



# Low Power Narrowband FM IF

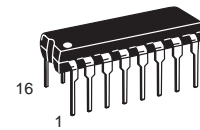
The MC3361B includes an Oscillator, Mixer, Limiting Amplifier, Quadrature Discriminator, Active Filter, Squelch, Scan Control and Mute Switch. This device is designed for use in FM dual conversion communications equipment.

- Operates from 2.0 to 8.0 V Supply
- Low Drain Current 3.9 mA Typical @  $V_{CC} = 4.0$  Vdc
- Excellent Sensitivity: Input Limiting Voltage  $-3.0$  dB =  $2.6 \mu\text{V}$  Typical
- Low Number of External Parts Required
- Operating Frequency Up to 60 MHz

## MC3361B

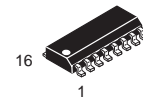
### LOW POWER NARROWBAND FM IF

#### SEMICONDUCTOR TECHNICAL DATA



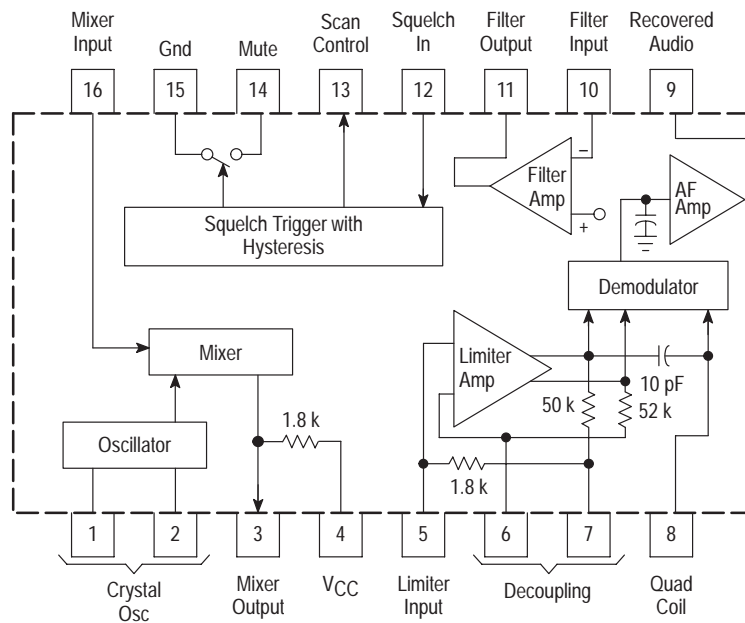
**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648

*Not Recommended for New Design*



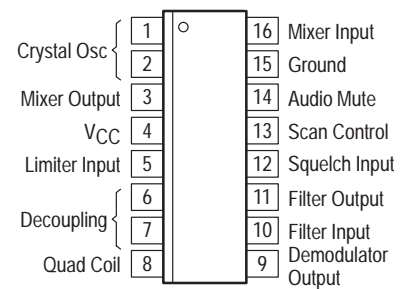
**D SUFFIX**  
PLASTIC PACKAGE  
CASE 751B  
(SO-16)

#### Representative Block Diagram



This device contains 92 active transistors.

#### PIN CONNECTIONS



(Top View)

#### ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC3361BD	$T_A = -30$ to $70^\circ\text{C}$	SO-16
MC3361BP		Plastic DIP

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## MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise noted.)

Rating	Pin	Symbol	Value	Unit
Power Supply Voltage	4	V <sub>CC(max)</sub>	10	Vdc
Operating Supply Voltage Range	4	V <sub>CC</sub>	2.0 to 8.0	Vdc
Detector Input Voltage	8	–	1.0	V <sub>pp</sub>
Input Voltage (V <sub>CC</sub> ≥ 4.0 V)	16	V <sub>16</sub>	1.0	V <sub>rms</sub>
Mute Function	14	V <sub>14</sub>	–0.5 to 5.0	V <sub>pk</sub>
Junction Temperature	–	T <sub>J</sub>	150	°C
Operating Ambient Temperature Range	–	T <sub>A</sub>	–30 to 70	°C
Storage Temperature Range	–	T <sub>stg</sub>	–65 to 150	°C

