Features

- Single power supply voltage: 3V~5V
- Low power consumption
- Low distortion
- Low clock jitter sensitivity
- High SNR ratio and dynamic range
- Low harmonic distortion
- Wide temperature range
- Control feature for click and Pops
- On-chip digital de-emphasis for 32, 44.1 and 48kHz
- 16-pin NSOP package

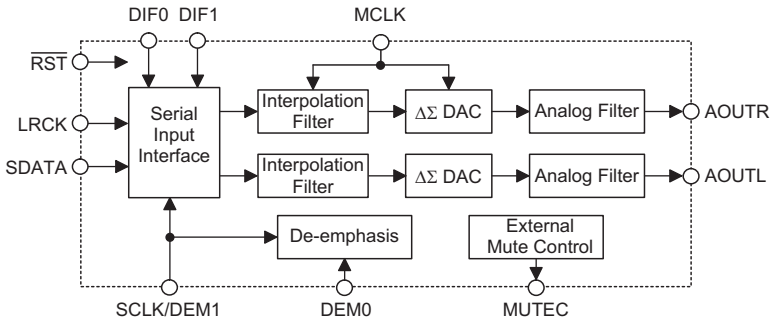
Applications

- DVD players
- Home theater systems
- Digital TV
- Digital set top boxes
- MP3 players
- CD players
- Automotive systems

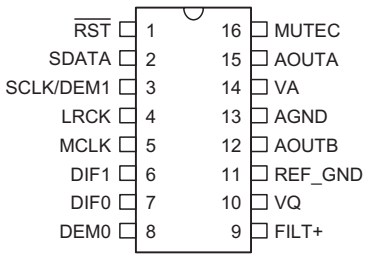
General Description

The HT82V738 is a high performance audio DAC converter. It provides digital de-emphasis (32, 44.1 and 48kHz), external mute control and adjustment for serial data and clock. The HT82V738 accepts data at audio rates up to 96kHz. It performs within a wide dynamic range, high SNR ratio and has low clock jitter sensitivity. HT82V738 is an ideal DAC for DVD players, MP3 players and set-top box systems. It is also pin-compatible with CS4340.

Block Diagram



Pin Assignment



HT82V738
– 16 NSOP-A

Pin Description

<table>
<tr><th>Pin No.</th><th>Pin Name</th><th>I/O</th><th>Description</th></tr>
<tr><td>1</td><td>$\overline{RST}$</td><td>I</td><td>Reset</td></tr>
<tr><td>2</td><td>SDATA</td><td>I</td><td>Serial data</td></tr>
<tr><td>3</td><td>SCLK/DEM1</td><td>I</td><td>Serial clock/de-emphasis</td></tr>
<tr><td>4</td><td>LRCK</td><td>I</td><td>Left/right clock</td></tr>
<tr><td>5</td><td>MCLK</td><td>I</td><td>Master clock
<table>
<tr><th rowspan="3">Sample Rate (kHz)</th><th colspan="5">MCLK (MHz)</th></tr>
<tr><th colspan="2">HRM</th><th colspan="3">BRM</th></tr>
<tr><th>128x</th><th>192x</th><th>256x</th><th>384x</th><th>512x</th></tr>
<tr><td>32</td><td>4.0960</td><td>6.1440</td><td>8.1920</td><td>12.2880</td><td>16.3840</td></tr>
<tr><td>44.1</td><td>5.6448</td><td>8.4672</td><td>11.2896</td><td>16.9344</td><td>22.5792</td></tr>
<tr><td>48</td><td>6.1440</td><td>9.2160</td><td>12.2880</td><td>18.4320</td><td>24.5760</td></tr>
<tr><td>64</td><td>8.1920</td><td>12.2880</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>88.2</td><td>11.2896</td><td>16.9344</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>96</td><td>12.2880</td><td>18.4320</td><td>—</td><td>—</td><td>—</td></tr>
</table></td></tr>
<tr><td>6, 7</td><td>DIF1, DIF0</td><td>I</td><td>Digital interface format
<table>
<tr><th>DIF1</th><th>DIF0</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>I^2S, up to 24-bit data</td></tr>
<tr><td>0</td><td>1</td><td>Left justified, up to 24-bit data</td></tr>
<tr><td>1</td><td>0</td><td>Right justified, 24-bit data</td></tr>
<tr><td>1</td><td>1</td><td>Right justified, 16-bit data</td></tr>
</table></td></tr>
<tr><td>8</td><td>DEM0</td><td>I</td><td>De-emphasis control DEM0 and DEM1
Internal serial clock mode
<table>
<tr><th>DEM1</th><th>DEM0</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Disabled</td></tr>
<tr><td>0</td><td>1</td><td>44.1kHz</td></tr>
<tr><td>1</td><td>0</td><td>48kHz</td></tr>
<tr><td>1</td><td>1</td><td>32kHz</td></tr>
</table>
External serial clock mode
<table>
<tr><th>DEM0</th><th>Description</th></tr>
<tr><td>0</td><td>Disabled</td></tr>
<tr><td>1</td><td>44.1kHz</td></tr>
</table></td></tr>
<tr><td>9</td><td>FILT+</td><td>I</td><td>Positive voltage reference</td></tr>
<tr><td>10</td><td>VQ</td><td>I</td><td>Quiescent voltage</td></tr>
<tr><td>11</td><td>REF_GND</td><td>I</td><td>Reference ground</td></tr>
<tr><td>12</td><td>AOUTB</td><td>O</td><td>Analog output B</td></tr>
<tr><td>13</td><td>AGND</td><td>I</td><td>Analog ground</td></tr>
<tr><td>14</td><td>VA</td><td>I</td><td>Analog power</td></tr>
<tr><td>15</td><td>AOUTA</td><td>O</td><td>Analog output A</td></tr>
<tr><td>16</td><td>MUTEC</td><td>O</td><td>Mute control</td></tr>
</table>

