www.ctscorp.com

CTS®
ELECTRONIC COMPONENTS, INC.

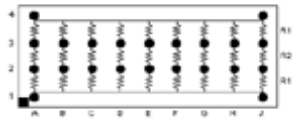
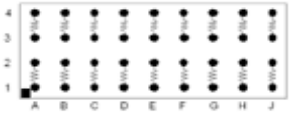
Short Form Resistors

MOVING FORWARD... EVERYWHERE. EVERY DAY

May 19, 2009

Terminators

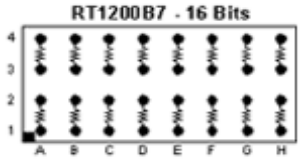
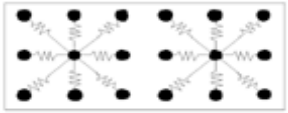
The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

Application	Picture	Configuration	Description					
LVD SCSI		 Style C	9 line differential terminator set designed to meet Ultra2 and Ultra 3 LVD SCSI standards.	1.27mm Pitch Part Number	1.00mm Pitch Part Number	R1 W	R2 W	
				RT1300B6	--	475	121	
				RT1320B6	--	330	150	
DDR SDRAM		 Style H	9 line integrated terminator set provides series termination at the source and parallel termination at the receiver. Designed to meet Jadec Std. 8-9a.+/- 1% tolerance.	1.27mm Pitch Part Number	1.00mm Pitch Part Number	Style	R1 W	R2 W
				RT1400B6	RT1400B7	H	50	25
				RT1401B6	RT1401B7	H	25	22
				RT1408B6	RT1408B7	H	60	25
				RT1402B6	RT1402B7	F	50	--
		 Style F		RT1403B6	RT1403B7	F	25	--
				RT1407B6	RT1407B7	F	35	--
				RT1430B6	RT1430B7	F	60	--
				RT1432B6	RT1432B7	F	120	--
				RT1431B6	--	F	182	--
		 Style C		RT1404B6	RT1404B7	C	25	--
				RT1405B6	RT1405B7	C	22	--
				RT1460B6	RT1460B7	C	50	--
				RT1463B6	RT1463B7	C	33	--
				RT1465B6	RT1465B7	C	47	--
				RT1466B6	RT1466B7	H	51	22

CTS® CLEARONE™

Terminators

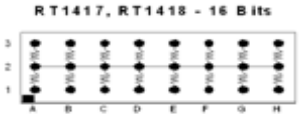
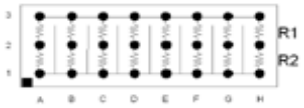
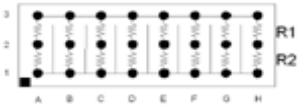
The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

Application	Picture	Configuration	Description					
Compact PCI, IDE, DRAM, SDRAM		 Style C	16 line or 32 line terminator provides series termination at the source. Designed for CompactPCI PC card and memory applications. Standard resistance tolerance +/-1%	1.27mm Pitch Part Number	1.00mm Pitch Part Number	R1 W	Array	
				--	RT1200B7	10	121	
				--	RT1201B7	10	150	
				--	RT1202B7	33		
				--	RT1203B7	33		
				RT1205B6	RT1205B7	50		
GTL		 Style D	8, 16 or 32 line terminator provides parallel termination at the receiver. Designed with star pattern to minimize crosstalk and improve high frequency performance. Tolerance +/- 1%	1.27mm Pitch Part Number	1.00mm Pitch Part Number	R1 W	Lines	Array Size
				--	RT1100B7	22		3 x 3
				RT1101B6	RT1101B7	22		3 x 6
				RT1102B7	RT1102B7	22		3 x 9
				RT1450B6	--	25	8	3 x 3
				RT1451B6	--	25	8	3 x 6
				RT1452B6	--	25	16	3 x 12
				RT1453B6	--	56	16	3 x 3
				RT1454B6	--	56		3 x 6
				RT1427B6	--	56		3 x 12
				RT1410B6	--	150		3 x 3
				RT1411B6	--	150		3 x 6
				RT1412B6	RT1412B7	150		3 x 12