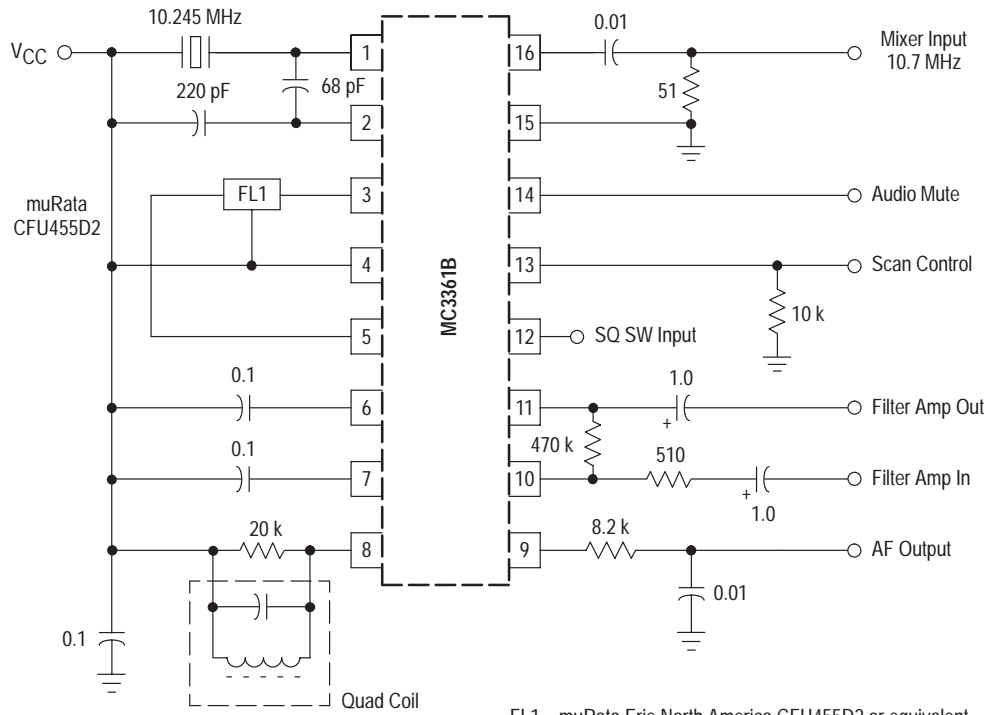
- NOTES:** 1. Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the limits in the Electrical Characteristics tables or Pin Descriptions section.  
2. ESD data available upon request.

## ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 4.0 Vdc, f<sub>0</sub> = 10.7 MHz, Δf = ± 3.0 kHz, f<sub>mod</sub> = 1.0 kHz, T<sub>A</sub> = 25°C, unless otherwise noted.)

Characteristic	Pin	Min	Typ	Max	Unit	
Drain Current (No Signal)	4	Squelch "Off"	2.9	3.9	4.9	mA
		Squelch "On"	4.4	5.4	6.4	
Recovered Audio Output Voltage (V <sub>in</sub> = 10 mVrms)	9	130	160	200	mVrms	
Input Limiting Voltage (–3.0 dB Limiting)	16	–	2.6	6.0	μV	
Total Harmonic Distortion	9	–	0.86	–	%	
Recovered Output Voltage (No Input Signal)	9	60	120	250	mVrms	
Drop Voltage AF Gain Loss	9	–3.0	–0.6	–	dB	
Detector Output Impedance	–	–	450	–	Ω	
Filter Gain (10 kHz) (V <sub>in</sub> = 0.3 mVrms)	–	40	50	–	dB	
Filter Output Voltage	11	1.0	1.3	1.6	Vdc	
Mute Function Low	14	–	30	50	Ω	
Mute Function High	14	1.0	11	–	MΩ	
Scan Function Low (Mute "Off") (V <sub>12</sub> = 1.0 Vdc)	13	–	0	0.4	Vdc	
Scan Function High (Mute "On") (V <sub>12</sub> = Gnd)	13	3.0	3.5	–	Vdc	
Trigger Hysteresis	–	–	45	100	mV	
Mixer Conversion Gain	3	–	28	–	dB	
Mixer Input Resistance	16	–	3.3	–	kΩ	
Mixer Input Capacitance	16	–	2.2	–	pF	

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Figure 1. Test Circuit



FL1 – muRata Erie North America CFU455D2 or equivalent  
 Quadrature Coil – Toko America Type 7MC-8128Z or equivalent  
 C –  $\mu\text{F}$ , unless noted

