FAN4050

Precision Micropower Shunt Voltage Reference

Features

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

Applications

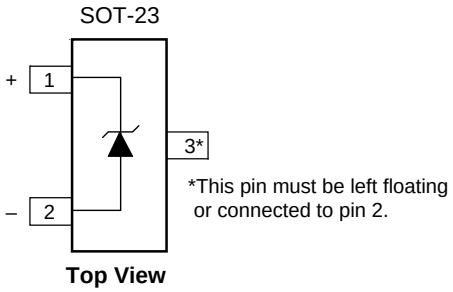
- Portable equipment
- Disk drives
- Instrumentation
- Audio equipment
- Data acquisition systems

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



Top View

Absolute Maximum Ratings[1]

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

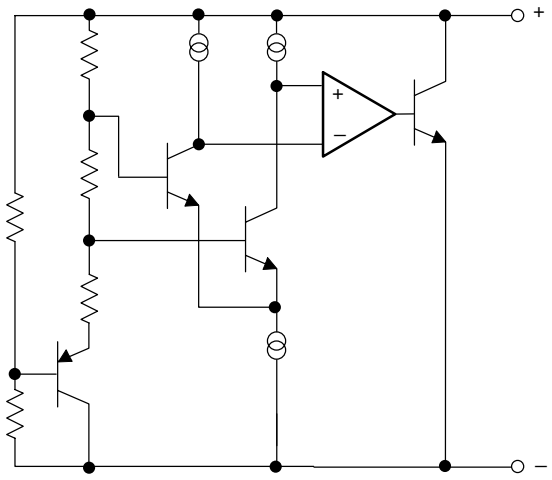
Notes:

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°C unless otherwise specified, in free air)
The • denotes specifications which apply over the full operating temperature range.

Symbol	Parameter	Conditions		Limits A	Limits B	Limits C	Units
V_R	Reverse Breakdown Voltage	I_K = 100µA		2.500	2.500	2.500	V*
TCV_R	Reverse Breakdown Voltage Tolerance	I_K = 100µA	 •	±2.5 ±11	±5.0 ±14	±13 ±21	mV mV
I_{RMIN}	Minimum Operating Current		•	65	65	65	µA
$\Delta V_R/\Delta T$	Reverse Breakdown Voltage Temperature Coefficient	I_K = 100µA	•	±50	±50	±50	ppm/°C
ΔV_R (ΔI_K)	Reverse Breakdown Voltage Change with Operating Current	$I_{RMIN} \le I_K \le$1mA 1mA ≤ I_K ≤ 15mA 1mA ≤ I_K ≤ 25mA	• • 	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=1mA, f=120Hz, I_{AC}=0.1I_K		0.3	0.3	0.3	Ω*
e_N	Wideband Noise	I_K=100µA, 10Hz ≤ f ≤ 10kHz		35	35	35	μV_{RMS}*
ΔV_R	Reverse Breakdown Voltage Long-term Stability	t=1000hrs, T=25°C, I_K=100µA		120	120	120	ppm*

*Typical.

Guaranteed Electrical Characteristics, FAN4050-3.3

(T_A = 25°C unless otherwise specified, in free air)
The • denotes specifications which apply over the full operating temperature range.

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

*Typical.

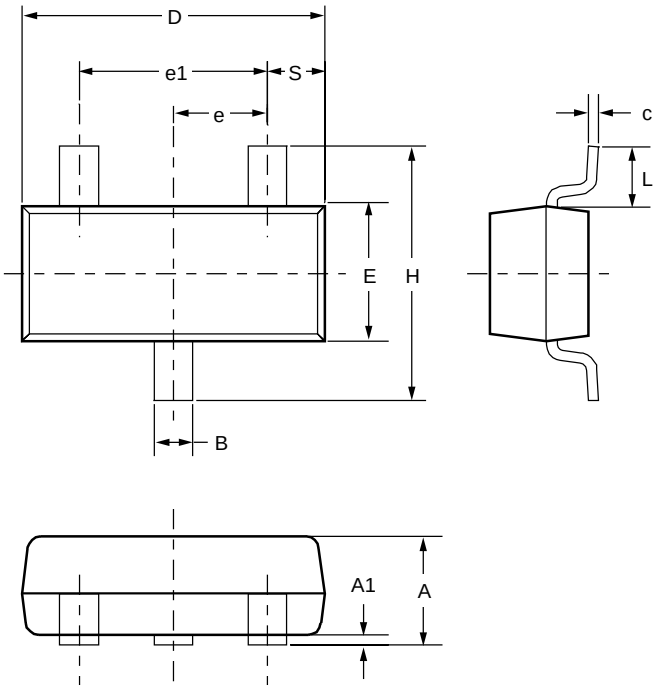
Mechanical Dimensions

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 **A** **I** **S3** **–** **2.5**

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

F **C** **A**

Voltage	Grade
2.5V = C	0.1% = A
3.3V = H	0.2% = B
	0.5% = C