

**BIPOLAR ANALOG INTEGRATED CIRCUIT**

**$\mu$ PC1316**

**DUAL AUDIO POWER AMPLIFIER**

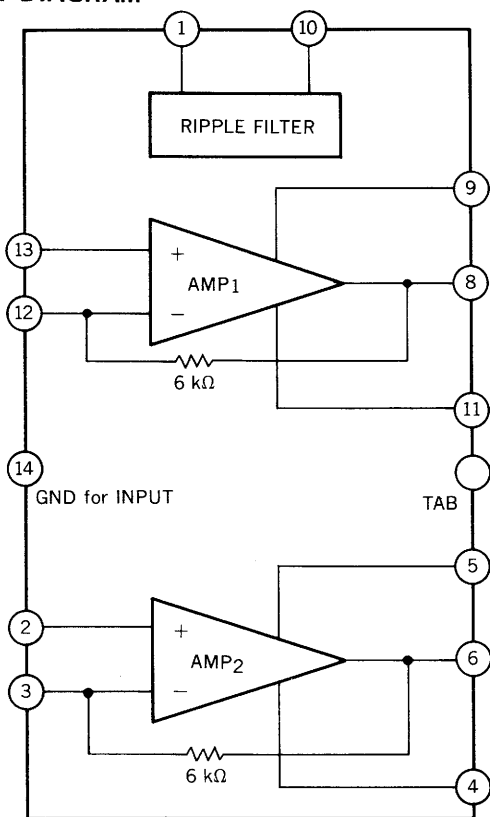
**DESCRIPTION**

The  $\mu$ PC1316 is a dual audio power amplifier designed for portable audio sets.

**FEATURES**

- Wide operating voltage range.  $V_{CC} = 3$  to  $16$  V
- High output power.  $P_O = 2$  W TYP. @  $12$  V /  $8 \Omega$  / 10 %  
 $P_O = 1.6$  W TYP. @  $9$  V /  $4 \Omega$  / 10 %  
 $P_O = 1.2$  W TYP. @  $9$  V /  $8 \Omega$  / 10 %  
 $P_O = 0.7$  W TYP. @  $6$  V /  $4 \Omega$  / 10 %  
 $P_O = 0.5$  W TYP. @  $6$  V /  $8 \Omega$  / 10 %  
 $P_O = 80$  mW @  $4.5$  V /  $32 \Omega$  / 10 %  
 ( $V_{CC} / R_L / THD$ )
- High supply voltage rejection. SVR = 45 dB
- Low quiescent current.  $I_{CC} = 12$  mA
- Low pop noise at power switch on and off.

**BLOCK DIAGRAM**



**CONNECTION DIAGRAM**

PIN NO	CONNECTION
1	Filter
2	Input 2
3	NFB 2
4	Compensation 2
5	Bootstrap 2
6	Output 2
7	NC
TAB	GND
8	Output 1
9	Bootstrap 1
10	$V_{CC}$
11	Compensation 1
12	NFB 1
13	Input 1
14	GND

**ORDERING INFORMATION**

PART NUMBER	PACKAGE	QUALITY GRADE
μPC1316C	14 PIN PLASTIC DIP WITH TAB (300 mil)	Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25 °C)**

Supply Voltage (No Signal)	V <sub>CC1</sub>	18	V
Supply Voltage (Operating)	V <sub>CC2</sub>	16	V
Power Dissipation	P <sub>D</sub>	2.4 *	W
Operating Temperature	T <sub>opt</sub>	-20 to +70	°C
Storage Temperature	T <sub>stg</sub>	-40 to +150	°C