Absolute Maximum Ratings

Supply Voltage .....V_{SS}–0.3V to V_{SS}+6.0V

Input Voltage .....V_{SS}–0.3V to V_{DD}+0.3V

Storage Temperature .....–50°C to 125°C

Operating Temperature .....–10°C to 70°C

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Electrical Characteristics

Analog Characteristics

Ta=–10°C to 70°C

Symbol	Parameter	Test Conditions		Base-rate Mode			High-rate Mode			Unit
		V_{DD}	Conditions	Min.	Typ.	Max.	Min.	Typ.	Max.	
Dynamic Performance										
	Dynamic Range (18~24-bit)	5V	Unweighted	—	93	—	—	92	—	dB
			A-weighted	—	95	—	—	95	—	
	Dynamic Range (16-bit)		Unweighted	—	91	—	—	88	—	
			A-weighted	—	94	—	—	94	—	
THD+N	Total Harmonic Distortion+Noise (18~24-bit)	5V	—	—	–88	—	—	–88	—	dB
	Total Harmonic Distortion+Noise (16-bit)		—	—	–86	—	—	–86	—	
	Interchannel Isolation	5V	—	—	90	—	—	90	—	dB
Dynamic Performance										
	Dynamic Range (18~24-bit)	3V	Unweighted	—	91	—	—	90	—	dB
			A-weighted	—	94	—	—	91	—	
	Dynamic Range (16-bit)		Unweighted	—	90	—	—	88	—	
			A-weighted	—	92	—	—	90	—	
THD+N	Total Harmonic Distortion+Noise (18~24-bit)	3V	—	—	–88	—	—	–88	—	dB
	Total Harmonic Distortion+Noise (16-bit)		—	—	–86	—	—	–86	—	
	Interchannel Isolation	3V	—	—	90	—	—	90	—	dB

Analog Characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
Analog Output							
	Full Scale Output Voltage	—	—	—	0.7VA	—	V_{PP}
V_Q	Quiescent Voltage	—	—	—	0.5VA	—	VDC
	Interchannel Gain Mismatch	—	—	—	0.1	—	dB
	Gain Drift	—	—	—	100	—	ppm/°C
R_L	AC-load Resistance	—	—	3	—	—	kΩ
C_L	Load Capacitance	—	—	—	—	100	pF

