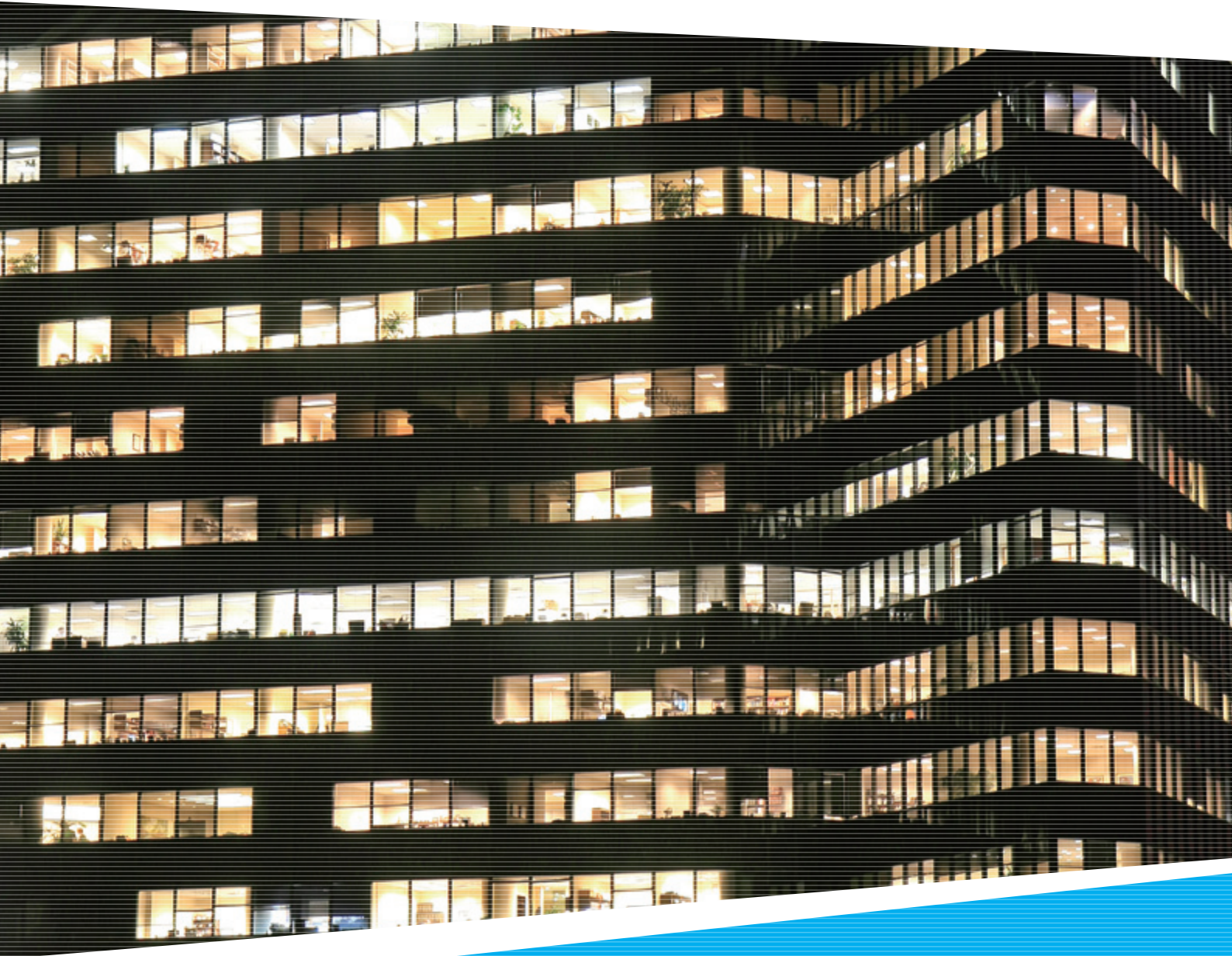


LED/Lighting Test Solution

www.chromaate.com



Chroma

Turnkey Test & Automation Solution Provider

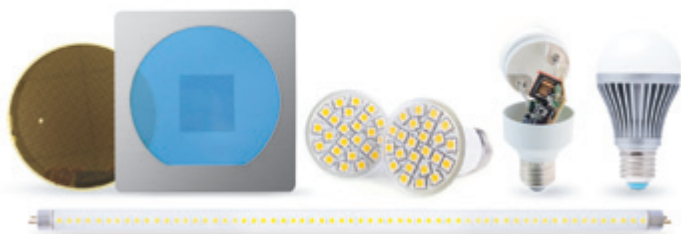


Founded in 1984, Chroma ATE Inc. is a world leading supplier of precision Test and Measurement Instrumentation, Automated Test Systems, Manufacturing Execution Systems and Turnkey Test and Automation Solutions marketed globally under the brand name "Chroma".

