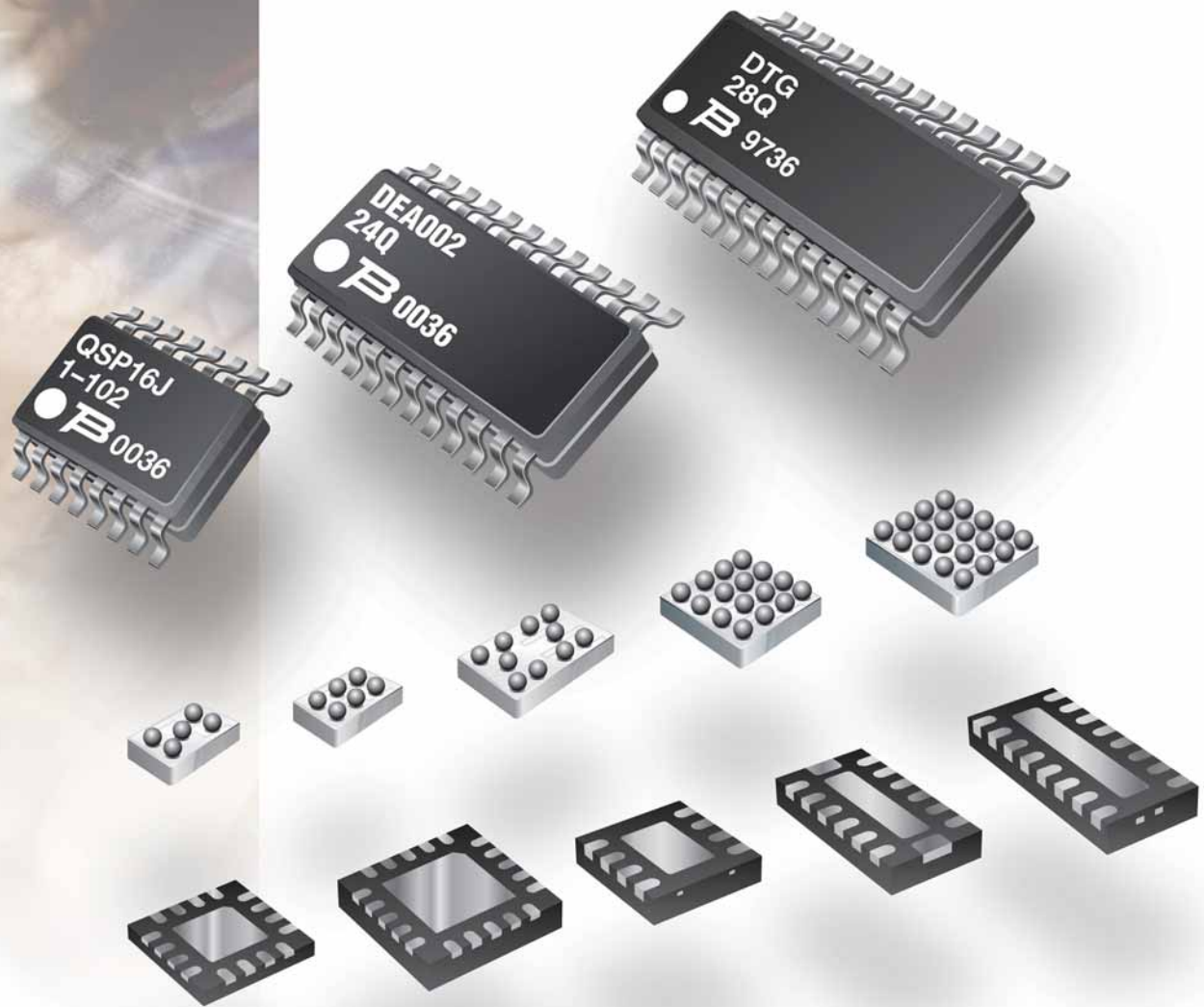


Bourns® Integrated Passive & Active Devices

Short Form Catalog



Thin Film On Silicon Products

Bourns can now provide designers with an integrated passive & active device solution that saves PCB real estate while offering remarkable electrical performance. The designers of compact electronic systems, especially handheld/wireless devices, are faced with tightening board space constraints, driving the requirement for alternative passive & active component technologies.

In the last several years, there has been somewhat of a revolution in the I.C. packaging world with the birth of a generation of extremely space-efficient packaging solutions. Using Thin Film On Silicon wafer fabrication technology, Bourns offers the capability to integrate resistors, capacitors, inductors, diodes and transistors into a single monolithic device with minimal packaging overhead.

Thin Film On Silicon technology using Chip Scale Packaging is commonly used in "Portable Electronics" applications where the customer has specified a particular electrical response characteristic for a minimum real-estate allowance. Handheld wireless devices (in particular, cell phones and PDAs) often have data and/or audio ports that connect the device to other external devices such as laptop computers and headsets.

Thin Film On Silicon technology with QSOP and NSOIC packages is widely used in applications that require cost reductions while also providing a consistent and reliable performance. Typical applications include telecom base stations, network servers, PCs and peripheral devices.

Bourns can now provide designers with an integrated passive & active solution that provides:

1. *Reduction in overall package size and maximum space savings.*
2. *Elimination of existing package wire-bonds with their associated unwanted high frequency parasitic elements using a CSP package solution.*
3. *Low cost solution due to shrinking of the bill of materials, reduced pick and place cycles and decreasing overall product manufacturing costs.*
4. *Simple package construction while providing high reliability performance.*

The integration of Resistors, Capacitors, Inductors, Diodes and Transistors into single, ultra miniature, monolithic packages has opened the door to a new level of component count reduction.