\* 50 x 50 x 0.035 mm Copper heat sink on PCB

**RECOMMENDED OPERATING CONDITIONS (T<sub>a</sub> = 25 °C)**

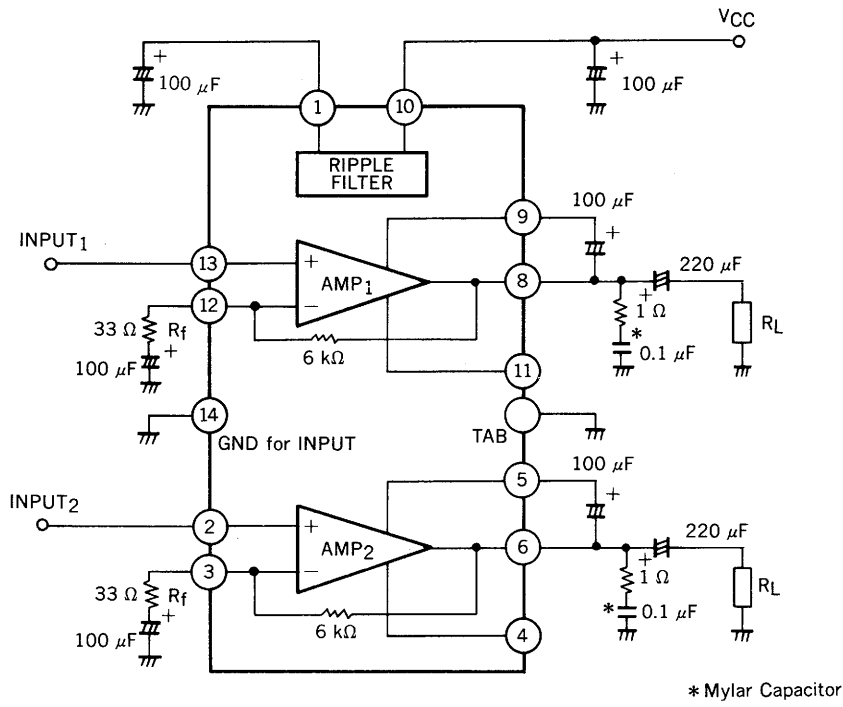
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage (R <sub>L</sub> =16 Ω)	V <sub>CC</sub> (16)	3		16	V
Supply Voltage (R <sub>L</sub> =8 Ω)	V <sub>CC</sub> (8)	3		13	V
Supply Voltage (R <sub>L</sub> =4 Ω)	V <sub>CC</sub> (4)	3		9	V
Load Impedance	R <sub>L</sub>	4	8		Ω
Voltage Gain	A <sub>v</sub>	34	44		dB

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

(V<sub>CC</sub>=9 V, R<sub>f</sub>=33 Ω, f=1 kHz, R<sub>L</sub>=8 Ω)