Digital Characteristics

Ta=–10°C to 70°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V_{IH}	High-level Input Voltage	5V	—	2.0	—	—	V
		3V	—	2.0	—	—	V
V_{IL}	Low-level Input Voltage	5V	—	—	—	0.8	V
		3V					
I_{IN}	Input Leakage Current	—	—	—	—	±10	μA
	Input Capacitance	—	—	—	8	—	pF
Power Ratio							
V_A	DC Power Supply	—	—	2.7	5.0	5.5	V
V_{IND}	Digital Input Voltage	—	—	–0.3	—	V_A+0.4	mA

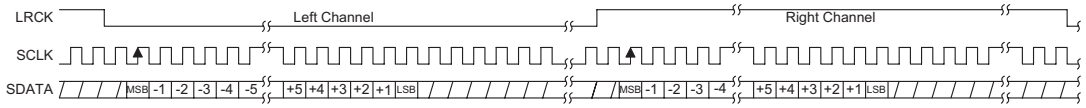
Power Characteristics

Symbol	Parameter	Test Conditions		Base-rate Mode			High-rate Mode			Unit
		V_{DD}	Conditions	Min.	Typ.	Max.	Min.	Typ.	Max.	
I_A	Power Supply Current	3V	Normal	—	10	—	—	10	—	mA
			Power-down	—	30	—	—	30	—	μA
		5V	Normal	—	15	—	—	15	—	mA
			Power-down	—	60	—	—	60	—	μA
I_A	Power Dissipation	3V	Normal	—	30	—	—	30	—	mW
			Power-down	—	0.09	—	—	0.09	—	
		5V	Normal	—	75	—	—	75	—	mW
			Power-down	—	0.3	—	—	0.3	—	

Timing Diagrams

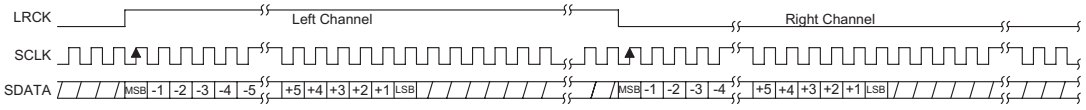
I^2S Mode

- 16-bit data and INT SCLK=32Fs, MCLK/LRCK=512, 256 or 128
- Up to 24-bit data and SCLK=48Fs, MCLK/LRCK=384 or 192



