

BENCH-TOP SiC INVERTER REFERENCE DESIGN



Our original SiC Inverter Reference Design is based on CISSOID's modular hardware and software inverter platform, supporting fast development and deployment of electric motor drives. This version is designed and intended for lab and bench testing.

KEY FEATURES

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

ORDERING INFORMATION

Reference	Rating (continuous)
EVK-PLA1050B-74	650 V _{DC} / 275 A _{RMS} / 150 kW
EVK-PLA1050B-76	650 V _{DC} / 400 A _{RMS} / 250 kW (includes DC link capacitor top cooling)
EVK-PLA1050B-94	800 V _{DC} / 275 A _{RMS} / 200 kW
EVK-PLA1050B-96	800 V _{DC} / 400 A _{RMS} / 300 kW (includes DC link capacitor top cooling)



MOTOR INTERFACE

- 1 x MOTOR TEMPERATURE MEASUREMENT WITH SIGNAL CONDITIONING (PT100/PT1000/KTY84/NTC)
- 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

- FIELD ORIENTED CONTROL (FOC)
- HIGH CONTROL LOOP AND SWITCHING FREQUENCIES (UP TO 50kHz)
- ADVANCED MODULATIONS (SVPWM, DPWM, OPP)
- FLUX WEAKENING FOR EXTENDED SPEED
- OPTIMIZED DEAD TIME COMPENSATION
- IMPROVED TOTAL HARMONICS DISTORTION (THD)
- REDUCED HVDC LINK VOLTAGE RIPPLE

FUNCTIONAL SAFETY

- PROCESSOR & SOFTWARE:
ISO 26262 ASIL-D CERTIFIED
- INVERTER CONTROL MODULE:
ISO 26262 ASIL-C READY CERTIFIED



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MODULAR SiC INVERTER REFERENCE DESIGN

Inverter characteristics	EVK-PLA1050B-74	EVK-PLA1050B-76	EVK-PLA1050B-94	EVK-PLA1050B-96	Units
Capacitor Max Voltage	750	750	900	900	V _{DC}
Sensors Max Current	425	670	425	670	A
DC Bus Voltage - operating	100 to 650	100 to 650	100 to 800	100 to 800	V _{DC}
Maximum DC Bus Voltage non-operating	700	700	850	850	V _{DC}
Continuous Motor Current	275	400*	275	400*	A _{RMS}
Motor Current Peak (60s)	290	420*	290	420*	A _{RMS}
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 Time (passive)	<60				s
Inverter PWM frequency	< 50	< 50	< 50	< 50	kHz
Auxiliary Supply Voltage	8 to 30				V _{DC}
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 ²
Cable Outside Diameter	16 to 25				mm
Outline dimensions	394 x 407 x 91				mm

* Limited by the EMC filter rated current