

**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.

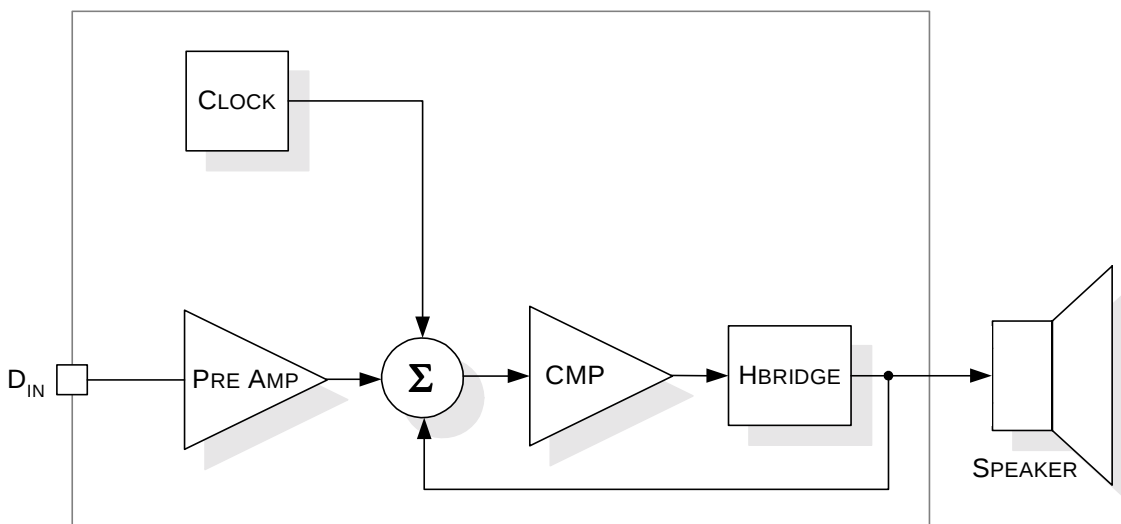
KEY FEATURES

- 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 _J (°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

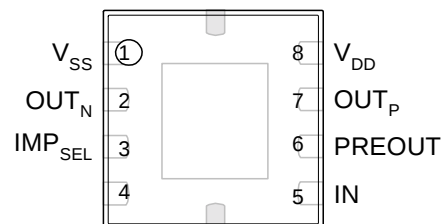
**Low Voltage, Low Power, AudioMite™
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PRELIMINARY SPECIFICATION
ABSOLUTE MAXIMUM RATINGS

Input Logic Supply Voltage (V_{DD}).....-0.3V to +3.0V
 Operating Temperature Range10°C to 55°C

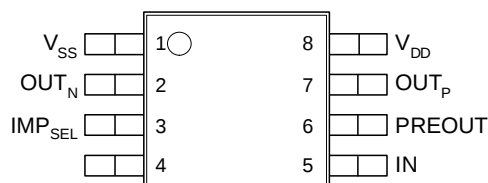
Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

SETTINGS

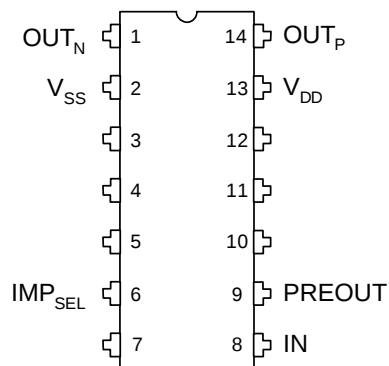
PIN	IMP _{SEL} =VSS	IMP _{SEL} =VDD	IMP _{SEL} =Floating
IMP _{SEL}	16Ω	24Ω	48Ω

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_{DD}	13	8	8	Supply Voltage
V_{SS}	2	1	1	Ground
IN	8	5	5	Analog Audio Input
OUT _P	14	7	7	Positive Output Voltage
OUT _N	1	2	2	Negative Output Voltage
PREOUT	9	6	6	Pre amplifier output
IMP _{SEL}	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	
▶ OPERATING CONDITIONS						
Supply Voltage	V _{DD}		0.9		1.5	V
Ground	V _{SS}			0		V

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the operating ambient temperature $T_A=25^{\circ}\text{C}$ except where otherwise noted. Test conditions: $V_{DD}=1.3\text{V}$, $V_{SS}=0\text{V}$, Circuit connected as application schematic on page 5, Output loaded with 200Ohm in series with 60mH.

