LM4041 Precision Micropower Shunt Voltage Reference

1 Features

- 1.225V Fixed and adjustable outputs (1.225V to 10V)
- Tight output tolerances and low temperature coefficient
  - Maximum 0.1%, 100ppm/°C – A grade
  - Maximum 0.2%, 100ppm/°C – B grade
  - Maximum 0.5%, 100ppm/°C – C grade
  - Maximum 1.0%, 150ppm/°C – D grade
- Low output noise . . . 20μV_{RMS} (typical)
- Wide operating current range . . . 45μA (typical) to 12mA
- Stable with all capacitive loads; no output capacitor required
- Available in
  - Industrial temperature: –40°C to 85°C
  - Extended temperature: –40°C to 125°C

2 Applications

- Data-Acquisition Systems
- Power Supplies and Power-Supply Monitors
- Instrumentation and Test Equipment
- Process Control
- Precision Audio
- Automotive Electronics
- Energy Management/Metering
- Battery-Powered Equipment

3 Description

The LM4041 series of shunt voltage references are versatile, easy-to-use references designed for a wide array of applications. These parts do not require external capacitors for operation and are stable with all capacitive loads. Additionally, the reference offers low dynamic impedance, low noise, and a low temperature coefficient to maintain a stable output voltage over a wide range of operating currents and temperatures. The LM4041 uses fuse and Zener-zap reverse breakdown voltage trim during wafer sort to offer four output voltage tolerances, ranging from 0.1% (maximum) for the A grade to 1% (maximum) for the D grade. Thus, a great deal of flexibility is offered to designers in choosing the best cost-to-performance ratio for applications. The LM4041 is available in a fixed (1.225V nominal) or an adjustable version (which requires an external resistor divider to set the output to a value between 1.225V and 10V).

Packaged in space-saving SC-70 and SOT-23-3 and requiring a minimum current of 45μA (typical), the LM4041 also designed for portable applications. The TO-92 package also is available for through-hole packaging needs. The LM4041xI is characterized for operation over an ambient temperature range of –40°C to 85°C. The LM4041xQ is characterized for operation over an ambient temperature range of –40°C to 125°C.

Table of Contents

1 Features.....1
2 Applications.....1
3 Description.....1
4 Pin Configuration and Functions.....3
Pin Functions.....3
Pin Functions: ADJ Pinouts.....4
5 Specifications.....5
5.1 Absolute Maximum Ratings.....5
5.2 ESD Ratings.....5
5.3 Recommended Operating Conditions.....6
5.4 LM4041x12I Electrical Characteristics.....6
5.5 LM4041x12I Electrical Characteristics.....7
5.6 LM4041x12Q Electrical Characteristics.....8
5.7 LM4041xI (Adjustable Version) Electrical Characteristics.....9
5.8 LM4041xI (Adjustable Version) Electrical Characteristics.....10
5.9 LM4041xQ (Adjustable Version) Electrical Characteristics.....11
5.10 Typical Characteristics.....12
6 Functional Block Diagram.....15
7 Application Information.....16
7.1 Output Capacitor.....16
7.2 SOT-23 and SC-70 Pin Connections.....16
7.3 Adjustable Version.....17
7.4 Cathode and Load Currents.....17
8 Device and Documentation Support.....18
8.1 Receiving Notification of Documentation Updates.....18
8.2 Trademarks.....18
8.3 Electrostatic Discharge Caution.....18
8.4 Support Resources.....18
8.5 Glossary.....18
9 Revision History.....18
10 Mechanical, Packaging, and Orderable Information.....20

4 Pin Configuration and Functions

Pin Functions

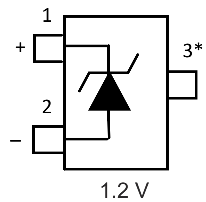

Figure 4-1. DBZ Package 3-Pin SOT-23 Top View

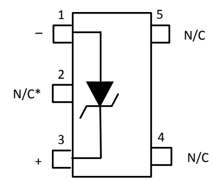

Figure 4-2. DCK Package 5-Pin SC70 Top View

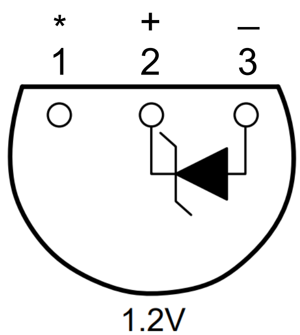

Figure 4-3. LP Package 3-Pin TO-92 Bottom View

Pin Functions

PIN				I/O	DESCRIPTION
NAME	SOT-23	SC70	TO-92		
Anode	2	1	3	O	Anode pin, normally grounded
Cathode	1	3	2	I/O	Shunt current and output voltage
FB	—	—	—	I	Feedback pin for adjustable output voltage
NC*	3	2	1	—	**Must float or connect to anode (1)
NC	—	4, 5	—	—	No connect

(1) **In applications with high electromagnetic interference (for example, when placed near transformers or other electromagnetic sources) or significant high-frequency switching noise, TI recommends to connect this pin to the anode.**

