

**Low Voltage, Low Power, AudioMite™  
 Class-D Audio Amplifier**
**PRELIMINARY SPECIFICATION**
**DESCRIPTION**

The MSC-LX1792 offers a patent pending, low voltage, low power, and high efficiency amplifier for driving a high impedance speaker such as a hearing aid receiver.

The core of the amplifier is built upon Microsemi's patented LX1790 class D amplifier.

The LX1790 consists of a preamplifier followed by a fixed gain class D amplifier. The input resistor and feedback resistor is external in the LX1792 making it possible to set the gain arbitrarily, up to approximately 40dB. The feedback resistor can also be potentiometer to facilitate volume control.

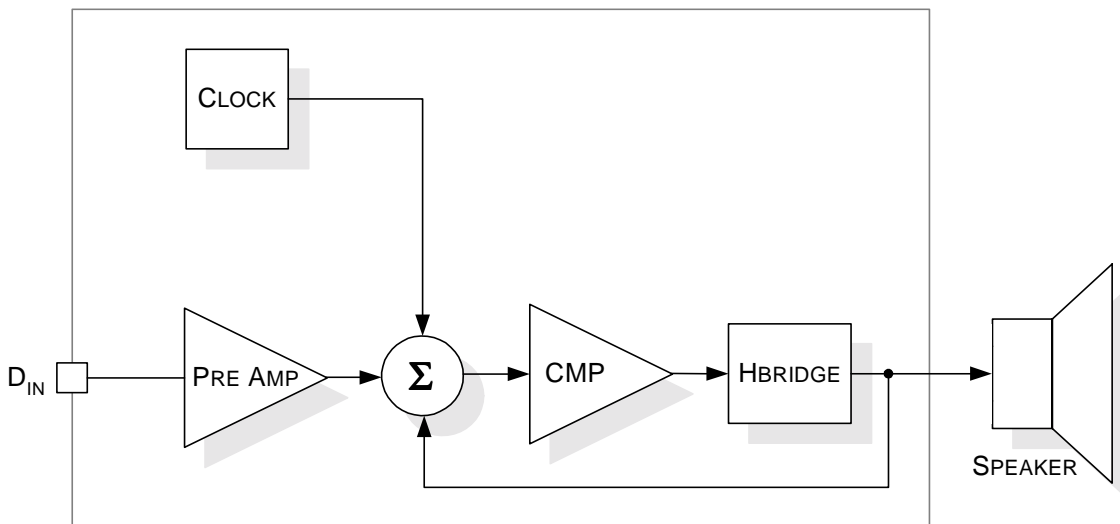
**KEY FEATURES**

- Low Operating Current: 120µA Typical
- Low Operating Voltage: 0.9V minimum
- Gain set by external resistors
- 3 Output Switch Resistance Settings: 48, 24 & 16 Ω
- 5uVrms input referred noise.

**APPLICATIONS**

- Hearing Aid applications
- High impedance speaker /Transducer applications

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**PRODUCT HIGHLIGHT**

**PACKAGE ORDER INFO**

T <sub>J</sub> (°C)	J	Ceramic Dip 14-Pin	LM	Plastic MLPM 8-Pin	DU	Plastic MSOP 8-Pin	BD	Bare Die
10 to 55		LX1792CJ		LX1792CLM		LX1792CDU		LX1792BD

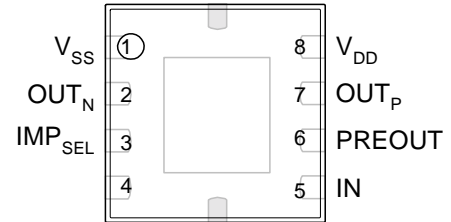
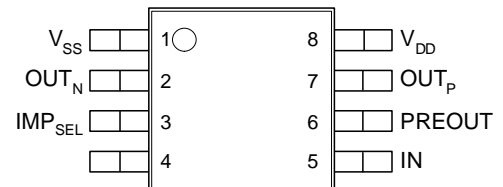
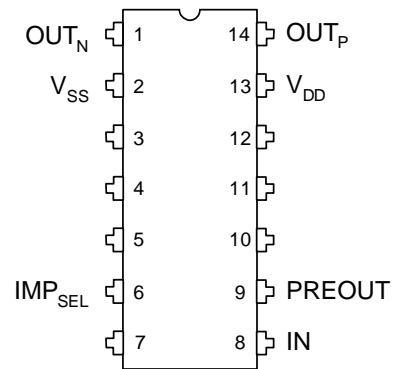
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**PRELIMINARY SPECIFICATION**
**ABSOLUTE MAXIMUM RATINGS**