Parameter	Symbol	Test Conditions	LX1792			Units
			Min	Typ	Max	
Switch Output Resistance @ Low Drive	R_{OUT-L}			48		Ω
Switch Output Resistance @ Med Drive	R_{OUT-M}			24		
Switch Output Resistance @ High Drive	R_{OUT-HI}			16	19	
Quiescent Current @ Low Drive	$IDDQ_L$	No load		110		μA
Quiescent Current @ Med Drive	$IDDQ_M$			120		
Quiescent Current @ High Drive	$IDDQ_H$			130		
3dB Bandwidth – min Frequency	F_{MIN}	R1=50k, R2=1000k, $F_{in}=1\text{kHz}$		40	100	Hz
3dB Bandwidth – max Frequency	F_{MAX}		10			KHz
Output Switching Frequency		F_{CLK}		200		KHz
Gain1	A_1	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, $V_{in}=5\text{mVrms}$, $F_{in}=1\text{kHz}$ R1=25k, R2=500k, $V_{in}=5\text{mVrms}$, $F_{in}=1\text{kHz}$		0.3 0.5		%
Input Referred Noise	V_{N-20}	R1=50k, R2=500k, 100Hz-10kHz, No weighting R1=25k, R2=500k, 100Hz-10kHz, No weighting		4 3		μVrms
Output clock frequency	F_{CLK}		140	200	300	KHz
Max absolute DC Offset OutN-OutP	V_{OFF-NP}	No input signal	0	0.5	5	mV



