

Low standby loss front-end with inrush current limitation and insulated AC switch control



Features

- Fully electronic solution without the need for an inrush current limiter resistor and bulky by-pass electromechanical relay
- DC bus disconnection at standby to reduce loss below 0.3 W
- Inrush current compliant with IEC61000-3-3
- Operation allowed with PFC (continuous or discontinuous)
- EN 55015, IEC 61000-4-11 compliant
- Criteria A @ 2 kV IEC 61000-4-5 and @ 4 kV IEC 61000-4-4
- Insulated control of AC switches used to drive AC loads for residential appliances
- RoHS compliant

Description

The [STEVAL-IHT008V1](#) evaluation board limits the inrush current charging a DC bus capacitor so that it is compliant with the IEC 61000-3-3 standard. This inrush current is based on a soft-start procedure for the rectifier bridge achieved with a [T1635T-8FP](#) Triac added in series with the mains line, which is controlled by the [STM8S103K3](#) microcontroller through progressive phase-control during the startup phase.

This solution drastically reduces standby losses as the DC bus can be totally disconnected from the AC mains when it is not required. The DC bus is easily turned off by turning off the series Triac, without needing an additional relay to open the circuit in standby.

Steady-state losses are also reduced because NTC resistors, traditionally used to limit inrush current, are not required; nor are the corresponding relays to bypass them.

This board also demonstrates that AC loads can be driven with an easy-design isolated solution using the same power supply for the whole system and some opto-transistors to control the [ACST210-8FP](#), [ACS108-8SN](#) and [Z0109MUF](#) AC switches.

Product summary	
STEVAL-IHT008V1 evaluation board	STEVAL-IHT008V1
STEVAL-IHT008V1 evaluation board firmware	STSW-IHT008
Mainstream Access line 8-bit MCU with 8 Kbytes Flash, 16 MHz CPU, integrated EEPROM	STM8S103K3
16 A Snubberless Triac	T1635T-8FP
Overvoltage protected AC switch	ACS108-8SN
Overvoltage protected AC switch	ACST210-8FP
1 A Triacs	Z0109MUF

