STHVUP64

64-channel pulser with integrated beamformer channel

Highly integrated ultrasound transmitter for handheld scanner solutions driven wirelessly or via USB

With an advanced 64-channel beamforming control unit, the STHVUP64 embeds two half-bridges (±100 V, 0.2/0.8 A) and 3- or 5-level outputs in addition to fully integrated Tx/Rx switches and clamp functions for each channel.

Optimized for handheld ultrasound topologies for use in point-of-care testing areas and emergency units, it offers excellent design opportunities for compact scanner solutions.

Available in a 196-ball FC-BGA package (10x10 mm).

KEY FEATURES & BENEFITS

- 0 to 200 V output signal (peak-to-peak)
- Self-biased gate driver architecture, no filtering capacitors required
- Pulsed wave (PW) and continuous wave (CW) mode operations
  - Programmable ±200 mA or ±400 mA source and sink current in 3-level configuration
- Fully integrated true clamping to ground
- Fully integrated Tx/Rx switches
- Programmable power management to optimize performance in ultra-portable applications
- Beamforming in Tx mode
  - Programmable single-channel delay for beam steering and beam focusing
  - Clock frequency up to 200 MHz
  - 5ns delay resolution
- Embedded memory to store transmission patterns
  - 32 states for waveform definition
  - Waveforms compression algorithm
- Easy driving control
  - Control through standard Quad Serial Peripheral Interface (QSPI)
- Checksum control
- Very low package thermal resistance

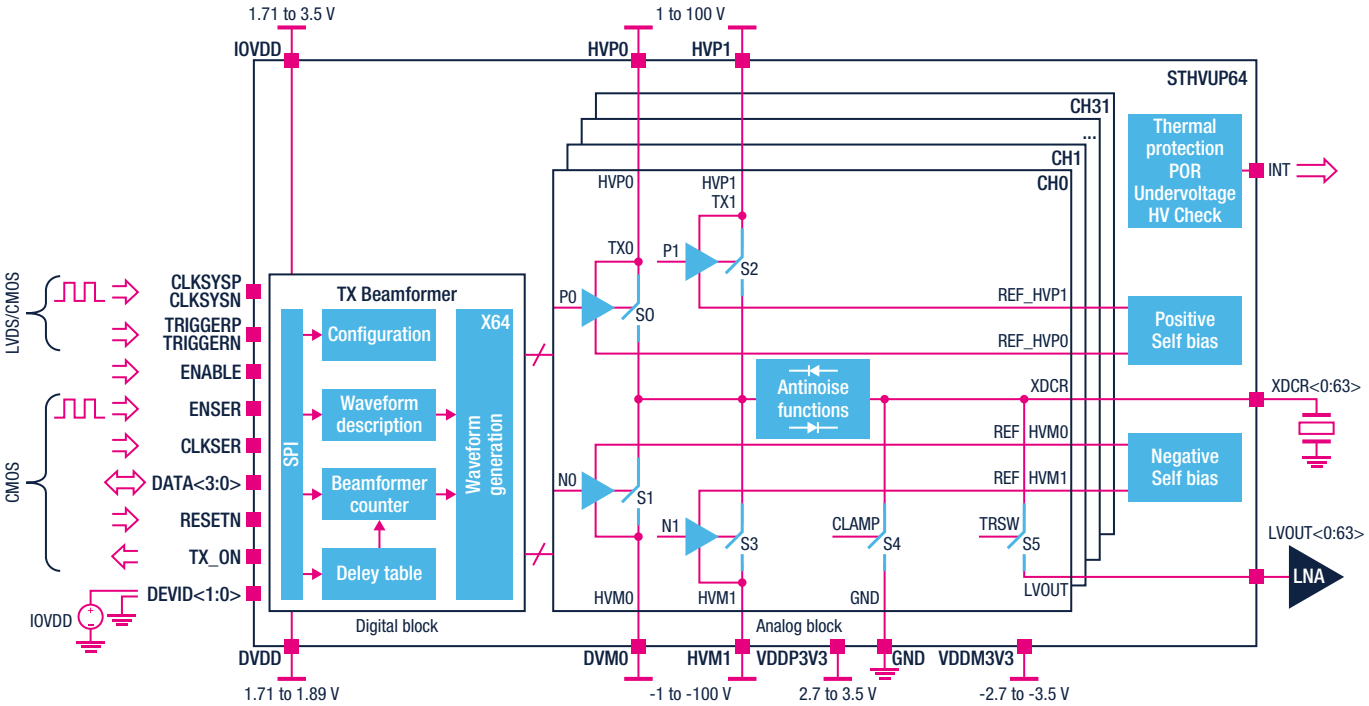
KEY APPLICATIONS

- Ultra-portable ultrasound imaging
- Medical ultrasound imaging
- Pulse waveform generators
- Piezoelectric transducer drivers

Device description

The STHVUP64 is monolithic, high-voltage and high-speed pulse generator features beamformer with 64 independent channel for pulse generation in multi-channel medical ultrasound applications ultra-portable low-power imaging systems.
A pure analog section provides each channel two half-bridges (two high-voltage P-channel and two high-voltage N-channel MOSFETs), a clamping-to-ground circuit and a transmitting/receiving switch structure which guarantees an effective isolation during the transmission phase.
Through a dedicated bit, channels can be programmed as a 3- or 5-level output. In 3-level mode, the two half-bridges are driven in parallel to provide a default peak current of 400 mA. However, it is also possible to program a low-consumption mode to decrease the overall power consumption: in this case, only one half-bridge is used and the output current drops to 200 mA. In 5-level mode, the two half-bridges can be driven independently, and each half-bridge has a current capability of 200 mA.
The STHVUP64 also includes thermal protection circuits,undervoltage checks on VDDP3V3, VDDM3V3 and DVDD, a power-on-reset (POR) on DVDD and a global self-biased high-voltage MOSFET gate driver with internal check of the correct value and of the HV supplies.
All functions are managed by a digital core working at a maximum clock frequency of 200 MHz. This block manages the delay profiles used in the beamformer, the waveform generation and the various global settings and ensures that all device operations are performed in the correct sequence.

Application block diagram



Main specification

Order code	Package	Max HV	Max Ipeak	TRSW	Sys CLK	CW ModePower consumption per channel	HD2	Min state duration
STHVUP64	196-ball FC-BGA 10x10x1.4 mm	200 Vpp	400 mA	R = 45 Ω C = 18 pF	200 MHz	33 mW (@ 5 MHz/HV = ±5 V/no load)	-40 dB (@ 5 MHz/HV = ±40 V)	5 ns