CTS® CLEARONE™

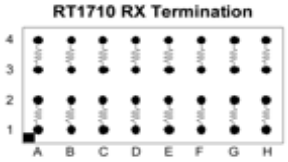
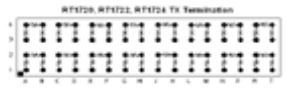
Terminators

The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

Application	Picture	Configuration	Description					
PCI		 Style F	8 or 16 line bias network provides pull-up or pull-down to reference voltage. Designed for PCI and PCIX applications. Standard tolerance +/-1%	**1.27mm Pitch Part Number**	**1.00mm Pitch Part Number**	**R1** W	**Lines**	**Array Size**
				RT1415B6	RT1415B7	4.7K	8	3 x 4
				RT1416B6	RT1416B7	8.2K	8	3 x 4
				RT1417B6	RT1417B7	4.7K	16	3 x 8
				RT1418B6	RT1418B7	8.2K	16	3 x 8
LVPECL		 Style G	8 line terminator network provides Thevenin termination. Designed for LVPECL applications. Standard resistor tolerance is ±1%	**1.27mm Pitch Part Number**	**1.00mm Pitch Part Number**	**R1** W	**R2** W	
				RT1250B6	RT1250B7	127	82.5	
VME		 Style G	8 line terminator network provides Thevenin termination. Designed for VME64 and VME64x applications. Standard resistance tolerance is +/-1%	**1.27mm Pitch Part Number**	**1.00mm Pitch Part Number**	**R1** W	**R2** W	
				--	RT1210B7	330	470	
				--	RT1211B7	220	1.8K	

Terminators

The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

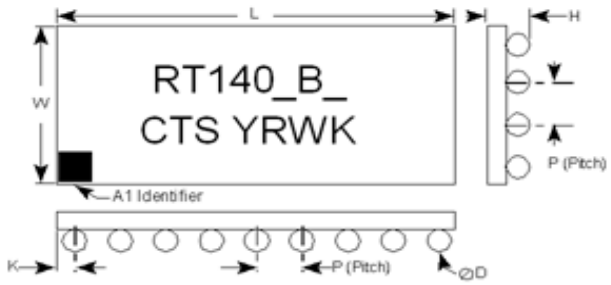
Application	Picture	Configuration	Description					
FPGA/LVDS		 Style C	These LVPECL and LVDS termination networks are designed for high performance termination of differential Input/Output signals on some of the most popular Field Programmable Gate Arrays (FPGAs). Designed for termination of Xilinx® and Altera® FPGAs. 8 or 16 differential channels of termination provided in a single integrated package.	1.27mm Pitch Part Number	1.00mm Pitch Part Number	R1 W	R2 W	Array Size
				RT1710B6	RT1710B7	100		4 x 8
				--	RT1720B7	187	100	4 x 16
				RT1721B6	RT1721B7	187	100	4 x 8
		 Style I		--	RT1722B7	140	165	4 x 16
				RT1723B6	RT1723B7	140	165	4 x 8
				--	RT1724B7	140	135	4 x 16
				RT1725B6	RT1725B7	140	135	4 x 8

