50 & Ω SMA Wideband Pick-Off Tee PT-45A
Advanced TLP/HMM/HBM Solutions

- Wideband pick-off tee for TLP/VF-TLP measurements
- General purpose voltage probe 45:1
- Nominal pick-off transfer coefficient –33 dB
- DC to 10 GHz bandwidth (±2 dB)
- Insertion loss typ. 0.2 dB at 5 GHz
- max. 2.5 kV peak pulse voltage (1.6 μs pulse width)
- max. 30 V DC (port 1, port 2 to port 3)

1 Description

The wideband pick-off tee can be used to measure the voltage amplitude of incident and reflected waves in a 50 Ω transmission line. Pulse input and output are electrically equivalent and can be also changed in the setup.

![PT-45A connectors](image1)

Figure 1: PT-45A connectors.

- **Input (Port 1):** 50 Ω pulse force input.
- **Output (Port 2):** 50 Ω pulse force output.
- **Pick-Off Output (Port 3):** This output must be terminated with 50 Ω. Normally it is directly connected to the oscilloscope input. The pick-off voltage transfer coefficient is calculated $k = (R+50)/50$ where $R = 2.2$ kΩ, which results in a voltage transfer coefficient of $k = 45$. The voltage transfer coefficient $k$ can be calculated also from Fig. 4 using $k = 1/(10^{S31/20})$, with $S31$ in [dB].

2 Electrical Characteristics

2.1 Frequency Response

(50 & Ω S-Parameter)

![S21 dB vs Frequency](image2)

Figure 2: PT-45A schematic diagram.

![S31 dB vs Frequency](image3)

Figure 3: Typical insertion loss of the PT-45A from port 1 to port 2 (Fig. 1).

![S31 dB vs Frequency](image4)

Figure 4: Typical transfer characteristic of the PT-45A from port 1 or port 2 to port 3 (Fig. 1).

CAUTION: IF THE MAXIMUM INPUT VOLTAGE OF THE OSCILLOSCOPE IS 5 V THEN THE MAXIMUM ALLOWED TLP VOLTAGE IN THE 50 Ω TRANSMISSION LINE IS 5 x 45 = 225 V. A HIGHER SIGNAL LEVEL MAY DAMAGE THE OSCILLOSCOPE INPUT. IT IS RECOMMENDED TO CONNECT AN ADDITIONAL ATTENUATOR IN SERIES, ACCORDING TO YOUR REQUIREMENTS.
3 Ordering Information

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<th>Pos.</th>
<th>Description</th>
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<td>01</td>
<td>50 Ω SMA Wideband Pick-Off Tee (k = 45)</td>
<td>PT-45A</td>
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