

## Product Preview

# 3 V PCM Codec-Filter

The XC145481 is a general purpose per channel PCM Codec-Filter with pin selectable Mu-Law or A-Law companding, and is offered in 20-pin DIP, SOG, and SSOP packages. This device performs the voice digitization and reconstruction as well as the band limiting and smoothing required for PCM systems. This device is designed to operate in both synchronous and asynchronous applications and contains an on-chip precision reference voltage.

This device has an input operational amplifier whose output is the input to the encoder section. The encoder section immediately low-pass filters the analog signal with an active R-C filter to eliminate very high frequency noise from being modulated down to the passband by the switched capacitor filter. From the active R-C filter, the analog signal is converted to a differential signal. From this point, all analog signal processing is done differentially. This allows processing of an analog signal that is twice the amplitude allowed by a single-ended design, which reduces the significance of noise to both the inverted and non-inverted signal paths. Another advantage of this differential design is that noise injected via the power supplies is a common-mode signal that is cancelled when the inverted and non-inverted signals are recombined. This dramatically improves the power supply rejection ratio.

After the differential converter, a differential switched capacitor filter bandpasses the analog signal from 200 Hz to 3400 Hz before the signal is digitized by the differential compressing A/D converter.

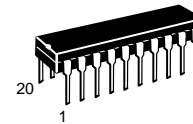
The decoder accepts PCM data and expands it using a differential D/A converter. The output of the D/A is low-pass filtered at 3400 Hz and sinX/X compensated by a differential switched capacitor filter. The signal is then filtered by an active R-C filter to eliminate the out of band energy of the switched capacitor filter.

The XC145481 PCM Codec-Filter accepts a variety of clock formats, including Short Frame Sync, Long Frame Sync, IDL, and GCI timing environments.

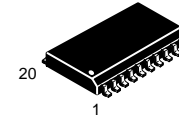
The XC145481 PCM Codec-Filter utilizes CMOS due to its reliable low-power performance and proven capability for complex analog/digital VLSI functions.

- Single 3 V Power Supply
- Typical Power Dissipation of 12 mW, Power-Down of 0.01 mW
- Fully Differential Analog Circuit Design for Lowest Noise
- Transmit Band-Pass and Receive Low-Pass Filters On-Chip
- Active R-C Pre-Filtering and Post-Filtering
- Mu-Law and A-Law Companding by Pin Selection
- On-Chip Precision Reference Voltage (0.886 V) for a -5 dBm TLP @ 600 Ω
- Push-Pull 300 Ω Power Drivers with External Gain Adjust

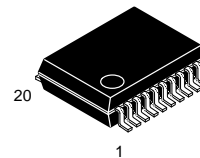
## XC145481



**P SUFFIX**  
PLASTIC DIP  
CASE 738



**DW SUFFIX**  
SOG PACKAGE  
CASE 751D



**SD SUFFIX**  
SSOP  
CASE 940C

### ORDERING INFORMATION

XC145481P	Plastic DIP
XC145481DW	SOG Package
XC145481SD	SSOP

### PIN ASSIGNMENT

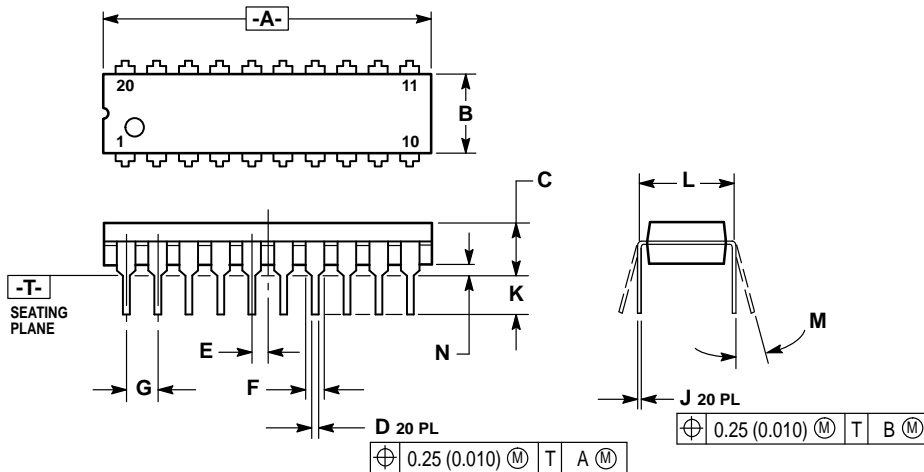
VAG-REF	1	20	VAG
RO-	2	19	TI+
PI	3	18	TI-
PO-	4	17	TG
PO+	5	16	Mu/A
VDD	6	15	VSS
FSR	7	14	FST
DR	8	13	DT
BCLKR	9	12	BCLKT
PDI	10	11	MCLK

