
EIGHTEENTH ANNUAL
BiTS
TM
Burn-in & Test Strategies Workshop
March 5 - 8, 2017
Hilton Phoenix / Mesa Hotel
Mesa, Arizona
Archive – Session 4
© 2017 BiTS Workshop – Image: tonda / iStock

Copyright Notice

Session 4

Rahima Mohammed

Session Chair

BiTS Workshop 2017 Schedule

Frontier Day

Tuesday March 7 - 8:00 am

Launch Pad

"Load Board PCB Socket Contact Pad Solution"

Willy Ganoy, Jess Coleta – ON Semiconductor Philippines

"Addressing high frequency challenges for burn-in requiring LVDS"

Rolando Reyes - Analog Devices Inc.

"New Applications for Embedded Thin Film Heaters"

Bruce Mahler - Ohmega Technologies, Inc.

"Adressing the EOS on legacy burn-in boards with over voltage protection through a modular design"

Gil Conanan - Analog Devices, Inc.

BiTS 2017 Burn-in & Test Strategies Workshop

Load Board PCB Socket Contact Pad Solution

Willy Ganoy, Jess Coleta
On Semiconductor Philippines

BiTS Burn-in & Test Strategies Workshop

BiTS Workshop
March 5 - 8, 2017

ON Semiconductor®

Background

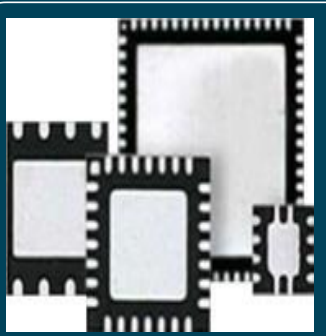
- Tests requires interface adapters (load boards & sockets) electronically connected during Production Operations. These interface adapters are customized per application depending on its technology, application and compatibility which leads to higher costs and limited flexibility.

- With multiple sockets and pin technologies now available in the market and new design also emerging, correct technology selection is a challenge for design engineers. Furthermore, it becomes a gating item for loadboard designs.

Objectives

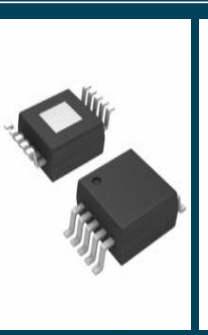
- Develop a technique on the load board design for flexibility during device qualifications and manufacturing releases.
- An alternative solution to cut down costs during development.

IC Package Trend



QFN/DFN

Wettable Flank



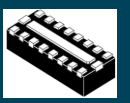
eMSOP 8/10

eTSSOP

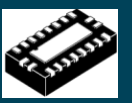
U1210-6

3333-8

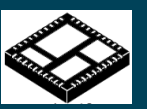
U30135-12



4016-16



2545-20



6060-40

Stack die

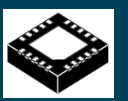
x3DFN (0201)

U1616-6

3535-14

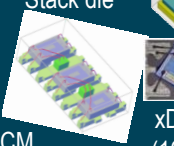
U33135-16

U2020-6



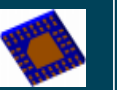
3030-20

7070-48



MCM

xDFN (1010)



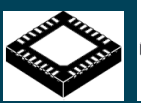
ULLGA dual-row

U17135-8

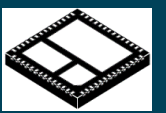
U1515-8

U1418-10

2022-6



4040-28



8080-56

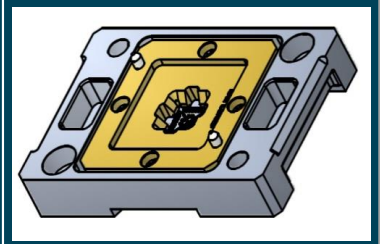
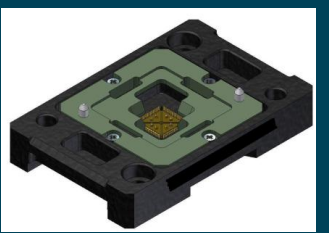
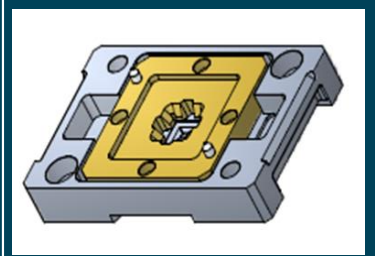
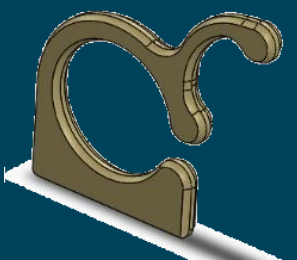
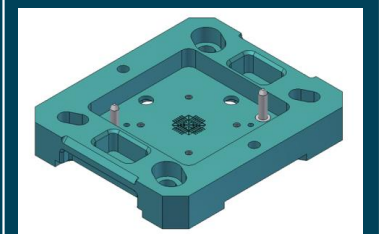
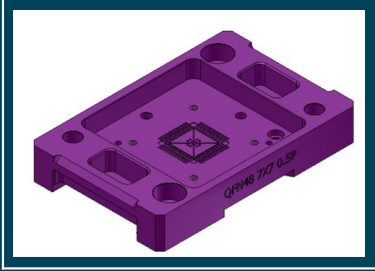
xDFN 0606

Dr MOS Flip-chip

Loadboard PCB socket contact pad solution

7

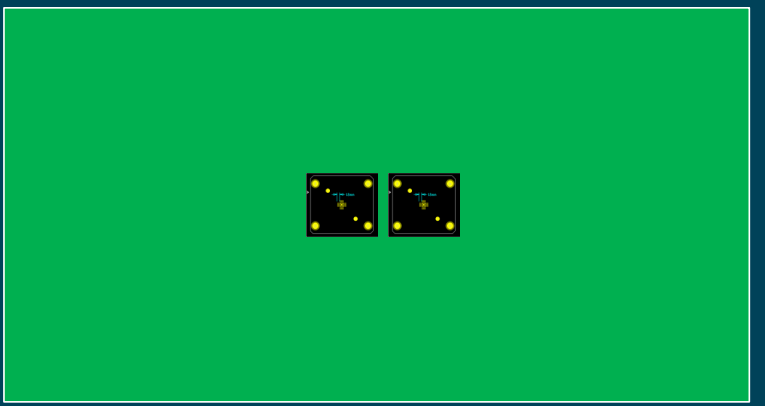
Socket & Pin Technology

Socket	Pin	Socket	Pin
			
			
			

