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[ICL8069CCZR](#)

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Low Voltage Reference

The ICL8069 is a 1.2V temperature-compensated voltage reference. It uses the band-gap principle to achieve excellent stability and low noise at reverse currents down to 50µA. Applications include analog-to-digital converters, digital-to-analog converters, threshold detectors, and voltage regulators. Its low power consumption makes it especially suitable for battery operated equipment.

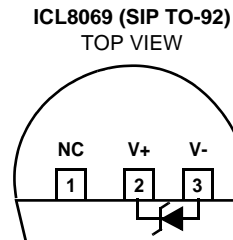
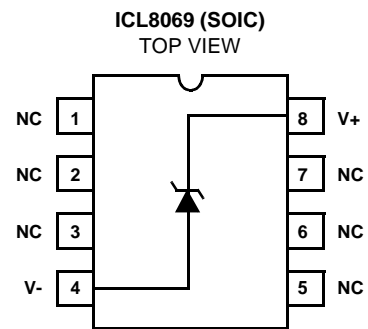
Features

- Low Bias Current (Min)50µA
- Low Dynamic Impedance
- Low Reverse Voltage
- Low Cost

Pinouts

Ordering Information

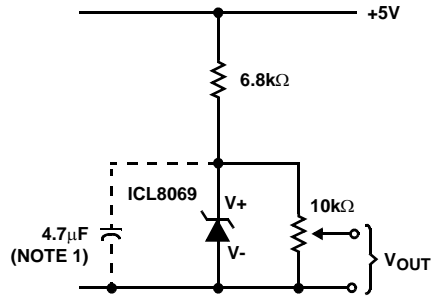
PART NUMBER	MAXIMUM TEMPCO	TEMP. RANGE (°C)	PACKAGE	PKG. DWG. #
ICL8069CCZR	0.005%/°C	0 to 70	SIP Package (TO-92)	Z3.05
ICL8069DCZR	0.01%/°C	0 to 70	SIP Package (TO-92)	Z3.05
ICL8069CCBA	0.005%/°C	0 to 70	8 Ld SOIC	M8.15



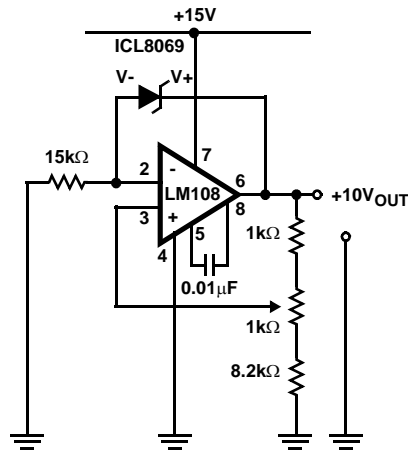
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Functional Block Diagrams

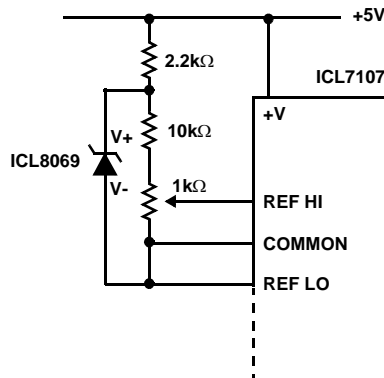
SIMPLE REFERENCE (1.2V OR LESS)



BUFFERED 10V REFERENCE USING A SINGLE SUPPLY



DOUBLE REGULATED 100mV REFERENCE FOR ICL7107 ONE-CHIP DPM CIRCUIT



ICL8069

Absolute Maximum Ratings

Reverse Voltage See Note 3
 Forward Current 10mA
 Reverse Current 10mA

Operating Conditions

Temperature Ranges
 ICL8069C 0°C to 70°C

Thermal Information

Thermal Resistance (Typical, Note 1)	θ_{JA} (°C/W)	θ_{JC} (°C/W)
SOIC Package	170	N/A
SIP (TO-92) Package	200	N/A

Power Dissipation Limited by MAX Forward/Reverse Current
 Maximum Junction Temperature (SOIC Package) 150°C
 Maximum Storage Temperature Range -65°C to 150°C
 Maximum Lead Temperature (Soldering 10s) 300°C
 (SOIC - Lead Tips Only)

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

- θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications $T_A = 25^\circ\text{C}$ Unless Otherwise Specified

