

Photonics Test Solution

Laser Diodes: VCSEL/CoS/TO-CAN/Packaged

www.chromaate.com



Chroma

Test & Automation Turnkey Solution Provider

Get more information in Chroma ATE APP



iOS



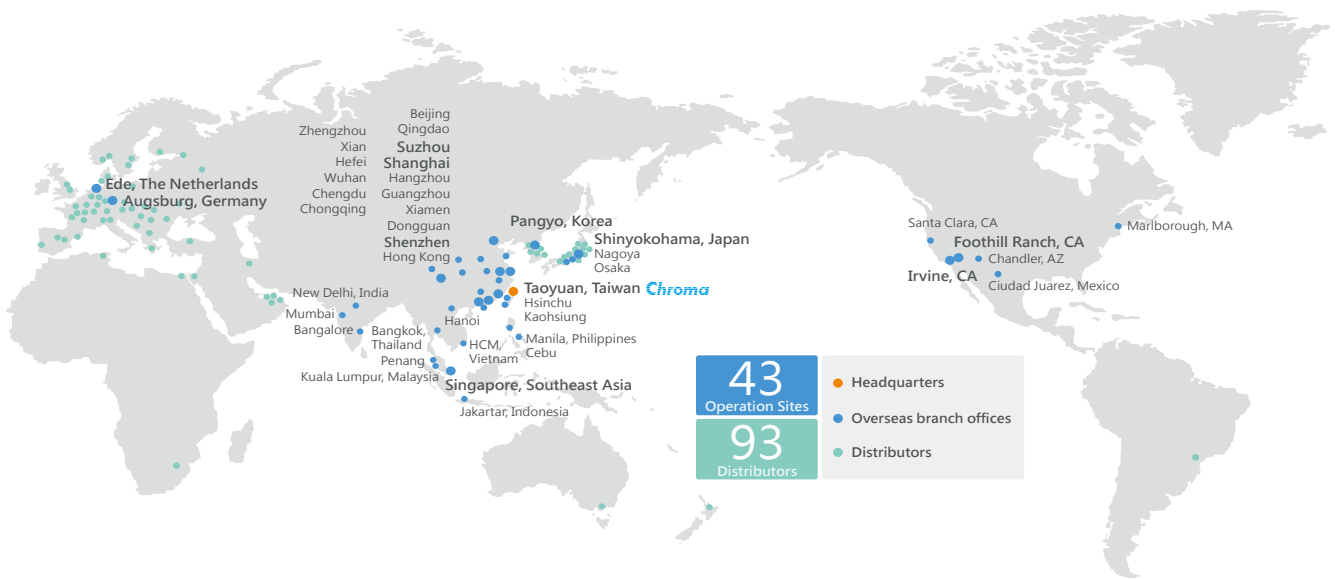
Android



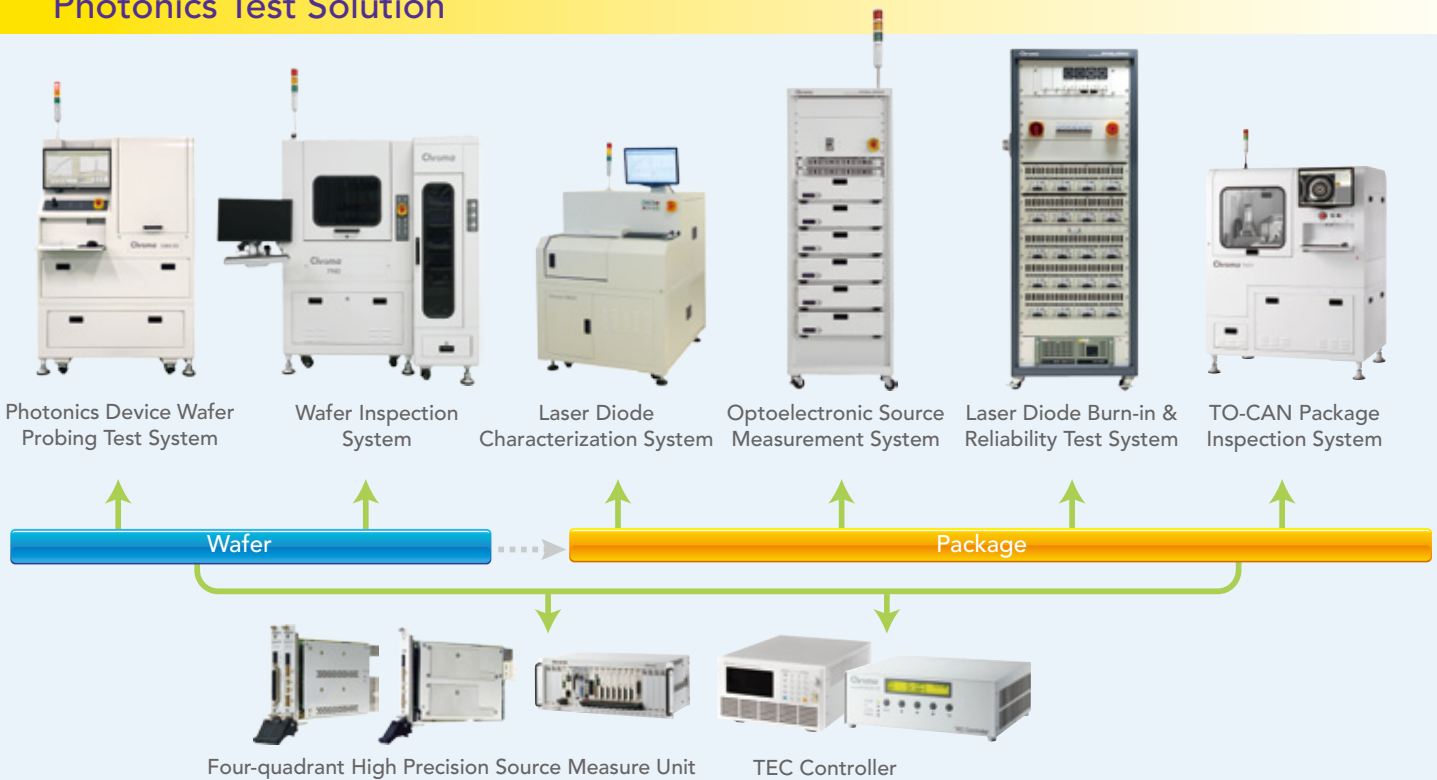
Founded in 1984, Chroma ATE is a world leading supplier in Automatic Testing Equipment (ATE). We provide proven test solutions for many key technology applications including Laser Diode, VCSEL, LED, photovoltaic, Li-battery, electric vehicle (EV/EVSE), semiconductor/IC, photonics, flat panel display, video and color, power electronics, passive component, electrical safety, and thermoelectric test, as well as automated optical inspection and manufacturing execution systems.