Loadboard PCB socket contact pad solution

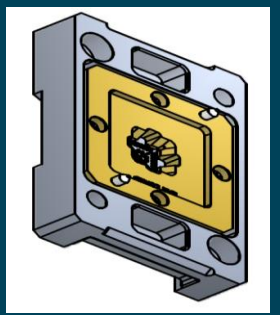
Load Board Design

Load board Mechanical Footprint

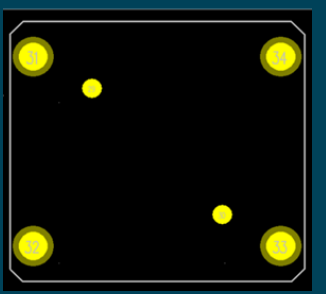


5 mm x 5 mm

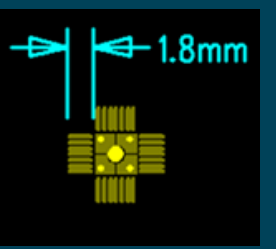
Package



Socket & Pin



Mounting holes

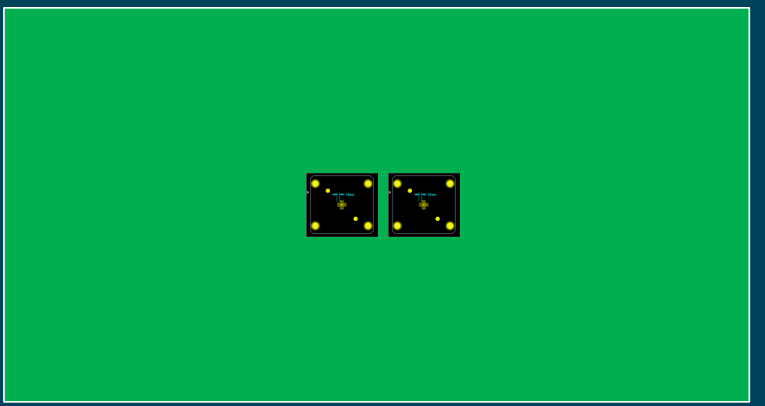


Contact footprint

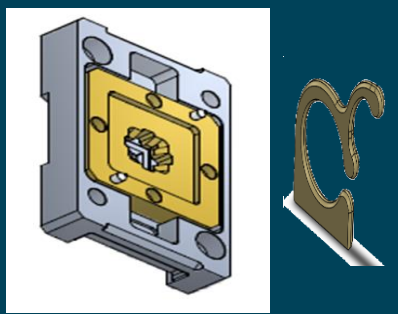
Loadboard PCB socket contact pad solution

Load Board Design

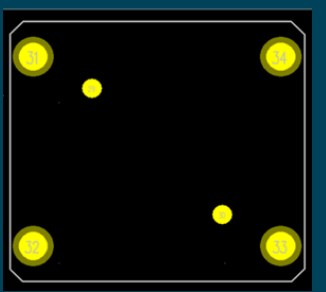
Load board Mechanical Footprint



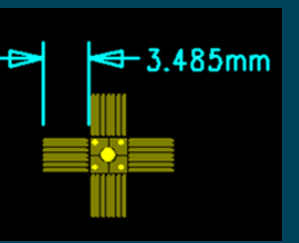
5 mm x 5 mm
Package



Socket & Pin



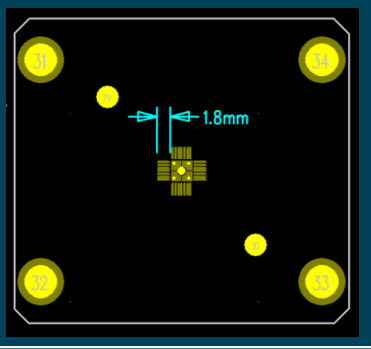
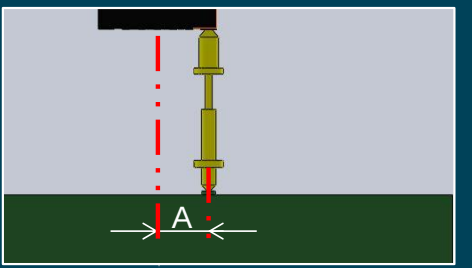
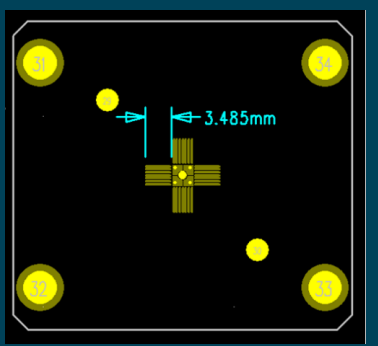
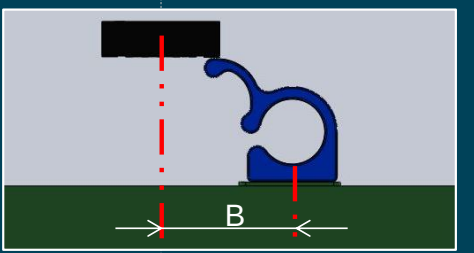
Mounting holes



Contact footprint

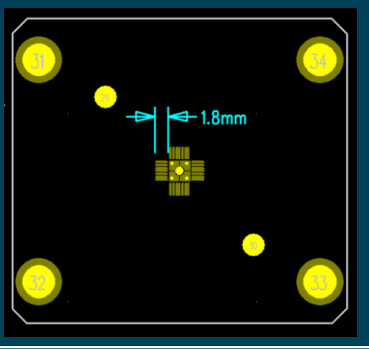
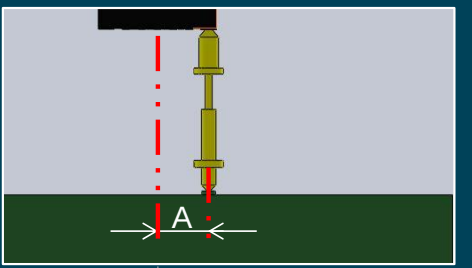
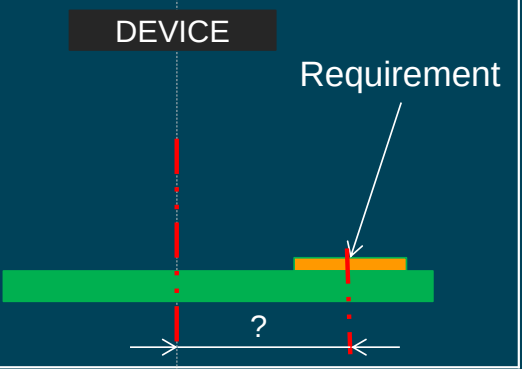
Loadboard PCB socket contact pad solution

