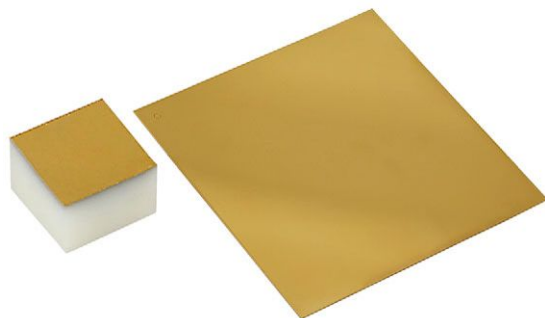


Thin Film Metallized Plates - Custom Substrates



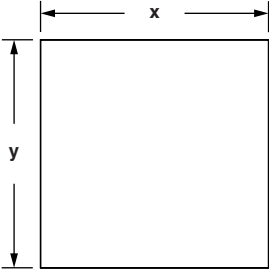
FEATURES

- Metalization on 1, 2, or 6 surfaces
- Various substrate materials
- Tantalum nitride or nickel chromium resistor material
- Sputtered / plated metal systems
- Sizes from 0.020" x 0.020" to 4.500" x 4.500"
- High volume
- Quick delivery available

APPLICATIONS

Vishay EFI metallized plates can be used as stand-offs, jumpers or bonding pads in hybrid packages when diced to small sizes; they are also available with no metallization (bare ceramic) for use as spacers or insulators. Larger sized plates can be used where the customer wants to pattern and etch substrates in-house.

SUBSTRATE MATERIALS				
MATERIAL CODE	MATERIAL	SURFACE FINISH (μ " CLA)		APPLICATION
A	Alumina (99.6)	A L P	< 3 front / < 4 back as-fired < 12 lapped < 1 polished	Cost effective material with wide range of applications
B	Beryllium oxide	L P	15 to 40 lapped < 3 polished	Highest thermal conductivity (285 W/mC)
N	Aluminum nitride	L P	10 to 20 lapped < 2 polished	High thermal conductivity (170 W/mC)

PLATE SIZE	
	
X (mils)	Y (mils)
20	20
50	50
100	100
200	200
500	500
1000	1000
2000	2000
4500	4500

Note

- For any plates smaller than 1.000" x 1.000" or where plate size is not available, metal is only available on one or two surfaces (front or back)

**RESISTOR MATERIAL**



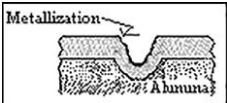
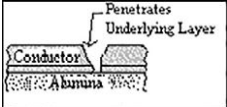
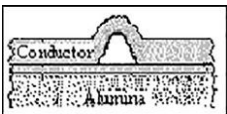
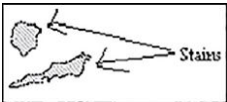
Typical reasons for using NiCr resistor material are for long term stability and high sheet rho. Typical recommended uses for TaN are for non-hermetic applications where self-passivation is important.

RESISTOR MATERIAL			
RESISTOR CODE	RESISTOR MATERIAL	SHEET RHO (Ω/SQ) $\pm 20\%$	TCR (ppm/$^{\circ}\text{C}$) TYPICAL VALUES
A	NiCr	25	± 50
B	NiCr	50	± 100
C	NiCr	100	± 200
D	NiCr	200	± 250
1	TaN	25	± 50
2	TaN	50	± 100
3	TaN	75	± 250

METAL STACK			
METAL CODE	METAL STACK	TYPICAL APPLICATION	TYPICAL ATTACHMENT METHOD
1	TiW (500 Å to 1000 Å) / Au (50 μm min.)	Au and Al wirebondable	Epoxy
2	TiW (500 Å to 1000 Å) / Au (100 μm min.)	Au and Al wirebondable	Epoxy
3	TiW (500 Å to 1000 Å) / Au (15 μm to 40 μm) / Ni (20 μm to 80 μm) / Au (50 μm min.)	Au and Al wirebondable and solderable	Epoxy or solder
4	TiW (500 Å to 1000 Å) / Au (15 μm to 40 μm) / Ni (20 μm to 80 μm) / Au (100 μm min.)	Au and Al wirebondable and solderable	Epoxy or solder
5	TiW (500 Å to 1000 Å) / Pd (1500 Å to 2500 Å) / Au (50 μm min.)	Au and Al wirebondable and solderable	Epoxy or solder
6	TiW (500 Å to 1000 Å) / Pd (1500 Å to 2500 Å) / Au (100 μm min.)	Au and Al wirebondable and solderable	Epoxy or solder
7	Cr (500 Å to 1500 Å) / Cu (5000 Å to 7000 Å) / Au (100 μm min.)	Au and Al wirebondable	Epoxy
8	Cr (500 Å to 1500 Å) / Cu (500 μm min.) / Ni (20 μm to 80 μm) / Au (100 μm min.)	Au and Al wirebondable and solderable. High power applications for low metal resistivity	Epoxy or solder

VISUAL INSPECTION

VEFI uses internal visual inspection criteria as shown in the table below for metal non-patterned substrates. For any plates smaller than 1.000" x 1.000" or where plate size is not available, metal burrs will be acceptable along part edges where plates are sawn to size.

