

300 W motor control power board based on STIPQ3M60T-H SLLIMM™-nano 2nd series MOSFET IPM



Features

- Input voltage: from 125 to 400 V_{DC}
- Nominal power: up to 300 W
 - Allowable maximum power is related to the application conditions and cooling system
- Nominal current: up to 1.1 Arms
- Input auxiliary voltage: up to 20 VDC
- Single- or three-shunt resistors for current sensing (with sensing network)
- Three options for current sensing: dedicated external op-amps, internal SLLIMM-nano op-amp (single) or via MCU
- Overcurrent hardware protection
- IPM temperature monitoring and protection
- Hall sensor or encoder input
- MOSFETs intelligent power module:
 - SLLIMM-nano 2nd series IPM (STIPQ3M60T-H) - Full molded package
- Motor control connector (32 pins) interfacing with ST MCU boards
- Universal design for further evaluation with breadboard and testing pins
- Very compact size
- WEEE compliant
- RoHS compliant

Product summary	
300 W motor control power board based on STIPQ3M60T-H SLLIMM™-nano 2nd series MOSFET IPM	STEVAL-IPMNM3Q
SLLIMM-nano 2nd series IPM, 3-phase inverter, 3 A, 1.6 Ω max., 600 V N-channel MDmesh DM2	STIPQ3M60T-HZ/ STIPQ3M60T-HL
Featured technologies	STPOWER SLLIMM
Development environments	STM32 MCSDK STSW-POWERSTUDIO
Applications	PMSM / BLDC Motor 3-phase Induction Motor (ACIM)

Description

The STEVAL-IPMNM3Q is a compact motor drive power board equipped with the STIPQ3M60T-HZ (or STIPQ3M60T-HL) SLLIMM-nano (small low-loss intelligent molded module) 2nd series based on N-channel Power MOSFET MDmesh™ DM2 fast-recovery diode. It provides an affordable and easy-to-use solution for driving high power motors in a wide range of applications such as power white goods, air conditioning, compressors, power fans and 3-phase inverters for motor drives in general.

The IPM consists of six MOSFETs, three high voltage half-bridge gate driver ICs and a wide range of features like undervoltage lockout, smart shutdown, internal temperature sensor and NTC, overcurrent protection and internal op-amp.

The main characteristics of this evaluation board are small size, minimal BOM and high efficiency. It features an interface circuit (BUS and V_{CC} connectors), bootstrap capacitors, snubber capacitor, hardware short-circuit protection, fault event signal and temperature monitoring. It is designed to work in single- or three-shunt configuration and with three current sensing options: three dedicated on-board op-amps, op-amps available on a connected microcontroller, or the single op-amp embedded in the power module. A Hall/Encoder section completes the circuit.

The system is designed to achieve accurate and fast conditioning of current feedback to satisfy the typical requirements for field oriented control (FOC).

The STEVAL-IPMNM3Q is compatible with ST control boards based on STM32 microcontrollers, providing a complete platform for motor control.

1 Schematics

Figure 1. STEVAL-IPMNM3Q board schematic (1 of 5)

