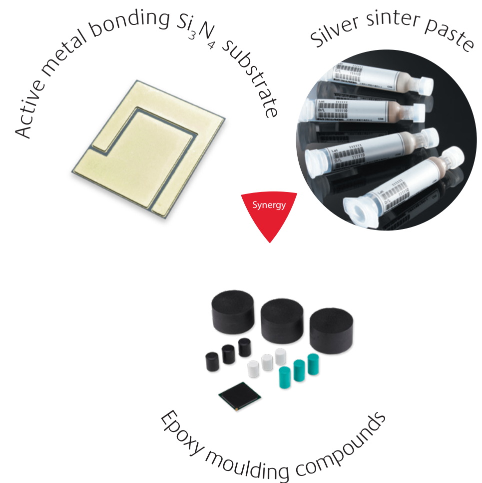
KYOCERA

Power Module Ceramic Substrates

Total material solution for EV/HEV inverters

Kyocera provides advanced Si_3N_4 power module substrate to innovate highly efficient automotive inverters.

KYOCERA Synergy



APPLICATIONS

- HEV / EV inverters
- Power switch

FEATURES

- High reliable silver plating to silver-sintering paste for SiC chip assembly
- High thermal conductivity / high flexural strength
- Si_3N_4 (ceramic): 85 W/mK / 820 MPa
- Copper thickness: ~ 0.8 mmt
- Fine pitch design rule: 1.0 mm gap between copper patterns

AMB SUBSTRATE ROADMAP
Automotive Inverters

New Si_3N_4 85 W/mK (2016–2020)

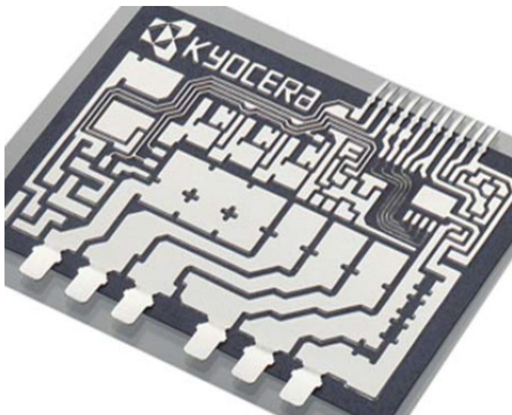
	CY	2015	2016	2017	2018	2019	2020
Product roadmap	AMB Silicon nitride substrate	Case type (substrate size > 20 mm): 0.3 t Cu/0.32 t Si_3N_4 Au plating	0.3 t Cu/0.32 t Si_3N_4 Ag plating; 0.5 t Cu/0.32 t Si_3N_4 Ag plating				0.5t Cu/0.25 Si_3N_4 Ag plating (all in mm)
		Mould type (substrate size < 20 mm)	0.8 t Cu/0.32 t Si_3N_4 Ag plating				4 t Cu/0.32 t Si_3N_4 Ag plating
Tech. trend	Thermal conductivity	58 W	58 W/85 W				
	Insulation voltage	400 V–4 kV					
	TCT	-40 ~ 175 °C					200 °C
	Plating	NiPdAu	NiPdAg				Electrolytic Ag
		full	full/selective				selective

KYOCERA Fineceramics GmbH · Fritz-Mueller-Strasse 27 · 73730 Esslingen / Germany
Contact Person: Mr Florian Wurster · Tel: +49 (0)711-93 93 48 26 · E-Mail: florian.wurster@kyocera.de · www.kyocera.de

Copyright © 2018 KYOCERA Fineceramics GmbH, October 2018. We reserve the right to make changes without prior notice.

KYOCERA

AMB Ceramic Substrate for Power Module Applications

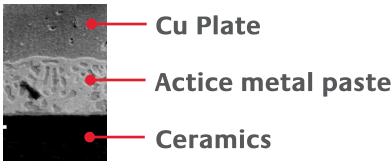


FEATURES

- High reliability (AMB Technology)
- Variety of platings (Ni, Ni/Au, NiPdAu, Ni/Pd/Ag, Ag)
- High thermal conductivity
- Multilayer structure feasible
- Different Cu thickness plates on same substrate
- Various connector possibilities

Reliability AMB process

- Active Metal Bonding
- Ti Compound - alloy (Ag-Cu)
- High adhesion strength to Ceramics

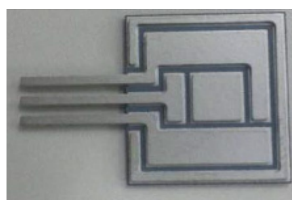


Plating options

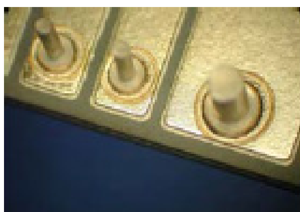
- Partial silver plating
- Direct silver plating
- Nickel-palladium-gold or silver plating
- Nickel-gold plating
- Nickel plating

Connector Technologies

Lead type



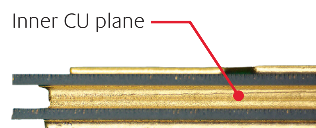
Long lead type



Cu PIN type

Screwable (SiN) type

Multilayer structure



- Multilayer AMB structure
- Low inductance
- 3 dimensional routing

Materials availability

- Si_3N_4: High flexural strength (85 W/mK)
- AlN: High thermal conductivity (170WmK)
- Al_2O_3: Low cost applications

Copyright © 2018 KYOCERA Fineceramics GmbH, September 2018. We reserve the right to make changes without prior notice.

KYOCERA Fineceramics GmbH · Fritz-Mueller-Strasse 27 · 73730 Esslingen / Germany
Contact Person: Mr Florian Wurster · Tel: +49 (0)711-93 93 48 26 · E-Mail: florian.wurster@kyocera.de · www.kyocera.de