WIRE BONDABLE
BURIED SINGLE LAYER CAPACITORS

PRESIDIO ADVANTAGE

- Presidio's patented thick film technology buries electrodes into the ceramic body (Fig. 1) allowing a 10:1 advantage over a conventional construction (Fig. 2). It offers the designer: (a) more bandwidth through increased device capacitance, (b) more stable capacitance over temperature and (c) more capacitance in smaller case sizes for increased board density.

  Filled vias connect the buried electrodes with the outside top and bottom metallization pads; 99.95% pure Au is standard for all metal connections allowing proven wire bond techniques with AuSn or conductive epoxy die attach techniques.

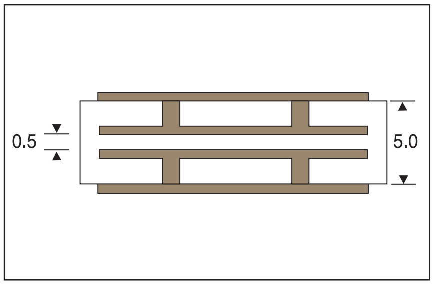

Fig. 1. Construction of Buried Electrodes

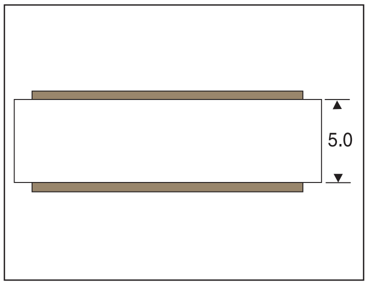

Fig. 2. Conventional Single Layer Capacitor

- Excellent low loss performance for high Q applications as demonstrated with a 10 pF NPO capacitor shown in Fig. 6 below.
- Ease of dielectric material selection: Presidio offers 3 ceramic materials while most other suppliers offer more than 15.
- RoHS compliant.

KENT SIMULATOR

Using the KENT SIMULATOR (Fig. 3), a designer can obtain commonly needed RF capacitor parameters in graphical format for popular Presidio Components RF capacitors. In addition, S-parameters for selected capacitors can be saved in S2P format. All device parameters are derived from a series transmission line model developed by Dr. Gordon Kent and available at *www.presidiocomponents.com.* A technical discussion of the simulation used in the Kent Simulator is presented by Gordon Kent in the "Summary of the Capacitor Simulator."

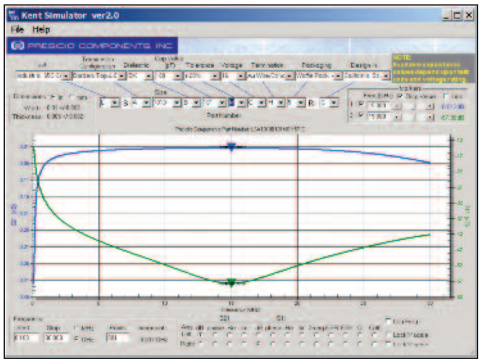

Fig. 3. Kent Simulator Version 2.0
LSA1010B101MGH5C–

TYPICAL APPLICATIONS

FILTER CAPACITOR

A filter design requires a specific capacitance value, C_F, and at the upper end of the filter response, f_F, the effective capacity must not exceed C_F by more than a specified amount of ΔC. Once C_F is determined, case size, voltage rating and temperature characteristics can be selected. Typically, lower loss Class I materials like NPQ and NPO are first choice. See Fig. 4.

RESONANCE-FREE BROADBAND COUPLING/DECOUPLING CAPACITOR

Class II "BX" dielectric is typical for DC block or RF bypass applications to operate resonance free over a specified broad frequency range. Low impedance is typically more important than the capacitance value which should be large enough to cover the 3 dB low edge of the bandwidth. See Fig. 5.

