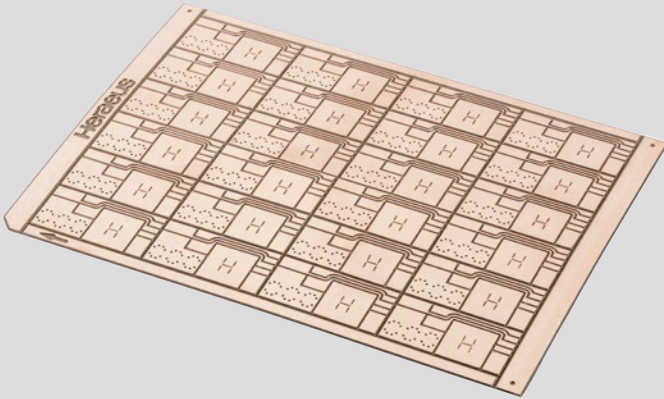


Condura®.classic Metal Ceramic Substrates Condura.extra DPIS⁽¹⁾



Alumina DCB facts

- Alumina ceramic Al_2O_3 (96 %)
 - Thicknesses⁽²⁾: 0.25 mm/Condura.extra 0.32 mm/0.38 mm/0.63 mm
- Direct Copper Bonding Cu-OFE
 - Thicknesses⁽²⁾: 0.2 mm/0.25 mm/0.3 mm/0.4 mm
- Single unit or master card size 7 " x 5 " (usable area)
- Surface finish: bare Cu, Ni, Ni/Au (others planned)

Key features

- Pre-qualified solutions & optimized surfaces
- Fast sample delivery target for standard material combinations
 - Europe: 5 working days
 - Worldwide: 15 working days (after drawing approval)
- Improved warpage / customization possible

Main properties raw Al_2O_3

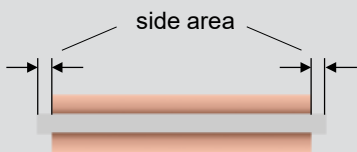
	Rating	Unit
Thermal conductivity @ 20 °C	≥ 20	W/m.K
Bending strength	> 450	N/mm ²
Young's modulus	≥ 300	GPa
Coefficient of thermal expansion (Al_2O_3) @ 100 °C - 600 °C	6.7 - 8.7	ppm/k

Condura®.classic Design Rules Al₂O₃ DPIS⁽¹⁾

Material properties raw Al₂O₃⁽³⁾

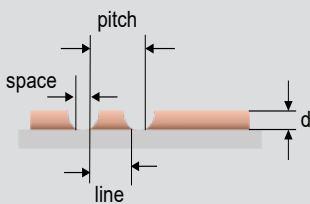
	Rating	Unit
Density	> 3.73	g/cm ³
Electrical resistivity	≥ 10 ¹³	Ohm·cm
Dielectric strength	> 15	kV/mm

Copper free area



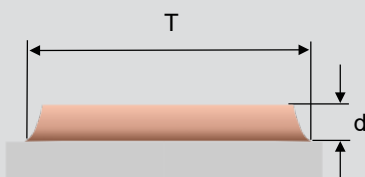
Thickness Cu [mm]	Min. side area [mm]
0.20	0.20
0.25	0.23
0.30	0.25
0.40	0.35

Structuring



Thickness Cu [mm]	Min. space [mm]	Min. line [mm]	Min. pitch [mm]
0.20	0.40	0.40	0.80
0.25	0.45	0.45	0.90
0.30	0.50	0.50	1.00
0.40	0.60	0.60	1.20

Etching tolerance

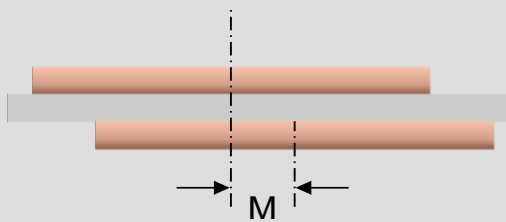


Tolerance length & width [mm]	Thickness Cu [mm]
T _{typ.} = ± 0.15	d = 0.2
T _{typ.} = ± 0.20	d ≤ 0.3
T _{typ.} = ± 0.20	d ≤ 0.4

