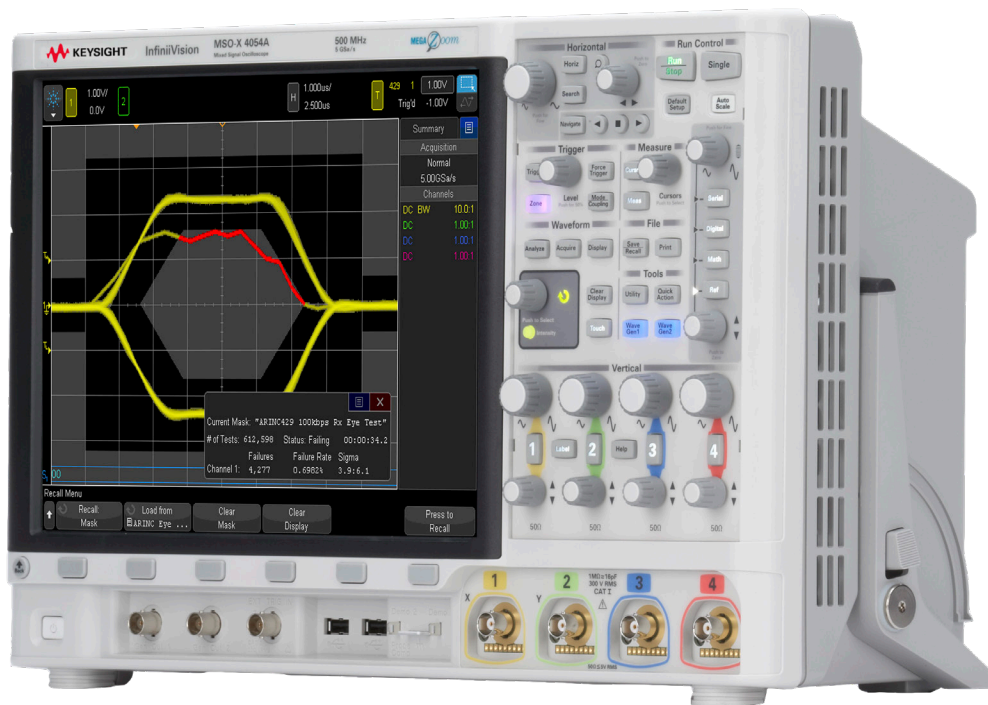


Keysight Technologies

Mask/Waveform Limit Testing for InfiniiVision Series Oscilloscopes

Data Sheet



Introduction

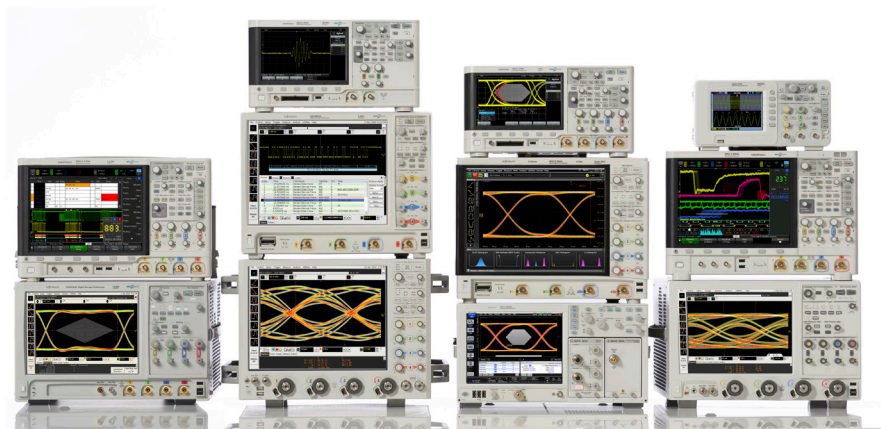
If you need to validate the quality and stability of your electronic components and systems, the Keysight Technologies, Inc. mask test option for InfiniiVision Series oscilloscopes can save you time and provide pass/fail statistics almost instantly. The mask test option offers a fast and easy way to test your signals to specified standards, as well as the ability to uncover unexpected signal anomalies, such as glitches. Mask testing on other oscilloscopes is usually based on software-intensive processing technology, which tends to be slow.

Keysight's InfiniiVision scopes mask test option is based on hardware-accelerated technology, meaning that InfiniiVision Series oscilloscopes can perform up to 270,000 real-time waveform pass/fail tests per second. This makes your testing throughput orders of magnitude faster than you can achieve on other oscilloscope mask test solutions.