MINIMUM LOSS, FINITE BAND COUPLING CAPACITOR

When minimum loss is required, e.g. a low noise circuit, a high Q capacitor with Class I dielectric (NPQ or NPO) is recommended. Any parallel resonance frequency of the capacitor should be outside of the use frequency band. The best capacitor choice puts the series resonance at the band center (approximately f_0 / 2). See Fig. 6.

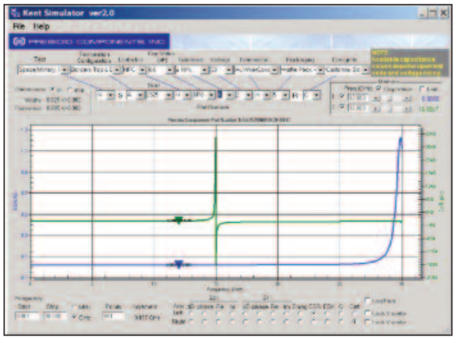

Fig. 4. Modeled ESR/50 and Ceff of part NSA2525N6R8K2H5C–

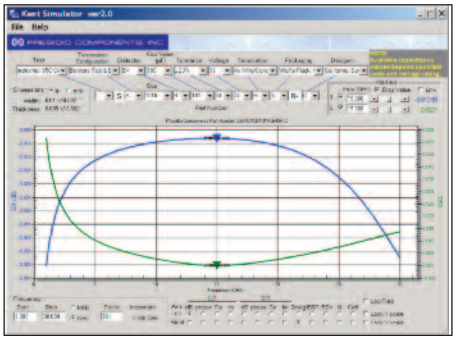

Fig. 5. Modeled S21 and Z/50 of part LSA1010B101MGH5C–, Class II Dielectric

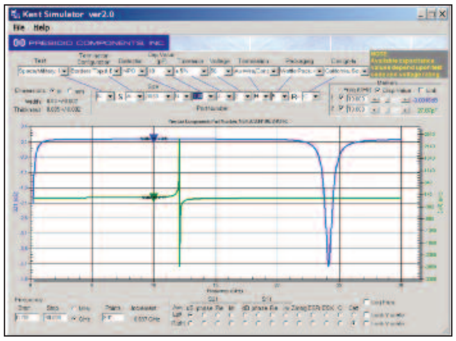

Fig. 6. Modeled S21 and Ceff of part NSA3030N100J2H5C–, Class 1 Dielectric

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GLOBAL PART NUMBER EXAMPLE (How to Order)

L	S	A	1010	B	101	M	G	H	5	C	–	*
Test Code	Product	Termination Configuration	Size (Pg. 5)	Dielectric	Capacitance Code	Capacitance Tolerance	Voltage	Termination	Packaging	RoHS Compliant	Hyphen Required	Design-In Code (See Page 14)

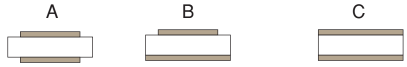
Test Codes, Dielectric Codes and Specifications

