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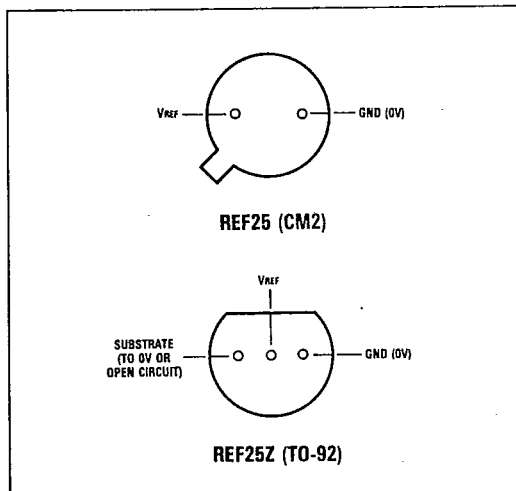
REF25/REF25Z

2.5V MICROPOWER PRECISION REFERENCES

The REF25 and REF25Z are integrated circuits using the bandgap principle to provide a precise stable reference voltage of 2.5V without the need for an external shaping capacitor. There are two package options available: REF25 in 2-pin TO-18 metal can (CM2) and REF25Z in plastic 3-pin TO-92. These references feature a recommended operating current range of 60 μ A to 5mA which make them ideal for all low power and battery applications.

FEATURES

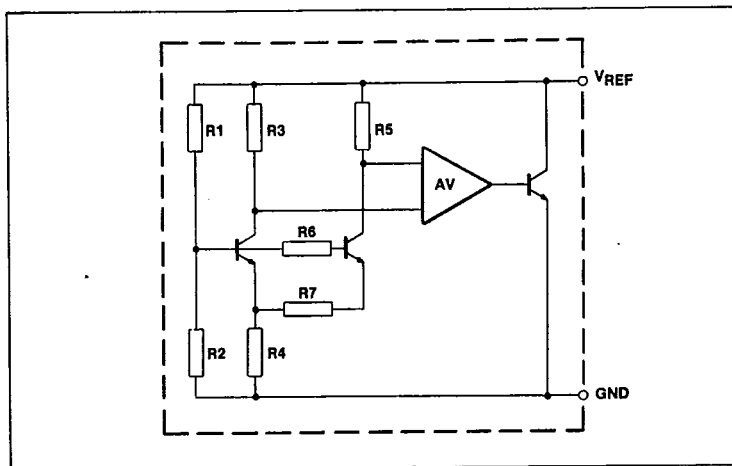
- Low Knee Current — Typically 40 microamps
- Ideal for Battery Operation — 150 microwatts
- Internally Shaped
- REF25Z — 3 Lead TO-92 Plastic Package
- REF25 — 2 Lead TO-18 (CM2) Metal Can Package
- Tight Initial Vout Tolerance $\pm 1\%$
- Low Temperature Coefficient
- Low Slope Resistance
- Low Cost
- Operation over Full Military (Metal Can) and Industrial (Plastic) Temperature Ranges



Pin connections - bottom view

ORDERING INFORMATION

Device type	Operating temperature	Package
REF25	-55°C to +125°C	CM2
REF25Z	-40°C to +85°C	TO-92



Internal connections REF25/25Z

ABSOLUTE MAXIMUM RATINGS

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Reference current	5mA
Operating temperature range	0 to +70°C
Storage temperature range	-55 to +125°C
Soldering temperature for a maximum time of 10s	
within 1.59mm of the seating plane	300°C
within 0.80mm of the seating plane	265°C

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified).