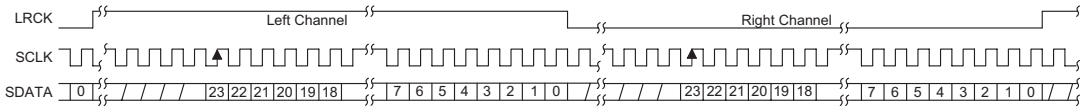
Left Justified 24-Bit Mode

- INT SCLK=64Fs, MCLK/LRCK=512, 256 or 128
- INT SCLK=48Fs, MCLK/LRCK=384 or 192



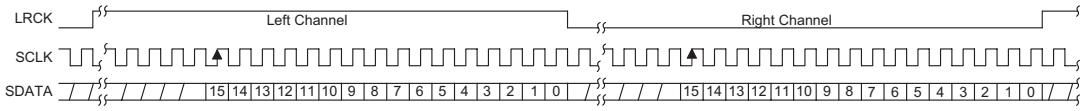
Right Justified 24-Bit Mode

- INT SCLK=64Fs, MCLK/LRCK=512, 256 or 128
- INT SCLK=48Fs, MCLK/LRCK=384 or 192

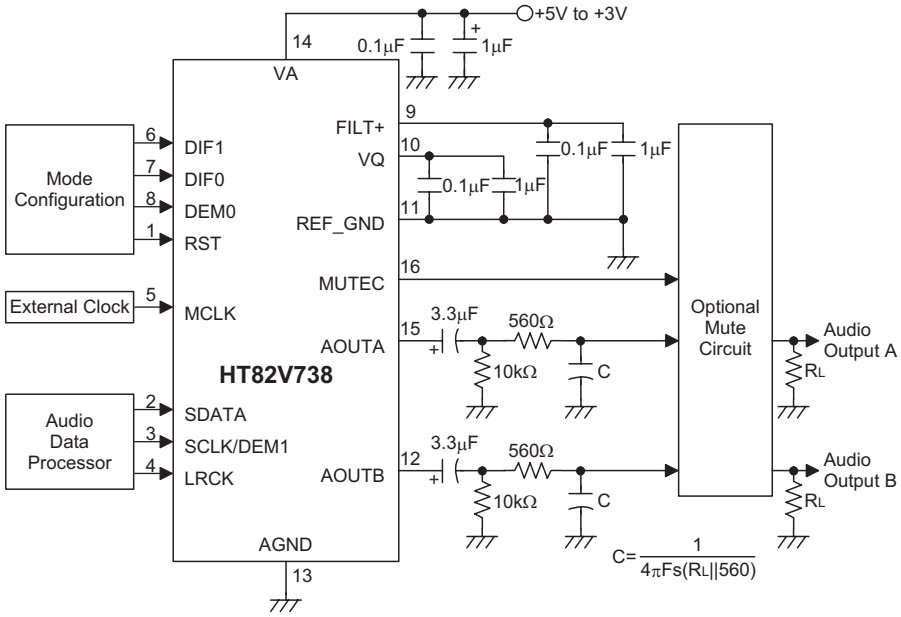


Right Justified 16-Bit Mode

- INT SCLK=32Fs, MCLK/LRCK=512, 256 or 128
- INT SCLK=48Fs, MCLK/LRCK=384 or 192

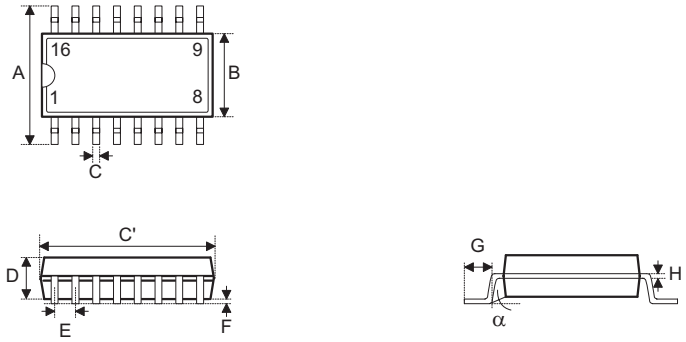


Application Circuits



Package Information

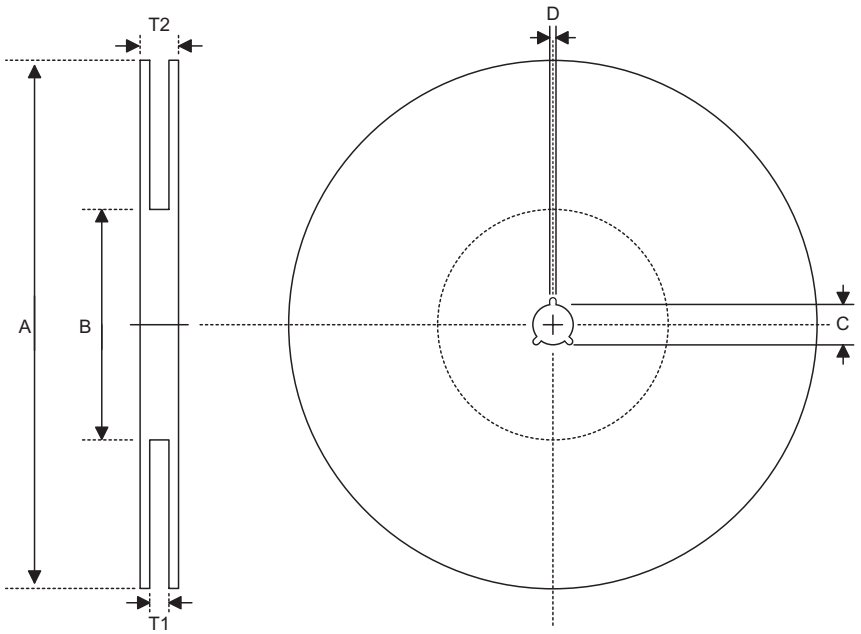
16-pin NSOP (150mil) Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	228	—	244
B	149	—	157
C	14	—	20
C′	386	—	394
D	53	—	69
E	—	50	—
F	4	—	10
G	22	—	28
H	4	—	12
α	0°	—	10°

