

FAN4041

Precision Micropower Shunt Voltage Reference

Features

- Adjustable shunt reference
- Tolerances to $\pm 0.5\%$ (25°C)
- Low output noise
- Low temperature coefficient to $100\text{ ppm}/^{\circ}\text{C}$ max
- Small packages
- Extended operating current range

Applications

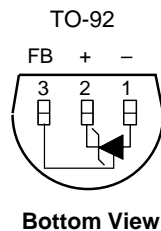
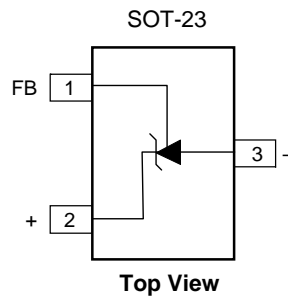
- Portable equipment
- Disk drives
- Instrumentation
- Audio equipment
- Data acquisition systems

Description

The FAN4041 adjustable precision shunt references are ideal for space- and cost-sensitive applications. They are available with output voltage tolerances of 0.5% and 1%. They also have excellent temperature coefficients, to $100\text{ ppm}/^{\circ}\text{C}$ for the tighter tolerance grades. The FAN4041 series has an extended operating current range, sinking as much as 25mA.

The FAN4041 series is available in SOT-23 and TO-92 packages.

Connection Diagrams



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	See Dissipation Rating Table		
Maximum Output Voltage (FAN4041)		12	V
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.

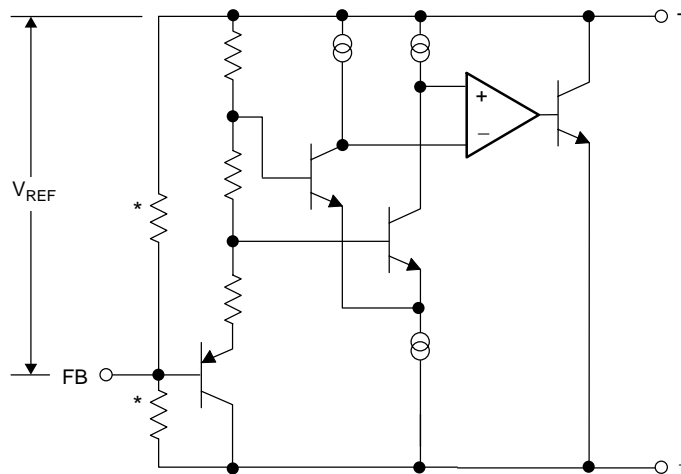
Recommended Operating Conditions

Parameter	Min.	Max.	Unit
Continuous cathode current, I_K	0.07	25	mA
Operating temperature range in free air, T_A	-40	85	°C
Output Voltage Range (FAN4041)	1.24	10	V

Dissipation Rating Table

Package	Power Rating $T_A \leq 25^\circ\text{C}$	Derating Factor $T_A \geq 25^\circ\text{C}$	Power Rating $T_A = 70^\circ\text{C}$
TO-92	550mW	5.5mW/°C	302mW
SOT23	306mW	3.0mW/°C	168mW

Equivalent Schematic



*External adjust components.

Guaranteed Electrical Characteristics, FAN4041

(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		Units
			C	D	
V _{REF}	Reference Voltage	I _K = 100µA, V _{OUT} = 5V	1.220	1.220	V*
TCV _{Ref}	Reference Voltage Tolerance	I _K = 100µA, V _{OUT} = 5V	±6.2 • ±14	±12 ±24	mV mV
I _{RMIN}	Mimimum Operating Current		• 65	70	µA
ΔV _{REF} /ΔT	Reference Voltage Temperature Coefficient	I _K = 1mA	• ±100	±150	ppm/°C
ΔV _{REF} (ΔI _K)	Reference Voltage Change with Operating Current	I _{RMIN} ≤ I _K ≤ 1mA 1mA ≤ I _K ≤ 12mA 1mA ≤ I _K ≤ 25mA	• 2.0 • 8 12	2.5 10 15	mV mV mV*
ΔV _{REF} (ΔV _O)	Reference Voltage Change with Output Voltage	I _µ = 1mA	• -2.5	-3.0	mV/V
I _{FB}	Feedback Current		• 120	200	nA
Z _{KA}	Reverse Dynamic Impedance	I _K =1mA, f=120Hz, I _{AC} =0.1I _K V _{OUT} = V _{REF} V _{OUT} = 10V	0.3 2	0.3 2	Ω* Ω*
e _N	Wideband Noise	I _K =100µA, V _{OUT} = V _{REF} 10Hz ≤ f ≤ 10kHz	20	20	µV _{RMS} *
ΔV _{REF}	Reference Voltage Long-term Stability	t=1000hrs, T=25°C, I _K =100µA	120	120	ppm*

*Typical.