Load Board Design

Existing Load board foot print of 5 mm x 5 mm	Load board Landing pad
A 	
B 	

Loadboard PCB socket contact pad solution

Load Board Design

Existing Load board foot print of 5 mm x 5 mm	Load board Landing pad
	
New Technology	

Loadboard PCB socket contact pad solution

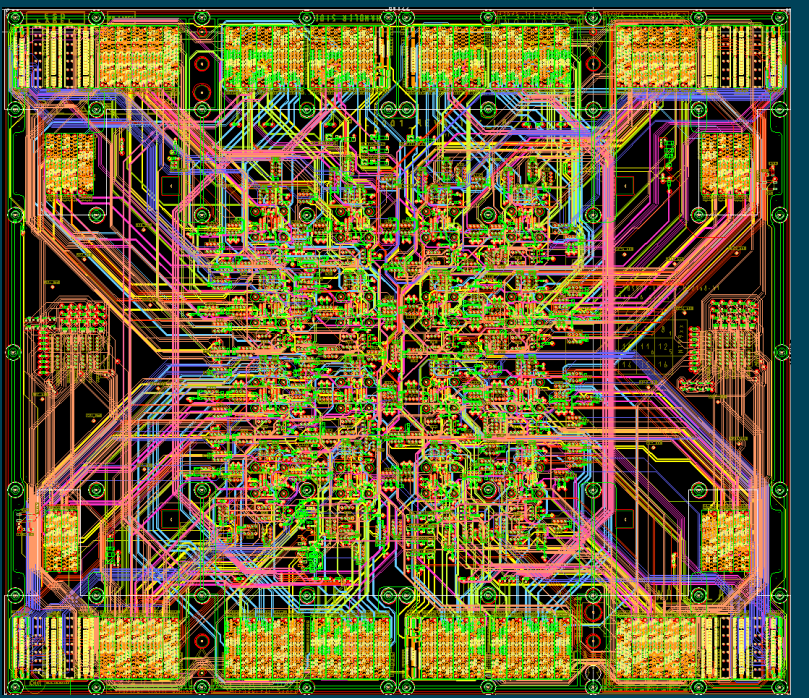
Drawback in Load Board Re-layouts

- **RE-DESIGN / RELAYOUT**

❑PCB Fabrication Cost

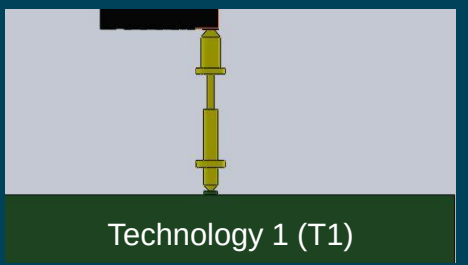
❑Build & component stuffing manpower

❑Evaluation timeline

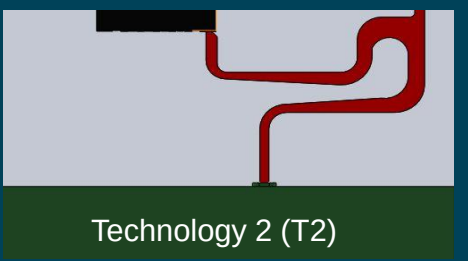


Contactor Pin Geometry

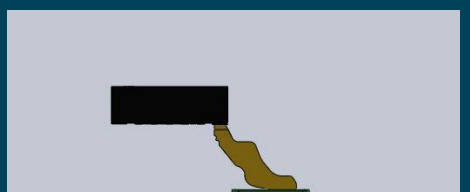
Multiple socket & pin designs



Technology 1 (T1)

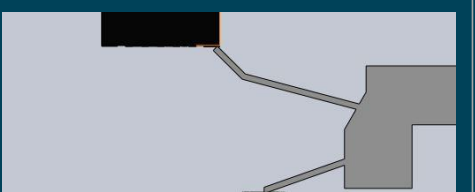


Technology 2 (T2)



Technology 3 (T3)

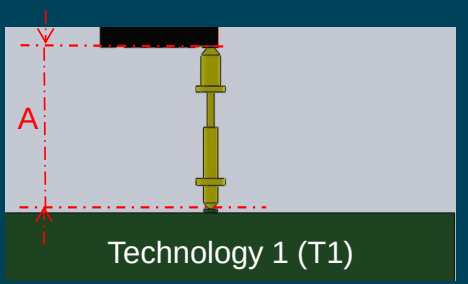
Technology 4 (T4)

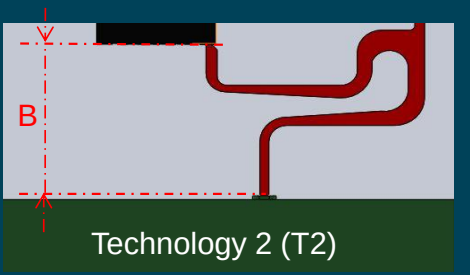


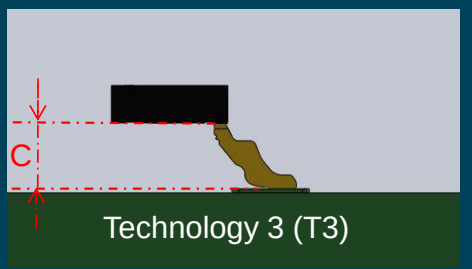
Technology 5 (T5)