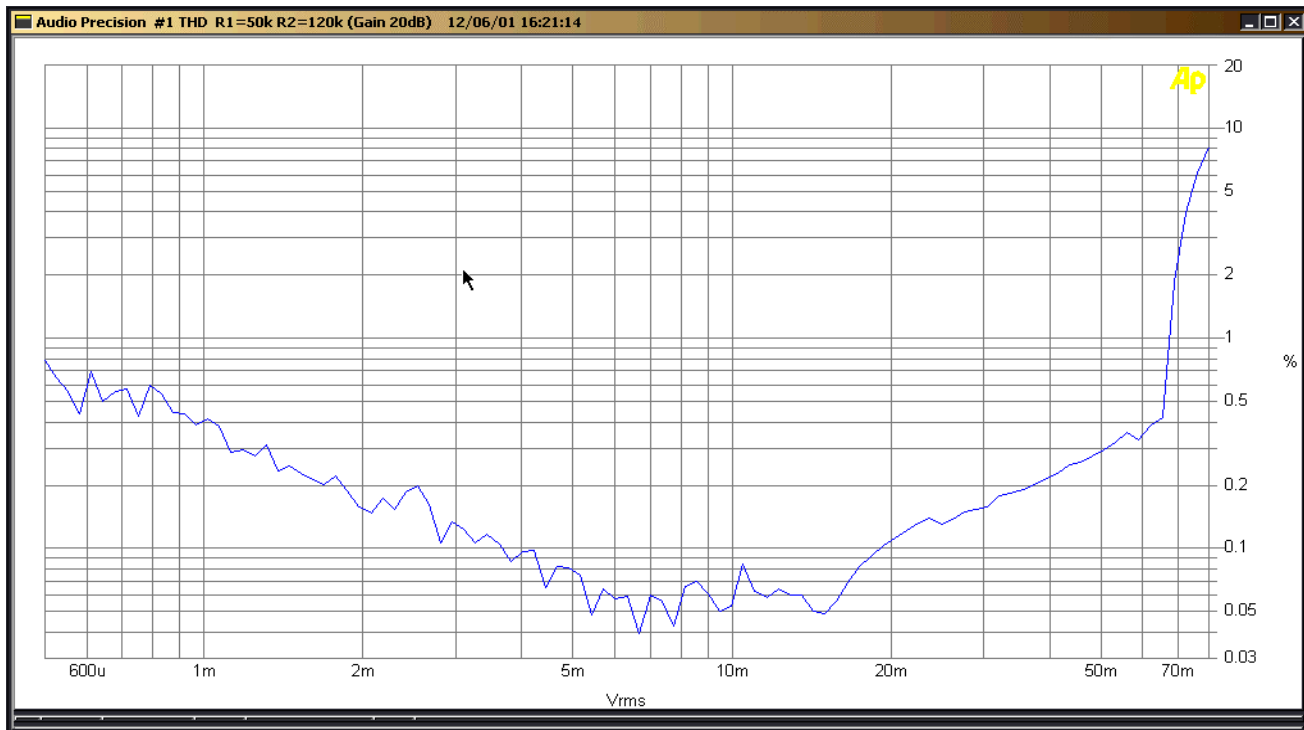
Microsemi
INTEGRATED PRODUCTS

LX1792

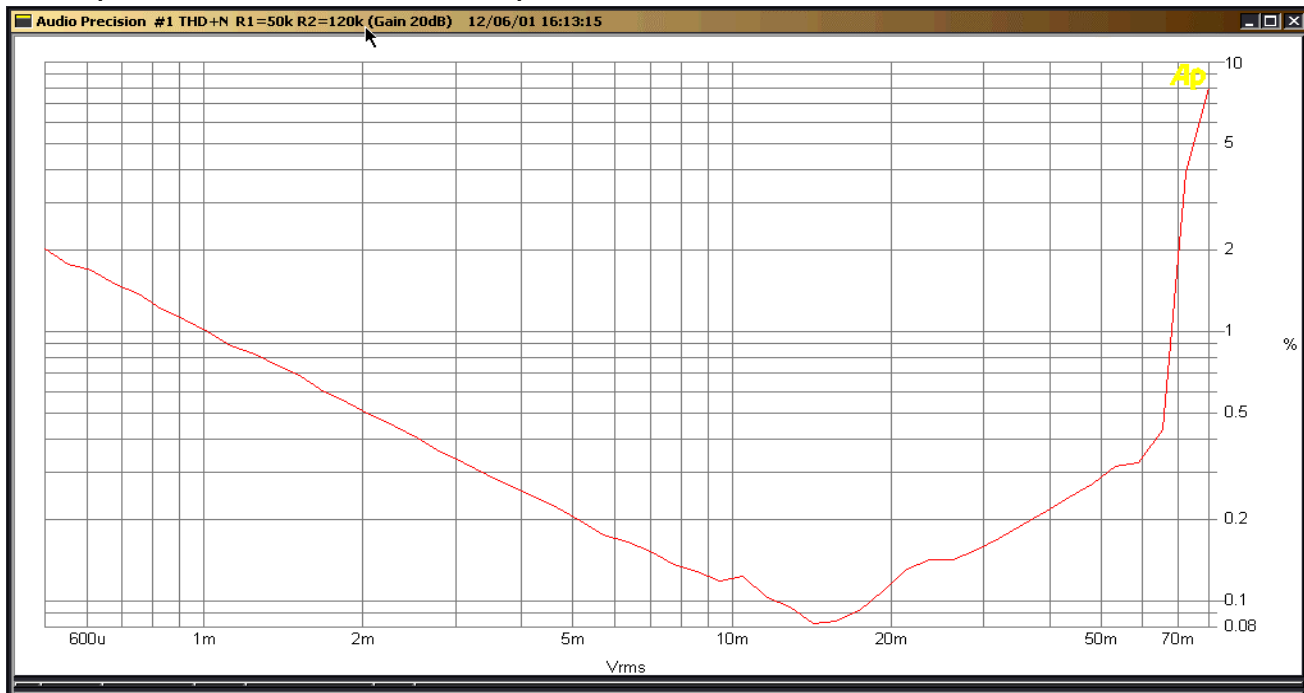
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PRELIMINARY SPECIFICATION

CHARTS



Note: Graphs show distortion with no load outputs



CHARTS (CONTINUED)

