

1.0 SCOPE

This specification covers the detail requirements for a precision voltage reference which provides a stable +5V output that can be adjusted over a $\pm 6\%$ range with minimal effect on temperature stability. Long term stability of the REF-05 is qualified by sample wafer lot testing to a limit of 100ppm/1000 hours maximum.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace spec control drawings.

1.2 Part Number. The complete part numbers per Table I of this specification follow:

<u>Device</u>	<u>Part Number</u>	<u>Package</u>
A	REF-05AJ/883	J
B	REF-05BJ/883	J

1.2.3 Case Outline.

<u>Letter</u>	<u>Case Outline (Lead finish per MIL-M-38510)</u>
J	8-lead metal can (TO-99)

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

Input Voltage	40V
Power Dissipation	500mW
Output Short-Circuit Duration (to Ground or V_{IN})	Indefinite
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Operating Temperature Range	-55°C to $+125^\circ\text{C}$
Lead Temperature (Soldering, 60 sec)	$+300^\circ\text{C}$
DICE Junction Temperature Range (T_J)	-65°C to $+150^\circ\text{C}$

1.5 Thermal Characteristics:

Thermal Resistance, TO-99 (J) package:

Junction-to-Case (θ_{JC}) = 45°C/W MAX

Junction-to-Ambient (θ_{JA}) = 150°C/W MAX

TABLE 1 $V_{IN} = 15V$; $T_A = 25^\circ C$ unless otherwise specified.

REF-05/883							
Characteristics	Symbol	Special Conditions	LIMITS A		LIMITS B		Units
			Min	Max	Min	Max	
Quiescent Supply Current	I _{SY}	No Load	—	1.4	—	1.4	mA
		-55°C ≤ T _A ≤ +125°C	—	2.0	—	2.0	mA
Output Voltage	V _O	I _L = 0	4.985	5.015	4.975	5.025	V
		-55°C ≤ T _A ≤ +125°C	4.978	5.022	4.953	5.047	V
Output Voltage Temperature Coefficient (Notes 1, 4)	TCV _O	-55°C ≤ T _A ≤ +125°C	—	8.5	—	25	ppm/°C
Short-Circuit Current	I _{SC}	V _O = 0	+15	+60	+15	+60	mA
Sink Current	I _S		-0.3	—	-0.3	—	mA
Load Regulation (Note 2)	LD _{reg}	I _L = 0mA to 10mA	—	0.010	—	0.010	%/mA
		I _L = 0mA to 8mA	—	0.012	—	0.015	%/mA
		-55°C ≤ T _A ≤ +125°C					
Line Regulation (Note 2)	LN _{reg}	V _{IN} = 8V to 33V	—	0.010	—	0.010	%/V
		-55°C ≤ T _A ≤ +125°C	—	0.015	—	0.015	%/V
Load Current (Note 3)	I _L		10	—	10	—	mA
Output Adjustment Range	ΔV _{trim}	R _p = 10kΩ	±3.0	—	±3.0	—	%
Output Voltage Noise (Note 4)	e _{np-p}	0.1Hz to 10Hz	—	15	—	15	μV _{p-p}
Long-Term Stability (Note 5)			—	100	—	100	ppm/1kHrs

NOTES:

$$1. TCV_O = ABS \left(\frac{V_{MAX} - V_{MIN}}{10V} \right) \left(\frac{1}{180^\circ C} \right) \left(10^6 \right) \text{ where } -55^\circ C \leq T_A \leq +125^\circ C.$$

2. Line and Load Regulation specifications include the effect of self-heating.

3. Minimum of 10mA Load Current guaranteed by Load Regulation test.

4. This parameter is 100% tested.

5. Each wafer lot is tested for Long-Term Stability at a chip temperature of $76^\circ C$ for 168 hours. The sample size is 105 units with an LTPD of 5/2.

TABLE 2**REF-05/883**

**Electrical Test Requirements
For Class B Devices**

MIL-STD-883 Test Requirements	Subgroups (see Table 3)
Interim Electrical Parameters (pre Burn-In)	1
Final Electrical Test Parameters	1*, 2, 3, 8
Group A Test Requirements	1, 2, 3, 8

* PDA applies to Subgroup 1 only.
No other Subgroups are included in PDA.

