



**THE DATASHEET OF  
LM4041C12IDCKRE4**



## 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 . . . 20 $\mu$ V<sub>RMS</sub> (typical)
- Wide operating current range . . . 45 $\mu$ A (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](#)
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### 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 45 $\mu$ A (typical), the LM4041 also designed for portable applications. The TO-92 package also is available for through-hole packaging needs. The LM4041xl 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.



## 4 Pin Configuration and Functions

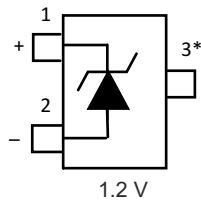


Figure 4-1. DBZ Package 3-Pin SOT-23 Top View

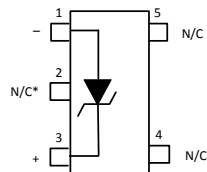


Figure 4-2. DCK Package 5-Pin SC70 Top View

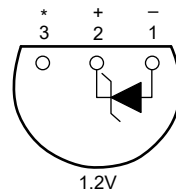
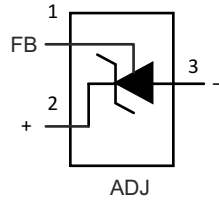


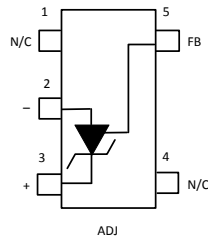
Figure 4-3. LP Package 3-Pin TO-92 Bottom View

## Pin Functions

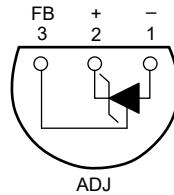
NAME	PIN			I/O	DESCRIPTION
	SOT-23	SC70	TO-92		
Anode	2	1	1	O	Anode pin, normally grounded
Cathode	1	3	2	I/O	Shunt current and output voltage
FB	—	—	—	I	Feedback pin for adjustable output voltage
NC*	3	2	3	—	**Must float or connect to anode
NC	—	4, 5	—	—	No connect



**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 Functions: ADJ Pinouts**

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

## 5 Functional Block Diagram

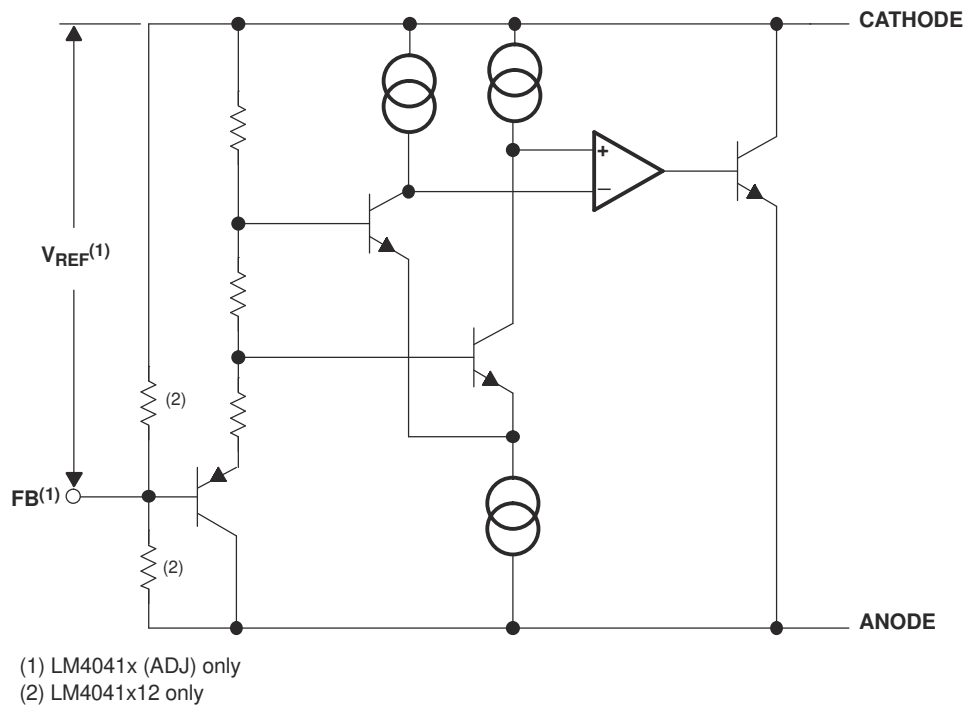


Figure 5-1. Functional Block Diagram

## 6 Specifications

### 6.1 Absolute Maximum Ratings

over free-air temperature range (unless otherwise noted)

