BENCH-TOP
SiC INVERTER
REFERENCE DESIGN

CISSOID
POWER SEMICONDUCTORS

This reference design is based on CISSOID's modular hardware and software inverter platform, developed in partnership with Intel® Automotive, supporting fast development of electric motor drives, 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
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

- Adaptive Control Unit T222 processor & software: ISO 26262 ASIL-D certified
- Inverter Control Module: ISO 26262 ASIL-C Ready certified

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MODULAR
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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_{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 / mm²
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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