Parameter	Symbol	Min.	Typ.	Max.	Units	Comments
Output voltage	V_{REF}	2.475	2.500	2.525	V	REF25 } $I_{REF} = 150\mu\text{A}$ REF25Z }
		2.450	2.500	2.550		
Slope resistance	R_{REF}	—	1.2	1.5	Ω	REF25 } $I_{REF} = 150\mu\text{A}$ REF25Z } to 5mA note (a)
		—	1.2	2.0		
Turn-on (knee) current	I_{ON}	—	40	—	μA	
Recommended operating current range	I_{REF}	0.06	—	5.0	mA	
Temperature coefficient	TC V_{ref}	—	25	55	ppm/°C	REF25 } $I_{REF} = 150\mu\text{A}$ REF25Z } note (b)
		—	35	70		
RMS noise voltage 1Hz to 10kHz	E_N	—	35	—	μV	Peak to peak
Turn-on time	T_{on}	—	80	—	μs	$I_{ref} = 150\mu\text{A}$
Turn-off time	T_{off}	—	7	—		
Turn-on time	T_{on}	—	65	—	μs	$I_{ref} = 500\mu\text{A}$
Turn-off time	T_{off}	—	2	—		

NOTES

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(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:

$$TC V_{ref} = \frac{\Delta V_{ref} \times 10^6}{V_{ref} \times \Delta T} \text{ ppm/}^\circ\text{C}$$

ΔT = temperature change in °C.

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

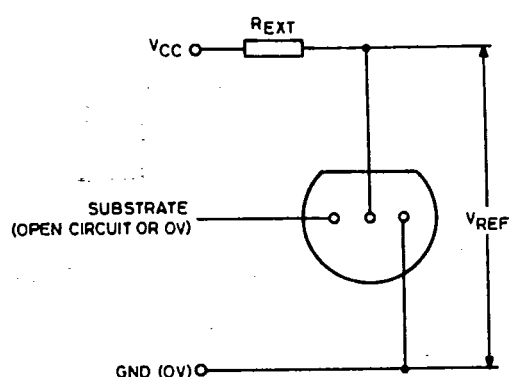
(c) Line regulation ($\Delta V_{ref} L$)

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

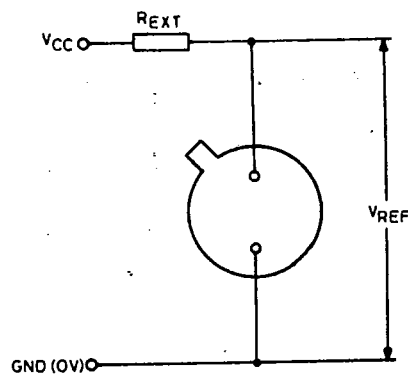
$$\Delta V_{ref} L = \left(\frac{R_{ref} \times 100}{V_{ref} \times R_s} \right) \% / V$$

R_s = Source resistance.

External connections



REF25Z

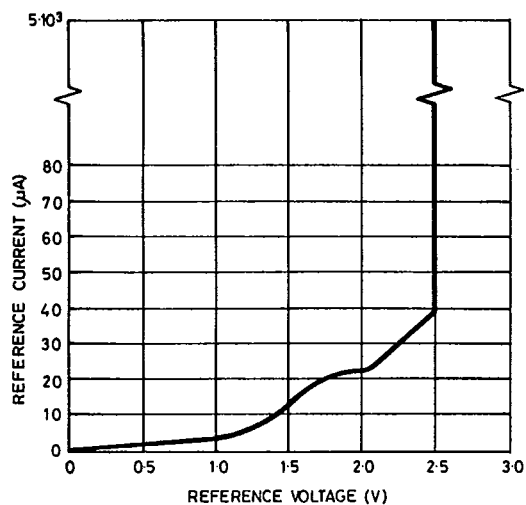


REF25

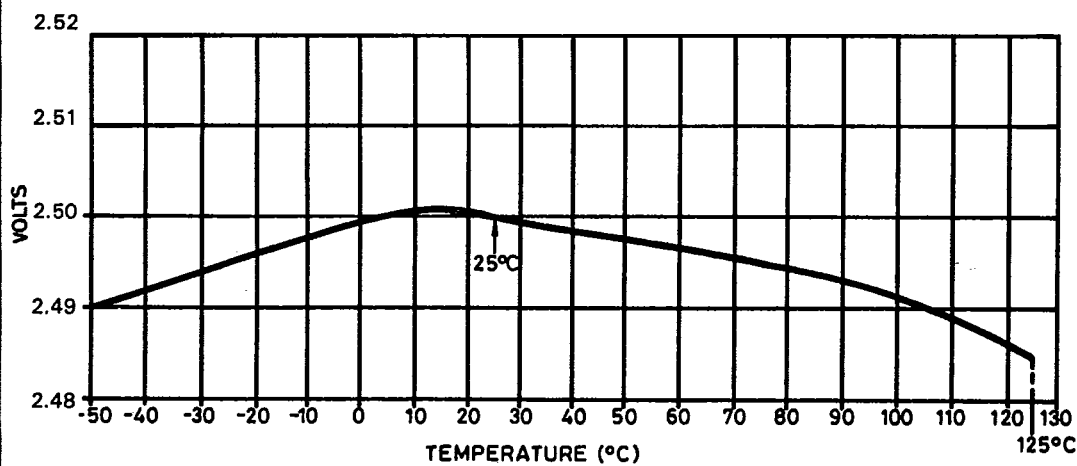
$$R_{EXT} = (V_{CC} - V_{REF}) / I_{REF}$$

