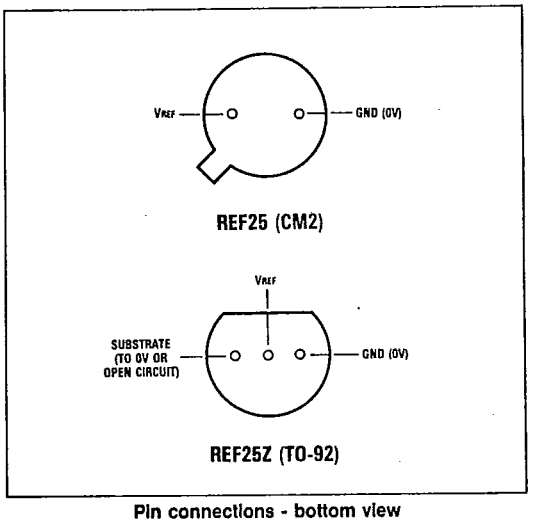
PLESSEY
Semiconductors

T-58-07

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 60μA to 5mA which make them ideal for all low power and battery applications.



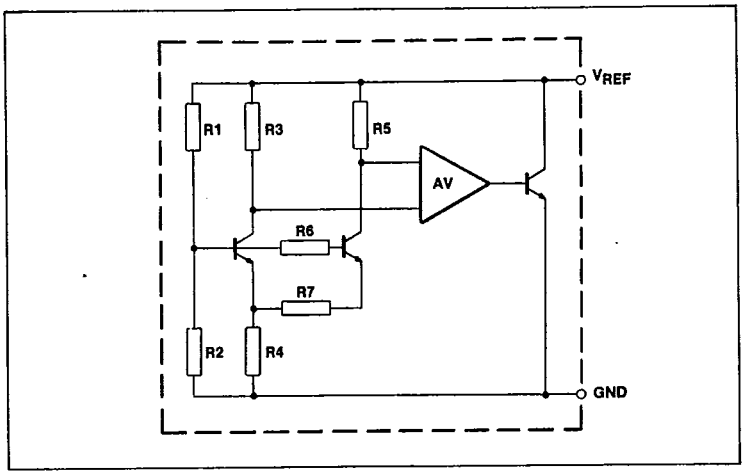
Pin connections - bottom view

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 ±1%
- Low Temperature Coefficient
- Low Slope Resistance
- Low Cost
- Operation over Full Military (Metal Can) and Industrial (Plastic) Temperature Ranges

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

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ABSOLUTE MAXIMUM RATINGS

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°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} = 150μA
		2.450	2.500	2.550		REF25Z }
Slope resistance	R_{REF}	–	1.2	1.5	Ω	REF25 } I_{REF} = 150μA to 5mA note (a)
		–	1.2	2.0		REF25Z }
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} = 150μA note (b)
		–	35	70		REF25Z }
RMS noise voltage 1Hz to 10kHz	E_N	–	35	–	μV	Peak to peak
Turn-on time	T_{on}	–	80	–	μs	I_{ref} = 150μA
Turn-off time	T_{off}	–	7	–		
Turn-on time	T_{on}	–	65	–	μs	I_{ref} = 500μA
Turn-off time	T_{off}	–	2	–		

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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:

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

ΔT = temperature change in °C.

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

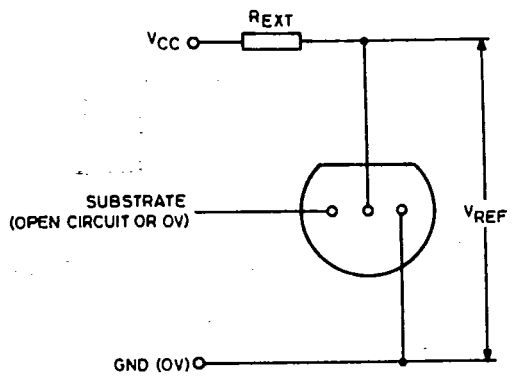
(c) Line regulation (ΔV_{ref} L)

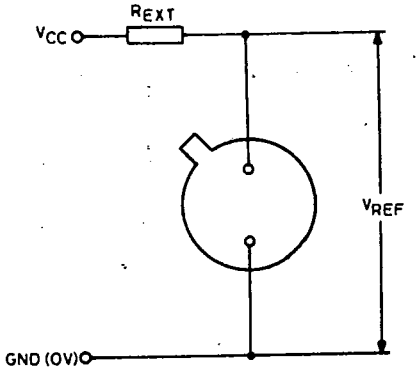
The ratio of the change in reference voltage to the change in input voltage.

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

R_S = Source resistance.