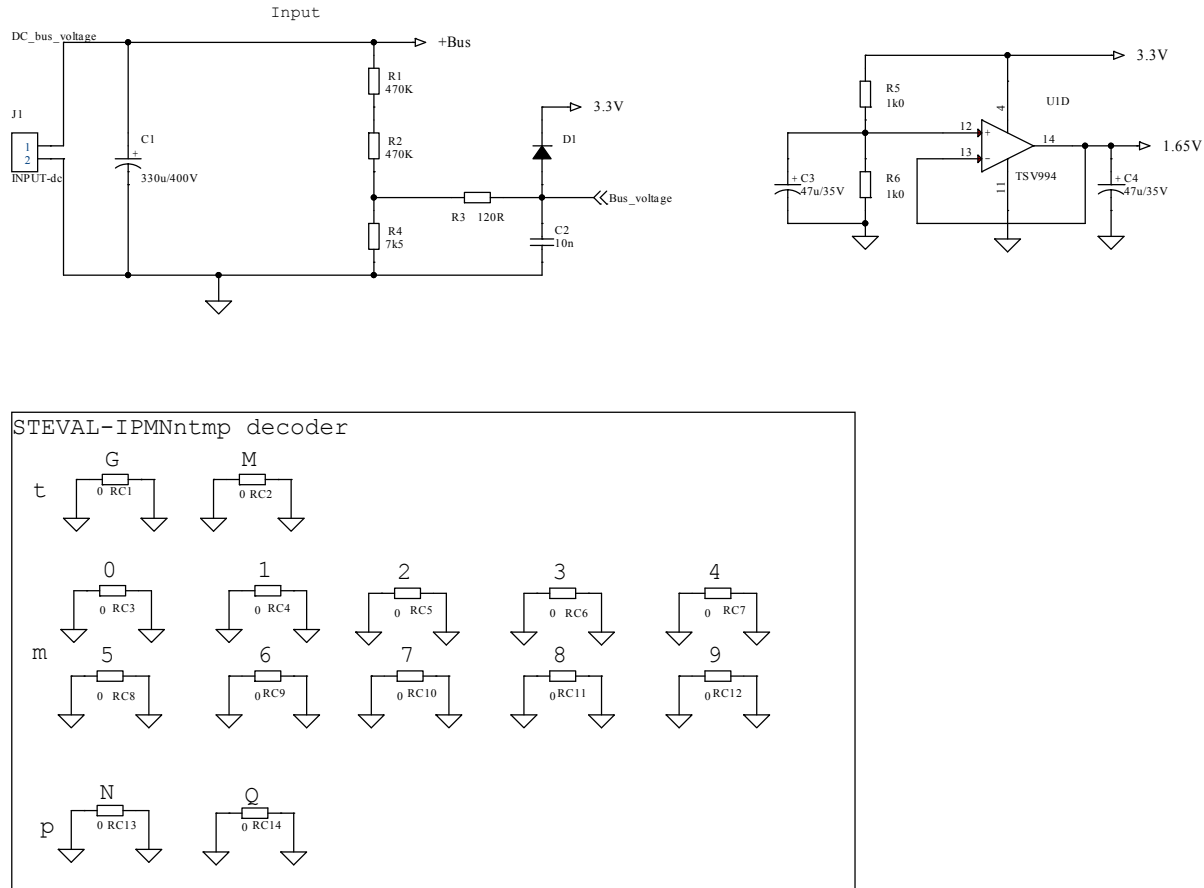


Figure 2. STEVAL-IPMNM3Q board schematic (2 of 5)