Pin Functions: ADJ Pinouts

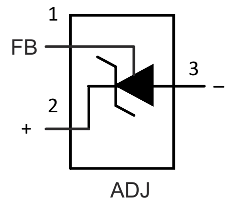

Figure 4-4. DBZ Package
3-Pin SOT-23
Top View

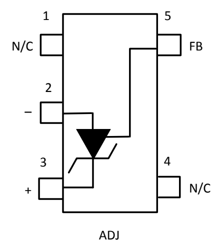

Figure 4-5. DCK Package
5-Pin SC70
Top View

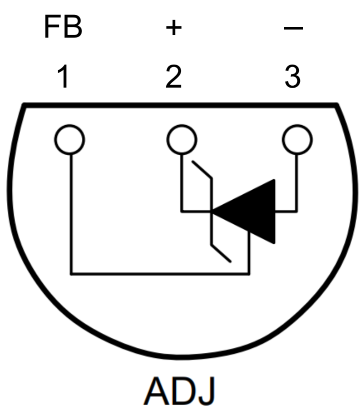

Figure 4-6. LP Package
3-Pin TO-92
Bottom View

PIN				I/O	DESCRIPTION
NAME	**SOT-23**	**SC70**	**TO-92**		
Anode	3	2	3	O	Anode pin, normally grounded
Cathode	2	3	2	I/O	Shunt current and output voltage
FB	1	5	1	I	Feedback pin for adjustable output voltage
NC**	—	—	—	—	**Must float or connect to anode
NC	—	1, 4	—	—	No connect

5 Specifications

5.1 Absolute Maximum Ratings

over free-air temperature range (unless otherwise noted)

			MIN	MAX [(1)]	UNIT
V_Z	Continuous cathode voltage			15	V
I_Z	Continuous cathode current		–10	25	mA
θ_{JA}	Package thermal impedance[(2) (3)]	DBZ package		206	°C/W
		DCK package		252	
		LP package		156	
T_J	Operating virtual junction temperature			150	°C
T_{stg}	Storage temperature range		–65	150	°C

(1) Stresses beyond those listed under "absolute maximum ratings" can 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 under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods can affect device reliability.
(2) Maximum power dissipation is a function of T_J(max), θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) – T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.
(3) The package thermal impedance is calculated in accordance with JESD 51-7.

5.2 ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic Discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 [(1) (2)]	±2000	V
		Charged-device model (CDM), per JEDEC specification JESD22-C101 [(3)]	±500	

(1) JEDEC document JEP155 states that 500V HBM allows safe manufacturing with a standard ESD control process.
(2) The human-body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin. The machine model is a 200pF capacitor discharged directly into each pin. All pins are rated at 2kV for human-body model, but the feedback pin which is rated at 1kV.
(3) JEDEC document JEP157 states that 250V CDM allows safe manufacturing with a standard ESD control process. Manufacturing with less than 250V CDM is possible with the necessary precautions.

5.3 Recommended Operating Conditions

			MIN	MAX	UNIT
I_Z	Cathode current		(1)	12	mA
V_Z	Reverse breakdown voltage (adjustable version)			10	V
T_A	Free-air temperature	LM4041 (I temperature)	–40	85	°C
		LM4041 (Q temperature)	–40	125	

(1) See parametric tables

5.4 LM4041x12I Electrical Characteristics

full-range T_A = –40°C to 85°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	LM4041A12I			LM4041B12I			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
V_Z	Reverse breakdown voltage	I_Z = 100μA	25°C		1.225			1.225		V
	Reverse breakdown voltage tolerance	I_Z = 100μA	25°C	–1.2		1.2	–2.4		2.4	mV
			Full range	–9.2		9.2	–10.4		10.4	
$I_{Z,min}$	Minimum cathode current		25°C		45	75		45	75	μA
			Full range			80			80	
α_{VZ}	Average temperature coefficient of reverse breakdown voltage	I_Z = 10mA	25°C		±20			±20		ppm/°C
		I_Z = 1mA	25°C		±15			±15		
			Full range			±100			±100	
		I_Z = 100μA	25°C		±15			±15		
$\Delta V_Z/\Delta I_Z$	Reverse breakdown voltage change with cathode current change	$I_{Z,min} < I_Z <$ 1mA	25°C		0.7	1.5		0.7	1.5	mV
			Full range			2			2	
		1mA $< I_Z <$ 12mA	25°C		4	6		4	6	
			Full range			8			8	
Z_Z	Reverse dynamic impedance	I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z	25°C		0.5	1.5		0.5	1.5	Ω
e_N	Wideband noise	I_Z = 100μA, 10Hz ≤ f ≤ 10kHz	25°C		20			20		μV_{RMS}
	Long-term stability of reverse breakdown voltage	t = 1000 h, T_A = 25°C ± 0.1°C, I_Z = 100μA	25°C		120			120		ppm