Condura®.classic Design Rules Al₂O₃ DPIS⁽¹⁾

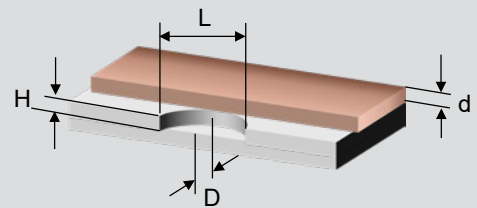
Tolerance and chip off

Tolerance



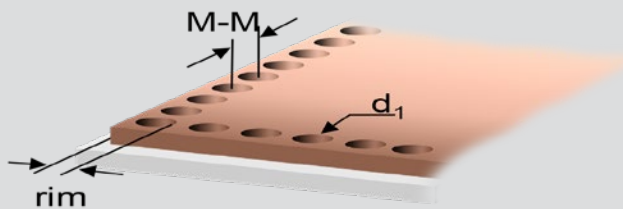
Mismatch $M \leq 0.1$ mm
Tolerance of total thickness = + 7 % / -10 %

Chip-off at ceramic edge



Length $L \leq d$
Depth $D \leq \frac{1}{2}d$
Height $H \leq \frac{1}{2}d$

Dimple structure



Thickness Cu [mm]	Dimple area rim [mm]	Dimple diameter d ₁ [mm]	Dimple pitch M-M [mm]
0.20			
0.25		To be agreed	
0.30			
0.40			

Dimensions

General dimensions	Rating (mm)
Master card	138 x 190.5
Max. usable area	127 x 178
Minimum dimension for ceramic thickness ≤ 0.63 mm	10 x 10 (smaller on request)

Tolerances of single parts	Rating (mm)
Ceramic thickness ≤ 0.63 mm	+ 200 μ m - 50 μ m

Warpage behavior depends on specific layout, single part size and material combination and can only be specified after initial sample preparation.

Surface plating

Plating Method	Thickness (μ m)
Electroless Ni	3 - 7 (9% \pm 2% P)
	Ni 3 - 7 (9% \pm 2% P)
Electroless NiAu	Au Class 1: 0.01 - 0.05
	Au Class 2: 0.03 - 0.13

Condura®.classic Design Rules Al₂O₃ DPIS⁽¹⁾

Metal & hole properties

Roughness		Minimum hole diameter	
Rmax = 50 µm		d _{hole} = 1 mm	
Ra ≤ 3.5 µm	Ra ≤ 1 µm	Electrical conductivity raw copper G _{Cu} = 58 · 10 ⁶ S/m	
Rz ≤ 24 µm	Rz ≤ 7 µm		
Different roughness by request		Thickness Cu	Copper peeling Strength
		0.30mm	> 4 N/mm

HET Academy R&D Application Center

Besides offering Assembly Materials, Bonding Wires and Metal Ceramic Substrates, Heraeus Electronics provides matching material solutions and R&D oriented partnerships to create individual solutions.

Application conditions and assembly optimization

Thermal shock test cycles	Customized surface for assembly process
-55 °C up to +150 °C Under Investigation	Optimization of surface and assembly process parameters available or in development cooperation for: <ul style="list-style-type: none"> ■ Sintering ■ Solder wetting ■ Heavy wire bondability

10.2019, Layout: CF

Heraeus Electronics offers:

- Reliable IATF 16949 certified supply of:
 - ✓ Condura®.prime AMB-Si₃N₄ (active metal brazed Si₃N₄)
 - ✓ Condura®.extra DCB-ZTA (zirconia-toughened alumina)
 - ✓ Condura®.classic DCB-Al₂O₃ (direct copper bonded Al₂O₃)
- Condura® + for example:
 - ✓ Engineering Services (Simulation, Prototype Design & Assembly, Testing and Qualification, Material Analysis)
 - ✓ Pre-applied sinter / solder
- To be your competent **one-stop materials solutions partner!**

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