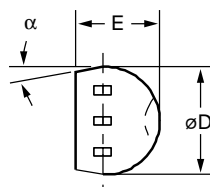
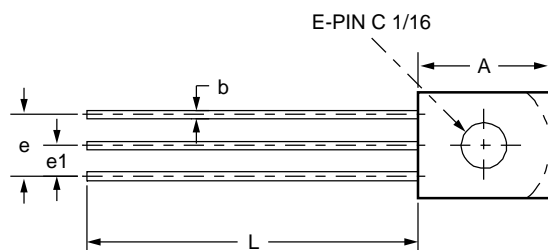
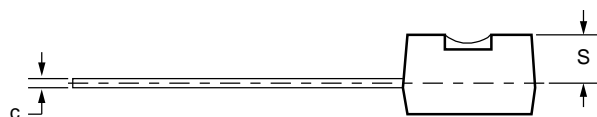
Mechanical Dimensions

TO-92 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.170	.210	4.32	5.33	
b	.015	.021	.38	.53	
c	.014	.020	.36	.51	
øD	.175	.205	4.45	5.21	
E	.125	.165	3.18	4.19	
e	.095	.105	2.41	2.67	
e1	.045	.055	1.14	1.40	
L	.500	—	12.70	—	
S	.080	.115	2.03	2.92	
α	4°	6°	4°	6°	

Notes:

1. Package outline exclusive of any mold flashes dimension.
2. Package outline exclusive of burr dimension.



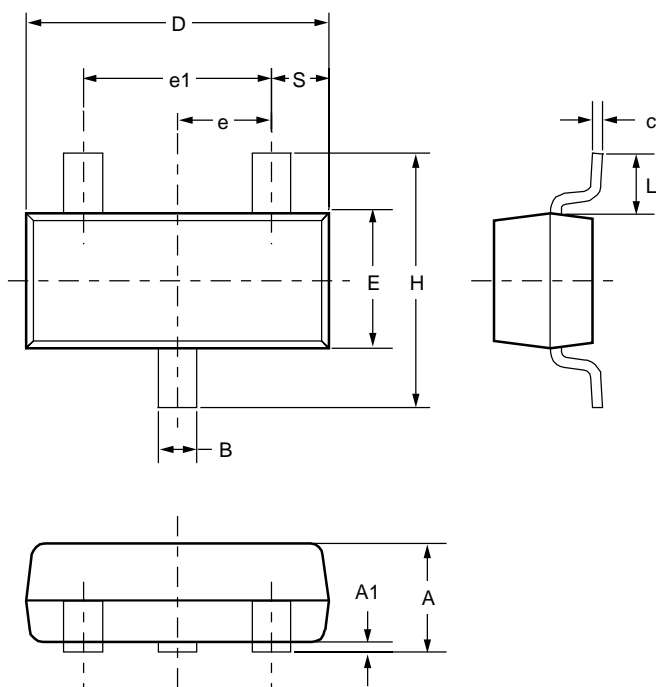
Mechanical Dimensions (continued)

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		

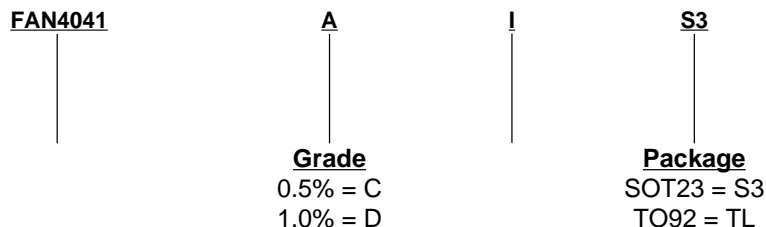
Notes:

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

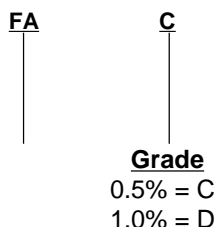
Example: FAN4041CIS3



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: FAC



DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
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.