Chroma's photonics test solutions address mainly on automated test equipment for laser diode, VCSEL, LED both in wafer and chip format as well as optical communication active components. With more than 30 years of power electronic and automated optical test experience, Chroma offers many integrated mechanism and temperature control technology capable of performing reliable characteristics and aging test for optical devices under various temperature test conditions.



Photonics Test Solution



Wafer Inspection System

Model 7940

Chroma 7940 wafer chip inspection system is an automated inspection system for post-diced wafer chip inspection. It is capable of inspecting both top and bottom view of the wafer chip simultaneously. Utilizing an advanced illumination technology and color camera acquisition, the system can be customized for various wafer processes and test configuration such as vertical chip or flip chip inspection.

With high-speed camera and inspection algorithms, Chroma 7940 can inspect up to 6" wafer in 3 minutes with a throughput of up to 15 msec./chip. It provides auto focus and compensation for wafer warpage and leveling of an uneven chuck. 2X and 5X magnifications with 1.3µm/pixel and 0.5µm/pixel resolutions respectively are used to detect various defects down to 1.5µm in size.

System Function

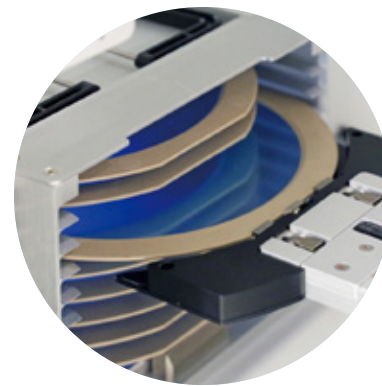
After tape expansion, individual chip orientation may become irregular and chip realignment is needed during the inspection process. Chroma 7940 includes a software alignment function that automatically adjusts wafer alignment angle for precision scanning. The system comes with an easy-to-read and user-friendly interface that significantly reduces user's learning time while providing visual wafer mapping of defect regions and inspection result.

Defect Analysis

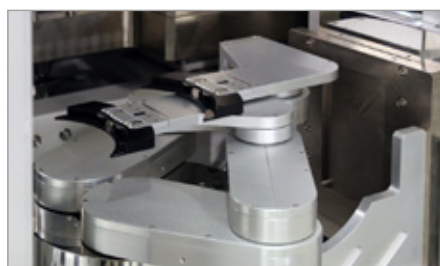
Besides pass/fail inspection and bin data, all raw data for the inspection result can be recorded for further analysis. This database makes it easy to analyze and obtain optimal parameters for balancing the over-kill and under-kill. It is also used to monitor defect trend caused by the production process, therefore capable of providing advanced feedback for production control.

Key Features

- ☑ Simultaneous double side color inspection
- ☑ 6" wafer / 8" inspection area
- ☑ Automatic wafer alignment
- ☑ Wafer shape / edge identification
- ☑ Unique defect detection algorithm
- ☑ Versatile defect criteria definitions
- ☑ Complete defect classification
- ☑ Defect detection rate > 99%
- ☑ Wafer mapping
 - Yield
 - Up/down stream operation



Bin	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail
1001	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1002	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1003	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1004	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1005	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1006	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1007	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1008	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1009	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1010	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1011	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1012	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1013	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1014	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1015	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1016	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1017	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1018	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1019	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1020	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1021	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1022	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1023	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1024	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1025	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1026	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1027	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1028	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1029	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1030	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1031	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1032	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1033	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1034	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1035	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1036	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1037	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1038	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1039	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00
1040	0.00	0.00	78.75	1.51.00	0.00	0.00	0.00	0.00	0.00



Detail defect raw data for analysis

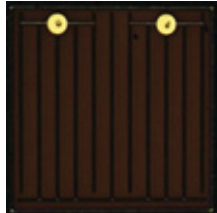




APPLICATIONS

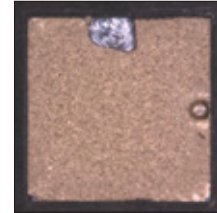
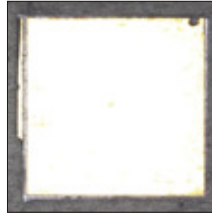
LED Top Side Defects

- Pad Defect
- Pad Residue
- ITO Peeling
- Finger Broken
- Mesa Abnormality
- Epi Defect
- Chipping
- Chip Residue



LED Back Side Defects

- Dicing Abnormality
- Pad Bump
- Chipping
- Metal Lack



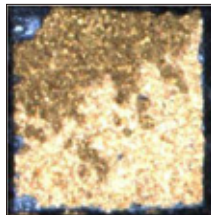
VCSEL Top Side Defects

- Pad Defect
- Pad Scratch
- Emitting Area Defect
- Peeling
- Mesa Abnormality
- Epi Defect
- Chipping
- Chip Residue



