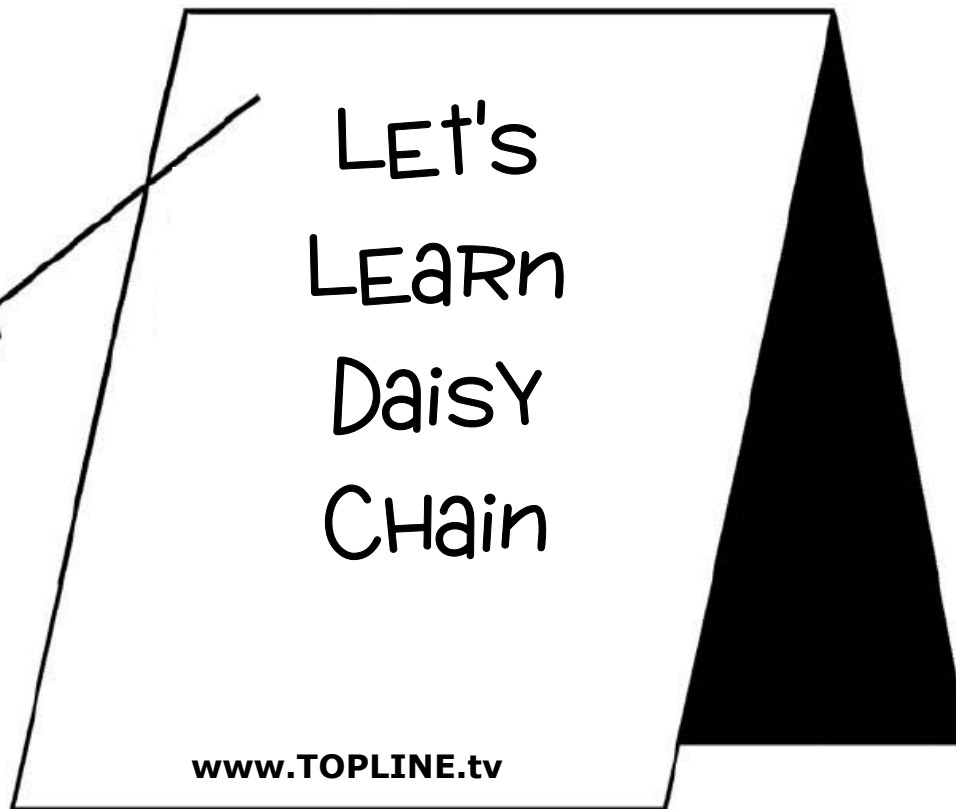




# Daisy Chain Tutorial in 3 Minutes



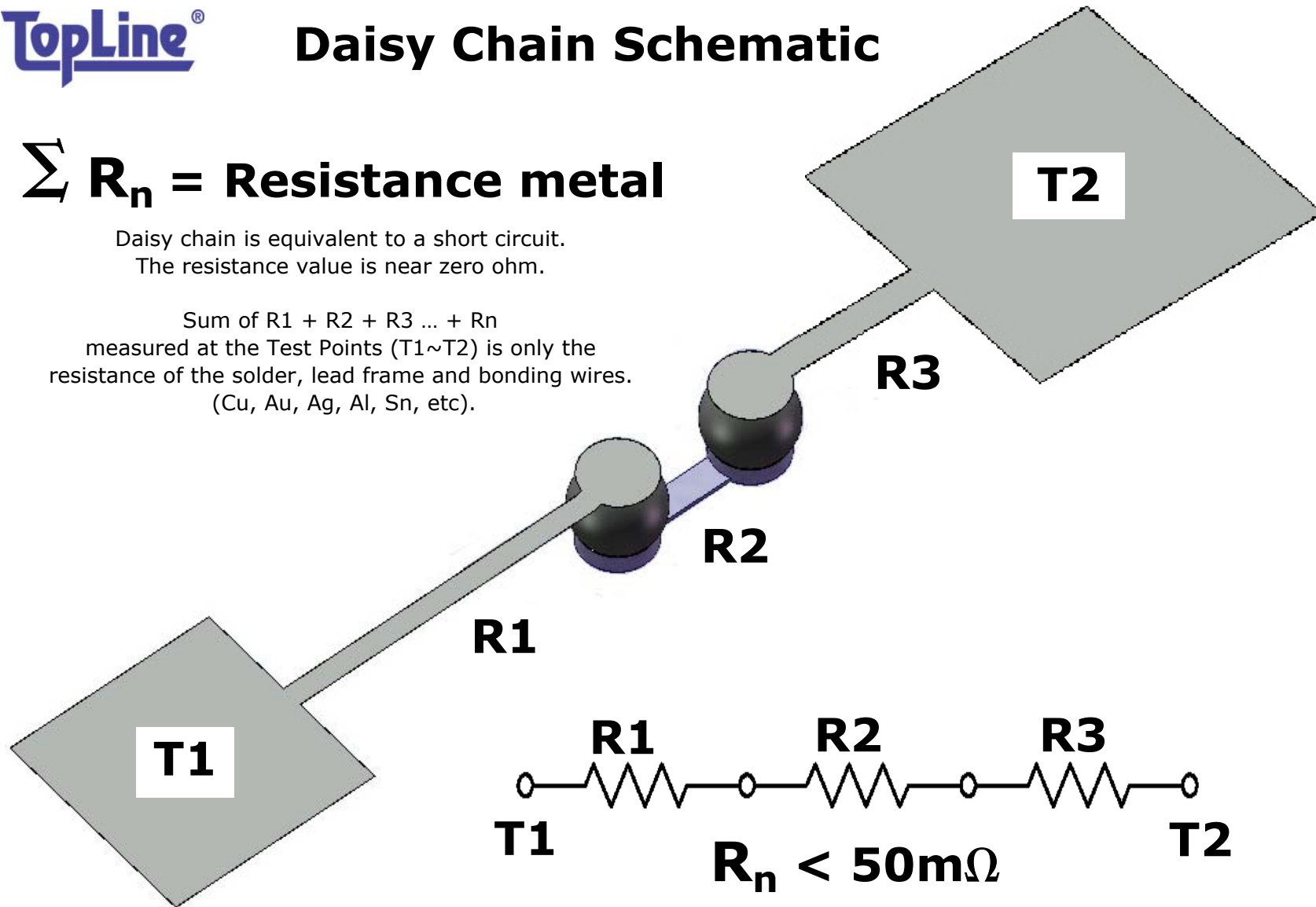
Sept 6, 2012

## Daisy Chain Schematic

$$\sum R_n = \text{Resistance metal}$$

Daisy chain is equivalent to a short circuit.  
The resistance value is near zero ohm.

Sum of  $R_1 + R_2 + R_3 \dots + R_n$   
measured at the Test Points (T1~T2) is only the  
resistance of the solder, lead frame and bonding wires.  
(Cu, Au, Ag, Al, Sn, etc).