Input Logic Supply Voltage ( $V_{DD}$ ).....-0.3V to +3.0V  
 Operating Temperature Range ..... 10°C to 55°C

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

**SETTINGS**

PIN	IMP <sub>SEL</sub> =V <sub>SS</sub>	IMP <sub>SEL</sub> =V <sub>DD</sub>	IMP <sub>SEL</sub> =Floating
IMP <sub>SEL</sub>	16Ω	24Ω	48Ω

**PACKAGE PIN OUT**

**LM PACKAGE**  
(Top View)

**DU PACKAGE**  
(Top View)

**J PACKAGE**  
(Top View)

**FUNCTIONAL PIN DESCRIPTION**

PIN NAME	PIN No 14 PIN J (EVALUATION SAMPLES)	PIN No 8 PIN LM	PIN No 8 PIN DU	DESCRIPTION
V <sub>DD</sub>	13	8	8	Supply Voltage
V <sub>SS</sub>	2	1	1	Ground
IN	8	5	5	Analog Audio Input
OUT <sub>P</sub>	14	7	7	Positive Output Voltage
OUT <sub>N</sub>	1	2	2	Negative Output Voltage
PREOUT	9	6	6	Pre amplifier output
IMP <sub>SEL</sub>	6	3	3	Output Resistance Select. See Settings table below for selections.

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**RECOMMENDED OPERATING CONDITIONS**

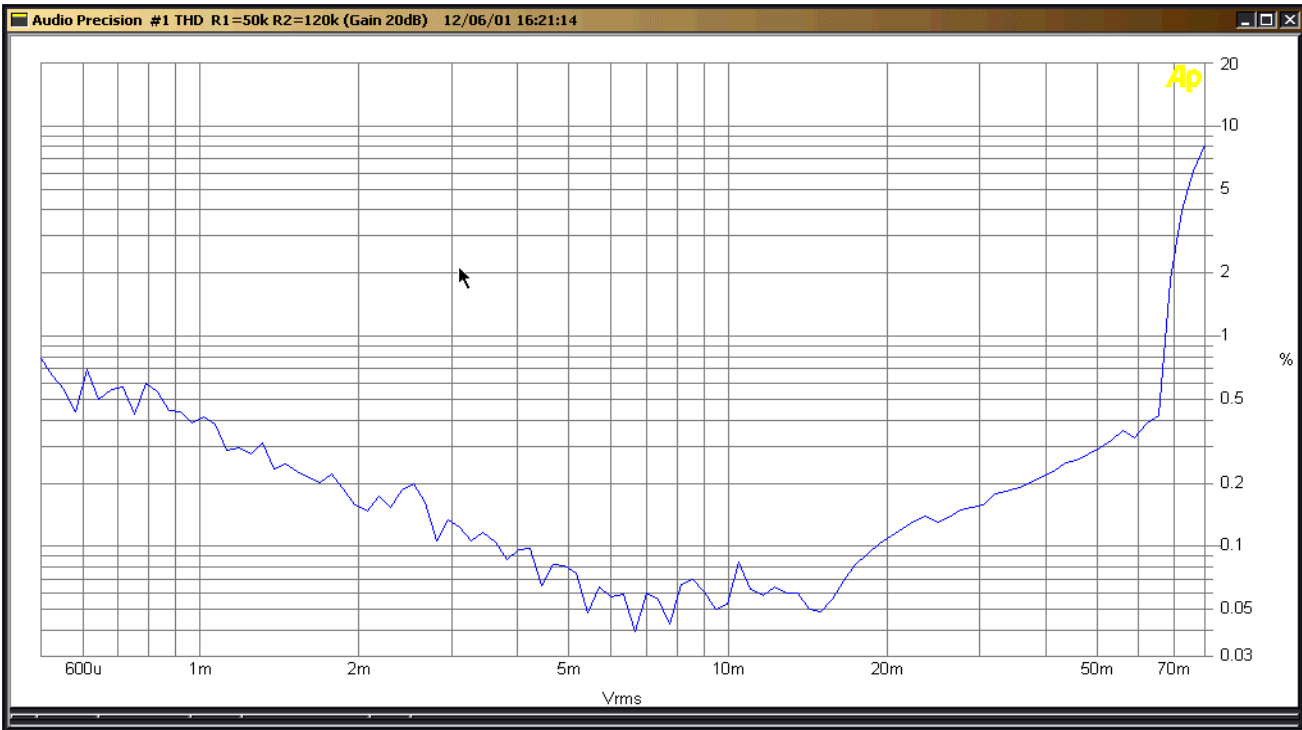
Parameter	Symbol	Test Conditions	LX1792			Units
			Min	Typ	Max	
<b>▶ OPERATING CONDITIONS</b>						
Supply Voltage	V <sub>DD</sub>		0.9		1.5	V
Ground	V <sub>SS</sub>			0		V

