EVK-PLA1121
Advanced Features Set

Version: 1.00
8-Dec-21

OLEA® COMPOSER - T222
3-Phase 1200V/550A SiC Inverter Starter Kit

General Description

This Starter Kit offers optimal mechanical and electrical integration of OLEA® T222 FPCU-based controller board and OLEA® APP INVERTER application software from Silicon Mobility together with 3-Phase 1200V/550A SiC MOSFET Intelligent Module (IPM) from CISSOID.

This unique integration of a highly integrated and low losses SiC IPM with an ultra-fast, low power consumption, and critically safe real-time controller is setting new levels in terms of power density and efficiency for electric motor inverters.

Integrated hardware and application software support the rapid development of SiC inverters for compact and efficient motor drives in Electrical vehicles and other E-Mobility applications.

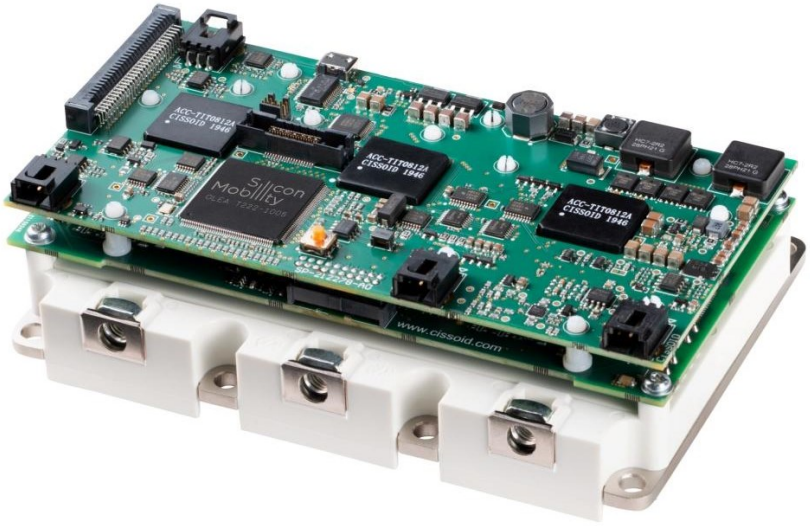
The platform is supplied with highly configurable control application software supporting various types of electric motors and position sensors.

SiC Intelligent Power Module

- Max Drain-to-source Voltage: 1200V
- Max DC Current: 550A @ Tc=25°C
- Low On-Resistance: typ. 2.53mΩ
- Low switching energies
- Max operating temperature: 175°C (Tj)
- High Temperature gate driver board with protections (Desat detection, SSD, AMC)
- Lightweight AlSiC Pin Fin Baseplate

OLEA® T222 Control Board & Software

- OLEA® T222 FPCU controller chip
- ISO-26262 ASIL-D Design-Ready Certified
- Advanced control algorithms for highly energy-efficient systems.
- Closed-loop control based on Field Oriented Control and variable SVPWM switching up to 50 kHz with short dead time compensation.



Interfaces

Liquid cooling

- AlSiC Pin Fin baseplate

SiC 3-Phase Power Module

- 3-Phase outputs U, V, W
- 3x2 Power Supply Pins VDCx+/VDCx-

Motor interface

- Resolver winding
- Incremental encoder
- 2 motor temperature sensors
- 3 current sensors

