

Trailing edge phase control rotary wall dimmer based on the STF17N62K3 power MOSFET

Data brief



Features

- Operation for 2-wire wall dimmer
- Trailing-edge control only (compatible with all lamps commonly found on the market)
- Operation on 110 V or 230 V rms line voltage ($\pm 10\%$) and 50 Hz or 60 Hz line frequency;
- Dimmable power range (without heatsinks mounted on MOSFETs)
 - 40 W to 300 W for 230 V rms line
 - 15 W to 90 W for 110 V rms line
- Maximum operating ambient temperature: 50 °C
- Power efficiency @ Max power - 230 V > 95%
- Power factor @ Max power > 0.98
- Control and regulation interface with a switched type single linear rotary potentiometer
- Compliance with EMC standards:
 - IEC 61000-4-5: criteria A for 2 kV surge
 - Compliant with EN55015 with 300 W - 230 V halogen lamp
- Flicker-free dimming performance

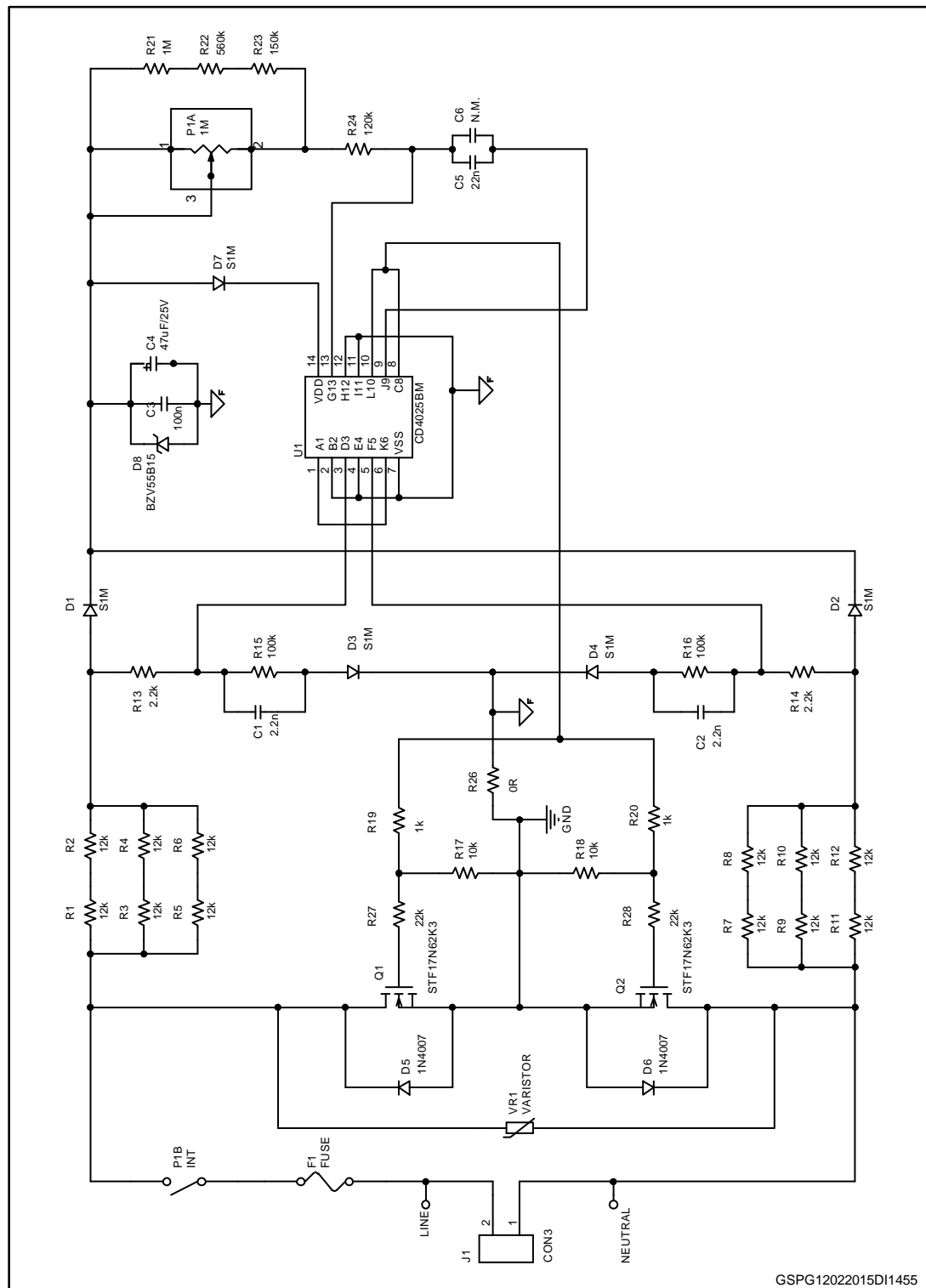
- Smooth dimming operation and silent dimming control with no buzzing or audible noise
- Acceptable levels of EMI noise without the need for LC filters to reduce conducted emission disturbances
- Low inrush current generation
- RoHS compliant

Description

The STEVAL-ILD005V1 evaluation board implements a simple and cost-effective MOS-based reverse phase cut dimming solution for analog wall dimmers using a pair of STF17N62K3 power MOSFETs controlled by a triple 3-input NOR gate to effectively dim either resistive or capacitive lighting loads (i.e. halogen lamps, electronic low voltage transformers and various dimmable CFL/LED lamps). The AC analog control dimming technique employed allows for both on/off power switching and up/down dimming functions through a single linear rotary potentiometer equipped with a mechanical switch which opens the circuit at minimum setting. Control of the board is achieved using a triple 3-input NOR gate (pin-to-pin compatible with a ST's HCF4025BE 14-lead dual in-line CMOS gate logic device in plastic SO-14 micropackage) which acts as a gate driving voltage signal source, performs zero crossing detection and timing through the use of a few other passive components and diodes.

1 Schematic diagram

Figure 1: STEVAL-ILD005V1 circuit schematic



2 Revision history

Table 1: Document revision history

Date	Rev	Changes
12-Feb-2015	1	First release.
18-Feb-2015	2	Minor text change to improve readability
23-Apr-2015	3	Updated: Features

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2015 STMicroelectronics – All rights reserved