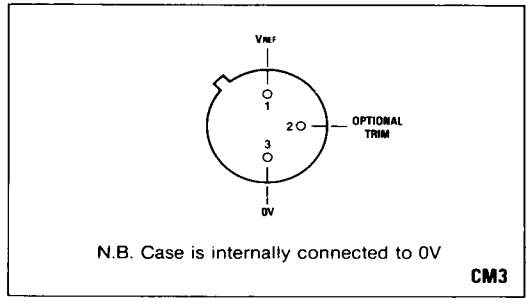
ZNREF040

4V LOW POWER PRECISION REFERENCE SOURCE

The ZNREF040 is a monolithic integrated circuit providing a precise stable reference voltage of 4.01V at 500μA.

The circuit features a knee current of 150μA and operation over a wide range of temperatures and currents.

The ZNREF040 is available in a 3-pin metal can package with pin 2 offering a trim facility whereby the output voltage can be adjusted as shown in Fig.1. This facility is used when compensating for system errors or setting the reference output to a particular value. When the trim facility is not used, pin 2 should be left open circuit.



Pin connections (bottom view)

FEATURES

- Trimmable Output
- Excellent Temperature Stability
- Low Output Noise Figure
- Available in Two Temperature Ranges
- 1 and 2% Initial Voltage Tolerance Versions Available
- No External Stabilising Capacitor required in most cases
- Low Slope Resistance

ORDERING INFORMATION

Device type	Tol. (%)	Temperature Range
ZNREF040 A1	1	-55°C to +125°C
ZNREF040 C1	1	0°C to +70°C
ZNREF040 C2	2	0°C to +70°C

ABSOLUTE MAXIMUM RATINGS

Reference current	75mA*
Power dissipation	300mW
Operating temperature range	See ordering information
Storage temperature range	-55°C to +175°C
Soldering temperature for a maximum time of 10s	
Within 1/16 in of the seating plane	300°C
Within 1/32 in of the seating plane	265°C

*Above 25°C this figure should be linearly derated to 20mA at +125°C.

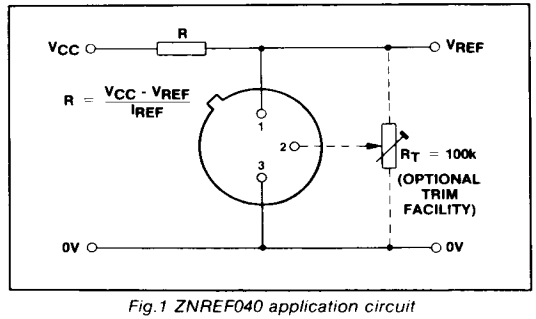


Fig.1 ZNREF040 application circuit

TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Initial voltage tolerance %	Grade A −55 to 125°C		Grade C 0 to 70°C		Units
			Typ.	Max.	Typ.	Max.	
Output voltage change over relevant temperature range (See note (a))	ΔV_{REF}	1 & 2	25.6	36	4.2	14	mV
Output voltage temperature coefficient (See note (b))	TCV_{REF}	1 & 2	35	50	15	50	ppm/°C

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C and Pin 2 o/c unless otherwise specified).

Parameter	Symbol	Min.	Typ.	Max.	Units	Comments
Output voltage 1% tolerance (A1 C1) 2% tolerance (C2)	V_{REF}	 3.97 3.93	 4.01 4.01	 4.05 4.09	V	I_{REF} = 500μA
Output voltage adjustment range	ΔV_{TRIM}	–	±5	–	%	R_T = 100kΩ
Change in TCV_{REF} with output adjustment	$TC\Delta V_{TRIM}$	–	0.8	–	ppm/°C/%	
Operating current range	I_{REF}	0.15	–	75	mA	See note (c)
Turn-on time Turn-off time	t_{on} t_{off}	– –	40 0.3	– –	μs	R_L = 1kΩ
Output voltage noise (over the range 0.1 to 10Hz)	e_{np-p}	–	50	–	μV	Peak to peak measurement
Slope resistance	R_{REF}	–	2	3	Ω	I_{REF} 0.5mA to 5mA, See note (d)

NOTES

(a) Output change with temperature (ΔV_{REF})
The absolute maximum difference between the maximum output voltage and the minimum output voltage over the specified temperature range

$$\Delta V_{REF} = V_{max} - V_{min}$$

(b) Output temperature coefficient (TCV_{REF})
The ratio of the output change with temperature to the specified temperature range expressed in ppm/°C.

