

MAXIM

High Precision +2.5 Volt Reference

MX580

General Description

The MX580 is a high performance three-terminal voltage reference which provides a stable +2.5V source for 8, 10, and 12-bit data converters and analog functions. A temperature compensated internal band-gap operates from +4.5V to +30V and consumes only 1.5mA.

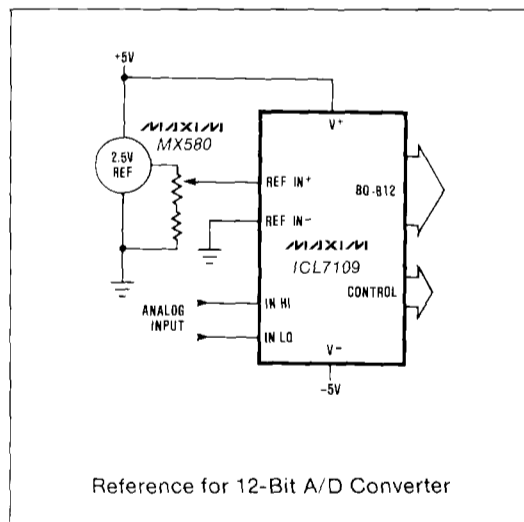
The reference can be connected directly to a number of CMOS A-to-D and D-to-A converters and is especially convenient in +5V powered systems. An initial untrimmed accuracy of 0.4% and temperature stability of 10ppm/°C allow adjustment-free designs in many precision applications.

Available packages include TO-52 metal cans for commercial and military temperature grades, as well as 8 lead small outline for commercial grade devices.

Applications

- CMOS Data Conversion
- Digital Panel Meters
- Portable Instrumentation
- Remote Measurement Systems
- Logic Powered Analog Systems

Typical Application



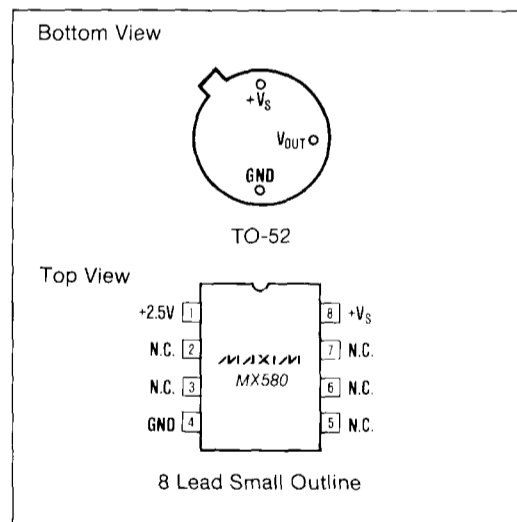
Features

- ◆ 2.500V ±0.4% Accuracy (MX580L/M)
- ◆ 10ppm/°C Temperature Stability (MX580M)
- ◆ No Adjustments
- ◆ 250µV Long Term Stability
- ◆ 1.5mA Quiescent Current
- ◆ +4.5V to +30V Operation

Ordering Information

PART	TEMP. RANGE	PACKAGE	TOLERANCE
MX580JH	0°C to +70°C	TO-52 Can	±75mV
MX580KH	0°C to +70°C	TO-52 Can	±25mV
MX580LH	0°C to +70°C	TO-52 Can	±10mV
MX580MH	0°C to +70°C	TO-52 Can	±10mV
MX580JCSA	0°C to +70°C	8 Lead S.O.	±75mV
MX580KCSA	0°C to +70°C	8 Lead S.O.	±25mV
MX580LCSA	0°C to +70°C	8 Lead S.O.	±10mV
MX580MCSA	0°C to +70°C	8 Lead S.O.	±10mV
MX580SH	-55°C to +125°C	TO-52 Can	±25mV
MX580TH	-55°C to +125°C	TO-52 Can	±10mV
MX580UH	-55°C to +125°C	TO-52 Can	±10mV

