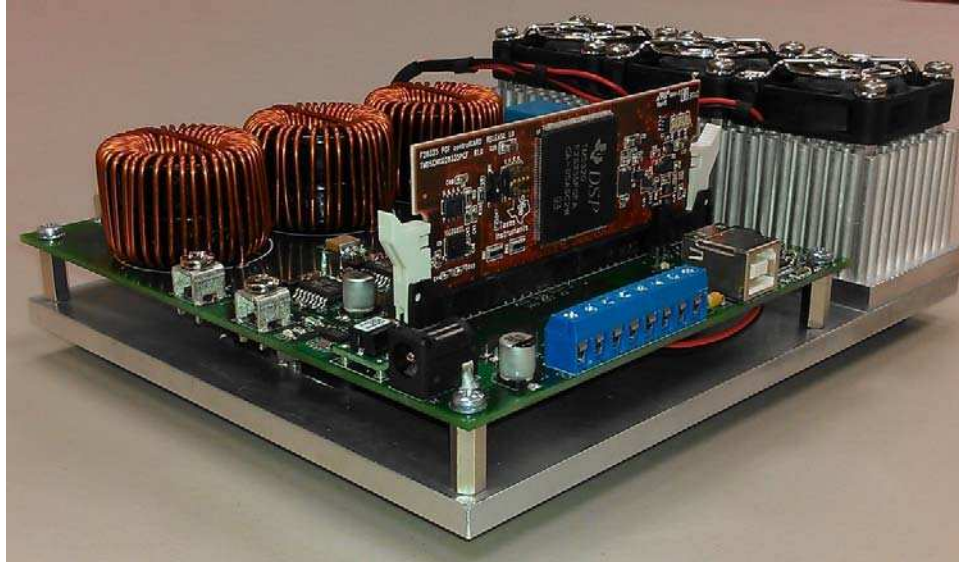


Transphorm Motor-Drive Development Kits

Description

TDMC series motor-drive kits from Transphorm provide an easy way to evaluate the performance advantages of GaN power transistors in off-line motor-drive applications. The kits provide the main features of a three-phase voltage-source inverter, operating at switching frequencies of 100kHz and higher. At the core of the inverter is a module with six GaN transistors configured as three 600V half bridges. The module is mounted to a printed circuit board which provides tightly coupled gate-drive circuits, highly flexible microcontroller options, and convenient communication connection to a PC. Also included on the board are output filters which provide pure sinusoidal output waveforms to the motor. The inverter operates off of a DC input voltage in the range of 150 to 370V. Control circuits are powered from an additional 12-15V input. Depending on the model, the maximum output power level is 2kW (TDMC2000E0I) or 4kW (TDMC4000E0I) when driving the three-phase outputs at 230VAC.

The microcontroller comes pre-loaded with firmware for driving either a permanent magnet AC motor with sensorless speed or current control, or an AC induction motor with an open-loop V/F algorithm. The source code is included, and may be customized for use with any motor type.

