

ClearONE™ RC BGA Configuration Options

Introduction

The double-sided construction of the CTS ceramic Ball Grid Array (BGA) package allows the PC board designer to closely locate passive resistor and capacitor elements near the active signal sources and loads. The BGA package solution, eases routing design, saving many hours of printed circuit layout time and space.

Description

ClearONE Resistor/Capacitor BGA (RC BGA) terminator networks provide a high performance passive termination. Designed on a ceramic substrate, RC BGA devices virtually eliminate channel capacitance while providing identical performance characteristics on each signal line.

By choosing the RC BGA, the designer is provided with the opportunity to closely match signal line circuit performance. Each channel in the RC BGA will be closely matched in resistor and capacitor values with minimal channel capacitance and cross talk. Minimizing cross talk while closely matching channel performance is critical for differential signal line applications. Server back plane jitter filters and memory terminators can now have optimally placed bypass capacitors and fewer component placements.

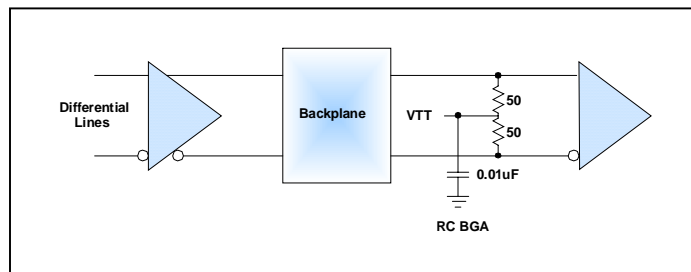


Figure 1. Back Plane Jitter Filter

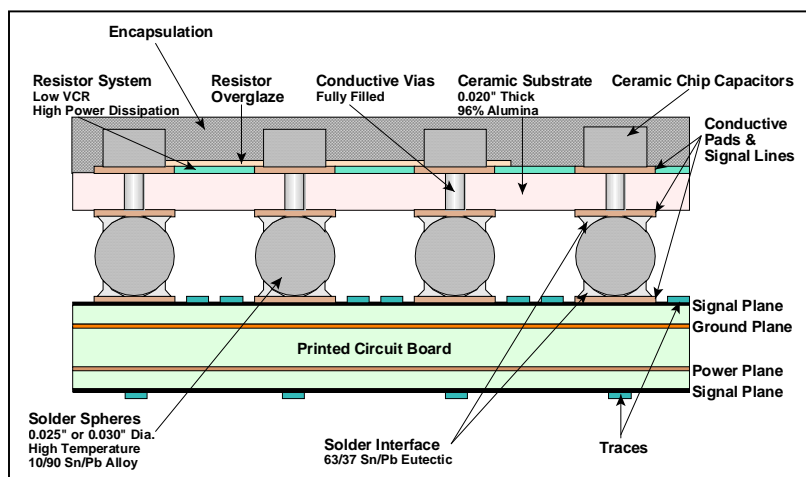


Figure 2. RC BGA Physical Construction

Component Specifications and Design Options

Resistors:	
Value Range	10 Ohms – 1 Meg Ohm
Tolerance	±1.0%
TCR	±200ppm/°C
Power Rating ¹ - Single Element	.050mW min. @ 70°C
- Total Package	1 Watt @ 70°C
Capacitors:	
Values ² for X5R Dielectric:	.01µF to 1.0 µF
Values ² for X7R Dielectric:	220 pF to .022 µF
Values ² for COG Dielectric:	0.5 pF to 330 pF
Package:	
BGA Pitch	1.0mm and 1.27mm
Styles (Figure 3)	J, K, and L
Channel Capacitance	< .25pF
Ball Grid Array Size	Up to 4 x 9

Notes:

- 1 Individual element and total device power requirements must both be considered for each application
- 2 The Working Voltage must be considered when making the capacitor value and dielectric selections

Table 1. Resistor, Capacitor, and Package Options

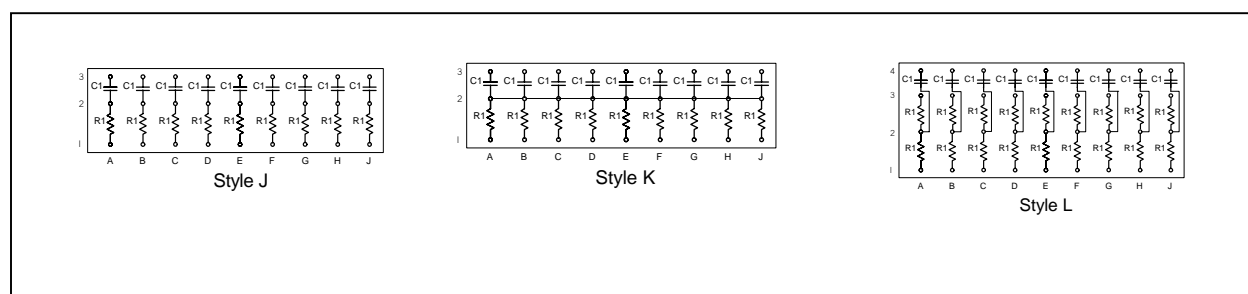


Figure 3. RC BGA Styles

Environmental Performance

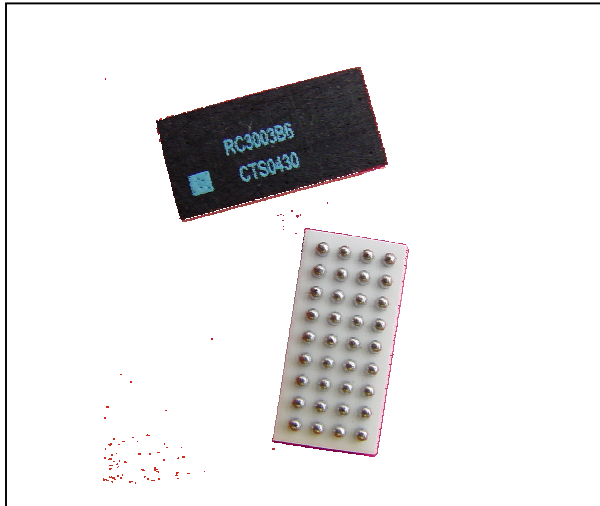
Operating Temperature Range:

-55°C to +85°C

Standard Process Range with Epoxy Encapsulation

-55°C to +125°C (X7R & COG Dielectric)

Range applies to a special order non-encapsulated version with exposed capacitors.



Encapsulated RC BGA



Non-Encapsulated RC BGA

Figure 4. RC BGA Packages

Conclusion

CTS RC BGA terminators provide the options, features and performance required in today's state of the art board designs. CTS is interested in working closely with board designers to provide custom solutions to meet their needs.

Referenced Documents

Application Notes:

Printed Circuit Assembly Guidelines
RC BGA Rework

AN-C1-PCAG-A
AN-RC1-RW-A

LINK to Application Notes:
Link to RC BGA Data Sheet:

<http://www.ctscorp.com/components/clearone/appnotes.htm>
<http://www.ctscorp.com/components/clearone.asp>

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