Figure 2. Audio Output, Distortion versus Supply Voltage

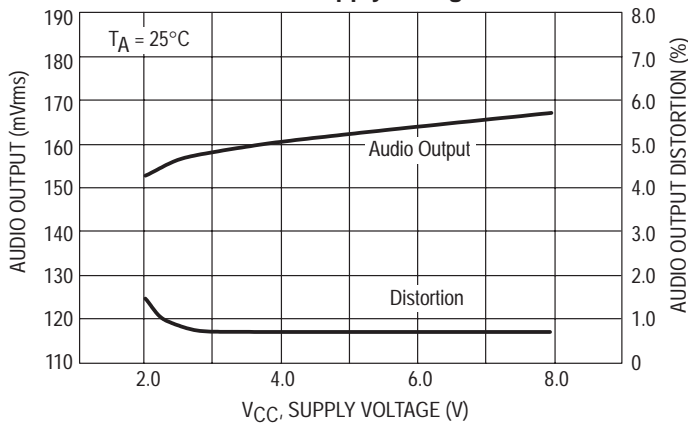


Figure 3. Audio Output, Distortion versus Temperature

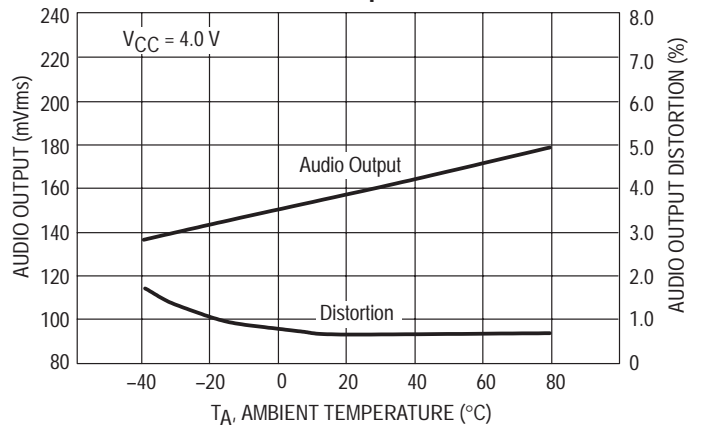
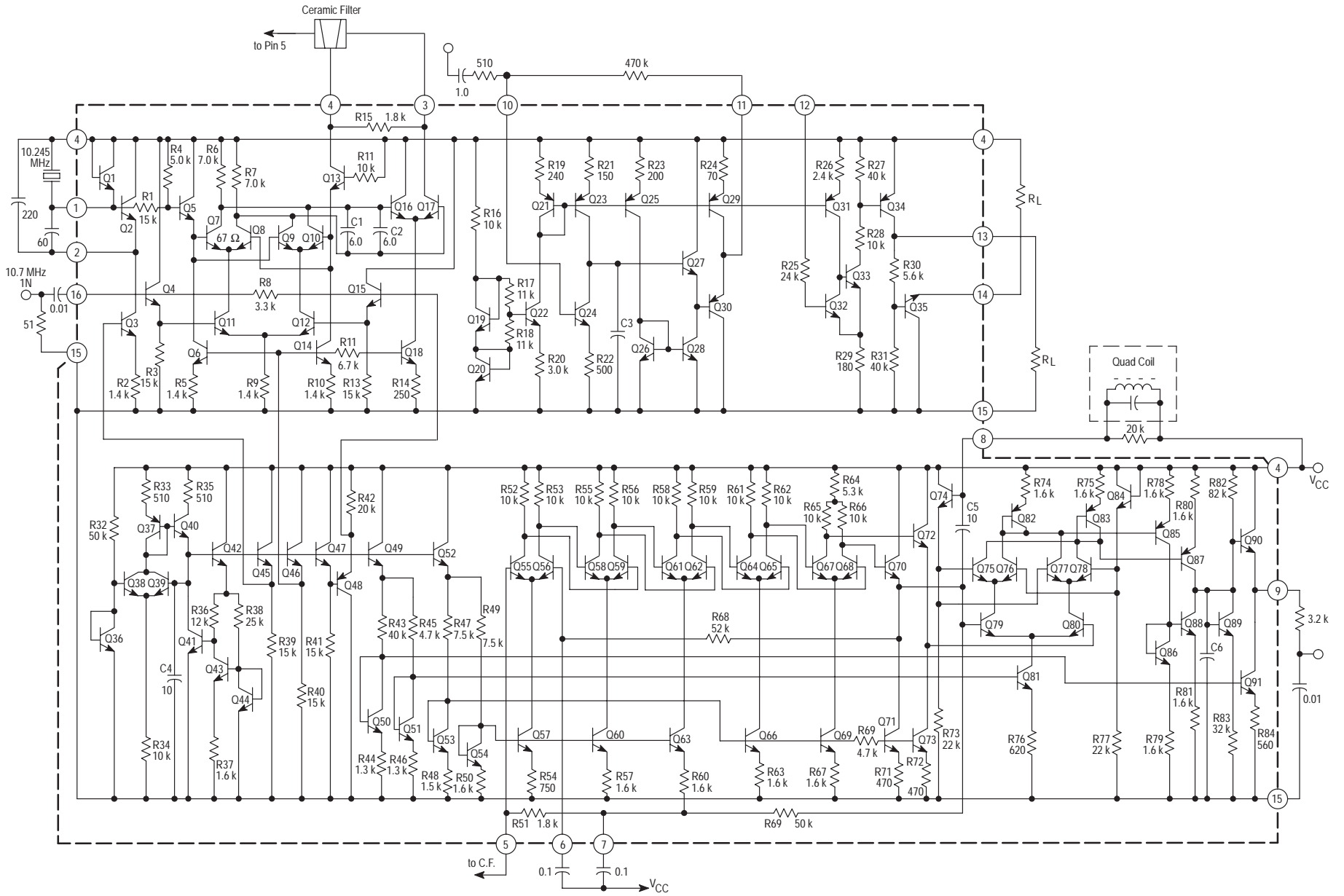