					FIT* 65° C	FIT* 85° C	FIT* 100° C	Mil-PRF-38534E Table C-III		MIL-PRF-49464 Tabl VI	Table VII	Cust. Spec.
				TEST CODES:	L	M	N	H	K	A	B	D
				Upgradable to Codes:	H	H, K	H, K, A, B					
ELECTRICAL SPECIFICATIONS	**NPQ Dielectric Code Q**	**NPO Dielectric Code N**	**BX Dielectric Code B**	**Tested as per MIL-PRF-49464C**	**Test Samples**			**Test Samples**		**Test Samples**		
Temperature Coefficient Limits	0 ± 25 ppm/ °C	0 ± 30 ppm/ °C	± 15%	Para. 4.8.10								
Temperature Coefficient Limit Cycle	-55° to +125° C	-55° to +125° C	-55° to +125° C	Para. 4.8.10								
Capacitance	1 MHz, 1 V AC RMS	1 MHz, 1 V AC RMS	1 kHz, 1 V AC RMS	Para. 4.8.4	100%	100%	100%	100%	100%	100%	100%	
Dissipation Factor, maximum	0.1%	0.15%	100 & 50V : 2.5%	Para. 4.8.5	100%	100%	100%	100%	100%	100%	100%	
Dissipation Factor, maximum	0.1%	0.15%	16 & 25V : 3.5%	Para. 4.8.5	100%	100%	100%	100%	100%	100%	100%	
Dissipation Factor, maximum	0.1%	0.15%	10V : 5%	Para. 4.8.5	100%	100%	N/A	100%	100%	N/A	N/A	
Dissipation Factor, maximum	0.1%	0.15%	6.3V : 7.5%	Para. 4.8.5	100%	N/A	N/A	100%	N/A	N/A	N/A	
Insulation Resistance @ +25° C at WVDC	100,000 MΩ min.	100,000 MΩ min.	100,000 MΩ min.	Para. 4.8.6	1% AQL	1% AQL	1% AQL	100%	100%	100%	100%	
Insulation Resistance @ +125° C at WVDC	10,000 MΩ min.	10,000 MΩ min.	10,000 MΩ min.	Para. 4.8.6						100%	100%	
Dielectric Withstanding Voltage (DWV)	250% of WVDC	250% of WVDC	250% of WVDC	Para. 4.8.7	1% AQL	1% AQL	1% AQL	100%	100%	100%	100%	
Aging Effects	None	None	2.5% typ./decade hr.	Presidio Specification								
VISUAL & MECHANICAL SPECIFICATIONS												
Visual, Workmanship	No slivers, cracks, demetalization	No slivers, cracks, demetalization	No slivers, cracks, demetalization	Para. 4.8.1	100%	100%	100%	100%	100%	100%	100%	
Bond Strength, minimum	3 grams, 0.001" dia. Au wire	3 grams, 0.001" dia. Au wire	3 grams, 0.001" dia. Au wire	Para. 4.8.8				10	10	13	13	
Shear Strength, minimum	Size dependent	Size dependent	Size dependent	Para. 4.8.9						13	13	
Physical Dimensions	See Page 5	See Page 5	See Page 5	Para. 4.8.1						13	13	
99.8% Gold Metalization, minimum	100 µin (2.5 µm)	100 µin (2.5 µm)	100 µin (2.5 µm)	Para. 1.2.1.7								
ENVIRONMENTAL TESTS (TEST CODES K, A, B)												
Thermal Shock & Voltage Conditioning	5 cycles/100 hr min.	5 cycles/100 hr min.	5 cycles/100 hr min.	Para. 4.8.3					10	100%	100%	
Constant Acceleration				PRF-38534E					10			
Temperature Coefficient Limits, 0 Volt	0 ± 25 ppm/ °C	0 ± 30 ppm/ °C	± 15%	Para. 4.8.10						12	12	
Immersion	0.5% or 0.5 pF cap. change	0.5% or 0.5 pF cap. change	± 10% cap. change	Para. 4.8.11							12	
Humidity, Steady State, Low Voltage	240 hours min.	240 hours min.	240 hours min.	Para. 4.8.12							12	
Life Test	2000 hours	2000 hours	2000 hours	Para. 4.8.13							25	
RoHS Compliant	Yes	Yes	Yes									

***FIT (Failure In Time) Calculations are based on assumed CONTINUOUS operating temperatures 65° C, 85° C and 100° C**

Termination Configuration Codes

Code	Description
A	Borders top and bottom
B	Borders top, full metalization at bottom
C	Fully metalized top and bottom



Capacitance Codes

First two digits = Significant figures of capacitance in picofarads

Third digit = Additional number of zeros

Example: 0R1 = 0.1 pF 100 = 10 pF
1R0 = 1.0 pF 101 = 100 pF

Capacitance Tolerance Codes

Code	Tolerance	Cap Range	Dielectrics
A	± .05 pF	< 2.2 pF	NPQ, NPO
B	± .1 pF	< 10 pF	NPQ, NPO
C	± .25 pF	< 10 pF	NPQ, NPO
D	± .5 pF	< 10 pF	NPQ, NPO
G	± 2%	> 9.1 pF	NPQ, NPO
J	± 5%	> 9.1 pF	NPQ, NPO
K	± 10%	> 0.45 pF	all
M	± 20%	> 0.45 pF	all

