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Low Power Narrowband FM IF

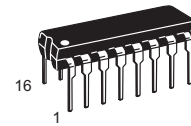
The MC3361B includes an Oscillator, Mixer, Limiting Amplifier, Quadrature Discriminator, Active Filter, Squelch, Scan Control and Mute Switch. This device is designed for use in FM dual conversion communications equipment.

- 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

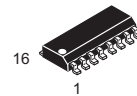
LOW POWER NARROWBAND FM IF

SEMICONDUCTOR TECHNICAL DATA



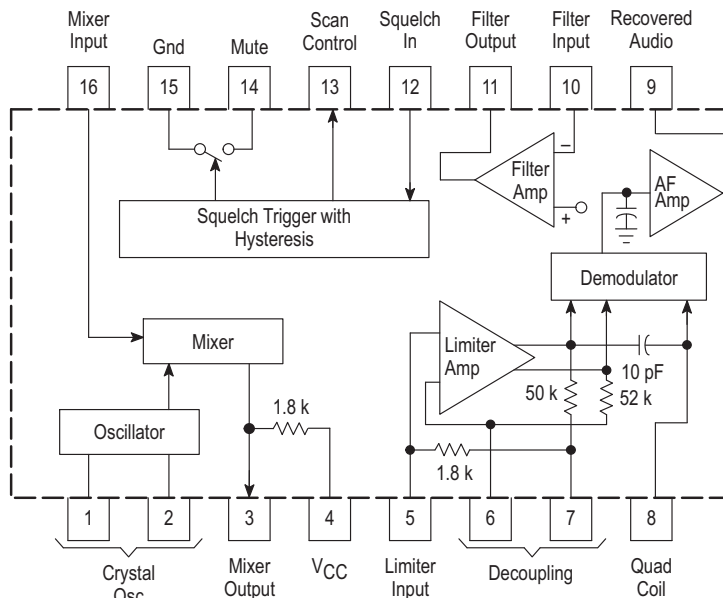
P SUFFIX
PLASTIC PACKAGE
CASE 648

Not Recommended for New Design



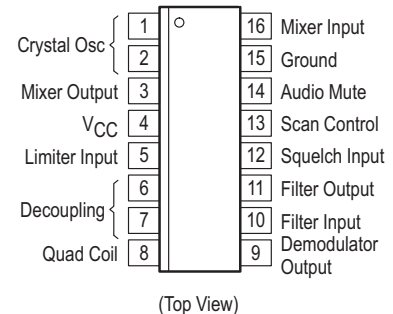
D SUFFIX
PLASTIC PACKAGE
CASE 751B
(SO-16)

Representative Block Diagram



This device contains 92 active transistors.

PIN CONNECTIONS



ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC3361BD	$T_A = -30$ to 70°C	SO-16
MC3361BP		Plastic DIP

MC3361B

MAXIMUM RATINGS (T_A = 25°C, unless otherwise noted.)

Rating	Pin	Symbol	Value	Unit
Power Supply Voltage	4	V _{CC(max)}	10	Vdc
Operating Supply Voltage Range	4	V _{CC}	2.0 to 8.0	Vdc
Detector Input Voltage	8	–	1.0	V _{pp}
Input Voltage (V _{CC} ≥ 4.0 V)	16	V ₁₆	1.0	V _{rms}
Mute Function	14	V ₁₄	–0.5 to 5.0	V _{pk}
Junction Temperature	–	T _J	150	°C
Operating Ambient Temperature Range	–	T _A	–30 to 70	°C
Storage Temperature Range	–	T _{stg}	–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_{CC} = 4.0 Vdc, f_o = 10.7 MHz, Δf = ± 3.0 kHz, f_{mod} = 1.0 kHz, T_A = 25°C, unless otherwise noted.)