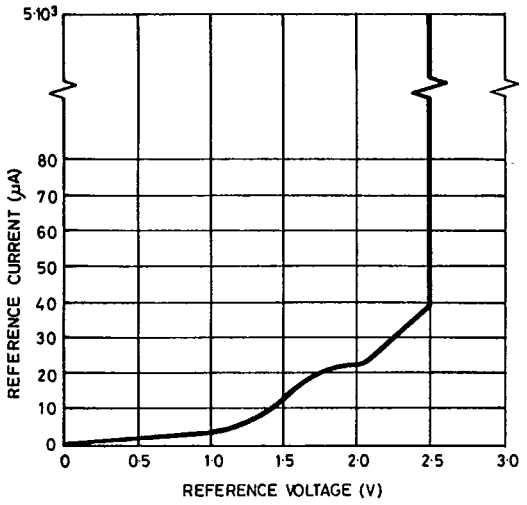
External connections



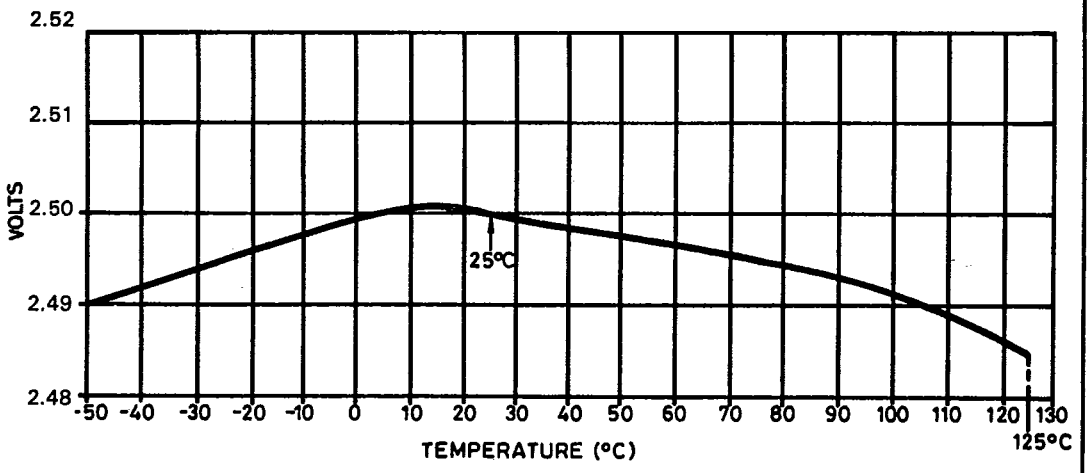


$R_{EXT} = (V_{CC} - V_{REF})/I_{REF}$

REF25Z **REF25**



Typical reference characteristic



Typical temperature characteristic

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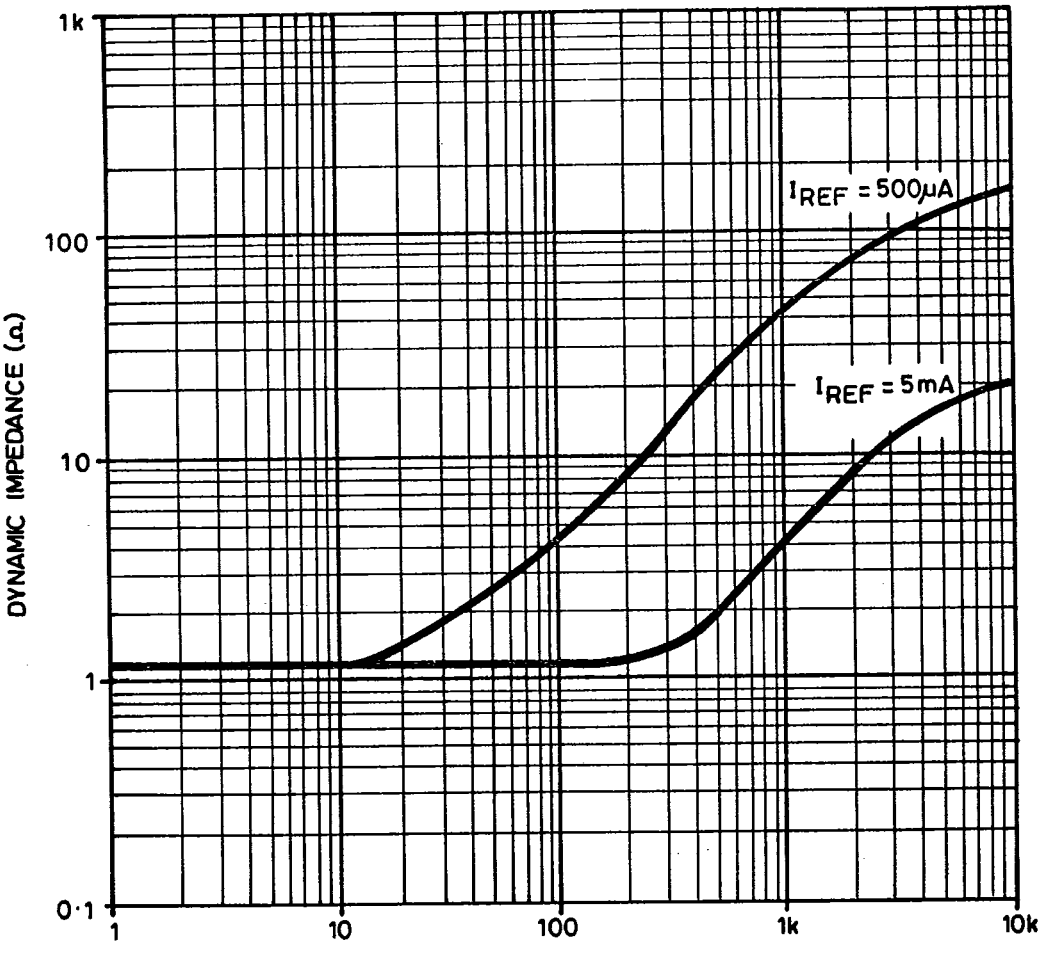