PLESSEY SEMICONDUCTORS

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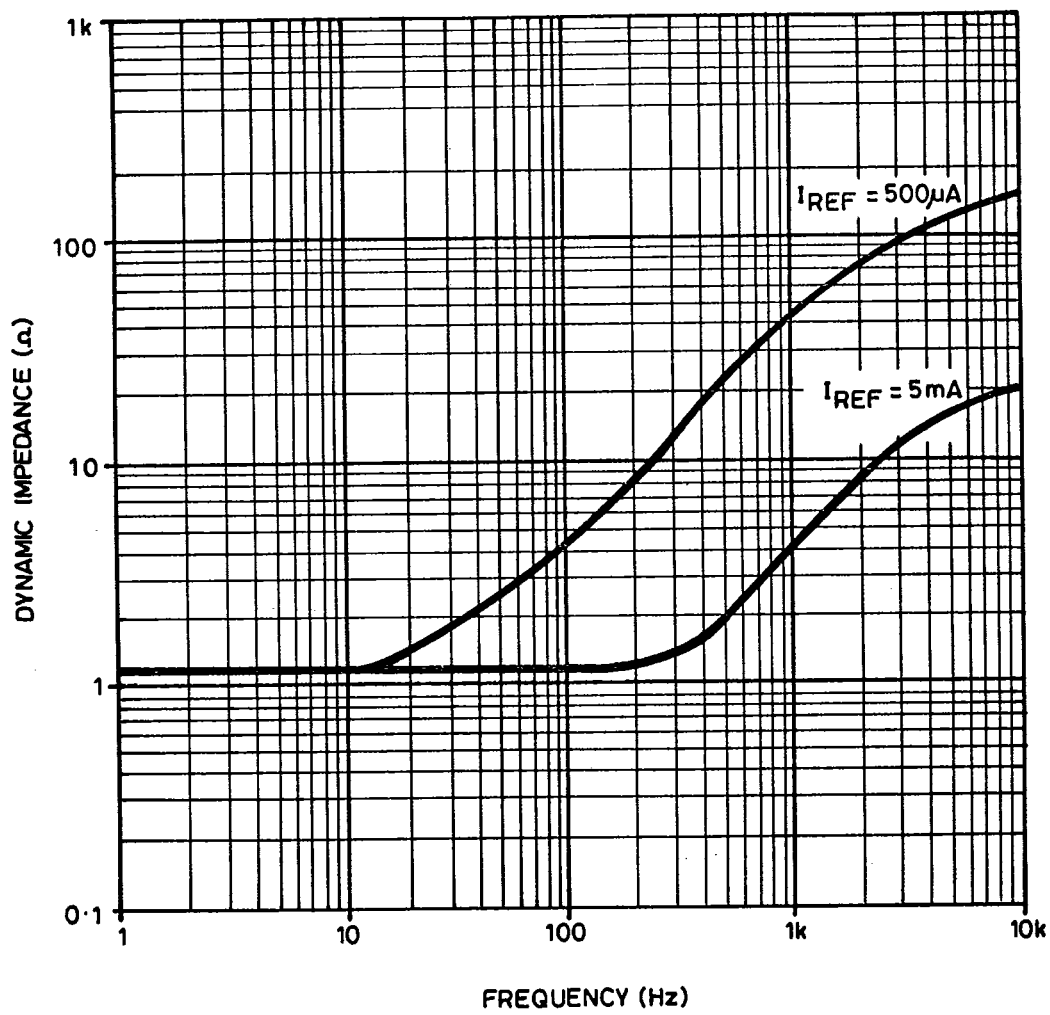