VCSEL Back Side Defects

- Dicing Abnormality
- Pad Bump
- Chipping
- Metal Lack



SPECIFICATIONS

Model	7940
Suitable Chip and Package Type	
Applicable Ring	Grip ring or wafer frame
Inspection Area	8 inches
Chip Size	125um x 125um ~ 2.2mm x 2.2mm at 5X magnification
Suitable Package	LED vertical chip, flip chip, VCSEL
Inspection	
Camera	25M Color Camera x 2
Light Source	LED co-axis light, ring light, back light
Magnification	2X, 5X objective lens selectable
Resolution	1.28um/pixel (2X), 0.5um/pixel (5X)
Throughput	6" wafer in 3 minutes at 2 lights, 2X magnification
Algorithm	- Pad defect, mesa defect, chipping defect, double chips and emitting area defect - Provide algorithm interface to replace or add new inspection algorithm
System	
Cassette Load Port	Auto load ports x 3
Warpage Compensation	software auto focus to overcome wafer warpage
PC	x 1
Software Function	
Monitor	Real-time wafer map display
Image Storage	All/defect image saving selectable
Report	Including chip position, defect type, inspection results
Cassette Selection	Programmable cassette selection and scheduling
Facility Requirement	
Dimension (WxDxH)	1500 mm x 1500 mm x 1800 mm
Weight	2000 kg
Power	AC 220V ± 10%, 50/60 Hz, 1 Φ, 3KW
Compressed Air	0.6 MPa
Operation Temperature	+5°C ~ 40°C
Operation Humidity	20% ~ 60% R.H.

Optoelectronic Source Measurement System

Model 58602

Burn-in, Reliability & Life Test

Chroma 58602 is a high density, precision multi Source Measurement Unit (SMU) module with temperature control and exchangeable interface developed for Burn-In, Reliability and Life Test of optoelectronic components including Laser Diodes, LEDs, OLEDs, Photo-Diodes and other similar components. Each module has up to 768 discrete SMUs (6 modules contain up to 4608 SMUs per system), which may be used as Device Drives, Device Biasing and/or Measurement Operations. The system's high density allows for optimized clean room space.

Source and Measurement

Discrete voltage measurements are available for high current devices placed in series. Multiple current sources may also be paralleled (exchanging the conversion interface board) to support higher power devices.

Ultimate Flexibility

Chroma brings the change kit flexibility used in the semiconductor industry to optoelectronics. Through the change kit the 58602 can be configured to other devices in minutes for:

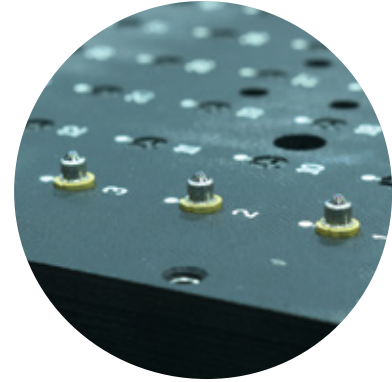
- ☑ High Channel Density
- ☑ Higher Currents
- ☑ Optical Power Monitoring
- ☑ Monitor Photodiode Measurements
- ☑ Dark Current Measurements
- ☑ Component Biasing
- ☑ Multiple Device Types

Efficient Processing

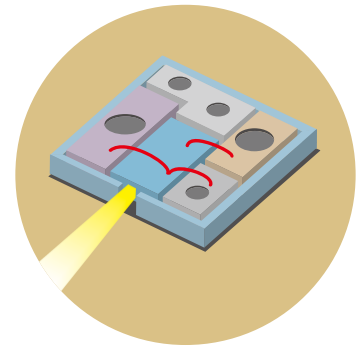
- ☑ Higher temperatures reduce aging times and provide quicker results while lowering cost by requiring lower channels
- ☑ The High Density Design reduces floor space over other similar solutions
- ☑ Batch processing is performed through device carriers. Carriers may be used between Aging and Characterization Testing. Software tracks acquired data between all Chroma testing
- ☑ Same base system may be used for many device types. A Conversion Kit provides quick, cost effective adaptation to prototypes and new products or variation in production
- ☑ Hot Swappable power supplies eliminate this type of failure mode while reducing MTBF / MTTR

Key Features

- ☑ Burn-In, Reliability and Life Testing
- ☑ Up to 4608 Channels
- ☑ Up to 20A per device
- ☑ Up to 150 °C
- ☑ Batch processing via device carriers
- ☑ Change Kit – adapts to multiple devices



TO-CAN carrier



CoC carrier



Single Module



Rack type





DEVICE SPECIFICATIONS					
Devices	Feature	Definition			
	Component Types	Laser Diodes, LEDs, OLEDs, SLEDs, Photodiode, MPDs			
	Package Types	CoS / CoC, TO-Can, C-Mount, Custom			
MODULE SPECIFICATIONS					
	Range	Resolution	Uncertainty Accuracy ± (%Value + offset)	Random Uncertainty (Stability)	Max Devices Per Module / System
Wavelength	380 nm – 1700 nm				
Temperature Control (Life Test)	40°C - 150°C	0.1°C	± (2.0% + 1°C)	1°C	
Temperature Control (I-V)	30°C - 50°C	0.1°C	± (2.0% + 1°C)	1°C	
58602-022					768 / 4608
Source/Measure Voltage	0-3.00 V	175 µV	1% + 5 mV	5 mV	
Source/Measure Current	0-250 mA*	48 µA	1% + 480 µA	480 µA	
Power Measurement	0 – 250 mW	250 µW	(20% + 500 µW)	2500 µW	
58602-013					384 / 2304
Source/Measure Voltage	1.50 - 4.00 V	76.3 µV	2% + 30 mV	30 mV	
Source/Measure Current	0-1250 mA	38.3 µA	2% + 12.5 mA	12.5 mA	
Current Pulsing	200 µs - CW	100 µs Rise / 10 µs Fall (typical)	1% Overshoot	10 µ Settling Time	
Power Measurement (CW Only)	0 – 1500 mW	5 mW	(20% + 500 µW)	2500 µW	
58602-023					192 / 1152
Source/Measure Voltage	1.50 - 4.00 V	76.3 µV	2% + 30 mV	30 mV	
Source/Measure Current	0-2500 mA	76.6 µA	2% + 25 mA	25 mA	
Current Pulsing	200 µs - CW	100 µs Rise / 10 µs Fall (typical)	1% Overshoot	10 µ Settling Time	
Power Measurement (CW Only)	0 – 2500 mW	5 mW	(20% + 500 µW)	2500 µW	
58602-053					96 / 576
Source/Measure Voltage	0-5.00 V	175 µV	1% + 5 mV	5 mV	
Source/Measure Current	0-5000 mA**	180 µA	0.1% + 2.5 mA	1.0 mA	
Power Measurement	0 – 5000 mW	5 mW	(20% + 500 µW)	2500 µW	
58602-053S					960 / 5760
Source/Measure Voltage	20-50.0 V	175 mV	1% + 10 mV	30 mV	Up To 20 Devices
Source/Measure Current	500 - 5000 mA**	180 µA	2% + 2.5 mA	25 mA	In Series
Power Measurement	0– 5000 mW	5 mW	(20% + 500 µW)	2500 µW	
Module & System Specifications:					
	Feature	Definition	Minimum	Maximum	
Module	Carriers Per Module***		1	6	
	Data Sample Time	10 sec - 48 hrs			
	Communication	Ethernet - TCP/IP			
	Change Kit Device Adaptability	Maximizes Flexibility			
	User Site Calibration/Validation	With Validation Board & DMM			
	Internal Water Leak Detectors	Yes			
	Device Temperature ****		40°C	150°C	
System	Modules Per System		1	6	
	System Per Server		1	2	
	System Thermal Deviation	5°C			
	System Internal Power	High Reliable, Redundant, Hot Swappable Power Supply			
	Water Leak Shut Down	System Level (Optional)			
System Requirements	Power Requirement *****	208 3-Phase VAC or 187 to 250 VAC			
	Water Temperature	20°C ± 2	18°C	20°C	
	Water Flow (per Module)	3 to 6 Liters/Min			
	Ambient Temperature	23°C ± 5°C			
	Ambient Relative Humidity	< 60 %RH (Non Condensing)			
	Rack Size (HxWxD)	80.5" x 23" x 44"			