		MIN	MAX <sup>(1)</sup>	UNIT
$V_Z$	Continuous cathode voltage		15	V
$I_Z$	Continuous cathode current	-10	25	mA
$\theta_{JA}$	Package thermal impedance <sup>(2) (3)</sup>	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" 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 under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) Maximum power dissipation is a function of  $T_J(\text{max})$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(\text{max}) - T_A)/\theta_{JA}$ . 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.

## 6.2 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

## 6.3 LM4041x12I Electrical Characteristics

full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

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

## 6.4 LM4041x12I Electrical Characteristics

full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

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

## 6.5 LM4041x12Q Electrical Characteristics

full-range  $T_A = -40^\circ\text{C}$  to  $125^\circ\text{C}$  (unless otherwise noted)

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

## 6.6 LM4041xl (Adjustable Version) Electrical Characteristics

full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

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

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

## 6.7 LM4041xl (Adjustable Version) Electrical Characteristics

full-range  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$  (unless otherwise noted)

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

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

## 6.8 LM4041xQ (Adjustable Version) Electrical Characteristics

full-range  $T_A = -40^\circ\text{C}$  to  $125^\circ\text{C}$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS	$T_A$	LM4041CQ			LM4041DQ			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
$V_{REF}$	Reference voltage	$I_Z = 100\mu\text{A}$ , $V_Z = 5\text{V}$	25°C			1.233			V
	Reference voltage tolerance <sup>(1)</sup>	$I_Z = 100\mu\text{A}$ , $V_Z = 5\text{V}$	25°C			-6.2      6.2			mV
			Full range			-18      18			
$I_{Z,min}$	Minimum cathode current		25°C			45      75			$\mu\text{A}$
			Full range			80      80			
$\Delta V_{REF}/\Delta I_Z$	Reference voltage change with cathode current change	$I_{Z,min} < I_Z < 1\text{mA}$	25°C			0.7      1.5			mV
			Full range			2      2.5			
		$1\text{mA} < I_Z < 12\text{mA}$	25°C			2      4			
			Full range			8      10			
$\Delta V_{REF}/\Delta V_{KA}$	Reference voltage change with output voltage change	$I_Z = 1\text{mA}$	25°C			-1.55      -2			mV/V
			Full range			-3      -4			
$I_{FB}$	Feedback current		25°C			60      100			nA
			Full range			120      200			
$\alpha V_{REF}$	Average temperature coefficient of reference voltage <sup>(1)</sup>	$I_Z = 10\text{mA}$ , $V_Z = 5\text{V}$	25°C			$\pm 20$			ppm/°C
			25°C			$\pm 15$			
		$I_Z = 1\text{mA}$ , $V_Z = 5\text{V}$	Full range			$\pm 100$			
			25°C			$\pm 15$			
$Z_Z$	Reverse dynamic impedance	$I_Z = 1\text{mA}$ , $f = 120\text{Hz}$ , $I_{AC} = 0.1 I_Z$ , $V_Z = V_{REF}$	25°C			0.3			$\Omega$
			25°C			2			
$e_N$	Wideband noise	$I_Z = 100\mu\text{A}$ , $V_Z = V_{REF}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	25°C			20			$\mu\text{V}_{RMS}$
	Long-term stability of reverse breakdown voltage	$t = 1000\text{ h}$ , $T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ , $I_Z = 100\mu\text{A}$	25°C			120			ppm