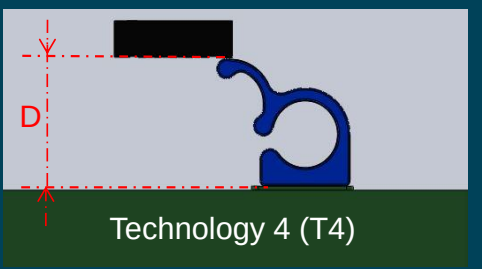
Contactor Pin Geometry

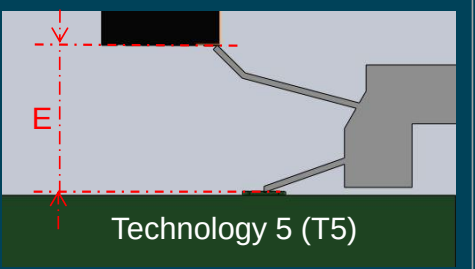
Varying contact pin heights





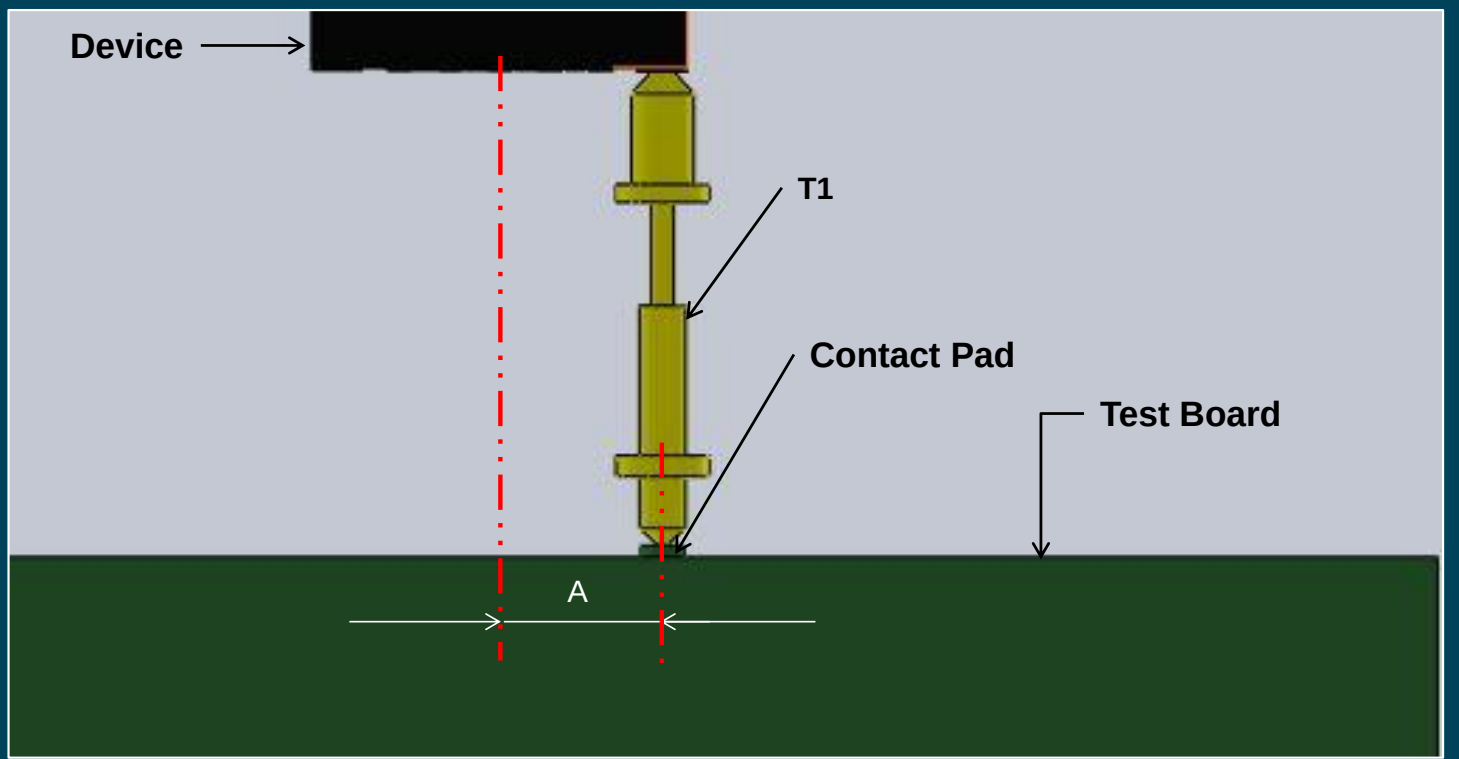






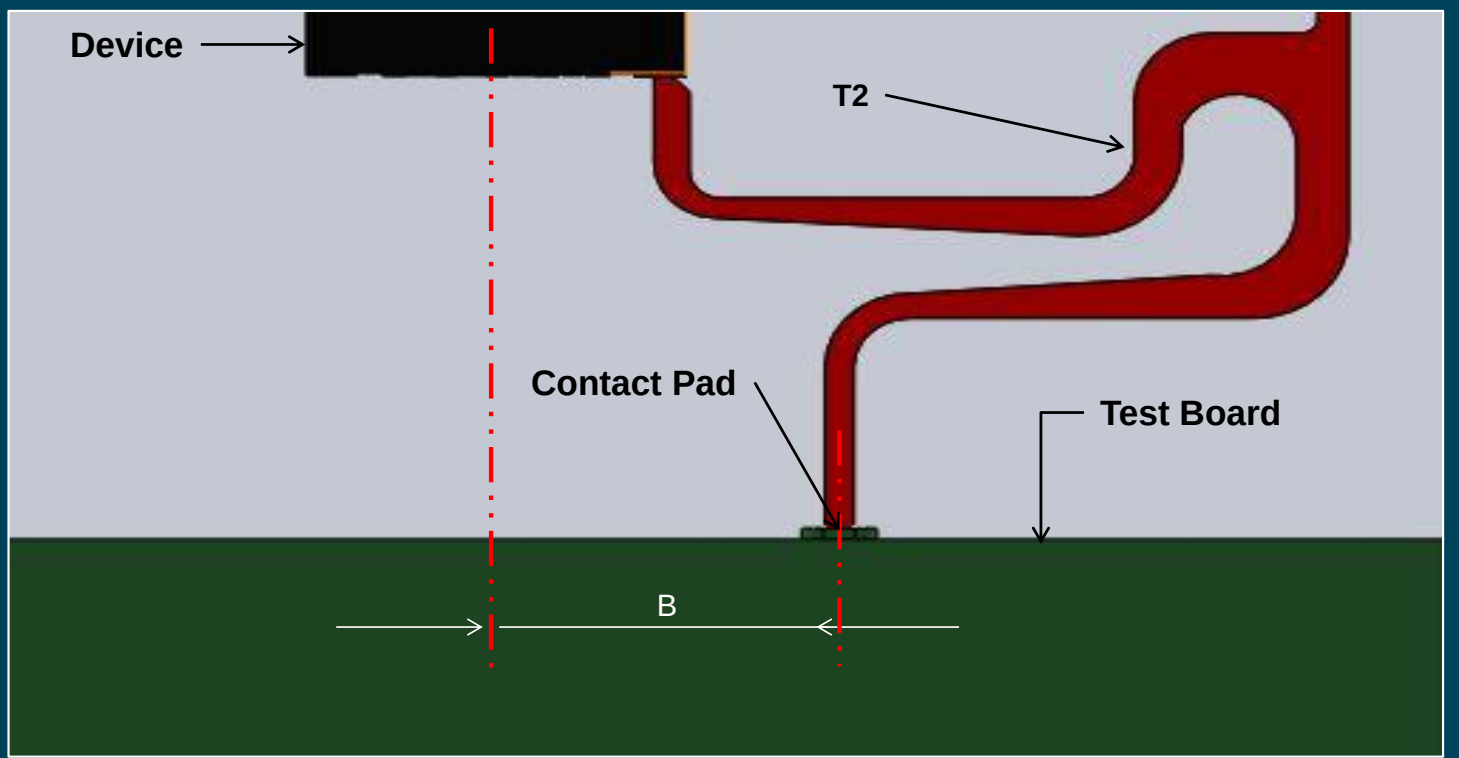
Loadboard PCB socket contact pad solution