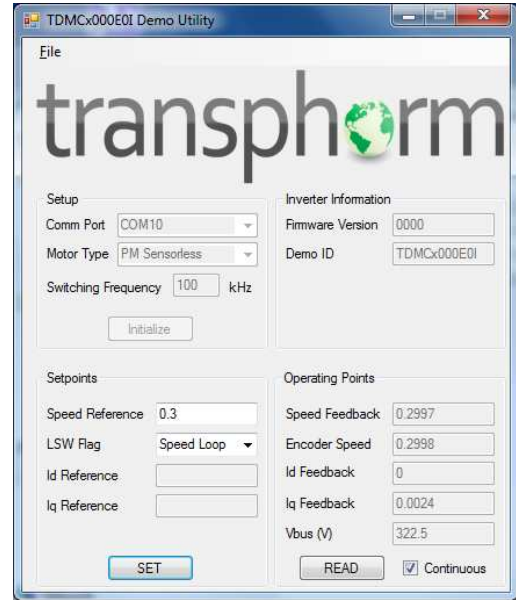


TDMC4000E01, 4kW, 3-Phase Inverter

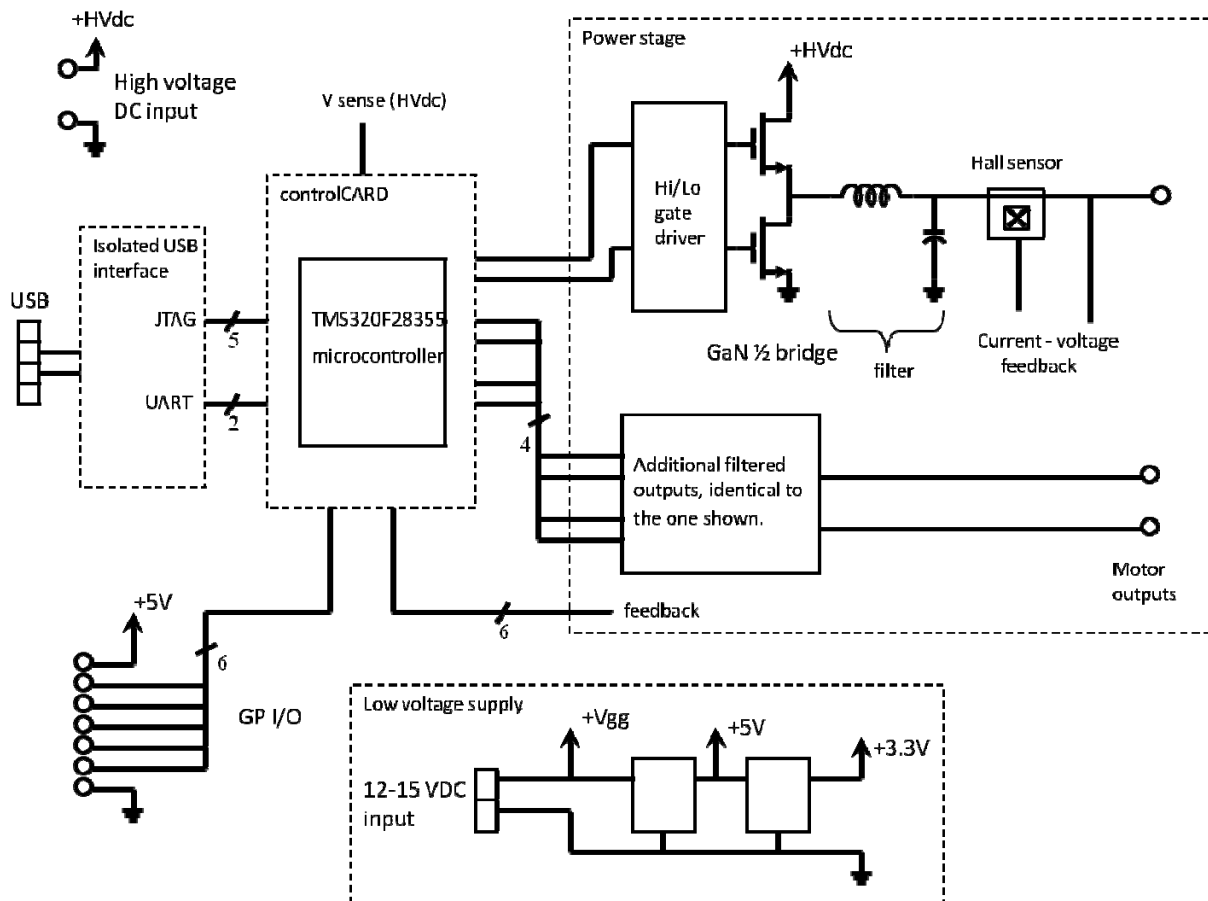
Features

- **GaN Module** - six 600V GaN high-electron mobility transistors (HEMTs) mounted in a power module. The inverter takes advantage of diode-free operation, in which the freewheeling current is carried by the GaN HEMTs themselves, without the need of additional freewheeling diodes.
- **Output Filter** – Small, simple LC filters on each output attenuate the switching frequency, producing clean sinusoidal waveforms for the motor connections.
- **Current Sensing** - Hall sensors provide linear current feedback to the microcontroller. The currents sensed are the motor phase currents with minimal ripple current superposed.
- **High-performance DSP** – 32-bit floating-point TI microcontroller on a removable control card.
- **Communication** - An isolated USB interface enables simultaneous operation of two physical ports to the microcontroller: a JTAG port for debug and loading of firmware, and a UART for communication with a host application
- **Open-Source Firmware** –Source code and documentation are provided with the kit and may be modified for any type of motor or control algorithm. Based on open-source firmware for Texas Instrument DSPs, existing libraries may be adapted for use with the Transphorm kits.
- **Servo Motor** - A 400W servo motor is included with the kit as an easy starting point for test and evaluation. The firmware pre-loaded on the microcontroller includes parameters specific to this motor.

- **Encoder Interface/GPIO** – An 8-contact terminal strip provides connection to general-purpose I/O on the microcontroller for interface to an incremental angle encoder or any other function.
- **Demo Utility** -Transphorm’s demo utility runs on a PC and communicates with the inverter. It provides an easy means of driving motors for test and evaluation using the firmware which is pre-loaded in the microcontroller’s flash memory, while also allowing access to key variables. Supports permanent-magnet sensorless control or AC induction motor V/F control. The utility is written in C#, and the source code is provided.
- **Convenient Mechanical Design** - The PCB is mounted on an aluminum base plate, to which both the GaN module and heat sink are thermally coupled.



Demo utility interface



Inverter Circuit Block Diagram

Kit Contents

- TDMCXXXXE01 three-phase inverter assembly (PCB, base plate, heatsink)
- Texas Instruments F28335 controlCARD
- 12V power supply with universal AC adaptors
- 400W servo motor (for out-of-the-box evaluation)
- Related media (documentation and software) on a USB memory stick
- Cables for motor, high-voltage DC input, and USB communication



TDMC4000E01-KIT