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

### 6.9 Typical Characteristics

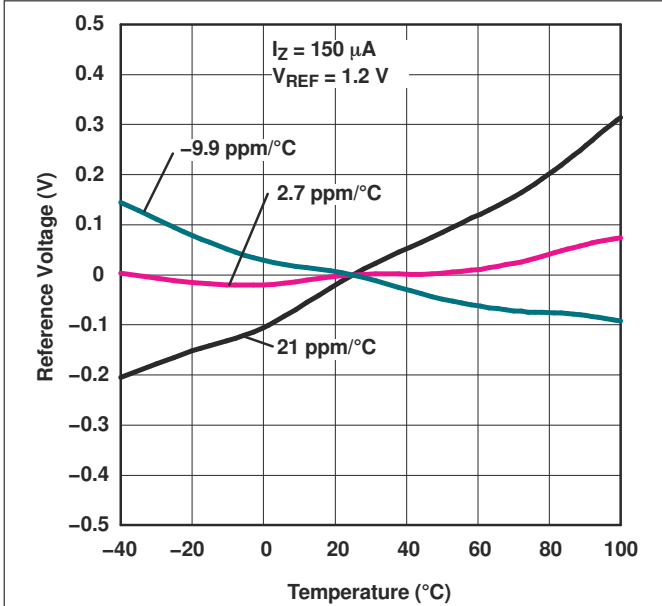


Figure 6-1. Temperature Drift for Different Average Temperature Coefficients

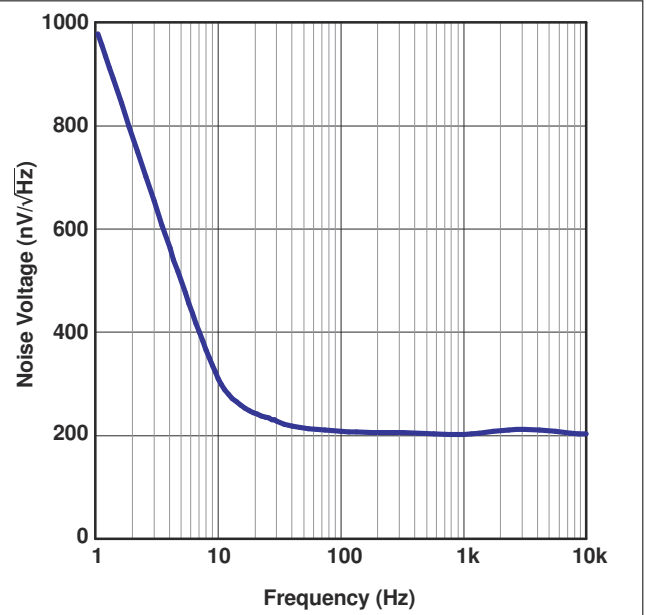


Figure 6-2. Noise Voltage vs Frequency

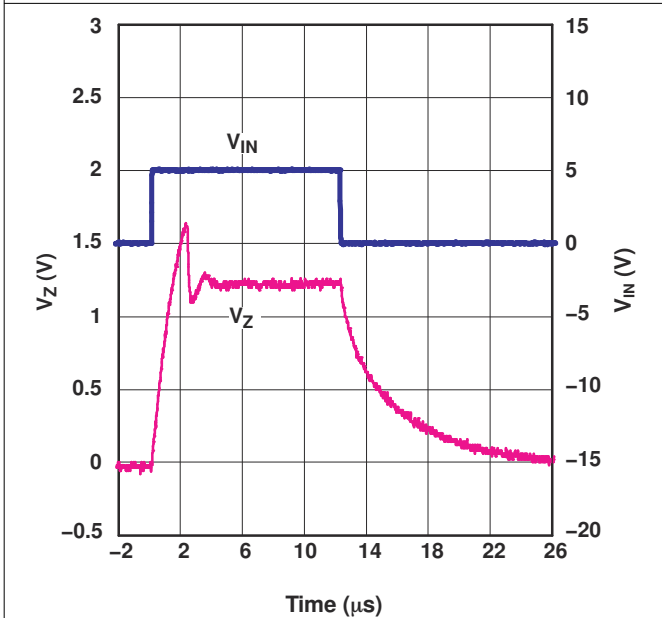


Figure 6-3. Start-Up Characteristics

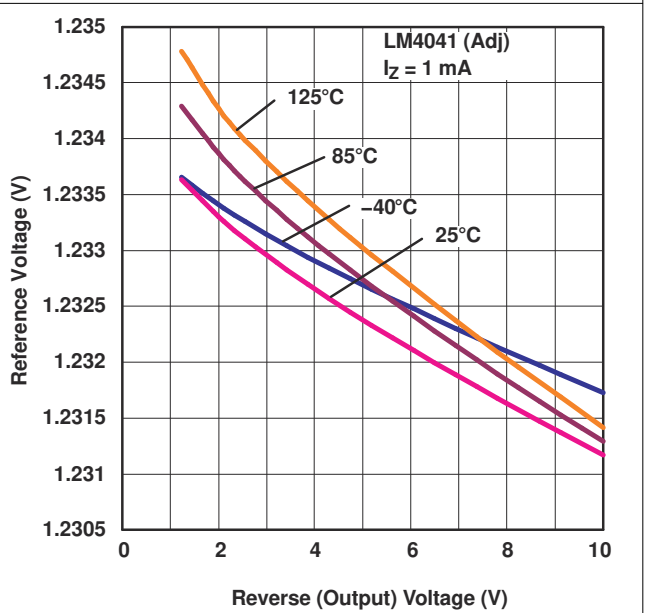


