



High-Precision, +2.5V 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 bandgap operates from 4.5V to 30V and consumes only 1.5mA.

The reference can be connected directly to a number of CMOS analog-to-digital and digital-to-analog 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-pin SO packages for commercial grade devices.

Applications

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

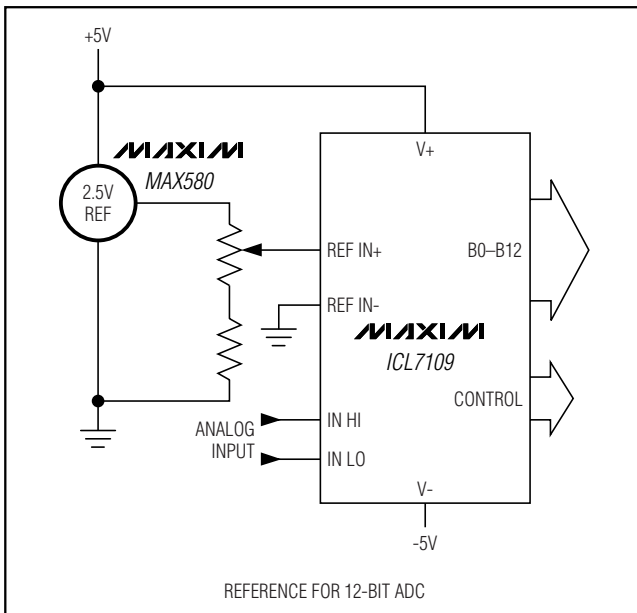
Features

- ◆ 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

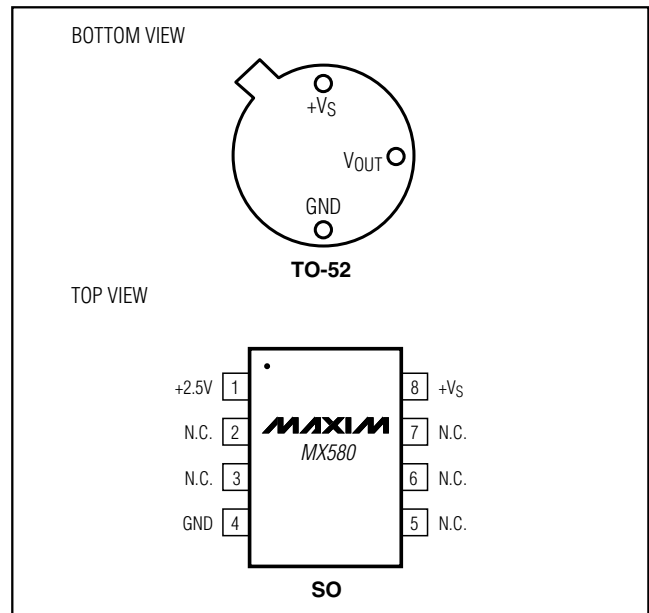
Ordering Information

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

Typical Application Circuit



Pin Configurations



For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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ABSOLUTE MAXIMUM RATINGS

| | |
|--|-----------------|
| Input Voltage (V_{IN} to GND) | -0.3V, +40V |
| Continuous Power Dissipation | |
| TO-52 Metal Can (derate 2.8mW/°C above +25°C) | 350mW |
| SO (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, 10s) | +300°C |
| Thermal Resistance, Junction to Ambient | |
| TO-52 Metal Can | +360°C/W |
| SO | +170°C/W |
| Junction to Case | |
| TO-52 Metal Can | +100°C/W |
| SO | +55°C/W |

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

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

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

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|------------|------------------------------------|----------|-----|-----------|----------------|
| Output Voltage Tolerance | | $I_L = 0mA$ | MX580J/S | | ±75 | mV |
| | | | MX580K | | ±25 | |
| | | | MX580L/M | | ±10 | |
| Output Voltage Change with Temperature (Temperature Coefficient) | | $T_A = 0°C$ to +75°C | MX580J | | 15 (85) | mV (ppm/°C) |
| | | | MX580K | | 7 (40) | |
| | | | MX580L | | 4.3 (25) | |
| | | $T_A = -40°C$ to +85°C | MX580M | | 1.75 (10) | |
| | | | MX580J | | 20 (64) | |
| | | | MX580K | | 12 (38) | |
| $T_A = -55°C$ to +125°C | MX580S | | 25 (55) | | | |
| Line Regulation | | $I_L = 0mA$, $4.5V < V_{IN} < 7V$ | MX580J/S | 0.3 | 3 | mV |
| | | | MX580K | 0.3 | 2 | |
| | | | MX580L/M | | 1 | |
| | | $I_L = 0mA$, $7V < V_{IN} < 30V$ | MX580J/S | 1.5 | 6 | |
| | | | MX580K | 1.5 | 4 | |
| | | | MX580L/M | | 2 | |
| Load Regulation | | $I_L = 0mA$ to 10mA | | | 10 | mV |
| Quiescent Supply Current | I_Q | $I_L = 0mA$ | | 1.0 | 1.5 | mA |
| Noise | $e_n(P-P)$ | 0.1Hz to 10Hz | | 60 | | μV_{P-P} |
| Stability | | Long term | | 250 | | μV |
| | | Per month | | 25 | | |