* 58602-022: 8 channels may be paralleled to source up to 2-Amps per device.

** 58602-053 & -053S: 4 channels may be paralleled to source up to 20-Amps per device.

*** For discrete drive systems, Series sources vary per device power

**** Typical thermal control range is 40°C

***** Series drive source varies dependent on device power.

Laser Diode Burn-in & Reliability Test System

Model 58604

Burn-in, Reliability & Life Test

Chroma 58604 is a high density, multifunctional, and temperature controlled test system designed for laser diode burn-in and lifetime test. Each module has up to 256 SMU channels providing source current and measure voltage in various control modes as described below.

Auto Current Control Mode (ACC)

In auto current control (ACC) mode, the control circuit provides a preset current to each laser diode with high stability. Regardless of change in device resistance and temperature, the current is always kept constant over the test period. The device voltage will be recorded as quality parameter for reference.

Auto Power Control Mode (APC)

In auto power control (APC) mode, the system utilizes feedback signal from the optional external Photo Diode PCB for each laser diode. The control circuit adjusts each laser diode current automatically to keep a constant feedback signal strength so that the laser diode optical output is maintained constant over the test period. The device voltage and current are recorded as quality parameters for reference.

Temperature Control

Chroma's proprietary heat plate design allows the laser diode case temperature to be maintained with high accuracy, excellent stability, and good uniformity across the test fixture. Compared with oven or chamber type laser diode burn-in systems, Chroma's solution is much more compact, easier to operate, better performance, and energy saving. Additional benefits include small footprint, versatile usage, and easy maintenance.

Individual Module Operation

Modular design enables individual modules to operate at different temperatures with different control modes as well as start and stop times. The design provides great flexibility during test operation.

Protection and Individual Channel Shutdown

The control circuit is specially designed to protect laser diodes during unexpected power shutdown. No surge current or voltage will occur to hurt the devices. High/Low limits of current and voltage can be set to perform shutdown protection. When abnormality happens to a particular channel, only that specific channel will be shut down while others continue to run normally. Besides protection functions implemented in the control circuit, isolation and ESD protection are also provided in the system.

Auto Data Recovery after Communication Interruption

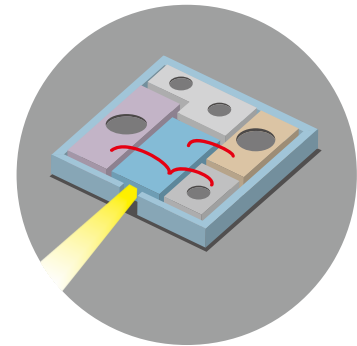
Burn-in data are stored in the system PC as well as optional remote servers. If the communication between the module and PC is broken temporarily, the data will be buffered in the module up to 6 hours or longer. After the communication is restored, the buffered data will be transferred back to the PC/server without any data loss.

Key Features

- ☑ Laser Diode Burn-In, Reliability and Life Test
- ☑ ACC and APC control modes
- ☑ Individual channel control and measurement
- ☑ Drive current 500 mA per channel & up
- ☑ Precise temperature control up to 125°C
- ☑ Individual module operation



Burn-in Test



CoC carrier



Test Fixture



Full height rack



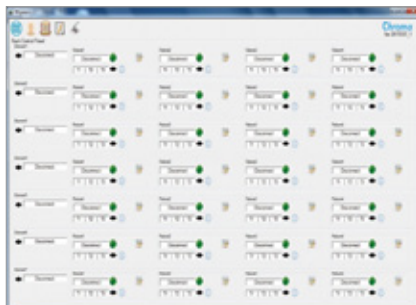


User Friendly Softpanel

The soft panel provides an intuitive user-friendly visual interface to allow convenient checking of certain device at certain module with simple mouse-clicks anytime during the test. The burn-in raw data are stored in a Microsoft Excel compatible format for further analyses. Optional barcode system can also be incorporated for test management.