5.5 LM4041x12I Electrical Characteristics

full-range T_A = –40°C to 85°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	LM4041C12I			LM4041D12I			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
V_Z	Reverse breakdown voltage	I_Z = 100μA	25°C		1.225			1.225		V
	Reverse breakdown voltage tolerance	I_Z = 100μA	25°C	–6		6	–12		12	mV
			Full range	–14		14	–24		24	
$I_{Z,min}$	Minimum cathode current		25°C		45	75		45	75	μA
			Full range			80			80	
α_{VZ}	Average temperature coefficient of reverse breakdown voltage	I_Z = 10mA	25°C		±20			±20		ppm/°C
		I_Z = 1mA	25°C		±15			±15		
			Full range			±100			±150	
		I_Z = 100μA	25°C		±15			±15		
$\Delta V_Z/\Delta I_Z$	Reverse breakdown voltage change with cathode current change	$I_{Z,min} < I_Z <$ 1mA	25°C		0.7	1.5		0.7	2	mV
			Full range			2			2.5	
		1mA $< I_Z <$ 12mA	25°C		2.5	6		2.5	8	
			Full range			8			10	
Z_Z	Reverse dynamic impedance	I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z	25°C		0.5	1.5		0.5	2	Ω
e_N	Wideband noise	I_Z = 100μA, 10Hz ≤ f ≤ 10kHz	25°C		20			20		μV_{RMS}
	Long-term stability of reverse breakdown voltage	t = 1000 h, T_A = 25°C ± 0.1°C, I_Z = 100μA	25°C		120			120		ppm

5.6 LM4041x12Q Electrical Characteristics

full-range T_A = –40°C to 125°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	LM4041C12Q			LM4041D12Q			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
V_Z	Reverse breakdown voltage	I_Z = 100μA	25°C		1.225			1.225		V
	Reverse breakdown voltage tolerance	I_Z = 100μA	25°C	–6		6	–12		12	mV
			Full range	–18.4		18.4	–31		31	
$I_{Z,min}$	Minimum cathode current		25°C		45	75		45	75	μA
			Full range			80			80	
α_{VZ}	Average temperature coefficient of reverse breakdown voltage	I_Z = 10mA	25°C		±20			±20		ppm/°C
		I_Z = 1mA	25°C		±15			±15		
			Full range			±100			±150	
		I_Z = 100μA	25°C		±15			±15		
$\Delta V_Z/\Delta I_Z$	Reverse breakdown voltage change with cathode current change	$I_{Z,min} < I_Z <$ 1mA	25°C		0.7	1.5		0.7	2	mV
			Full range			2			2.5	
		1mA $< I_Z <$ 12mA	25°C		2.5	6		2.5	8	
			Full range			8			10	
Z_Z	Reverse dynamic impedance	I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z	25°C		0.5			0.5		Ω
			Full range			1.5			2	
e_N	Wideband noise	I_Z = 100μA, 10Hz ≤ f ≤ 10kHz	25°C		20			20		μV_{RMS}
	Long-term stability of reverse breakdown voltage	t = 1000 h, T_A = 25°C ± 0.1°C, I_Z = 100μA	25°C		120			120		ppm

5.7 LM4041xI (Adjustable Version) Electrical Characteristics

full-range T_A = –40°C to 85°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	LM4041BI			LM4041CI			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
V_{REF}	Reference voltage	I_Z = 100µA, V_Z = 5V	25°C		1.233			1.233		V
	Reference voltage tolerance[(1)]	I_Z = 100µA, V_Z = 5V	25°C	–2.5		2.5	–6.2		6.2	mV
			Full range	–10.5		10.5	–14		14	
$I_{Z,min}$	Minimum cathode current		25°C		45	75		45	75	µA
			Full range			80			80	
$\Delta V_{REF}/\Delta I_Z$	Reference voltage change with cathode current change	$I_{Z,min} < I_Z <$ 1mA	25°C		0.7	1.5		0.7	1.5	mV
			Full range			2			2	
		1mA $< I_Z <$ 12mA	25°C		2	4		2	4	
			Full range			6			6	
$\Delta V_{REF}/\Delta V_{KA}$	Reference voltage change with output voltage change	I_Z = 1mA	25°C		–1.55	–2		–1.55	–2	mV/V
			Full range			–2.5			–2.5	
I_{FB}	Feedback current		25°C		60	100		60	100	nA
			Full range			120			120	
αV_{REF}	Average temperature coefficient of reference voltage[(1)]	I_Z = 10mA, V_Z = 5V	25°C		±20			±20		ppm/°C
		I_Z = 1mA, V_Z = 5V	25°C		±15			±15		
			Full range			±100			±100	
		I_Z = 100µA, V_Z = 5V	25°C		±15			±15		
Z_Z	Reverse dynamic impedance	I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z, V_Z = V_{REF}	25°C		0.3			0.3		Ω
		I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z, V_Z = 10V	25°C		2			2		
e_N	Wideband noise	I_Z = 100µA, V_Z = V_{REF}, 10Hz ≤ f ≤ 10kHz	25°C		20			20		μV_{RMS}
	Long-term stability of reverse breakdown voltage	t = 1000 h, T_A = 25°C ± 0.1°C, I_Z = 100µA	25°C		120			120		ppm

(1) Reference voltage tolerance and average temperature coefficient change with output voltage (V_Z). See *Typical Characteristics*.