**ELECTRICAL CHARACTERISTICS**

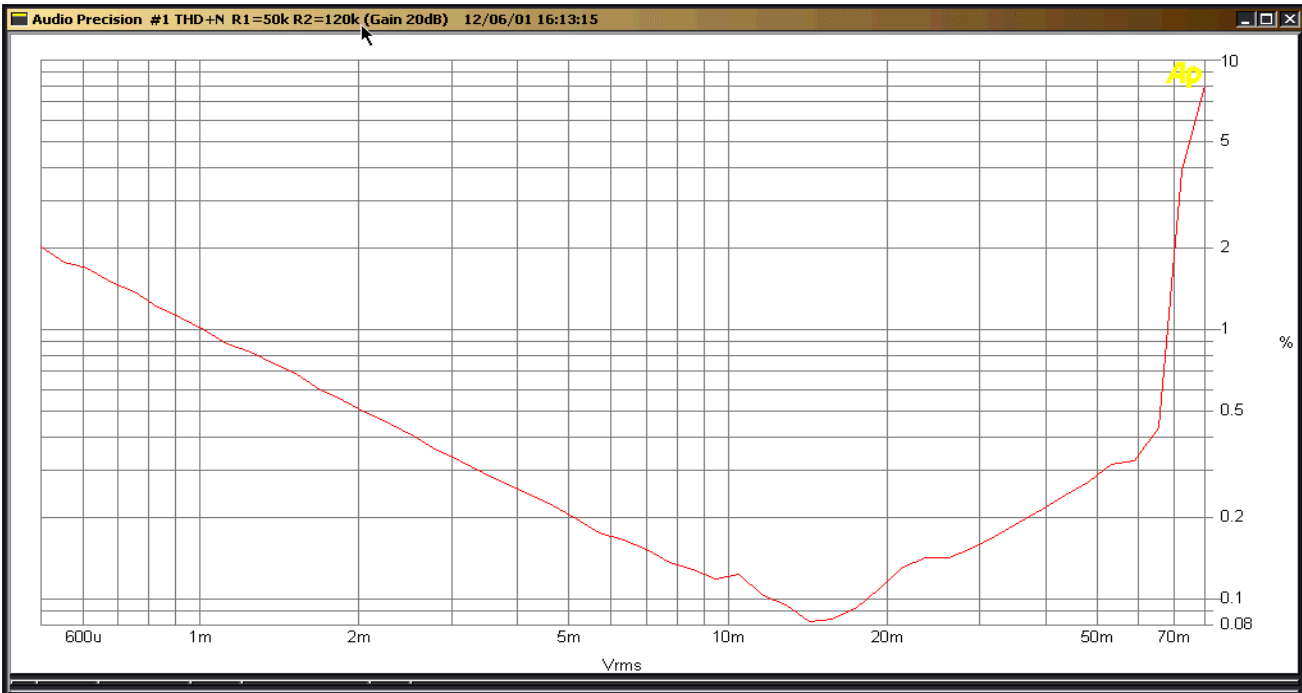
Unless otherwise specified, the following specifications apply over the operating ambient temperature T<sub>A</sub>=25°C except where otherwise noted. Test conditions: V<sub>DD</sub>=1.3V, V<sub>SS</sub>=0V, Circuit connected as application schematic on page 5, Output loaded with 200Ω in series with 60mH.

