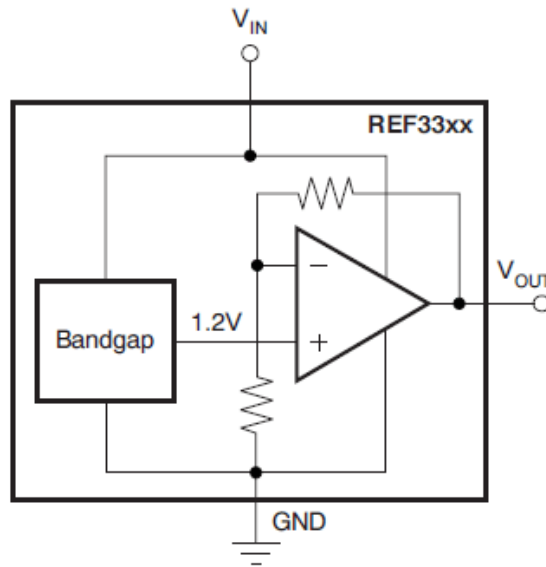


# Functional Safety FIT Rate, Failure Mode Distribution REF33xx

3.9- $\mu$ A, SC70-3, SOT-23-3, and UQFN-8, 30-ppm/ $^{\circ}$ C Drift Voltage Reference

## Functional Block Diagram



Failure Rate Mission Profile (1)	Per 10 <sup>9</sup> Hours (FIT)		
Package Option	SOT-23-3	SC70-3	UQFN-8
Total FIT Rate	4	4	3
Die FIT Rate	2	2	1
Package FIT Rate	2	2	2

FIT Siemens Norm SN29500 (2)			
Table	Category	Ref FIT $\lambda_{ref}$	Ref Virtual Tj $\theta_{vj,1}$
Table 5	Digital, Analog, Mixed	20 FIT	55 C

Failure Modes	Failure Mode Distribution (%)
VOUT No Output, HIZ	20%
VOUT to GND	20%
VOUT outside specification (voltage or time)	50%
Pin to Pin short any two pins	10%

## **(1) Failure Rate, Mission Profile and Failure Modes Distribution**

The failure rate and mission profile information come from reliability modeling for Integrated circuits in Reliability data handbook IEC TR 62380 and ISO 26262 Part 11

Mission Profile: Motor Control from Table 11

Power dissipation 100.0 mW

Climate type: World-wide Table 8

Package factor lambda 3 Table 17b

Substrate Material: FR4

EOS FIT rate assumed = 0

## **(2) Reference failure rate, Virtual (equivalent) junction temperature**

The reference failure rate and virtual junction temperature come from Siemens Norm SN29500-2 tables 1-5. Failure rate for user mission profile is calculated using the reference failure rate and virtual junction temperature and following the calculation information in SN29500-2 section 4.

The failure mode distribution estimation comes from the combination of common failure modes listed in standards such as IEC 61508 and ISO 26262, the ratio of sub-circuit function size and complexity and from best engineering judgment. The failure rates listed reflect random failure events and do not include failures due to misuse or over stress.

REF33xx is a catalog product and not compliant to ISO-26262 standards.

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