Symbols & Terms

I_F	<i>Forward Current</i>
I_R	<i>Reverse Current</i>
V_F	<i>Forward Voltage</i>
V_R	<i>Reverse Voltage</i>
C_T	<i>Diode Capacitance</i>
P_D	<i>Power Dissipation</i>

R Networks

Product Selection Guide

Features

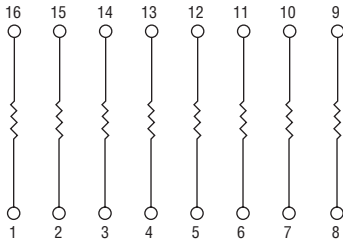
- Multiple Resistors
- Stable TFOS Technology
- JEDEC Standard Packages

Applications

- Base stations
- Computers & Peripherals
- Instrumentation

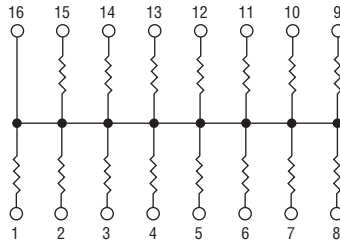
2QSP / 2NBS-XX1

Package Schematic



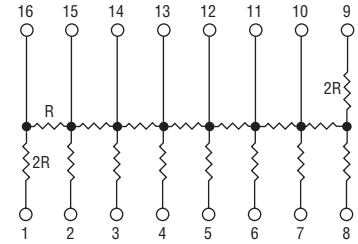
2QSP / 2NBS-XX2

Package Schematic



2QSP / 2NBS-XX6

Package Schematic



2QSP / 2NBS-XX1

Standard R Values

Resistance (ohms)	Resistance Code
10	100
22	220
33	330
39	390
47	470
51	510
68	680
120	121
220	221
270	271
330	331
470	471
510	511
680	681
1 K	102
2.2 K	222
4.7 K	472
5 K	502
8.2 K	822
10 K	103
18 K	183
20 K	203
47 K	473
50 K	503
100 K	104

2QSP / 2NBS-XX2

Standard R Values

Resistance (ohms)	Resistance Code
100	101
120	121
220	221
270	271
330	331
390	391
470	471
510	511
680	681
1 K	102
1.5 K	152
2 K	202
2.2 K	222
2.7 K	272
3.3 K	332
4.7 K	472
5.1 K	512
10 K	103
20 K	203
47 K	473
51 K	513
75 K	753
82 K	823
100 K	104

2QSP / 2NBS-XX6

Standard R Values

R1 Value (ohms)	R2 Value (ohms)	Resistance Code
10 K	20 K	103
25 K	50 K	253

How to Order

2 QSP 16 - T J 1 - 472 LF

Product Class	Thin Film On Silicon
Standard Package Styles	QSP = QSOP NBS = Narrow Body SOIC
Pin Count	QSP = 16, 20, 24, 28 NBS = 8, 14, 16
Dispensing	R = Reel T = Tube
Tolerance	J = ±5 % G = ±2 % F = ±1 %
Circuit Configuration	1 = Isolated Resistors 2 = Bussed Resistors 6 = R2R Ladder
Resistance Value Code	1st two digits are significant 3rd digit = number of zeroes to follow to give resistance value in ohms
Lead Free	LF = Lead Free Solution

RC Networks

Product Selection Guide

Features

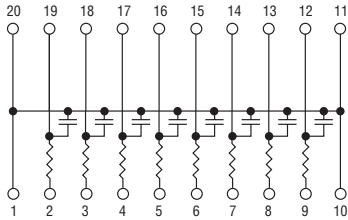
- RC Configuration
- Stable TFOS Technology
- JEDEC Standard Packages

Applications

- Base stations
- Computers & Peripherals
- Instrumentation

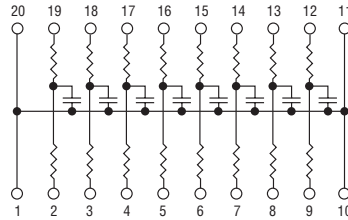
2CFA Tapped RC Filter

Package Schematic



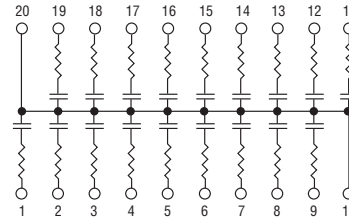
2CFB T-Filter

Package Schematic



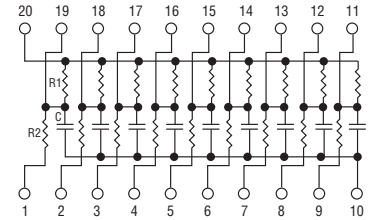
2CTA AC Terminator x 18

Package Schematic



2CTE IEEE 1284 Terminator

Package Schematic



Standard RC Values

R1 Value (ohms)	C1 Value (pF)	Cap. BV (typ.)	Part Number (Tape & Reel)	Part Number (Tubes)
33	47	75	2CFA-330/470M-Q20R	2CFA-330/470M-Q20T
25	200	25	2CFB-250/201M-Q20R	2CFB-250/201M-Q20T
33	220	25	2CFA-330/221M-Q20R	2CFA-330/221M-Q20T
47	33	25	2CFB-470/330M-Q20R	2CFB-470/330M-Q20T
100	100	25	2CFB-101/101M-Q20R	2CFB-101/101M-Q20T
100	100	25	2CTA-101/101M-Q20R	2CTA-101/101M-Q20T
33	47	50	2CTA-330/470M-Q20R	2CTA-330/470M-Q20T
47	47	50	2CTA-470/470M-Q20R	2CTA-470/470M-Q20T

Value Code	R1 Value (ohms)	R2 Value (ohms)	C1 Value (pF)	Cap. BV (typ.)	Part Number (Tape & Reel)	Part Number (Tubes)
V01	1 K	33	180	25	2CTE-V01M-Q20R	2CTE-V01M-Q20T
V02	2.2 K	33	220	25	2CTE-V02M-Q20R	2CTE-V02M-Q20T
V03	4.7 K	10	180	25	2CTE-V03M-Q20R	2CTE-V03M-Q20T
V04	4.7 K	33	180	25	2CTE-V04M-Q20R	2CTE-V04M-Q20T
V05	4.7 K	270	33	25	2CTE-V05M-Q20R	2CTE-V05M-Q20T
V08	1 K	33	47	25	2CTE-V08M-Q20R	2CTE-V08M-Q20T
V09	2.2 K	33	47	25	2CTE-V09M-Q20R	2CTE-V09M-Q20T

