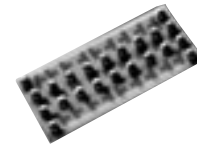
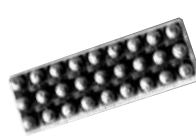


BGA Networks

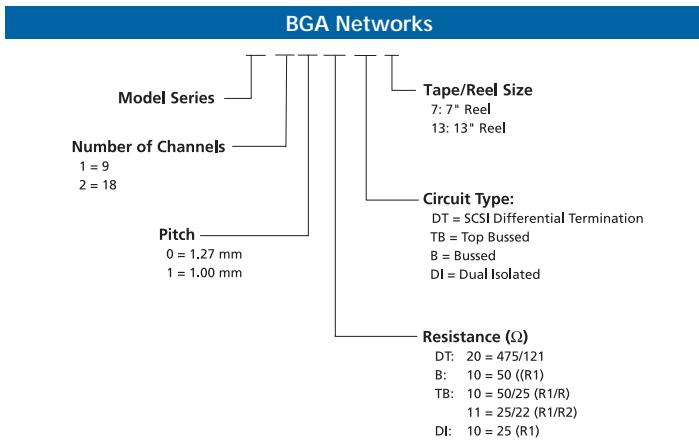


BGA Network

Model	BB1110B/BB1110TB/BB2110DI	BB1020DT
Resistance Nominal, Ohms	20 to 100	475/121/425
Ball Size (mm)	0.64/0.76	0.64/0.76
Pitch (mm)	1.27, 1	1.27, 1
Absolute Tolerance (%)	±1	±1
Ratio Tolerance (%)	±1	±1
Temperature Coefficient of Resistance (ppm/°C)	±200	±100
Operating Temperature (°C)	-55 to 125	-55 to 125
Interlead Capacitance (pF)	<0.1	<0.1
Application	DDR SDRAM	SCSI LVD

Specifications subject to change without notice.
Consult factory for custom products.

Ordering Information



Notes

BGA Networks

Features

- Superior high frequency performance.
- Minimal stray capacitance and inductance.
- Surface mountable with automatic pick and place equipment.

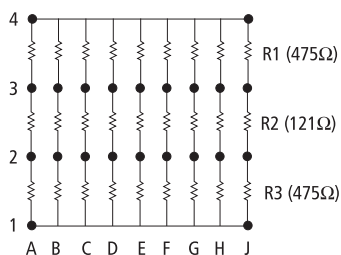
Applications

- DDR memory termination: BB1110TB, BB1110B, BB2110DI
 - 18 Bit SSTL-2 Termination Sets
 - Compliant to JEDEC Standard 8-9A.
- SCSI termination: BB1020DT7
 - SPI-2 (Ultra2) and SPI-3 (Ultra3) compliant
 - LVD termination for up to 9 lines

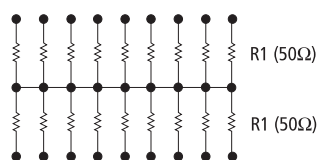
Packaging	
Reel Size (inches)	Part Count
7	1000
13	4000

Schematics

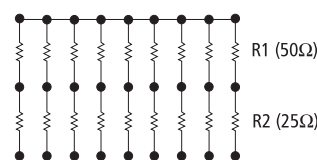
BGA Networks



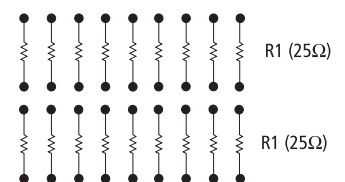
BB1020DT (SCSI LVD)



BB1110B (DDR SRAM)



DB1110TB (DDR SRAM)



BB2110DI (DDR SRAM)

Thick Film Resistor Networks



Surface Mount

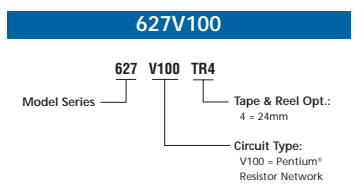
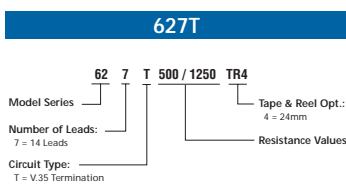
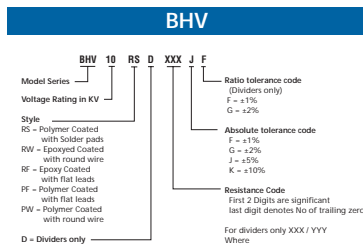
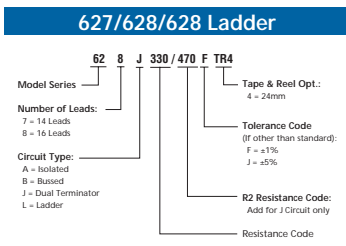
Through-Hole