Figure 6-4. Reference Voltage vs Reverse (Output) Voltage (for Different Temperatures)

### 6.9 Typical Characteristics (continued)

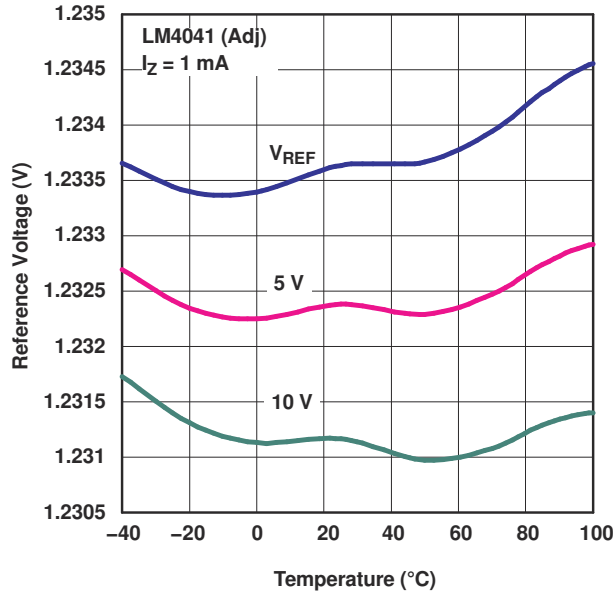


Figure 6-5. Reference Voltage vs Temperature (for Different Reverse Voltages)

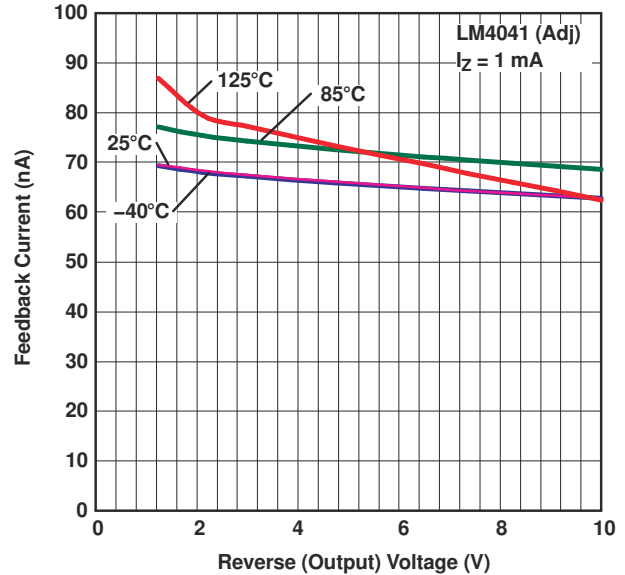


Figure 6-6. Feedback Current vs Reverse (Output) Voltage (for Different Temperatures)