How to Order

2 CFA-330 / 470M - Q20R L F

Product Class _____
Thin Film On Silicon

Standard Package Styles _____
CFA = Tapped RC Filter
CFB = T-Filter
CTA = AC Terminator

Resistance Value Code _____
1st two digits are significant
3rd digit = number of zeros to follow to give resistance value in ohms

Capacitor Value Code _____
1st two digits are significant
3rd digit = number of zeros to follow to give capacitance value in pF

Tolerance _____
M:R = ±10 %, C = ±20 %

Standard Package _____
Q = QSOP

Pin Count _____
20

Dispensing _____
R = Reel
T = Tube

Lead Free _____
LF = Lead Free Solution

How to Order

2 CTE-V02 M-Q 20R L F

Product Class _____
Thin Film On Silicon

Product Function _____
CTE = IEEE 1284 Terminator

Value Code _____
(Refer to Standard RC Value Table)

Standard Grade _____
 $M = \frac{R. Tol.}{\pm 10 \%} \frac{C. Tol.}{\pm 20 \%}$

Standard Package _____
Q = QSOP

Pin Count _____
Q = 20

Dispensing _____
R = Reel
T = Tube

Lead Free _____
LF = Lead Free Solution

RCD Networks

Product Selection Guide

Features

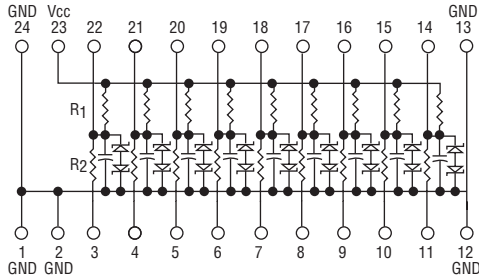
- RCD Configuration
- Stable TFOS Technology
- JEDEC Standard Packages
- ESD Protection: IEC61000-4-2

Applications

- Bidirectional Parallel Port Communications
- Computers & Peripherals
- Instrumentation

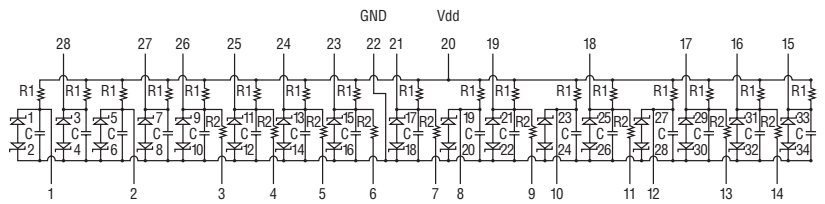
2DTF 1284 Terminator/Filter/Diode Array

Package Schematic



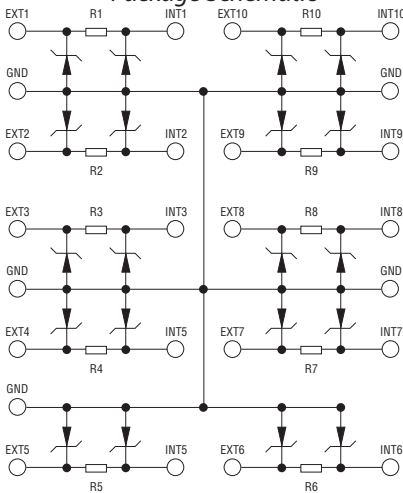
2DTG Super Terminator/Filter/Diode Array

Package Schematic



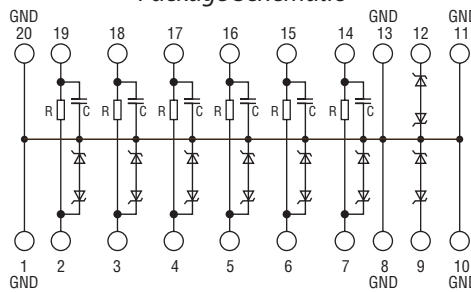
2FAA/2FAB ESD & EMI Filter Array

Package Schematic



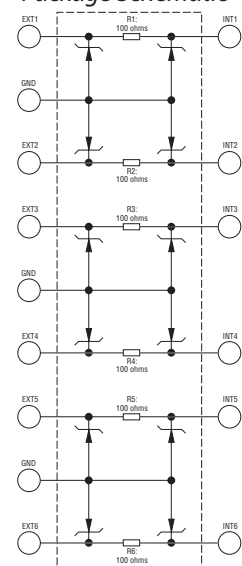
2FAD ESD & EMI Filter Array

Package Schematic



2FAE ESD & EMI Filter Array

Package Schematic



Bourns Part Number	SMT Package	Lead/Bumps	No. of Channels	Typ Res ohms	Typ Cap pF	Bidirectional Filter
2DTF-V01M-Q24RLF	QSOP	24	9	33	180	Yes
2DTG-V02M-Q28RLF	QSOP	28	17	33	220	Yes
2FAA-M20R	QFN	20	10	200	20	Yes
2FAB-M20R	QFN	20	10	100	20	Yes
2FAD-C20RLF	CSP	20	8	100	50	Yes
2FAE-C15RLF	CSP	15	6	100	54	Yes

RCD Networks

Product Selection Guide

Features

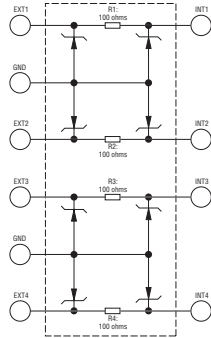
- RCD Configuration
- Stable TFOS Technology
- JEDEC Standard Packages
- ESD Protection: IEC61000-4-2

Applications

- Bidirectional Parallel Port Communications
- Computers & Peripherals
- Instrumentation

