

# MODULAR SiC INVERTER REFERENCE DESIGN



This reference design is based on Cissoïd's modular hardware and software inverter platform, developed in partnership with Silicon Mobility, supporting fast development of electric motor drives.

## KEY FEATURES

- Up to 350kW/850V
- 3-phase 1200V SiC power module
- Integrated gate driver board
- Ultra-fast OLEA® T222 FPCU control board
- DC and phase current sensors
- DC-link capacitor & EMC filter
- Liquid cooling

## ORDERING INFORMATION

Reference	Description
EVK-PLA1050B-74	650 V <sub>DC</sub> / 275 A <sub>RMS</sub> / 150 kW
EVK-PLA1050B-76	650 V <sub>DC</sub> / 400 A <sub>RMS</sub> / 250 kW
EVK-PLA1050B-94	800 V <sub>DC</sub> / 275 A <sub>RMS</sub> / 200 kW
EVK-PLA1050B-96	800 V <sub>DC</sub> / 400 A <sub>RMS</sub> / 300 kW (includes DC link capacitor top cooling)

## MOTOR INTERFACE

- 1 X MOTOR TEMPERATURE MEASUREMENT WITH SIGNAL CONDITIONING CIRCUITRY FOR PT1000 SENSOR.
- 1 X RESOLVER INTERFACE (EXC/SIN/COS)
- 1 X QUADRATURE ENCODER INTERFACE (A/B/I)
- 3 X DIGITAL HALL EFFECT INTERFACE
- 2 X ANALOG INPUT SIGNALS
- 4 X DIGITAL INPUT SIGNALS
- 6 X DIGITAL I/O FOR RELAY INTERFACES
- 1 X FILTERED BATTERY POWER OUTPUT
- 2 X AUXILIARY 5V

## EV-ECU INTERFACE

- 1 X CAN FLEXIBLE DATA RATE INTERFACE UP TO 8 MBIT/S
- 1 X CAN HIGH SPEED RATE INTERFACE UP TO 1 MBIT/S
- 1 X USB CONNECTION
- 3 X ANALOG INPUT SIGNALS
- 4 X DIGITAL INPUT SIGNALS
- 3 X DIGITAL OUTPUT FOR RELAY INTERFACES
- 1 X BATTERY INPUT CONNECTION
- 1 X FILTERED BATTERY POWER OUTPUT
- 2 X AUXILIARY 5V

## CALIBRATION AND DEBUG

- 1 X PROGRAMMING AND CONFIGURATION CONNECTOR (LAUTERBACH TRACE INTERFACE)
- 1 X SWD DEBUG INTERFACE

## INVERTER SOFTWARE

- HIGH CONTROL LOOP AND SWITCHING FREQUENCIES (>25 kHz TO 100 kHz) WITH OPTIMIZED DEAD TIME COMPENSATION
- ADVANCED MODULATIONS (SVPWM, DPWM)
- IMPROVED TOTAL HARMONICS DISTORTION (THD)
- REDUCED HVDC LINK VOLTAGE RIPPLE

## FUNCTIONAL SAFETY

- OLEA® T222 PROCESSOR & SOFTWARE: ISO26262 ASIL-D AND AUTOSAR 4.3 CERTIFIED
- INVERTER CONTROL MODULE: DESIGNED FOR ISO-26262 ASIL-D (CERTIFICATION ONGOING)



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Inverter characteristics	EVK-PLA1050B-74	EVK-PLA1050B-76	EVK-PLA1050B-94	EVK-PLA1050B-96	Units
Capacitor Max Voltage	750	750	900	900	V <sub>DC</sub>
Sensors Max Current	425	670	425	670	A
DC Bus Voltage - operating	100-650	100-650	100 to 800	100-800	V <sub>DC</sub>
Maximum DC Bus Voltage non-operating	700	700	850	850	V <sub>DC</sub>
Continuous Motor Current	275	400*	275	400*	A <sub>RMS</sub>
Motor Current Peak (60s)	290	420*	290	420*	A <sub>RMS</sub>
Continuous Output Power	150	250	200	300	kW
Output Power Peak (60s)	180	280	240	330	kW
Output Frequency	DC to 2000				Hz
Peak Efficiency	>99				%
DC-link capacitor	320 ± 10%	320 ± 10%	135 ± 10%	135 ± 10%	µF
DC Bus Discharge	Passive with Tdischarge < 60s	Passive with Tdischarge < 60s	Passive with Tdischarge < 60s	Passive with Tdischarge < 60s	s
Inverter PWM frequency	< 50	< 50	< 50	< 50	kHz
Auxiliary Supply Voltage	8 to 30				V <sub>DC</sub>
Operating Temperature Range (coolant)	-40 to +65				°C
Coolant Flow Rate	2 to 10				L/min
Coolant Pressure Drop	0.75(10.9)	1.5(21.8)	0.75(10.9)	1.5(21.8)	bar (PSI)
Maximum Coolant Pressure (@70°C / 10L/min)	2 (29)				bar (PSI)
Cable Gland Size	M32				
Conductor Size	#(3/0) / 85	#(4/0) / 120	#(3/0) / 85	#(4/0) / 120	#AWG / mm <sup>2</sup>
Cable Outside Diameter	16 to 25				mm
Outline dimensions	394 x 407 x 91				mm

\* Limited by the EMC filter rated current

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