19-0618; Rev 1; 9/06

Low-Voltage Reference

MAX8069

General Description

The MAX8069 is a 1.2V temperature-compensated voltage reference. It uses the bandgap principle to achieve excellent stability and low noise at reverse currents down to 60µA. The MAX8069 also features excellent stability, freedom from oscillation. The MAX8069 is a functional alternative to Maxim's ICL8069 with an identical pinout.

Applications

Analog-to-Digital Converters
Digital-to-Analog Converters
Threshold Detectors
Voltage Regulators
Portable Instruments

Features

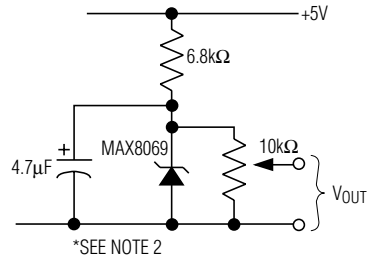
- **Temperature Coefficient Guaranteed to 25ppm/°C (max)**
- **Low Bias Current: 60µA (min)**
- **Low Dynamic Impedance**
- **Low Reverse Voltage**
- **Low Cost**

Ordering Information

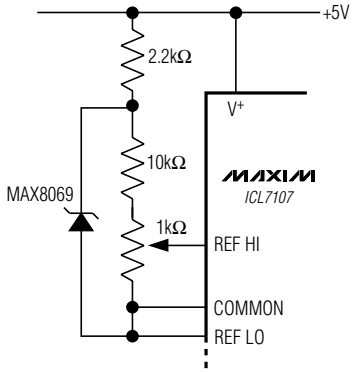
PART	TEMP RANGE	PIN-PACKAGE	PKG CODE
MAX8069ESA+	-40°C to +85°C	8 SO	S8-2
MAX8069CCZQ	0°C to +70°C	TO-92	C92-2

+Denotes lead-free package.

Typical Operating Circuit



(a) Simple Reference (1.2V or Less)



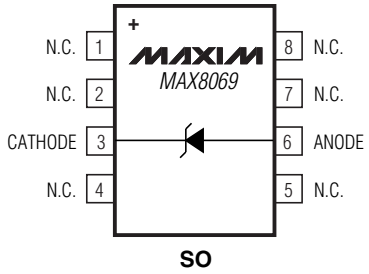
(b) Double-Regulated 100mV Reference for ICL7107 One-Chip DPM Circuit

Selector Guide

PART	TEMP RANGE	PIN-PACKAGE	MAX TEMPCO (ppm/°C)
MAX8069ESA+	-40°C to +85°C	8 SO	25
MAX8069CCZQ	0°C to +70°C	TO-92	50

Pin Configurations

TOP VIEW



SO

Pin Configurations continued at end of data sheet.

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.

ABSOLUTE MAXIMUM RATINGS

Reverse Voltage .....(Note 1)
Forward Current 10mA
Reverse Current 10mA
Power Dissipation .....Limited by Max Forward/Reverse Current
Storage Temperature Range .....-65°C to +150°C

Operating Temperature Range
MAX8069CCZQ .....0°C to +70°C
MAX8069ESA .....-40°C to +85°C
Lead Temperature (soldering, 10s) .....+300°C

Note 1: In normal use, the reverse voltage cannot exceed the reference voltage. However, when plugging units into a powered-up test fixture, an instantaneous voltage equal to the compliance of the test circuit will be seen. This should not exceed 20V.

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

(T_A = +25°C, unless otherwise noted.) (Note 2)

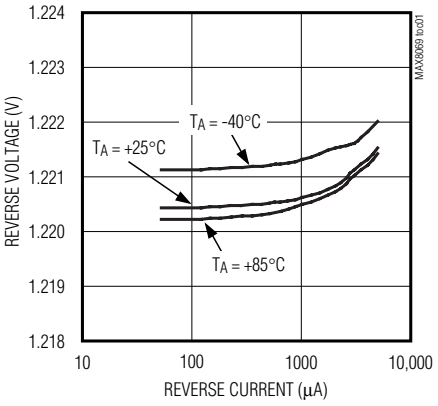
PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Output Voltage	I_R = 500µA		1.20	1.22	1.25	V
Output Voltage Temperature Coefficient	I_R = 500µA, $T_A = T_{MIN}$ to T_{MAX}	MAX8069ESA			25	ppm/°C
		MAX8069CCZQ			50	
Output Voltage Change	60µA ≤ I_R ≤ 5mA			15	20	mV
Reverse Dynamic Impedance	I_R = 60µA			1	2	Ω
	I_R = 500µA			0.6	2	
Forward Voltage Drop	I_R = 500µA			0.6	1	V
RMS Noise Voltage	10Hz ≤ f ≤ 10kHz, I_R = 500µA			20		µV
Reverse Current Range			0.06		5.0	mA

Note 2: If circuit strays in excess of 200pF are anticipated, a 4.7µF shunt capacitor will ensure stability under all operating conditions.