PCB Board Contact Pad Layout



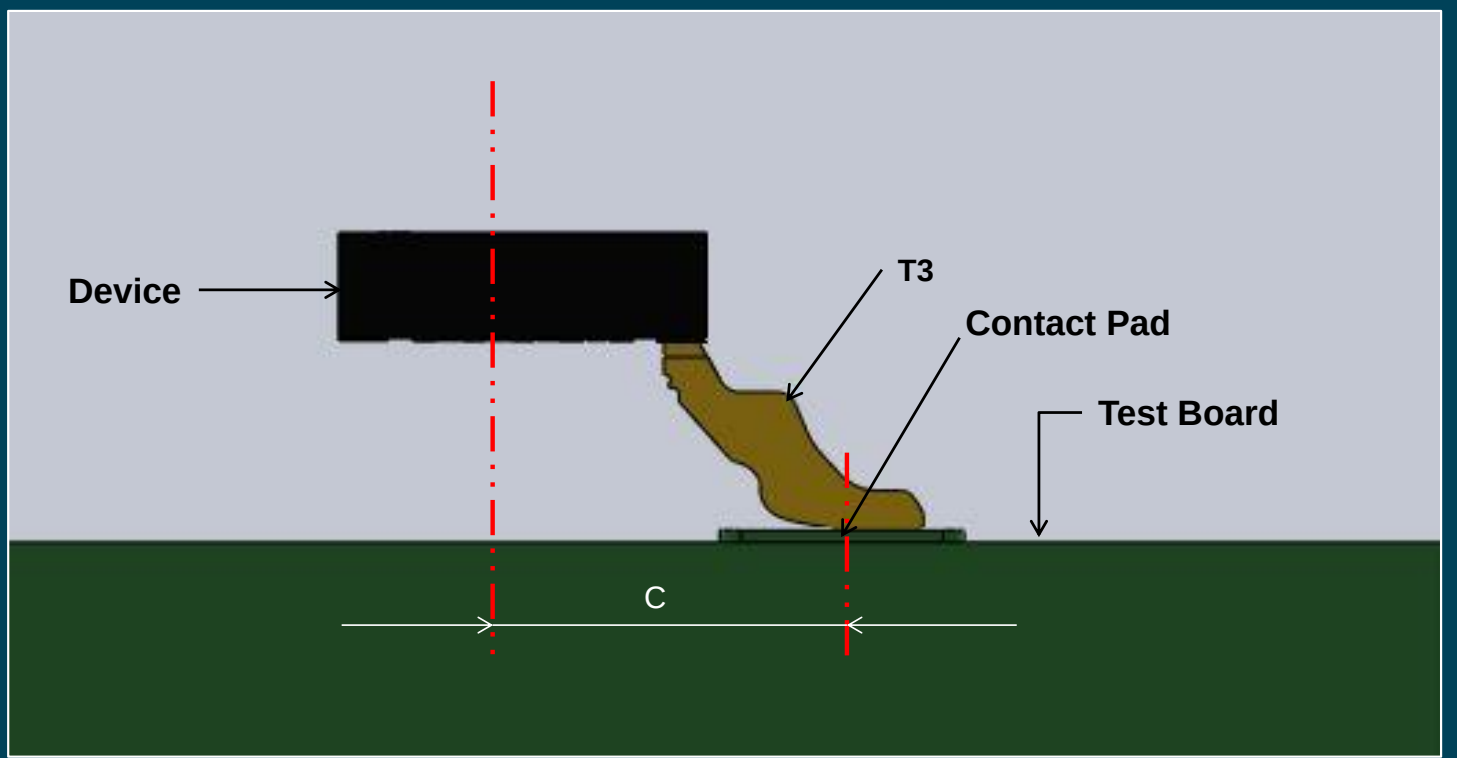
Loadboard PCB socket contact pad solution

PCB Board Contact Pad Layout



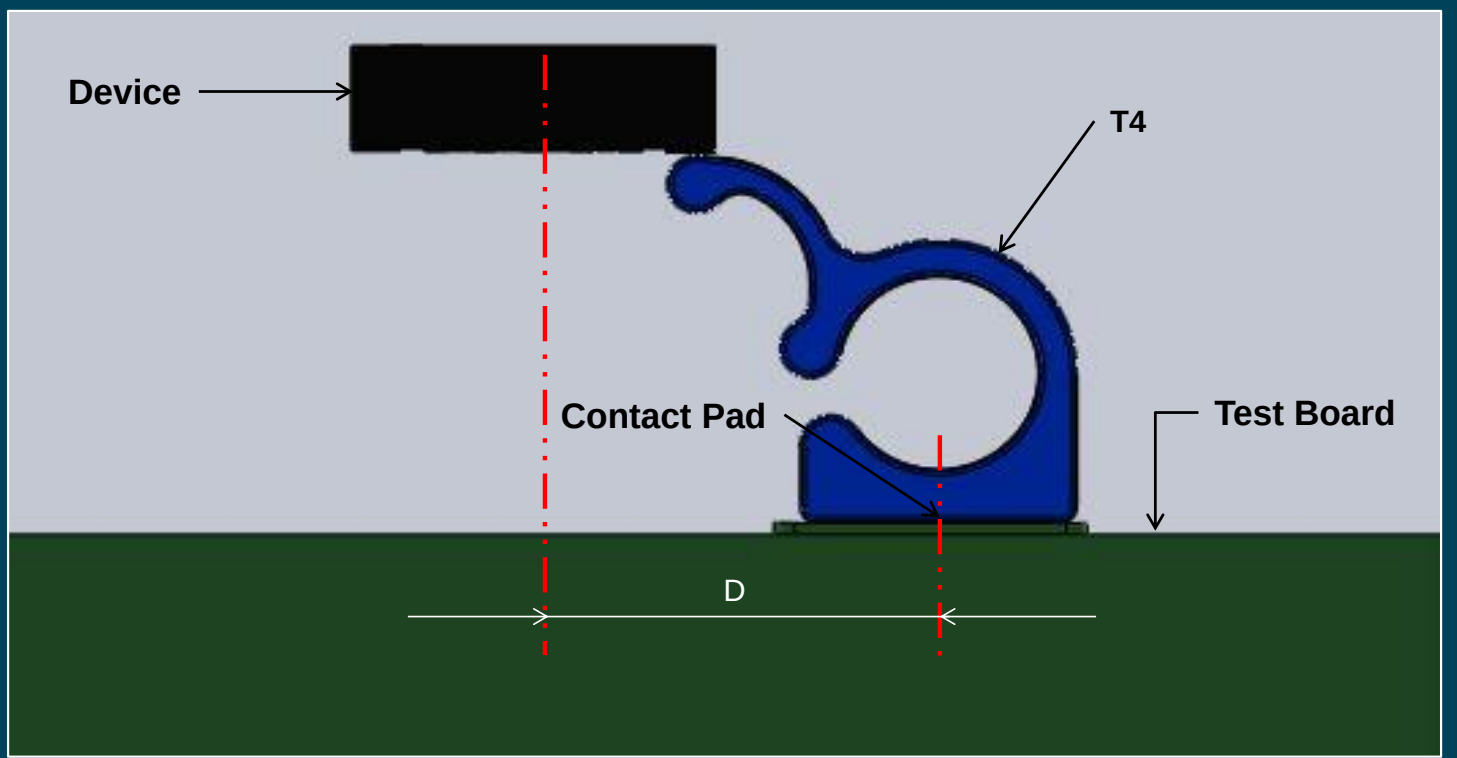
Loadboard PCB socket contact pad solution

