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# SR12D

# **1.2V PRECISION VOLTAGE REFERENCE**

The SR12D is a monolithic integrated circuit using the bandgap principle to provide a precise reference voltage of 1.23V.

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S E M I C O N D U C T O R S

This reference device is packaged in a standard SOT-23 small outline package, making it ideal for all surface mount applications.

### FEATURES

- Standard SOT-23 Surface Mount Package
- Low Knee Current Typically 80 μA
- Low temperature Coefficient

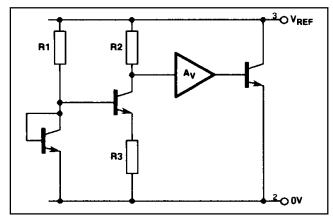


Fig.2 SR12D circuit diagram

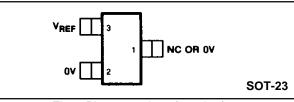


Fig. 1 Pin connections (top view)

## **ABSOLUTE MAXIMUM RATINGS**

| Reference current           | 2.5mA           |
|-----------------------------|-----------------|
| Operating temperature range | -40°C to + 85°C |
| Storage temperature range   | -55°C to +125°C |

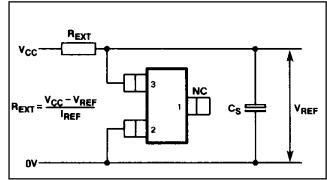


Fig.3 SR12D external connections.

NOTE: In order to achieve optimum operation, an electrolytic stabilising capacitor ( $C_{s} \ge 1\mu F$ ) should be connected between  $V_{\text{REF}}$  and 0V as shown in Fig. 3.

#### **ELECTRICAL CHARACTERISTICS**

These characteristics are guaranteed over the following conditions (unless otherwise stated):

| $T_{amb} = +25^{\circ}C, I_{REF}$ | = 150μA, Cs = 1μF |
|-----------------------------------|-------------------|
|-----------------------------------|-------------------|

|                                      |                  | Value | alue<br>Unit |       | Conditions |                               |
|--------------------------------------|------------------|-------|--------------|-------|------------|-------------------------------|
| Characteristic                       | Symbol           | Min.  | Тур.         | Max.  | Units      | Conditions                    |
| Output voltage                       | V <sub>ref</sub> | 1.193 | 1.230        | 1.267 | v          |                               |
| Slope resistance (see note 1)        | R <sub>REF</sub> |       | 1.5          | 2.5   | Ω          | $I_{REF} = 150\mu A$ to 2.5mA |
| Turn-on (knee) current               | I <sub>on</sub>  |       | 80           | 90    | μΑ         |                               |
| Recommended operating current range  | I <sub>REF</sub> | 0.09  |              | 2.5   | mA         |                               |
| Temperature coefficient (see note 2) | TCV              |       | 40           | 125   | ppm/°C     | 0°C to +70°C                  |
|                                      |                  |       | 40           | 120   | ppm/°C     | -40°C to + 85°C               |
| RMS noise voltage                    | E <sub>N</sub>   |       | 10           |       | μV         | 1Hz to 25kHz                  |
| Turn on time                         | t <sub>on</sub>  |       | 7            |       | ms         |                               |
| Turn off time                        | t <sub>off</sub> |       | 24           |       | ms         |                               |
| Turn on time                         | t <sub>on</sub>  |       | 0.4          |       | ms         | I <sub>REF</sub> = 5mA        |
| Turn off time                        | t <sub>off</sub> |       | 1.8          |       | ms         |                               |

# NOTES

1. Slope Resistance (R<sub>REF</sub>) The slope resistance is defined as

 $R_{REF} = \frac{Change in V_{REF} \text{ over specified current range}}{The arts}$ The change in reference current

# 2. Reference Voltage Temperature Coefficient (TCV<sub>REF</sub>)

This is the normalised reference voltage change over temperature, divided by the change in temperature. It is expressed in ppm/°C as follows:

$$TCV_{REF} = \frac{\Delta V_{REF} \times 10^6}{V_{REF} \times \Delta T} \text{ ppm/°C}$$

 $\Delta T$  = temperature change in °C  $\Delta V_{REF}$  = change in reference voltage over temperature change  $\Delta T$ .

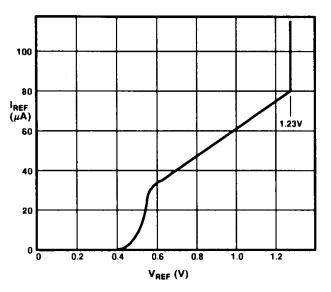


Fig.4 Typical reference characteristic

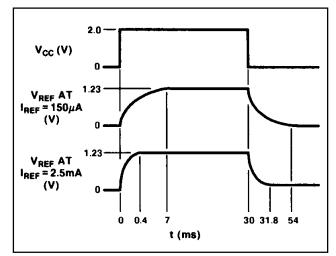


Fig.5 SR12D typical response time (not to scale)

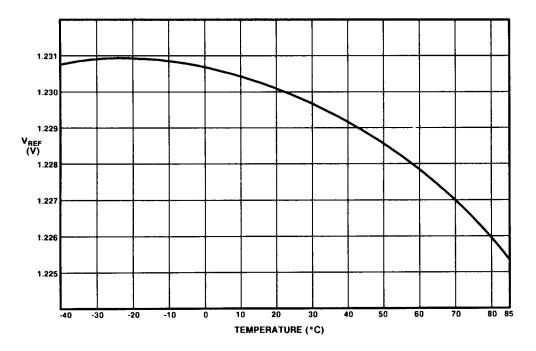


Fig.6 Typical temperature characteristic of SR12D at  $I_{REF} = 150 \mu A$ 

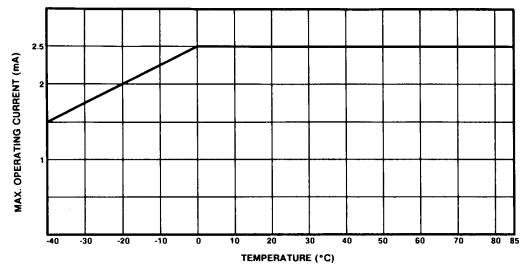


Fig.7 Derating curve



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