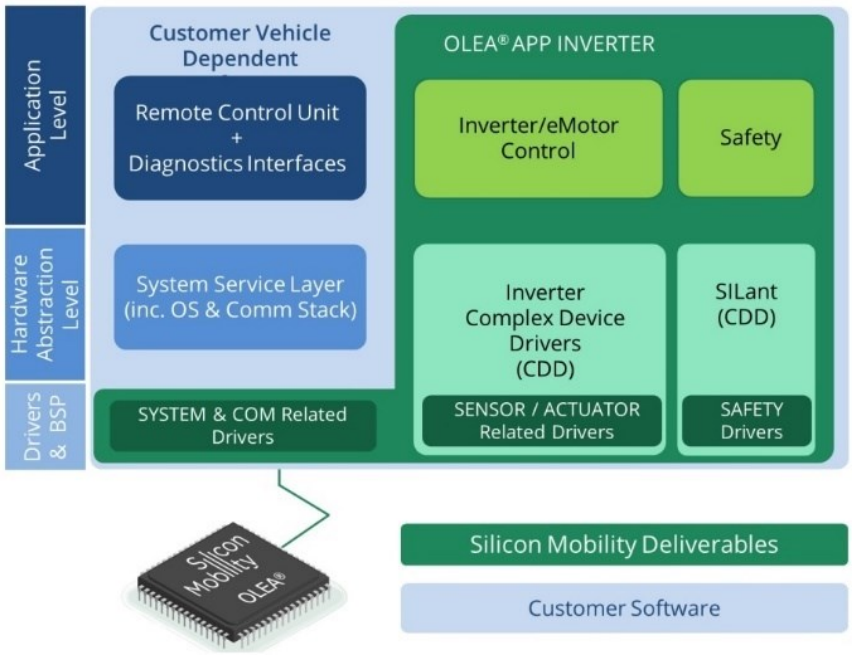
Vehicle interface

- 2 CAN FD (Flexible data rate
- interface up to 8Mbit/s)
- LIN 2.21
- Battery supply

Developer interface

- SWD interface (debug)
- Trace Port Unit interface up to 100MB/s (real time debug and measure interface)
- 3 potentiometers
- 4 LEDs

OLEA APP INVERTER Highly configurable control software (supplied by Silicon Mobility)



Type of E-motor

- ASM, PMSM and WRSM motors
- Axial and Radial Flux motors
- Configurable number of pole pairs

Regulation

- Flux weakening and Id/Iq Decoupling
- Field Oriented Control regulation

Modulation

- Space Vector PWM modulation
- Variable switching frequency based on the electrical speed
- Dead-time compensation

Motor Sensors Signals Processing

- Position Tracking Loop algorithm for SIN/COS signals with a configurable number pole pairs number
- Support of various position sensors: Resolver, Inductive, AMR/GMR, Hall

Safety & Diagnostics:

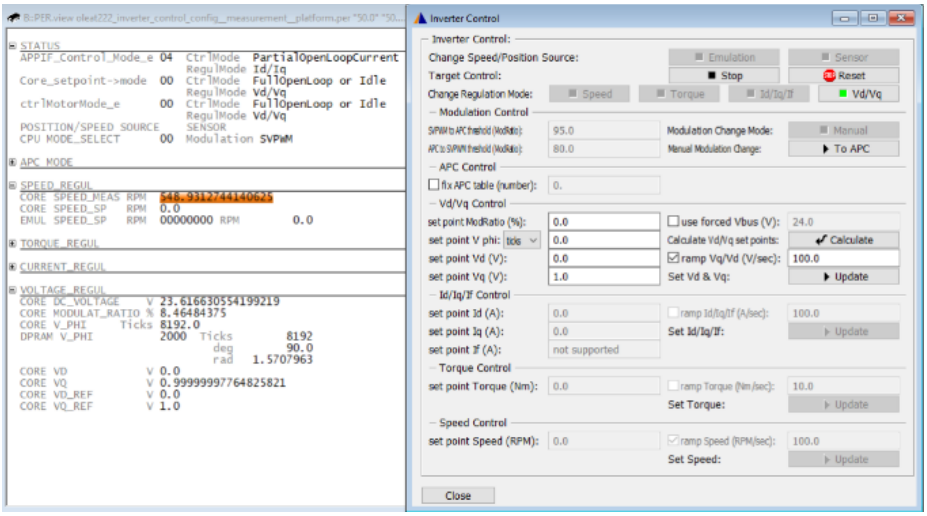
- ISO 26262 ASIL-C Ready Design
- Safety Finite State Machine (FSM) managing the faults containment
- Configurable safety faults detections
- Warning detections: Over/under temperature warning

Vehicule Control Unit (VCU) Interface

- E-motor Control FSM supporting the VCU operating states
- Fully features set of APIs (control, diagnostics, safety, calibration/configuration) allowing integration with a VCU

Calibration

- ASAM compliant automatic calibration interface
- 3rd party debugging and tracing tool: LAUTERBACH debugger, trace with TRACE32 software
- Customized control GUI and menu for seamless calibration on e-motor benches
- Real-time trace, high bandwidth up to 800 Mb/s