Parameter	Symbol	Test Conditions	LX1792			Units
			Min	Typ	Max	
Switch Output Resistance @ Low Drive	R <sub>OUT-L</sub>			48		Ω
Switch Output Resistance @ Med Drive	R <sub>OUT-M</sub>			24		
Switch Output Resistance @ High Drive	R <sub>OUT-HI</sub>			16	19	
Quiescent Current @ Low Drive	IDDQ <sub>L</sub>	No load		110		μA
Quiescent Current @ Med Drive	IDDQ <sub>M</sub>			120		
Quiescent Current @ High Drive	IDDQ <sub>H</sub>			130		
3dB Bandwidth – min Frequency	F <sub>MIN</sub>	R1=50k, R2=1000k, Fin=1kHz		40	100	Hz
3dB Bandwidth – max Frequency	F <sub>MAX</sub>		10			KHz
Output Switching Frequency		F <sub>CLK</sub>		200		KHz
Gain1	A <sub>1</sub>	R1=50k, R2=500k R1=25k, R2=500k		32 37		dB
Power Supply Rejection Ratio	PSRR	Input Reference R1=50k, R2=500k		45		dB
Total Harmonic Distortion	THD1	R1=50k, R2=500k, Vin=5mVrms, Fin=1kHz R1=25k, R2=500k, Vin=5mVrms, Fin=1kHz		0.3 0.5		%
Input Referred Noise	V <sub>N-20</sub>	R1=50k, R2=500k, 100Hz-10kHz, No weighting R1=25k, R2=500k, 100Hz-10kHz, No weighting		4 3		μVrms
Output clock frequency	F <sub>CLK</sub>		140	200	300	KHz
Max absolute DC Offset OutN-OutP	V <sub>OFF-NP</sub>	No input signal	0	0.5	5	mV

CHARTS



Note: Graphs show distortion with no load outputs



CHARTS (CONTINUED)

