

19-0911; Rev 1; 8/96

# MAXIM

## High Precision +2.5 Volt Reference

### 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

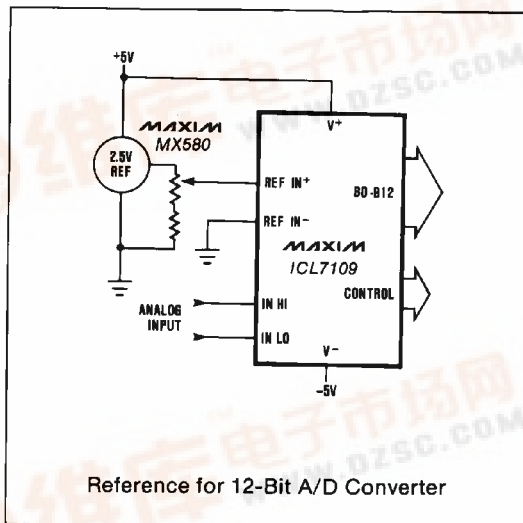
### Features

- ◆ 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

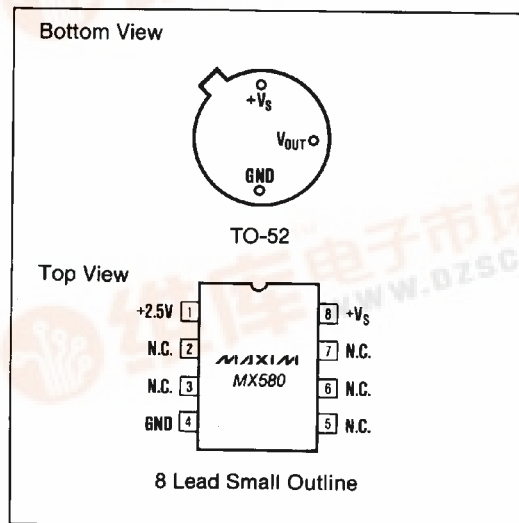
### Ordering Information

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 SO	±75mV
MX580KCSA	0°C to +70°C	8 Lead SO	±25mV
MX580LCSA	0°C to +70°C	8 Lead SO	±10mV
MX580JESA	-40°C to +85°C	8 Lead SO	±75mV
MX580KESA	-40°C to +85°C	8 Lead SO	±25mV
MX580SH	-55°C to +125°C	TO-52 Can	±25mV

### Typical Application



### Pin Configurations



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### ABSOLUTE MAXIMUM RATINGS

Input Voltage $V_{IN}$ to GND	-0.3V, +40V	Storage Temperature Range	-65°C to +175°C
Power Dissipation		Lead Temperature (Soldering 10sec)	+300°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)	-55°C to +125°C	Small Outline Package	+55°C/W

Stresses beyond 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 beyond 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

( $V_{IN} = +15V$ ,  $T_A = +25^\circ C$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage Tolerance		$I_L = 0mA$ MX580J/S MX580K MX580L/M			±75 ±25 ±10	mV
Output Voltage Change with Temperature (Temperature Coefficient)		$T_A = 0^\circ C$ to $+70^\circ C$ MX580J MX580K MX580L MX580M		15 (85) 7 (40) 4.3 (25) 1.75 (10)		±mV (ppm/°C)
		$T_A = -40^\circ C$ to $+85^\circ C$ MX580J MX580K		20 (64) 12 (38)		
		$T_A = -55^\circ C$ to $+125^\circ C$ MX580S MX580 MX580		25 (55) 11 (25) 4.5 (10)		
Line Regulation		$I_L = 0mA$ $+4.5V < V_{IN} < +7V$ MX580J/S MX580K MX580L/M		0.3 0.3	3 2 1	mV
		$I_L = 0mA$ , $+7V < V_{IN} < +30V$ MX580J/S MX580K MX580L/M		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 <sub>NP-P</sub>	0.1Hz to 10Hz		60		µV <sub>P-P</sub>
Stability Long Term Per Month				250		µV
				25		

**Note 1:** Absolute maximum power dissipation must not be exceeded.

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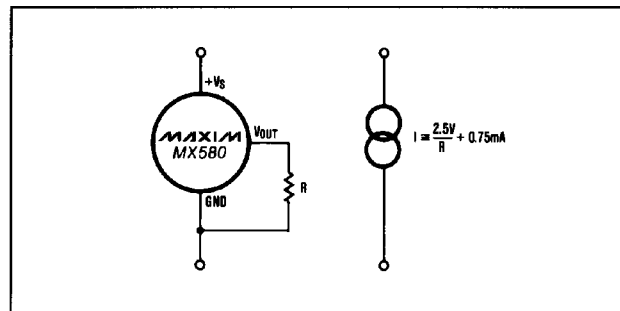


Figure 1. Two-Component Precision Current Limiter

**MX580**

**MX580**

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### Package Information

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.115	0.150	2.92	3.81
Φb	-	0.021	-	0.533
Φb2	0.016	0.019	0.406	0.483
ΦD	0.209	0.230	5.31	5.84
ΦD1	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	-
α	45°		45°	

21-0020A

**2-PIN TO-52 PACKAGE**

DIM	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

DIM	PINS	INCHES		MILLIMETERS	
		MIN	MAX	MIN	MAX
D	8	0.189	0.197	4.80	5.00
D	14	0.337	0.344	8.55	8.75
D	16	0.386	0.394	9.80	10.00

21-0041A

**Narrow SO SMALL-OUTLINE PACKAGE (0.150 in.)**

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