5.8 LM4041xI (Adjustable Version) Electrical Characteristics

full-range T_A = –40°C to 85°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	LM4041DI			UNIT
				MIN	TYP	MAX	
V_{REF}	Reference voltage	I_Z = 100µA, V_Z = 5V	25°C		1.233		V
	Reference voltage tolerance(1)	I_Z = 100µA, V_Z = 5V	25°C	–12		12	mV
			Full range	–24		24	
$I_{Z,min}$	Minimum cathode current		25°C		45	75	µA
			Full range			80	
$\Delta V_{REF}/\Delta I_Z$	Reference voltage change with cathode current change	$I_{Z,min}$ < I_Z < 1mA	25°C		0.7	2	mV
			Full range			2.5	
		1mA < I_Z < 12mA	25°C		2	6	
			Full range			8	
$\Delta V_{REF}/\Delta V_{KA}$	Reference voltage change with output voltage change	I_Z = 1mA	25°C		–1.55	–2	mV/V
			Full range			–3	
I_{FB}	Feedback current		25°C		60	150	nA
			Full range			200	
αV_{REF}	Average temperature coefficient of reference voltage(1)	I_Z = 10mA, V_Z = 5V	25°C		±20		ppm/°C
		I_Z = 1mA, V_Z = 5V	25°C		±15		
			Full range			±150	
		I_Z = 100µA, V_Z = 5V	25°C		±15		
Z_Z	Reverse dynamic impedance	I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z, V_Z = V_{REF}	25°C		0.3		Ω
		I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z, V_Z = 10V	25°C		2		
e_N	Wideband noise	I_Z = 100µA, V_Z = V_{REF}, 10Hz ≤ f ≤ 10kHz	25°C		20		$µV_{RMS}$
	Long-term stability of reverse breakdown voltage	t = 1000 h, T_A = 25°C ± 0.1°C, I_Z = 100µA	25°C		120		ppm

(1) Reference voltage tolerance and average temperature coefficient change with output voltage (V_Z). See *Typical Characteristics*.

5.9 LM4041xQ (Adjustable Version) Electrical Characteristics

full-range T_A = –40°C to 125°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	LM4041CQ			LM4041DQ			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
V_{REF}	Reference voltage	I_Z = 100μA, V_Z = 5V	25°C		1.233			1.233		V
	Reference voltage tolerance(1)	I_Z = 100μA, V_Z = 5V	25°C	–6.2		6.2	–12		12	mV
			Full range	–18		18	–30		30	
$I_{Z,min}$	Minimum cathode current		25°C		45	75		45	75	μA
			Full range			80			80	
$ΔV_{REF}/ΔI_Z$	Reference voltage change with cathode current change	$I_{Z,min} < I_Z <$ 1mA	25°C		0.7	1.5		0.7	2	mV
			Full range			2			2.5	
		1mA < I_Z < 12mA	25°C		2	4		2	6	
			Full range			8			10	
$ΔV_{REF}/ΔV_{KA}$	Reference voltage change with output voltage change	I_Z = 1mA	25°C		–1.55	–2		–1.55	–2.5	mV/V
			Full range			–3			–4	
I_{FB}	Feedback current		25°C		60	100		60	150	nA
			Full range			120			200	
$αV_{REF}$	Average temperature coefficient of reference voltage(1)	I_Z = 10mA, V_Z = 5V	25°C		±20			±20		ppm/°C
		I_Z = 1mA, V_Z = 5V	25°C		±15			±15		
			Full range			±100			±150	
		I_Z = 100μA, V_Z = 5V	25°C		±15			±15		
Z_Z	Reverse dynamic impedance	I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z, V_Z = V_{REF}	25°C		0.3			0.3		Ω
		I_Z = 1mA, f = 120Hz, I_{AC} = 0.1 I_Z, V_Z = 10V	25°C		2			2		
e_N	Wideband noise	I_Z = 100μA, V_Z = V_{REF}, 10Hz ≤ f ≤ 10kHz	25°C		20			20		$μV_{RMS}$
	Long-term stability of reverse breakdown voltage	t = 1000 h, T_A = 25°C ± 0.1°C, I_Z = 100μA	25°C		120			120		ppm

(1) Reference voltage tolerance and average temperature coefficient change with output voltage (V_Z). See *Typical Characteristics*.