High Voltage Precision Divider, High Voltage

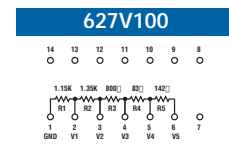
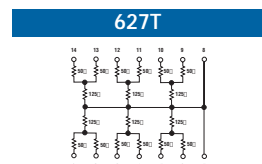
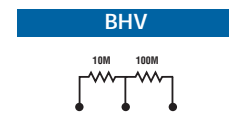
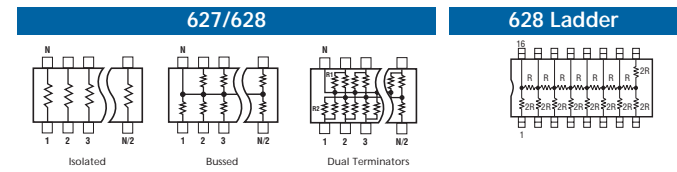
Model	627/628	628 Ladder	627T/V	L/M/BH	BHV
Number of Leads	14/16	16	14	4 to 14	2/3
Dimensions, Inches					
Body Length, Maximum	0.395/0.445	0.445	0.395	0.1 x no. of leads	0.953 to 2.35
Height Off Board, Maximum	0.090	0.090	0.090	0.195	0.4 to 0.606
Body Style/Width (Thickness)	(SO-M) 0.220	(SO-M) 0.220	(SO-M) 0.220	0.095	0.100
Resistance					
Range, Ohms	10 to 1 Meg	1K to 100K	50 to 142	22 to 1 Meg	1 Giga, Max.
Tolerance (%)	±2 (±5 for J Circuits)	±2	±2	±2 (±1 Optional)	±1, ±5, ±10
Operating Temperature Range °C	-55/125	-55/125	-55/125		
Temp. Coefficient, ppm/°C	±100 (Below 100R, 250)	±100	±250	±100 (< 100w = ±250)	±150 (±100 Divider)
Temp. Coefficient Tracking, ppm/°C	±50		±50	±50	±50
Ladder Accuracy		8 Bit: 1/2 LSB			
Power Rating, Watts at 70°C					
Resistor Power	Schematic A: 0.32 Schematics B & J: 0.16	0.04	0.250	0.125 Bussed 0.200 Isolated	0.8 to 3.0
Package Power	1.28	0.64 W/Pkg.	1.28		
Operating Voltage					30kV (2kV for Precision Divider)
Voltage Coefficient (ppm/V)					2 Max
Packaging Options					
Tubes	50	50	50		
Tape & Reel: 7"					
Tape & Reel: 13"	2000	2000	2000		

Specification subject to change without notice.
 Contact factory for custom products
 Also available: 627/628 Jumpers

