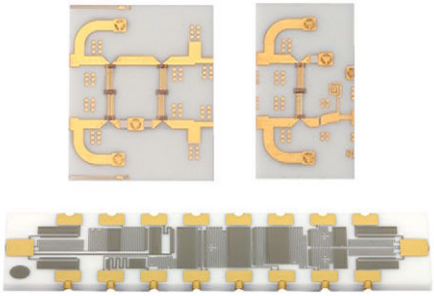
Custom Substrates - Metal Via / Multilayer / Lumped Element



FEATURES

- Plated or filled via technology
- Mulitlayer and overcoat patterning
- Lumped element custom substrates
- Al_2O_3, AlN, and BeO substrate drilling and shaping
- TaN and NiCr resistor films
- Metallization on 1,2, or 4 surfaces
- Various substrate materials
- Sputtered / plated metal systems
- Custom sizes from 0.020" x 0.020" to 4.000" x 4.000"
- Quick delivery available

APPLICATIONS

Vishay EFI custom interconnect substrates are used in military, aerospace, hybrid circuit, telecommunications, microwave, and industrial applications. These custom interconnect substrates are manufactured to be used in heat transfer connectors, top to bottom connectors, and RF / microwave designs. Surface connections can be made by plated thru-holes, edge wraps, or filled via technologies. Custom cutouts of various sizes and shapes can also be created and used to fit into almost any size and shape. The custom interconnect substrates are manufactured using Vishay Electro-Films (EFI) sophisticated thin film equipment and manufacturing technology. The custom interconnect substrates are 100 % electrically tested (when applicable) and visually inspected to MIL-STD-883, method 2032 class H or K.

THIN FILM DESIGN GUIDELINES

For further detail, please reference document: Thin Film Design Guide for Custom Substrates (www.vishay.com/doc?49109)

SUBSTRATE MATERIALS

For substrate materials and their properties, please reference datasheet: SPF1 (www.vishay.com/doc?61105)

METAL SYSTEM AND CONDUCTOR PATTERNING

For metal patterning design guidelines please reference datasheet: SPF2 (www.vishay.com/doc?61110)

THIN FILM RESISTORS

For thin film resistors and their properties and design guidelines, please reference datasheet:
PSS (www.vishay.com/doc?61111)

PROTECTIVE COATINGS

For protective coatings or overcoat options and their properties and design guidelines, please reference datasheet PSS:
PSS (www.vishay.com/doc?61111)

FRONT TO BACK CONTINUITY

For designs requiring metal or electrical connection from the top to the bottom of the substrate, metal via connections will be used. Metalized Edge Wraps are chosen for applications where soldering to the side of the substrate is desired for connection to the PCB or module design. Plated thru-holes are used for applications where the module design may require alignment or soldering pins to be inserted into the holes. Filled vias are used for applications where the strongest electrical connection is needed or preventing solder migration to the backside. See Fig. 1 below for edge wrap, plated thru-hole, and filled via pictorial representation.

METALLIZED EDGE WRAPS	
Min. distance from wrap edge to pattern edge	0.005"
Min. tolerance from wrap center to pattern edge	± 0.002"
Wrap diameter (as measured from exit side)	0.8 to 2.0 x substrate thickness

PLATED THRU-HOLES	
Min. distance from hole edge to pattern edge	0.005"
Min. tolerance from hole center to pattern edge	± 0.002"
Hole diameter (as measured from exit side)	0.8 to 2.0 x substrate thickness
Min. hole center to hole center spacing	2 x hole diameter

FILLED VIAS	
Min. distance from via edge to pattern edge	0.0025"
Min. tolerance from via center to pattern edge	± 0.002"
Min. via center to via center spacing	2 x via diameter
Preferred via diameter (as measured from exit side)	0.8 x substrate thickness
Via diameter range (as measured from exit side)	0.6 - 1.5 x substrate thickness
Min. via diameter	0.007"
Max. via diameter	0.040"

Note

- These rules apply to the non-vented via side

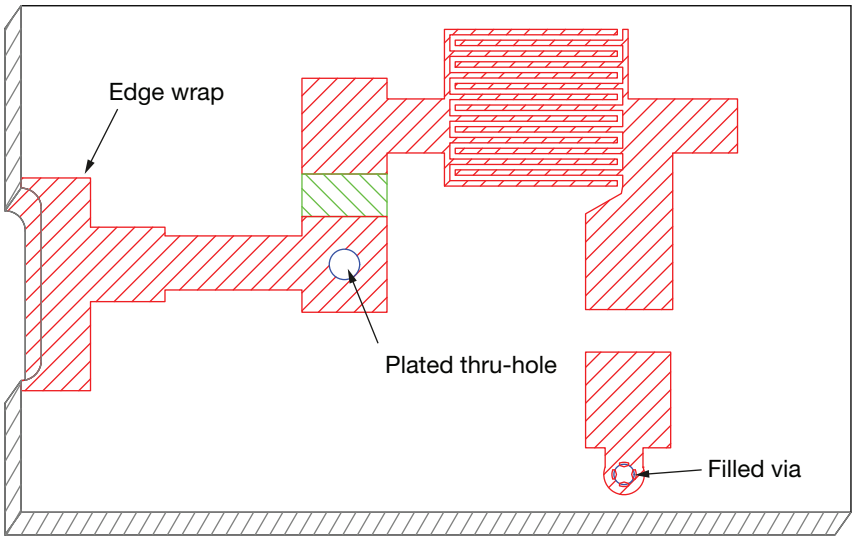


Fig. 1

FILLED VIA VENT NOTES	
Min. distance from via vent edge to pattern edge	0.004"