1 Schematic diagram

Figure 2. STEVAL-IHT008V1 power and insulated control schematic

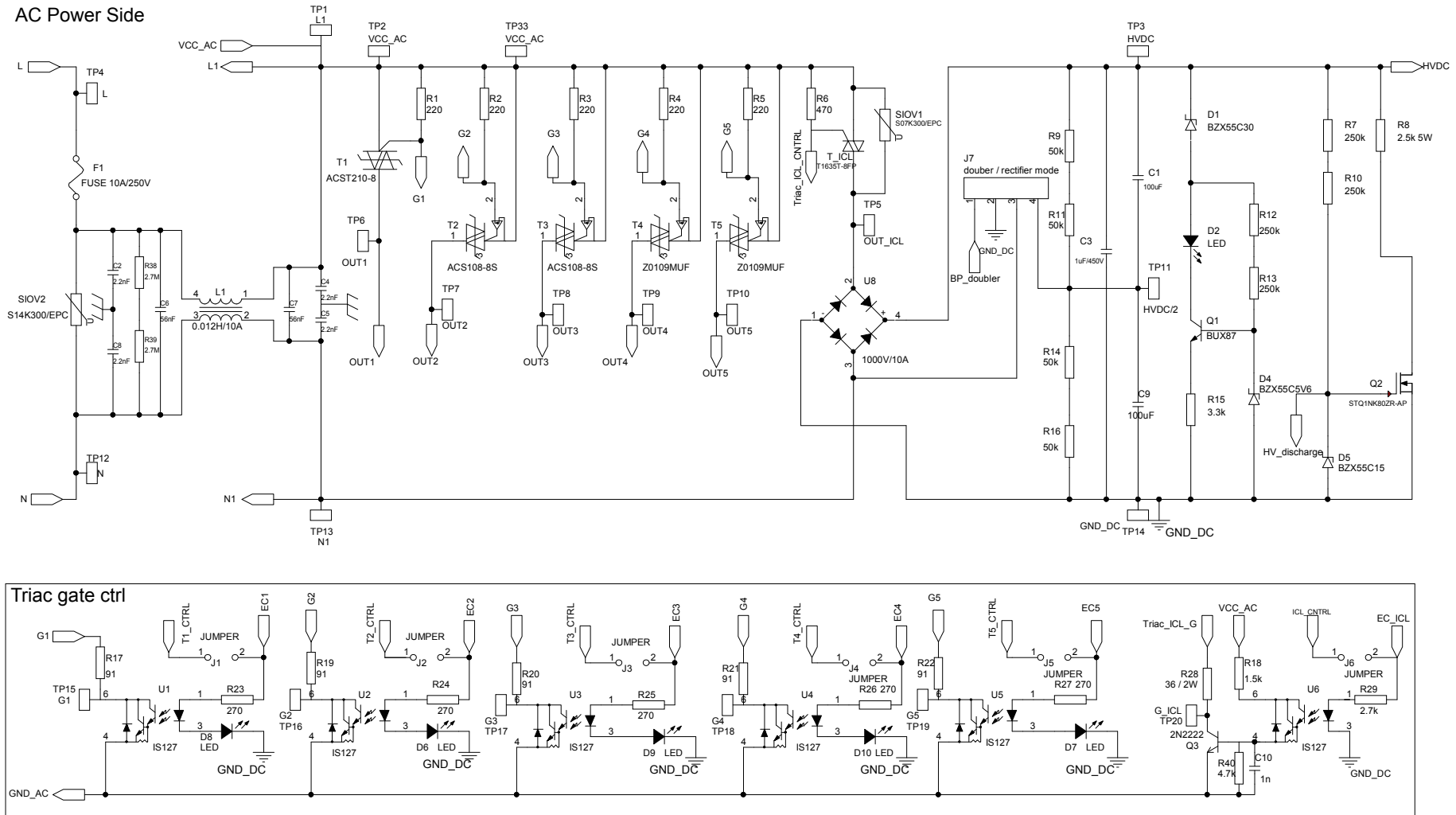


Figure 3. STEVAL-IHT008V1 control circuit schematic (1 of 3)

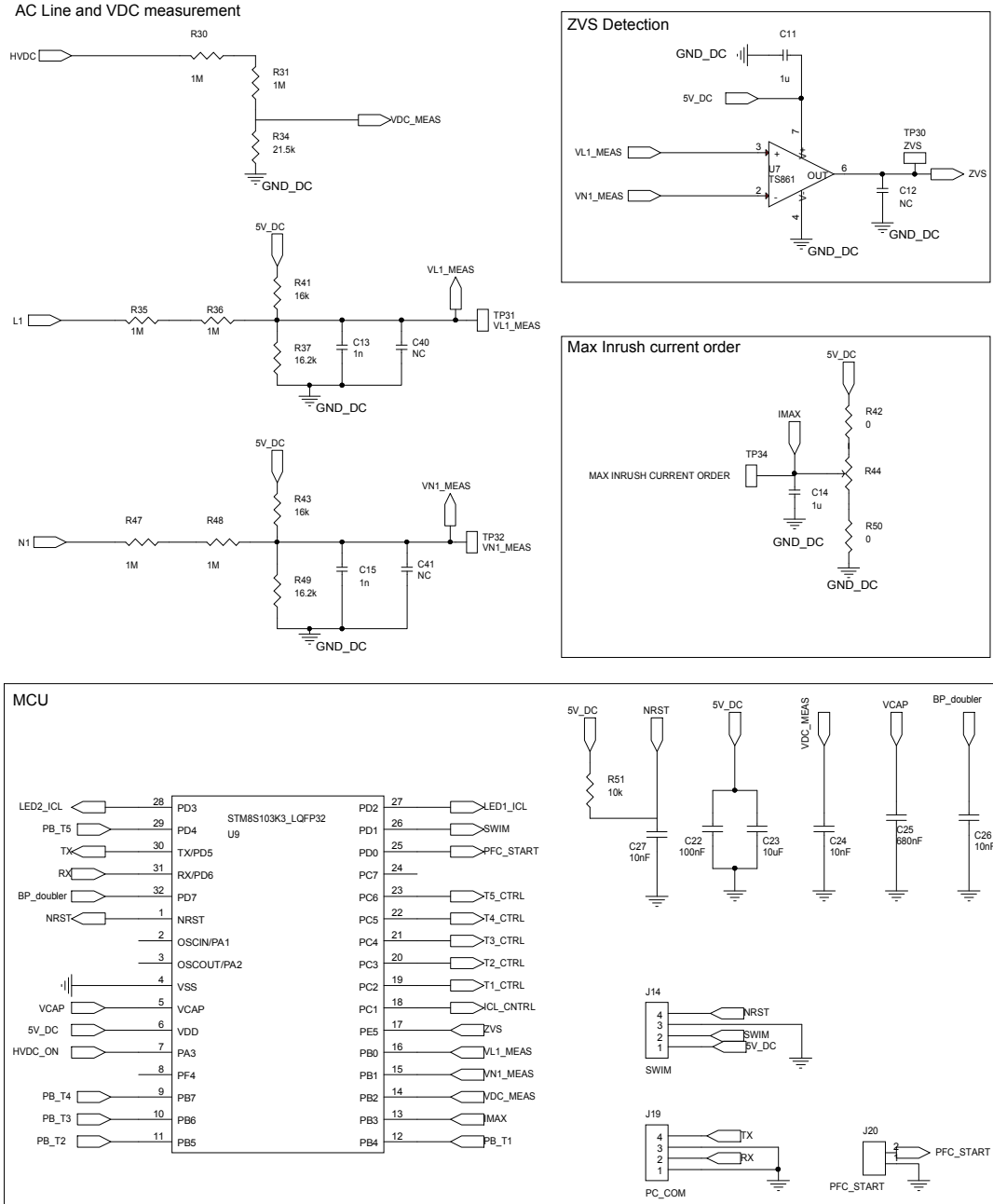
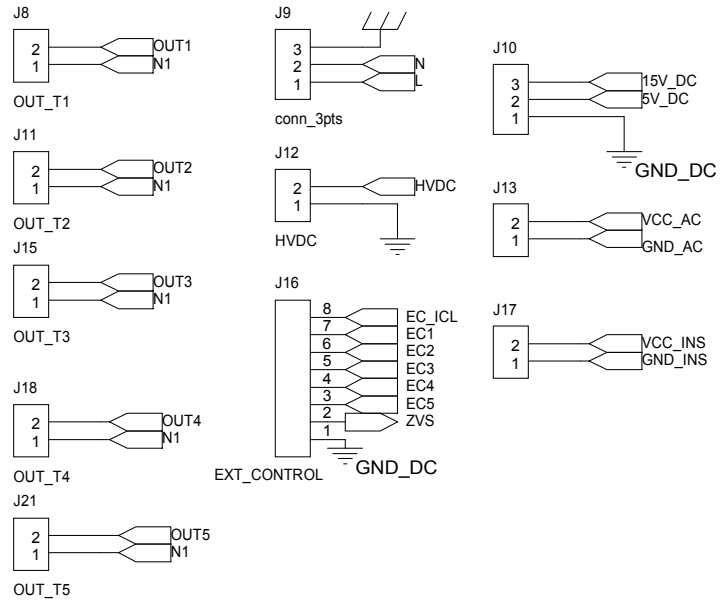