PCB Board Contact Pad Layout



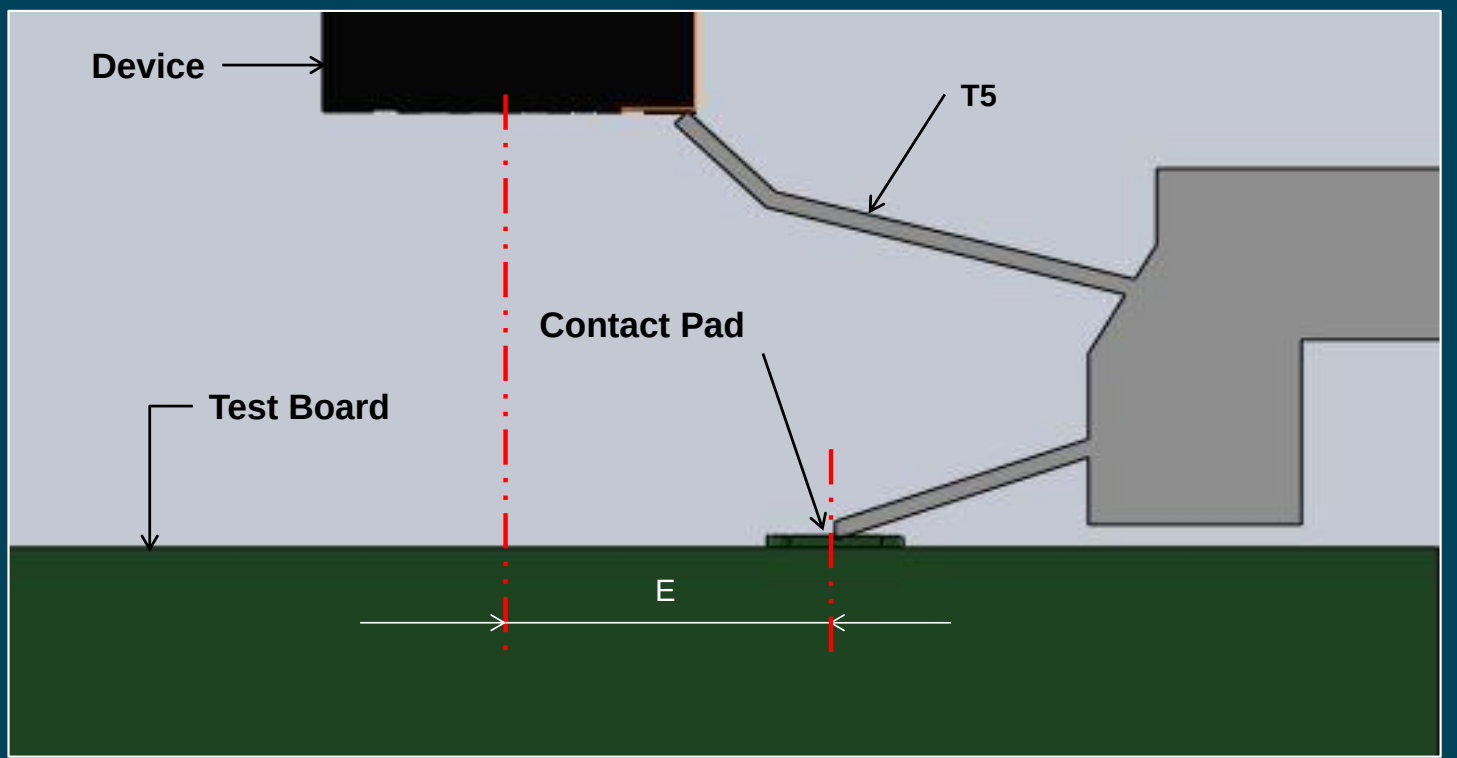
Loadboard PCB socket contact pad solution