Note

- Via vents are required on one side of the substrate if metals are plated
- See Fig. 2 for via vent pattern example

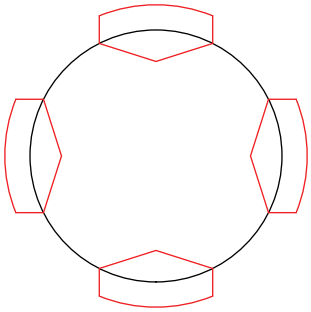


Fig. 2

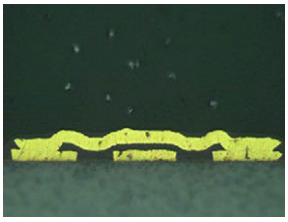
SHAPES AND CUT-OUTS

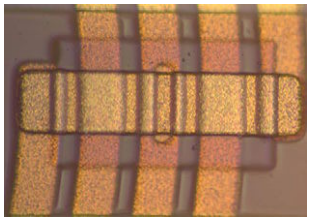
Many circuit designs require custom substrates with different shapes and holes cutout of the parts. These include cutting out material internal and external to the overall part size and shape.

PART SHAPE / CUT-OUTS	
Min. distance from cut-out edge to pattern edge	0.003"
Min. tolerance from cut-out edge to pattern edge	± 0.002"
Min. tolerance of cut-out feature	± 0.003"
Min. distance between cut-outs	0.050"

MULTILAYER AND AIR BRIDGE

For certain complex designs multiple layers of metal and / or interlevel dielectrics are required. Vishay Electro-Films has developed precision patterning and layering techniques where ± 0.0001" pattern tolerance and ± 0.0005" layer to layer alignment is achievable.





For Multilayer designs that require an interlevel dielectric the following two choice are currently available:

DIELECTRIC	TYPICAL THICKNESS	PATTERN TOLERANCE	DIELECTRIC CONSTANT
Silicon nitride (1)	4000 Å to 6000 Å	± 0.002"	-
Polyimide	50 000 Å to 80 000 Å	± 0.002"	3.2 at 1 MHz

Note

(1) Silicon nitride can also be used to integrate a capacitive element to the design if needed

In applications where lange couplers and cross-metal patterning are needed, air bridges can be used to connect different metal patterns using polyimide supported bridges. These bridges require several design guidelines for layering the base metal, polyimide, and bridge metal into the optimum air bridge design.

Fig. 3 can be used as a guideline for a typical lange coupler / air bridge set-up. The dimensions listed in the bubble detail picture are considered minimums for any design. For more specific design layout guidelines, contact the factory for more information.

MULTI-LEVEL CROSSOVER DESIGN PARAMETERS			
PARAMETER		MINIMUM VALUE (in µm)	COMMENTS
Dimension	Crossover thickness	0.0001 (2.5)	Minimum
A	Crossover width	0.001 (25)	0.0001 in crossover to conductor pullback
B	Crossover length	0.003 (75)	Minimum
C / D	Insulator dimension	Length: 0.0015 (37.5) Width: 0.003 (76)	0.0025 (63) insulator-to-conductor overlap
	Insulator material		Polyimide
E / F	Encapsulation dimension	Crossover width: +0.0015 (37.5) Crossover length: +0.003 (76)	These values are added to the insulator dimension
	Encapsulation material		Polyimide

Note

- These rules apply to the non-vented via side

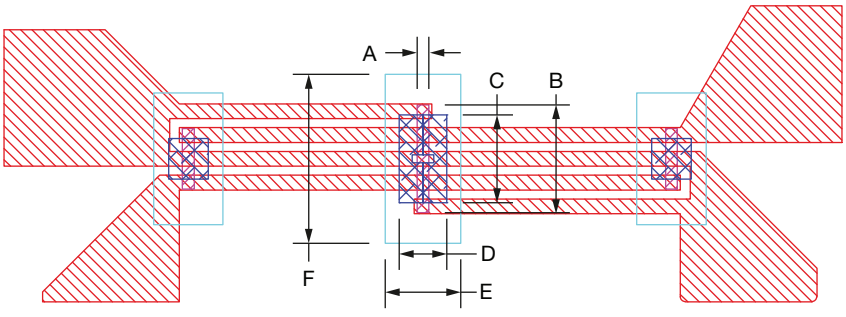


Fig. 3

GLOBAL PART NUMBER INFORMATION

Custom Global Part Number: INT206822-03Q

Custom Global Part Number Description: interconnect custom 206822-03Q

I	N	T	2	0	6	8	2	2	-	0	3	Q
MODEL			INTERNAL P/N							INTERNAL REVISION		VARIANT

Q = metalized thru-holes, filled vias, cut-outs, multilayer
Z = SLR

Note

- Z = SLR, see separate SLR datasheet (www.vishay.com/doc?61068)

CONTACT INFORMATION

For design assistance, contact: efi@vishay.com

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.