Ordering Information



Schematics



Thick Film Chip Resistor Arrays



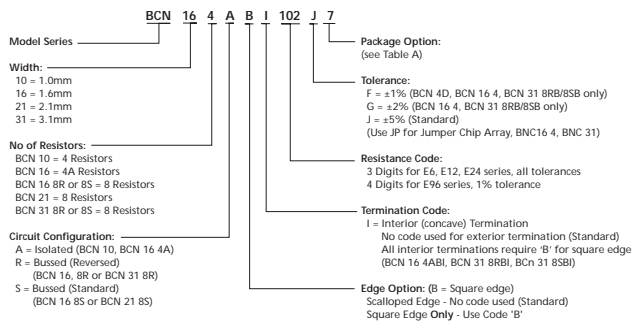
Resistor Arrays

Model	BCN 10 4	BCN 16 4	BCN 16 8
Industrial Style, Inches (mm)	0804 (2010)	1206 (3216)	1206 (3216)
Standard Resistance Range, Ohms	10 to 1 Meg	10 to 1 Meg	100 to 1 Meg
Standard Resistance Tolerance (%)	±5	±1, ±2, ±5	±5
Temp. Coefficient of Resistance, ppm/°C	±250	±250	±200
Operation voltage	25Vdc	50Vdc	25Vdc
Power Rating at 25°C per Resistor per Package	31mW 125mW	63mW 250mW	32mW 250mW
Capacitance Range, pF (at 1Khz)			
Capacitor Characteristic			
Capacitor Tolerance			
Capacitor Voltage Rating			
Capacitor Dissipation Factor, Maximum			
Dielectric Withstanding Voltage, 50mA Chrg.			
Operating Temperature	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C
Termination Options	Convex	Convex/Concave	Convex
Edge Options	Square	Square/Scalloped	Square
Packaging Options (Quantity/Reel)			
Tape & Reel: 7" Tape & Reel: 13"	Paper: 10K Paper: 40K	Paper: 5K Paper: 20K	Paper: 5K Paper: 20K
Surge Capability			
Short Term Overload			

Specifications subject to change without notice. Consult factory for custom products Also available BCN and BSR jumpers All BCN chip arrays are RoHS compliant

Ordering Information

BCN



BCN

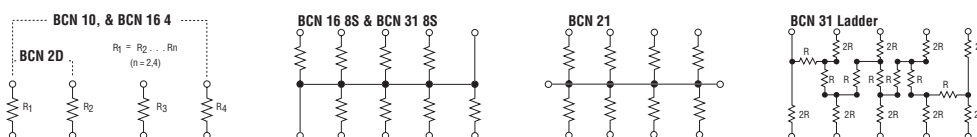
Packaging

	7" Reel Diameter		13" Reel Diameter	
	Paper	Embossed	Paper	Embossed
BCN 10	10k		40k	
BCN 16 4	5k		20k	
BCN 16 8	5k		20k	
BCN 21		4k		16k
BCN 31		4k		16k

See 'Model Styles' for Available Options:
 Note: Tape & Reel dimensions per EIA-481.

Schematics

BCN



Thin Film Resistor Networks



Ultra Precision
Thin Film - Ceramic

Model	NQS	664/667/668	688	694/698/699
Number of Leads	16/20/24	8/14/16	16	8/16/14
Available Circuit Type	A, B	A, B	A, B	-3, -1
Dimensions, Inches				
Body Length, Maximum	0.196/0.344/0.344	0.196/0.344/0.393	0.413	0.375/0.760/0.760
Height Off Board, Maximum	0.068	0.068	0.104	0.2
Body Style/Width	(QSOP) 0.157	(SOICN) 0.157	(SOICW) 0.300	(PDIP) 0.300
Resistance				
Range, Ohms	10 to 140K	10 to 275K	10 to 275K	10 to 275K
Tolerance (%)	±0.1	±0.1	±0.1	±0.1
Temp. Coefficient, ppm/°C	±25	±25	±25	±25
Temp. Coefficient Tracking, ppm/°C	±5	±5	±5	±5
Power Rating, Watts at 70°C				
Per Resistor	0.1	0.1	0.1	0.1
Per Package	NQS16 = 0.8 NQS20/24 = 1.0	664 = 0.4 667/668 = 0.8	1	694 = 0.4 698/699 = 0.6
Packaging Options				
Tubes	NQS20/24 = 56 NQS16 = 100	664 = 100 667/668 = 50	50	694 = 50 698/699 = 25
Tape & Reel: 7"	1000	664 = 1000 667/668 = 500	500	
Tape & Reel: 13"	2500	2500	1500	
Vial				

Ordering Information

NQS

Model Series: NQS 24 A 1001 B P LF 7

Number of leads:
16 = 16 leads
20 = 20 leads
24 = 24 leads

Circuit Type:
A = Isolated
B = Bussed

Resistance Code: _____

Tape & Reel Options:
7 = 7" Reel Dia.
13 = 13" Reel Dia.