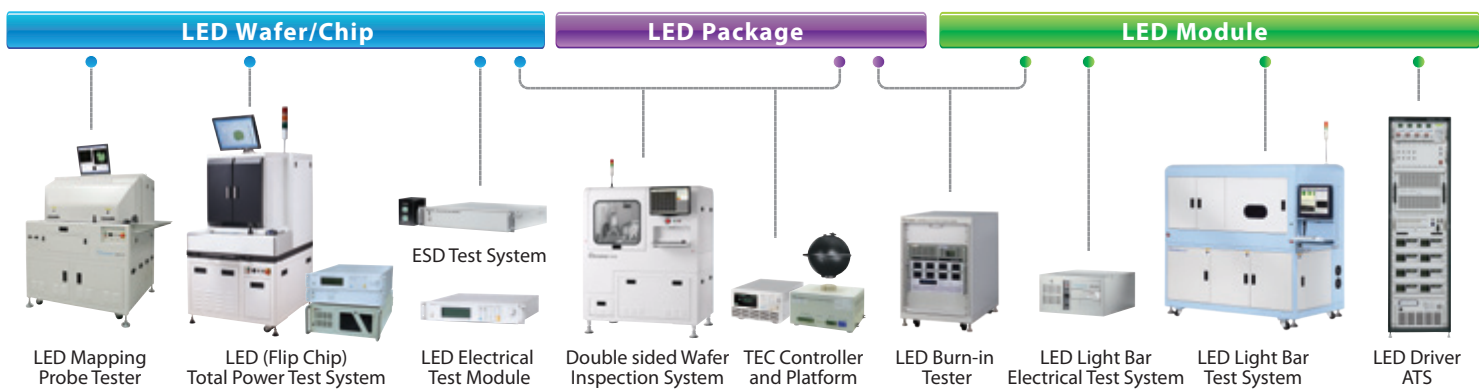
Significant markets Chroma serves include LED, photovoltaic, Li-battery, electric vehicle, semiconductor/IC, optical device, flat panel display, video and color, power electronics, passive component, electrical safety, and thermoelectric test, as well as automated optical inspection and manufacturing execution systems.

Chroma's vision is to develop globally leading products as a world-class enterprise. To achieve this, Chroma devotes a significant amount of investment and resources in research and development in order to produce exceptional products of precision, reliability and valuable unique test solutions for technology industries. To sustain as a world-class enterprise, Chroma nurtures its brand as one of innovation, continuous improvement, and globalization ensuring its leading technology and integration capabilities in optics, mechanics, electronics, thermal control and software provide competitive advantages and future growth for the company.

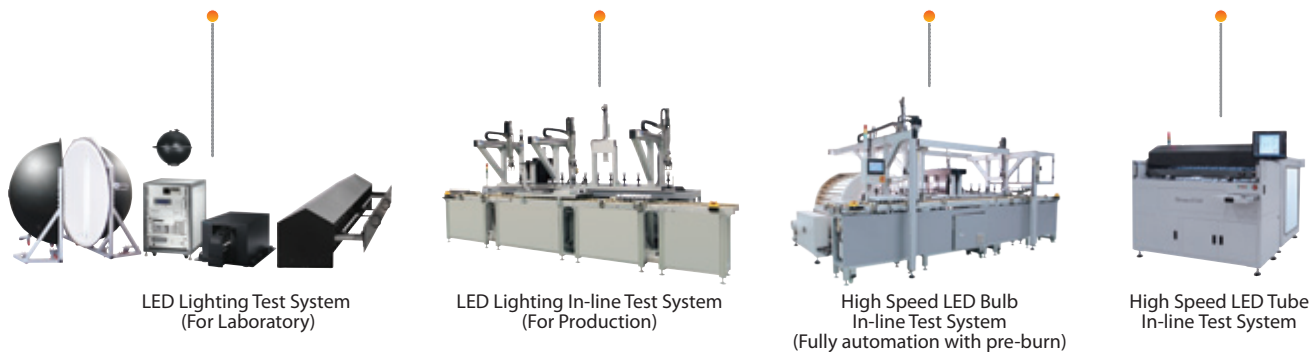
Chroma has branch offices in Europe, the United States, Japan and mainland China chartered to deliver innovative technologies with high value-added service to satisfy our global customers' demands.