Control Panel



Data Analysis



Test Item

SPECIFICATIONS	
Model	58604
SMU Module	
Channel Number	up to 256
Laser Diode Type	TO-46, TO-56, CoC
Test Function	ACC (standard) APC, LIV (optional)
Burn-in Record Time	1 min to 5000 hours
Auto Current Control Mode	
Current Range	± 500 mA
Current Accuracy	0.2% F.S.
Compliant Voltage	± 7 V
Voltage Measurement Range	± 7 V
Voltage Measurement Accuracy	0.2% F.S.
Auto Power Control Mode (Optional)	
External PD type	Si or InGaAs *1
Wavelength Range	400 ~ 1600 nm *1
Optical Power Measurement Repeatability	± 1%
Temperature Control	
Temperature Measuring Range	Ambient ~ 125 °C
Temperature Setting Range *2	45~125 °C
Temperature Setting/Reading Resolution	0.1 °C
Temperature Stability *3	1 °C
Temperature Uniformity	±(1 °C + 1.2% ΔT) *4
System	
CommunicationPort	Ethernet to server
Dimensions (D x W x H)	1,300 mm x 900 mm x 1,900 mm
Weights	500 ± 50 kg
Power Requirements	187 ~ 250 Vac (3 Phase 4 Wire, Δ Connection) or 323 ~ 437 Vac (3 Phase 5 Wire, Y Connection) / 45 ~ 65 Hz
Environment Temperature	20~30 °C
Humidity	<80% RH, non-condensing
Compressed Air	5 kgf/cm ³ , 30 L/min. ; 0.5 Mpa

Note *1 : Wavelength dependent, customized PD types upon request

Note *2 : Condition : under 10W thermal load of test fixture

Note *3 : Thermal platform temperature without DUT loading, ΔT = | ambient temperature - setting temperature |

Note *4 : 1 °C = (Max T - Min T) within 48 hrs burn-in time

Laser Diode Characterization System

Model 58620

58620 Characterization Station Overview

The Chroma 58620 Laser Diode Characterization Station is a state-of-the-art full turnkey system specifically designed for Laser Diode testing. Features range from macro inspection of the facet or aperture active area to a full suite of electro-optical parametric tests. When used in conjunction with Chroma's high capacity carrier, multiple devices can be rapidly indexed to improve not only test times but also repeatability which produces a large impact on yield and quality control. The Chroma 58620 is equipped with an ultra stable and uniform thermal control platform to incorporate R&D-style tests in a production environment.

Ultra Precise Carrier Design

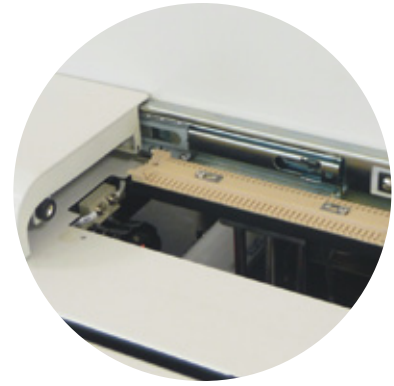
From vast experience in the Semiconductor industry, Chroma introduces a precision and high capacity carrier which may be designed to accommodate a large array of mechanical form factors such as Chip on Carrier (CoC), Chip on Submount (CoS), Transistor Outline (TO), or Laser Bars. The highly innovative bi-lateral design's symmetry allows components to be placed on both sides allocating a larger batch of components. The carrier's multi-layer configuration allows for components to be easily inserted manually or by a robotic pick and place system. Surfaces and materials are engineered to optimize thermal contact to the device under test (DUT) allowing for efficient heat transference and a high level of temperature control. Once the carrier is inserted, the robotics take over and perform a wide-range of pre-defined automated tests on all devices (both sides) in the carrier.

Multi-Purpose Platform

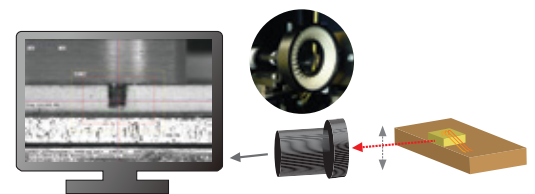
The Chroma 58620 is equipped with a fully-automated alignment station to simulate or correlate to real-world Optical Sub-Assembly (OSA) testing. These parameters include, but are not limited to, power, coupling efficiency and spectral performance. Equipment used can be as simple as a fiber-coupled power meter and spectrometer, or as complex as a full-featured Optical Spectrum Analyzer to measure Side-Mode Suppression Ratio and more. Other stations may incorporate an integrating sphere for raw output measurements and current sweep curves, or even capacitance metrology equipment if necessary. Since the carrier is indexed to position and bar-coded for traceability, every device is tagged with an identification code. This enables the Chroma 58620 to provide the user with traceable data to either reduce the need for down-stream testing, or accurate device-specific correlation to final package test parameters.

Key Features

- ✓ Full Turn-Key Automated Test for edge and surface emitting laser diodes
- ✓ High precision and large capacity carrier, interchangeable with other automated equipment
- ✓ Fully automated alignment for fiber-coupled tests
- ✓ Automated optical inspection decreasing mechanical positioning Takt time
- ✓ Highly accurate TEC temperature controller with stability up to $\pm 0.01^{\circ}\text{C}$
- ✓ PXI-Based SMU and power meter for fast test times
- ✓ Full suite of software analysis tools for laser diode characterization (Including: I_{th} , R_s , V_f , slope efficiency, λ_p)



Automated load/unload



Auto-alignment Fiber with AOI Assistance



Characterization System
Model 58620



carrier



Burn-In system
Model 58604

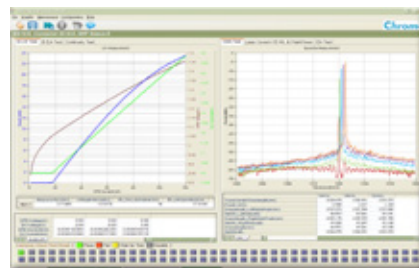


Cross-Platform Compatibility

The carrier, designed for a particular product type used on the Chroma 58620, can also be used in other processes. This enables the user to form a streamlined, fully automated, Laser Diode verification process. These processes are, but not limited to, Chip/Wafer Qualification, Life-Test, Burn-In, Chip Characterization, and Final Production Test. The carrier is designed to be inter-operable with the Chroma 58601-family of Opto-Electronic Burn-In and Life Test systems. Devices can be left in the carrier to burn-in for hours or months, collect valuable in-situ degradation data, and then inserted into the 58620 for full-scale characterization. With access to pre-test, burn-in, and post-test parametric information, the user can generate accurate component models that are empirically based. This adds tremendous value when working to increase yield or compare to theoretical expectations.

