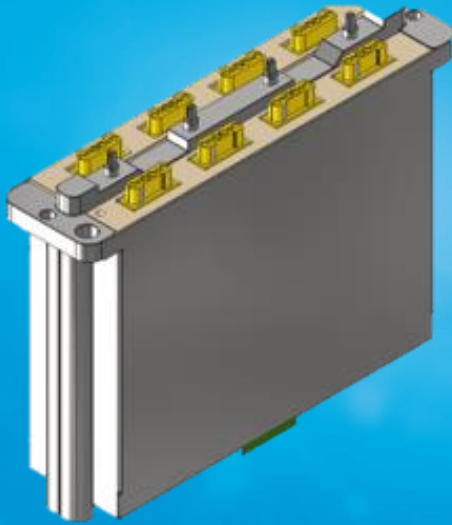


Innovation for the next generation



OT4025

Advantest Exascale 4 Channel 70GHz Sampling Scope

Depicted here are two OT4025 sampling scopes (DSO) encapsulated into one water-cooled cassette

Summary

The OT4025 is a high-speed sampling scope encapsulated into a water-cooled cassette. Three cassettes can populate each garage with a garage enclosure on either side of the loadboard area. Each water-cooled module can be configured with multiple OT4025 instruments.

The OT4025 resides inside the Exascale testhead underneath the load board. Due to this proximity, the signal path to the DUT is minimized. This is an important feature for extremely high-speed signals.

This sampling scope instrument is ideal for packaged silicon and wafer die testing at production or characterization. It enables at-speed testing of SerDes, transceivers, amplifiers, and other active and passive high-speed digital components.

OT4025

Introduction

The OT4025 is a fully featured, cost effective, advanced and highly compact four channels equivalent Digital Sampling Oscilloscope characterized by its 70GHz bandwidth.

The oscilloscope comes equipped with comprehensive software libraries that enable eye measurements, jitter analysis, and processing of NRZ and PAM4 data. Additionally, its extensive set of APIs makes it highly suitable for automated testing and efficient go/no-go production validation.

Banner Specifications

- 4 differential inputs channels
- 70 GHz input bandwidth
- Phase trigger
- Full eye and mask measurements
- NRZ & PAM4

Typical Applications

- Time domain measurements of high-speed digital communication signals, including SerDes, Transceivers, TIA's
- Qualification of PAM-N and NRZ drivers.
- Package and Wafer test
- Characterization and Production test

Key Features

The OT4025-NPI family of DSOs is truly powerful, boasting an extensive set of features and functions that are unique in the industry. These include:

- Exascale Turnkey hardware and mechanical
- Smartest programming language API's
- High Performance testing per Elec Specs
- An extensive free library of built-in de-embedding and component emulation API's
- Built-in standard eye window masks library
- Faster test times than benchtop methods

Electrical Specifications

Parameter	Specifications
Data format support	NRZ and PAM-4
Intrinsic jitter	200 fs rms
Electrical amplitude	< 600 mV SE and < 1200 mV Diff
Rise/Fall Time	7 ps
Vertical resolution	14 bits
Electrical channel bandwidth	70 GHz
Electrical channel connectors	(4X) 1X2 ML SMPS
Clock input bandwidth (phase shifter mode)	0.1 – 0.57 GHz
Clock input bandwidth (PLL mode)	0.1 – 1.35 GHz
Clock input swing	LVPECL
Sampling frequency	50 ~ 80 MHz
Data Input	AC coupled
Supported number of samples per channel	(page 4)
Pattern Capture	SSPRQ & Up to PRBS-16
Normal Operating Temperature	0 - 65 °C
Instrument Automatic Shutoff	70 °C (manual reboot is needed to turn it back on)
Cooling Method	Water Cooled
Power rating	31W

Spectrum Analysis view & THD

The DSO uses DFT to derive the spectral content of the signal present at the input. It also calculates the Total Harmonic Distortion figure.

Supported Measurements

Coding	Measurement
PAM-4	TDECQ
	SNDR
	RLM
	OMA _{outer}
	Eye Height by BER
	Eye Width by BER
NRZ	Top & Base
	Min & Max
	One & Zero
	Transition Time
	Crossing %
	AOP
	OMA
	Mask Margin
	Peak to Peak
	Eye Amplitude
	Eye Height
	Eye Width
	Jitter
	SNR
	ER
	VEC
	Vrms
	DJ & RJ
Noise	

Supported DSP Functions

- Frequency response correction of O/E & analog front end.
- Bessel Thomson 4th Order
- CTLE Adaptive/manual
- FFE Adaptive/manual
- DFE Adaptive/manual
- De-embedding S4P
- Emulating S4P
- Normalizing Filter
- Moving average

Applying Filters

Several filters including FFE, DFE, CTLE, Bessel-Thomson are available in NRZ as well as PAM mode. Concatenation of several filters is also possible, and the effect of each filter is shown immediately on the eye or pattern.