5.10 Typical Characteristics

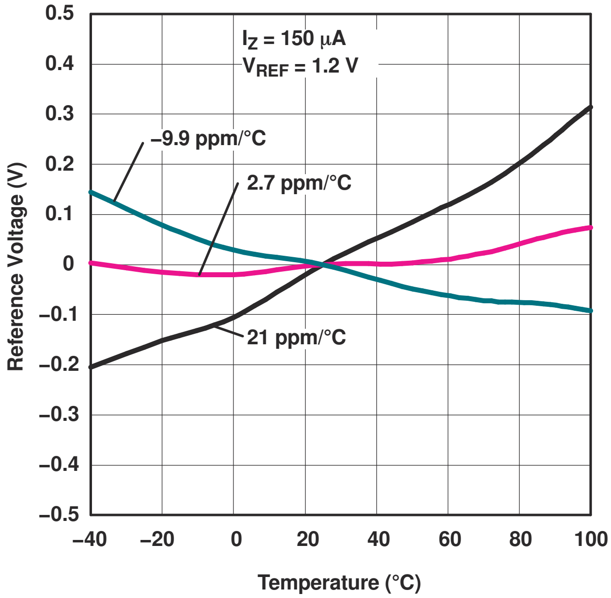

Figure 5-1. Temperature Drift for Different Average Temperature Coefficients

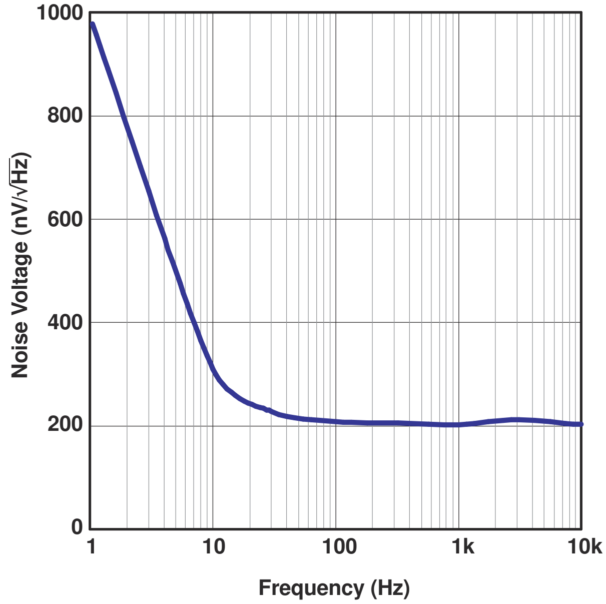

Figure 5-2. Noise Voltage vs Frequency

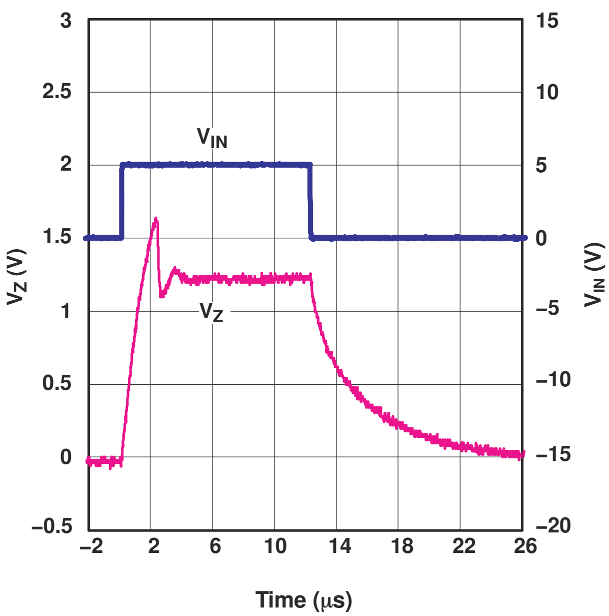

Figure 5-3. Start-Up Characteristics

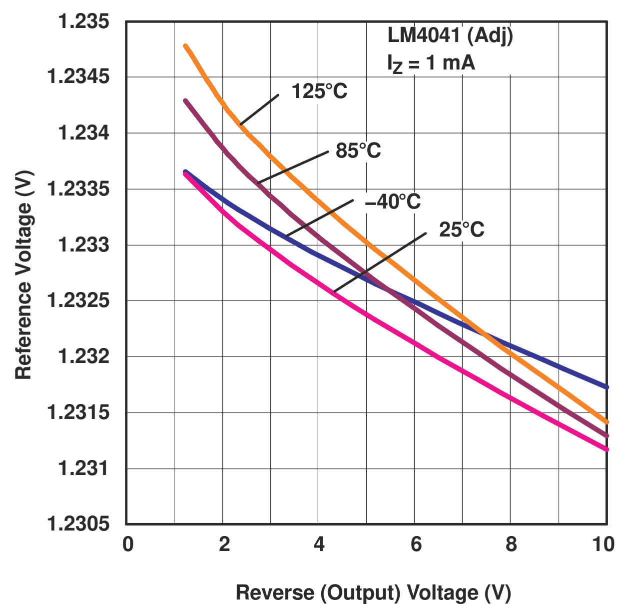

Figure 5-4. Reference Voltage vs Reverse (Output) Voltage (for Different Temperatures)

5.10 Typical Characteristics (continued)

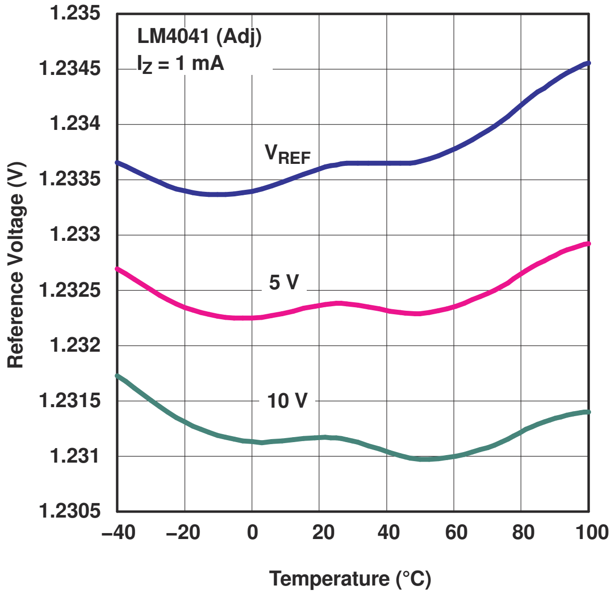

Figure 5-5. Reference Voltage vs Temperature (for Different Reverse Voltages)