Friendly and Flexible User Interface

The Chroma 58620 features a complete user-friendly Graphical User Interface (GUI) that includes recipe generation, test sequence execution, and sophisticated data management with export to standard MES or proprietary database systems. There are rapid pre-verification features to ensure correct part positioning such as initial continuity testing and DUT photographs. This allows the user to be alerted and the opportunity to adjust for maximum test time efficiency and yield. Recipe generation enables the user to create complex test plans for an entire carrier or by DUT position. The display also provides complete battery of parametric data in tabular or graphical form. All or selective opto-electronic parameters such as output power sweep curves or spectral probes can be displayed and manipulated. The Chroma 58620 provides the user with an accurate picture of final test yield based on carrier or production lots. Once the tests are performed, the data management system allows for local viewing or remote storage to a wide array of MES architectures, proprietary databases and file systems.



Flexible user interface

SPECIFICATIONS	
Model	58620
Device Under Test	
Form Factor	CoC, CoS
Channels in Carrier **	80 Channels (Max.) / 40 DUTs (Max.)
Current Ranges (Chroma Model 52401)	
Current Range (Source & Measurement)	±200nA / 2µA / 20µA / 200µA / 2mA / 20mA / 200mA
Current Resolution	±1.6pA/±16pA/±160pA/±1.6nA/±16nA/±160nA/±1.6µA
Current Accuracy (Source & Measurement)	I range ≥ 1mA : 0.1% + 0.1% FS ; I range < 1mA : 0.05%+0.2% FS
Voltage Ranges	
Compliance Voltage Range	± 0.5V/1V/2.5V/5V/10V/25V
Compliance Voltage Accuracy	≥ 1V: 0.05% + 0.01%FS ; <1V: 0.05% + 0.1%FS
Voltage Measurement	± 3.8nV~ ± 25V
Voltage Measurement Accuracy	0.05% + 38nV @0.5V to 0.05% + 1.9mV @25V
Test Parameters	
Electrical	L-I-V Curves, Ith, Vf, Rs, Linearity (Kink)
Spectral	Peak wavelength, SMSR, etc.
Optical Spectrum Analyzer*(Optional)	
Wavelength Range	700 nm to 1700 nm
Resolution Bandwidth	< 0.1 nm
SMSR Measurement	> 40 dB
Wavelength Accuracy	± 0.03 nm
Temperature Control	
Temperature Range	25 °C ~85°C ; -5°C ~85°C (optional)
Temperature Accuracy	0.3 °C
Temperature Uniformity	± (0.5°C+1% ΔT) *3
Mechanical Specification	
Motion Stage Travel Distance	400 mm
Minima Fine Stage Resolution	20 nm
System Size (W x D x H)	1000 mm x 1200 mm x 1350 mm
System Weight	400 ± 20 Kg
Power Input	220V single phase , 50/60 Hz
Water flow Rate	<3~5 lpm
Operating Environment	Temperature : 20°C ~25 °C ; Humidity : <70%
Software	
Operating System Supported	Microsoft Windows® 2000, XP or 7

Note *1 : Capacity of carrier depends on the DUT size and form factor; additional channels/DUTs to be reviewed and customized.

Note *2 : Chroma 58620 is compatible with multiple Optical Spectrum Analyzers.

Please inquire for further details.

Note *3 : ΔT = | Ambient temperature - setting temperature |

TO-CAN Package Inspection System

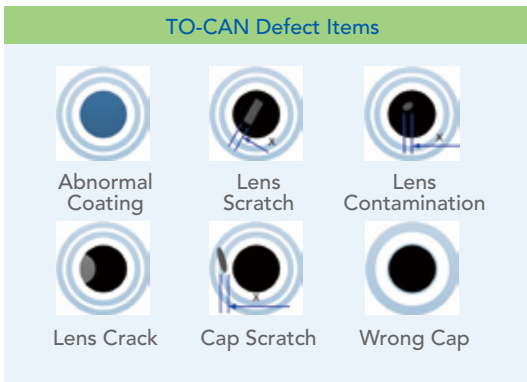
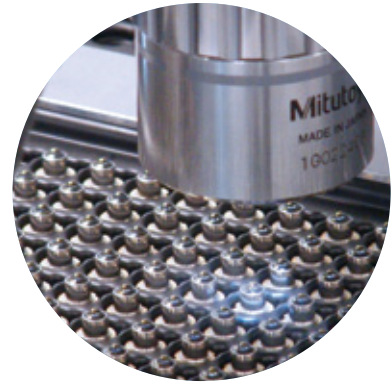
Model 7925

Chroma 7925 is an automated inspection system for TO-CAN package capable of detecting lens scratches (>30 μm) with clear display of particles through the advanced illumination technology. The system is equipped with auto-focus function to compensate for tray and package height variation during the inspection process.

The user can edit the defect criteria with versatile pass/fail settings and identify defect packages in another tray by defect code. The entire machine process is fully automated from loading, inspection, picking to unloading. It reduces the probability of operating error and abnormal procedure. A detailed inspection raw data and defect images are available for analysis of potential process problem and further enhancing the process yield.

Key Features

- ☑ Defect inspection of lens scratches, cracks, particles and metal cap of TO-CAN package
- ☑ Auto-focus function to compensate for tray or package height variation
- ☑ Defect criteria editor with versatile pass/fail settings
- ☑ High inspection reliability and repeatability as compared to visual inspection
- ☑ High inspection throughput (>3600 UPH)
- ☑ Auto-cassette function to reduce loading/unloading time
- ☑ Customized inspection report and defect images for analysis



SPECIFICATIONS	
Model	7925
Target	TO-CAN package
Tray Size	< 6" (width) X 6" (Length)
Station Layout	Optical side inspector X1 Auto cassette X 2 Picker X1
Throughput	UPH 3600 (depends on the numbers of light used)
Stages	X, Y axis motorized stages
Algorithm	Provide enable/ disable function and external algorithm interface
Image Save	All/ defect/ none image selectable
Monitor	Real-time tray map
Report	*.txt, including chip position, defect type
Dimension	1500mm x 1200 mm x 1800mm





High Precision Source Measure Unit

Model 52400 & 52400e Series

Light emitting devices such as LEDs or laser diodes require sourcing, loading and optical power measurement when conducting parametric test for LIV as well as reverse characteristics. The 52400 and 52400e series SMUs can either be programmed as a current source to drive the DUT testing forward device characteristics or may also be set as a voltage source performing device reverse characteristics.