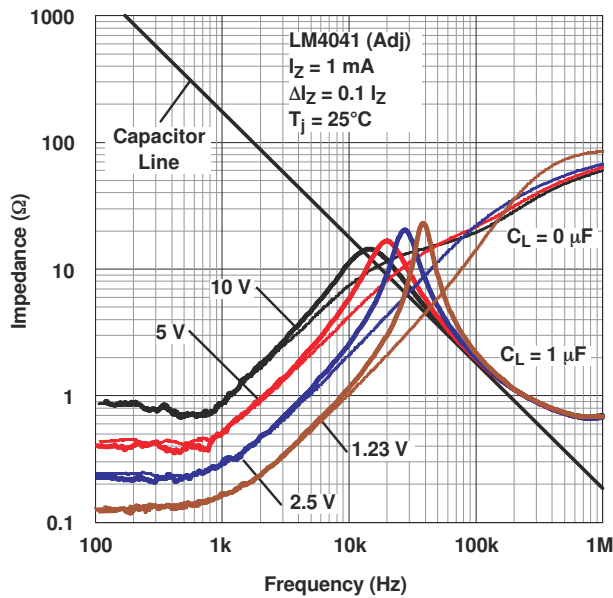


Figure 6-7. Output Impedance vs Frequency

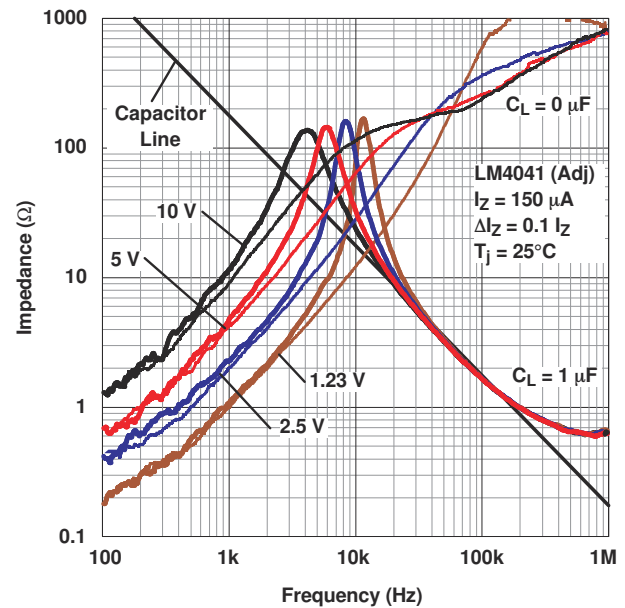