Figure 4. STEVAL-IHT008V1 control circuit schematic (2 of 3)

External_connectors



HV_capacitor discharge

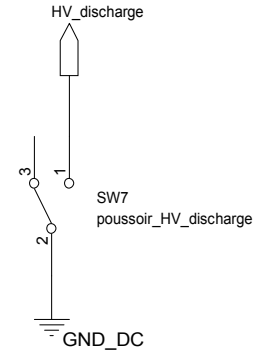
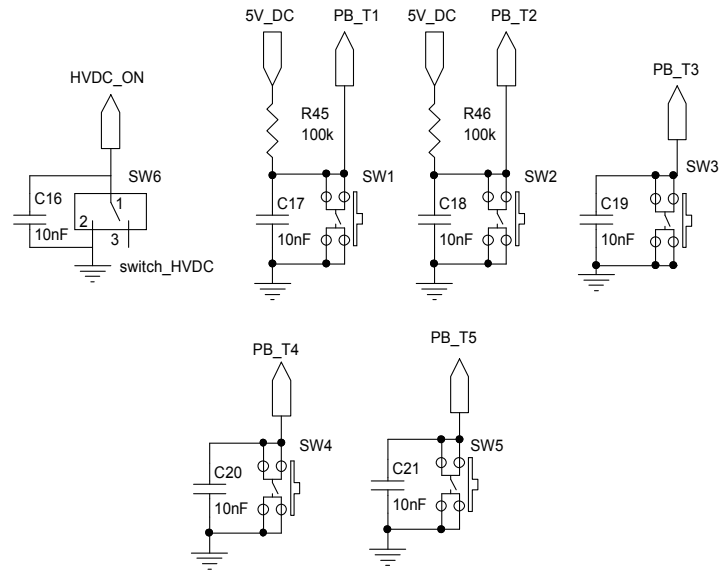


