

Voltage Reference Overview

Shunt and Series References for Any Application



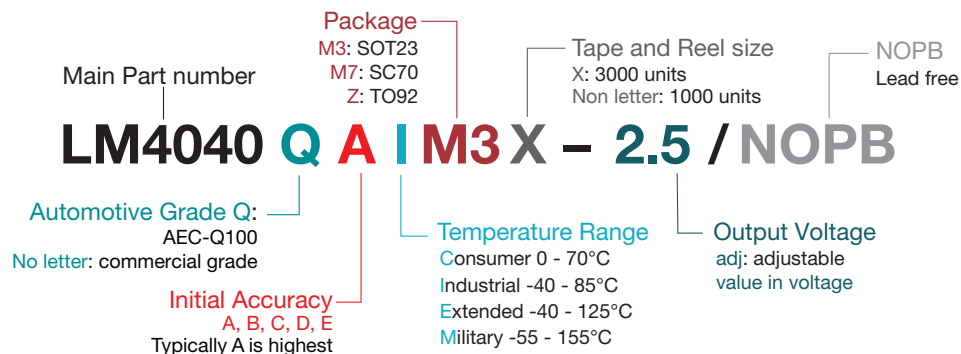
Shunt V_{REF}

With more than 40 years of supply history, Texas Instruments is the premier volume supplier of voltage references. TI's broad portfolio features low temperature coefficient, precise initial accuracy, low noise, and excellent long term stability performance. Series and shunt references support a wide variety of applications, including high-precision references for data converters up to 20-bit precision accuracy and low-noise references for sensor conditioning. Voltage references are also commonly used as voltage monitors, current limiters, and programmable current sources.

Voltage Reference Selection Guide

Temp Drift ppm/°C	Initial Accuracy						Part Number	Output Voltage										Temp Range	Package Option	
								Adjustable	1.2	2.0	2.5	3.0	3.3	4.0	5.0	8.2	10			
10	0.05						LM4030 A				•					•			0 up to 85	
20	0.05	0.1					LM4030 A/B				•					•			Q	3SOT-23, 5SOT-23
30			0.15				LM4030 C				•					•			Q	
20					1.0	2.0	LM2/385/B*		•										C/I	TSSOP, SOP,
30					1.0	2.0	LM1/2/385 BX*	Up to 5.3V	•		•								I/C/M	SDIC-8,
50					1.0	2.0	LM1/2/385 BY*	Up to 5.3V	•		•								I/C/M	TO-92
30/50			0.2				REF1112		•										C/I	
50		0.1	0.2	0.5			LM4050/1 A/B/C		•	•	•					•	•	•	I/Q	3SOT-23
50		0.1	0.2	0.5			TL4050/1 A/B/C	Up to 10V	•		•					•	•		I/Q	3/5SOT-23**
50				0.4	1.0	2.2	LM431 C/B/A	Up to 36V			•								I/Q	3SOT-23
50				0.5	1.0	2.0	TL431 A/B	Up to 36V			•								C/I	3/5SOT-23**
100		0.1	0.2				LM4040 A/B*			•	•	•				•	•	•	I	
100				0.5			LM4040 C*			•	•	•				•	•	•	I/Q	3SOT-23, SC-70, TO-92
100		0.1	0.2				LM4041 A/B	Up to 15V	•										I	
100				0.5			LM4041 C*	Up to 15V	•										I/Q	
129				0.5			LMV431B	Up to 30V	•										I/C	
129					1.0		LMV431A	Up to 30V	•										I/C	
129						1.5	LMV431	Up to 30V	•										I/C	3/5SOT-23
150					1.0	2.0	LM1/2/385 B*	Up to 5.3V	•		•								I/C/M	
150					1.0	2.0	LM4040 D/E*			•	•	•				•	•	•	I/Q	
150					1.0	2.0	LM4041 D/E*	Up to 15V	•										I/Q	
150			0.5				TLV431B	Up to 6V	•										I/C/Q	3/5SOT-23, TO-92
150					1.0		TLV431A	Up to 6V	•										I/C/Q	
150						1.5	TLV431	Up to 6V	•										I/C/Q	

V_{REF} Orderable Part Number Decoder



Series V_{REF}

Voltage Reference Selection Guide

Temp Drift ppm/°C	Initial Accuracy						Part Number	Adjustable	Output Voltage										Temp Range	Package Options		
									1.0	1.2	1.8	2.0	2.5	3.0	3.3	4.1	4.5	5.0			10	
3	0.05						REF50xx					•	•	•			•	•	•	•	Q	MSOP-8
3		0.1					LM4140A		•	•		•	•				•				C	SOIC-8
6		0.1					LM4140B		•	•		•	•				•				C	
7			0.2				REF32xx			•		•	•	•	•	•					0/M	SC23-6
8		0.1					REF50xx					•	•	•			•	•	•	•	Q	MSOP-8
10		0.1					LM4140C		•	•		•	•				•				C	SOIC-8
10	0.05						LM4132A				•	•	•	•	•	•					I/Q	5SOT-23
15			0.2				REF31xx			•		•	•	•	•	•					C	SC23-6
20			0.2				REF32xx			•		•	•	•	•	•					Q	SC23-6
20		0.1	0.2	0.4			LM4132B/C/D				•	•	•	•	•	•					I/Q	5SOT-23
30					0.5		LM4132E				•	•	•	•	•	•					I/Q	
30		0.15					REF33xx			•	•	•	•	•	•	•					Q	3SOT-23
50			0.2				LM4120/1/5A	•			•	•	•	•	•	•				•	I	5SOT-23
50					0.5		LM4120/1/5	•			•	•	•	•	•	•				•	I	
50			0.2				REF30xx			•		•	•	•	•	•	•				C	3SOT-23
75			0.2				REF30xx			•		•	•	•	•	•	•				Q	
75		0.1	0.2				LM4128A/B				•	•	•	•	•	•	•				Q	5SOT-23
100					0.5	1.0	LM4128C/D				•	•	•	•	•	•	•				Q	
100						2.0	REF29xx			•		•	•	•	•	•	•				Q	3SOT-23

* See ti.com for additional versions of this part.