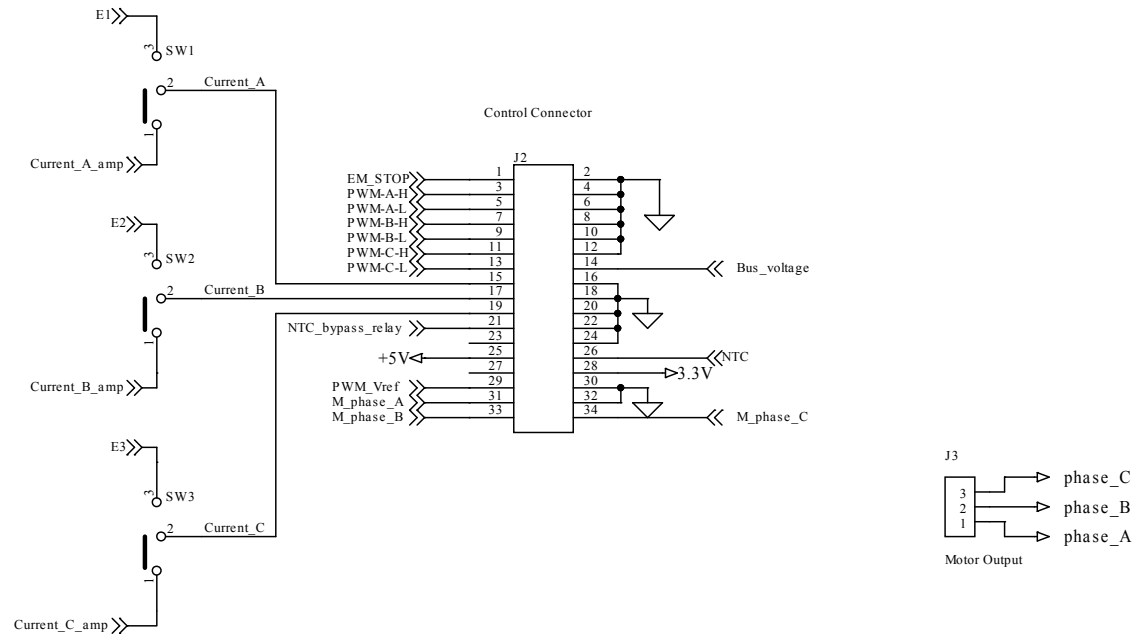


Figure 3. STEVAL-IPMNM3Q board schematic (3 of 5)

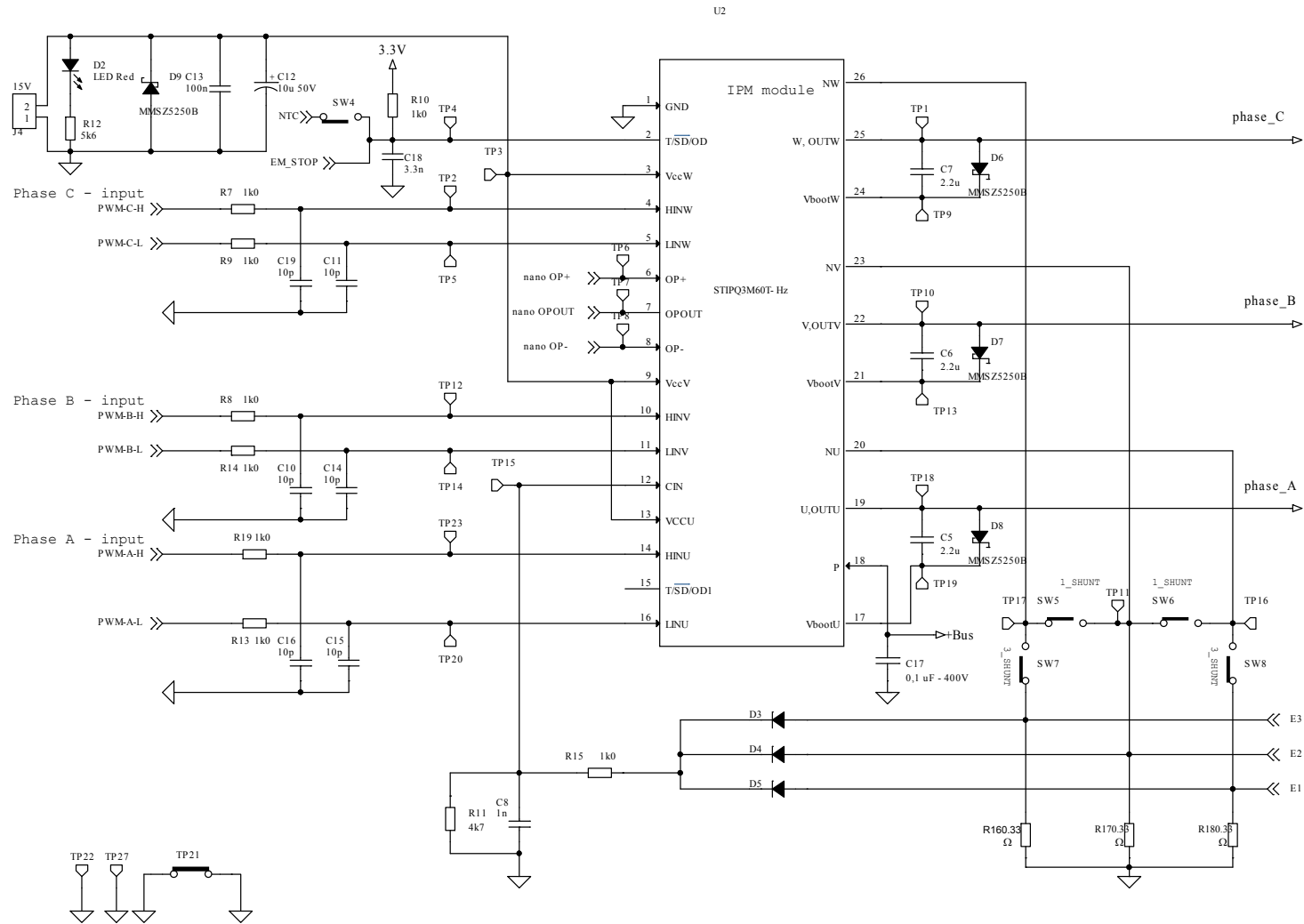


Figure 4. STEVAL-IPMNM3Q board schematic (4 of 5)