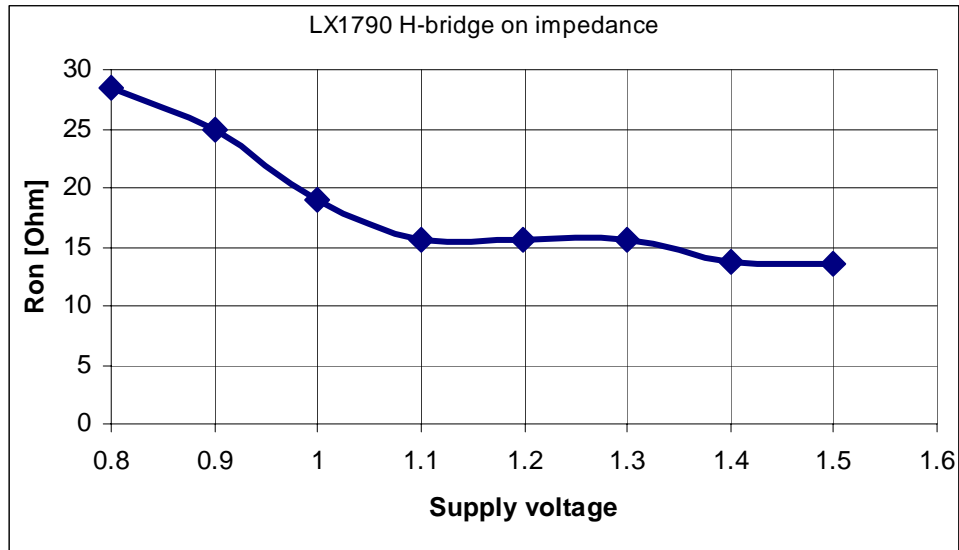
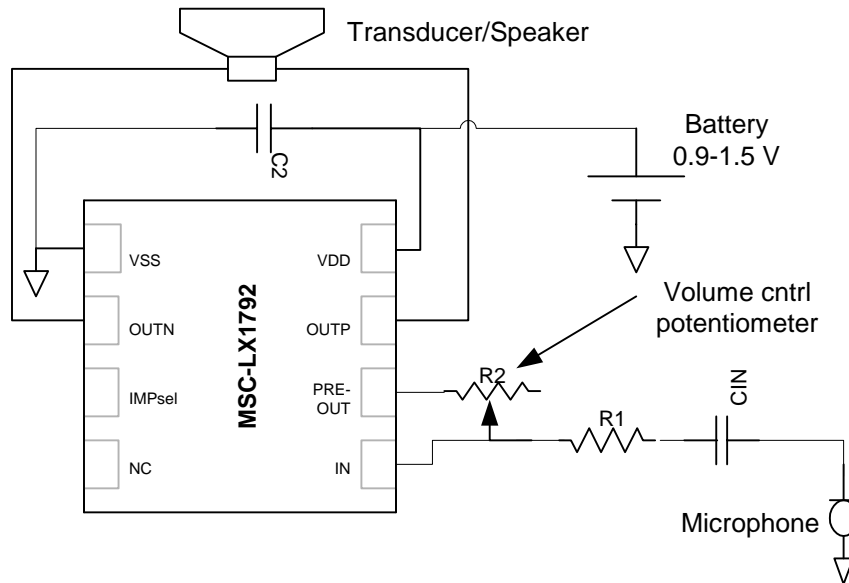
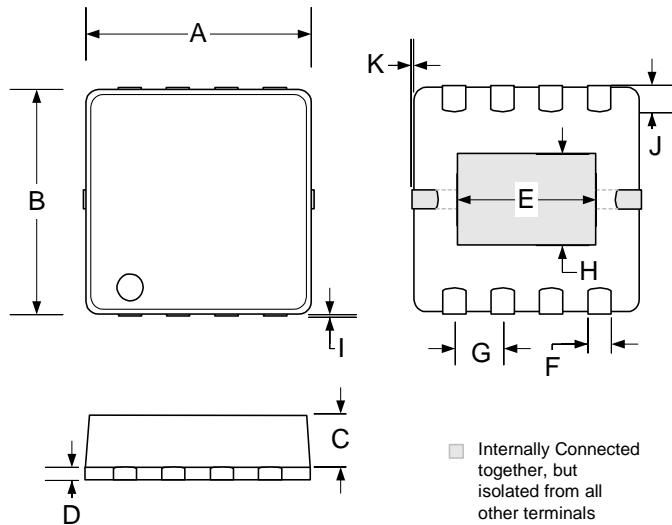


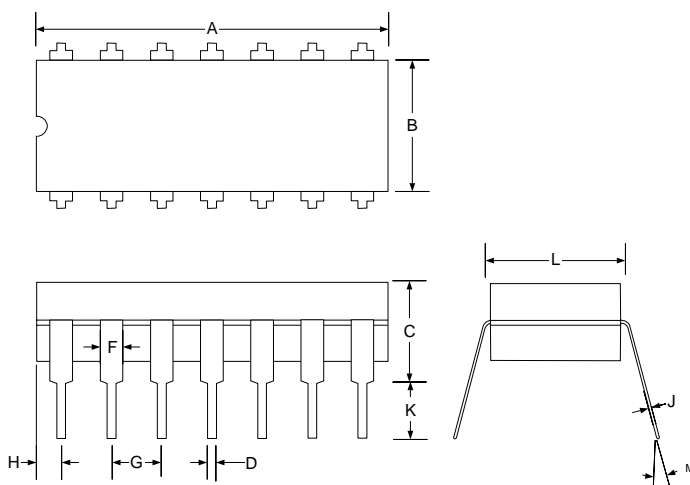
Figure 2 – H-Bridge Impedance vs. Supply Voltage (Lowest Impedance Setting)

**APPLICATION SCHEMATIC**

**SUGGESTED EXTERNAL APPLICATION COMPONENTS**

Component	Suggested value	Description
CIN	100nF	Input AC coupling capacitor, must be present
C2		For best performance this should be as close as possible to the supply pins
R1	> 25k Ohm	Input resistor > 25k Ohms
R2		Preamplifier feedback resistor
RX/CX		If the audio source (for example a microphone) has a low power supply rejection an additional filter for the supply to this have to be added.