Figure 4. Low Voltage Low Power Narrowband FM IF



MC3361B

Figure 5. Input Limiting Voltage

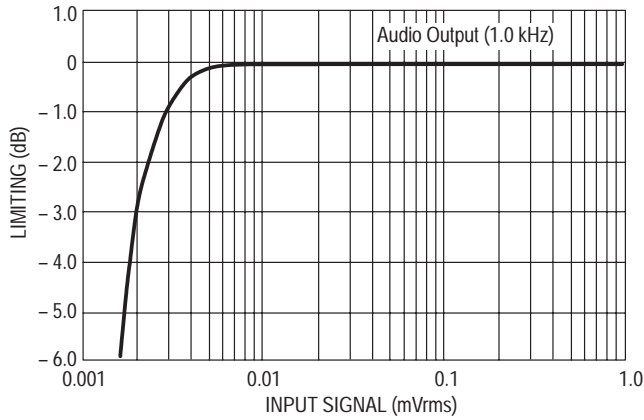


Figure 6. Overall Gain, Noise and AM Rejection

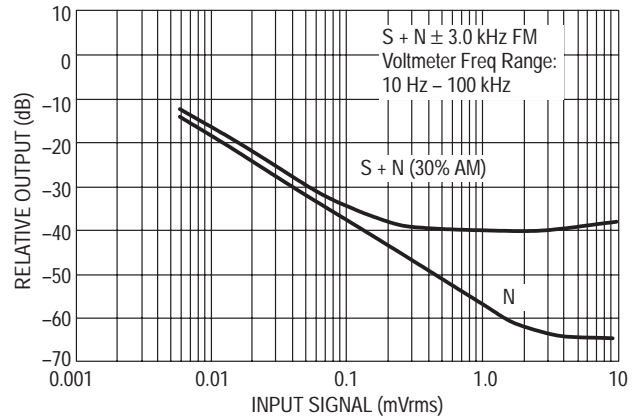