Typical reference characteristic



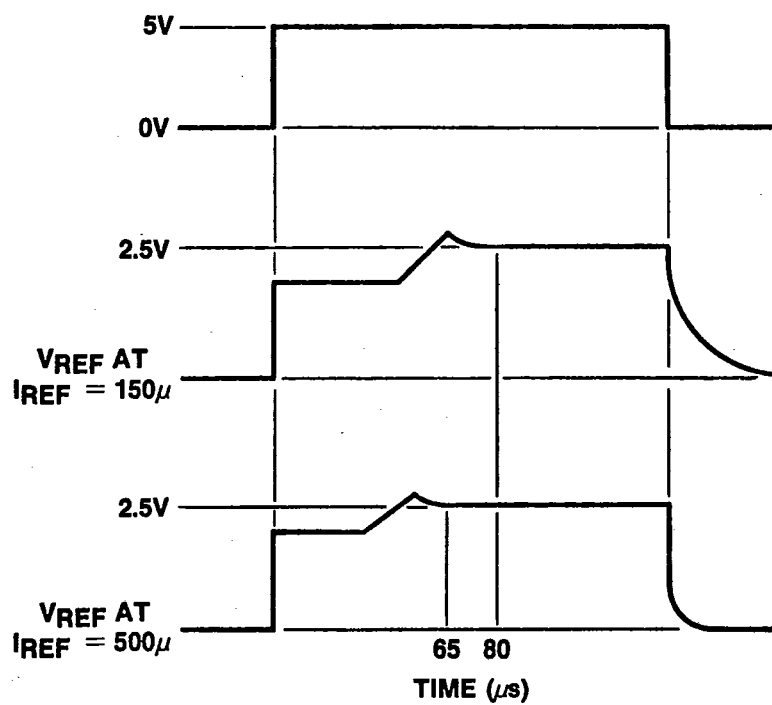
Typical temperature characteristic

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Typical dynamic impedance

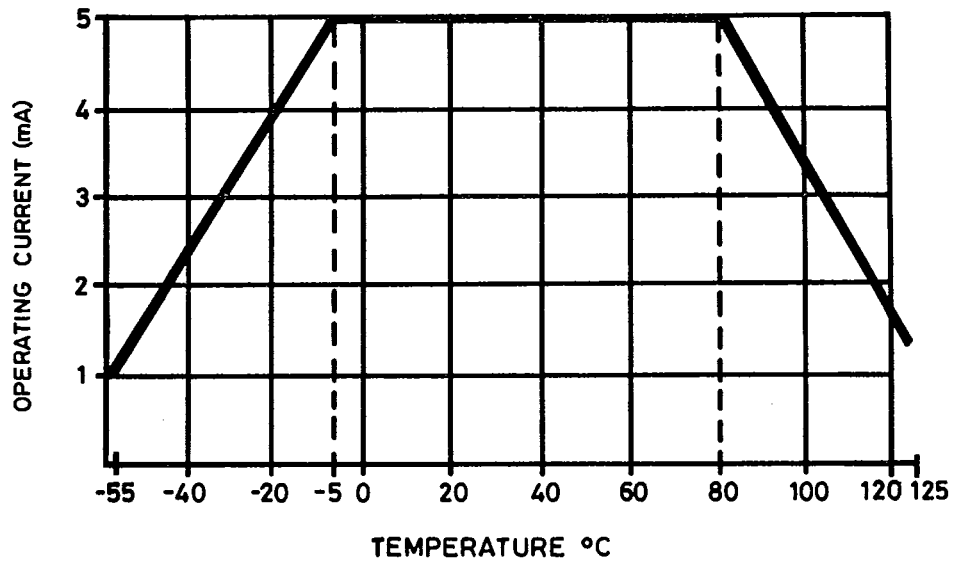
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Typical response time

PLESSEY SEMICONDUCTORS

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Typical derating curve