Working Voltage

Code	WVDC	Code	WVCD
3	100	G	16
2	50	F	12
1	25	E	10
		C	6.3

Termination Codes

Code	Material	Wire	Attachment
H	99.8% Au 100 µin min. thickness	Au	Conductive Epoxy or AuSn

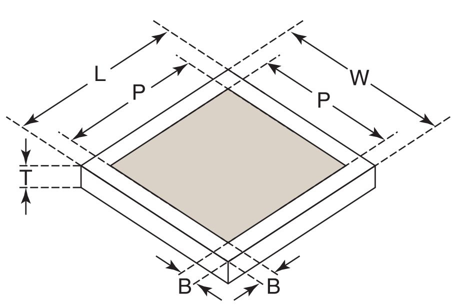
Packaging Codes

Code	Description
5	Waffle Pack, 400 max/waffle
F	Grip Ring, 6.0" diameter standard (low tack)

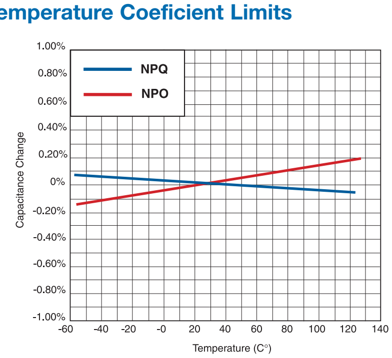
RoHS

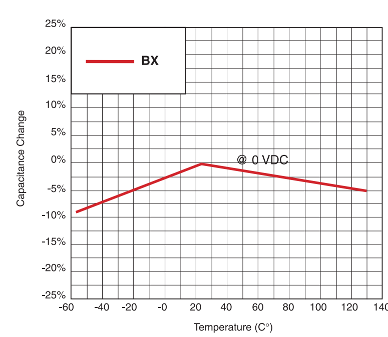
Code	Compliant
N	No
R	Legacy, ended 2012
C	Yes, started January 2013