PCB Board Contact Pad Layout



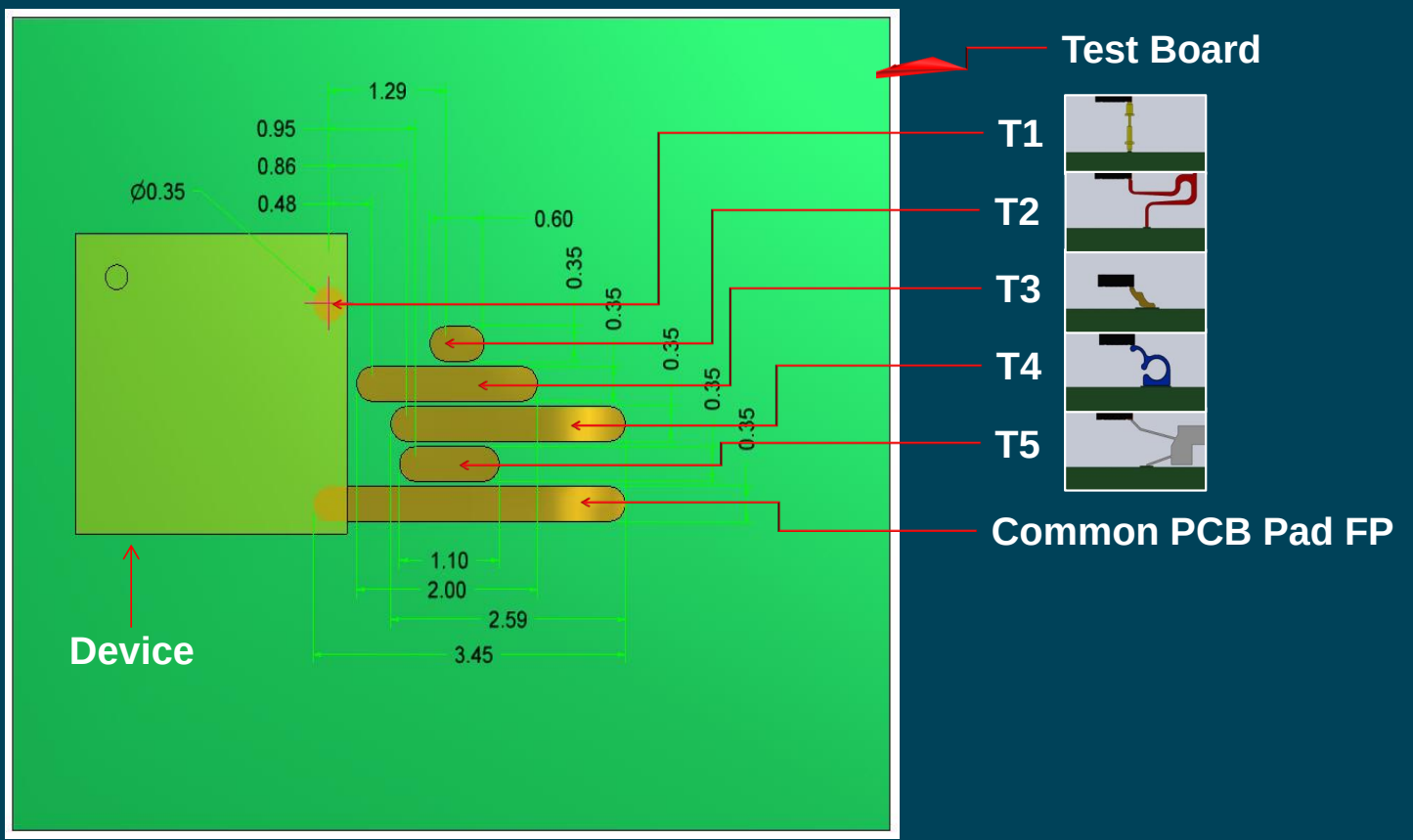
Loadboard PCB socket contact pad solution

PCB Board Contact Pad Layout



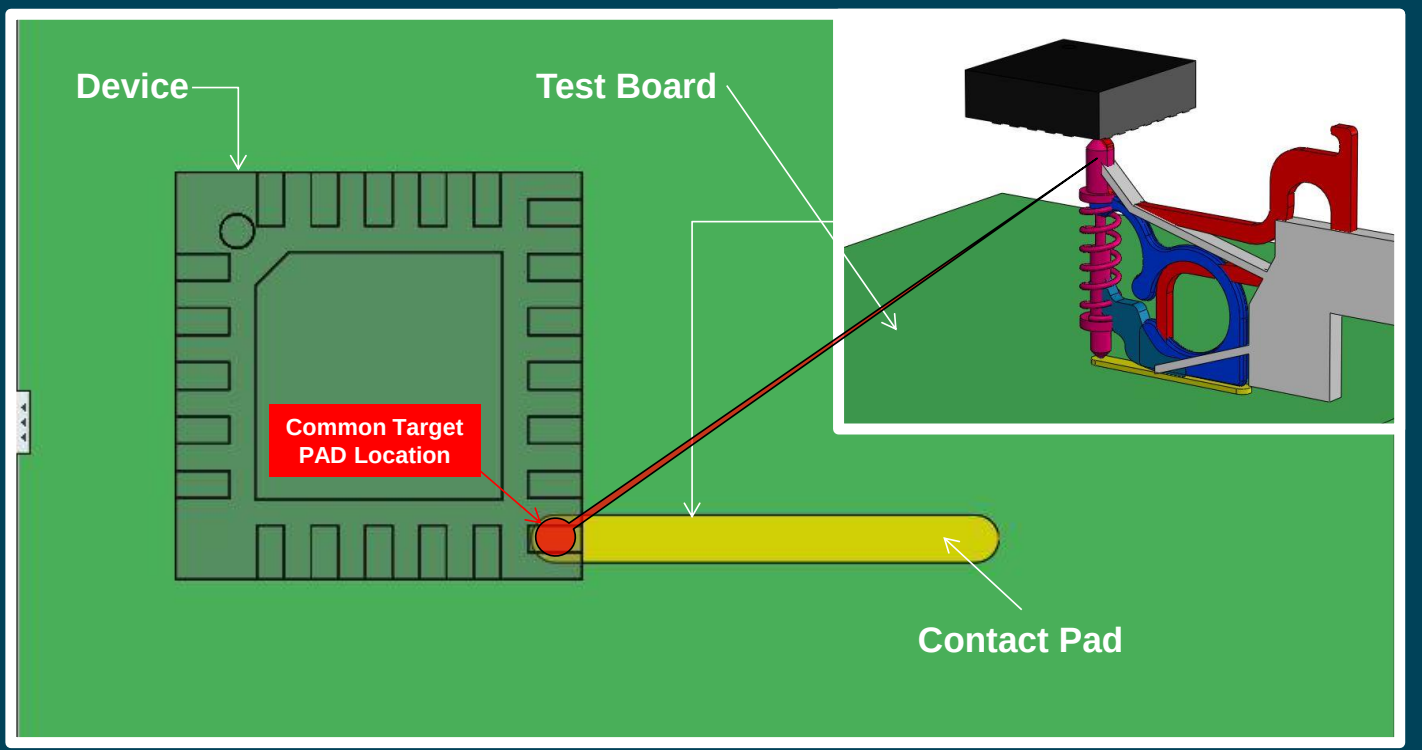
Loadboard PCB socket contact pad solution

