

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

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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
Tangent Mode	E _{SC}	-1	3.0	3.0	4.0		- 180° to + 180°, U _P = 1V	% FS max
	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

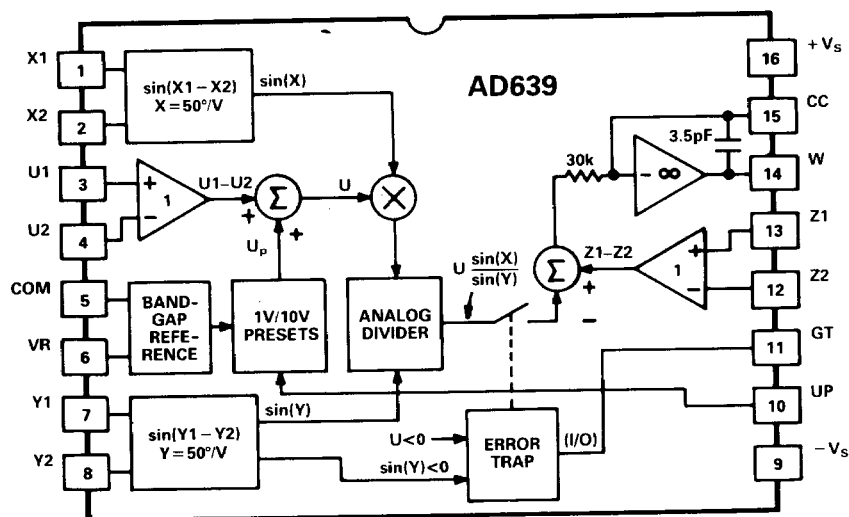
¹V_S = ± 15V, R_L = 2kΩ.

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).