Features

- Test up to 270,000 waveforms per second with the industry's fastest hardware-accelerated mask testing technology
- Automatic mask creation using input standard
- Easily download multi-region masks and setups based on industry standards
- Detailed pass/fail statistics
- Test to high-quality standards based on sigma
- Multiple user-selectable test criteria

Test waveforms to specified standards in seconds instead of hours using hardware-accelerated mask testing



Keysight Oscilloscopes

Multiple form factors from 20 MHz to > 90 GHz | Industry leading specs | Powerful applications

Using AutoMask

Figure 1 shows an example where we automatically created a pulse-shaped mask using an input signal standard. You can easily specify horizontal and vertical tolerance bands in either divisions or absolute volts and seconds. We set up the mask test to run continuously in order to accumulate valid pass/fail statistics. In this example, we quickly detected an infrequent glitch. After running the test for just a few seconds, the mask test statistics showed that the scope performed the pass/fail mask test on more than 1,000,000 waveforms and detected just two errors for a computed error rate of 0.0002%. In addition, we can see that this particular signal has a sigma quality relative to the mask tolerance of approximately 6.1 σ .

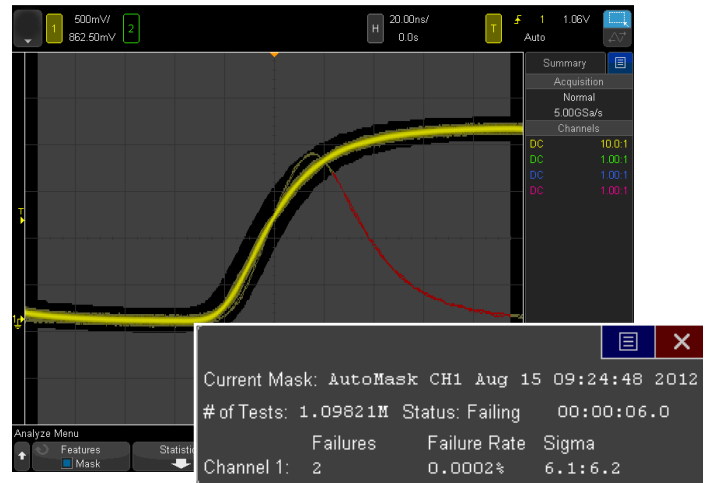


Figure 1. Mask testing uncovers an infrequent signal anomaly.

Importing an industry-standard mask

Figure 2 shows an example of an eye-diagram mask test. This particular polygon-shape mask is based on a published standard and was created on a PC using a simple text editor. We then imported the mask and setup parameters into the scope via a USB memory stick.

Multiple test criteria

When setting up your specific mask test criteria, you can choose from multiple options including:

- Run forever (with accumulated pass/fail statistics)
- Run until a specified number of tests
- Run until a specified time duration
- Run until a maximum ideal sigma standard
- Stop-on-failure
- Save-on-failure
- Print-on-failure
- Trigger out-on-failure

Six Sigma mask testing

Keysight InfiniiVision Series scopes are the first in the industry that can report mask test pass/fail statistics in sigma quality. InfiniiVision's fast acquisition and waveform mask test rate of up to 270,000 waveforms/sec makes this possible and for the first time, practical. If waveform failures follow a random/Gaussian failure distribution, Six Sigma quality represents approximately three failures/defects or fewer out of a test sample of 1,000,000. InfiniiVision Series scopes can test up to a Six Sigma standard in as little as 1.1 seconds. To learn more about waveform mask testing to Six Sigma quality standards, refer to the application note, "Oscilloscope Mask Testing for Six Sigma Quality Standards" listed at the end of this document.

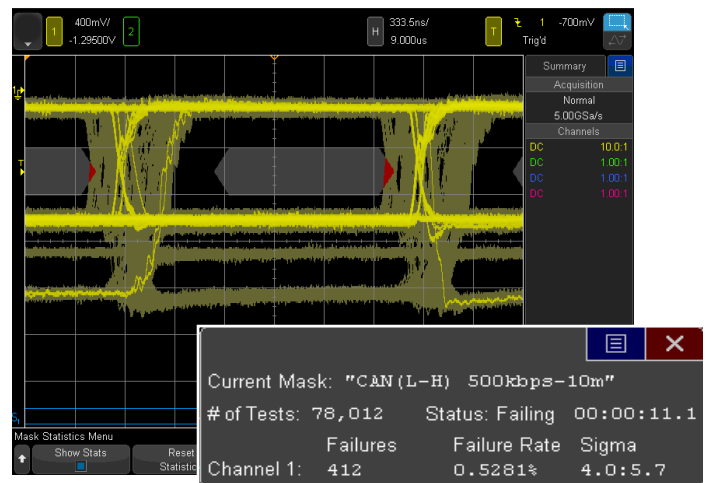


Figure 2. Testing an eye-diagram with an imported industry-standard mask.

