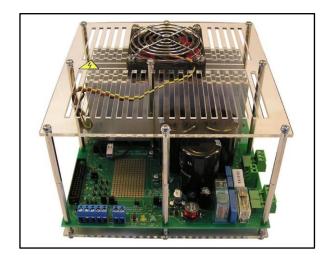


## STEVAL-IHM028V2

# 2 kW 3-phase motor control evaluation board featuring the STGIPS20C60 IGBT intelligent power module

Data brief



#### **Features**

- Complete solution for a 2 kW power inverter
- HV supply mode: voltage 90 VAC to 285 VAC or direct DC line 125 V DC to 400 V DC
- Input voltage range extended to +400 V, for PFC compliance
- Input inrush limiter with bypassing relay
- Brake feature with overvoltage comparator
- Single- or three-shunt resistor current sensing method
- · Hall sensor or encoder input
- Tachometer input
- Overtemperature and overcurrent hardware protection
- Active fan with automatic overtemperature switching
- · Compact and safe design
- Universal conception for further evaluation with bread board and testing pins
- RoHS compliant

### **Description**

The goal of the STEVAL-IHM028V2 product evaluation board is to present a universal, fully tested and populated design consisting of a 3-phase inverter bridge based on the 600 V, 17 A intelligent power module STGIPS20C60. The IPM itself consists of short-circuit rugged IGBTs with negative temperature co-efficiency. It also contains a wide range of auxiliary functions like undervoltage lockout and smart shutdown.

Thanks to these advanced characteristics, the system has been specifically designed to achieve accurate and fast conditioning of the current feedback, matching the typical requirements for field oriented control (FOC).

This board can be used to evaluate a wide range of applications such as HVAC (air conditioners), power white goods and high-end single-phase power tools.

Schematic diagrams STEVAL-IHM028V2

## 1 Schematic diagrams

Bus\_voltage V<sub>DD</sub>-micro V<sub>DD</sub>-micro +3.3 V +5 \ 100 nF C12 + D2 BAT48JFILM R6120 \(\Omega\) C7 100 nF C22 100 nF 5 + C21 4.7 µF / 35 V R5 470 KΩ ▲ R2 470 KΩ R8 7.5 kΩ W1 VDD C9 +C10 100 nF 47 µF B ∢[ D5 LED red C2 1500 μF 1500 μF 1500 μF C4 1500 µF 7250 V C75 +1500 μF -1550 V 100 µF / 25 V U1 LF33ABDT-TR VIN VOUT + C20 +3.3 V linear GND C16 220 nF D4 STTH1L06A L2 1.5 mH C19 100 nF R951 kΩ R11 13 kΩ C8 100 nF Input part with bridge R1 100 kΩ R4 100 kΩ | R7 | 100 kΩ NC 15. D7 🛣 BZV55C18SMD D3 1N4148 +15 V ◆ DC\_bus\_voltage C1 4.7 nF / Y2 R10 120 \O 4.7 nF / Y2 V\_doubler W15 C18 1 µF/ 50 V 5 | 14 | 15 | 10 | ...
| Drain 3 | Drain 1 VDD 5 | 5 |
| Drain 4 | Drain 2 | LIM 0 6 | 7 | U2 VIPer26LD KBPC3510 COMP Re B Source 4 Source 2 CO Source 3 Source 1 F1 16 A FUSE-10 × 38 10 Ω NTC **Buck converter** D6 STTH1L06A C5 H 150 nF / X2 ∰ L1 330 µH +Bus ← ------C17<sub>-</sub> 3.3 μF / 450 V

Figure 1: STEVAL-IHM028V2 circuit schematic (1 of 6)

STEVAL-IHM028V2 Schematic diagrams

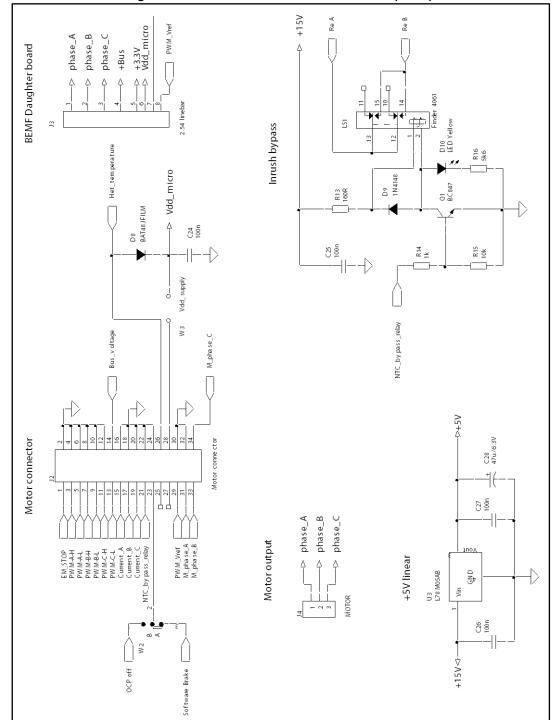


Figure 2: STEVAL-IHM028V2 circuit schematic (2 of 6)