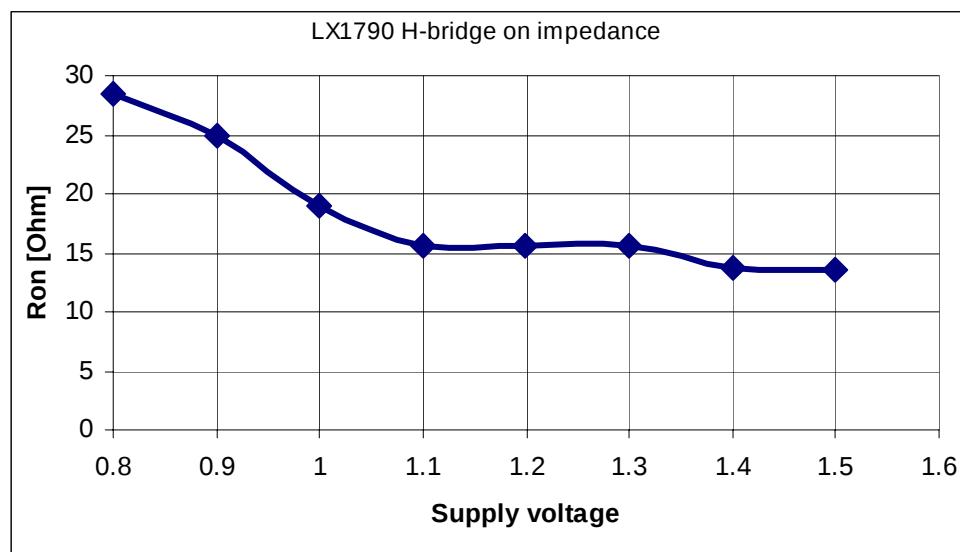
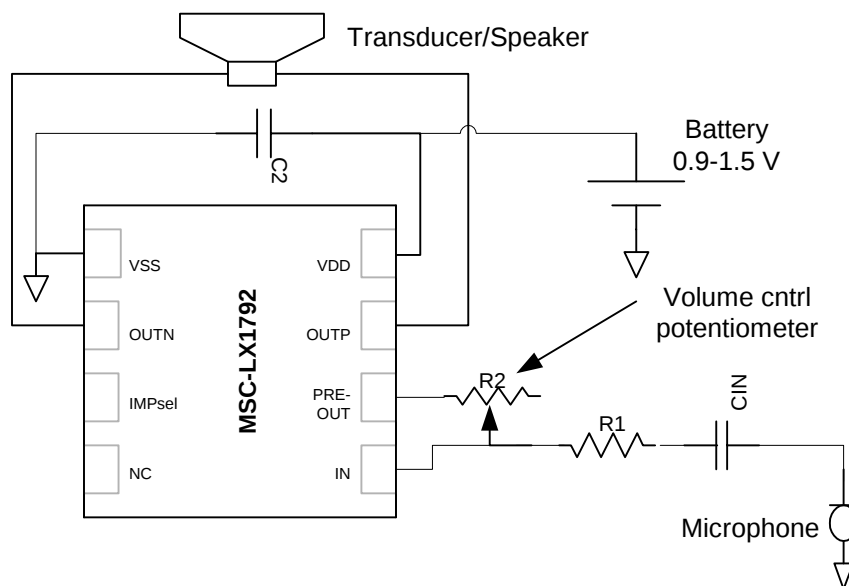
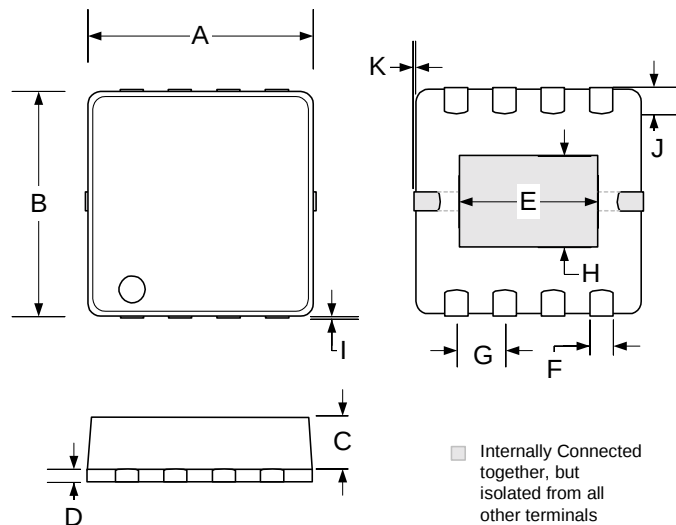


