

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: SSOT-23
- Extended operating current range

Applications

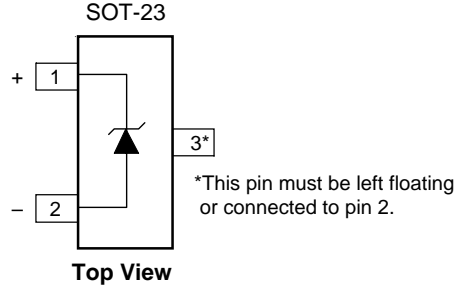
- Portable equipment
- Disk drives
- Instrumentation
- Audio equipment
- Data acquisition systems

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	-10	20	mA
Power dissipation ²		280	mW
Storage Temperature Range	-65	150	°C
Lead Temperature (Soldering, 10 sec.)		300	°C

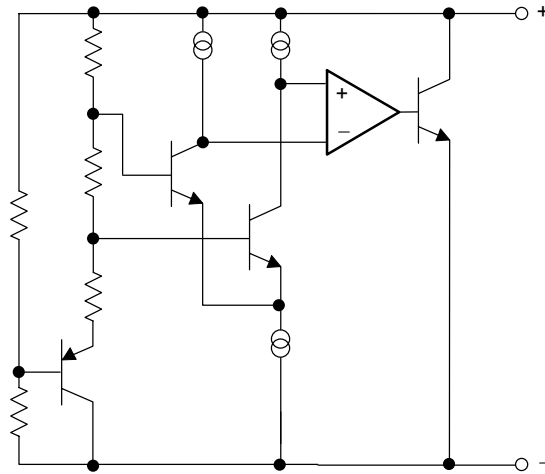
Notes:

- Functional operation under these conditions is not implied. Permanent damage may occur if the device is subjected to conditions outside these ratings.
- 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	0.1	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	$I_{R\text{MIN}} \leq I_K \leq 1\text{mA}$	• 1.2	1.2	1.2	mV
		$1\text{mA} \leq I_K \leq 15\text{mA}$	• 8.0	8.0	8.0	mV
		$1\text{mA} \leq I_K \leq 25\text{mA}$	12	12	12	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	$I_{R\text{MIN}} \leq I_K \leq 1\text{mA}$	• 1.2	1.2	1.2	mV
		$1\text{mA} \leq I_K \leq 15\text{mA}$	• 10	10	10	mV
		$1\text{mA} \leq I_K \leq 25\text{mA}$	15	15	15	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

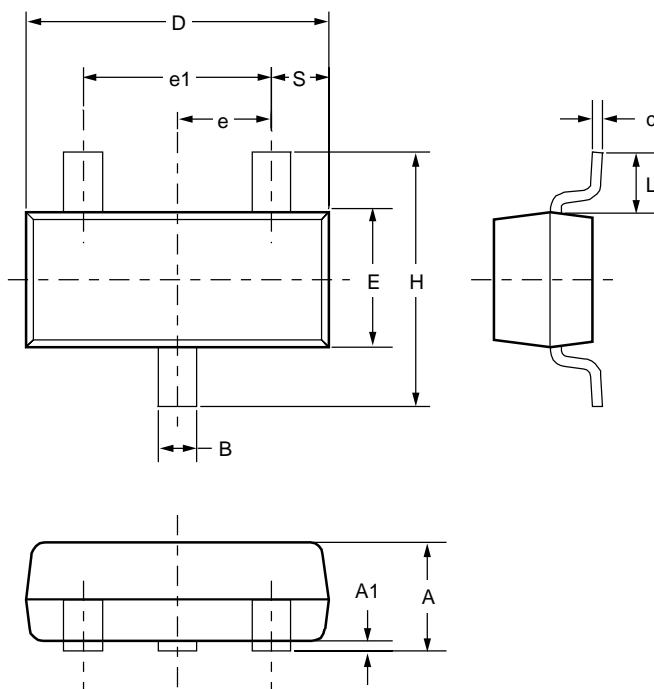
SOT-23 Package

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.

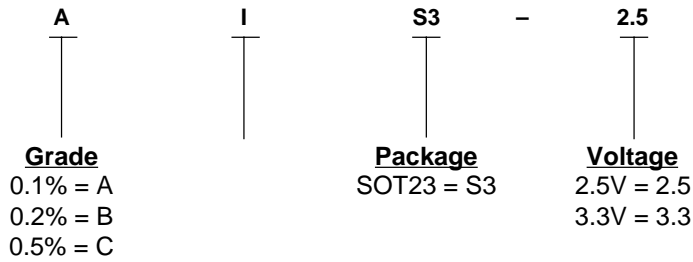
Advance Specification



Ordering Information

Example: FAN4050AIS3-2.5

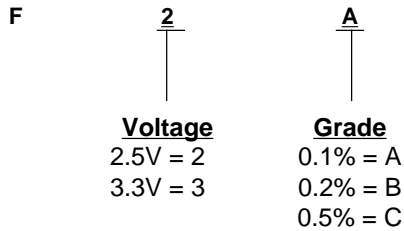
FAN4050



SOT-23 Package Marking Information

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

Example: F2A



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