Key Features

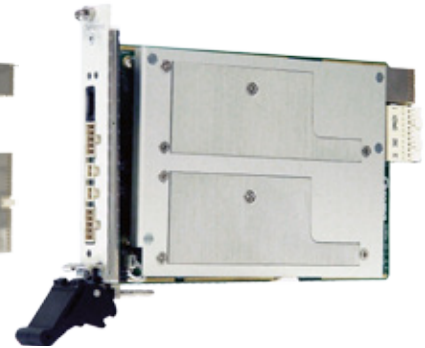
- ☑ 1-Slot PXI/PXIe express module
- ☑ 2/4 independent channels (4 ch for Model 52401e-7-1)
- ☑ 18-bit resolution
- ☑ Four quadrant operation
- ☑ 6-wire Force/Sense/Guard
- ☑ Low output noise
- ☑ DIO/Trigger bits
- ☑ Deterministic hardware sequencer
- ☑ Programmable resistance
- ☑ 16 control bandwidth selection
- ☑ Master/Slave operation
- ☑ LabView/LabWindows & C/C#
- ☑ Softpanel GUI

Applications

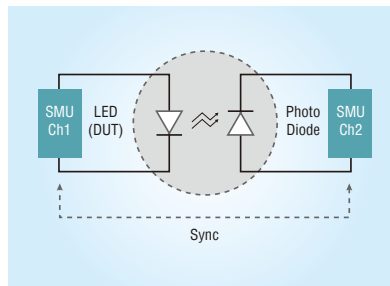
- ☑ Semiconductor
- ☑ LED / Laser Diode
- ☑ Solar Cell
- ☑ Battery / BMS
- ☑ Transistor
- ☑ Automotive
- ☑ Avionics
- ☑ Power Electronics
- ☑ Sensor / IoT



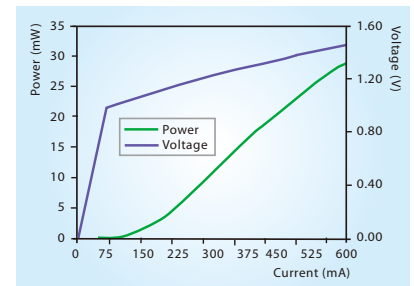
52405-25-6 & 52405-25-3



52405e-25-3

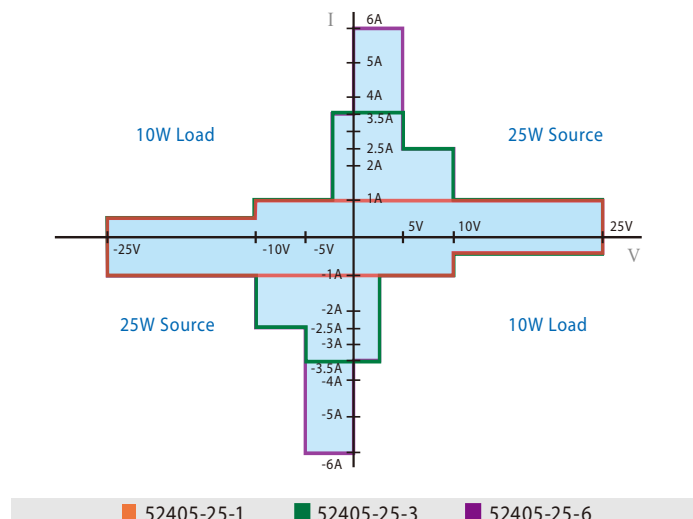
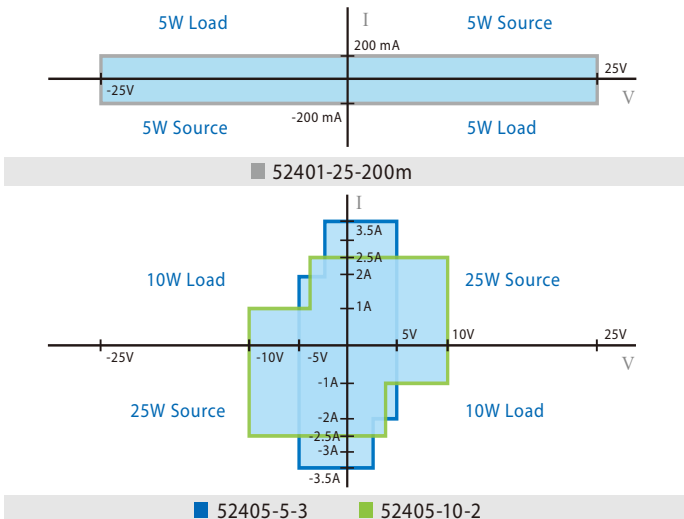


