PLESSEY Semiconductors

ADVANCED PRODUCT INFORMATION

T-58-07

REF25D

2.5V MICROPOWER PRECISION REFERENCE

The REF25D is an integrated circuit using the bandgap principle to provide a precise stable reference voltage of 2.5V without the need for an external shaping capacitor. The REF25D features a recommended operating current range of 60μA to 5mA which makes it ideal for all low power and battery applications.

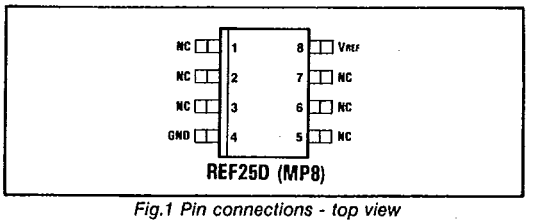

Fig.1 Pin connections - top view

FEATURES

- Low Knee Current — Typically 40 microamps
- Ideal for Battery Operation — 150 microwatts
- Internally Shaped
- Miniature Plastic Surface Mount Package (MP8)
- Tight Initial V_{OUT} Tolerance ±1%
- Low Temperature Coefficient
- Low Slope Resistance
- Low Cost
- Industrial Temperature Range: -40°C to +85°C

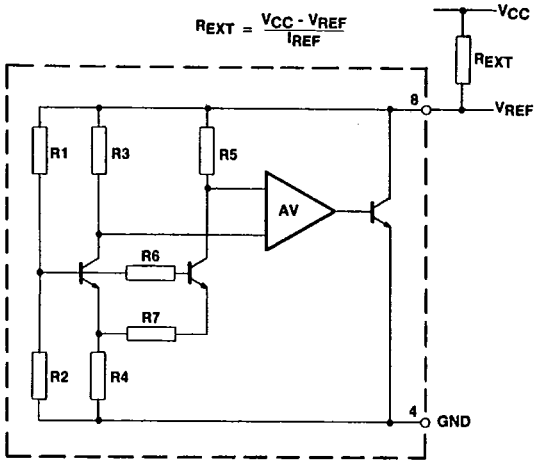

Fig.2 REF25D circuit diagram

ABSOLUTE MAXIMUM RATINGS

Reference current	5mA
Operating temperature range	-40°C to +85°C
Storage temperature	-55°C to +125°C

ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):
T_{amb} = 25°C

Characteristic	Symbol	Value			Units	Conditions
		Min.	Typ.	Max.		
Output voltage	V_{REF}	2.475	2.500	2.525	V	I_{REF} = 150μA
Slope resistance	R_{REF}		1.2	2.0	Ω	I_{REF} = 150μA to 5mA. Note (a)
Turn-on (knee) current	I_{ON}		40	60	μA	
Recommended operating current range	I_{REF}	0.06		5.0	mA	-5°C to 80°C (see Fig.7)
Temperature coefficient	TC V_{REF}		35	70	ppm/°C	I_{REF} = 150μA. Note (b)
RMS noise voltage 1Hz to 10kHz	E_N		35		μV	Peak to peak
Turn-on time	T_{on}		80		μs	I_{REF} 150μA (see Fig.6)
Turn-off time	T_{off}		7		μs	
Turn-on time	t_{on}		65		μs	I_{REF} = 500μA (see Fig.6)
Turn-off time	T_{off}		2		μs	

PLESSEY SEMICONDUCTORS

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NOTES

(a) Slope resistance (R_{REF})

Slope resistance is defined as

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

(b) Reference voltage temperature coefficient (TC V_{REF})

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

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

ΔT = temperature change in °C.

ΔV_{REF} = change in reference voltage over temperature change ΔT.

(c) Line regulation (ΔV_{REF} L)

The ratio of the change in reference voltage to the change in input voltage.

$$\Delta V_{REF}\ L = \left|\frac{R_{REF} \times 100}{V_{REF} \times R_s}\right| \quad \%/V$$

R_S = Source resistance.

