

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

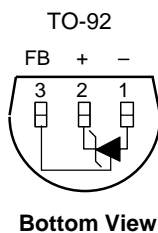
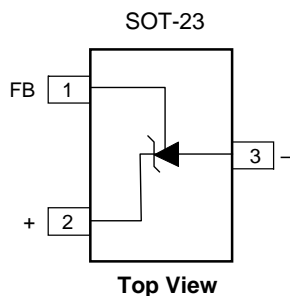
- Portable equipment
- Disk drives
- Instrumentation
- Audio equipment
- Data acquisition systems

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:

- 1. Functional operation under these conditions is not implied. Permanent damage may occur if the device is subjected to conditions outside these ratings.

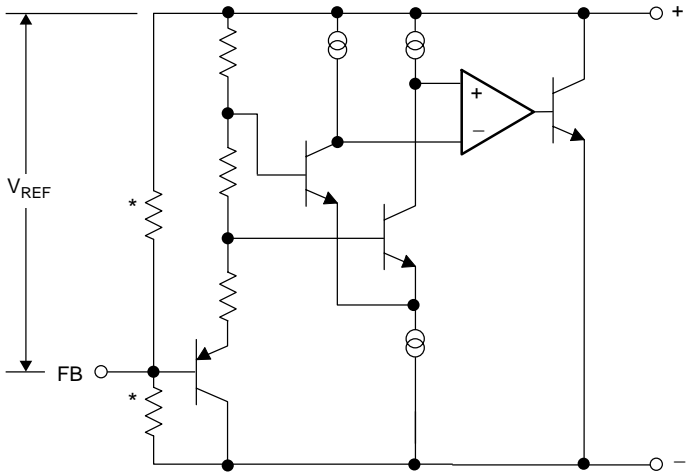
Recommended Operating Conditions

| 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 ≤ 25°C | Derating Factor T _A ≥ 25°C | Power Rating T _A = 70°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} | Minimum 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.

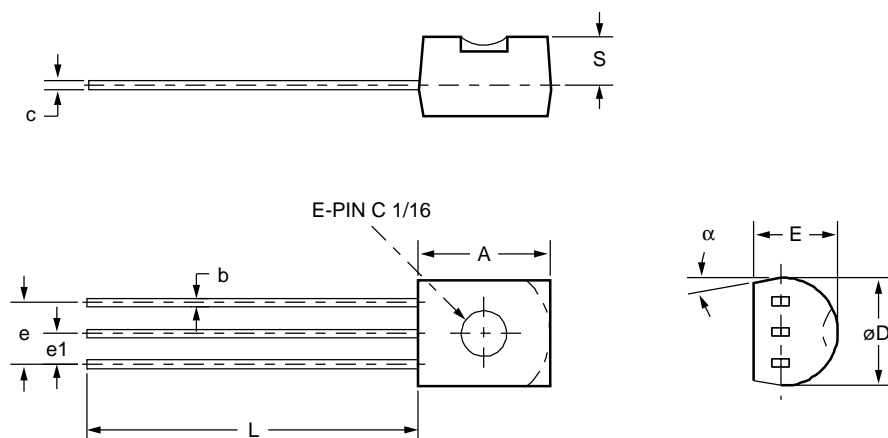
Mechanical Dimensions

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.



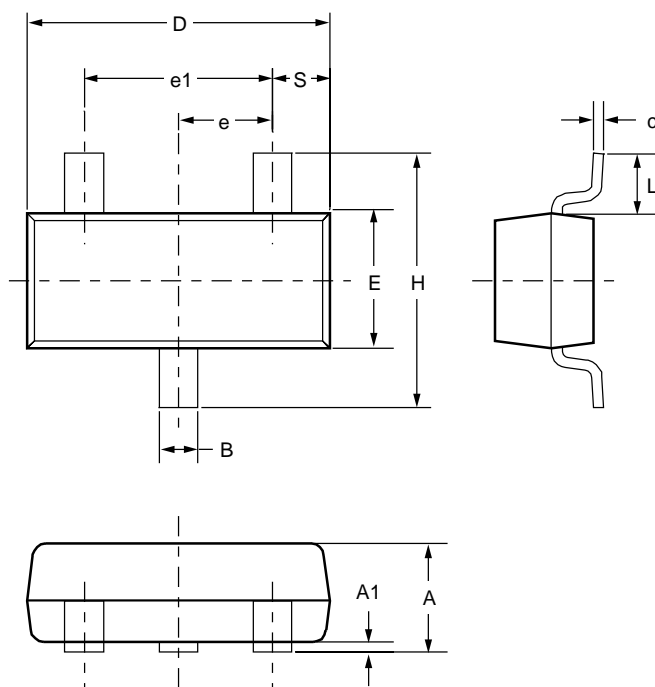
Mechanical Dimensions (continued)

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 | | |

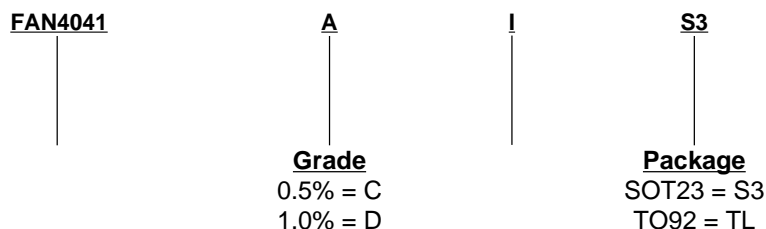
Notes:

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

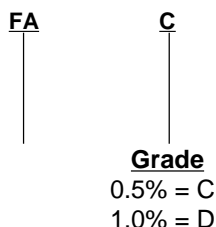
Example: FAN4041CIS3



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



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