Dimensions Diagram



Temperature Coeficient Limits





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SELECTION TABLE: BURIED SINGLE LAYER CAPACITORS — WIRE BONDABLE

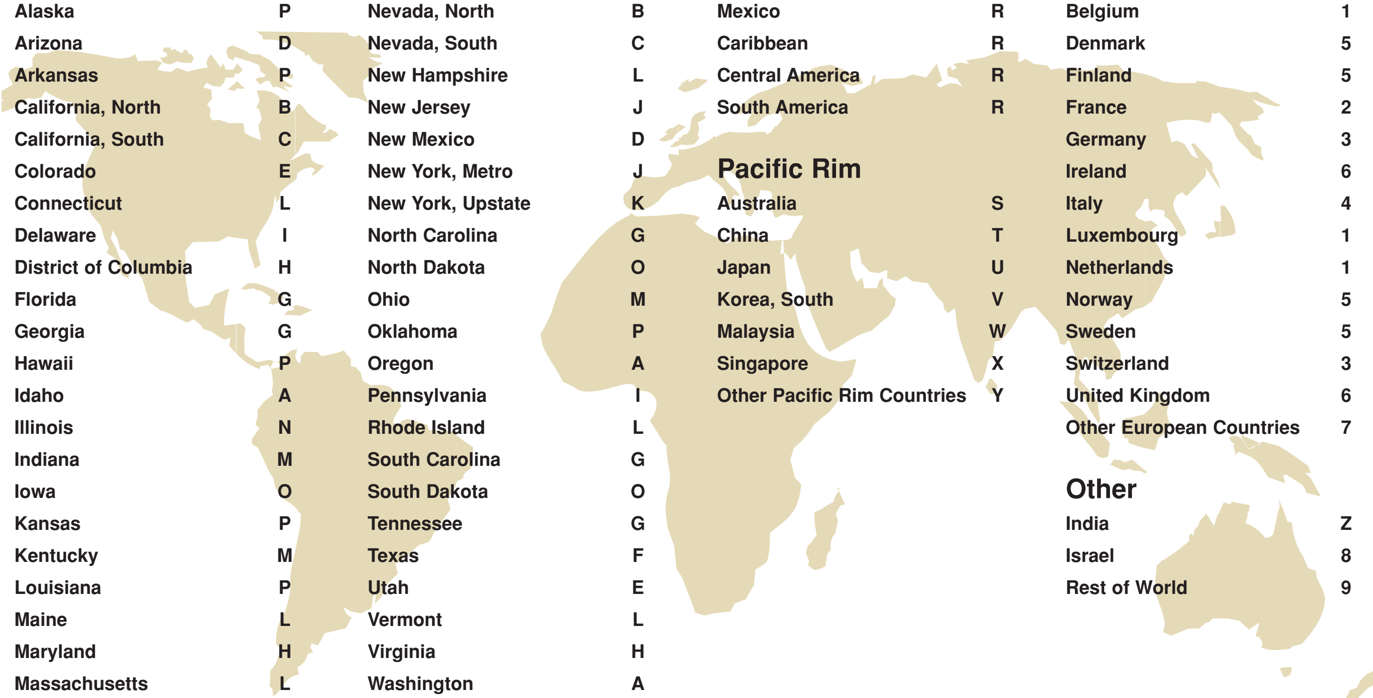
SIZE CODE	W inch (mm)	L inch (mm)	T inch (mm)	Nominal P inch (mm)	Minimum B inch (mm)	Working Voltage (WVDC) Max.	Capacitance (pF)	INDUSTRIAL Test Code L NPQ (pF)	INDUSTRIAL Test Code L NPO (pF)	INDUSTRIAL Test Code L BX (pF)	MILITARY Test Code M NPQ (pF)	MILITARY Test Code M NPO (pF)	MILITARY Test Code M BX (pF)	SPACE Test Code N NPQ (pF)	SPACE Test Code N NPO (pF)	SPACE Test Code N BX (pF)	Modeled Performance Data & S2P Files
1010	0.010 (0.254) ± 0.003 (0.076)	0.010 (0.254) ± 0.003 (0.076)	0.005 (0.127) ± 0.002 (0.051)	0.007 (0.178)	0.0005 (0.013)	50	Min:	0.5	1.5	6.2	0.3	1.0	6.2	—	—	—	Download Kent Simulator from Presidio's Website Web Link
						50	Max:	0.7	2.2	68	0.5	1.5	47	—	—	—	
						25	Max:	0.8	2.4	82	0.6	1.8	56	—	—	—	
						16	Max:	0.9	2.7	100	0.7	2.2	68	—	—	—	
						10	Max:	1.3	3.9	120	0.8	2.4	82	—	—	—	
						6.3	Max:	—	—	300	—	—	—	—	—	—	
1212	0.012 (0.305) ± 0.002 (0.051)	0.012 (0.305) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.009 (0.229)	0.0005 (0.013)	50	Min:	0.8	2.4	10	0.5	1.5	10	0.1	0.6	6.2	
						50	Max:	1.0	3.3	100	0.8	2.4	75	0.5	1.5	56	
						25	Max:	1.2	3.9	120	0.9	2.7	91	0.8	2.4	75	
						16	Max:	1.5	4.3	150	1.0	3.3	100	0.9	2.7	82	
						10	Max:	2.0	6.2	180	1.2	3.9	120	—	—	—	
1515	0.015 (0.381) ± 0.002 (0.051)	0.015 (0.381) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.011 (0.279)	0.001 (0.025)	100	Min:	0.1	0.6	15	0.1	0.6	15	0.1	0.6	15	
						100	Max:	1.5	4.7	150	1.0	3.0	82	0.5	1.5	47	
						50	Max:	2.2	6.8	200	1.5	4.7	100	1.0	3.0	82	
						25	Max:	2.4	7.5	240	1.8	5.6	120	1.5	4.7	100	
						16	Max:	2.7	8.2	270	2.2	6.8	150	1.8	5.6	120	
						10	Max:	3.9	12	330	2.4	7.5	180	—	—	—	
						6.3	Max:	—	—	680	—	—	—	—	—	—	
1717	0.017 (0.432) ± 0.002 (0.051)	0.017 (0.432) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.013 (0.330)	0.001 (0.025)	100	Min:	0.2	0.7	18	0.2	0.7	18	0.2	0.7	18	
						100	Max:	1.8	5.6	180	1.2	3.9	100	0.6	2.0	62	
						50	Max:	2.7	8.2	270	1.8	5.6	150	1.2	3.9	100	
						25	Max:	3.0	10	300	2.2	6.8	180	1.8	5.6	120	
						16	Max:	3.6	12	360	2.7	8.2	220	2.2	6.8	150	
						10	Max:	5.1	15	430	3.0	10	240	—	—	—	
2020	0.020 (0.508) ± 0.002 (0.051)	0.020 (0.508) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.016 (0.406)	0.001 (0.025)	100	Min:	0.2	1.0	22	0.2	1.0	22	0.2	1.0	22	