Characteristic	Pin	Min	Typ	Max	Unit
Drain Current (No Signal)	4				mA
Squelch "Off"		2.9	3.9	4.9	
Squelch "On"		4.4	5.4	6.4	
Recovered Audio Output Voltage (V _{in} = 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 _{in} = 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 ₁₂ = 1.0 Vdc)	13	–	0	0.4	Vdc
Scan Function High (Mute "On") (V ₁₂ = 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

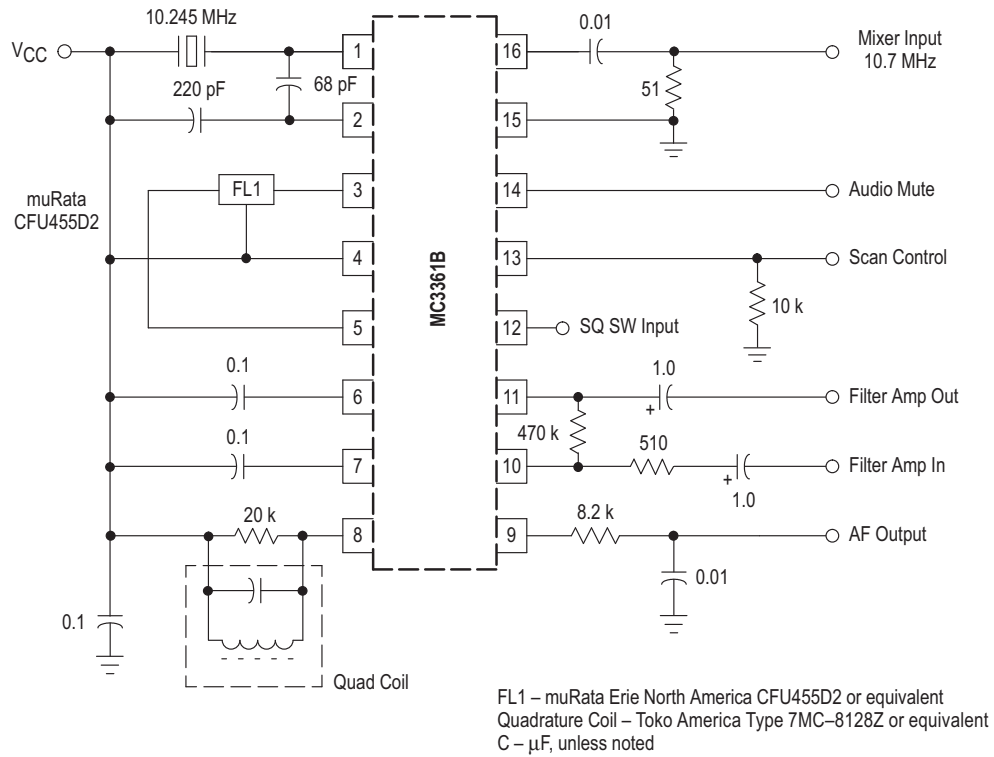


Figure 2. Audio Output, Distortion versus Supply Voltage

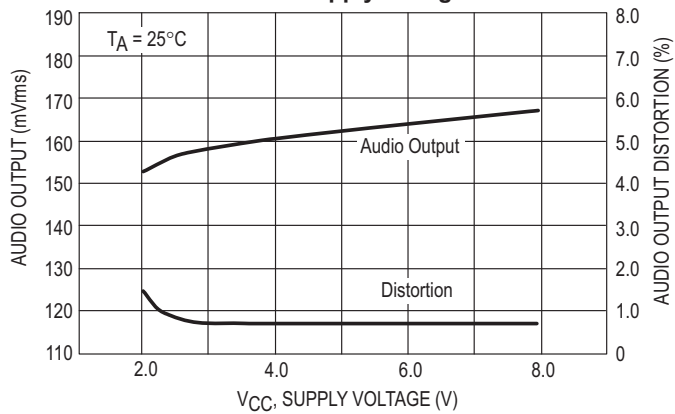
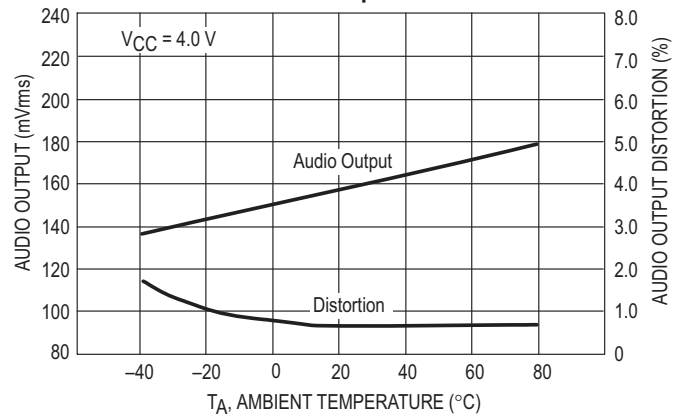


