

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

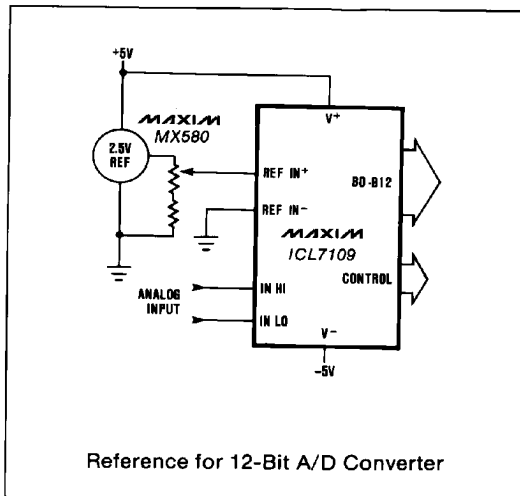
Features

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

Ordering Information

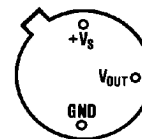
PART	TEMP. RANGE	PACKAGE	TOLERANCE
MX580JH	0°C to +70°C	TO-52 Can	± 75 mV
MX580KH	0°C to +70°C	TO-52 Can	± 25 mV
MX580LH	0°C to +70°C	TO-52 Can	± 10 mV
MX580MH	0°C to +70°C	TO-52 Can	± 10 mV
MX580JCSA	0°C to +70°C	8 Lead SO	± 75 mV
MX580KCSA	0°C to +70°C	8 Lead SO	± 25 mV
MX580LCSA	0°C to +70°C	8 Lead SO	± 10 mV
MX580JESA	-40°C to +85°C	8 Lead SO	± 75 mV
MX580KESA	-40°C to +85°C	8 Lead SO	± 25 mV
MX580SH	-55°C to +125°C	TO-52 Can	± 25 mV

Typical Application



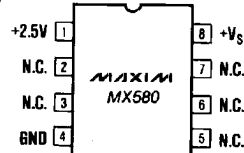
Pin Configurations

Bottom View



TO-52

Top View



8 Lead Small Outline

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ABSOLUTE MAXIMUM RATINGS

Input Voltage V_{IN} to GND -0.3V, +40V
 Power Dissipation
 TO-52 Metal Can (Derate 2.8mW/°C above +25°C) . . . 350mW
 Small Outline (Derate 5.3mW/°C above +75°C) 400mW
 Output Short-Circuit Duration (Note 1) Indefinite
 Operating Temperature Range
 Commercial (J, K, L, M) 0°C to +70°C
 Military (S) -55°C to +125°C

Storage Temperature Range -65°C to +175°C
 Lead Temperature (Soldering 10sec) +300°C
 Thermal Resistance, Junction to Ambient
 TO-52 Metal Can +360°C/W
 Small Outline Package +170°C/W
 Junction to Case
 TO-52 Metal Can +100°C/W
 Small Outline Package +65°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)		$\pm mV$ (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	ENP-P	0.1Hz to 10Hz		60		μV_{P-P}
Stability Long Term Per Month				250 25		μV

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

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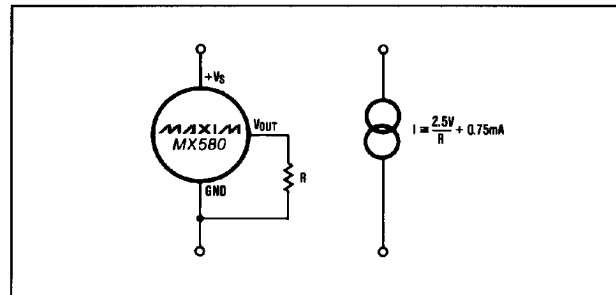
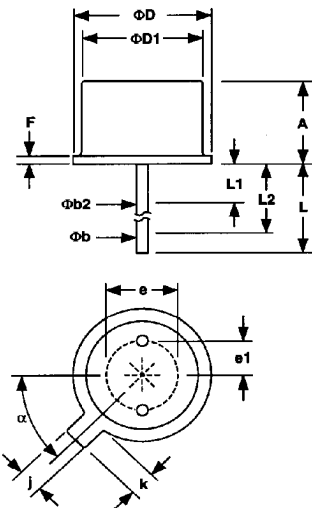


Figure 1. Two-Component Precision Current Limiter

MX580

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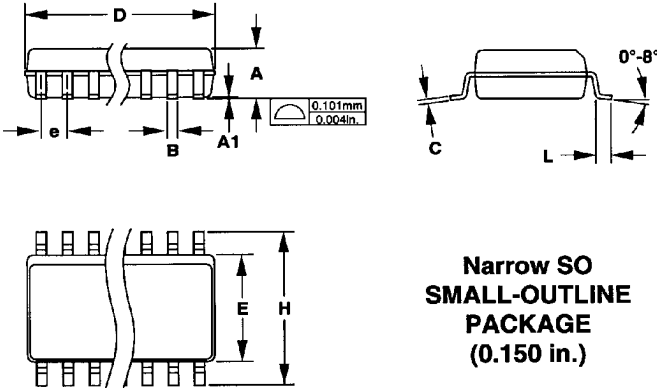
Package Information



2-PIN TO-52 PACKAGE

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°	

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Narrow SO SMALL-OUTLINE PACKAGE (0.150 in.)

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

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