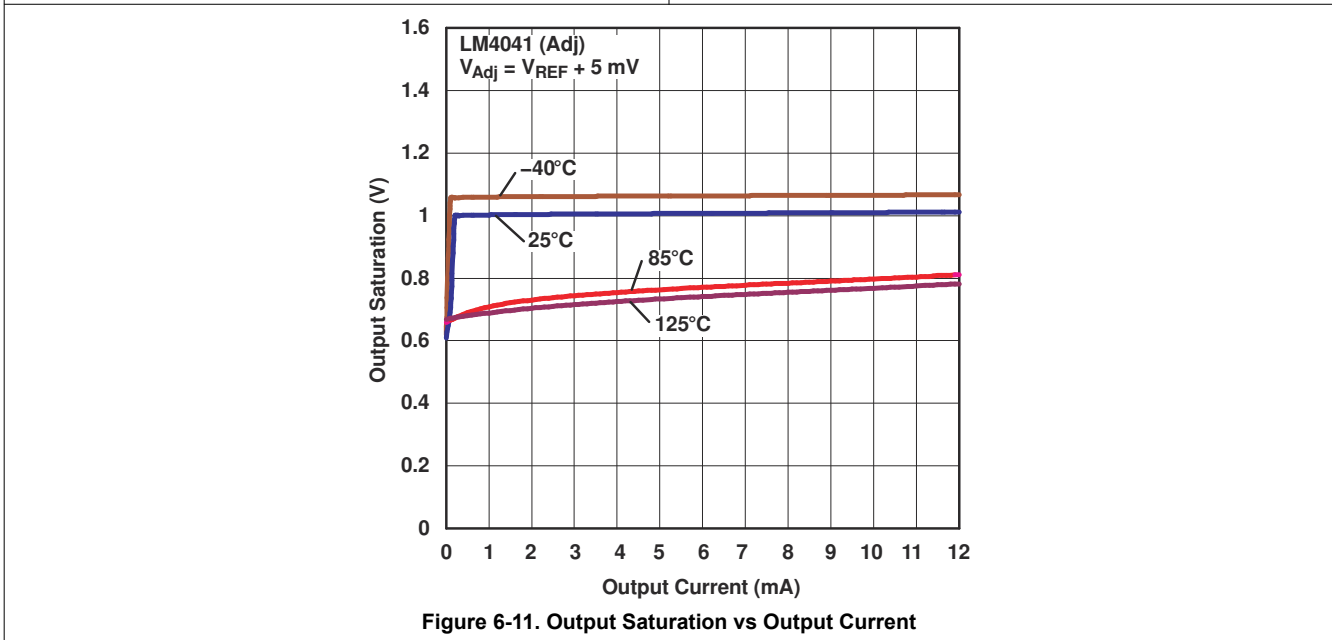
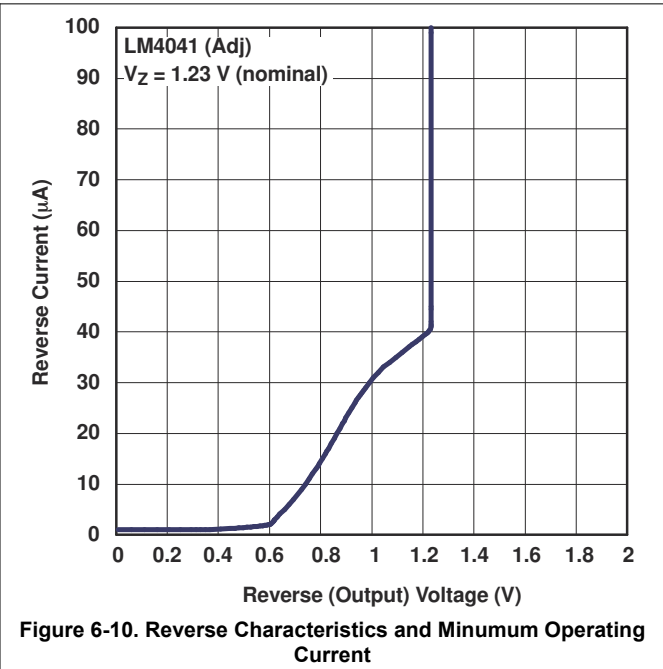
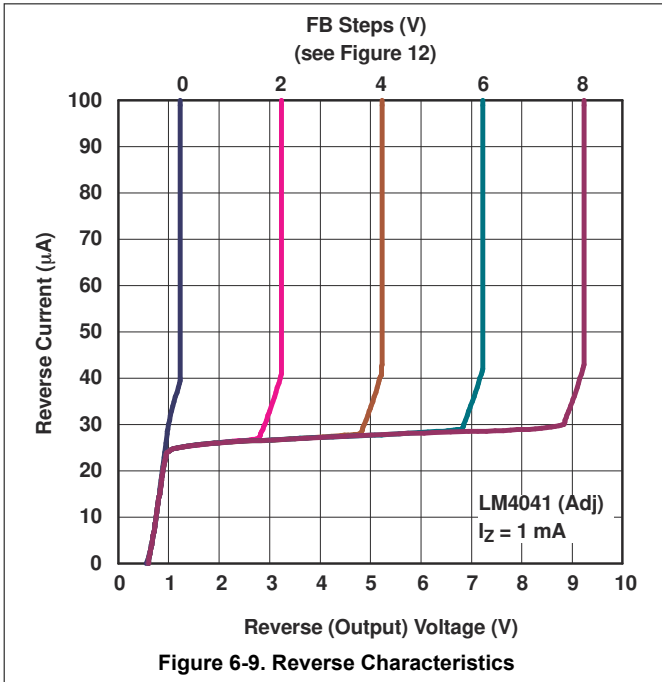