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

ΔT = Full temperature change.

(c) Operating current (I_{REF})
Maximum operating current must be derated as indicated in maximum ratings.

(d) Slope resistance (R_{REF})
The slope resistance is defined as R_{REF} = change in V_{REF} overspecified current range

ΔI_{REF} = 5 - 0.5 = 4.5mA (typically)

(e) Line regulation

The ratio of change in output voltage to the change in input voltage producing it.

$$\frac{R_{REF} \times 100}{V_{REF} \times R_S} \text{ %/V}$$ R_S = Source resistance

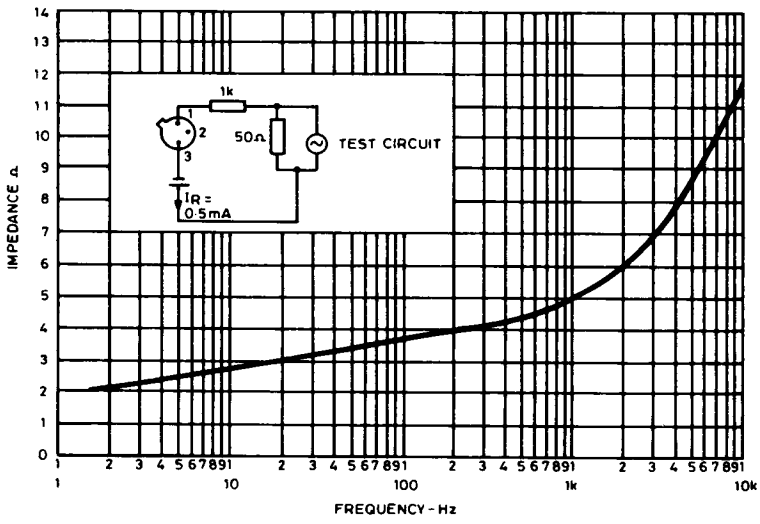


Fig.2 Dynamic impedance (typical)

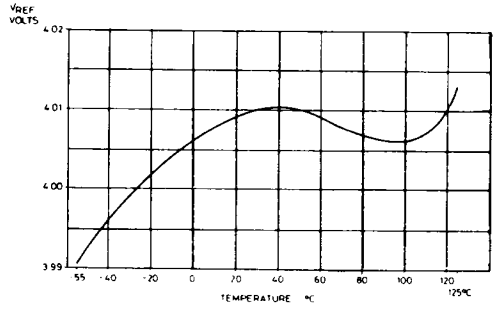


Fig.3 Typical temperature characteristics

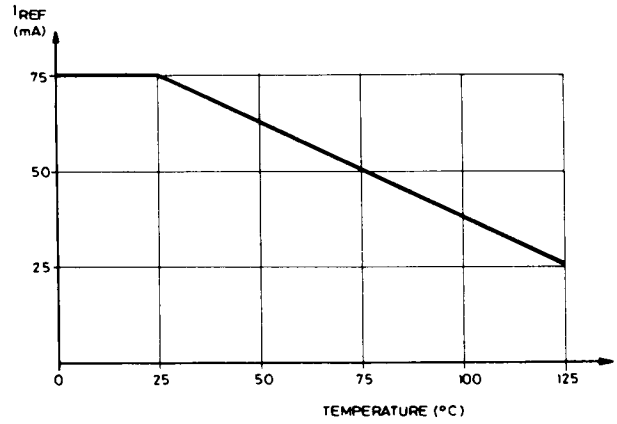


Fig.4 I_{REF} derating for ZNREF040