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Reverse Breakdown Voltage	$I_R = 500\mu\text{A}$	1.20	1.23	1.25	V
Reverse Breakdown Voltage Change	$50\mu\text{A} \leq I_R \leq 5\text{mA}$	-	15	20	mV
Reverse Dynamic Impedance	$I_R = 50\mu\text{A}$	-	1	2	Ω
	$I_R = 500\mu\text{A}$	-	1	2	Ω
Forward Voltage Drop	$I_F = 500\mu\text{A}$	-	0.7	1	V
RMS Noise Voltage	$10\text{Hz} \leq F \leq 10\text{kHz}$, $I_R = 500\mu\text{A}$	-	5	-	μV
Long Term Stability	$I_R = 4.75\text{mA}$, $T_A = 25^\circ\text{C}$	-	1	-	ppm/kHR
Breakdown Voltage Temperature Coefficient	$I_R = 500\mu\text{A}$, $T_A = \text{Operating Temperature Range}$	-	-	0.005	%/°C
		-	-	0.01	%/°C
Reverse Current Range	1.18V to 1.27V	0.050	-	5	mA

NOTES:

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

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Typical Performance Curves

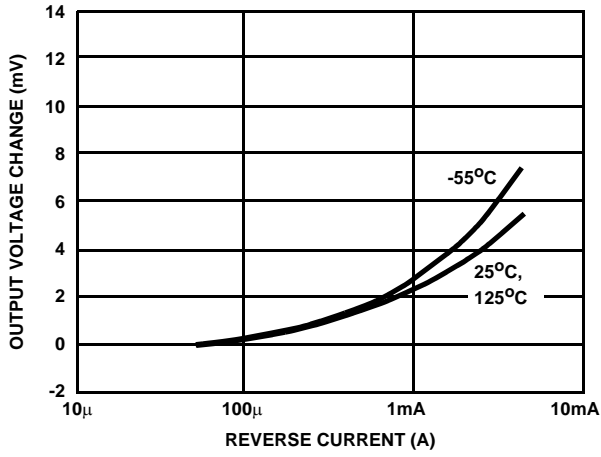


FIGURE 1. VOLTAGE CHANGE AS A FUNCTION OF REVERSE CURRENT

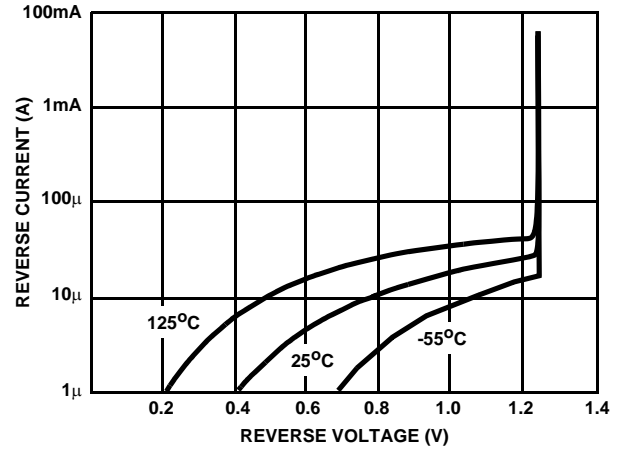


FIGURE 2. REVERSE VOLTAGE AS A FUNCTION OF CURRENT

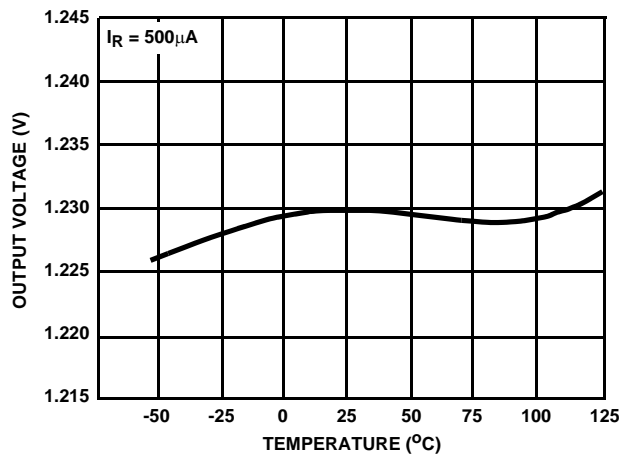
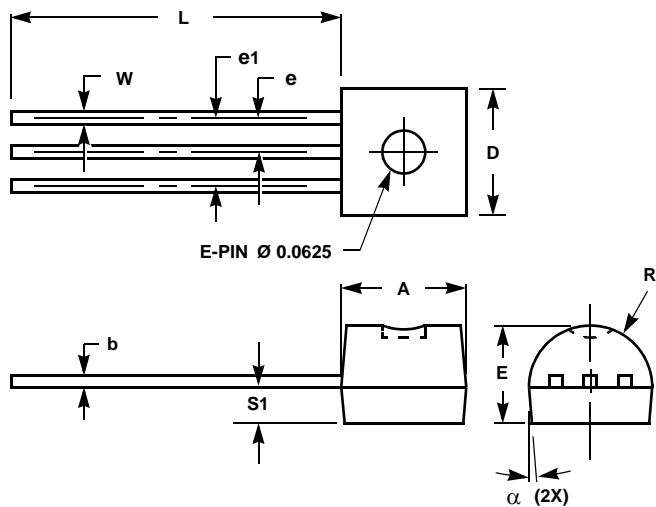