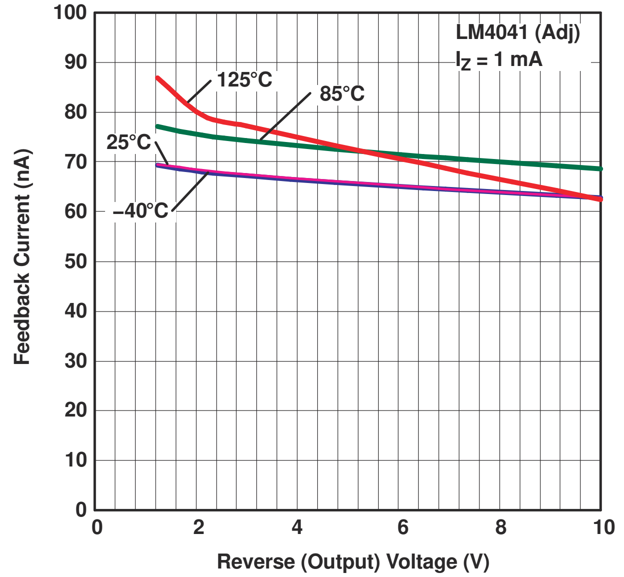

Figure 5-6. Feedback Current vs Reverse (Output) Voltage (for Different Temperatures)

