## FEATURES
- Pulse width 1 to 64 ns in steps of 0.25 ns
- Fixed crystal stabilised frequency of 1 MHz
- Variable frequency of 1 kHz to 2 MHz
- LVDS und TTL outputs
- Compatible with HG1D, NZN1D, NZP1D

## APPLICATIONS
- Pulse generator for fast laser diode drivers

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### BOARD

![Image of the ic149 board]
DESCRIPTION

Pulse generator iC149 produces pulses with a small duty cycle in the range of ca. 1 ns up to 64 ns max. in steps of 0.25 ns at a pulse frequency of 1 MHz. The pulse width is set by means of two hexadecimal coding switches in coarse and fine steps.

Alternatively a tunable (P1) oscillator can be used.

The pulses are output both as LVDS and TTL signals.

This module can easily be used with the evaluation boards HG1D, NZN1D and NZP1D.

ELECTRICAL CHARACTERISTICS

Operating Conditions: Ta = 25 °C

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>V5</td>
<td>Power Supply</td>
<td></td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>102</td>
<td>I(V5)</td>
<td>Supply Current</td>
<td>V5 = 5 V, S1 = ON/OFF, TRIGGER open</td>
<td>50</td>
<td>75</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>V5 = 5 V, S1 = ON, TRIGGER 50 Ω vs. Ground</td>
<td></td>
<td></td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>

Pulse Width

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Tp_{max}</td>
<td>Maximum Pulsweite</td>
<td>V5 = 5 V, Ta = 27 °C, coarse = &quot;F&quot;, fine = &quot;F&quot;</td>
<td>63.75</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>202</td>
<td>Tp_{min}</td>
<td>Minimum Pulsweite</td>
<td>V5 = 5 V, Ta = 27 °C, coarse = &quot;0&quot;, fine ≤ &quot;F&quot; cf. Figure 6</td>
<td>1</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>
PIN CONFIGURATION

**J1** 16 pole pin header for power supply and signal outputs

**J2** RJ45 connector for output signals with LVDS or TTL/CMOS levels

**J3** TRIGGER: SMA connector for trigger output, \(R_{out} = 50\, \Omega\)

**JP1** Jumper at position 1-2 selects TTL/CMOS signals for J2

**JP2** Jumper at position 1-2: variable frequency from 10 kHz to 2 MHz

Jumper at position 2-3: variable frequency from 1 to 100 kHz

**JP3** Jumper at position 1-2: crystal stabilised fixed frequency of 1 MHz

Jumper at position 2-3: variable frequency from 1 kHz to 2 MHz (see JP2)

**S1** Oscillator ON/OFF

**S2** Selector switch: programmable pulse or symmetrical 1 MHz signal

**S3** Coding switch *fine*

**S4** Coding switch *coarse*

**TP1** LVDS signal at J1 (must be terminated with 100\, \Omega for measurement purpose)

**TP2** LVDS signal at J1

**TP3** TTL/CMOS signal at J1

**TP4** LVDS signal at J2

**P1** Trimmer for setting the variable frequency

**GND** GND

**V5** 5 V Power supply

**3V3** 3.3 V

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Table 2: Connectors on the PCB
BLOCK DIAGRAM

Figure 3: Block diagram of the iC149

VARIABLE OSCILLATOR

Figure 4: Variable frequency vs. potentiometer setting
SETTING THE PULSE WIDTH

\[ \Delta T = (m \times 4 \text{ ns} + n \times 0.25 \text{ ns}) \pm 2 \text{ ns} \]

1 ≤ m (coarse) ≤ 15,
0 ≤ n (fine) ≤ 15

\[ \Delta T = (m \times 4 \text{ ns} + 3.75 \text{ ns}) \pm 2 \text{ ns} \]

1 ≤ m (coarse) ≤ 15,
n (fine) = 15

Figure 5: Setting the pulse width "coarse"

Figure 6: Setting the pulse width "fine", with respect to the supply voltage and device parameter variation
Figure 7: In pulse mode (S2 left hand position) the rising edge of the trigger signal and the LVDS appear simultaneously. The TTL/CMOS has an approx. 1 ns delay.

Figure 8: In the symmetrical mode (S2 right hand position) the rising edge of the trigger signal has an approx. 20 ns delay with reference to the output signals.

Figure 9: Maximum pulse width at switch setting “FF”

Figure 10: Minimum pulse width at switch setting “0B”
Figure 11: Minimum variable frequency, JP3 = 2-3, JP2 = 2-3, P1 = CCW

Figure 12: Maximum variable frequency, JP3 = 2-3, JP2 = 2-3, P1 = CW

Figure 13: Minimum variable frequency, JP3 = 2-3, JP2 = 1-2, P1 = CCW

Figure 14: Maximum variable frequency, JP3 = 2-3, JP2 = 1-2, P1 = CW

Figure 15: Fixed frequency 1 MHz, JP3 = 1-2
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