

### 1.0 Scope

This specification documents the detail requirements for space qualified product manufactured on Analog Devices, Inc.'s QML certified line per MIL-PRF-38535 Level V except as modified herein.

The manufacturing flow described in the STANDARD SPACE LEVEL PRODUCTS PROGRAM brochure is to be considered a part of this specification. <http://www.analog.com/aerospace>

This data sheet specifically details the space grade version of this product. A more detailed operational description and a complete data sheet for commercial product grades can be found at [www.analog.com/AD537](http://www.analog.com/AD537)

### 2.0 Part Number. The complete part number(s) of this specification follow:

<u>Part Number</u>	<u>Description</u>
<b>AD537-703D</b>	Voltage to Frequency Converter with 0 to 150kHz frequency range

### 3.0 Case Outline

<u>Letter</u>	<u>Descriptive designator</u>	<u>Case Outline (Lead Finish per MIL-PRF-38535)</u>
D	CDIP2-T14	14-Lead side-braced ceramic dual-in-line package

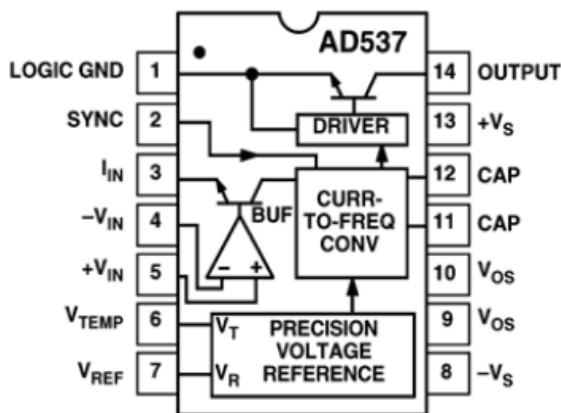


Figure 1 - Terminal Connections

ASD0016511

Rev. D

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# AD537S

## 4.0 Absolute Maximum Ratings. ( $T_A = 25^{\circ}\text{C}$ , unless otherwise noted)

Voltage, Rated Performance Single Supply .....4.5 to 36V  
Voltage, Rated Performance Dual Supply ..... $\pm 5\text{V}$  to  $\pm 18\text{V}$   
Operating Temperature Range..... $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$   
Storage Temperature Range..... $-65^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$   
Lead Temperature (Soldering, 10 sec.).....  $+300^{\circ}\text{C}$   
Maximum Junction Temperature ( $T_J$ ).....  $+150^{\circ}\text{C}$

### NOTES:

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

## 5.0 Thermal Characteristics:

Package Type	Junction-to-Case ( $\Theta_{JC}$ )	Junction-to-Ambient ( $\Theta_{JA}$ )	Units
Thermal Resistance, 14 DIP (X)	25	95	$^{\circ}\text{C}/\text{W}$ Max