						100	Max:	2.7	8.2	240	1.8	5.6	150	0.9	2.7	82	
						50	Max:	3.9	10	360	2.7	8.2	220	1.8	5.6	150	
						25	Max:	4.3	12	390	3.3	9.1	240	2.7	8.2	180	
						16	Max:	4.7	15	510	3.9	10	300	3.3	9.1	270	
						10	Max:	6.8	22	560	4.3	12	330	—	—	—	
						6.3	Max:	—	—	1,200	—	—	—	—	—	—	
2222	0.022 (0.559) ± 0.002 (0.051)	0.022 (0.559) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.018 (0.457)	0.001 (0.025)	100	Min:	0.2	1.2	24	0.2	1.2	24	0.2	1.2	24	
						100	Max:	3.0	9.1	270	2.0	5.6	200	1.0	3.0	91	
						50	Max:	4.3	12	390	3.0	9.1	270	2.0	5.6	180	
						25	Max:	4.7	15	430	3.6	10	330	3.0	9.1	270	
						16	Max:	5.1	18	620	4.3	12	390	3.6	10	330	
						10	Max:	7.5	24	750	4.7	15	470	—	—	—	
2525	0.025 (0.635) ± 0.002 (0.051)	0.025 (0.635) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.021 (0.533)	0.001 (0.025)	100	Min:	0.3	1.5	30	0.3	1.5	30	0.3	1.5	30	
						100	Max:	3.6	10	330	2.4	6.8	270	1.2	3.6	100	
						50	Max:	5.1	15	470	3.6	10	360	2.4	6.8	270	
						25	Max:	5.6	18	620	4.3	12	430	3.6	10	330	
						16	Max:	6.2	20	820	5.1	15	510	4.3	12	390	
						10	Max:	9.1	30	1,000	5.6	18	560	—	—	—	
2727	0.027 (0.686) ± 0.002 (0.051)	0.027 (0.686) ± 0.002 (0.051)	0.005 (0.127) ± 0.002 (0.051)	0.023 (0.584)	0.001 (0.025)	100	Min:	0.3	1.5	33	0.3	1.5	33	0.3	1.5	33	
						100	Max:	3.9	12	360	2.4	7.5	330	1.2	3.9	120	
						50	Max:	5.6	18	560	3.9	12	430	2.4	7.5	330	
						25	Max:	6.2	20	750	4.7	15	510	3.9	12	390	
						16	Max:	6.8	22	1,000	5.6	18	620	4.7	15	430	
						10	Max:	10	33	1,200	6.2	20	680	—	—	—	
3030	0.030 (0.762) ± 0.002 (0.051)	0.030 (0.762) ± 0.002 (0.051)	0.007 (0.178) ± 0.002 (0.051)	0.026 (0.660)	0.001 (0.025)	100	Min:	0.6	2.4	51	0.6	2.4	51	0.6	2.4	51	
						100	Max:	6.8	20	620	4.3	12	390	2.2	6.8	200	
						50	Max:	9.1	30	910	6.8	20	560	4.3	12	430	
						25	Max:	10	33	1,000	7.5	24	680	6.8	20	470	
						16	Max:	12	39	1,200	9.1	30	820	7.5	24	750	
						10	Max:	18	56	1,500	10	33	910	—	—	—	
3535	0.035 (0.889) ± 0.002 (0.051)	0.035 (0.889) ± 0.002 (0.051)	0.007 (0.178) ± 0.003 (0.076)	0.031 (0.787)	0.001 (0.025)	100	Min:	0.8	3.3	75	0.8	3.3	75	0.8	3.3	75	
						100	Max:	9.1	30	910	6.2	20	560	3.0	10	300	
						50	Max:	12	43	1,200	9.1	30	820	6.2	20	620	
						25	Max:	15	47	1,500	10	36	1,000	9.1	30	680	
						16	Max:	18	56	1,800	12	43	1,200	10	36	1,000	
						10	Max:	24	75	2,200	15	47	1,500	—	—	—	

