

FAN4050

Precision Micropower Shunt Voltage Reference

Features

- Fixed 2.500V and 3.300V
- Tolerances to $\pm 0.1\%$ (25°C)
- Low output noise
- Low temperature coefficient, 50ppm/°C max
- Small package: SOT-23
- Extended operating current range

Applications

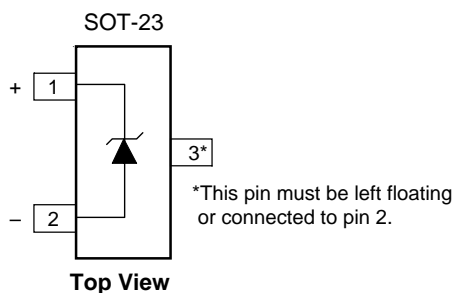
- Portable equipment
- Disk drives
- Instrumentation
- Audio equipment
- Data acquisition systems

Description

The FAN4050 series of precision shunt references are ideal for space- and cost-sensitive applications. They are available in two output voltages (2.500V and 3.300V) and with a variety of output voltage tolerances (0.1%, 0.2%, and 0.5%). They also have excellent temperature coefficients, 50ppm/°C.

The FAN4050 series is available in the SOT-23 package.

Connection Diagram



Absolute Maximum Ratings¹

Ratings are over full operating free-air temperature range unless otherwise noted.

Parameter	Min.	Max.	Unit
Continuous cathode current, I_K	-30	+30	mA
Power dissipation ²		280	mW
Storage Temperature Range	-65	150	°C
Lead Temperature (Soldering, 10 sec.)		300	°C

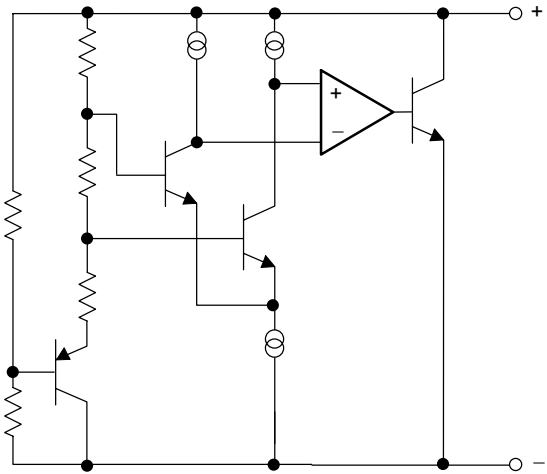
Notes:

- 1. Functional operation under these conditions is not implied. Permanent damage may occur if the device is subjected to conditions outside these ratings.
- 2. It is recommended to connect pin 3 to pin 2 in the SSOT23 package to ensure optimal thermal performance.

Recommended Operating Conditions

Parameter	Min.	Max.	Unit
Continuous cathode current, I_K	0.07	15	mA
Operating temperature range in free air, T_A	-40	85	°C

Equivalent Schematic



Guaranteed Electrical Characteristics, FAN4050-2.5

($T_A = 25^\circ\text{C}$ unless otherwise specified, in free air)

The • denotes specifications which apply over the full operating temperature range.

Symbol	Parameter	Conditions	Limits			Units
			A	B	C	
V_R	Reverse Breakdown Voltage	$I_K = 100\mu\text{A}$	2.500	2.500	2.500	V*
TCV_R	Reverse Breakdown Voltage Tolerance	$I_K = 100\mu\text{A}$	• ± 2.5 • ± 11	± 5.0 ± 14	± 13 ± 21	mV mV
$I_{R\text{MIN}}$	Minimum Operating Current		• 65	65	65	μA
$\Delta V_R / \Delta T$	Reverse Breakdown Voltage Temperature Coefficient	$I_K = 100\mu\text{A}$	• ± 50	± 50	± 50	ppm/ $^\circ\text{C}$
$\Delta V_R (\Delta I_K)$	Reverse Breakdown Voltage Change with Operating Current	$I_{R\text{MIN}} \leq I_K \leq 1\text{mA}$ $1\text{mA} \leq I_K \leq 15\text{mA}$ $1\text{mA} \leq I_K \leq 25\text{mA}$	• 1.2 • 8.0 10	1.2 8.0 10	1.2 8.0 10	mV mV mV*
Z_{KA}	Reverse Dynamic Impedance	$I_K = 1\text{mA}$, $f = 120\text{Hz}$, $I_{AC} = 0.1I_K$	0.3	0.3	0.3	Ω^*
e_N	Wideband Noise	$I_K = 100\mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$	35	35	35	$\mu\text{V}_{\text{RMS}}^*$
ΔV_R	Reverse Breakdown Voltage Long-term Stability	$t = 1000\text{hrs}$, $T = 25^\circ\text{C}$, $I_K = 100\mu\text{A}$	120	120	120	ppm*

*Typical.