SURFACE PERFECTION INSPECTION CRITERIA ⁽¹⁾				
SCHEMATIC ILLUSTRATION	DEFECT TYPE	DEFECT SIZE	FRONT ⁽²⁾	BACK ⁽³⁾
	NODULES BUMPS	> 10 mil dia. (>0.254 mm)	0.25/sq"	0.25/sq"
		5 mil to 10 mil dia. (0.127 mm to 0.254 mm)	1/sq"	2/sq"
		3 mil to 5 mil dia. (0.076 mm to 0.127 mm)	3/sq"	6/sq"
		2 mil to 3 mil dia. (0.05 mm to 0.076 mm)	3/sq"	6/sq"
		< 2 mil dia. (< 0.05 mm)	NIF	NIF
	METALIZATION VOIDS PINHOLES	> 2 mil dia. (> 0.05 mm)	None	None
		1 mil to 2 mil dia. (0.0254 mm to 0.05 mm)	5/sq"	10/sq"
		< 1 mil high (< 0.0254 mm)	NIF	NIF
	CRATERS DEPRESSIONS (hole into ceramic)	> 10 mil dia. (> 0.254 mm)	None	None
		5 mil to 10 mil dia. (0.127 mm to 0.254 mm)	1/sq"	3/sq"
		2 mil to 5 mil dia. (0.05 mm to 0.127 mm)	4/sq"	4/sq"
		1 mil to 2 mil dia. (0.0254 mm to 0.05 mm)	15/sq"	15/sq"
		< 1 mil dia. (0.0254 mm)	NIF	NIF
	SCRATCHES ⁽⁴⁾ (excluding surface abrasions)	> 1/2 mil wide (> 0.0127 mm)	1/sq"	NIF
		< 1/2 mil wide (< 0.0127 mm)	NIF	NIF
	BLISTERS	> 10 mil dia. (> 0.254 mm)	None	None
		5 mil to 10 mil dia. (0.127 mm to 0.254 mm)	1/sq"	1/sq"
		2 mil to 5 mil dia. (0.05 mm to 0.127 mm)	2/sq"	2/sq"
		1 mil to 2 mil dia. (0.0254 mm to 0.05 mm)	4/sq"	4/sq"
		1/2 mil to 1 mil dia. (0.0127 mm to 0.0254 mm)	6/sq"	6/sq"
		1/4 mil to 1/2 mil dia. (0.006 mm to 0.0127 mm)	16/sq"	16/sq"
		< 1/4 mil dia. (< 0.006 mm)	NIF	NIF
	STAINS-SPOTS ⁽⁵⁾	> 4 mil. (> 0.1 mm)	None	None
		2 mil to 4 mil (0.05 mm to 0.1 mm)	1/sq"	2/sq"
		1 mil to 2 mil (0.0254 mm to 0.05 mm)	2/sq"	4/sq"
		< 1 mil (< 0.0254 mm)	3/sq"	5/sq"

Notes

- NIF = not inspected for
- (1) Exclusion area for 1" x 1" and greater plates: Front and Rear: 100 mils (2.54 mm) from substrate edge
- (2) A-face 100 % inspection method: 3x to 8x magnification. Higher magnification may be used for defect verification
- (3) B-face 100 % inspection method: Unaided eye. Higher magnification may be used for defect verification
- (4) Scratch or probe mark exposing underlying material that is > 200 mils long
- (5) Contamination: Not removable by distilled water or common solvents



GLOBAL PART NUMBER INFORMATION

Standard Global Part Number: SPF1AA02021A11BX

Global Part Number Description: SPF1 Al₂O₃ As-Fired 20 mils x 20 mils 10 mils Thick NiCr 25 Ω/sq Front: TiW / Au (50 μ" min.)
Back: TiW / Au (50 μ" min.) BX

S	P	F	1	A	A	0	1	0	1	1	A	1	1	B	X
MODEL	MATERIAL	FINISH	PLATE SIZE X (MILS)	PLATE SIZE Y (MILS)	THICKNESS (MILS)	RESISTOR	METAL FRONT	METAL BACK	PACKAGING CODE						
SPF1	A = Al ₂ O ₃ B = BeO N = AlN	A = as-fired L = lapped P = polished	02 = 20 05 = 50 10 = 100 20 = 200 50 = 500 11 = 1000 21 = 2000 45 = 4500	02 = 20 05 = 50 10 = 100 20 = 200 50 = 500 11 = 1000 21 = 2000 45 = 4500	1 = 10 2 = 15 3 = 20 4 = 25	N = none Otherwise see Resistor Material table	N = none Otherwise see Metal Stack table	N = none Otherwise see Metal Stack table	BX = box 1 min. / 1 mult. W1 = waffle pack 1 min. / 1 mult.						

Custom Global Part Number: SPF1 xxxx - xx x

S	P	F	1						-			
MODEL				VEFI ASSIGNED NUMBER					INTERNAL REVISION		VARIANT	
											A = ALN B = Be0 0 = coating	

Note

- Plates 1" x 1" and greater will be individually packaged in glassine envelopes in the box

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.