

1.1 Scope.

This specification covers the detail requirements for a high-accuracy, monolithic trigonometric function converter.

1.2 Part Number.

The complete part number per Table 1 of this specification is as follows:

Device	Part Number
-1	AD639SD/883B

1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline: D-18.

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

Supply Voltage	$\pm 18\text{V}$
Internal Power Dissipation	300mW
Short Circuit to Ground	Indefinite
Input Voltages X_1, X_2, Y_1, Y_2 ¹	$\pm 12\text{V}$
Input Voltages U_P, U_1, U_2, Z_1, Z_2 ¹	$\pm 25\text{V}$
Operating Temperature Range	-55°C to $+125^\circ\text{C}$
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Lead Temperature (Soldering 60sec)	$+300^\circ\text{C}$

NOTE

¹These inputs are purely resistive and the maximum inputs are determined by resistor dissipation limits, not the supply voltages.

1.5 Thermal Characteristics.

Thermal Resistance $\theta_{JC} = 35^\circ\text{C/W}$
 $\theta_{JA} = 120^\circ\text{C/W}$

AD639 – SPECIFICATIONS

Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Sub Group 4	Test Condition ^{1,2}	Units
Peak Absolute Error								
Sine Mode	E_S	-1	0.8	0.8	2.5		-90° to +90°, $U_P = 10V$	% FS max
Cosine Mode	E_C	-1	1.2	1.2	2.7		-90° to +90°, $U_P = 10V$	% FS max
Both Modes	E_{SC}	-1	1.5	1.5	3.0		-180° to +180°, $U_P = 10V$	% FS max
	E_{SC}	-1	2.5	2.5	3.5		-90° to +90°, $U_P = 1V$	% FS max
	E_{SC}	-1	3.0	3.0	4.0		-180° to +180°, $U_P = 1V$	% FS max
Tangent Mode	E_T	-1	2.5	2.5	3.0		-45° to +45°, $U_P = 1V$	% FS max
	E_T	-1	3.5	3.5			-45° to +45°, $U_P = 10V$	% FS max
Angle Input ³	X_{SC}	-1	0.65			0.65	X_1 or X_2	% max
Scaling Error	Y_{SC}	-1	1.0			1.0	Y_1 or Y_2	% max
Angle Input ³	X_{OS}	-1	0.3			0.3	$X_1 = X_2 = 0$	° max
Angular Offset	Y_{OS}	-1	0.5			0.5	$Y_1 = Y_2 = 0$	° max
Amplitude Input Gain Error	U_{SC}	-1	0.5			0.5	$U = 0.1$ to $10V$	% max
Amplitude Input Voltage Offset	U_{OS}	-1	10			10	$U_1 = U_2 = 0V$	mV max
Amplitude Preset Accuracy	U_{LO}	-1	2.0			2.0	$U_P = 1V$	% max
	U_{HI}	-1	0.55			0.55	$U_P = 10V$	% max
Output Voltage Swing	V_O	-1	±11	±11				V min
Short-Circuit Current	I_{SC}	-1	45	45				mA max
Output Offset	Z_{OS}	-1	30			30	$Z_1 = Z_2 = 0, U_P = 10V$	mV max
	Z_{OS}	-1	20			20	$Z_1 = Z_2 = 0, U_P = 1V$	mV max
Reference Accuracy	V_{REF}	-1	0.45	0.45	0.6			% max
+ Supply Current	+ I_S	-1	11	11			$U = X = 0, Y = V_R$	mA max
- Supply Current	- I_S	-1	7.5	7.5			$U = X = 0, Y = V_R$	mA max

NOTES

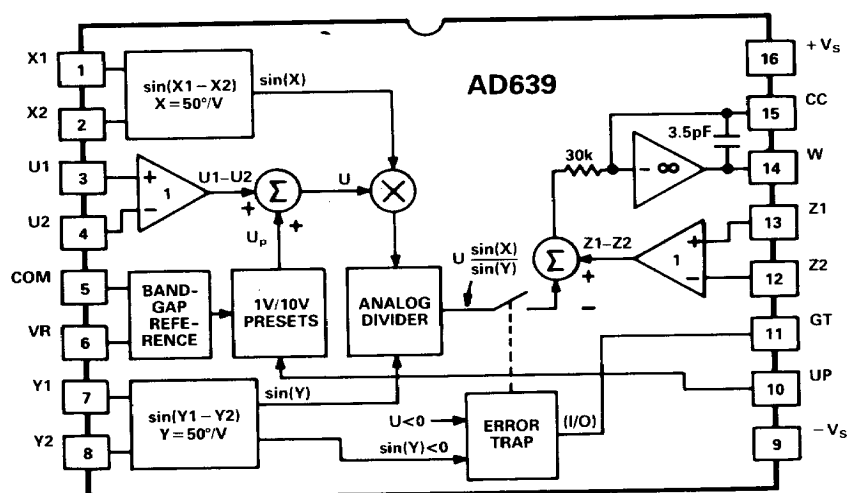
¹ $V_S = \pm 15V, R_L = 2k\Omega$.

²Full scale is defined as the ideal output when the angle input is at either end of the limit specified.

³Specifications for the X inputs apply for the range. $U_P = 1V$ to $10V$ while the Y input errors are specifically given for $U_P = 1V$.

Table 1.

3.2.1 Functional Block Diagram and Terminal Assignments.



3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (49).

4.2.1 Life Test/Burn-In Circuit.

Steady state life test is per MIL-STD-883 Method 1005. Burn-in is per MIL-STD-883 Method 1015 test condition (B).