Product Tape and Reel Specifications

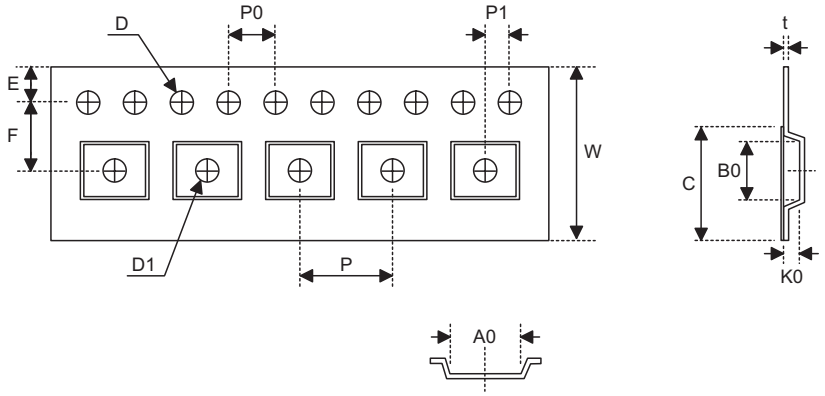
Reel Dimensions



SOP 16N (150mil)

Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	330±1.0
B	Reel Inner Diameter	62±1.5
C	Spindle Hole Diameter	13.0+0.5 −0.2
D	Key Slit Width	2.0±0.5
T1	Space Between Flange	16.8+0.3 −0.2
T2	Reel Thickness	22.2±0.2

Carrier Tape Dimensions



SOP 16N (150mil)

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	16.0±0.3
P	Cavity Pitch	8.0±0.1
E	Perforation Position	1.75±0.1
F	Cavity to Perforation (Width Direction)	7.5±0.1
D	Perforation Diameter	1.55+0.1
D1	Cavity Hole Diameter	1.5+0.25
P0	Perforation Pitch	4.0±0.1
P1	Cavity to Perforation (Length Direction)	2.0±0.1
A0	Cavity Length	6.5±0.1
B0	Cavity Width	10.3±0.1
K0	Cavity Depth	2.1±0.1
t	Carrier Tape Thickness	0.3±0.05
C	Cover Tape Width	13.3

Holtek Semiconductor Inc. (Headquarters)
No.3, Creation Rd. II, Science Park, Hsinchu, Taiwan
Tel: 886-3-563-1999
Fax: 886-3-563-1189
http://www.holtek.com.tw

Holtek Semiconductor Inc. (Taipei Sales Office)
4F-2, No. 3-2, YuanQu St., Nankang Software Park, Taipei 115, Taiwan
Tel: 886-2-2655-7070
Fax: 886-2-2655-7373
Fax: 886-2-2655-7383 (International sales hotline)

Holtek Semiconductor Inc. (Shanghai Sales Office)
7th Floor, Building 2, No.889, Yi Shan Rd., Shanghai, China 200233
Tel: 021-6485-5560
Fax: 021-6485-0313
http://www.holtek.com.cn

Holtek Semiconductor Inc. (Shenzhen Sales Office)
43F, SEG Plaza, Shen Nan Zhong Road, Shenzhen, China 518031
Tel: 0755-8346-5589
Fax: 0755-8346-5590
ISDN: 0755-8346-5591

Holtek Semiconductor Inc. (Beijing Sales Office)
Suite 1721, Jinyu Tower, A129 West Xuan Wu Men Street, Xicheng District, Beijing, China 100031
Tel: 010-6641-0030, 6641-7751, 6641-7752
Fax: 010-6641-0125

Holmate Semiconductor, Inc. (North America Sales Office)
46712 Fremont Blvd., Fremont, CA 94538
Tel: 510-252-9880
Fax: 510-252-9885
http://www.holmate.com