## 6.0 Table I. Electrical Table:

Table I						
Parameter See notes at end of table	Symbol	Conditions Note 1/	Sub- group	Limit Min	Limit Max	Units
Frequency Range	$F_o$		1	0	150	KHz
Linearity Error (Nonlinearity)	LE	$F_o = 10\text{KHz}$	1		0.07	%
		$F_o = 100\text{KHz}$	4		0.1	
Gain Error (Full-Scale Calibration Error)	$A_E$	$C=0.01\mu\text{F}$ , $I_{in}=1.00\text{mA}$	1	-5	5	%
Gain vs. Supply	$\Delta A_E / \Delta V_S$	$F_o = 10\text{KHz}$ , $15\text{V} < V_S < 20\text{V}$	1		0.1	%/V
Gain Drift	$\Delta A_E / \Delta T$	+25 °C to +125 °C	2	-250	250	ppm/°C
		+25 °C to -55 °C	3	-250	250	
Voltage Input Range	$V_{IR}$	$V_S$ Single Supply	1	0	+ $V_S$ -4	V
		$V_S$ Dual Supply	1	- $V_S$	+ $V_S$ -4	
Input Bias Current	$I_{IB}$		1	-100	+100	nA
Input Resistance 4/	$R_I$			250		Mohms
Input Offset Voltage 2/	$V_{OS}$		1		2	mV
Offset vs. Supply	$\Delta V_{OS} / \Delta V_S$	$15\text{V} < V_S < 20\text{V}$	1		100	$\mu\text{V}/\text{V}$
Offset Drift	$\Delta V_{OS} / \Delta T$	+25 °C to +125 °C	2	-10	10	$\mu\text{V}/^\circ\text{C}$
		+25 °C to -55 °C	3	-10	10	
Voltage Ref Absolute Value 3/	$V_{REF}$		1	-5	5	%
$V_{REF}$ vs. Temp	$\Delta V_{REF} / \Delta T$	+25 °C to +125 °C	2	-100	100	ppm/°C
		+25 °C to -55 °C	3	-100	100	
$V_{REF}$ vs. Supply	$\Delta V_{REF} / \Delta V_S$	$15\text{V} < V_S < 35\text{V}$	1		0.03	%/V
Initial Calibration - Absolute Temperature Reference	$V_{Temp}$		1	278	318	mV
Output Voltage Logic Low	$V_{OL}$	$I_{SINK} = 10\text{mA}$	1,2,3		0.4	V
Output Leakage Current	$I_{OH}$	Logic 1	1,2,3		2	$\mu\text{A}$
Quiescent Current	$I_S$	$V_S = 5\text{V} \text{ \& } 36\text{V}$	1,2,3		2.5	mA

## TABLE I NOTES:

1/  $T_A = +25^\circ\text{C}$ ,  $T_A \text{ Max} = +125^\circ\text{C}$ ,  $T_A \text{ Min} = -55^\circ\text{C}$ .  $V_S = +15\text{V}$ ,  $C = 0.01\mu\text{F}$  unless otherwise noted

2/ Trimmable for 14 pin DIP package only.

3/ Nominal value 1.00V.

4/ Guaranteed by design

**7.0 Table II. Electrical Test Requirements:**

<b>Table II</b>	
Test Requirements	Subgroups (in accordance with MIL-PRF-38535, Table III)
Interim Electrical Parameters	1
Final Electrical Parameters	1, 2, 3, 4 1/ 2/
Group A Test Requirements	1, 2, 3, 4
Group C end-point electrical parameters	1 2/
Group D end-point electrical parameters	1
Group E end-point electrical parameters	N/A

Notes:

1/ PDA applies to Subgroup 1. Delta's excluded from PDA.

2/ See Table III for Delta limits. See Table I for test conditions.

**8.0 Table III. Life Test / Burn-in Delta limits:**

<b>Table III</b>		
<u>Test Symbol</u>	<u>Delta Limit</u>	<u>Units</u>
$I_S$	$\pm 0.3$	mA
$V_{OS}$	$\pm 1$	mV

**9.0 Life Test / Burn-In Circuit:**

**9.1** HTRB is not applicable for this drawing.

**9.2** Burn-in is per MIL-STD-883 Method 1015, test condition B.

**9.3** Steady state life test is per MIL-STD-883 Method 1005, test condition B.

**10.0 MIL-STD-38535 QMLV exceptions:**

**10.1** Full WLA per MIL-STD-883 TM 5007 is not available for this product. SEM Inspection only is available per MIL-STD-883, TM2018.

Rev	Description of Change	Date
A	Initiate	July 17, 2007
B	Update header/footer and add to 1.0 Scope description.	March 6, 2008
C	Add Junction Temperature (T <sub>J</sub> ).....+150°C to Absolute Max. Ratings	April 2, 2008
D	Remove post Group C specification limits in Table III such that only Delta limits are listed. Correct Case Outline Letter and descriptive designator. Formatting improvements.	March 25, 2010