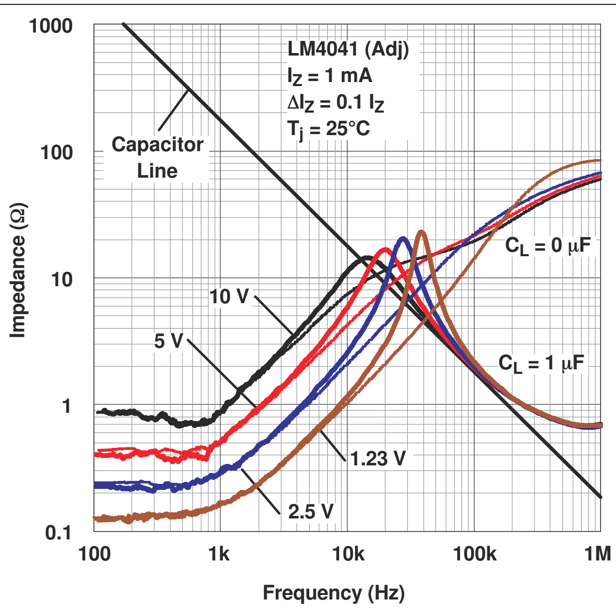

Figure 5-7. Output Impedance vs Frequency

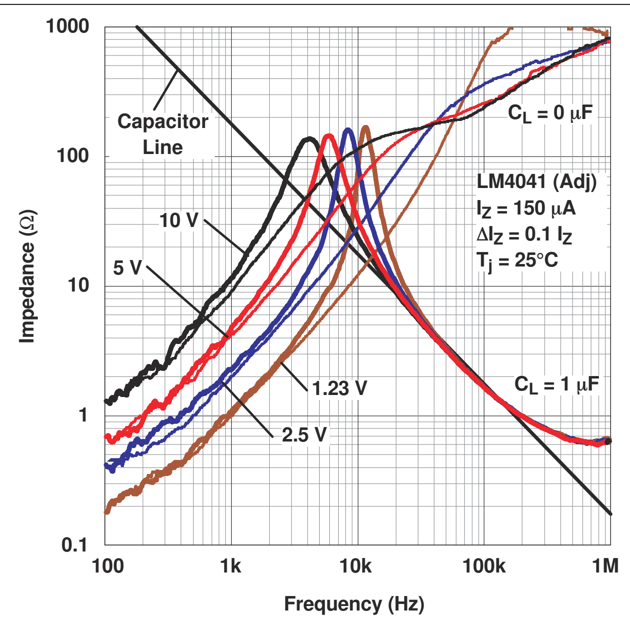

Figure 5-8. Output Impedance vs Frequency

5.10 Typical Characteristics (continued)

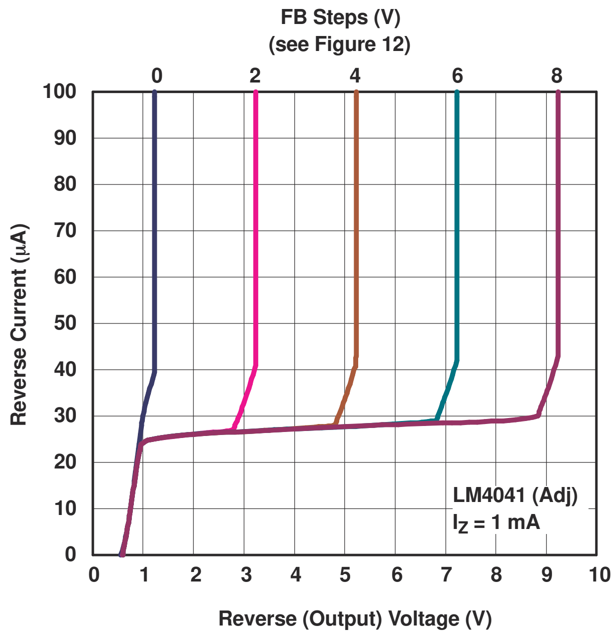

Figure 5-9. Reverse Characteristics

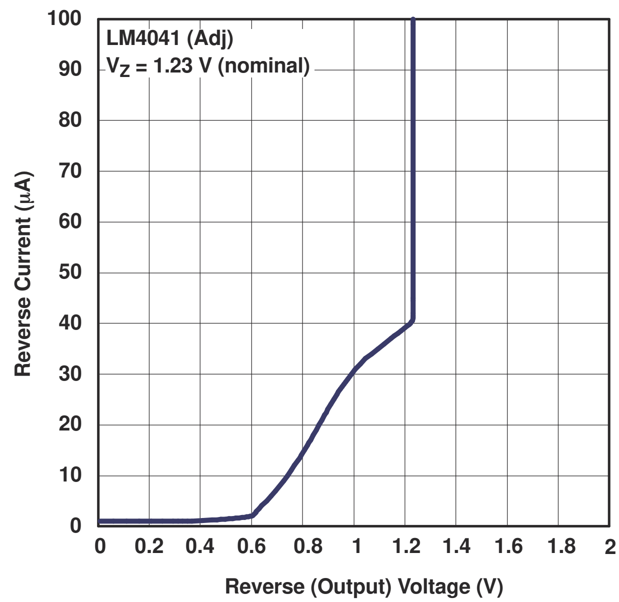

Figure 5-10. Reverse Characteristics and Minumum Operating Current

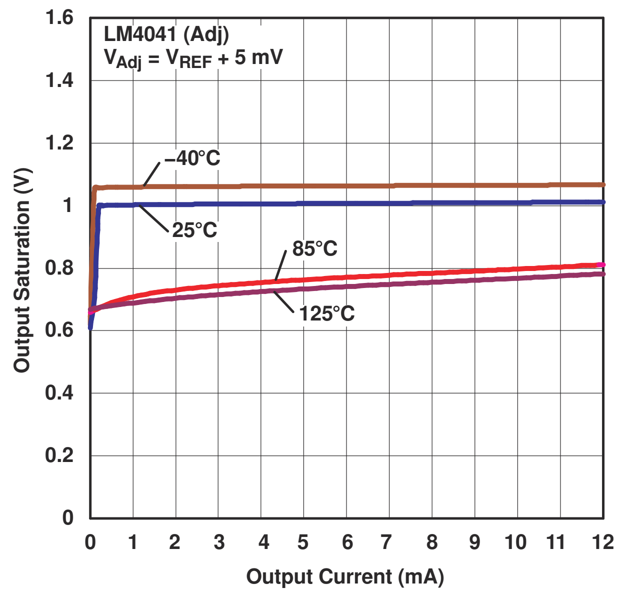

Figure 5-11. Output Saturation vs Output Current

6 Functional Block Diagram

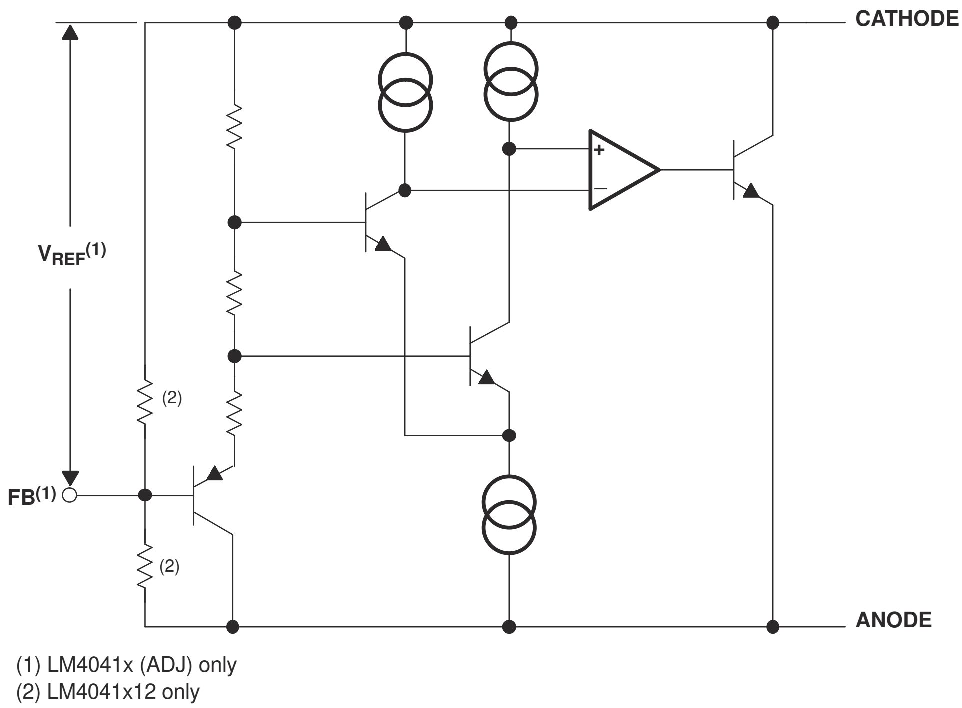

Figure 6-1. Functional Block Diagram

7 Application Information

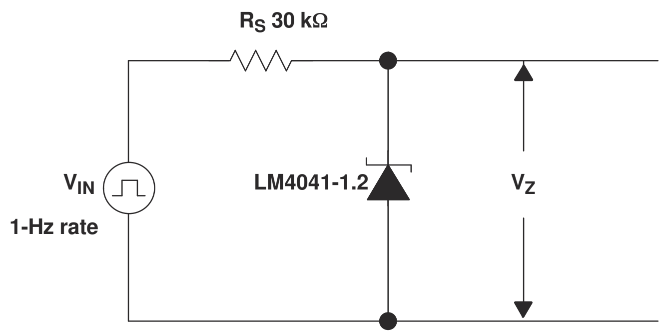

Figure 7-1. Startup Characteristics Test Circuit

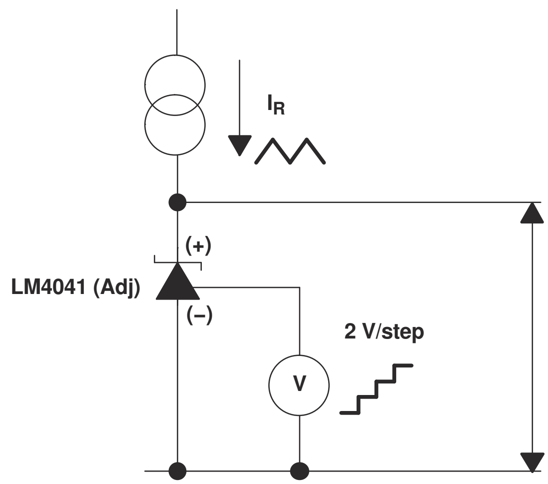

Figure 7-2. Reverse Characteristics Test Circuit

7.1 Output Capacitor

The LM4041 does not require an output capacitor across CATHODE and ANODE for stability. However, if an output bypass capacitor is desired, the LM4041 is designed to be stable with all capacitive loads.

7.2 SOT-23 and SC-70 Pin Connections

There is a parasitic Schottky diode connected between pins 2 and 3 of the SOT-23 packaged device. Thus, pin 3 of the SOT-23 package must be left floating or connected to pin 2. Similarly, pin 2 of the SC-70 package also must be left floating or connected to pin 1.

7.3 Adjustable Version

The adjustable version allows V_Z to be set by a user-defined resistor divider. The output voltage, V_Z, is set according to the equation shown in Figure 7-3.

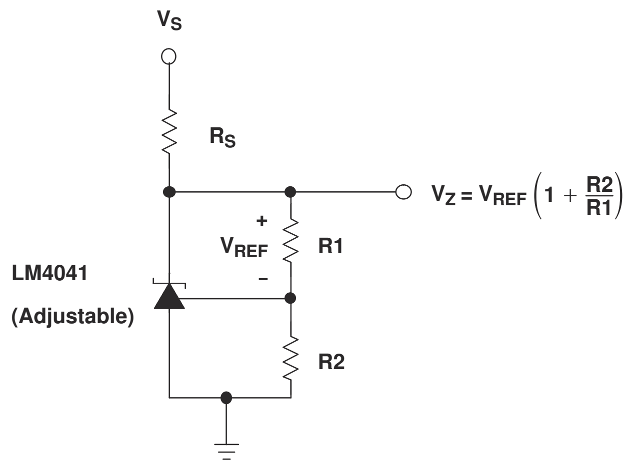

Figure 7-3. Adjustable Shunt Regulator

When the output voltage, V_Z, is set below 2.5V on adjustable versions of LM4041, the device can experience increased reference voltage change with output voltage change ($\Delta V_{REF}/\Delta V_{KA}$) when compared to output voltages set equal to or above 2.5V.

7.4 Cathode and Load Currents

