

1.0 SCOPE

This specification covers the detail requirements for a precision voltage reference which provides a stable +10V output that can be adjusted over a $\pm 3\%$ range with minimal effect on temperature stability. Long term stability of the REF-10 is qualified by sample wafer lot testing to a limit of 50ppm/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-10AJ/883	J
B	REF-10BJ/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.

Characteristics	Symbol	Special Conditions	REF-10/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Quiescent Supply Current	I_{SY}	No Load	–	1.4	–	1.4	mA
		$-55^\circ C \leq T_A \leq +125^\circ C$	–	2.0	–	2.0	mA
Output Voltage	V_O	$I_L = 0$	9.970	10.030	9.950	10.050	V
		$-55^\circ C \leq T_A \leq +125^\circ C$	9.955	10.045	9.905	10.095	V
Output Voltage Temperature Coefficient (Notes 1, 4)	TCV_O	$-55^\circ C \leq T_A \leq +125^\circ C$	–	8.5	–	25	ppm/ $^\circ C$
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	–	0.008	–	0.010	%/mA
		$I_L = 0mA$ to 8mA $-55^\circ C \leq T_A \leq +125^\circ C$	–	0.012	–	0.015	%/mA
Line Regulation (Note 2)	LN_{reg}	$V_{IN} = 13V$ to 33V	–	0.010	–	0.010	%/V
		$-55^\circ C \leq T_A \leq +125^\circ C$	–	0.015	–	0.015	%/V
Load Current (Note 3)	I_L		10	–	10	–	mA
Output Adjustment Range	ΔV_{trim}	$R_p = 10k\Omega$	± 3.0	–	± 3.0	–	%
Output Voltage Noise (Note 4)	e_{np-p}	0.1Hz to 10Hz	–	30	–	30	μV_{p-p}
Long-Term Stability (Note 5)			–	50	–	50	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-10/883

**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.

Test Requirement	Symbol	Special Conditions	REF-10/883				Units
			LIMITS A		LIMITS B		
			Min	Max	Min	Max	
Subgroup 1	I_{SY}	No Load	--	1.4	--	1.4	mA
$T_A = +25^\circ C$	ΔV_{trim}	$R_p = 10k\Omega$	± 3.0	--	± 3.0	--	%
	V_O	$I_L = 0$	9.970	10.030	9.950	10.050	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)	--	0.008	--	0.010	%/mA
	LN_{reg}	$V_{IN} = 13V, 33V$ (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
$T_A = +125^\circ C$	V_O		9.955	10.045	9.905	10.095	V
	LD_{reg}	$I_L = 0mA, 8mA$ (Note 2)	--	0.012	--	0.015	%/mA
	LN_{reg}	$V_{IN} = 13V, 33V$ (Note 2)	--	0.015	--	0.015	%/V
Subgroup 3	I_{SY}	No Load	--	2.0	--	2.0	mA
$T_A = -55^\circ C$	V_O		9.955	10.045	9.905	10.095	V
	LD_{reg}	$I_L = 0mA, 8mA$ (Note 2)	--	0.012	--	0.015	%/mA
	LN_{reg}	$V_{IN} = 13V, 33V$ (Note 2)	--	0.015	--	0.015	%/V
Subgroup 8 $-55^\circ C \leq T_A \leq +125^\circ C$	TCV_O	(Notes 1, 4)	--	8.5	--	25	ppm/ $^\circ C$

NOTES:

- $TCV_O = ABS \left(\frac{V_{MAX} - V_{MIN}}{10V} \right) \left(\frac{1}{180^\circ C} \right) \left(10^6 \right)$ where $-55^\circ C \leq T_A \leq +125^\circ C$.
- Line and Load Regulation specifications include the effect of self-heating.
- Minimum of 10mA Load Current guaranteed by Load Regulation test.
- This parameter is 100% tested.