TABLE 3**Group A Inspection** $V_{IN} = 15V$; $T_A = T_J$ unless otherwise specified.

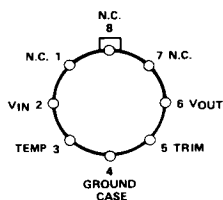
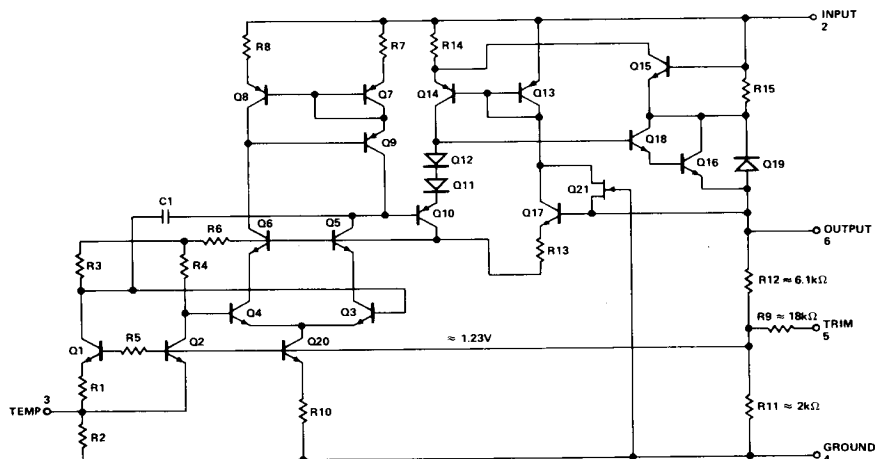
REF-05/883							
Test Requirement	Symbol	Special Conditions	LIMITS A		LIMITS B		Units
			Min	Max	Min	Max	
Subgroup 1	I _{SY}	No Load	--	1.4	--	1.4	mA
T _A = +25 °C	ΔV _{trim}	R _p = 10kΩ	±3.0	--	±3.0	--	%
	V _O		4.985	5.015	4.975	5.025	V
	I _{SC}	V _O = 0	+15	+60	+15	+60	mA
	I _S		-0.3	--	-0.3	--	mA
	LD _{reg}	I _L = 0mA, 10mA (Note 2)	--	0.010	--	0.010	%/mA
	LN _{reg}	V _{IN} = 8V, 33V (Note 2)	--	0.010	--	0.010	%/V
	I _L	(Note 3)	10	--	10	--	mA
Subgroup 2	I _{SY}	No Load	--	2.0	--	2.0	mA
T _A = +125 °C	V _O		4.978	5.022	4.953	5.047	V
	LD _{reg}	I _L = 0mA, 8mA (Note 2)	--	0.012	--	0.015	%/mA
	LN _{reg}	V _{IN} = 8V, 33V (Note 2)	--	0.015	--	0.015	%/V
Subgroup 3	I _{SY}	No Load	--	2.0	--	2.0	mA
T _A = -55 °C	V _O		4.978	5.022	4.953	5.047	V
	LD _{reg}	I _L = 0mA, 8mA (Note 2)	--	0.012	--	0.015	%/mA
	LN _{reg}	V _{IN} = 8V, 33V (Note 2)	--	0.015	--	0.015	%/V
Subgroup 8	TCV _O	(Notes 1, 4)	--	8.5	--	25	ppm/°C
-55 °C ≤ T _A ≤ +125 °C							

NOTES:

$$1. \text{TCV}_O = \text{ABS} \left(\frac{V_{\text{MAX}} - V_{\text{MIN}}}{10\text{V}} \right) \left(\frac{1}{180^\circ\text{C}} \right) \left(10^6 \right) \text{ where } -55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}.$$

2. Line and Load Regulation specifications include the effect of self-heating.
3. Minimum of 10mA Load Current guaranteed by Load Regulation test.
4. This parameter is 100% tested.

3.2.1 Simplified Schematic and Pin Connections.



TO-99 (J-Suffix)
REF-05AJ/883
REF-05BJ/883

REF-05

3.2.4 Microcircuit Group Assignment. This microcircuit is covered by microcircuit group 59.

4.2 Life Test/Burn-In Circuit.