Performance Characteristics

Mask test source	Analog channels 1, 2, 3, or 4
Maximum test rate	5000, 6000, 7000 Series: Up to 100,000 waveforms tested per second 3000 and 4000 X-Series: Up to 270,000 waveforms tested per second 2000 X-Series: Up to 50,000 waveforms tested per second 6000 X-Series: Up to 130,000 waveforms tested per second
Acquisition modes	Real-time sampling-non-averaged, Real-time sampling-averaged
Mask creation	
– Automask-divisions	\pm X divisions, \pm Y divisions
– Automask-absolute	\pm X seconds, \pm Y volts
– Mask file import	Up to 8 failure regions (created in text editor)
Mask scaling	Source lock on (mask automatically re-scales with scope settings) Source lock off (mask scaling fixed relative to display when loaded or created)
Test criteria	Run until forever, Minimum number of tests, Minimum time, Minimum sigma
Action on error	Stop acquisitions, save image, print, perform measurements
Trigger output	On failure
Statistics display	Number of tests, Number of failures (for each channel tested), Failure rate (for each channel tested), Test time (hours – minutes – seconds), Sigma (actual versus maximum without failures)
Display formats	Mask – translucent gray, Failing waveform segments – red, Passing waveform segments – channel color
Save/recall	4 non-volatile internal registers (.msk format), USB memory stick (.msk format)

Ordering Information

The mask/waveform limit test option is compatible with all Keysight InfiniiVision Series oscilloscopes.

InfiniiVision model	Mask test options
2000 X-Series	DSOX2MASK
3000T X-Series	DSOX3MASK
4000 X-Series	DSOX4MASK
6000 X-Series	DSOX6MASK
5000,60000, and 7000 Series	N5455A

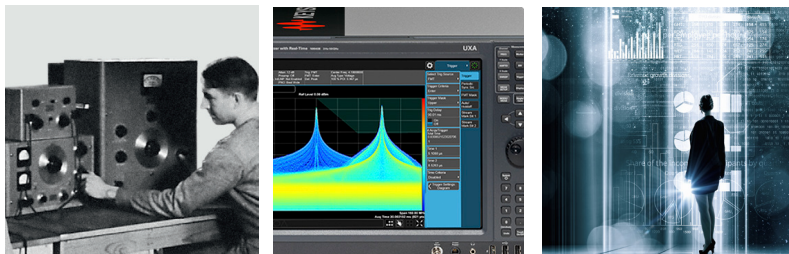
Related Keysight literature

Publication title	Publication number
InfiniiVision 6000 X-Series Oscilloscopes - Data Sheet	5991-4087EN
InfiniiVision 4000 X-Series Oscilloscopes - Data Sheet	5991-1103EN
InfiniiVision 3000T X-Series Oscilloscopes - Data Sheet	5992-0140EN
InfiniiVision 2000 X-Series Oscilloscopes - Data Sheet	5990-6618EN
InfiniiVision Oscilloscope Probes and Accessories - Selection Guide	5968-8153EN
Evaluating Oscilloscope Mask Testing for Six Sigma Quality Standards - Application Note	5990-3200EN
Oscilloscope Waveform Update Rate Determines Ability to Capture Elusive Events - Application Note	5989-7885EN
FlexRay Physical Layer Eye-diagram Mask Testing - Application Note	5990-4923EN
CAN Eye-Diagram Mask Testing - Application Note	5991-0484EN

Evolving Since 1939

Our unique combination of hardware, software, services, and people can help you reach your next breakthrough. We are unlocking the future of technology.

From Hewlett-Packard to Agilent to Keysight.



myKeysight

myKeysight

www.keysight.com/find/mykeysight

A personalized view into the information most relevant to you.

www.keysight.com/find/emt_product_registration

Register your products to get up-to-date product information and find warranty information.

KEYSIGHT SERVICES

Accelerate Technology Adoption.
Lower costs.

Keysight Services

www.keysight.com/find/service

Keysight Services can help from acquisition to renewal across your instrument's lifecycle. Our comprehensive service offerings—one-stop calibration, repair, asset management, technology refresh, consulting, training and more—helps you improve product quality and lower costs.



Keysight Assurance Plans

www.keysight.com/find/AssurancePlans

Up to ten years of protection and no budgetary surprises to ensure your instruments are operating to specification, so you can rely on accurate measurements.

Keysight Channel Partners

www.keysight.com/find/channelpartners

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/infiniivision

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:

www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 11 2626
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:

www.keysight.com/find/contactus
(BP-9-7-17)

DEKRA Certified
ISO 9001 Quality Management System

www.keysight.com/go/quality

Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2015
Quality Management System



Unlocking Measurement Insights

This information is subject to change without notice.

© Keysight Technologies, 2017
Published in USA, December 1, 2017
5990-3269EN

www.keysight.com