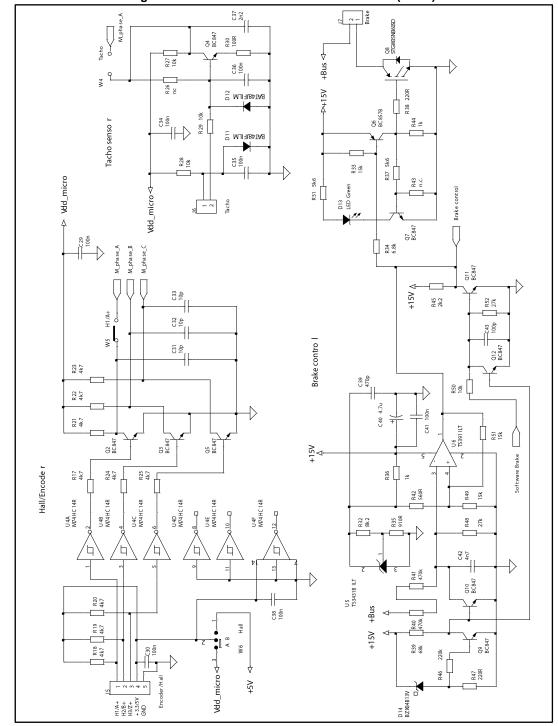
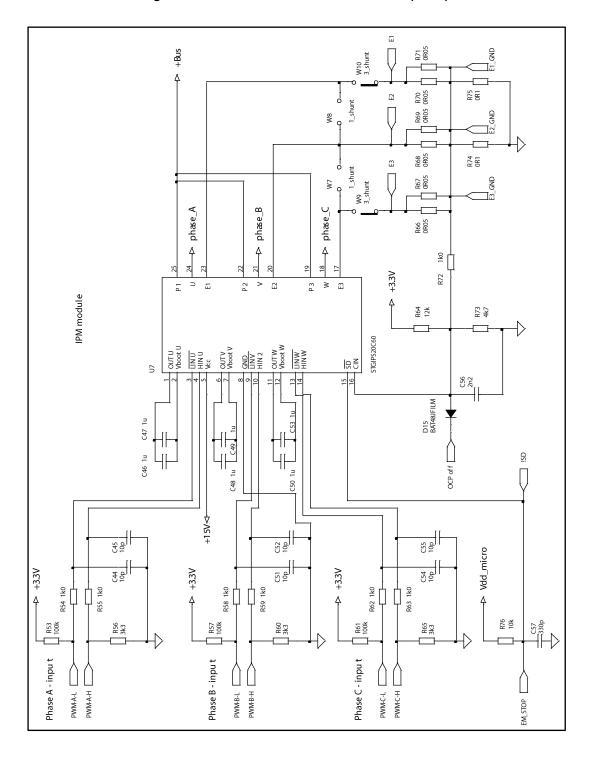


Figure 3: STEVAL-IHM028V2 circuit schematic (3 of 6)

STEVAL-IHM028V2 Schematic diagrams

Figure 4: STEVAL-IHM028V2 circuit schematic (4 of 6)



→ Vdd\_micr C66 100n R96 220R D17 ¥ U8D TSV994 BAT48JFILM R104 Temperature amplifie r R86 NTC\_temp Current sensing C U8B TSV994 R98 8k2 R103 1k R88 R93 10k ₩ 75 75 C62 47p **1**5√4 C61 C 47p R90 7 7k5 7 Vdd\_micro △ D18 + C65 + 47w/6.3V BAT48JFILM F R89 3k6 Vdd\_micro R95 820R 820R BAT48JFILM D16 R87 R85 E3\_GND R102 Current sensing B 100 L C69 100p R79 3k6 U8C TSV994 R101 3k6 -12+5V U8A TSV994 R81 Current sensing A F82 7k5 R91 51k C68 47p Gain C67 47p W11 Gain R77 7k5 C59 47p C58 C 47p C R83 1 7k5 R100 7k5 R106 51k Vdd\_micro △ R105 3k0 R99 3k6 R82 3k6 W13 Gain 820R 820R 820R 820R R97 R94 R78 R80 E2\_GND E1\_GND\_I3

Figure 5: STEVAL-IHM028V2 circuit schematic (5 of 6)

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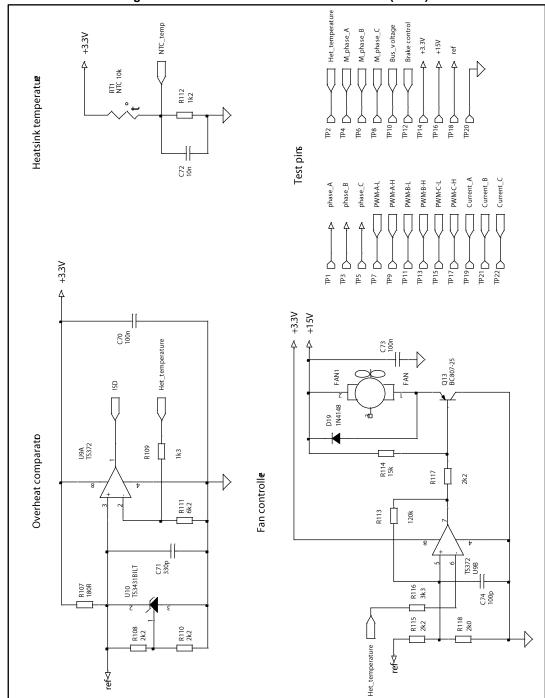


Figure 6: STEVAL-IHM028V2 circuit schematic (6 of 6)

Revision history STEVAL-IHM028V2

# 2 Revision history

**Table 1: Document revision history** 

Date	Version	Changes
22-Jul-2014	1	Initial release.
23-Aug-2017	2	Updated Figure 1: "STEVAL-IHM028V2 circuit schematic (1 of 6)".

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