Pin Configurations



High Precision +2.5 Volt Reference

ABSOLUTE MAXIMUM RATINGS

Input Voltage V_{IN} to GND	-0.3V, +40V	Lead Temperature (Soldering 10sec)	+300°C
Power Dissipation		Junction Temperature (T_J)	-55°C to +150°C
TO-52 Metal Can (Derate 2.8mW/°C above +25°C)	350mW	Thermal Resistance, Junction to Ambient	
Small Outline (Derate 5.3mW/°C above +75°C)	400mW	TO-52 Metal Can	360°C/W
Output Short-Circuit Duration (Note 1)	Indefinite	Small Outline Package	170°C/W
Operating Temperature Range		Junction to Case	
Commercial (J, K, L, M)	0°C to +70°C	TO-52 Metal Can	100°C/W
Military (S, T, U)	-55°C to +125°C	Small Outline Package	55°C/W
Storage Temperature Range	-65°C to +175°C		

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

($V_{IN} = +15V$, $T_A = +25°C$, unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage Tolerance		$I_L = 0mA$; MX580J/S MX580K/T MX580L/M/U			±75 ±25 ±10	mV
Output Voltage Change with Temperature, (Temperature Coefficient)		$T_A = 0°C$ to $+70°C$; MX580J MX580K MX580L MX580M			15 (85) 7 (40) 4.3 (25) 1.75 (10)	±mV (ppm/°C)
		$T_A = -55°C$ to $+125°C$; MX580S MX580T MX580U			25 (55) 11 (25) 4.5 (10)	
Line Regulation		$I_L = 0mA$, $+4.5V < V_{IN} < +7V$; MX580J/S MX580K MX580L/M/T/U		0.3 0.3	3 2 1	mV
		$I_L = 0mA$, $+7V < V_{IN} < +30V$; MX580J/S MX580K MX580L/M/T/U		1.5 1.5	6 4 2	
Load Regulation		$I_L = 0mA$ to 10mA			10	mV
Quiescent Supply Current	I_Q	$I_L = 0mA$		1.0	1.5	mA
Noise	e_{NP-P}	0.1Hz to 10Hz		60		µV _{P-P}
Stability Long Term Per Month				250		µV
				25		

Note 1: Absolute Maximum power dissipation must not be exceeded.

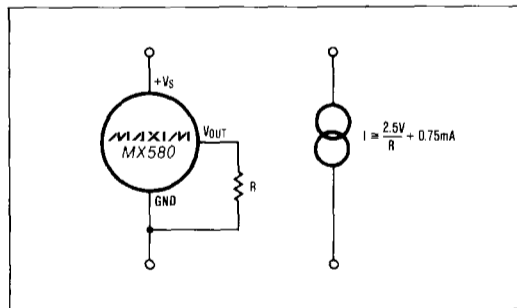


Figure 1. Two-Component Precision Current Limiter

High Precision +2.5 Volt Reference

Package Information

MX580

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.115	0.150	2.92	3.81
phi b	—	0.021	—	0.533
phi b2	0.016	0.019	0.406	0.483
phi D	0.209	0.230	5.31	5.84
phi D1	0.178	0.195	4.52	4.95
e	0.100	—	2.54	—
e1	0.050	—	1.27	—
F	—	0.030	—	0.762
j	0.036	0.046	0.914	1.17
k	0.028	0.048	0.711	1.22
L	0.500	—	12.70	—
L1	—	0.050	—	1.27
L2	0.250	—	6.35	—
alpha	45°		45°	

21-0020A

2-PIN TO-52 PACKAGE

DIM	PINS	INCHES		MILLIMETERS	
		MIN	MAX	MIN	MAX
A		0.053	0.069	1.35	1.75
A1		0.004	0.010	0.10	0.25
B		0.014	0.019	0.35	0.49
C		0.007	0.010	0.19	0.25
E		0.150	0.157	3.80	4.00
e		0.050	—	1.27	—
H		0.228	0.244	5.80	6.20
L		0.016	0.050	0.40	1.27

21-0041A

Narrow SO SMALL-OUTLINE PACKAGE (0.150 in.)