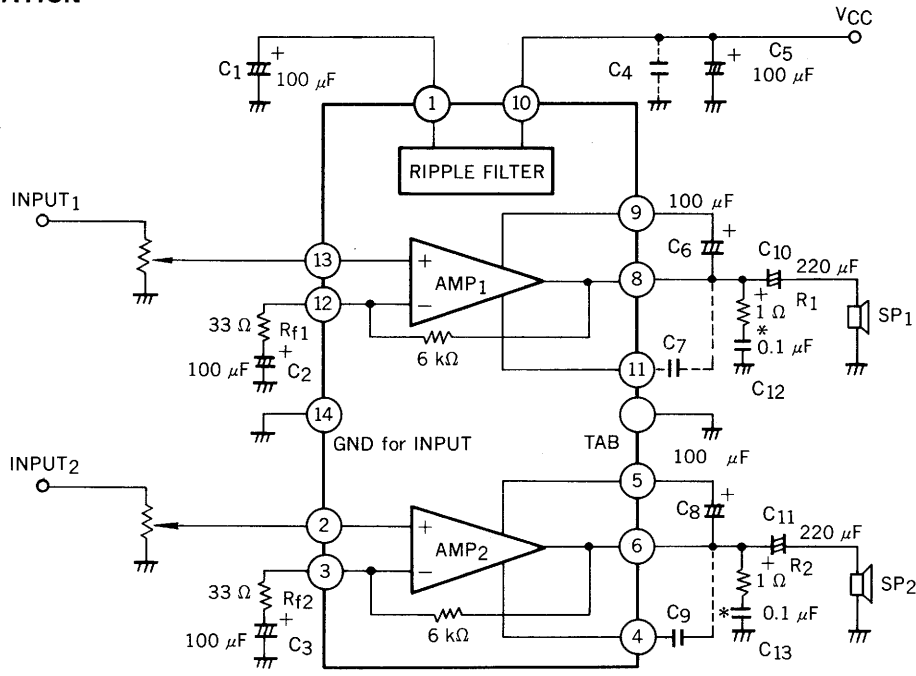
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Circuit Current	I <sub>CC</sub>		12	25	mA	No Signal
Voltage Gain	A <sub>v1</sub>	41	44	47	dB	P <sub>O</sub> =0.25 W, R <sub>f</sub> =33 Ω
	A <sub>v2</sub>		34		dB	P <sub>O</sub> =0.25 W, R <sub>f</sub> =120 Ω
Output Power	P <sub>O1</sub>		2		W	V <sub>CC</sub> =12 V, R <sub>L</sub> =8 Ω, THD = 10 %
	P <sub>O2</sub>		1.6		W	V <sub>CC</sub> =9 V, R <sub>L</sub> =4 Ω, THD = 10 %
	P <sub>O3</sub>	0.9	1.2		W	V <sub>CC</sub> =9 V, R <sub>L</sub> =8 Ω, THD = 10 %
	P <sub>O4</sub>		0.7		W	V <sub>CC</sub> =6 V, R <sub>L</sub> =4 Ω, THD = 10 %
	P <sub>O5</sub>		0.5		W	V <sub>CC</sub> =6 V, R <sub>L</sub> =8 Ω, THD = 10 %
	P <sub>O6</sub>		80		mW	V <sub>CC</sub> =4.5 V, R <sub>L</sub> =32 Ω, THD = 10 %
Total Harmonic Distortion	THD1		0.4	1.6	%	P <sub>O</sub> =0.5 W, R <sub>f</sub> =33 Ω
	THD2		0.3		%	P <sub>O</sub> =0.5 W, R <sub>f</sub> =120 Ω
Output Noise Voltage	NL		0.9	1.5	mV <sub>r.m.s.</sub>	R <sub>G</sub> =10 kΩ
Supply Voltage Rejection	SVR	36	45		dB	R <sub>G</sub> =0, f(ripple)=100 Hz, V(ripple)=0.3 V <sub>r.m.s.</sub>
Cross Talk	CT	40	55		dB	R <sub>G</sub> =0, P <sub>O</sub> =0.25 W
Channel Balance	ChB	-2	0	2	dB	P <sub>O</sub> =0.25 W
Input Impedance	Z <sub>in</sub>		5		MΩ	