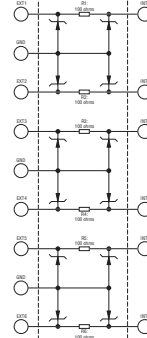
2FAF ESD & EMI Filter Array

Package Schematic



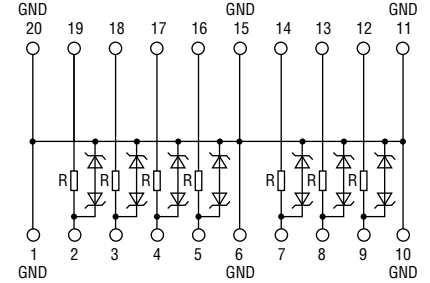
2FAG ESD & EMI Filter Array

Package Schematic



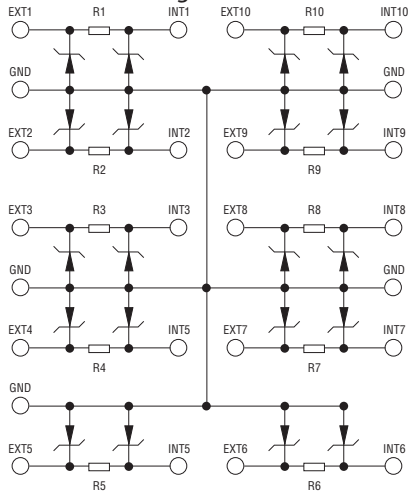
2FAH ESD & EMI Filter Array

Package Schematic



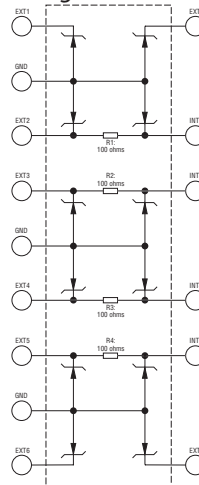
2FAI/2FAJ ESD & EMI Filter Array

Package Schematic



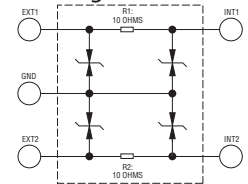
2FAK ESD & EMI Filter Array

Package Schematic



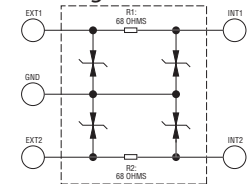
2FAM ESD & EMI Filter Array

Package Schematic



2FAN ESD & EMI Filter Array

Package Schematic



Bourns Part Number	SMT Package	Lead/Bumps	No. of Channels	Typ Res ohms	Typ Cap pF	Bidirectional Filter
2FAF-C10RLF	CSP	10	4	100	30	Yes
2FAF-M8R	DFN	10	4	100	20	Yes
2FAG-C15RLF	CSP	15	6	100	30	Yes
2FAG-M12R	DFN	12	6	100	20	Yes
2FAH-C20RLF	CSP	20	7	100	10.5	Yes
2FAI-M16R	QFN	16	8	100	20	Yes
2FAJ-M16R	QFN	16	8	100	20	Yes
2FAK-C15RLF	CSP	15	6	100	30	Yes
2FAL-M16R	DFN	16	8	100	20	Yes
2FAM-C5RLF	CSP	5	2	10	40	Yes
2FAN-C5RLF	CSP	5	2	68	40	Yes

Diode Networks

Product Selection Guide

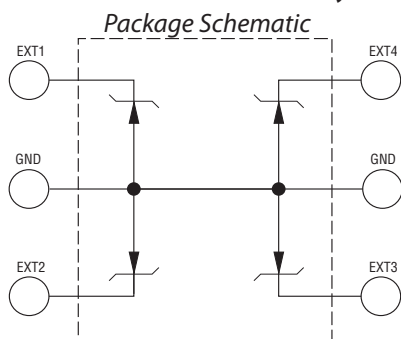
Features

- Diode Array
- Stable TFOS Technology
- JEDEC Standard Packages
- ESD Protection: IEC61000-4-2

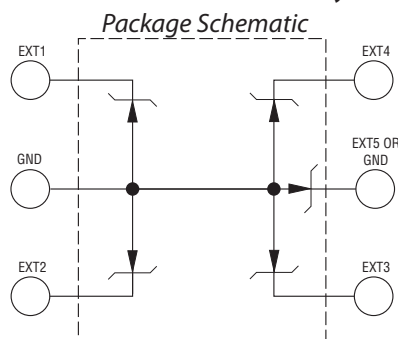
Applications

- Bidirectional Parallel Port Communications
- Computers & Peripherals
- Instrumentation