SiC Intelligent Power Module Key Features[1]

Power Module

- Max Drain-to-source Voltage: 1200V
- Low On-Resistance: typ. 2.53mΩ
- Max Continuous current:
  - 550A typ. @ Tc=25°C
  - 400A typ. @ Tc=90°C
- Thermal resistance (J2C):
  - 0.106 °C/W typ.
- Max 175°C operating junction temperature (power devices)
- Switching Energy@ 600V/300A:
  - Eon: 9 mJ
  - Eoff: 7 mJ
- Switching frequency: 50kHz Max
- Isolation (baseplate – power pins):
  - 3600VAC @50Hz (1min)
- Dimensions:
  - 104(W) x 154(L) X 34(H) (all in mm)
- Weight: 590g

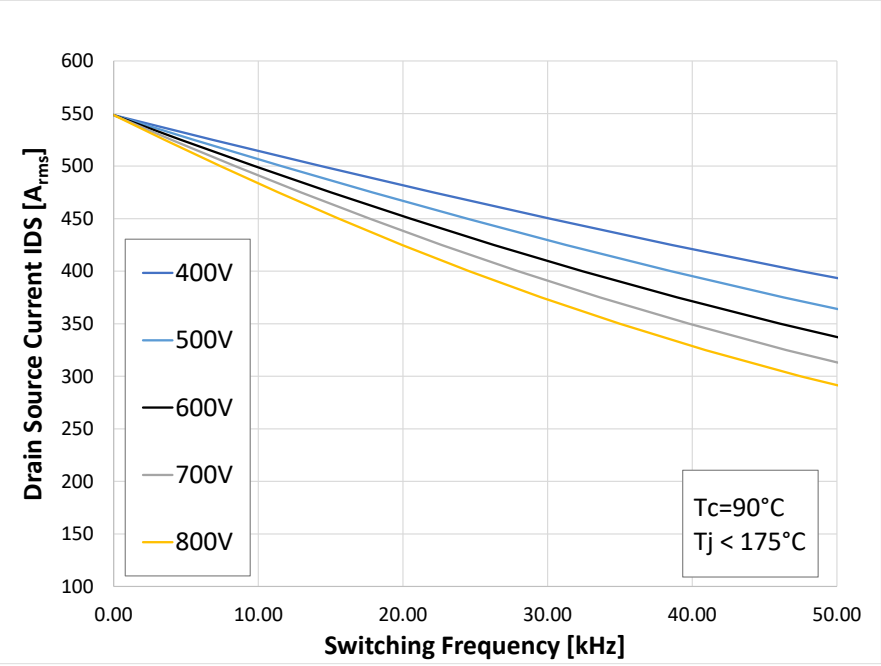
Isolated Gate Driver

- Common mode transient immunity:
  - >50kV/µs
- Max 125°C operating ambient temperature (gate driver)
- Isolation (primary – secondary):
  - 3600VAC @50Hz (1min)
- Parasitic capacitance between primary and secondary sides:
  - typ 11pF per phase
- Turn-On/Off delay: 180ns typ.

Protections

- Under voltage lockout (UVLO)
  - On VCC
  - On internally generated secondary supplies
- Desaturation protection
- Soft Shutdown turn-off (SSD)
- Negative gate drive (-3V)
- Active Miller Clamping (AMC)
- Gate-Source Short-circuit Protection

Phase RMS Current versus Switching Frequency[1]



[1] For more detailed characteristics, or other current ratings , see Cissoid - SiC Power Modules

Contacts

More information is available by contacting CISSOID and Silicon Mobility:

CISSOID S.A.

Headquarters and contact EMEA:	CISSOID S.A. Rue Francqui, 3 1435 Mont-Saint-Guibert Belgium T : +32 10 48 92 10 Email : sales@cissoid.com
Sales Representatives:	Visit our website: http://www.cissoid.com/sales

Silicon Mobility S.A.

Headquarters and contact EMEA:	Silicon Mobility Les Aqueducs, Bâtiment 2 535 route des Lucioles 06560 Valbonne T: +33 4 84 79 10 20 Email : sales@csilicon-mobility.com
Sales Representatives:	Visit our website: https://www.silicon-mobility.com/contact/