Figure 3. Audio Output, Distortion versus Temperature



The schematic diagram illustrates a 10.245 MHz PLL synthesizer. The circuit is divided into several functional blocks:

- Input Section:** A ceramic filter is connected to the input pin 5. The input signal is coupled through a 510 kΩ resistor to pin 10. A 470 kΩ resistor is connected between pins 4 and 11.
- PLL Core:** The core consists of multiple transistors (Q1-Q91) and resistors (R1-R89). The input signal is coupled to the base of Q1. The output of the PLL is taken from the collector of Q91, which is connected to a 15 kΩ resistor (R37) and a 1.6 kΩ resistor (R38).
- Feedback Loop:** A feedback loop is formed by a quad coil and a 20 kΩ resistor. The feedback signal is coupled to the base of Q91 through a 1.6 kΩ resistor (R38).
- Voltage Divider:** A voltage divider network is connected between VCC and ground, consisting of a 1.6 kΩ resistor (R38) and a 1.6 kΩ resistor (R39).
- Output Section:** The output signal is coupled to a C.F. (Crystal Filter) and a VCC supply. The output is connected to pin 15, which is also connected to a 1.6 kΩ resistor (R37) and a 1.6 kΩ resistor (R38).

The diagram includes various component values and pin numbers, such as 10.245 MHz, 220, 10.7 MHz, 51, 1N, 0.01, 51, 15, 16, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738,

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Figure 5. Input Limiting Voltage

