STHV800 highly-integrated octal ultrasound pulser with T/R switch simplifies design for ultrasound equipment

The cost and size of ultrasound imaging machines can be reduced with the new STHV800 octal ultrasound pulser from STMicroelectronics. ST’s proprietary BCD6s-SOI and BCD8s-SOI process technologies enable the combination of low-voltage CMOS logic, precise analog circuitry and robust power stages on the same chip, offering an unprecedented level of integration.

**KEY FEATURES**
- Medical ultrasound imaging
- Point-of-care ultrasound imaging
- Pulse waveform generator
- Non-destructive testing equipment
- Sonar and radar systems
- Piezoelectric transducer drivers

**KEY BENEFITS**
- 8 channels
- 0 to ± 90 V output voltage
- 2 A @ Vds = 60 V
- Integrated T/R switch
- Integrated clamping-to-ground function
- Anti-memory function
- 2 independently supplied half-bridges per channel (pulsed wave/continuous wave)
- Up to 20 MHz operating frequency
- Low power consumption
- 56-lead TFLGA (8 x 8 mm) package

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The STHV800 is an octal, monolithic, high-voltage and high-speed pulse generator. The device integrates a controller logic interface circuit (compatible with both 1.8 V and 3.3 V input signals), level translators, MOSFET gate drivers, noise-blocking diodes, and high-power P-channel and N-channel MOSFETs as the output stage for each channel.

Each channel consists of active clamping to ground circuitry (RTZ), an anti-leakage and anti-memory block, a thermal sensor to protect the device and an integrated T/R switch (just 8 ohms as equivalent resistor) to connect the HV output to its LV output, guaranteeing strong decoupling during the transmission phase. The eight independent T/R switches can be used in both a dedicated RX chain per channel or in a multiplexing configuration. In addition, the STHV800 includes self-biasing circuitry which allows very low power consumption.

STHV800 BLOCK DIAGRAM

<table>
<thead>
<tr>
<th>Partnumber</th>
<th>Channels</th>
<th>Output level</th>
<th>Output voltage (V)</th>
<th>Output current (A)</th>
<th>T/R switch impedance (Ω)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>STHV800L</td>
<td>8</td>
<td>3</td>
<td>± 90 V</td>
<td>± 2</td>
<td>8.5</td>
<td>TFLGA-56LD 8 x 8 x 0.9 mm</td>
</tr>
</tbody>
</table>

The STHV800 device is supported by STEVAL-IME009V1 and STEVAL-IME013V1 evaluation boards. More on www.st.com/ultrasound

Today, processes like 0.16 μm 200 V BCD8s-SOI and 0.32 μm BCD6s-SOI from STMicroelectronics are making transmit, receive, digital control logic, and beamforming functions easier to integrate into a single IC. The higher integration between ultrasound transducer and advanced semiconductor technology is greatly improving the effectiveness of ultrasound imaging, adding real-time 3D imaging capabilities. Ultrasound is finding new uses such as 3D breast scans to replace or augment mammography exams, complete heart exams in real-time, and for determining whether a tumor is cancerous or not without a biopsy.