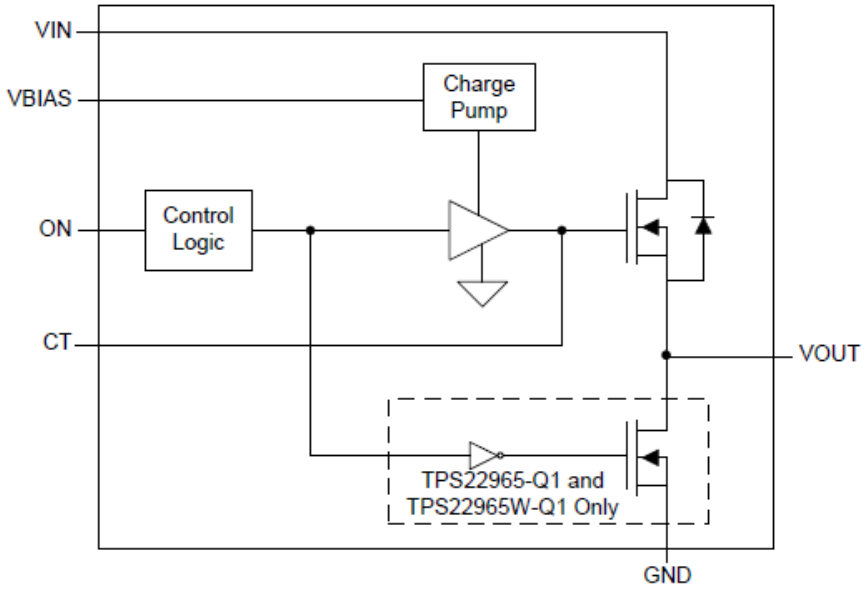
Functional Safety FIT Rate, Failure Mode Distribution TPS22965-Q1

5.5-V, 4-A, 16-mΩ On-Resistance Load Switch

Functional Block Diagram



Failure Rate Mission Profile (1)	Per 10^9 Hours (FIT)
Total FIT Rate	4
Die FIT Rate	2
Package FIT Rate	2

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

Failure Modes	Failure Mode Distribution (%)	
	TPS22965N-Q1 TPS22965NW-Q1	TPS22965-Q1 TPS22965W-Q1
VOUT open or HIZ	40	20
VOUT to GND	20	40
VOUT outside specification (voltage or time)	30	30
VOUT stuck on	5	5
Pin to Pin short any two pins	5	5

(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 5 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.

TPS22965-Q1 is a catalog product and not compliant to ISO-26262 standards.

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