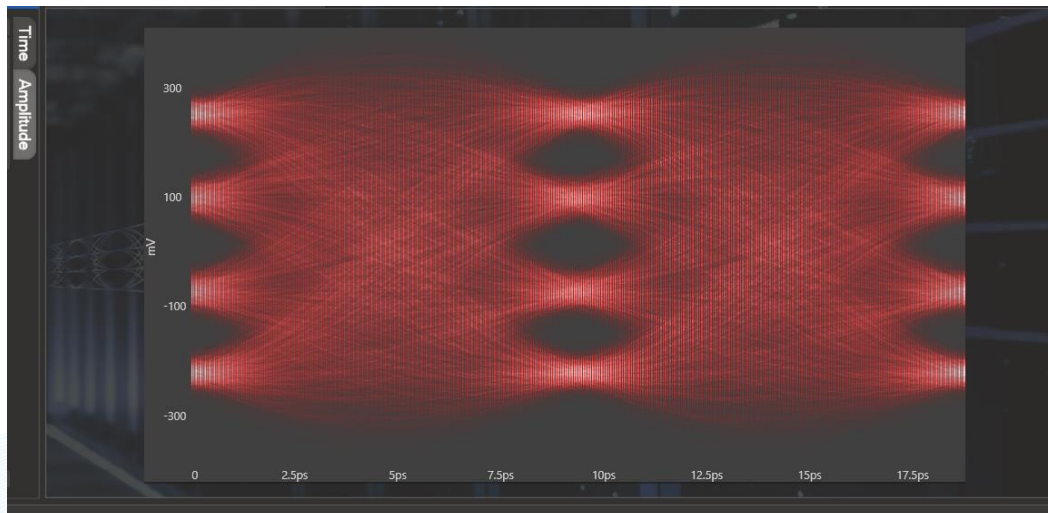
One may also import s2p or s4p files to de-embed fixtures.

A very useful function in determining the ideal CTLE gain for a given trace or the FFE number of taps for a certain target amplitude is the adaptive equalization feature available in the DSO.

Measuring Insertion Loss

If you have a source such as an ML BERT, you can measure the insertion loss (S21) of your device using the DSO.

The available dynamic range is 70 dB.



Eye Diagram capture at 224G

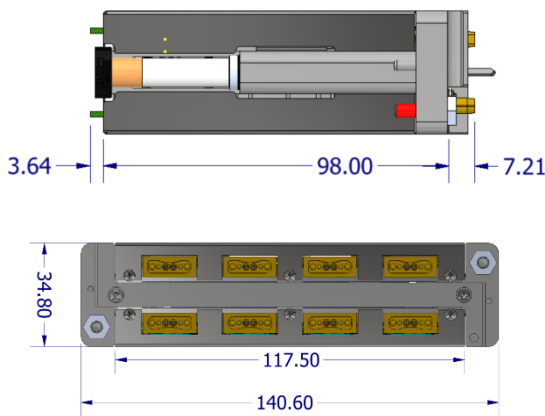
Supported number of samples per channel

This is the maximum number of samples per symbol that can be captured by the DSO and it's calculated by:

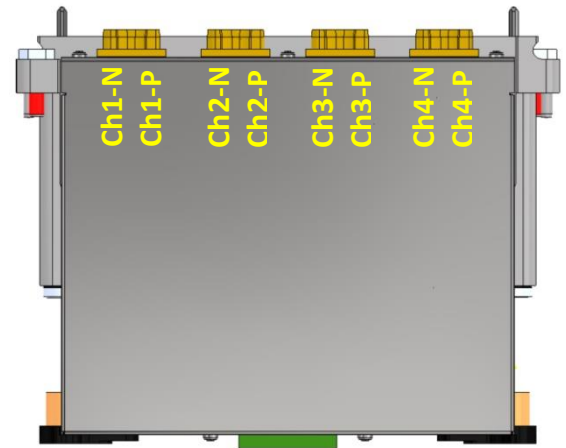
$$\text{Samples per Symbol} = \frac{300\text{MBytes}}{2 \times 4 \times ((\text{PRBS} + 1) \times \text{AVG})} < 4096$$

- 300 Mbytes: Memory depth for 4 channels
- PRBS: the length of the chosen PRBS i.e., PRBS7= 127
- AVG: the number of HW averaging chosen by software
- 4 is the number of channels
- 2 is the number of samples per byte

Mechanical Dimensions



OT4025 Pinout



Ordering Information

Option	Description
OT4025	(NPI) 4 Channel 70 GHz Digital Sampling Oscilloscope
142-7030-902	1x2 SMPS Female Cable Assembly to 1.85mm Precision Connector
142-7037-908	1x8 SMPS Female Cable Assembly to 1.85mm Precision Connector

Please contact us at sales@multilaneinc.com.

North America

48521 Warm Springs Blvd. Suite 310
Fremont, CA 94539
USA
+1 510 573 6388

Worldwide

Houmal Technology Park
Askarieh Main Road
Houmal, Lebanon
+961 81 794 455

Asia

14F-5/ Rm.5, 14F., No 295
Sec.2, Guangfu Rd. East Dist.,
Hsinchu City 300, Taiwan (R.O.C)
+886 3 5744 591