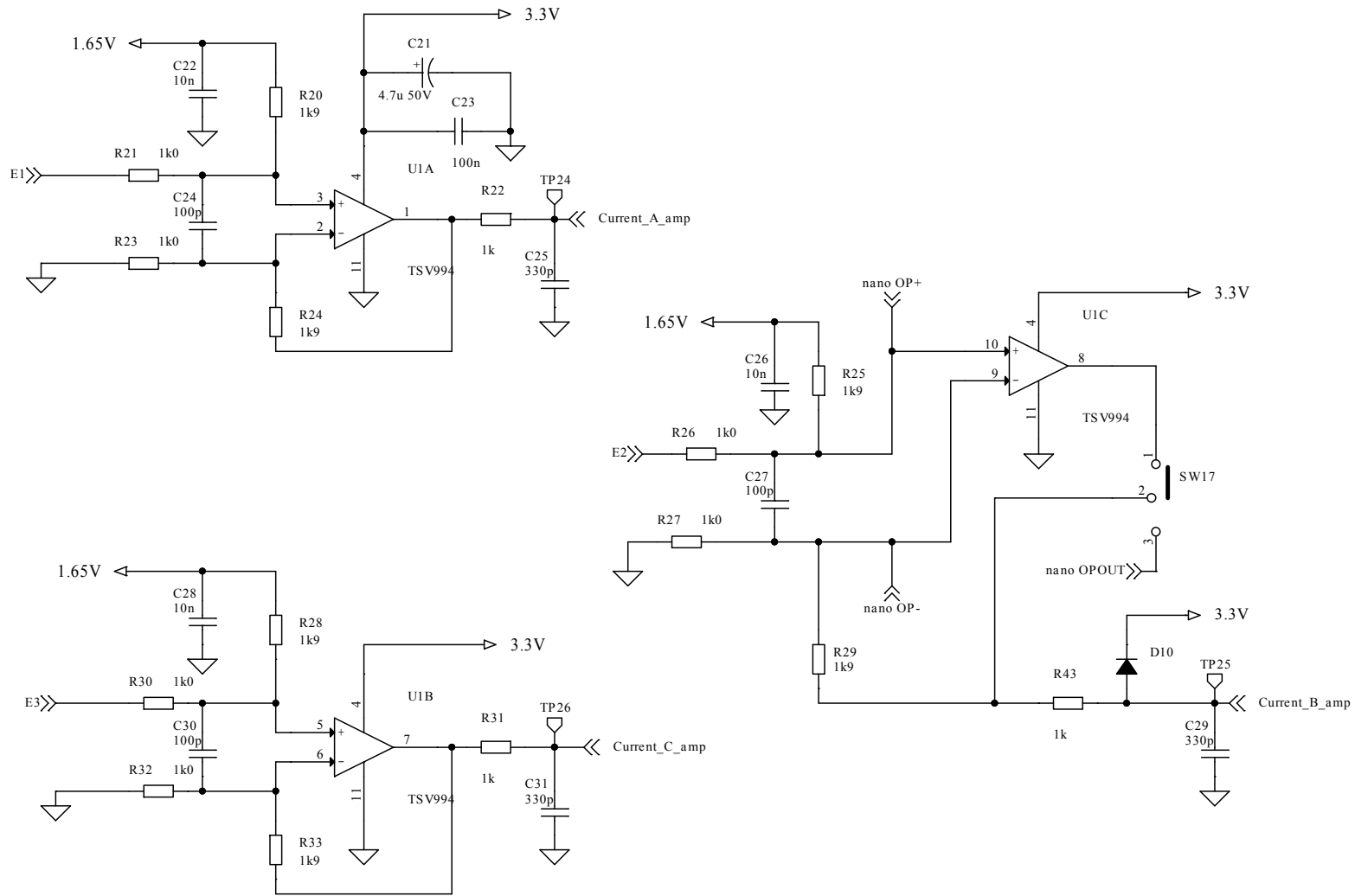
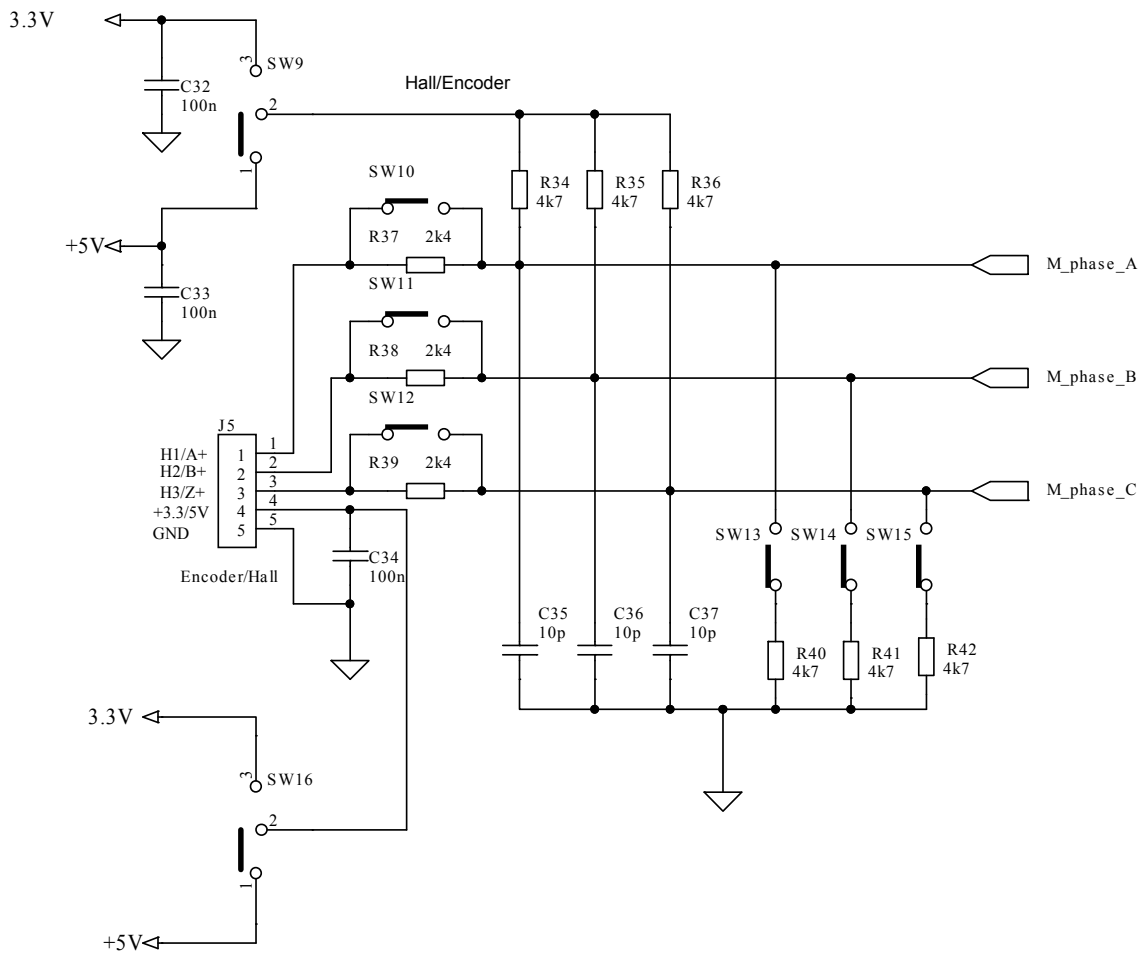


Figure 5. STEVAL-IPMNM3Q board schematic (5 of 5)



Revision history

Table 1. Document revision history

Date	Version	Changes
30-Apr-2020	1	Initial release.

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