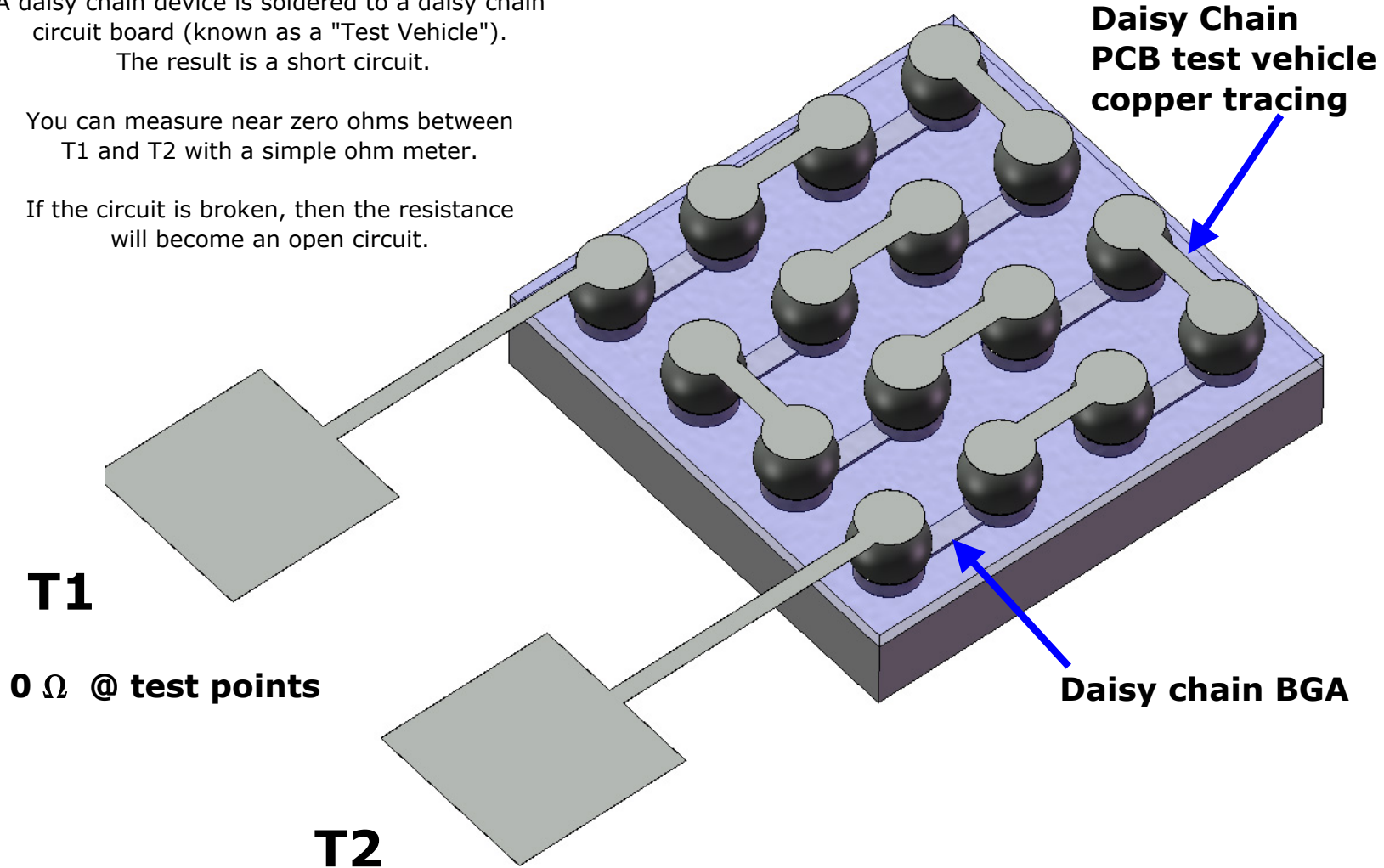
# Example of Daisy Chain Test Vehicle



A daisy chain device is soldered to a daisy chain circuit board (known as a "Test Vehicle").  
The result is a short circuit.

You can measure near zero ohms between T1 and T2 with a simple ohm meter.

If the circuit is broken, then the resistance will become an open circuit.



**T1**

**0 Ω @ test points**

**T2**



## **Daisy Chain Applications**

### **"Go" / "No-Go" Continuity Test**

"Go" = Good. The daisy chain device is connected to a "Test Vehicle" board.

"No-Go" = Bad. Problem such as an open circuit. Resistance will significantly rise (infinite).

**Daisy chain is an excellent tool to measure process improvements:**

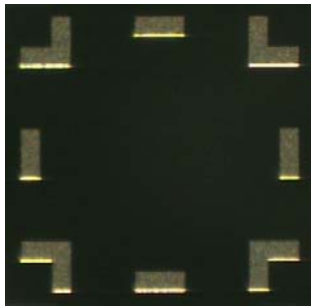
- 1. Failure analysis**
- 2. Drop & shock tests**
- 3. Underfil comparision**
- 4. Life cycle testing -40°C to +125°C**
- 5. Setting reflow temperature profiles**
- 6. Checking for voids in solder paste, etc**

**Add your ideas here**

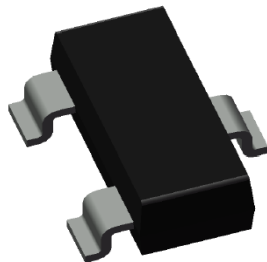
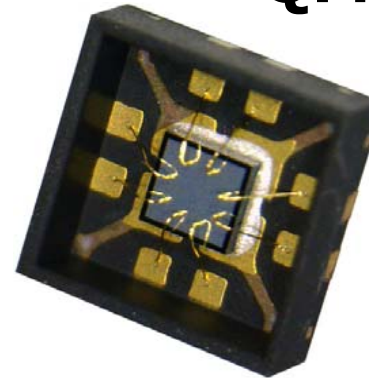
## Components with Daisy Chain

