

10kW PV system with energy storage

Description

This reference design is a 10kW hybrid PV inverter system. Which include interleaved boost converter, 3 Phase T-Type Inverter and CLLLC converter. It operates at high switching frequency with Silicon Carbide (SiC) MOSFET to achieve low power losses, high efficiency, and reduction of size and weight. This design was ready for bidirectional power conversion, embedded with MPPT, 3 phase inverter, DCDC converter with battery charge/discharge algorithm. Also this design can connect with external HMI board, display real-time system status and upload data to cloud for dashboard monitoring and analysis.



Advantages

- Digital control
- High system efficiency
- High output power (10kW Max.)
- Passive Cooling (no fans need)

Features

- Bidirectional power conversion
- Max. Output Power: 10kW Max.
- AC Output Voltage: 380Vac L-L
- Solar Input Voltage: 150Vdc to 550Vdc
- Charging voltage: 350Vdc to 540Vdc

Core Chip

- DSP control: **TI** TMS320F28379D
- SiC MOSFET: **Nexperia** NSF060120L4A0 / NSF040120L4A0
- SiC diode: **Wolfspeed** C4D20120D
- IGBT: **Nexperia** NGW30T65M3DFP
- Isolated gate driver: **Infineon** 1EDN7550B / **Rohm** BM61S41RFV-C
- Isolated Power Module: **Murata** NCS3S1212SC / MGJ2D121503SC
- Isolated CAN Transceiver: **ChipAnalog** CA-IS3062W
- Current Sensor: **ALLEGRO MICROSYSTEMS** ACS37002KMABTR-050B5-M
- Wireless module: **Murata** LBEE5KL1DX
- Magnetic components: **knitter-switch** ICSI34415700LHM61 / ICSI97215700LVM61 / ICSC58425700LHS61 / ICSC97430700LHS61 / ICSI36430700LVK61
- Connector: **Amphenol** 71918-140LF / RJHSE3080 / RJHSE3081 / ND9-AS3

Applications

- Residential PV energy storage system

Block Diagram

