

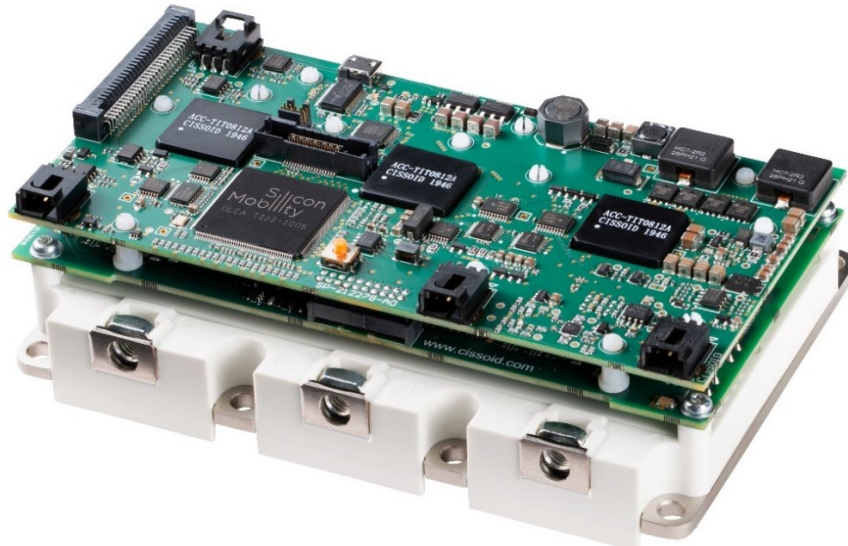
---

**EVK-PLA1121**  
**Advanced Features Set**

Version: 1.2  
22-Jun-22

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

---

**General Description**

This Starter Kit offers optimal mechanical and electrical integration of OLEA<sup>®</sup> T222 FPCU-based controller board and OLEA<sup>®</sup> APP INVERTER application software from Silicon Mobility together with 3-Phase 1200V/550A<sup>1</sup> 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 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<sup>1</sup>: 550A @ T<sub>c</sub>=25°C
- Low On-Resistance<sup>1</sup>: typ. 2.53mΩ
- Low switching energies
- Max operating temperature: 175°C (T<sub>j</sub>)
- High Temperature gate driver board with protections (Desat detection, SSD, AMC)
- Lightweight AlSiC Pin Fin Baseplate

**OLEA<sup>®</sup> T222 Control Board & Software**

- OLEA<sup>®</sup> 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 up to 50 kHz with short dead time compensation.

---

<sup>1</sup> Other current/cooling options are also available for the power module (see pages 4 & 5)

## Interfaces

### Liquid cooling<sup>2</sup>

- AISiC 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

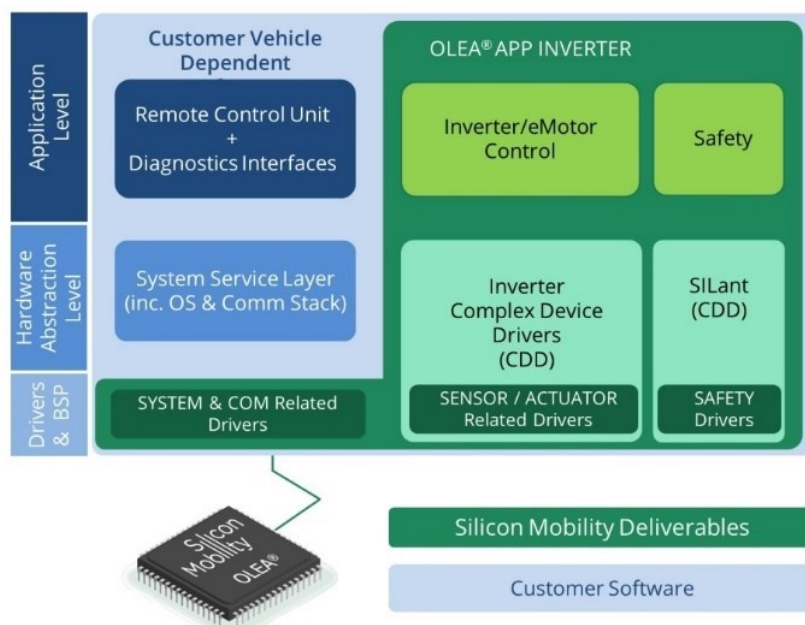
### Vehicle interface

- 2 CAN FD (Flexible data rate)
- interface up to 8Mbit/s
- LIN 2.21 (as an option)
- 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

<sup>2</sup> Flat baseplate option for standard cooling also available (see pages 4 & 5)

## 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:

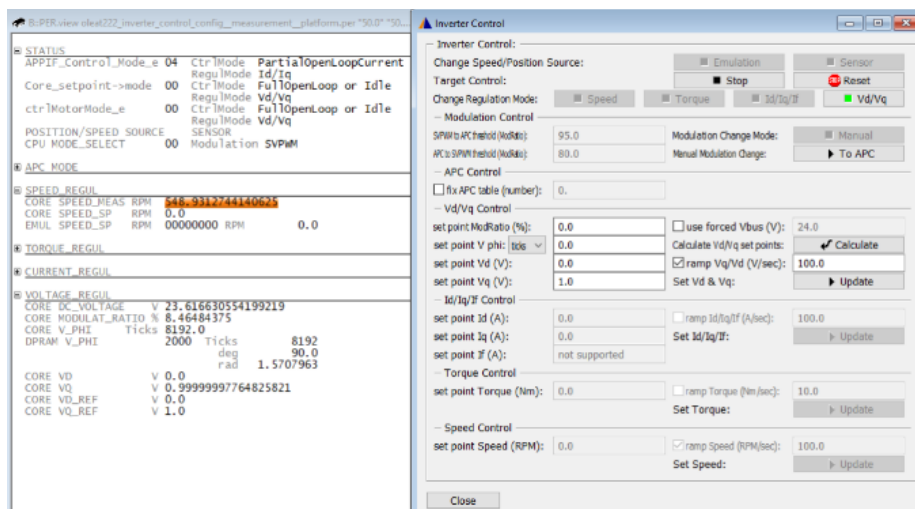
- ISO 26262 ASIL-C Ready Design
- Safety Finite State Machine (FSM) managing the faults containment
- Configurable safety faults detections
- Warning detections: Over/under temperature warning

