# 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.

METALIZATION	CODE
TiW / Au	T
TiW / Ni / Au	N
TiW / Ni / Sn	V
TaN / TiW / Au	R
TiW / Ni / Cu / Ni / Au	C
80Au / 20 Sn	E
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.
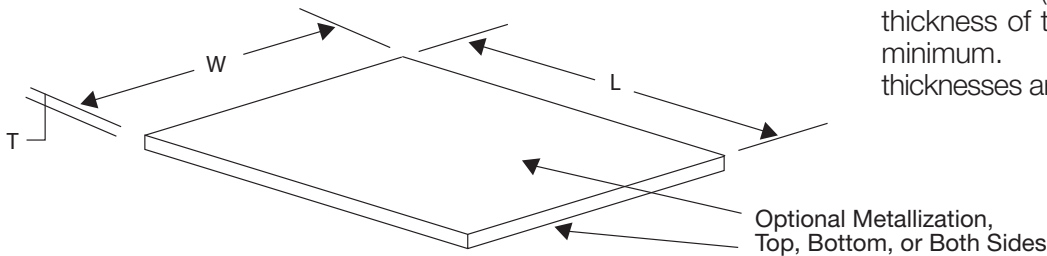
SUBSTRATE MATERIAL	MATERIAL CODE	K	TEMPERATURE COEFFICIENT	OPERATING TEMPERATURE	DISSIPATION FACTOR
ALN *	F	8.8	170 W/M deg K (Th. Cond.)	-55 to +125 deg. C	
Alumina *	G	9.9	P120 +/- 30 ppm / deg C	-55 to +125 deg. C	
Titanate Based	C	23	0 +/- 30 ppm / deg C	-55 to +125 deg. C	< 0.15% @ 1 MHz
Titanate Based	K	37	0 +/- 30 ppm / deg C	-55 to +125 deg. C	< 0.15% @ 1 MHz
Titanate Based	N	80	0 +/- 30 ppm / deg C	-55 to +125 deg. C	< 0.15% @ 1 MHz
Titanate Based	U	120	-750 +/- 120 ppm / deg C	-55 to +125 deg. C	< 0.25% @ 1 MHz
Titanate Based	V	160	-1500 +/- 300 ppm / deg C	-55 to +125 deg. C	< 0.25% @ 1 MHz
Titanate Based	R	280	-750 +/- 120 ppm / deg C	-55 to +125 deg. C	< 0.25% @ 1 MHz
Titanate Based	L	350	-750 +/- 120 ppm / deg C	-55 to +125 deg. C	< 1.50% @ 1 MHz
Titanate Based	D	600	+/- 10% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	B	1200	+/- 10% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	W	2000	+/- 10% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	X	2700	+/- 15% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	T	4000	+/- 15% (-55 to +125 C)	-55 to +125 deg. C	< 2.50% @ 1 kHz
Titanate Based	Z	8000	+22/-56% (+10 to +85 C)	-55 to +125 deg. C	< 4.00% @ 1 kHz
Titanate Based	Y	12000	+22/-82% (-30 to +85 C)	-55 to +125 deg. C	< 4.00% @ 1 kHz
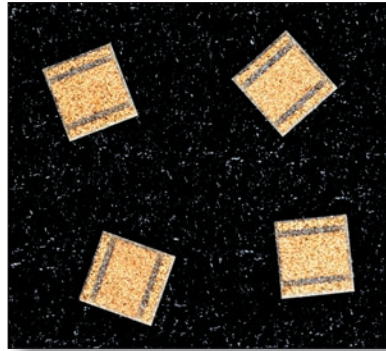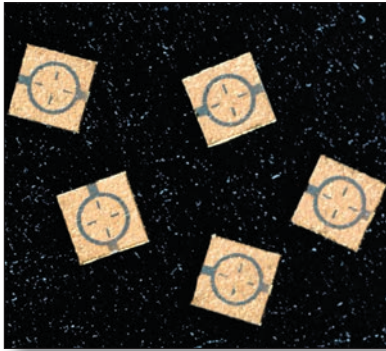
FLATNESS (Standard): 1 mil per 100 mils. Please contact the factory for other flatness options.

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 10 - 20 microinches (for non-bordered parts) and is 20 - 50 microinches (for bordered parts), and the thickness of the Gold is 100 microinches minimum. Other termination material thicknesses are available upon request.

Optional Metallization, Top, Bottom, or Both Sides

How to Order

| 500 | M | 12 | T | 045 | K | G | S | R | - | T*** | - | AA |

VOLTAGE CODE

1st two digits are significant; third digit denotes number of zeros, R denotes decimal point.

6R0 = 6VDCW
250 = 25 VDCW
101 = 100 VDCW
501 = 500 VDCW
102 = 1000 VDCW
502 = 5000 VDCW

PART TYPE

M = Substrate

SIZE CODES

Use size codes for dimension

CODE   DIM.
M10 = 1.0" x 1.0"
M12 = 1.2" x 1.2"
M15 = 1.5" x 1.5"
M20 = 2.0" x 2.0"
etc...

DIELECTRIC CODE

A = NPO/COG
B = BX/X7R
C = NPO
D = BX
F = ALUMINUM NITRIDE
G = ALUMINA
K = NPO
L = NEG TC
N = NPO
Q = P90/Hi Q
R = NEG TC
T = X7R
U = NEG TC
V = NEG TC
W = X7R
X = X7R
Y = Y5V
Z = Z5U

THICKNESS CODE

Thickness in mils 3rd digit is the decimal point

eg: 050 = 5.0 mils
eg: 065 = 6.5 mils
eg: 128 = 12.8 mils

GS = Back side metalization code

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

METALIZATION

A or Blank = Not applicable
S = Seed layer gold only
P = 100 micro" min. std
X = Special

Use blank in the S column instead of "A" only if it the last character in the part#

THICKNESS TOLERANCE CODE

A = ± 0.5 mil
B = ± 1.0 mil
C = ± 2.0 mil

J = ± 5.0 %
K = ± 10.0 %
L = ± 15.0 %
M = ± 20.0 %
X = Special

RT = Top side metalization code

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

METALIZATION

A or Blank = Not applicable
S = Seed layer gold only
P = 100 micro" min. std
X = Special

Leave R and T blank if both sides have the same type metalization.

If metalization types are different, then back side is scribed with an X.

NON-STANDARD CODE

Defines non-standard product marking, leading, testing, dielectric, cust, code, non-std. thk., L, W, endband & size codes,etc...

*** - ASTERISK
Required (place holders)