Figure 7. Filter Amp Response

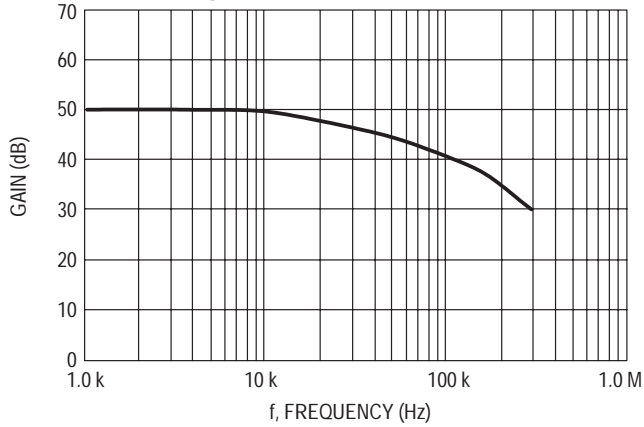


Figure 8. Filter Amp Gain

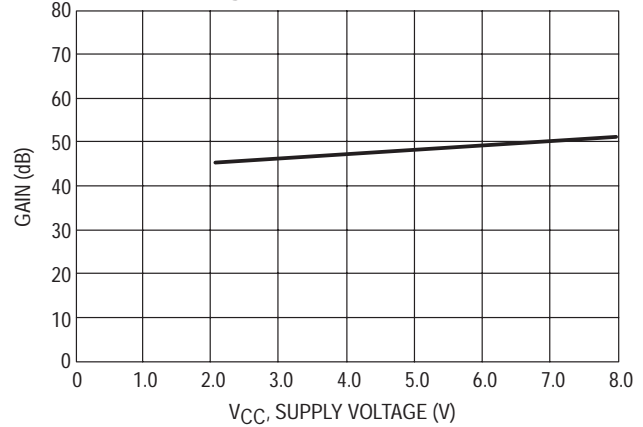
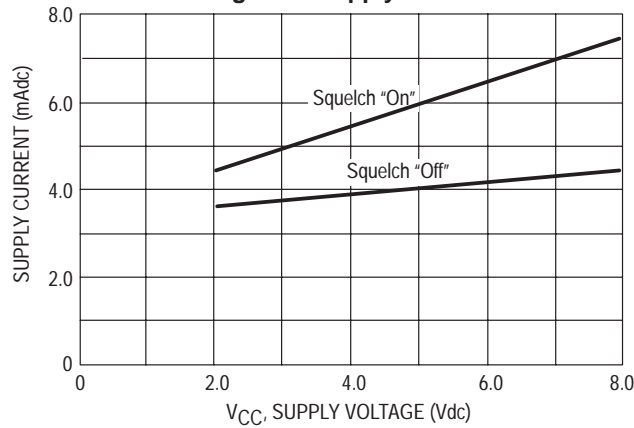
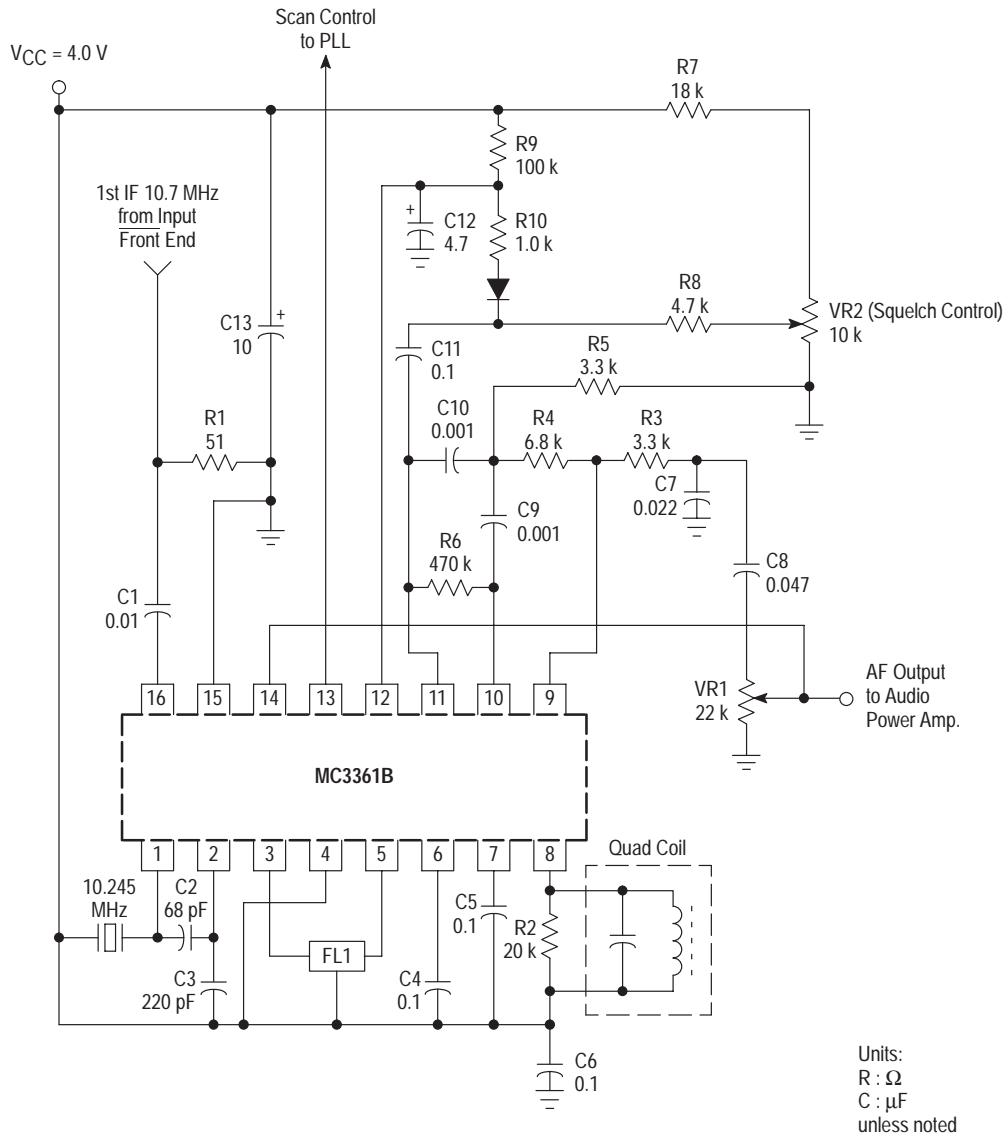