A WORD TO THE DESIGN ENGINEER

After the design work is done, outsourcing manufacturing on a global basis is a management option. At Presidio Components, we are striving for complete customer satisfaction which includes "after" service for all of our products.

We added a "Design In" locator code for quick traceability, if needed. Please select your location from the list below and add the appropriate code at the end of the part number.

If you need assistance give us a call at **(858) 578-9390** or email us at **info@presidiocomponents.com.**



UNITED STATES

USA	Code	USA	Code
Alabama	G	Nebraska	P
Alaska	P	Nevada, North	B
Arizona	D	Nevada, South	C
Arkansas	P	New Hampshire	L
California, North	B	New Jersey	J
California, South	C	New Mexico	D
Colorado	E	New York, Metro	J
Connecticut	L	New York, Upstate	K
Delaware	I	North Carolina	G
District of Columbia	H	North Dakota	O
Florida	G	Ohio	M
Georgia	G	Oklahoma	P
Hawaii	P	Oregon	A
Idaho	A	Pennsylvania	I
Illinois	N	Rhode Island	L
Indiana	M	South Carolina	G
Iowa	O	South Dakota	O
Kansas	P	Tennessee	G
Kentucky	M	Texas	F
Louisiana	P	Utah	E
Maine	L	Vermont	L
Maryland	H	Virginia	H
Massachusetts	L	Washington	A
Michigan	N	West Virginia	P
Minnesota	O	Wisconsin, East	N
Mississippi	G	Wisconsin, West	O
Missouri	N	Wyoming	E
Montana	A		

OUTSIDE THE UNITED STATES

Americas	Code	Europe	Code
Canada	R	Austria	3
Mexico	R	Belgium	1
Caribbean	R	Denmark	5
Central America	R	Finland	5
South America	R	France	2
		Germany	3
Pacific Rim		Ireland	6
Australia	S	Italy	4
China	T	Luxembourg	1
Japan	U	Netherlands	1
Korea, South	V	Norway	5
Malaysia	W	Sweden	5
Singapore	X	Switzerland	3
Other Pacific Rim Countries	Y	United Kingdom	6
		Other European Countries	7
		Other	
		India	Z
		Israel	8
		Rest of World	9

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