PCB Board Contact Pad Layout



Loadboard PCB socket contact pad solution

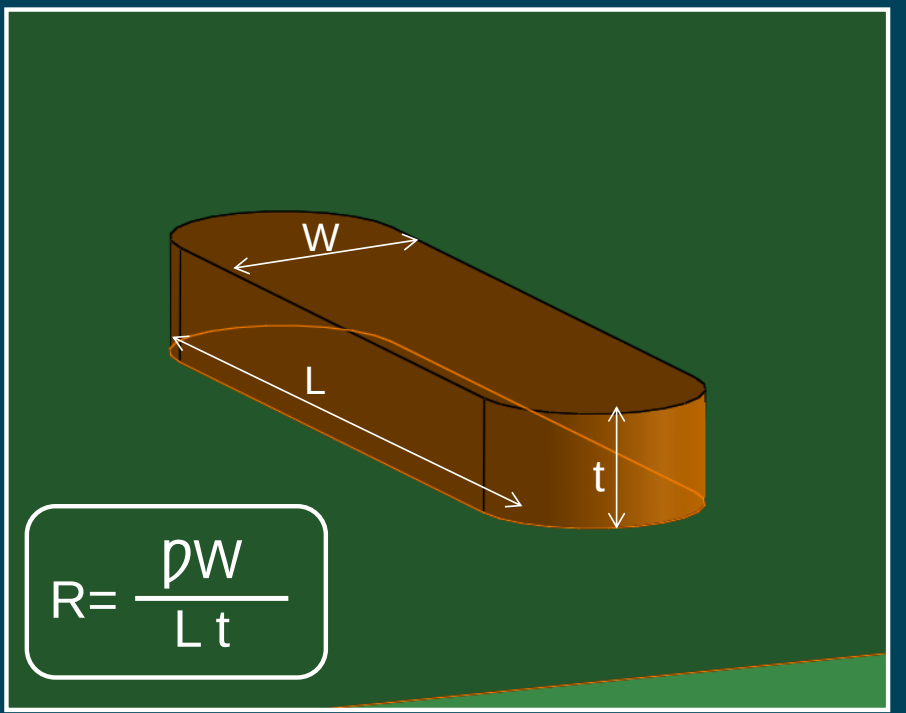
PCB Board Contact Pad Layout



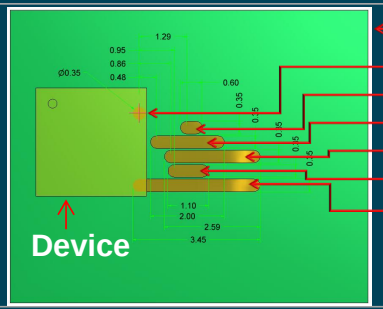
Loadboard PCB socket contact pad solution

Basic Electronic

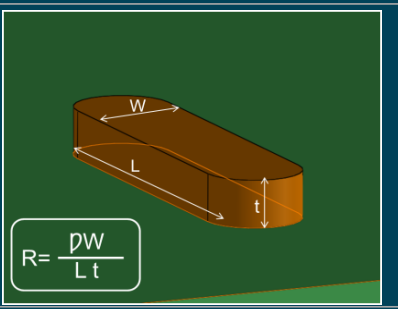
R = Resistance
ρ = resistivity
W = width
L = length
t = thickness



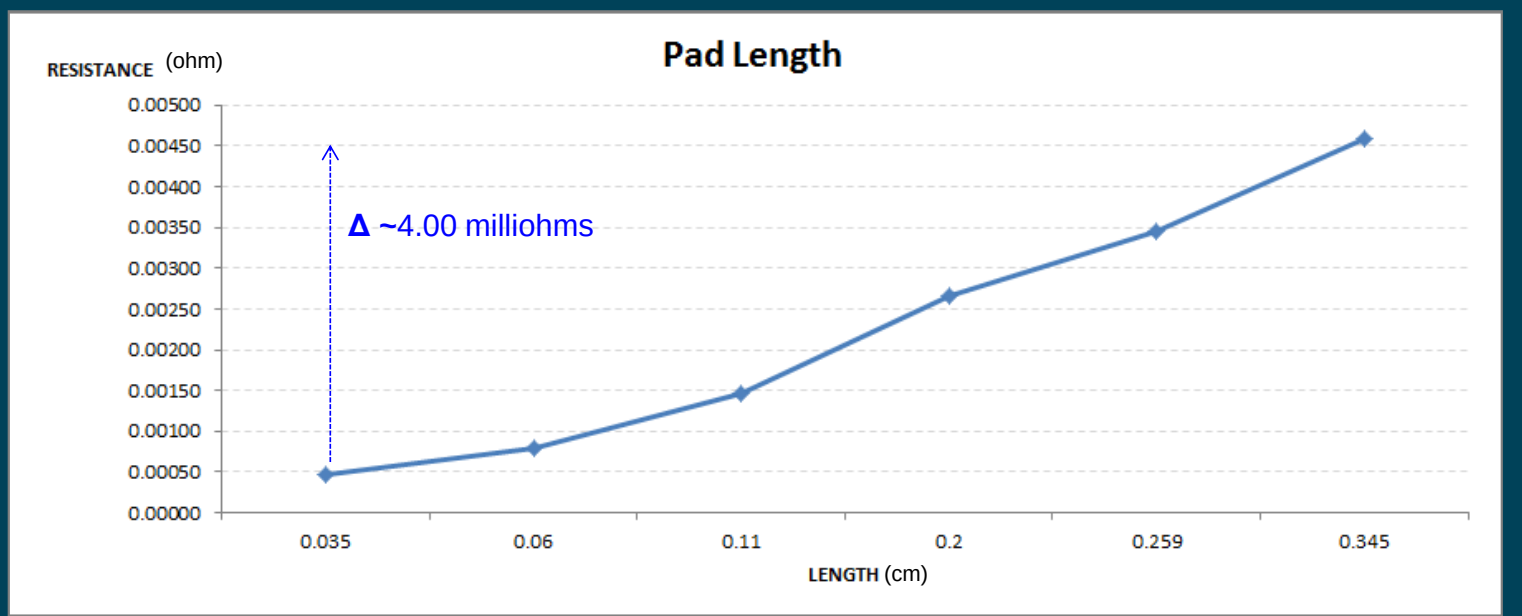
Computation



Test Board
T1
T2
T3
T4
T5
Common PCB Pad FP



R = Resistance
ρ = copper
W = same
t = same
L = varies



Summary

- Loadboard design is a critical factor in manufacturing flexibility which drive costs and non-value adding activities for development teams. On the other hand, socket and pin technologies can limit these flexibilities if not well-planned prior loadboard design and fabrication.

- An extended loadboard trace path makes huge difference and can cater N^{th} # of pin technology footprints. The recommendations presented on this paper can be one on the many developments that can be considered in load board and sockets designs and selection for devices not too sensitive to contact resistance up to ~4 milliohms.