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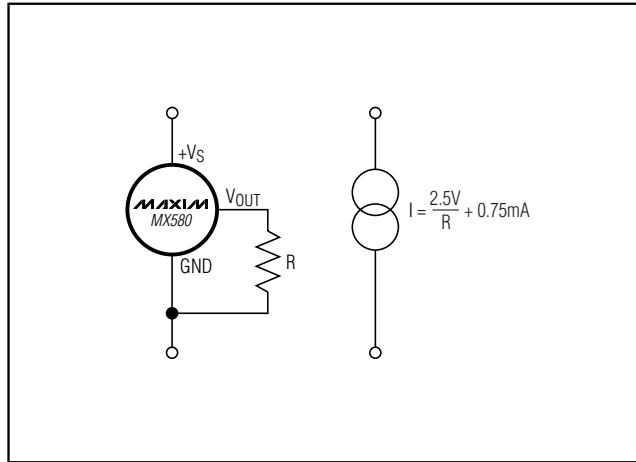


Figure 1. Two-Component Precision Current Limiter

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Package Information

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to www.maxim-ic.com/packages.)

| SYMBOL | INCHES | | MILLIMETERS | |
|--------|-----------|------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | .115 | .150 | 2.92 | 3.81 |
| f b | --- | .021 | --- | .533 |
| f b2 | .016 | .019 | .406 | .483 |
| f D | .209 | .230 | 5.31 | 5.84 |
| f D1 | .178 | .195 | 4.52 | 4.95 |
| e | .100 T.P. | | 2.54 T.P. | |
| e1 | .050 T.P. | | 1.27 T.P. | |
| F | --- | .030 | --- | .762 |
| J | .036 | .046 | .914 | 1.17 |
| k | .028 | .048 | .711 | 1.22 |
| L | .500 | --- | 12.70 | --- |
| L1 | --- | .050 | --- | 1.27 |
| L2 | .250 | --- | 6.35 | --- |
| Q | 45° T.P. | | 45° T.P. | |

NOTES: DIMENSIONS ARE COMPLIANT TO JEDEC, TO-52.

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
= N/A = .001 = N/A

DRAWN BY: DATE: TITLE: CASE OUTLINE TO-52, 2 LD

APPROVED BY: DATE: DOCUMENT CONTROL NO. REV. 21-0020 A

TO52/PO EFS

| 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 | 0.050 BSC | | 1.27 BSC | |
| E | 0.150 | 0.157 | 3.80 | 4.00 |
| H | 0.228 | 0.244 | 5.80 | 6.20 |
| L | 0.016 | 0.050 | 0.40 | 1.27 |

VARIATIONS:

| DIM | INCHES | | MILLIMETERS | | N | MS012 |
|-----|--------|-------|-------------|-------|----|-------|
| | MIN | MAX | MIN | MAX | | |
| D | 0.189 | 0.197 | 4.80 | 5.00 | 8 | AA |
| D | 0.337 | 0.344 | 8.55 | 8.75 | 14 | AB |
| D | 0.386 | 0.394 | 9.80 | 10.00 | 16 | AC |

NOTES:
 1. D&E DO NOT INCLUDE MOLD FLASH.
 2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED 0.15mm (.006").
 3. LEADS TO BE COPLANAR WITHIN 0.10mm (.004").
 4. CONTROLLING DIMENSION: MILLIMETERS.
 5. MEETS JEDEC MS012.
 6. N = NUMBER OF PINS.

DALLAS SEMICONDUCTOR

PROPRIETARY INFORMATION

TITLE: PACKAGE OUTLINE, .150" SOIC

APPROVAL: DOCUMENT CONTROL NO. 21-0041 REV. B 1/1

SOIC EFS

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

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