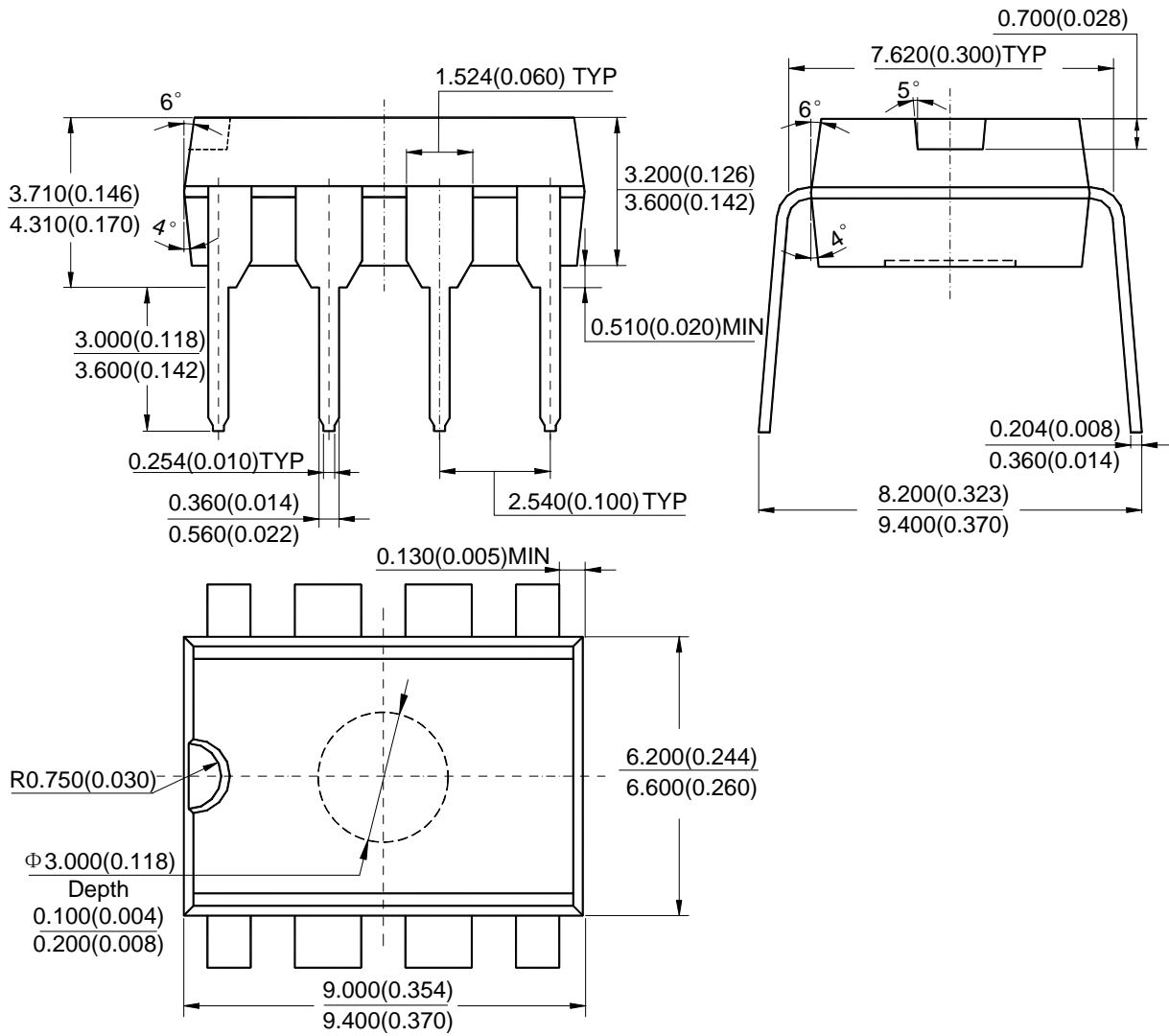


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Mechanical Dimensions (Continued)

DIP-8

Unit: mm(inch)





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