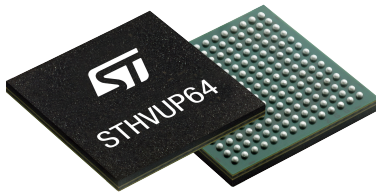


64-channel ± 100 V, $\pm 0.4/0.2$ A, 3/5-level RTZ, T/R switch, high-speed ultrasound pulser with integrated transmit beamformer



Features

- Pulsed wave (PW) and continuous wave (CW) mode operations:
 - 3- or 5-level ± 100 V output waveform
 - Programmable ± 200 mA or ± 400 mA source and sink current in 3-level configuration (± 200 mA in 5-level configuration)
- Fully integrated 45Ω resistance real clamping-to-ground function
- Fully integrated 45Ω resistance transmitting/receiving switches (TR_SW)
 - Compliant with receiver multiplexing function
- Auxiliary integrated circuits
 - Noise-blocking diodes
 - Thermal protection
 - Undervoltage protection and bias supply checks
- Programmable power management to optimize the performances for ultra-portable applications
- Beamforming in transmission mode
 - Programmable single-channel delay for beam steering and beam focusing
 - Clock frequency up to 200 MHz
 - 5 ns delay resolution
 - From 5 ns to 20 μ s delay range @ 200 MHz
 - 3 μ s minimum delay table writing time
- Embedded memory to store transmission patterns
 - 32 states for waveform definition, with waveform compression algorithm
 - Up to 4 different waveforms for each channel
- Easy driving control
 - Control through standard Quad Serial Peripheral Interface (QSPI)
 - Few input signals to drive several devices
 - Single interrupt as alert signal
 - Single trigger to manage transmitting (TX) and receiving (RX) phases, fully automatic and programmable
 - Anti-glitch on TRIGGER signal during TX phase
- Checksum control
- Very low package thermal resistance
- Latch-up free due to HV SOI technology
- Just a few passive components needed
- Small package: BGA 10 mm x 10 mm with 196 balls and 0.65 mm pitch

Product status link

[STHVUP64](#)

Product summary

Order code	STHVUP64
Package	FCBGA196 10X10X1.4
Packing	Tray

Product label



Application

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

Description

The **STHVUP64** is a 64 channels monolithic high-voltage and high-speed pulser with an integrated beamformer. It is specifically designed for pulse generation in multi-channel low-power ultra-portable medical ultrasound applications.

The waveforms generated by **STHVUP64** are described with sequences of up to 32 states stored in the device memory. With each state it is possible to configure each individual output channel to be connected to high voltage supplies (positive or negative), clamped to ground or left in high impedance.

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. Each channel features also integrated high-voltage level translators and noise-blocking diodes.

Through a dedicated bit, channels can be programmed as a 3-level output or as a 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 and low output current modes to decrease the overall power consumption: in this case, only one half-bridge is used and the output current lowers down 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 clamp circuit, used to force the XDCR<63:0> output pins down to ground, has a resistance of 45 Ω and a peak current capability of 0.32 A. The 64 independent T/R switches can be used in a multiplexing configuration.

The **STHVUP64** also includes some global blocks: thermal protection circuits, undervoltage checks on VDDP3V3, VDDM3V3 and DVDD, a power-on-reset (POR) on DVDD and a global self-biased supply for the drivers of the high-voltage MOSFET.

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 grants that all the device operations are performed in the correct sequence.

Revision history

Table 1. Document revision history

Date	Version	Changes
04-Aug-2022	1	Initial release.
03-Feb-2023	2	Updated Features and title.



Contents

Revision history3

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