Pulsed Laser Diode Test System

Keithley Instruments announced its Model 2520 Pulsed Laser Diode Test System for electrical characterization of laser diodes in either the chip/bar state or in finished modules. The Model 2520 is the only single-instrument system for testing laser diodes in pulse mode up to 5A peaks. It allows pulse widths as short as 500nS with rise and fall times less than 60nS, while protecting the laser diode with output short and voltage compliance functions. In addition to its pulsed current output, this fully-integrated instrument has three measurement channels with a remote digitizing head connected by cables. One channel measures voltage across the laser diode. Two voltage-biased current measurement channels are used for simultaneous measurement of the front and back photodiode detector outputs needed to characterize edge-emitting lasers. Moreover, the single-box design of the Model 2520 makes set up and data collection much faster, and represents a significant savings in cost of ownership compared to traditional solutions.
The Model 2520 was designed for production testing of laser diode chips and bars. These components find use as optical sources in optical networks and in optical read/write heads of data storage systems. However, its pulsed current and V-I compliance capabilities make it useful for testing a wide range of electronic devices that must be protected from destructive voltages or self-heating while under test. Along with a user-supplied PC controller, the Model 2520 typically is used with an optical spectrum analyzer and wavelength meter for spectral measurements (which may also require an active cooling system to control the laser diode temperature). Because source and measurement algorithms are contained within the Model 2520, they do not have to be developed by a programmer, nor do they have to be sent over the external data bus from the PC controller. This feature speeds up measurements and increases test throughput. Throughput is further enhanced by a source memory list in the Model 2520 that stores multiple test sequences internally, and by a memory buffer that stores data until the end of a test sequence. These features eliminate much of the GPIB traffic during a test, and allow data to be downloaded upon test completion.
The Model 2520 is supplied in a half-rack size box with IEEE-488 and RS-232 interfaces. It allows complete Light Intensity-Current-Voltage (L-I-V) testing without the need for separate current-to-voltage converters, multichannel digital oscilloscope, &quotboxcar averagers&quot, or customized software.
The Model 2520 has a 14-bit A/D converter for accurate determination of the laser diode's lasing threshold current, L-I efficiency, and I-V linearity. This allows the manufacturer to characterize the relationship between drive current and light output in the linear region above the lasing threshold. Identification of any &quotkinks&quot (non-linearities) in this region is a very important quality assurance test, as it indicates mode hopping within the optically resonant cavity of the laser diode. Such anomalies disqualify laser diodes from use in Wavelength Division Multiplexed (WDM) communication systems.
For users who develop laser diode test applications with LabWindows CVI and LabVIEW, instrument drivers for these packages can be downloaded from the Keithley web site. Application demonstration programs in LabVIEW, LabWindows

CVI, and Visual Basic will be provided free of cost upon request. For those who want a complete turn-key system, Keithley works with a select group of system integrators who add optical test hardware and develop the test application program. This approach provides maximum flexibility for changing test requirements as laser diode specifications change with time or across different product lines. A Keithley team of dedicated optoelectronics test application engineers can assist with instrument setup, programming, and operation to utilize the test system's maximum capabilities.

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