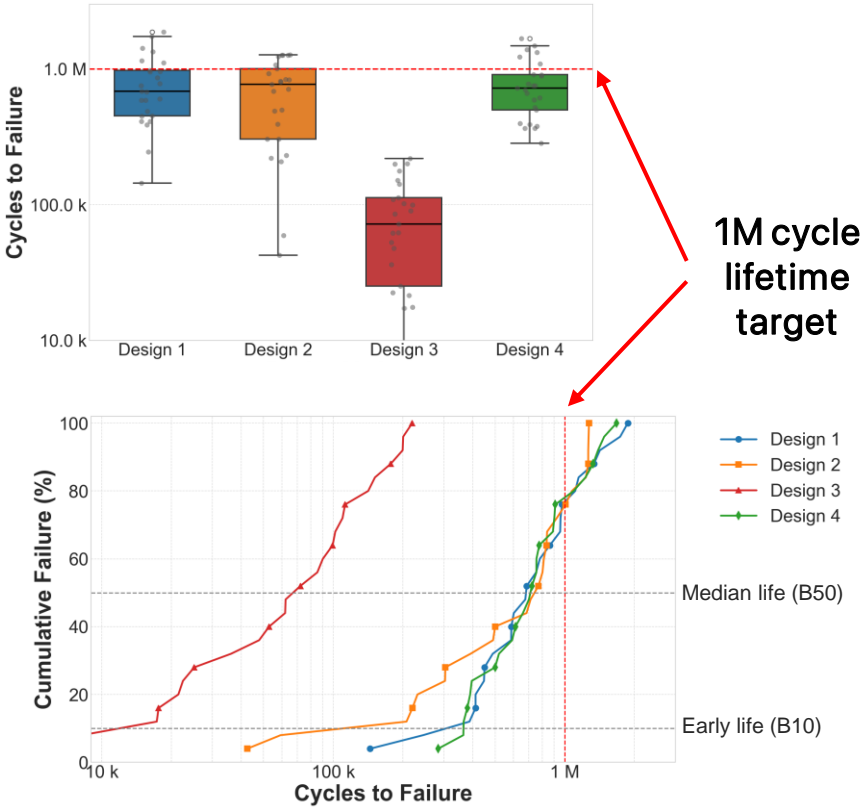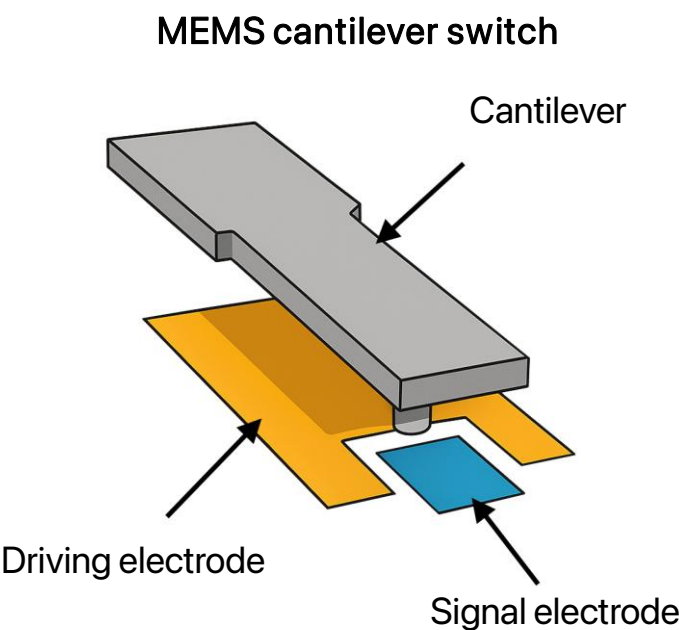# Example 2: MEMS device reliability analysis

Problem statement:
- We are targeting 1M cycle minimum lifetime for a MEMS switch device
- Multiple designs show significant variation in reliability performance
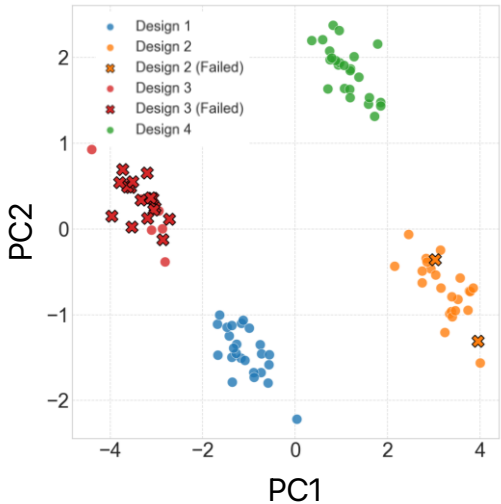- We want to identify key parameters affecting lifetime reliability

Device parameter	Target baseline
Contact gap	2.0 µm
Spring constant	0.8 N/m
Actuation voltage	40 V
Contact material	Gold
Surface treatment	None
Package humidity	0.5% RH
Contact force	200 µN

MEMS cantilever switch

Cantilever

Driving electrode

Signal electrode

1M cycle lifetime target

Example 2: MEMS device reliability analysis

The different design parameters across different device features lead to different reliability performance

Pearson correlation is carried out to identify each parameters effect on reliability

Device parameter variable
Contact gap
Spring constant
Actuation voltage
Contact material
Surface treatment
Package humidity
Contact force