CTS® CLEARONE™

Terminators

The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

Mechanical Design



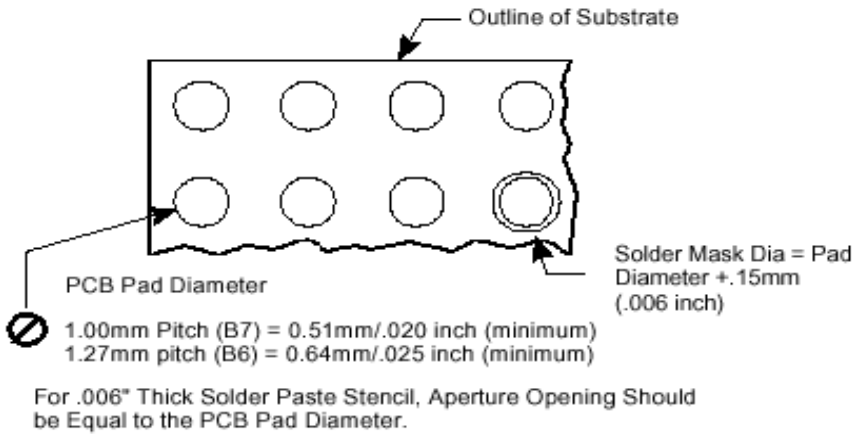
1.27 mm Pitch Package (B6 suffix)				1.00 mm Pitch Package (B7 suffix)			
		mm	inch			mm	inch
P		1.27±0.25	.050±.010	P		1.00±0.25	.039±.010
D		0.76±0.05	.030±.002	D		0.64±0.05	.025±.002
K		0.64±0.25	.025±.010	K		0.50±0.25	.020±.010
H		1.32±0.15	.052±.006	H		1.19±0.15	.047±.006
Array Size		**L**	**W**	**Array Size**		**L**	**W**
3 x 3	mm	3.81±0.15	3.81±0.15	3 x 4	mm	4.00±0.15	3.00±0.15
	inch	.150±.006	.150±.006		inch	.157±.006	.118±.006
3 x 4	mm	5.08±0.15	3.81±0.15	3 x 8	mm	8.00±0.15	3.00±0.15
	inch	.200±.006	.150±.006		inch	.315±.006	.118±.006
3 x 6	mm	7.62±0.15	3.81±0.15	3 x 9	mm	9.00±0.15	3.00±0.15
	inch	.300±.006	.150±.006		inch	.354±.006	.118±.006
3 x 8	mm	10.16±0.15	3.81±0.15	3 x 12	mm	12.00±0.15	3.00±0.15
	inch	.400±.006	.150±.006		inch	.472±.006	.118±.006
3 x 9	mm	11.43±0.15	3.81±0.15	4 x 8	mm	8.00±0.15	4.00±0.15
	inch	.450±.006	.150±.006		inch	.315±.006	.157±.006
3 x 12	mm	15.24±0.15	3.81±0.15	4 x 9	mm	9.00±0.15	4.00±0.15
	inch	.600±.006	.150±.006		inch	.354±.006	.157±.006
4 x 9	mm	11.43±0.15	5.08±0.15	4 x 16	mm	16.00±0.15	4.00±0.15
	inch	.450±.006	.200±.006		inch	.630±.006	0.157

CTS® CLEARONE™

Terminators

The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

Recommended Land Pattern

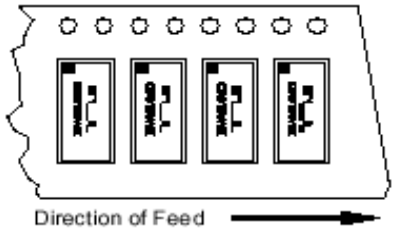


Part Number Coding

7 inch reel, Add TR7 to part number, example RT1415B7TR7

13 inch reel, Add TR13 to part number, example RT1415B7TR13

(Bulk packaging is not available)



Packaging Information		
Suffix	**TR7**	**TR13**
Tape Width	24 mm	24 mm
Carrier Pitch	8 mm	8 mm
Reel Diameter	7 inch	13 inch
Parts/Reel	1,000	4,000

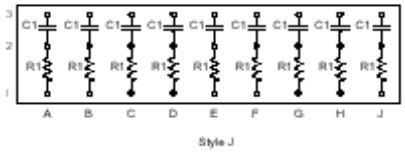
Electrical Specifications	
Resistor Tolerance	± 1.0%
TCR	± 200ppm/°C
Operating Temperature Range	-55°C to +125°C
Maximum Resistor Power	0.05 Watts minimum at 70°C
Maximum Package Power	1.0 Watts at 70°C