Figure 6-8. Output Impedance vs Frequency

### 6.9 Typical Characteristics (continued)



## 7 Application Information

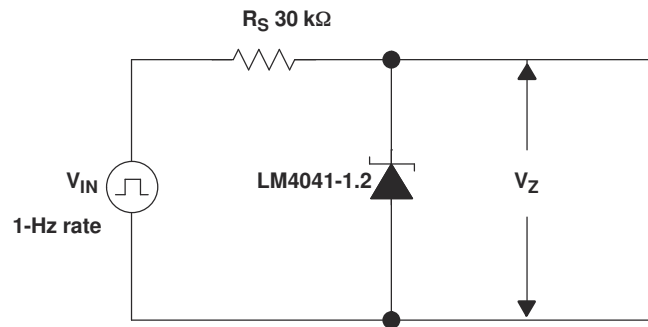


Figure 7-1. Startup Characteristics Test Circuit

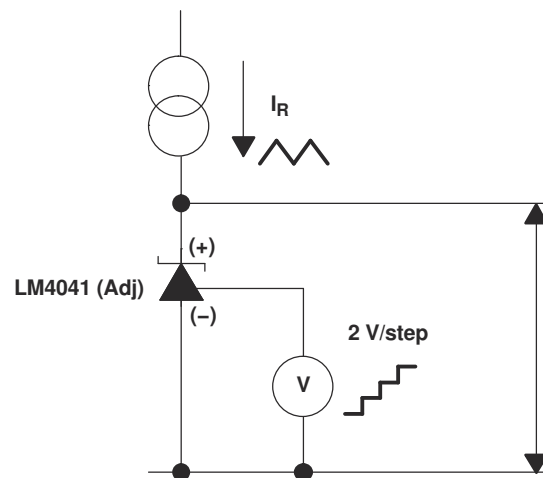


Figure 7-2. Reverse Characteristics Test Circuit

### 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.

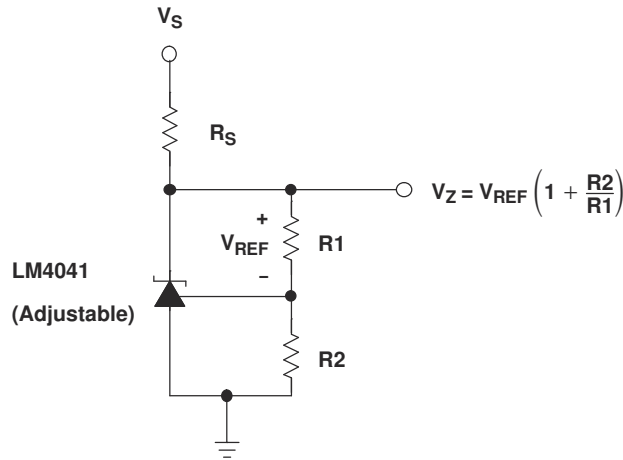


Figure 7-3. Adjustable Shunt Regulator

### 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.

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

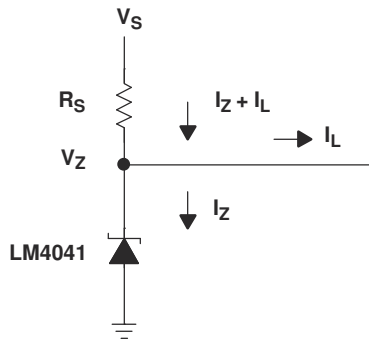


Figure 7-4. Shunt Regulator

## 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](http://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

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### 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.

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### 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.

<b>Changes from Revision F (September 2020) to Revision G (July 2024)</b>	<b>Page</b>
• Updated <i>Applications</i> links.....	<a href="#">1</a>
• Updated pinout diagrams .....	<a href="#">2</a>

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**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.....4
-

## 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.

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