Guaranteed Electrical Characteristics, FAN4050-3.3

($T_A = 25^\circ\text{C}$ unless otherwise specified, in free air)

The • denotes specifications which apply over the full operating temperature range.

Symbol	Parameter	Conditions	Limits			Units
			A	B	C	
V_R	Reverse Breakdown Voltage	$I_K = 100\mu\text{A}$	3.300	3.300	3.300	V*
TCV_R	Reverse Breakdown Voltage Tolerance	$I_K = 100\mu\text{A}$	• ± 3.3 • ± 25	± 6.6 ± 28	± 17 ± 38	mV mV
$I_{R\text{MIN}}$	Minimum Operating Current		• 70	70	70	μA
$\Delta V_R / \Delta T$	Reverse Breakdown Voltage Temperature Coefficient	$I_K = 100\mu\text{A}$	• ± 50	± 50	± 50	ppm/ $^\circ\text{C}$
$\Delta V_R (\Delta I_K)$	Reverse Breakdown Voltage Change with Operating Current	$I_{R\text{MIN}} \leq I_K \leq 1\text{mA}$ $1\text{mA} \leq I_K \leq 15\text{mA}$ $1\text{mA} \leq I_K \leq 25\text{mA}$	• 1.2 • 10 12	1.2 10 12	1.2 10 12	mV mV mV
Z_{KA}	Reverse Dynamic Impedance	$I_K = 1\text{mA}$, $f = 120\text{Hz}$, $I_{AC} = 0.1I_K$	0.5	0.5	0.5	Ω^*
e_N	Wideband Noise	$I_K = 100\mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$	70	70	70	$\mu\text{V}_{\text{RMS}}^*$
ΔV_R	Reverse Breakdown Voltage Long-term Stability	$t = 1000\text{hrs}$, $T = 25^\circ\text{C}$, $I_K = 100\mu\text{A}$	120	120	120	ppm*

*Typical.

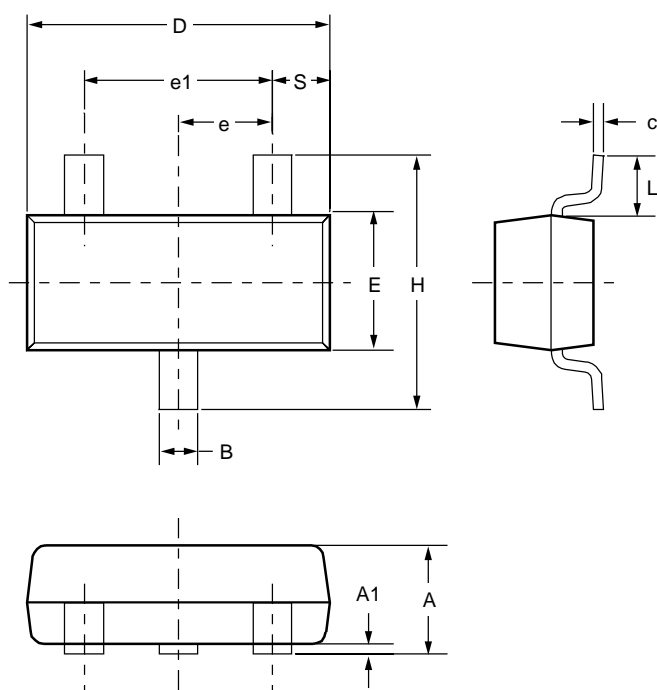
Mechanical Dimensions

SOT-23 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.035	.044	.89	1.12	
A1	.0004	.004	.01	.10	
B	.012	.020	.30	.50	
c	.003	.008	.08	.20	
D	.110	.120	2.80	3.04	
E	.047	.055	1.20	1.40	
e	.037 BSC		.95 BSC		
e1	.075 BSC		1.90 BSC		
H	.083	.104	2.10	2.64	
L	.021 REF		.54 REF		
S	.016 Nom		.395 Nom		

Notes:

1. Dimensions are inclusive of plating.
2. Dimensions are exclusive of mold flash & metal burr.
3. Comply to JEDEC TO-236.
4. This drawing is for matrix leadframe only.



Ordering Information

Example: FAN4050AIS3-2.5

FAN4050

<u>A</u>	<u>I</u>	<u>S3</u>	-	<u>2.5</u>
Grade		Package		Voltage
0.1% = A		SOT23 = S3		2.5V = 2.5
0.2% = B				3.3V = 3.3
0.5% = C				

SSOT-23 Package Marking Information

Only 3 fields of marking are possible on an SSOT-23. This table gives the meaning of these fields.

Example: FCA

<u>F</u>	<u>C</u>	<u>A</u>
Voltage	Grade	
2.5V = C	0.1% = A	
3.3V = H	0.2% = B	
	0.5% = C	

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.