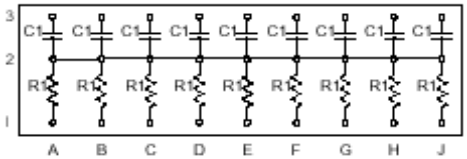
Terminators

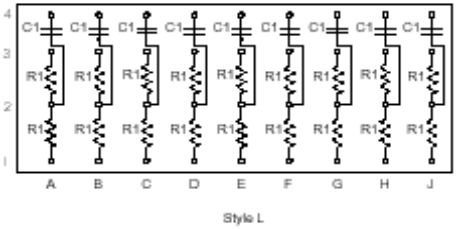
The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

ClearONE Resistor/Capacitor Ball Grid Array Package

R/C BGA







This Resistor/Capacitor terminator network provides high performance termination.

Designed with a ceramic substrate, this device virtually eliminates channel capacitance, a primary cause of reduced system performance. In addition, the BGA package eases routing design, saving the designer many hours of printed circuit layout.

1.27mm Pitch Part Number	1.00mm Pitch Part Number	R1 Ω	Tolerance R1		
RC3001B6[1]		50	± 1%		
RC3002B6	RC3002B7	50	± 1%		
RC3003B6[1]	--	50	± 1%		
RC3004B6[1]		50	± 1%		
RC3005B6		50	± 1%		
RC3007B6		50	± 1%		
RC3008B6		50	± 1%		

1.27mm Pitch Part Number	1.00mm Pitch Part Number	C1	Cap Tolerance	Dielectric	DF Max
RC3001B6[1]		33pf	± 10%	NPO	2.50%
RC3002B6	RC3002B7	0.1uf	± 10%	X5R	5%
RC3003B6[1]	--	0.1uf	± 10%	X5R	5%
RC3004B6[1]		100pf	± 10%	NPO	2.50%
RC3005B6		0.1uf	± 10%	X5R	5%
RC3007B6		100pf	± 10%	NPO	2.50%
RC3008B6		33pf	± 10%	NPO	2.50%

Note 1: These are obsolete encapsulated designs. Only the un-encapsulated part numbers may be ordered. RC3005B6 replaces RC3003B6, RC3007B6 replaces RC3004B6, and RC3008B6 replaces RC3001B6.

CTS CLEARONE™ Terminators

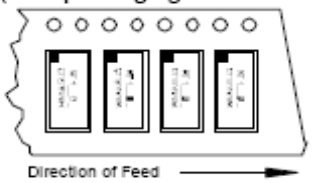
The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

Part Number Coding

7 inch reel, Add TR7 to part number, example RC3001B6TR7

13 inch reel, Add TR13 to part number, example RC3001B6TR13

(Bulk packaging is not available)



R/C Electrical Specifications

Resistor Tolerance	± 1.0%
TCR	± 200ppm/°C
Operating Temperature Range	-55°C to +125°C (with NPO capacitors) -55°C to +85°C (with X5R capacitors)
Maximum Resistor Power	0.05 Watts minimum at 70°C (Not to exceed total package power)
Maximum Package Power	1.0 Watts at 70°C
Maximum Processing Temperature	225°C, 30 sec. (Encapsulated Design - Obsolete) 225°C, 30 sec. (Un-encapsulated Design)

Note: Maximum resistor power will vary by resistance value

R/C Packaging Information

Suffix	TR7	TR13
Tape Width	24 mm	24 mm
Carrier Pitch	8 mm	8 mm
Reel Diameter	7 inch	13 inch
Parts/Reel	750	3,000