Typical LIV test setup for LED/LD



Typical LIV Curve of LED/LD

Four Quadrant Operation



SPECIFICATIONS							
Model Name	52401e-7-1	52401-25-200m 52401e-25-200m	52405-5-3 *1 52405e-5-3 *1	52405-10-2 *1 52405e-10-2 *1	52405-25-1 *1 52405e-25-1 *1	52405-25-3 *1 52405e-25-3 *1	52405-25-6 *3
Slots				1			
Output Channels	4			2			
Source	3.5W x 4		5W x 2		25W x 2		
Load	1.8W x 4		5W x 2		10W x 2		
Input Voltage	Backplane Power		External 48VDC source required *2				
Input Current	Peripheral 4A@+12V		0.7A Max		2.2A Max		
Output Isolation	Isolated but share common LO		Isolated		Isolated by External Power Supply		
Bit Resolution	20 bits for measurement 16 bits for programming		18 bits				
Programmable Loop Bandwidth	8 steps		16 steps				
Settling Time	<30µSec, typically						
Force Voltage Ranges	±7V	±25V, ±10V, ±5V, ±2.5V, ±1V, ±500mV	±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV
Force Current Ranges	±1A(Pulse mode), ±500mA, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA	±200mA, ±20mA, ±2mA, ±200uA, ±20uA, ±2uA, ±200nA	±3.5A, ±2.5A, ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±2.5A, ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±3.5A(≤5V), ±2.5A(≤10V), ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±6A(≤5V & Pulse Mode Only), ±3.5A(≤5V), ±2.5A(≤10V), ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA
Measure Voltage Ranges	±7V	±25V, ±10V, ±5V, ±2.5V, ±1V, ±500mV, ±250mV, ±100mV, ±50mV, ±25mV, ±10mV, ±4mV	±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV
Measure Current Ranges	±1A(Pulse mode), ±500mA, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA	±200mA, ±20mA, ±2mA, ±200uA, ±20uA, ±2uA, ±200nA	±3.5A, ±2.5A, ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±2.5A, ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±3.5A(≤5V), ±2.5A(≤10V), ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA	±6A(≤5V & Pulse Mode Only), ±3.5A(≤5V), ±2.5A(≤10V), ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA
Force Voltage Accuracy	0.02% reading + 0.01% F.S.	0.05% reading + 0.0076% F.S. (≥ 500mV Range) 0.02% reading + 25uV (<500mV Range)	0.05% reading + 0.008% F.S. (≥ 500mV Range) 0.05% reading + 25uV (<500mV Range)				
Force Current Accuracy	0.1% reading + 0.1% F.S. (≥ 500mA Range) 0.05% reading + 0.05% F.S. (<500mA Range)	0.05% reading + 0.05% F.S. (≥ 2uA Range) 0.05% reading + 200pA (<2uA Range)	0.1% reading + 0.1% F.S. (>1A Range) 0.05% reading + 0.05% F.S. (≤ 1A Range)				
Measure Voltage Accuracy	0.02% reading + 0.01% F.S.	0.05% reading + 0.0076% F.S. (≥ 500mV Range) 0.05% reading + 25uV (<500mV Range)	0.05% reading + 0.008% F.S. (≥ 500mV Range) 0.05% reading + 25uV (<500mV Range)				
Measure Current Accuracy	0.1% reading + 0.1% F.S. (≥ 500mA Range) 0.05% reading + 0.05% F.S. (<500mA Range)	0.05% reading + 0.05% F.S. (≥ 2uA Range) 0.05% reading + 200pA (<2uA Range)	0.1% reading + 0.12% F.S. (>1A Range) 0.05% reading + 0.05% F.S. (≤ 1A Range)				
Wideband&Source Noise	< 20 mV pp 20Mhz BW No Load						
Measurement Sampling Rate	600K Samples/s		100K Samples/s				
Output Connection	5 Wires (± Force, ± Sense, +Guard)		6 Wires (± Force, ± Sense, ± Guard)				
Measurement Log Output Profiling				32K Samples/channel 65535 Steps			
Trigger Input	Programmable 4 Ch		1 Ch		Programmable 8 Ch		
Trigger Output			Channel Isolated				
Floating Output	No		Yes				
Master/Slave Mode	Yes		No				
Programmable Resistance	Yes		No				
Regulatory Compliance	CE/FCC						

Note *1 : If chassis has less than 38.2W/slot, then the below output limitations apply.

2.5Amp range = 50% on duty cycle, 500mSec maximum continuous on time ; 3.5Amp range = 40% on duty cycle, 500mSec maximum continuous on time (1250mSec off during maximum on time case) If the PXI-SMU card is over temperature, it will automatically disconnect output to protect the unit.

Note *2 : Required voltage range 48V ± 5% ; required voltage noise ≤ 100mVpp

Note *3 : In the pulse mode of 52405-25-6, pulse width 100µS~5mS, maximum duty 5%, and voltage range ±5V only





**HEADQUARTERS
CHROMA ATE INC.**

66 Huaya 1st Road, Guishan, Taoyuan 33383, Taiwan
T +886-3-327-9999 F +886-3-327-8898
info@chromaate.com
www.chromaate.com

**ASIA
CHROMA ATE (SUZHOU) CO., LTD.**

Building 7, ShiShan Industrial Gallery, No. 855, Zhu Jiang Rd.,
Suzhou New District, Jiang Su, China
T +86-512-6824-5425 F +86-512-6824-0732
www.chroma.com.cn

CHROMA JAPAN CORP.

888 Nippa-cho, Kouhoku-ku, Yokohama-shi, Kanagawa, 223-0057 Japan
T +81-45-542-1118 F +81-45-542-1080
www.chroma.co.jp

CHROMA ATE KOREA BRANCH

3F Richtogether Center, 14, Pangyoyeok-ro 192, Bundang-gu,
Seongnam-si, Gyeonggi-do 13524, Korea
T +82-31-781-1025 F +82-31-8017-6614
www.chromaate.com
erica.shih@chromaate.co.kr

QUANTEL PTE LTD.

(A company of Chroma Group)
46 Lorong 17 Geylang # 05-02 Enterprise Industrial Building,
Singapore 388568
T +65-6745-3200 F +65-6745-9764
sales@quantel-global.com
www.quantel-global.com

USA

CHROMA ATE INC. (U.S.A.)

7 Chrysler, Irvine, CA 92618
T +1-949-421-0355 F +1-949-421-0353
Toll Free +1-800-478-2026
info@chromaus.com
www.chromaus.com

EUROPE

CHROMA ATE EUROPE B.V.

Morsestraat 32, 6716 AH Ede, The Netherlands
T +31-318-648282 F +31-318-648288
sales@chromaeu.com
www.chromaeu.com

CHROMA GERMANY GMBH

Südtiroler Str. 9, 86165 Augsburg, Germany
T +49-821-790967-0 F +49-821-790967-600
sales@chromaeu.com
www.chromaeu.com