** Additional package options available.

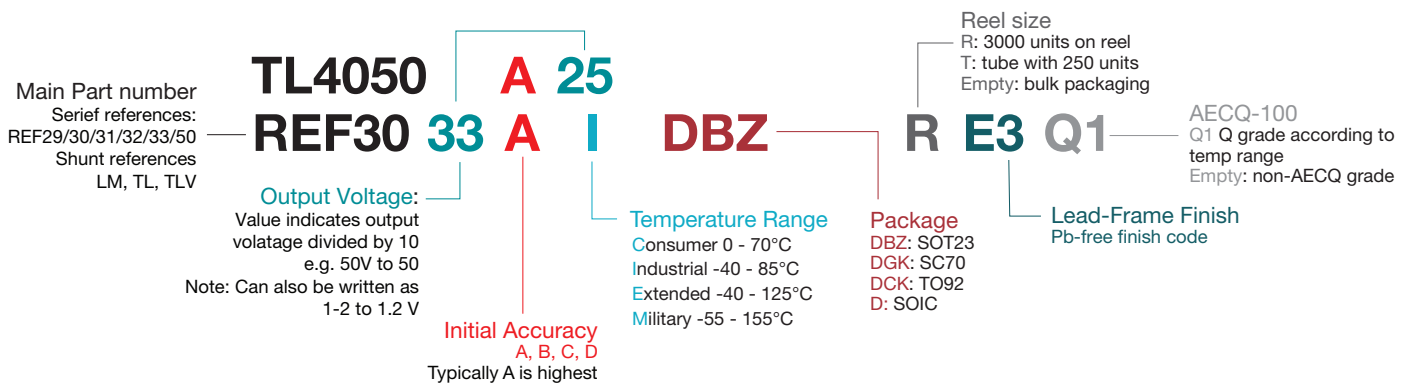
Temperature Ranges

Consumer: 0 – 70°C | Industrial: -40 – 85°C | Q or Extended: -40 – 125°C | Military: -55 – 125°C

AECQ Grades

Q1 -40 – 125°C | Q3 -40 – 85°C | Q4 0 – 70°C

V_{REF} Orderable Part Number Decoder

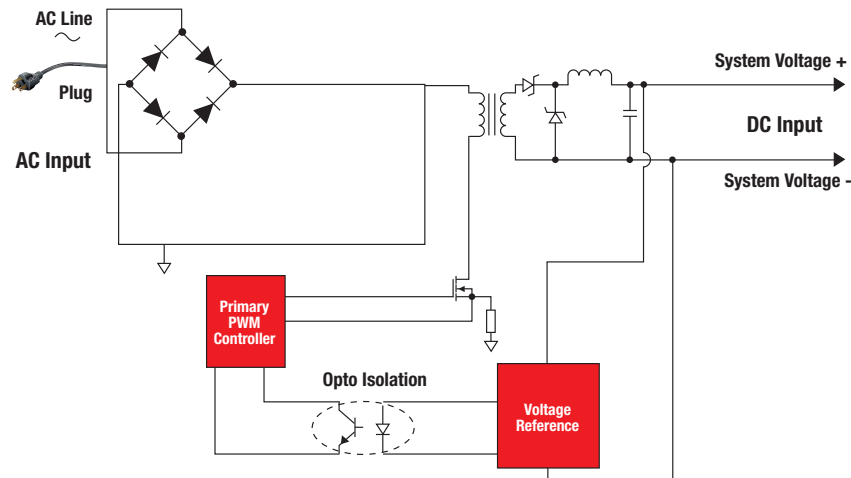


NOTES: Not all positions in the part number have to be filled. Always check the datasheet for precise product identification and specifications.

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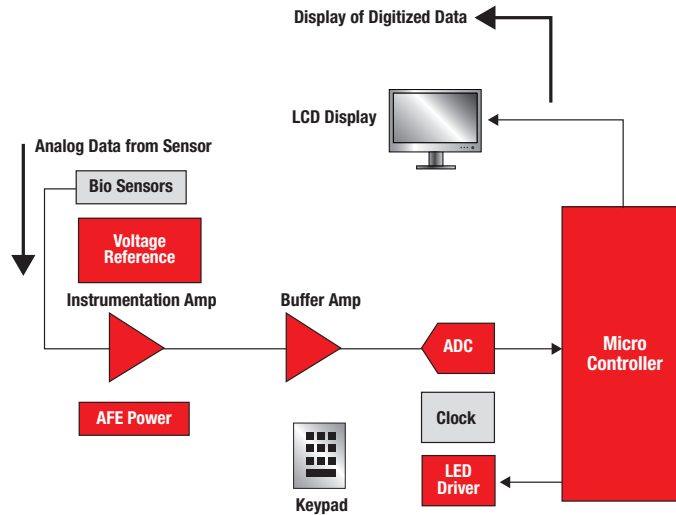
Typical Application Diagrams

Feedback Loop in Isolated AC/DC Power Supply



Shunt V_{REF} provides feedback to primary PWM controller to improve efficiency

Portable Medical System



Series V_{REF} provides continuous calibration for ADC to ensure accurate data conversion from sensor

Design Resources and Reference

See TI's complete voltage reference portfolio and easy selection tool at ti.com/vref



Power Management Forum
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Find answers to your power management questions

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