**MECHANICAL - 8 PIN MLPQ PACKAGE OUTLINE**
**LM 8-Pin Plastic MLP-Micro Exposed Pad**


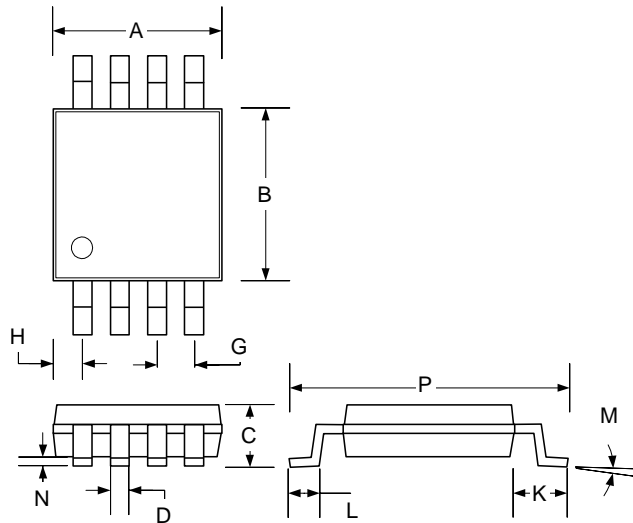
Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.65	0.75	0.025	0.029
D	0.15	0.25	0.005	0.009
E	1.841 BSC		0.075 BSC	
F	0.27	0.43	0.010	0.016
G	0.65 BSC		0.025 BSC	
H	1.22 BSC		0.048 BSC	
I	0	0.10	0	0.003
J	0.21	0.37	0.008	0.014
K	0	0.10	0	0.003

**J 14-Pin Ceramic Dip**


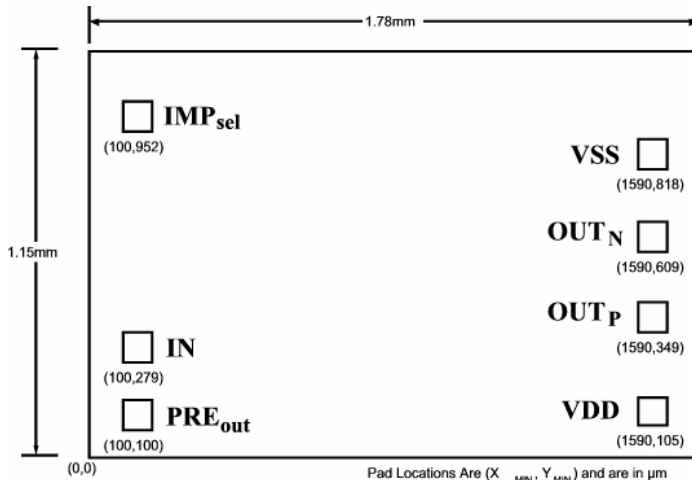
Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.30	19.94	0.760	0.785
B	5.59	7.11	0.220	0.280
C	-	5.08	-	0.200
D	0.38	0.51	0.015	0.020
F	1.02	1.77	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	-	2.03	-	0.080
J	0.20	0.38	0.008	0.015
K	3.18	5.08	0.125	0.200
L	7.37	7.87	0.290	0.310
M	-	15°	-	15°

**Note:**

- Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm(.006") on any side. Lead dimension shall not include solder coverage.

**MECHANICALS 7-PIN BARE DIE**
**DU**
**8-Pin MSOP**


Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.85	3.05	.112	.120
B	2.90	3.10	.114	.122
C	—	1.10	—	0.043
D	0.25	0.40	0.009	0.160
G	0.65 BSC		0.025 BSC	
H	0.38	0.64	0.015	0.025
J	0.13	0.18	0.005	0.007
K	0.95 BSC		0.037 BSC	
L	0.40	0.70	0.016	0.027
M	3°		3°	
N	0.05	0.15	0.002	0.006
P	4.75	5.05	0.187	0.198



Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
X		1.15		0.045
Y		1.78		0.070

**Note:**

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**NOTES**

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