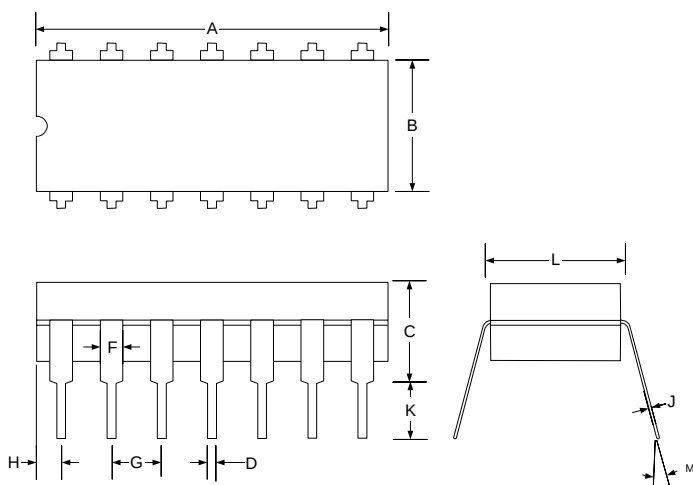
Figure 2 – H-Bridge Impedance vs. Supply Voltage (Lowest Impedance Setting)

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


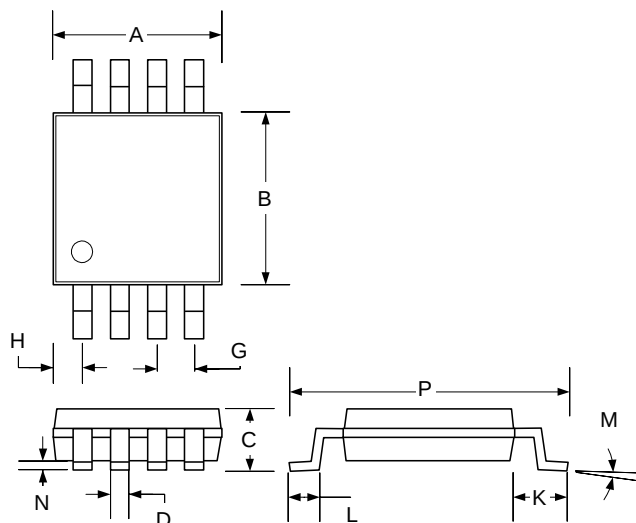
Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.65	0.75	0.025	0.029
D	0.15	0.25	0.005	0.009
E	1.841 BSC		0.075 BSC	
F	0.27	0.43	0.010	0.016
G	0.65 BSC		0.025 BSC	
H	1.22 BSC		0.048 BSC	
I	0	0.10	0	0.003
J	0.21	0.37	0.008	0.014
K	0	0.10	0	0.003

J 14-Pin Ceramic Dip


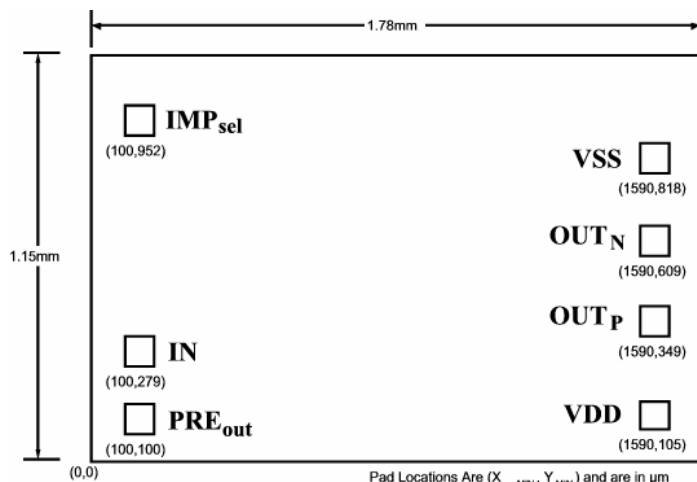
Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.30	19.94	0.760	0.785
B	5.59	7.11	0.220	0.280
C	-	5.08	-	0.200
D	0.38	0.51	0.015	0.020
F	1.02	1.77	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	-	2.03	-	0.080
J	0.20	0.38	0.008	0.015
K	3.18	5.08	0.125	0.200
L	7.37	7.87	0.290	0.310
M	-	15°	-	15°

Note:

1. 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.

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PRELIMINARY SPECIFICATION
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:

1. 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.

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PRELIMINARY SPECIFICATION

NOTES

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