

# CUSTOM SUBSTRATES & THIN FILM PRODUCTS



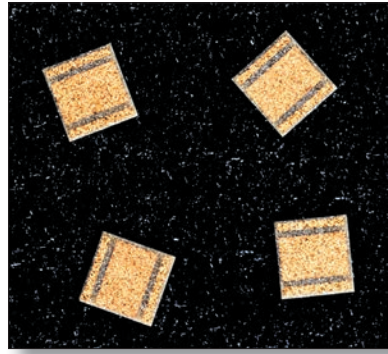
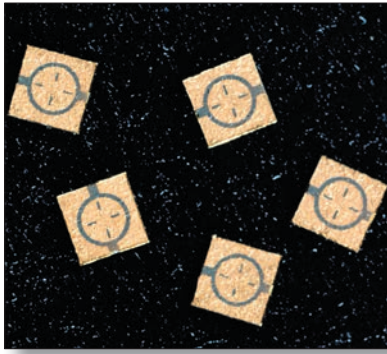
Metalized substrates may also be patterned to customer specifications by chemical etching, abrasive etching, or pattern plating. Please contact the factory for other types of metallization configurations other than a continuous top / bottom plating. Other termination material thicknesses are available upon request.

Johanson Technology offers a wide range of dielectrics for use in application specific environments. These materials are available both lapped and "as fired" condition as well as metalized and non-metalized substrates. Standard substrate sizes range from 0.50" x 0.50" to 1.50" x 1.50", with larger sizes available with special order. Dielectrics are available from 0.005" to 0.050" thick.

METALLIZATION	CODE
TiW / Au	T
TiW / Ni / Au	N
Non-Metallized	X

Note: When metallization is requested on both top and bottom sides, the metallization will wrap around the sides as a standard unless otherwise specified.

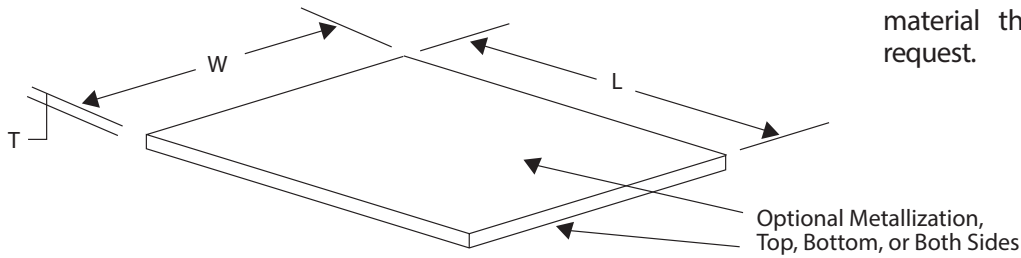
SUBSTRATE MATERIAL	MATERIAL CODE	K	TEMPERATURE COEFFICIENT	OPERATING TEMPERATURE	DISSIPATION FACTOR
ALN *	F	8.8	170 W/M deg K (Th. Cond.)	-55 to +125 deg. C	
Alumina *	G	9.9	P120 +/- 30 ppm / deg C	-55 to +125 deg. C	
Titanate Based	C	23	0 +/- 30 ppm / deg C	-55 to +125 deg. C	< 0.15% @ 1 MHz
Titanate Based	K	39	0 +/- 30 ppm / deg C	-55 to +125 deg. C	< 0.15% @ 1 MHz
Titanate Based	N	76	0 +/- 30 ppm / deg C	-55 to +125 deg. C	< 0.15% @ 1 MHz
Titanate Based	V	160	-1500 +500ppm / -944ppm / deg C	-55 to +125 deg. C	< 0.25% @ 1 MHz
Titanate Based	R	440	-2200 +/- 500 ppm / deg C	-55 to +125 deg. C	< 0.25% @ 1 MHz
Titanate Based	D	725	+/- 10% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	B	1410	+/- 10% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	W	2300	+/- 10% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	X	3150	+/- 15% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	T	4100	+/- 15% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz



FLATNESS (Standard): 1 mil per 100 mils.  
Please contact the factory for other flatness options.

NOTE: The thickness specified in the JTI part number is the thickness of the dielectric material not including the termination materials.

NOTE: The standard thickness of the Nickel barrier (if used) is 3-6 microinches and the thickness of the Gold is available from 80-150 microinches minimum. Other termination material thicknesses are available upon request.



## HOW TO ORDER

500	M	12	T	045	K	G	S	R	-	T	***	-	AA
<p><b>VOLTAGE CODE</b> 1st two digits are significant; third digit denotes number of zeros, R denotes decimal point.</p> <p>6R0 = 6VDCW 250 = 25 VDCW 101 = 100 VDCW 501 = 500 VDCW 102 = 1000 VDCW 502 = 5000 VDCW</p>	<p><b>PART TYPE</b> M = Substrate</p>	<p><b>DIELECTRIC CODE</b> B = X7P C = NPO D = X7P F = ALUMINUM NITRIDE G = ALUMINA K = NPO L = NEGTC N = NPO R = NEGTC T = X7R U = NEGTC V = NEGTC W = X7R X = X7R Y = Y5V Z = Z5U</p>	<p><b>THICKNESS CODE</b> Thickness in mils 3rd digit is the decimal point</p> <p>eg: 050 = 5.0 mils eg: 065 = 6.5 mils eg: 128 = 12.8 mils</p>	<p><b>GS = Back side metalization code</b> X = Unterminated T = Thin Film TiW-AU N = Thin Film TiW-NI-AU S = Special</p>	<p><b>METALIZATION</b> A or Blank = Not applicable S = Seed layer gold only P = 100 micro" min. std X = Special</p> <p>Use blank in the S column instead of "A" only if it the last character in the part#</p>	<p><b>THICKNESS TOLERANCE CODE</b> A = ±0.5 mil B = ±1.0 mil C = ±2.0 mil</p> <p>J = ±5.0 % K = ±10.0 % L = ±15.0 % M = ±20.0 % X = Special</p>	<p><b>RT = Top side metalization code</b> X = Unterminated 9 = Thick film G = Thick film + Au H = Thick film + Ni-Au T = Thin Film TiW-AU N = Thin Film TiW-NI-AU R = TaN-TiW-Au V = TiW-Ni-Sn E = 80Au/20Sn C = TiW-Ni-Cu-Ni-Au S = Special Blank = Both Sides are the Same</p>	<p><b>METALIZATION</b> A or Blank = Not applicable S = Seed layer gold only P = 100 micro" min. std X = Special</p> <p>Leave R and T blank if both sides have the same type metalization.</p> <p>If metalization types are different, then back side is scribed with an X.</p>		<p><b>NON-STANDARD CODE</b> Defines non-standard product marking, lead-ing, testing, dielectric, cust, code, non-std. thk., L, W, endband &amp; size codes, etc...</p>	<p>*** - ASTERISK Required (place holders)</p>		