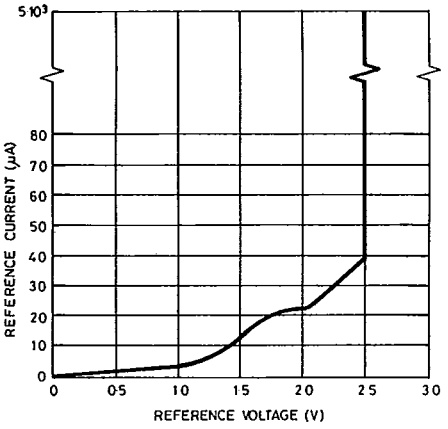

Fig.3 Typical reference characteristic

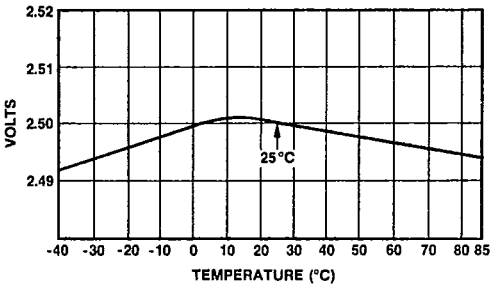

Fig.4 Typical temperature characteristic

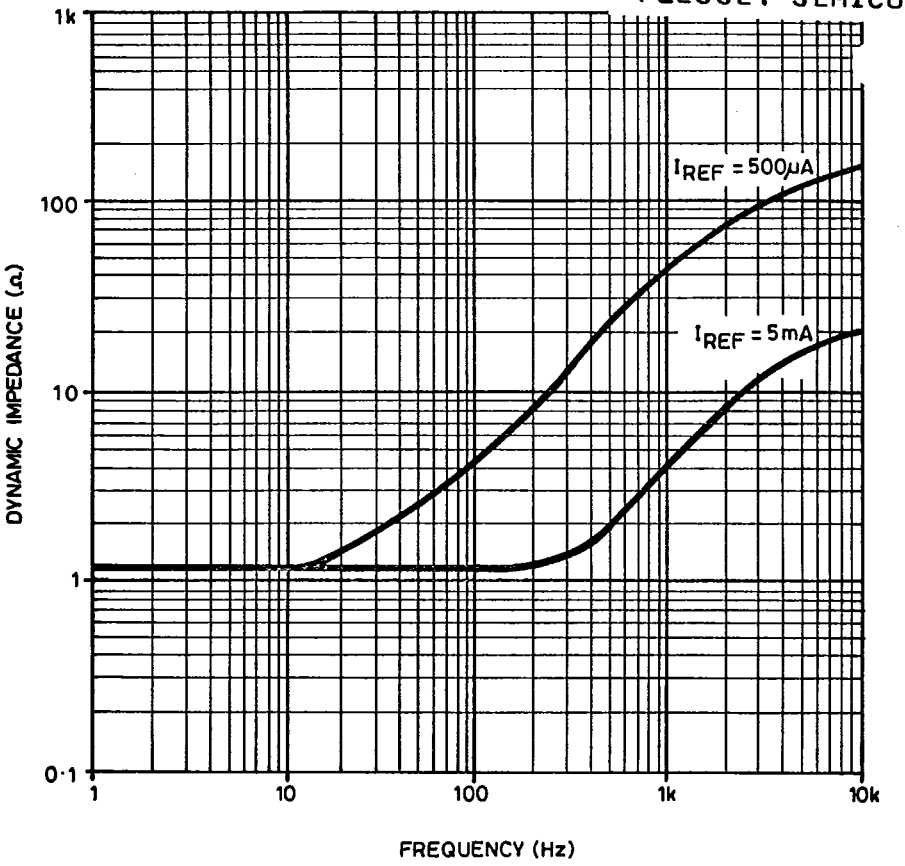

Fig.5 Typical dynamic impedance

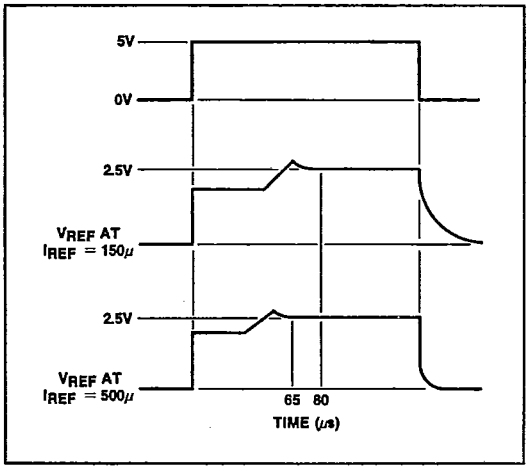

Fig.6 Typical response time

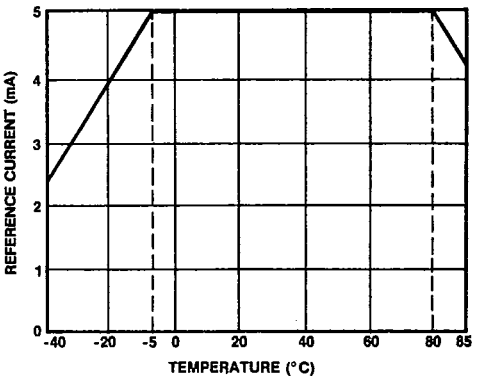

Fig.7 Typical derating curve