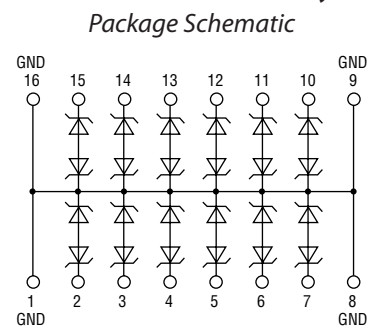
2DAA ESD Diode Array



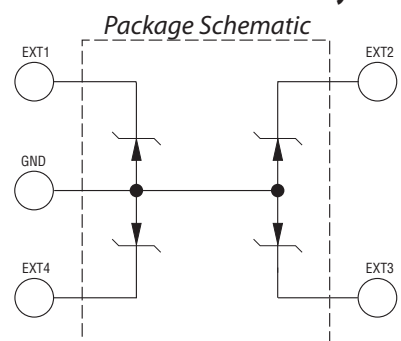
2DAB ESD Diode Array



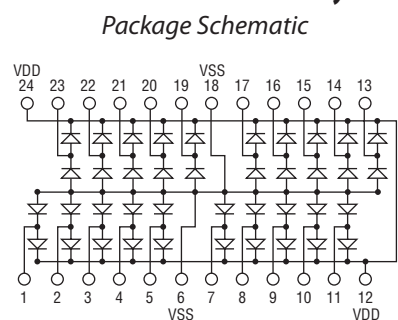
2DAC ESD Diode Array



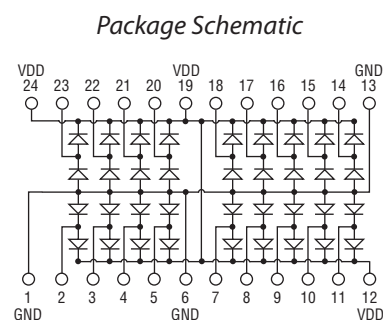
2DAD ESD Diode Array



2DEA ESD Diode Array



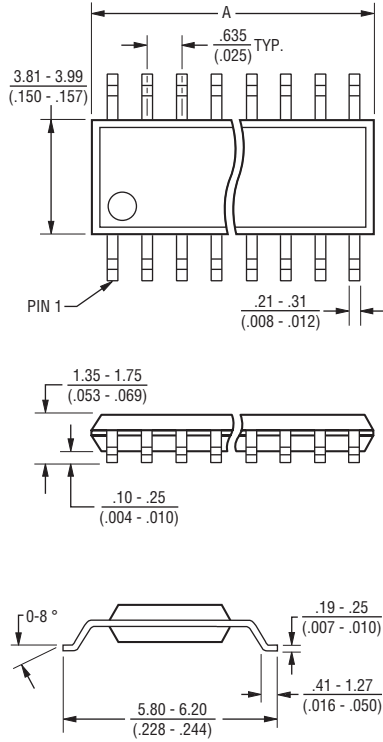
2DTA Bus Terminator



Bourns Part Number	SMT Package	Lead/Bumps	No. of Channels	Typ Cap pF
2DAA-F6RLF	FlipChip	6	4	150
2DAB-F6RLF	FlipChip	6	4	150
2DAC-C16RLF	CSP	16	12	10.5
2DAD-C5RLF	CSP	5	4	15
2DEA-2-Q24RLF	QSOP	24	20	5
2DTA-5-Q24RLF	QSOP	24	18	5
2DTA-10-Q24RLF	QSOP	24	18	5

Available Packages

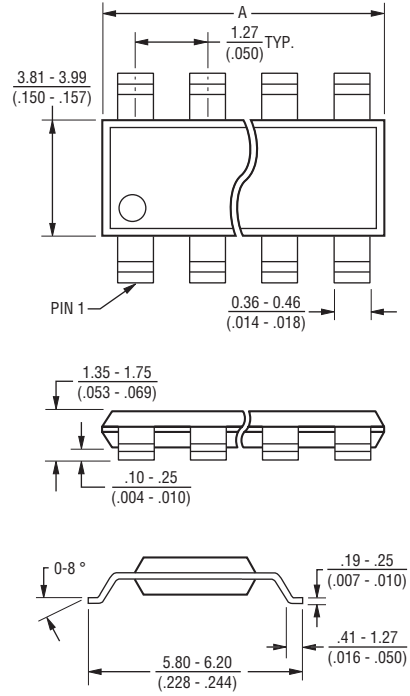
QSOP Package



Model	A
2QSP16	4.80 - 4.98 (.189 - .196)
2QSP20	8.56 - 8.74 (.337 - .344)
2QSP24	8.56 - 8.74 (.337 - .344)
2QSP28	9.80 - 9.98 (.386 - .393)

Governing dimensions are in mm.
Dimensions in parentheses are in inches and are approximate.

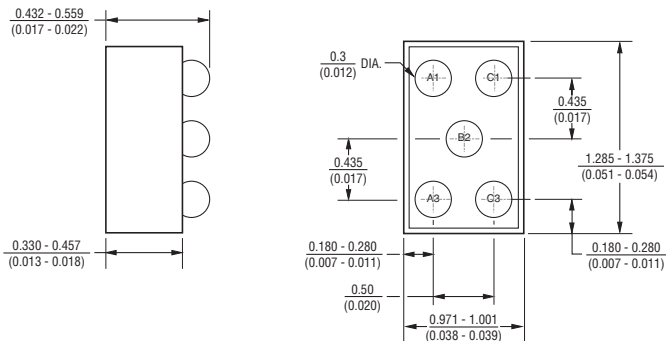
NBSOIC Package



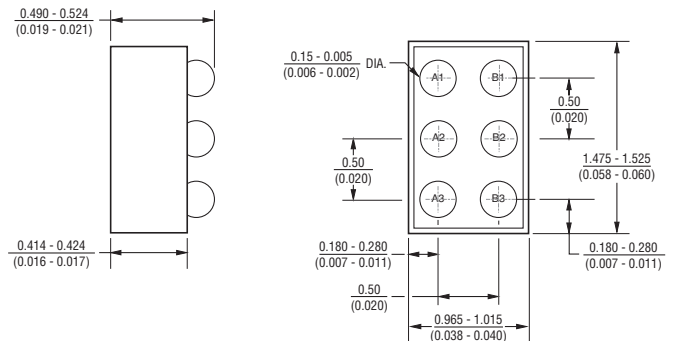
Model	A
2NBS08	4.80 - 4.98 (.189 - .196)
2NBS14	8.56 - 8.74 (.337 - .344)
2QSP28	9.80 - 9.98 (.386 - .393)

Governing dimensions are in mm.
Dimensions in parentheses are in inches and are approximate.