Figure 9. Supply Current



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Figure 10. Simplified Application

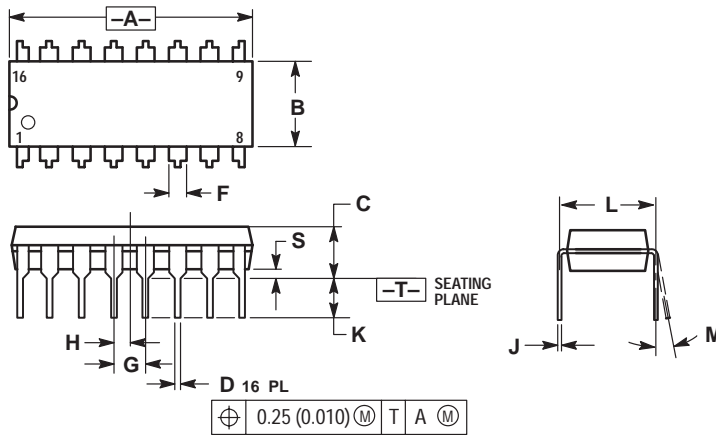


FL1 – muRata Erie North America Type CFU455D2 or equivalent  
Quadrature Coil – Toko America Type 7MC-8128Z or equivalent

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## OUTLINE DIMENSIONS

### P SUFFIX PLASTIC PACKAGE CASE 648-08 ISSUE R

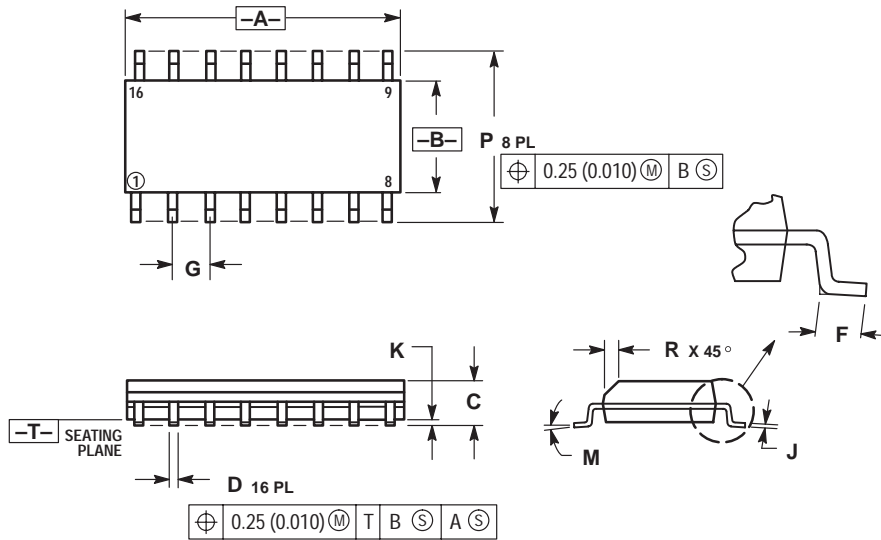


#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0° 10°		0° 10°	
S	0.020	0.040	0.51	1.01


### D SUFFIX PLASTIC PACKAGE CASE 751B-05 (SO-16) ISSUE J



#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0° 7°		0° 7°	
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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