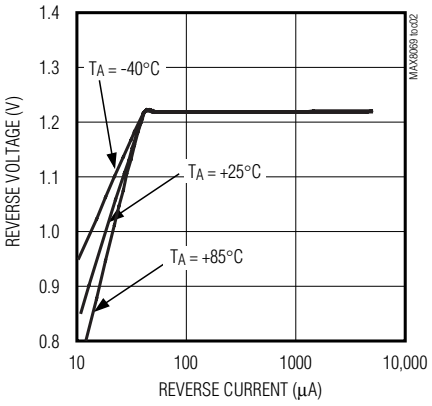
Typical Operating Characteristics

(T_A = +25°C, unless otherwise noted.)

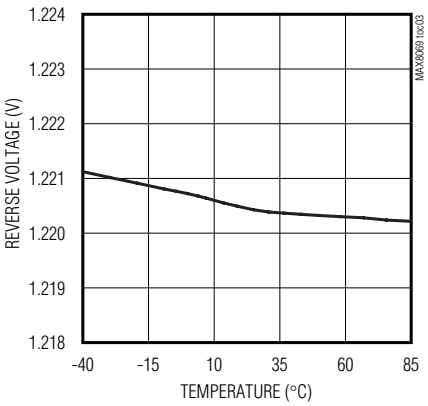
REVERSE VOLTAGE vs. REVERSE CURRENT



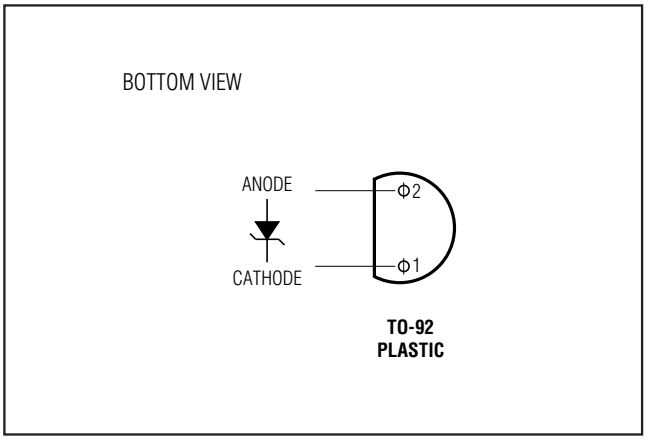
REVERSE VOLTAGE vs. REVERSE CURRENT



REVERSE VOLTAGE vs. TEMPERATURE



Pin Configurations (continued)



Package Information

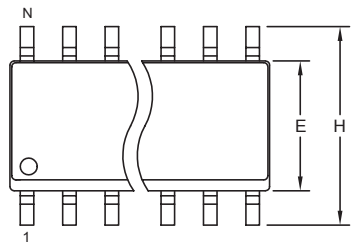
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to **www.maxim-ic.com/packages**.)

SOICN .EPS

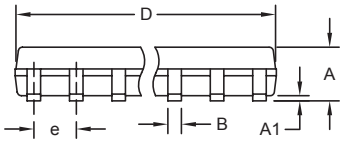
	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
B	0.014	0.019	0.35	0.49
C	0.007	0.010	0.19	0.25
e	0.050 BSC		1.27 BSC	
E	0.150	0.157	3.80	4.00
H	0.228	0.244	5.80	6.20
L	0.016	0.050	0.40	1.27

VARIATIONS:

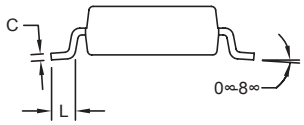
	INCHES		MILLIMETERS			
DIM	MIN	MAX	MIN	MAX	N	MS012
D	0.189	0.197	4.80	5.00	8	AA
D	0.337	0.344	8.55	8.75	14	AB
D	0.386	0.394	9.80	10.00	16	AC



TOP VIEW



FRONT VIEW



SIDE VIEW

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 MAXIM

PROPRIETARY INFORMATION

TITLE: PACKAGE OUTLINE, .150" SOIC

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

Revision History

Pages changed at Rev 1: 1, 2, 4.

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