R/C Ordering Information

1.27mm Pitch Part Number	1.00mm Pitch Part Number	Style	Array Size	R1 Ω	Tolerance R1	C1	Cap Tolerance	Dielectric	DF
RC3001B6[1]		J	3 x 9	50	± 1%	33pf	± 10%	NPO	2.5% max
RC3002B6	RC3002B7	K	3 x 9	50	± 1%	0.1uf	± 10%	X5R	5% max
RC3003B6[1]	--	L	4 x 9	50	± 1%	0.1uf	± 10%	X5R	5% max
RC3004B6[1]		J	3 x 9	50	± 1%	100pf	± 10%	NPO	2.5% max
RC3005B6	--	L	4 x 9	50	± 1%	0.1uf	± 10%	X5R	5% max
RC3007B6		J	3 x 9	50	± 1%	100pf	± 10%	NPO	2.5% max
RC3008B6		J	3 x 9	50	± 1%	33pf	± 10%	NPO	2.5% max

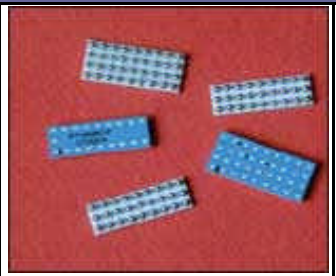
Note 1: These are obsolete encapsulated designs. Only the un-encapsulated part numbers may be ordered. RC3005B6 replaces RC3003B6, RC3007B6 replaces RC3004B6, and RC3008B6 replaces RC3001B6.

Terminators

The following catalog products are recommended for new applications. If the product required is not shown, we may have a customized product for your application. Please contact your CTS Representative for availability.

ClearONE Topside Probable Diagnostic Parts

Topside Probable Parts



In general, all ClearONE designs can be made available in Top Probe-Able versions upon request. Many of the standard products are available off-the-shelf, but your local CTS ClearONE representative should be contacted for specific device ordering and availability details. Figure 1 describes the proper numbering to convert a standard ClearONE part number to the Top Probe-Able version. (See Topside Probable Application Note for more information.)

Standard ClearONE → Top Probe-Able ClearONE

RT1404B7 → **RT1404B7P**

Figure 1

DIM Metric/English	"Pitch Suffix" B6	B7
"A"	0.64/.025	0.50/.020
"B"	1.27/.050	1.00/.039
"C"	0.64/.025	0.50/.020
"D"	0.66/.026	0.50/.020
"E"	0.71/.028	0.28/.011
"F"	0.66/.026	0.66/.026

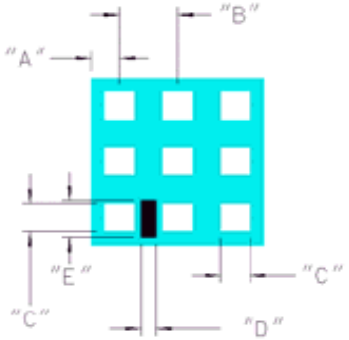


Figure 2 — Probe Pad Layout

Resistor Networks Solutions

Chip Resistor Array

Photo	Series	Description
	740X	New 0201 size
	741C, 742C, 743C, 744C, 745C	Concave Termination
	741X, 742X, 745X, 746X	Convex Termination

Surface Mount Leadless SIP

Photo	Series	Description
	752	SIP Surface Mount .050" Pitch
	753	SIP Surface Mount .025" Pitch

Resistor Networks Solutions

Surface Mount with Gull Wing Leads

Photo	Series	Description
	766	.150" Narrow Body
	767	.220" Medium Body
	768	.220" Medium Body

Through-Hole SIP

Photo	Series	Description
	770	Conformal Coated

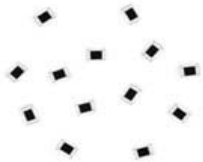
Current Sensing Resistors

Very Low Resistance

Photo	Series	Description	Resistance
	73M1, 73M2	Metal Plate	.003Ω to .100Ω
	73L1 - 73L7	Thick Film	.10Ω to .91Ω
	73E4, 73E6		.050Ω to .091Ω

Ultra High Resistance Chip Resistor

Ultra High Resistance

Photo	Series	Description	Resistance
	73U3	Thick Film	33MΩ to 100GΩ