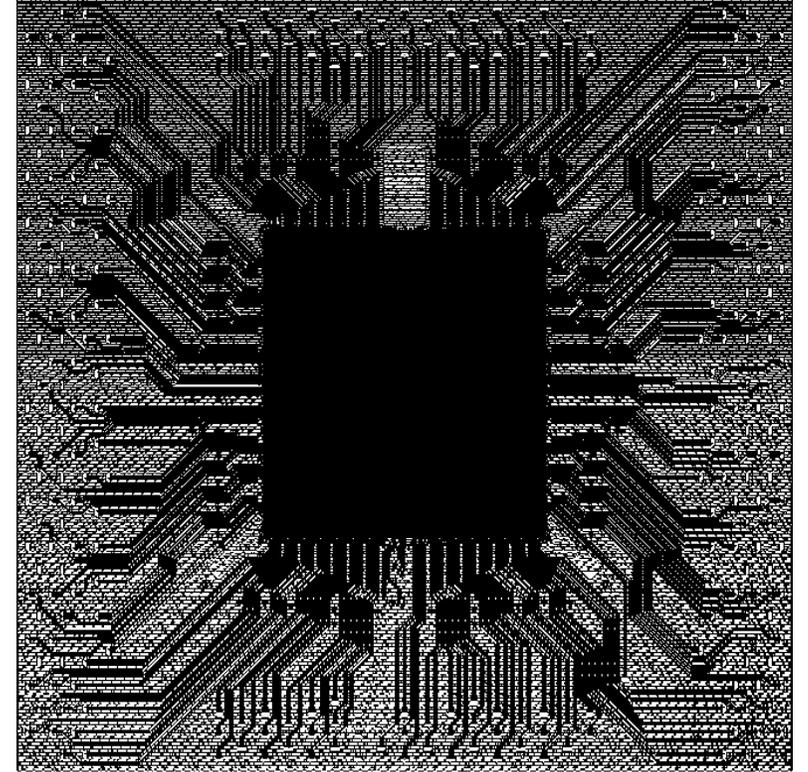


Switch Package Physical Design Considerations

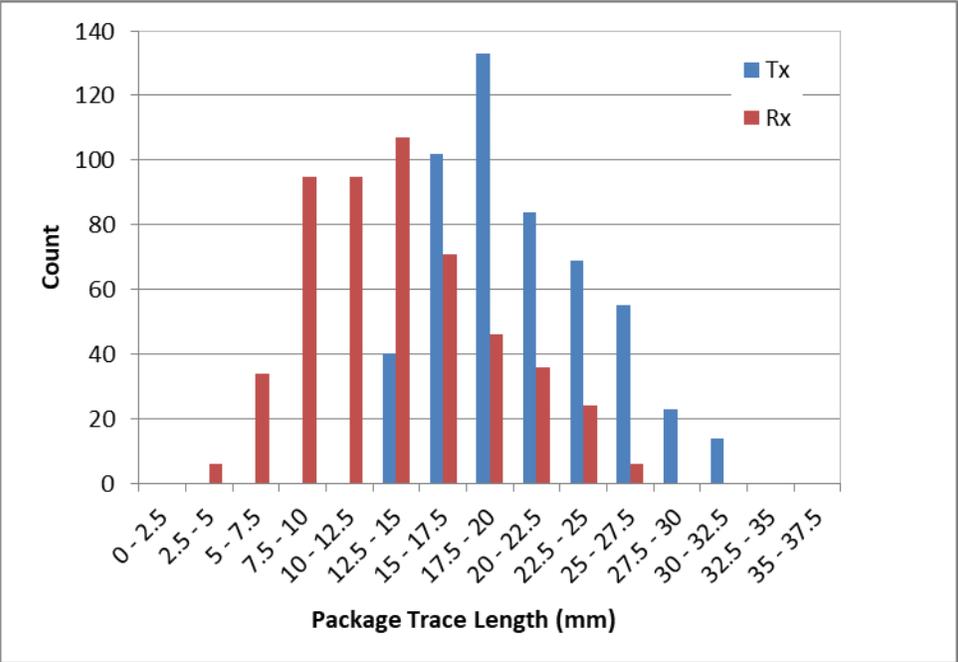
Rob Stone

Package Example: 256-lane Switch

- 67.5 mm BGA package
- 1mm ball pitch
- Commercially Available Product
- 512 high speed IOs (Tx + Rx)



Package Trace Length Distribution Histogram



	Min (mm)	Max (mm)	Average (mm)
Tx	15	33	23
Rx	7	29	16

- *Note: trace length does not include PTH package via*

Summary

- Representative 256 lane package design trace length data is presented
- 33 mm is the maximum trace length due to package size and routing
- In this design the Tx and Rx are asymmetric (as is the common practice)
 - For model simplicity and to allow design flexibility we should consider a symmetric Tx / Rx model as proposed in *bernartsi_3ck_01_0119.pdf*
- Latest package materials indicate ~ 0.1 dB / mm can be achieved
 - Tx / Rx loss of ~ 4 dB is a reasonable target for a 256 lane package
 - High lane count devices may have higher loss or will require other approaches to mitigate package loss