## Vehicle 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
- 3<sup>rd</sup> 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<sup>3</sup>

### Power Module

- Max Drain-to-source Voltage: 1200V
- Low On-Resistance<sup>3</sup>: typ. 2.53mΩ
- Max Continuous current<sup>3</sup>:
  - 550A typ. @ T<sub>c</sub>=25°C
  - 400A typ. @ T<sub>c</sub>=90°C
- Thermal resistance (J2C):
  - 0.106 °C/W typ.
- Max 175°C operating junction temperature (power devices)
- Switching Energy@ 600V/300A:
  - E<sub>on</sub>: 9 mJ
  - E<sub>off</sub>: 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

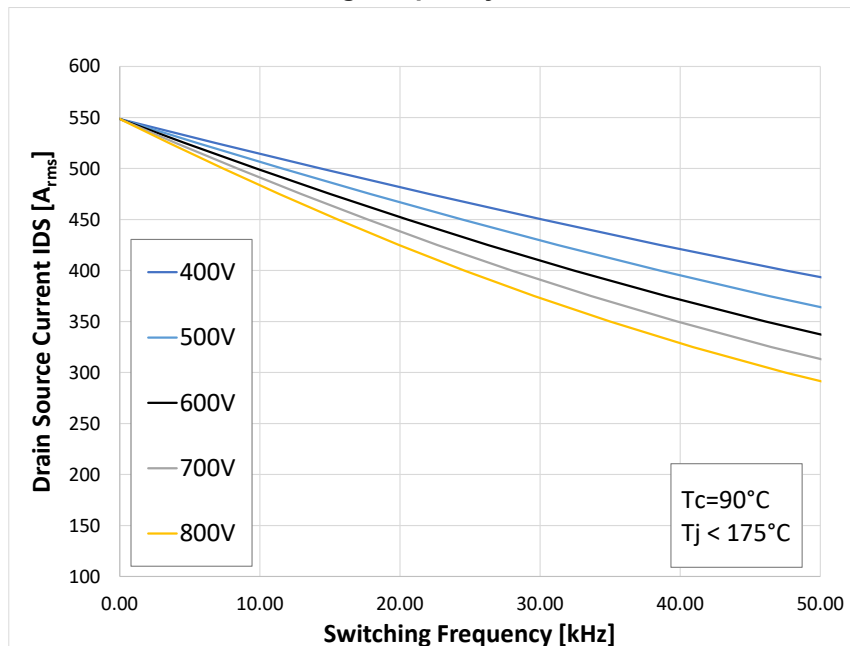
### Isolated Gate Driver

- 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 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<sup>3</sup>



<sup>3</sup> Other current/cooling option available: see table in page 5. For more details about power module characteristics, see [Cisoid - SiC Power Modules](#)

## Ordering information

Besides EVK-PLA1121A 1200V/550A SiC Inverter Starter Kit, other starter kits are available with **different current ratings** for the power module as described in the table below.

Note that the SiC Inverter Starter Kits **hardware** can be purchased from CISSOID based on the following information:

Part Number	Product Name	Description
EVK-PLA1106A	EVK-PLA1106	3-Phase 1200V/ <u>340A</u> SiC Inverter Starter Kit (CXT-PLA3SA12340AA ( <u>pin fin baseplate</u> )) +OLEA® T222 Control Board)
EVK-PLA1108A	EVK-PLA1108	3-Phase 1200V/ <u>450A</u> SiC Inverter Starter Kit (CXT-PLA3SA12450AA ( <u>pin fin baseplate</u> )) +OLEA® T222 Control Board)
EVK-PLA1121A	EVK-PLA1121	3-Phase 1200V/ <u>550A</u> SiC Inverter Starter Kit (CXT-PLA3SA12550AA ( <u>pin fin baseplate</u> )) +OLEA® T222 Control Board)
EVK-PLA1199A	EVK-PLA1199	3-Phase 1200V/ <u>340A</u> SiC Inverter Starter Kit (CMT-PLA3SB12340AA ( <u>flat baseplate</u> )) +OLEA® T222 Control Board)

For **software** licensing, please, contact Silicon Mobility.

## Contacts

More information is available by contacting [CISSOID](#) and [Silicon Mobility](#):

**CISSOID 授权代理商：深圳市邦晶科技有限公司**

销售联系方式:	CISSOID 授权代理商 深圳市邦晶科技有限公司 电话：0755-86968854 邮箱： <a href="mailto:sales@cissoid.cn">sales@cissoid.cn</a>
售后技术支持:	邮箱： <a href="mailto:Service@Cissoid.cn">Service@Cissoid.cn</a>

### 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 : <a href="mailto:sales@silicon-mobility.com">sales@silicon-mobility.com</a>
Sales Representatives:	Visit our website: <a href="https://www.silicon-mobility.com/contact/">https://www.silicon-mobility.com/contact/</a>