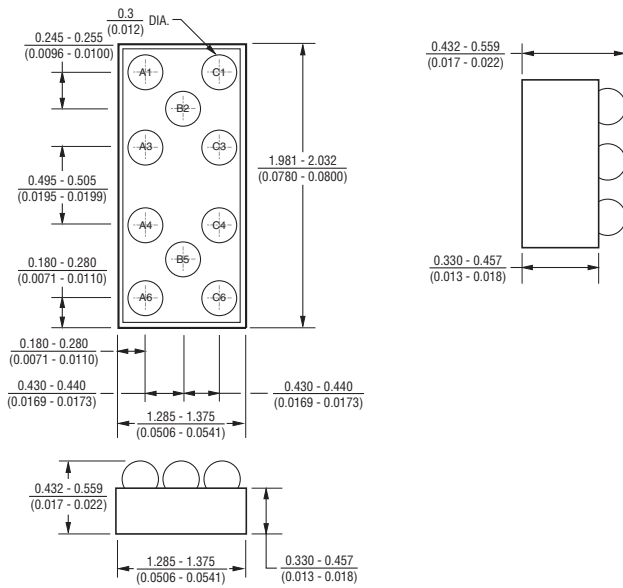
CSP Package – 5 I/O



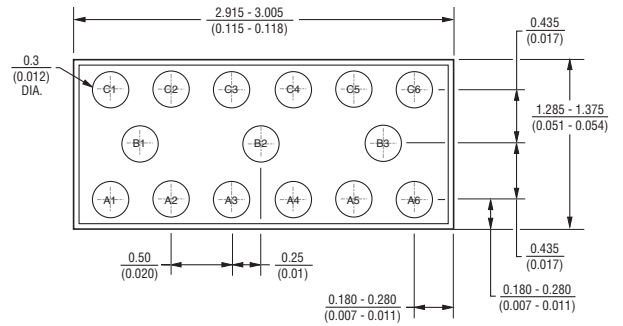
CSP Package – 6 I/O



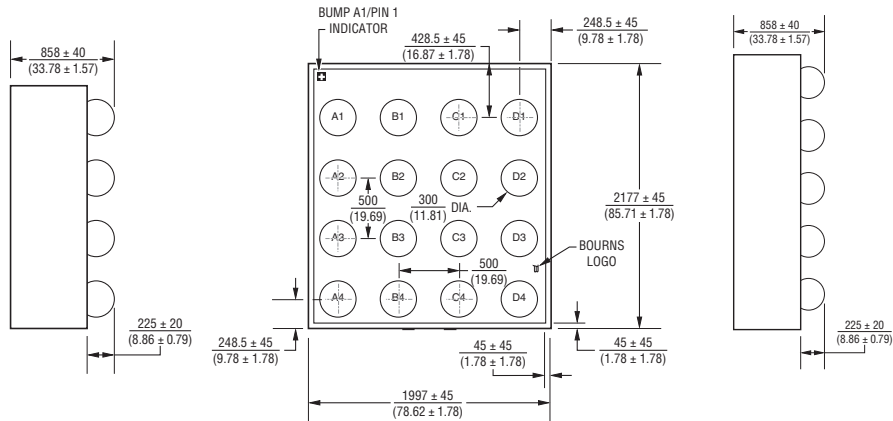
CSP Package – 10 I/O



CSP Package – 15 I/O

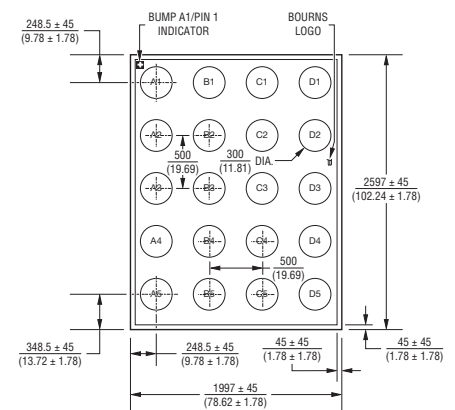


CSP Package – 16 I/O



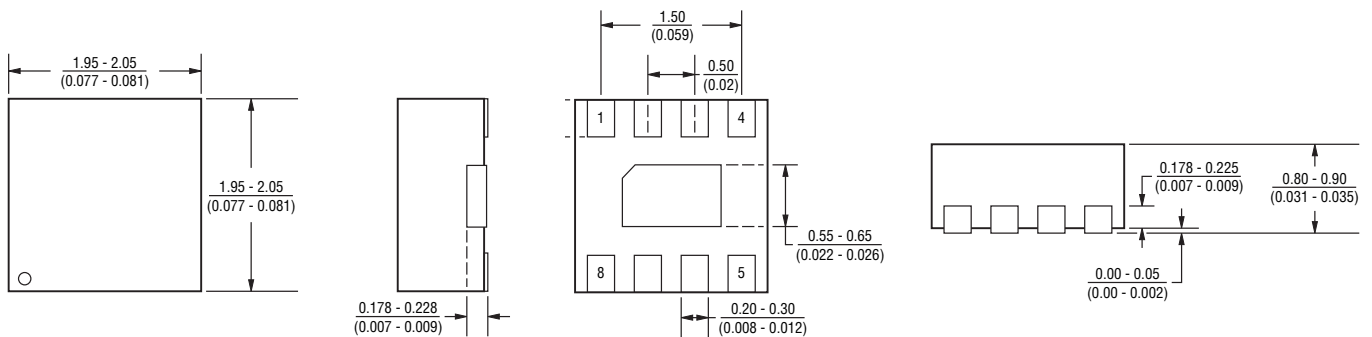
Governing dimensions are in microns.
Dimensions in parentheses are in mils.

CSP Package – 20 I/O



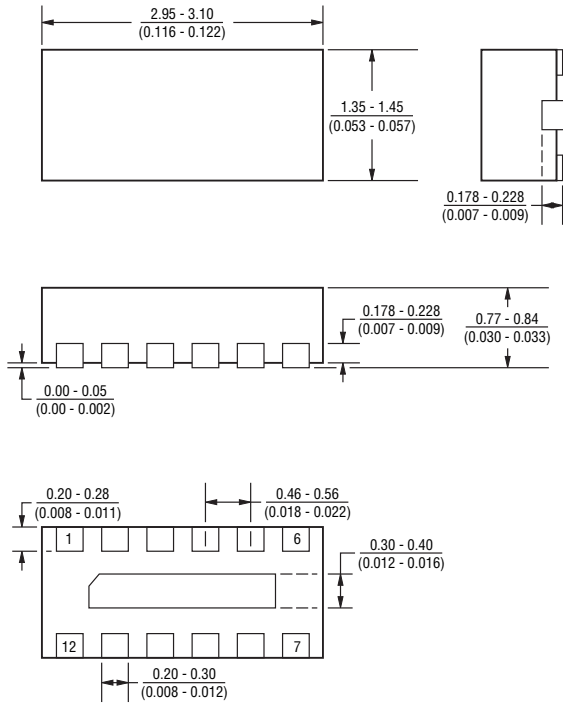
Governing dimensions are in microns.
Dimensions in parentheses are in mils.