FIGURE 3. REVERSE VOLTAGE AS A FUNCTION OF TEMPERATURE

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Single-In-Line Plastic Packages (SIP)



Z3.05 (JEDEC STYLE TO-92 MODIFIED)
3 LEAD PLASTIC SINGLE-IN-LINE PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.195	4.32	4.95	1
b	0.014	0.020	0.36	0.51	2
E	0.130	0.155	3.30	3.94	1
e	0.045	0.055	1.14	1.40	-
e1	0.095	0.105	2.41	2.67	-
L	0.500	0.610	12.70	15.49	-
R	0.085	0.095	2.16	2.41	-
S1	0.045	0.060	1.14	1.52	-
W	0.016	0.022	0.41	0.56	2
D	0.175	0.195	4.45	4.95	1
alpha	4°	6°	4°	6°	-

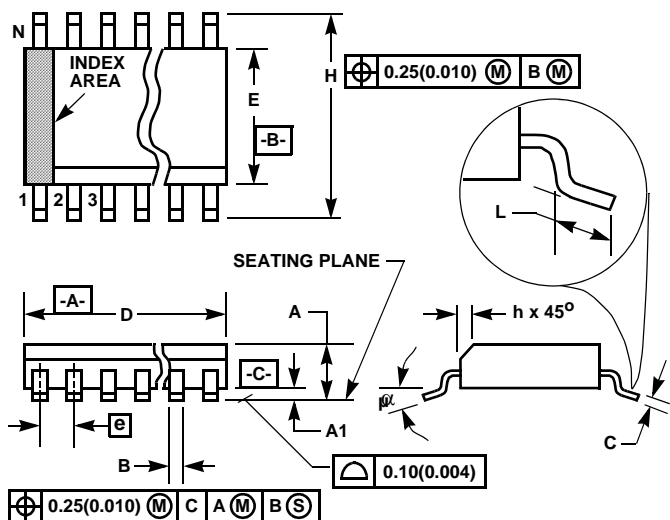
NOTES:

1. Package body dimensions do not include any mold flash or protrusions.
2. Package outline dimensions do not include burrs.
3. Controlling dimension: INCH.

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Small Outline Plastic Packages (SOIC)



M8.15 (JEDEC MS-012-AA ISSUE C)
8 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.0532	0.0688	1.35	1.75	-
A1	0.0040	0.0098	0.10	0.25	-
B	0.013	0.020	0.33	0.51	9
C	0.0075	0.0098	0.19	0.25	-
D	0.1890	0.1968	4.80	5.00	3
E	0.1497	0.1574	3.80	4.00	4
e	0.050 BSC		1.27 BSC		-
H	0.2284	0.2440	5.80	6.20	-
h	0.0099	0.0196	0.25	0.50	5
L	0.016	0.050	0.40	1.27	6
N	8		8		7
α	0°	8°	0°	8°	-

NOTES:

- Symbols are defined in the "MO Series Symbol List" in Section 2.2 of Publication Number 95.
- Dimensioning and tolerancing per ANSI Y14.5M-1982.
- Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion and gate burrs shall not exceed 0.15mm (0.006 inch) per side.
- Dimension "E" does not include interlead flash or protrusions. Interlead flash and protrusions shall not exceed 0.25mm (0.010 inch) per side.
- The chamfer on the body is optional. If it is not present, a visual index feature must be located within the crosshatched area.
- "L" is the length of terminal for soldering to a substrate.
- "N" is the number of terminal positions.
- Terminal numbers are shown for reference only.
- The lead width "B", as measured 0.36mm (0.014 inch) or greater above the seating plane, shall not exceed a maximum value of 0.61mm (0.024 inch).
- Controlling dimension: MILLIMETER. Converted inch dimensions are not necessarily exact.

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