Daisy chain is available in a wide range of plastic and ceramic packages, as well as die.  
QFP, QFN, PLCC, TSOP, SSOP, TSSOP, SOIC, BGA, CSP, WLP, FLAT PACK, LCC, CERQUAD, CCGA, etc

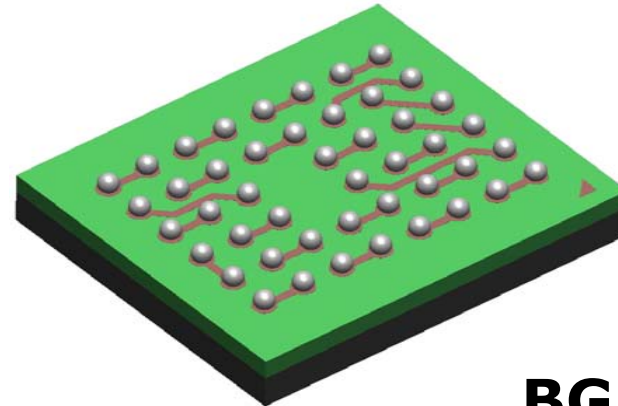
**Si Die**



**QFN**



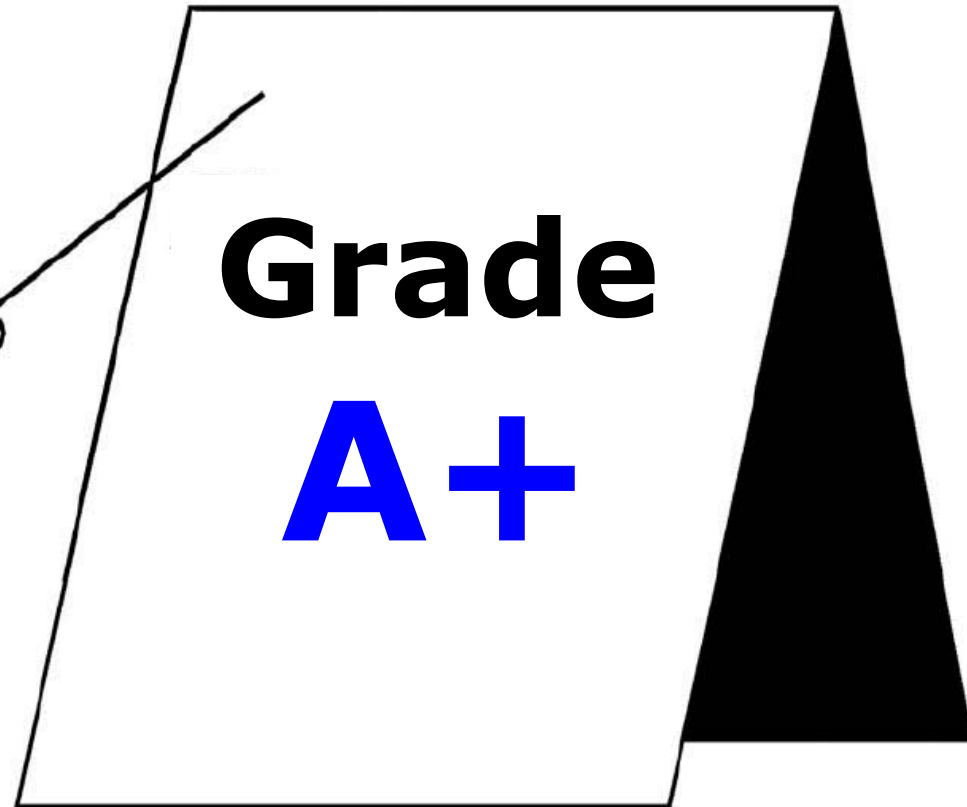
**Lead Frame Packages**



**BGA**



**Daisy chain test is complete.**



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