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

REV 0  
10/95

# PACKAGE DIMENSIONS

## P SUFFIX PLASTIC DIP CASE 738-03

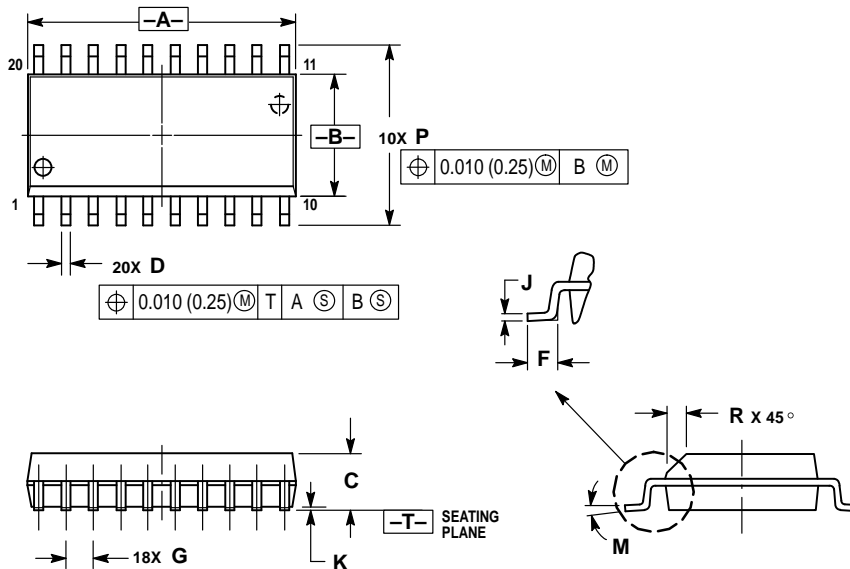


**NOTES:**

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.010	1.070	25.66	27.17
B	0.240	0.260	6.10	6.60
C	0.150	0.180	3.81	4.57
D	0.015	0.022	0.39	0.55
E	0.050 BSC		1.27 BSC	
F	0.050		0.070	
G	0.100 BSC		2.54 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.140	2.80	3.55
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

## DW SUFFIX SOG PACKAGE CASE 751D-04

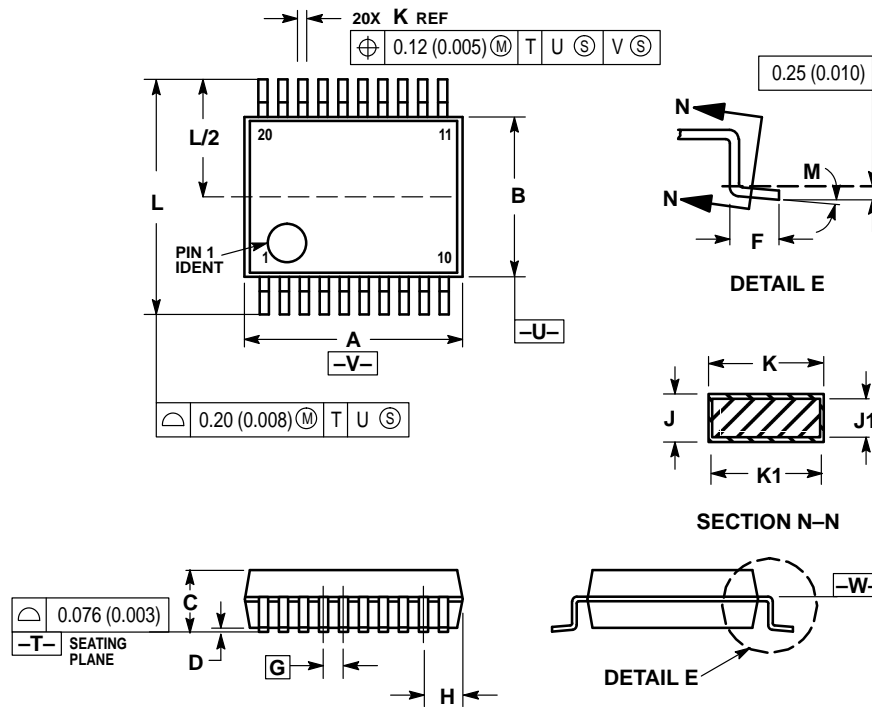


**NOTES:**

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 0.150 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.65	12.95	0.499	0.510
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.50	0.90	0.020	0.035
G	1.27 BSC		0.050 BSC	
J	0.25	0.32	0.010	0.012
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029


SD SUFFIX  
SSOP  
CASE 940C-03



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF K DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION K BY MORE THAN 0.07 (0.002) AT LEAST MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.07	7.33	0.278	0.288
B	5.20	5.38	0.205	0.212
C	1.73	1.99	0.068	0.078
D	0.05	0.21	0.002	0.008
F	0.63	0.95	0.024	0.037
G	0.65 BSC		0.026 BSC	
H	0.59	0.75	0.023	0.030
J	0.09	0.20	0.003	0.008
J1	0.09	0.16	0.003	0.006
K	0.25	0.38	0.010	0.015
K1	0.25	0.33	0.010	0.013
L	7.65	7.90	0.301	0.311
M	0°	8°	0°	8°

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

**How to reach us:**

**USA/EUROPE:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,  
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244-6609  
**INTERNET:** <http://Design-NET.com>

**HONG KONG:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



XC145481/D

