



Two-Terminal IC Temperature Transducer

ANALOG DEVICES INC

AD590

1.1 Scope.

This specification covers the requirements for a two-terminal monolithic temperature transducer which produces an output current proportional to absolute temperature (PTAT).

1.2 Part Number.

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

Device	Part Number ¹
-1	AD590J(X)/883B
-2	AD590K(X)/883B
-3	AD590L(X)/883B
-4	AD590M(X)/883B

NOTE

¹See paragraph 1.2.3 for package identifier.

1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline: F-2A or H-3A.

(X)	Package	Description
F	F-2A	2-Pin Flat Pack
H	H-3A	3-Pin Metal Can

1.3 Absolute Maximum Ratings. (T_A = +25°C unless otherwise noted)

Forward Voltage (E+ to E-)	+44V
Reverse Voltage (E+ to E-)	-20V
Breakdown Voltage (Case to E+ or E-)	±200V
Rated Performance Temperature Range	-55°C to +150°C
Storage Performance Temperature Range	-65°C to +155°C
Lead Temperature Range (Soldering 10sec)	+300°C

1.5 Thermal Characteristics.

MEDIUM	$\theta_{JC} + \theta_{CA}$ (°C/watt)		τ sec ¹	
	H ²	F ²	H ²	F ²
Aluminum Block	30	10	0.6	0.1
Stirred Oil ³	42	60	1.4	0.6
Moving Air ⁴				
With Heat Sink	45	—	5.0	—
Without Heat Sink	115	190	13.5	10.0
Still Air				
With Heat Sink	191	—	108	—
Without Heat Sink	480	650	60	30

NOTES

¹The time constant is defined as the time required to reach 63.2% of an instantaneous temperature change.

²H - 3-pin can; F - 2-pin flat pack.

³ τ is dependent upon velocity of oil; average of several velocities listed above.

⁴Air velocity $\approx$ 9ft/sec.

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Table 1.

Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Sub Group 4	Test Condition ¹	Units
Ambient Error	E	-1	5.0	5.0		5.0	Normal Output Current is 298.15μA @ +25.00°C	± °C max
		-2	2.5	5.0		2.5		
		-3	1.0	5.0		1.0		
		-4	0.5	5.0		0.5		
Absolute Error	E _A	-1	10.0		10.0		-55°C to +150°C without External Calibration	± °C max
		-2	5.5		5.5			
		-3	3.0		3.0			
		-4	1.7		1.7			
Calibrated Absolute Error	E _C	-1	3.0		3.0		-55°C to +150°C with Ambient Error (E) Set to Zero ²	
		-2	2.0		2.0			
		-3	1.6		1.6			
		-4	1.0		1.0			
Nonlinearity	NL	-1	1.5		1.5		-55°C to +150°C with Ambient Error (E) Set to Zero ²	± °C max
		-2	0.8		0.8			
		-3	0.4		0.4			
		-4	0.3		0.3			
Repeatability	RPT	-1, 4	0.1				Max Deviation between +25°C Readings after Temp. Cycling between -55°C and +150°C	± °C
Long-Term Drift	ΔE/ΔT	-1, 4	0.1				Constant +5V; Constant +125°C	± °C/Month
Power Supply Rejection Ratio	PSRR	-1, 4	1.0				+4V ≤ V _S ≤ +5V	°C/V max
		-1, 4	0.4				+5V ≤ V _S ≤ +15V	
		-1, 4	0.2				+15V ≤ V _S ≤ +30V	
Power Supply Voltage Range	V _S	-1, 4	+4					V min
		-1, 4	+30					V max

NOTES

¹T_A = +25°C, V_S = ±5V unless otherwise specified.

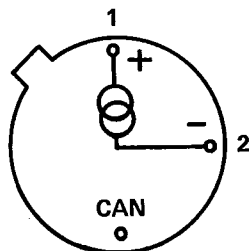
²See Figure 1.

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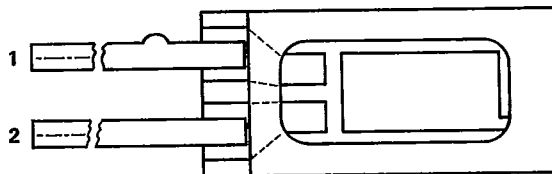
65E D

3.2.1 Functional Block Diagram and Pin Assignments.

H Package
Bottom View



F Package (Flat Pack)
Top View

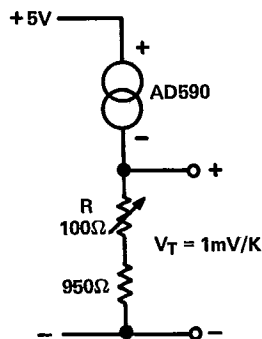
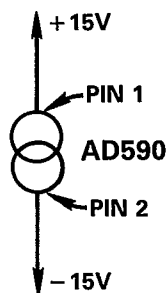


3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (59).

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).



NOTE
V_G ACROSS DEVICE MUST REMAIN CONSTANT
OR PSRR ERROR MUST BE INCLUDED.

Figure 1. One Temperature Trim