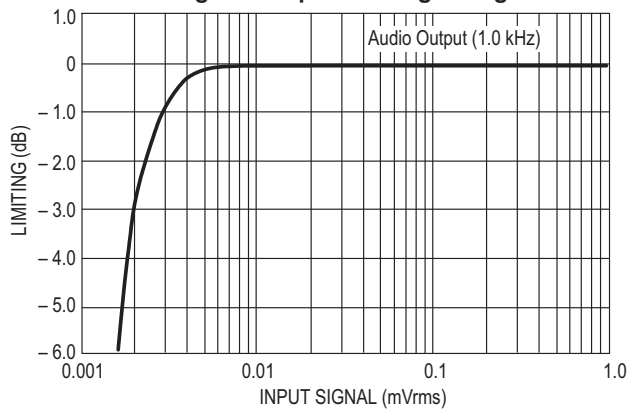


Figure 6. Overall Gain, Noise and AM Rejection

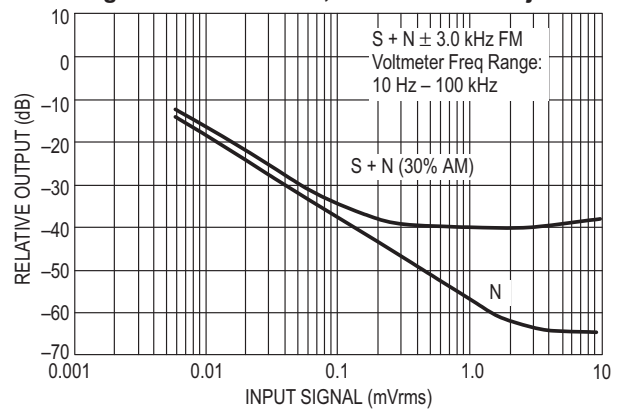


Figure 7. Filter Amp Response

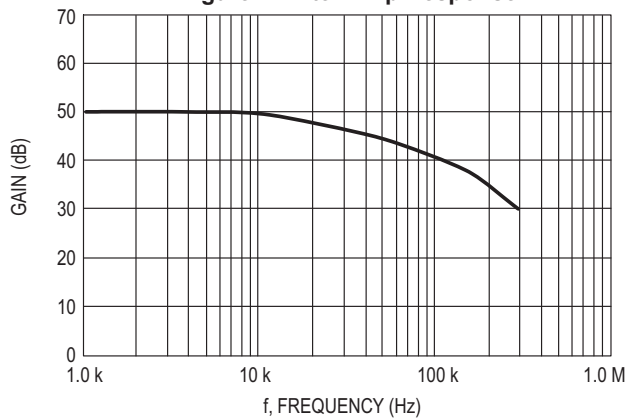


Figure 8. Filter Amp Gain

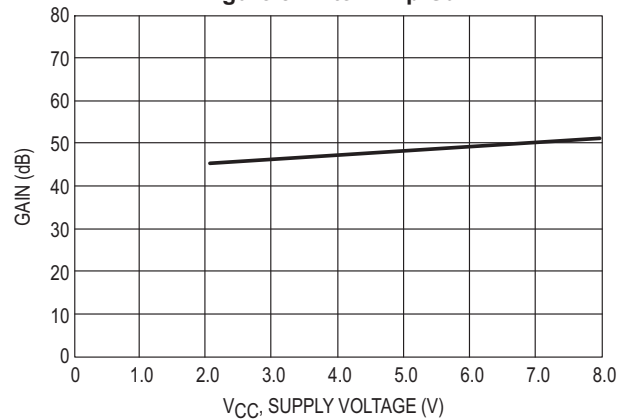
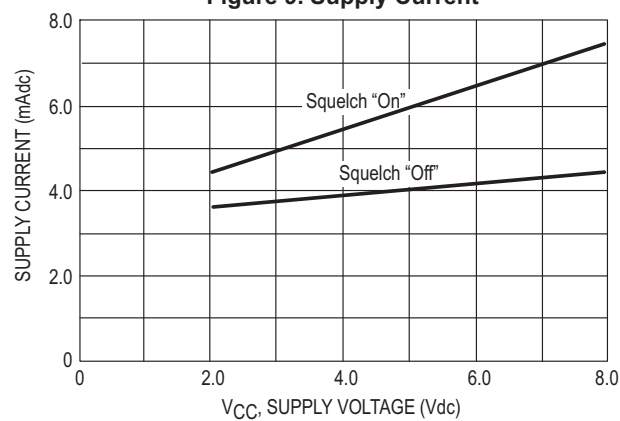
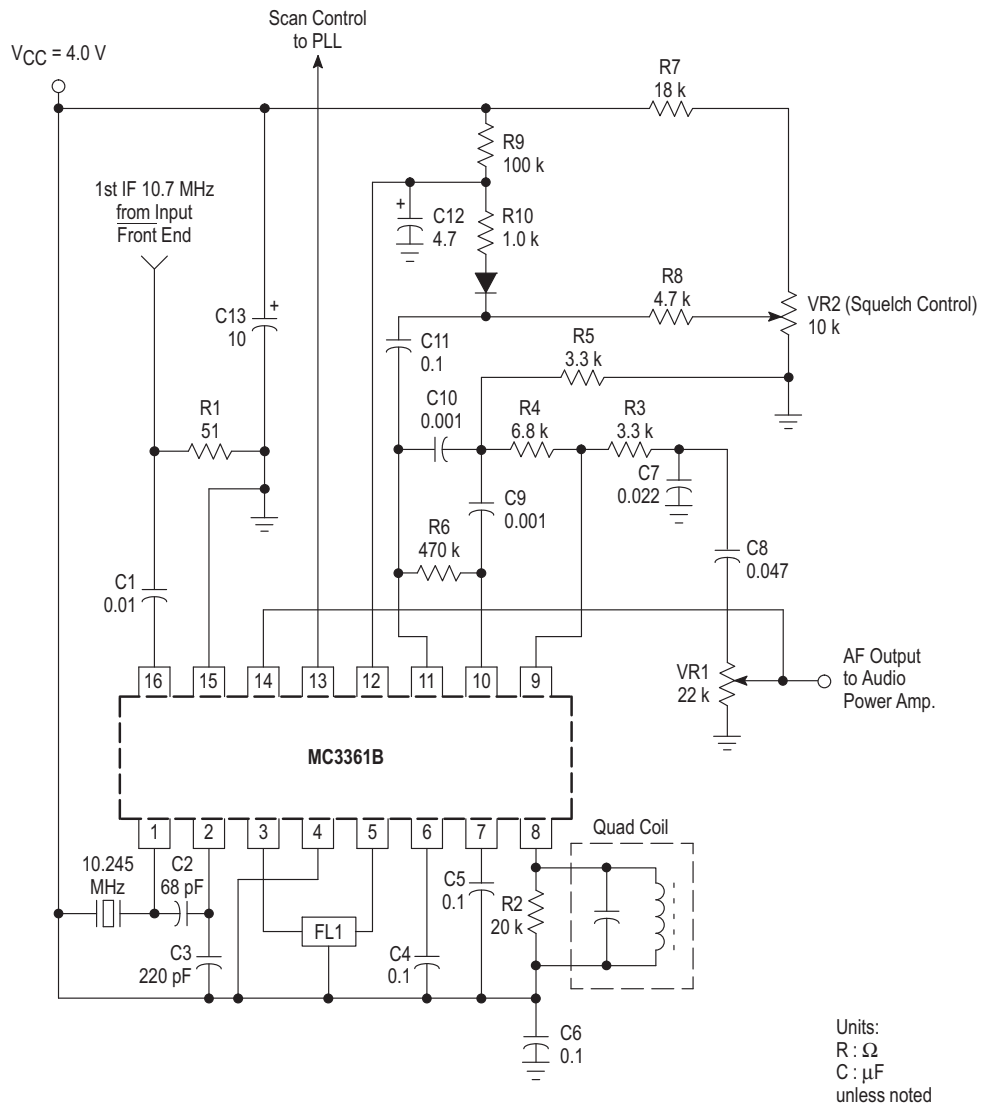