Typical dynamic impedance

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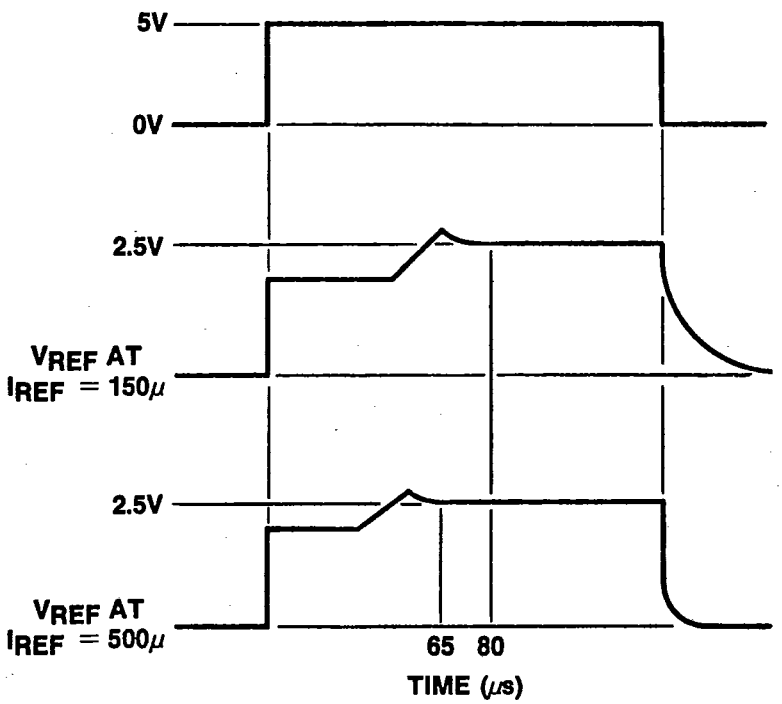
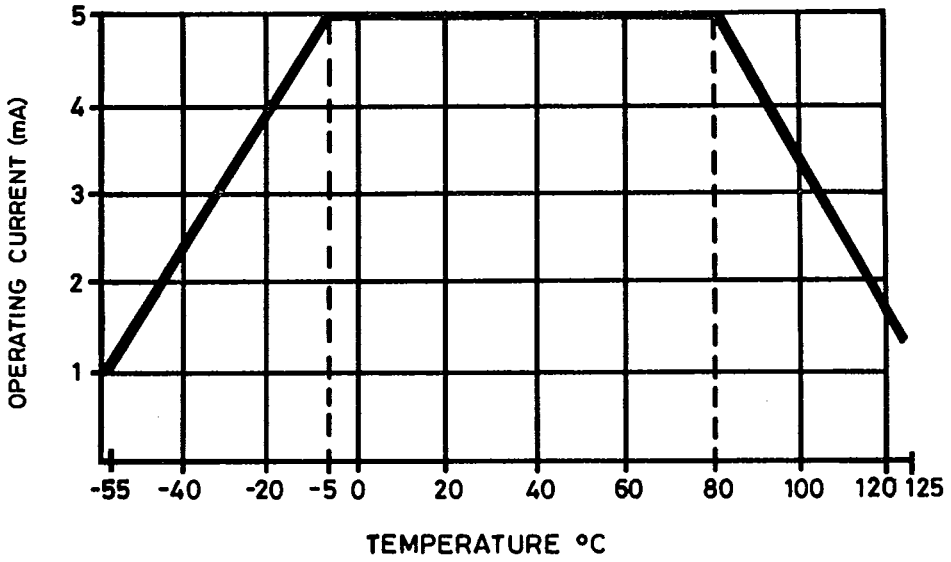


Typical response time



Typical derating curve