Figure 5. STEVAL-IHT008V1 control circuit schematic (3 of 3)

Push Buttons



Status LEDs

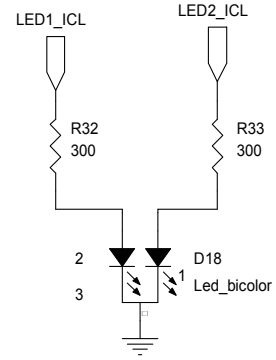
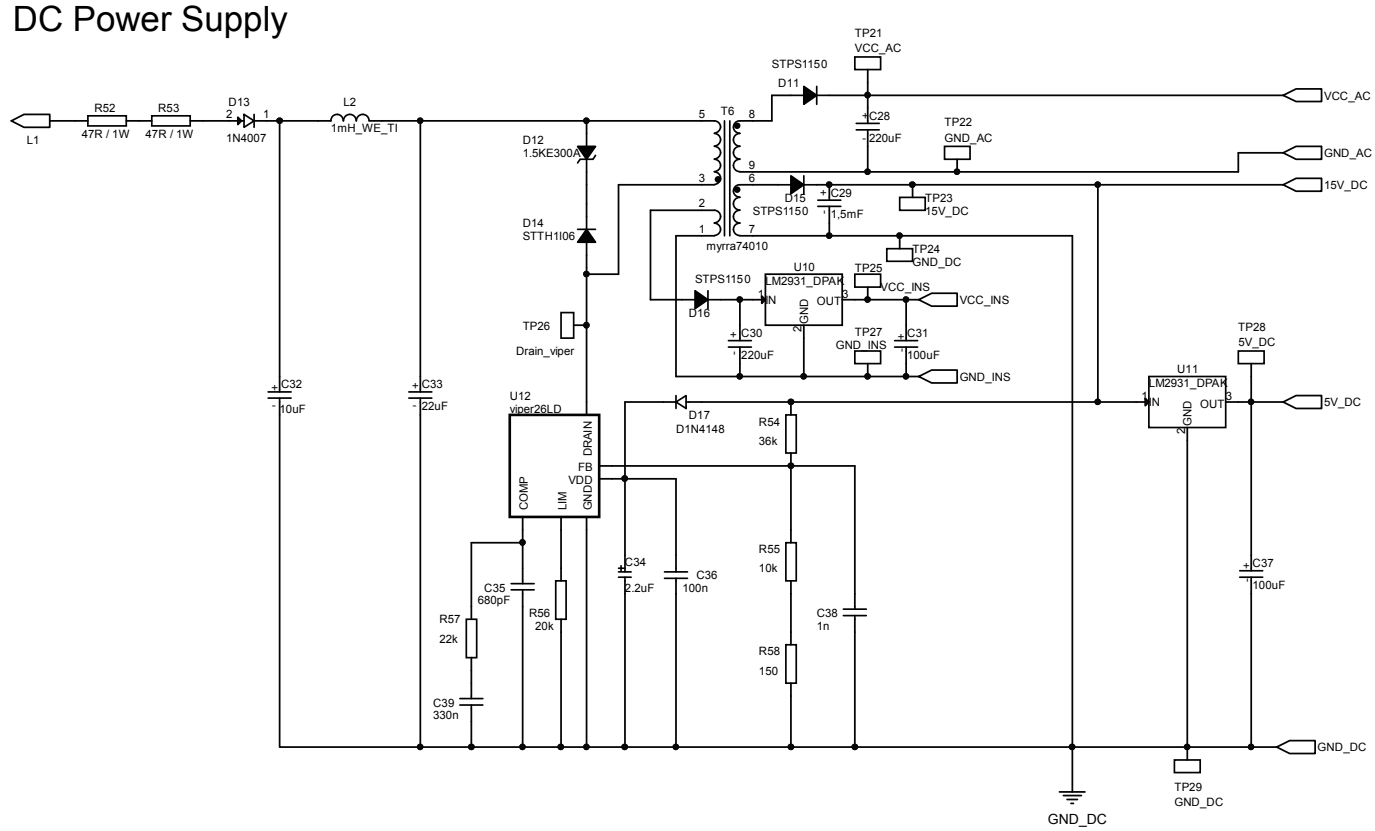


Figure 6. STEVAL-IHT008V1 Flyback SMPS schematic



Revision history

Table 1. Document revision history

Date	Version	Changes
01-Feb-2016	1	Initial release.
06-Feb-2019	2	Added cover page product summary table. Updated cover page description Minor text and formatting changes

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