In a typical shunt regulator configuration (see Figure 7-4), an external resistor, R_S, is connected between the supply and the cathode of the LM4041. R_S must be set properly, this sets the total current available to supply the load (I_L) and bias the LM4041 (I_Z). In all cases, I_Z must stay within a specified range for proper operation of the reference. Taking into consideration one extreme in the variation of the load and supply voltage (maximum I_L and minimum V_S), R_S must be small enough to supply the minimum I_Z required for operation of the regulator, as given by data sheet parameters. At the other extreme, maximum V_S and minimum I_L, R_S must be large enough to limit I_Z to less than the maximum recommended rating of 12mA.

R_S is calculated as shown in Equation 1.

$$R_S = \frac{(V_S - V_Z)}{(I_L + I_Z)} \tag{1}$$

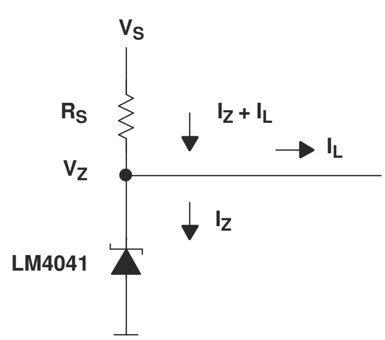

Figure 7-4. Shunt Regulator

8 Device and Documentation Support

8.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.2 Trademarks

TI E2E™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

8.3 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.4 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

8.5 Glossary

TI Glossary   This glossary lists and explains terms, acronyms, and definitions.

9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision G (July 2024) to Revision H (March 2025)	Page
• Updated LP pin numbering	3
• Added electromagnetic interference note and updated LP pinout numbering	3
• Added ESD ratings	5
• Added reference voltage change with output voltage change details	17

Changes from Revision F (September 2020) to Revision G (July 2024)	Page
• Updated *Applications* links	1
• Updated pinout diagrams	3

Changes from Revision E (February 2006) to Revision F (September 2020)	Page

- Updated the numbering format for tables, figures and cross-references throughout the document.................. 1
- Deleted *Ordering Information* table. See Mechanical, Packaging, and Orderable Information at the end of the data sheet.. 15

10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.