TEST CIRCUIT



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TYPICAL APPLICATION

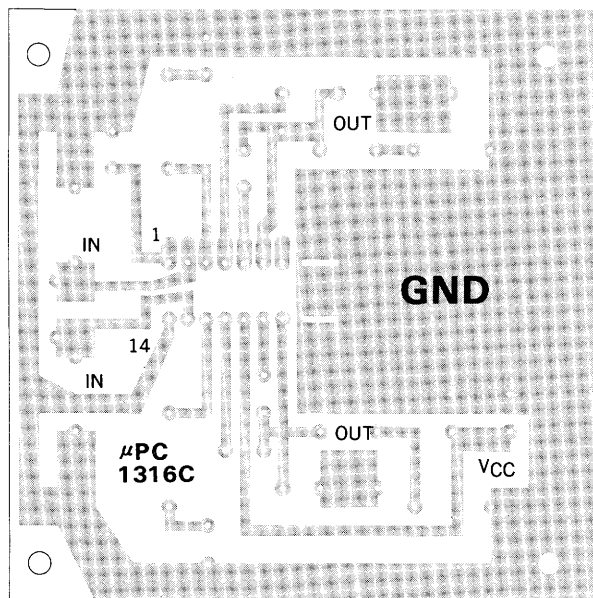


\* Mylar Capacitor

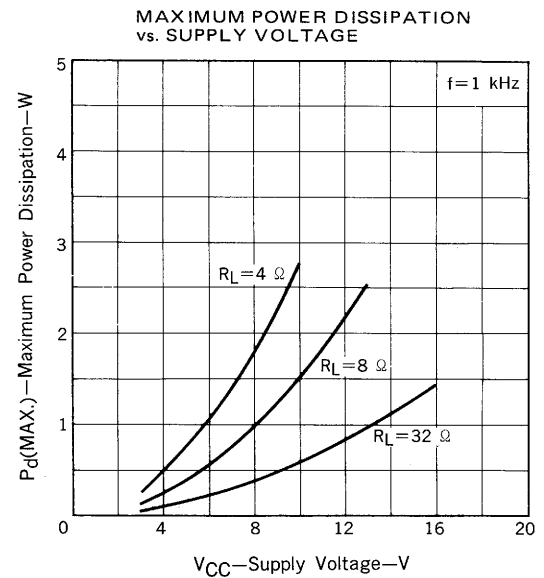
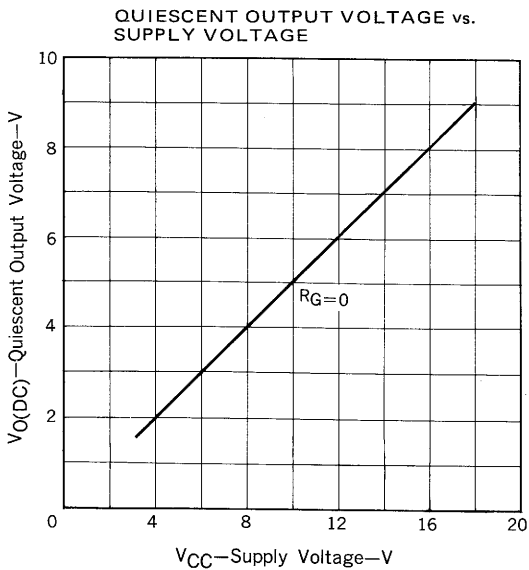
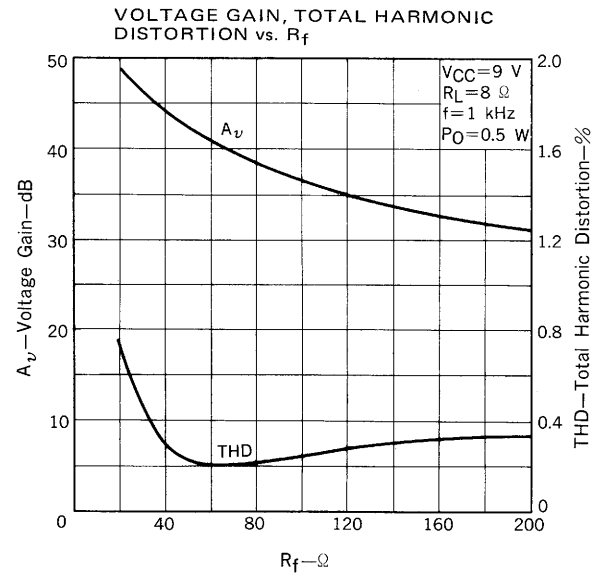
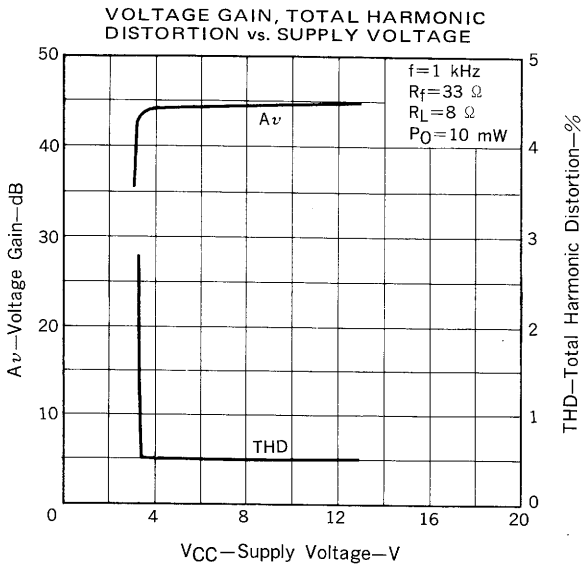
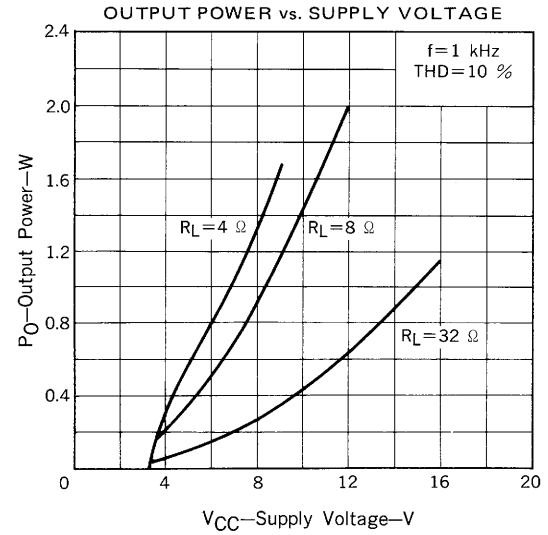
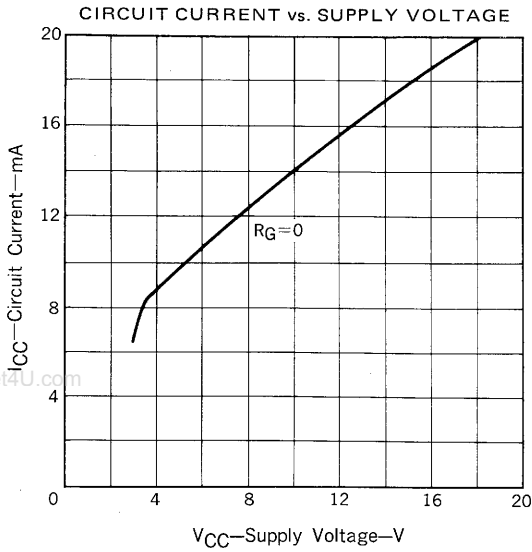
NOTE FOR USE