DFN Package – 8 I/O

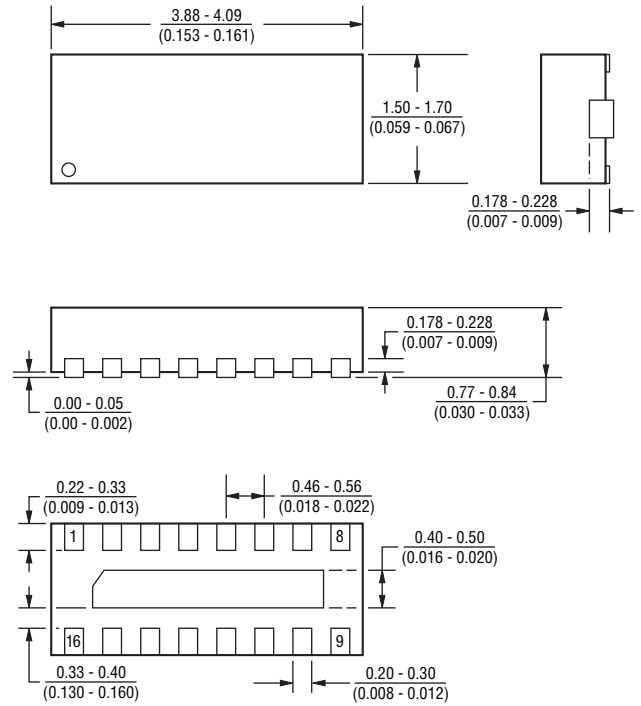


Available Packages, continued

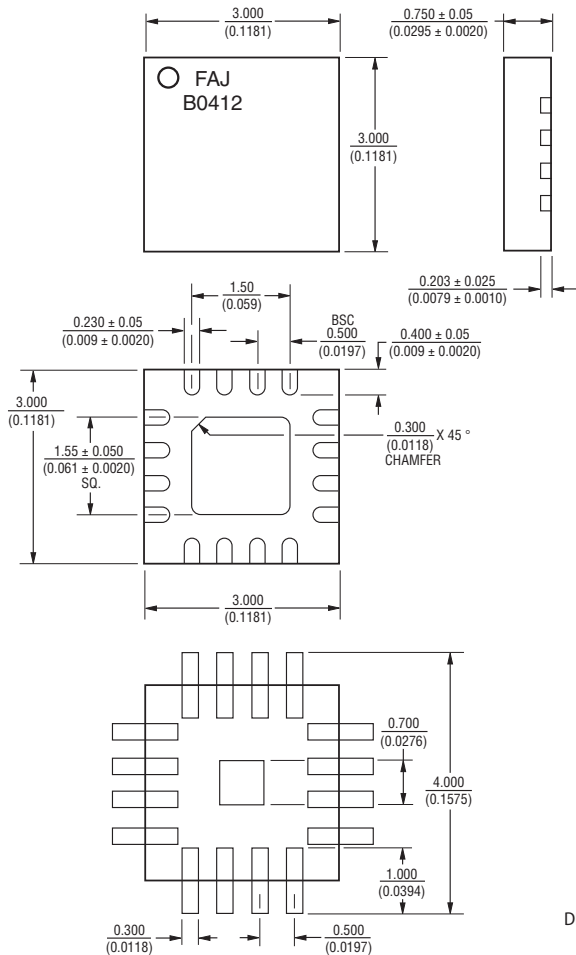
DFN Package – 12 I/O



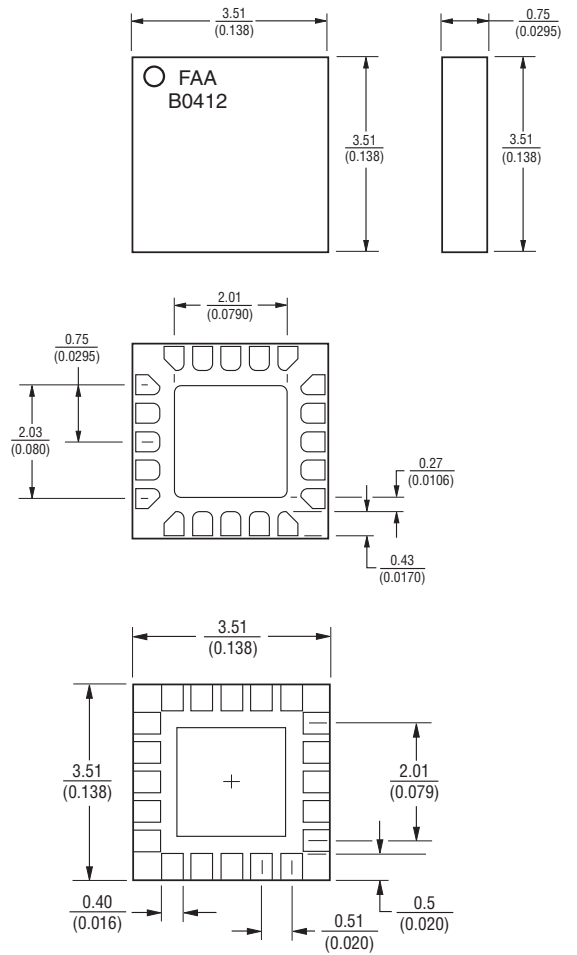
DFN Package – 16 I/O



QFN Package – 16 Lead



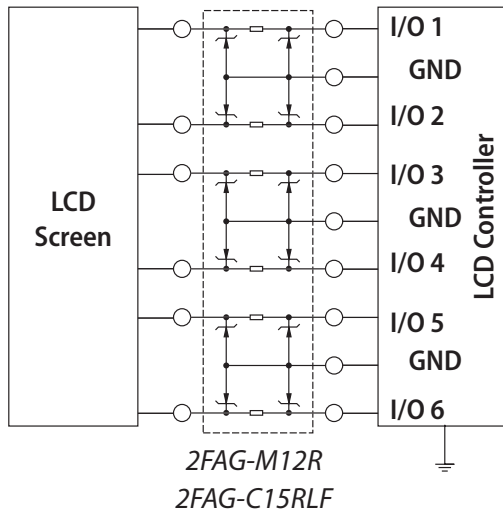
QFN Package – 20 Lead



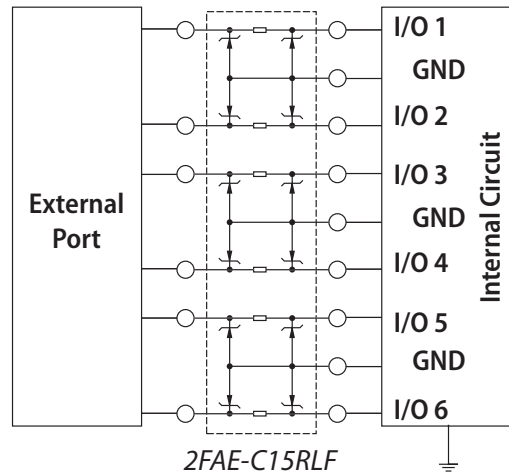
DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Application Solutions

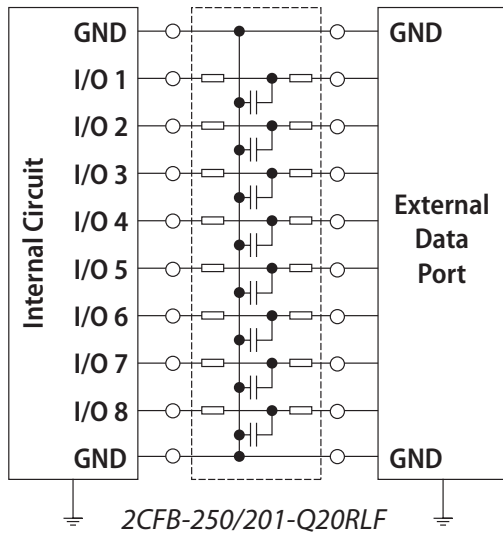
**Cell Phone/PDA LCD Screen Interface
(ESD, EMI Filter, Low Capacitance ~20pF)**



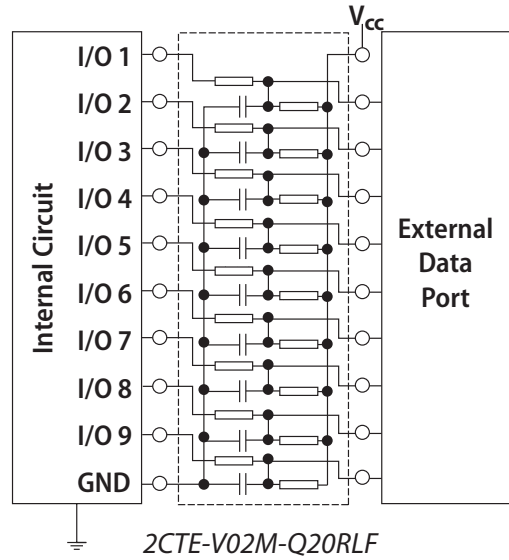
**Cell Phone/PDA External Port Interface
(ESD, EMI Filter)**



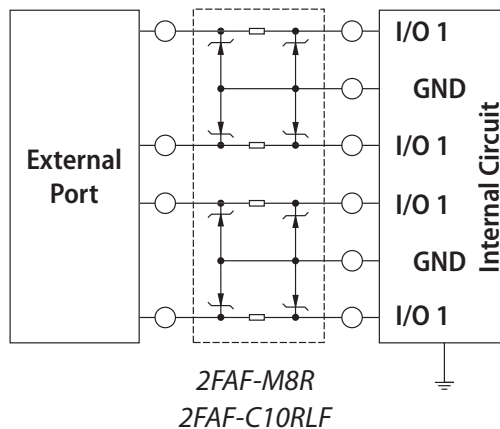
**Parallel I/O Port
(RC Filter, Bidirectional)**



**IEEE 1284 I/O Port
(RC Filter, R Pull Up to V_{CC})**



**Cell Phone/PDA External Port Interface
(ESD, EMI Filter, Low Capacitance ~20pF)**





Worldwide Sales Offices

Country	Phone	Fax
Benelux:	+31 (0)70 300 4333	+31 (0)70 300 4345
Brazil:	+55 11 5505 0601	+55 11 5505 4370
China:	+86 21 64821250	+86 21 64821249
France:	+33 (0)2 5473 5151	+33 (0)2 5473 5156
Germany:	+49 (0)69 800 78212	+49 (0)69 800 78299
India:	+91 484 302483	+91 484 302 287
Ireland:	+353 (0)1276 691087	+353 (0)1276 691088
Italy:	+390 2 389 00041	+390 2 389 00042
Japan:	+81 49 269 3204	+81 49 269 3297
Malaysia (KL Office):	+60 3 71183138	+60 3 71183139
Malaysia (Penang Office):	+60 4 6581771	+60 4 6582771
Singapore:	+65 63461933	+65 63461911
Switzerland:	+41 (0)41 768 5555	+41 (0)41 768 5510
Taiwan:	+886 2 25624117	+886 2 25624116
UK:	+44 (0)1276 691087	+44 (0)1276 691088
USA:	+1-951-781-5500	+1-951-781-5006
Non-Listed European Countries:	+41 (0)41 768 5555	+41 (0)41 768 5510

Technical Assistance

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