Figure 9. Supply Current



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Figure 10. Simplified Application

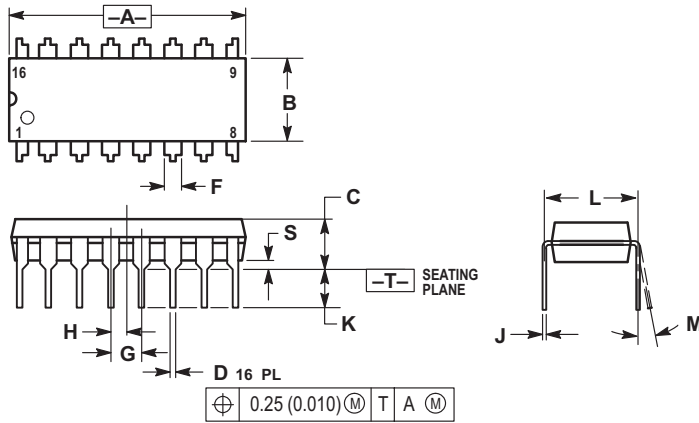


FL1 – muRata Erie North America Type CFU455D2 or equivalent
Quadrature Coil – Toko America Type 7MC-8128Z or equivalent

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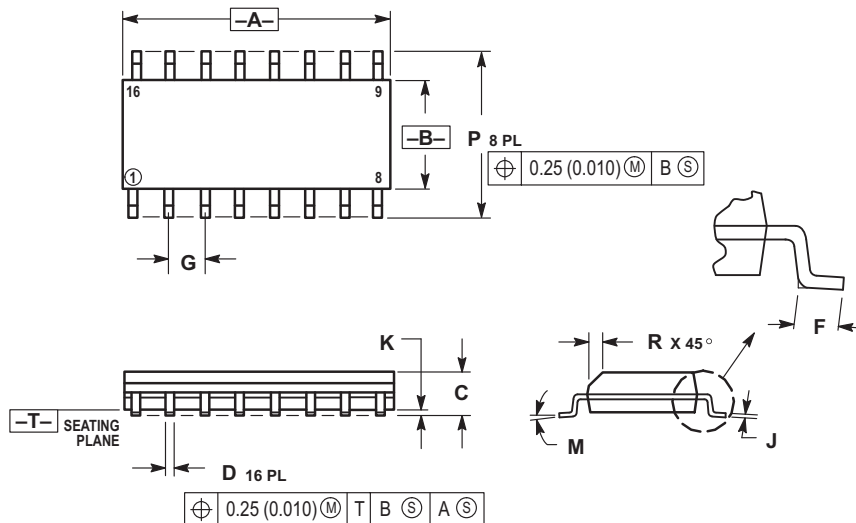
OUTLINE DIMENSIONS

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.

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.

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