- (1) Mylar capacitor is recommended as C<sub>12</sub>, C<sub>13</sub>.
- (2) Add C<sub>7</sub>, C<sub>9</sub>, in the case of reducing voltage gain at high frequency.
- (3) Add C<sub>4</sub> or increase capacitance of C<sub>12</sub>, C<sub>13</sub> when a oscillation may occur due to the pattern layout on PCB.
- (4) Voltage gain can be changed by value of R<sub>f1</sub>, R<sub>f2</sub>. The voltage gain should be set more than 34 dB.
- (5) When a input capacitor is connected the input terminal, a bias resistor should be connected between its terminal and GND.

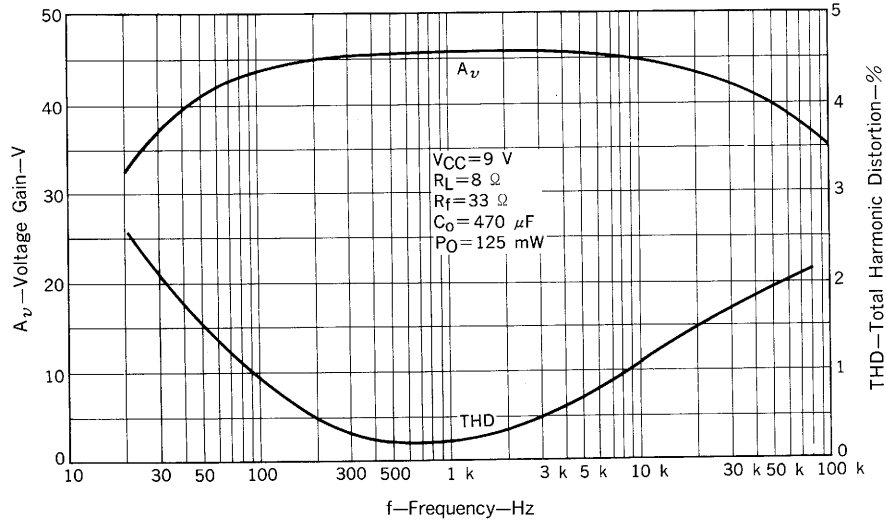
EXAMPLE FOR PRINTED CIRCUIT BOARD (Copper foil side)



TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

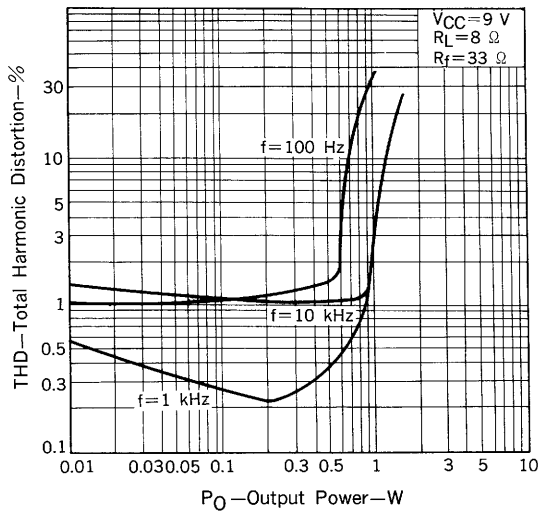


VOLTAGE GAIN, TOTAL HARMONIC DISTORTION vs. FREQUENCY

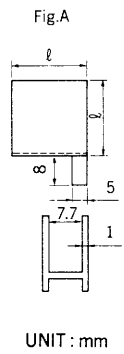
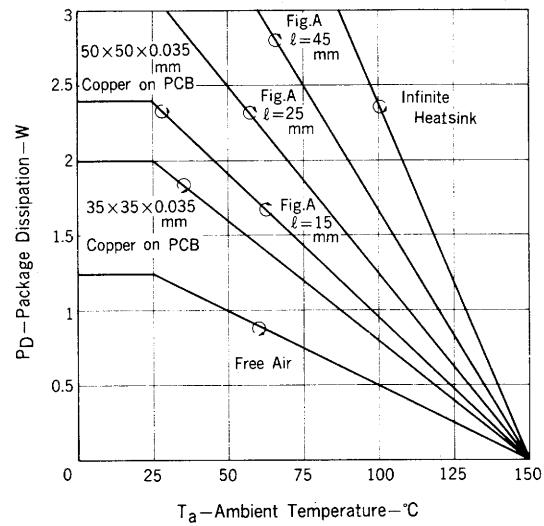


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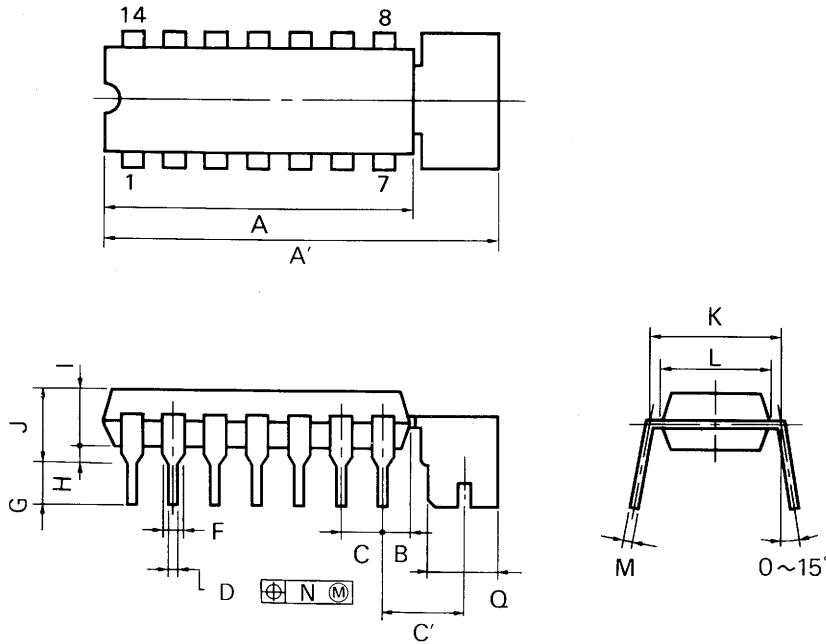
TOTAL HARMONIC DISTORTION vs. OUTPUT POWER



PACKAGE DISSIPATION vs. AMBIENT TEMPERATURE



14PIN PLASTIC DIP WITH TAB (300 mil)



P14CT-100-300B

NOTES

- 1) Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.
- 2) Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS	INCHES
A	20.32 MAX.	0.800 MAX.
A'	24.60 MAX.	0.969 MAX.
B	2.54 MAX.	0.100 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
C'	4.74	0.187
D	0.50 <sup>-0.10</sup>	0.020 <sup>+0.004</sup> <sub>-0.005</sub>
F	1.1 MIN.	0.043 MIN.
G	3.4 <sup>±0.3</sup>	0.134 <sup>±0.012</sup>
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
M	0.30 <sup>+0.10</sup> <sub>-0.05</sub>	0.012 <sup>+0.004</sup> <sub>-0.003</sub>
N	0.25	0.01
Q	4.40 <sup>±0.50</sup>	0.173 <sup>±0.020</sup>

[MEMO]

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