LF for RoHS

TCR Code:
P = ± 50ppm/°C
Q = ± 25ppm/°C
(No code is ± 100ppm/°C)

Accuracy (Absolute / Ratio)
A = ±0.1% / ±0.1%
B = ±0.1% / ±0.1%
D = ±0.5% / ±0.1%
F = ±1.0% / ±0.5%

694/698/699

Model Series: 69 4-3-R10K B LF

Number of leads:
4 = 8 leads
8 = 16 leads
9 = 14 leads

LF for RoHS

Accuracy Code

Resistance Value Consult Factory

Circuit Type
1 = Bussed
3 = Isolated

SQS/SSN/SSW/SPD/SS1

Model Series: S QS 16 A 1000 F S LF 13

Package Type:
QS = QSOP
SN = SOIC (Narrow Body)
SW = SOIC (Wide Body)
PD = P-DIP
S1 = SOT-23
S2 = SOT-143

Number of Pins:
3, 4, 8, 14, 16, 20 and 24

Circuit Type:
A = Isolated
B = Bussed
D = Dual Termination
D1 = Differential Termination
G = GTL Termination
H = HSTL Termination
L = R / 2R Ladder
N = NTL Termination
V = V.35 Termination
VD = Voltage Divider

LF for RoHS

TCR Code:
L = ±200ppm/°C
S = ±100ppm/°C
P = ±50ppm/°C
Q = ±25ppm/°C

Absolute / Ratio Tolerance Code:
B = ±0.1% / ±0.1%
D = ±0.5% / ±0.1%
F = ±1.0% / ±0.5%
G = ±2.0% / (N/A)
J = ±5.0% / (N/A)

Resistance Code

664/667/668/688

Model Series: 66 4 A 1001 A LF 7

Number of leads:
4 = 8 leads
7 = 14 leads
B = 16 leads

Circuit Type:
A = Isolated
B = Bussed
J = Dual Terminator

Tape & Reel Options:
7 = 7" Reel Dia.
13 = 13" Reel Dia.

LF for RoHS

Accuracy (Absolute / Ratio)
A = ±0.1% / ±0.05%
B = ±0.1% / ±0.1%
D = ±0.5% / ±0.1%
F = ±1.0% / ±0.5%

Resistance Code



Precision Thin Film - Silicon

SQS	SSN	SSW	SPD	SS1
16,20,24	8,14,16	16,18,20	8,14,16	3
A, B, D, D1, G, H, L, N, V	A, B, D, D1, L, N, V	A, B, D, D1, L, V	A, B, L	VD
0.196/0.344/0.344	0.196/0.344/0.393	0.406/0.459/0.506	0.375/0.760/0.760	0.119
0.068	0.068	0.104	0.2	0.044
(QSOP) 0.157	(SOICN) 0.157	(SOICW) 0.300	(PDIP) 0.300	(SOT23) 0.096
10 to 250k	10 to 250k	10 to 250k	10 to 250k	1k to 50k
±0.1	±0.1	±0.1	±0.1	±0.1
±25	±25	±25	±25	±25
±5	±5	±5	±5	±5
0.1	0.1	0.1	0.1	0.1
SQS16 = 0.8 SQS20/24 = 1.0	SSN8 = 0.4 SSN14/16 = 0.8	1.0	SPD8 = 0.4 SPD14/16 = 0.6	0.2
SQS16 = 100 SQS20/SQS24 = 50	SSN8 = 100 SSN14/SSN16 = 50	50	SPD8 = 50 SPD14/SPD16 = 25	
1000	SSN8 = 1000 SSN14/16 = 500	500		
2500	2500	1500		
				500

Schematics

Isolated Resistors

Resistance Code: First 3 digits are significant. Fourth digit denotes number of trailing zeros.

Bussed Resistors

Resistance Code: First 3 digits are significant. Fourth digit denotes number of trailing zeros.

Dual Terminator/SCSI

Resistance Code (R1/R2W): 01 = 220/330

Differential Ended SCSI Termination

Resistance Code (R1/R2/R1W): 01 = 330/150/330

GTL Termination

Resistance Code: First 3 digits are significant. Fourth digit denotes number of trailing zeros.

HSTL Termination

Resistance Code (R1/R2W): 01 = 94/94, 02 = 100/100, 03 = 112/112, 04 = 136/136

R/2R Ladder

Resistance Codes W : 01 = 25k/50k, 02 = 10k/20k, 03 = 50k/100k

NTL Termination

Resistance Codes (R1/R2W): 01 = 22/90

V.35 Termination

Resistance Codes (R1/R2W): 01 = 50/125

Voltage Divider

Consult Factory for resistance codes.