LED / Lighting Test Solution



LED Luminaire



LED Mapping Probe Tester

Model 58212-C

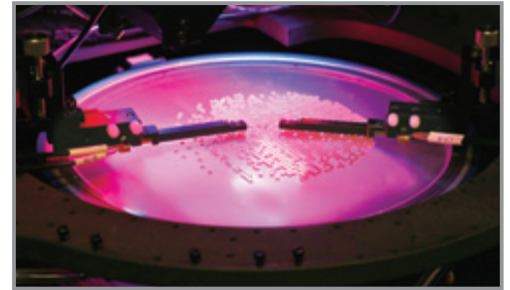
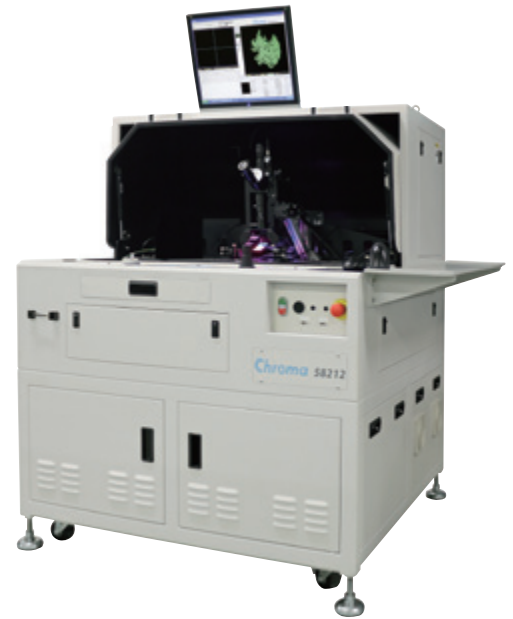
The Chroma 58212-C features an automated LED wafer/chip probe tester, delivering fast and accurate LED measurements with test times less than 125ms *1.

The system can be modified to support different LED structures including Lateral, Vertical, and Flip Chip designs. Integrated scanners provide autonomous wafer mapping to guarantee precision testing. The patented probe head prevents device scratches and ensures solid contact with every LED.

Chroma's unique design acquires and analyzes optical data such as the dominant wave length, peak wavelength, and CCT. Additionally, it provides essential electrical data such as forward voltage, leakage current, and reverse breakdown voltage, all in one test step.

The 58212-C includes a user-friendly graphical interface and advanced logic algorithms to significantly increase production efficiency. Comprehensive statistical reports and analysis tools allow for easy control and mass production management.

Note *1 : Test condition: under 300um sample pitch, 5 electrical test parameters and 1 optical parameter. Due to differences in LED characteristics, the measurement results may vary.



Key Features

- ✓ High speed and accuracy
- ✓ Lateral, vertical, and flip chip
- ✓ Wide power test range (up to 200V/2A)
- ✓ Up to 8 inch wafers
- ✓ Chroma® Huge Photo Detector
- ✓ Unique edge sensor
- ✓ Patented probe head
- ✓ Robust Z-Axis stage
- ✓ Wafer mapping algorithm
- ✓ External light shielding enclosure
- ✓ Analysis tools and statistical reports

Test Items

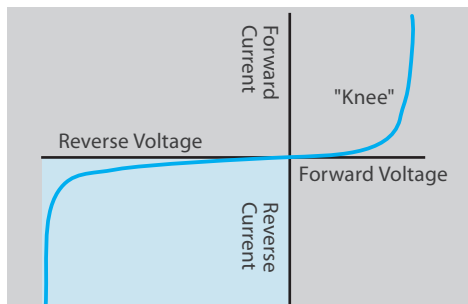
- ✓ Electrical parameters:
 - Forward Voltage Measurement (Vf)
 - Reverse Breakdown Voltage Measurement (Vrb)
 - Reverse Leakage Current (I_r)
 - SCR detection
- ✓ Optical parameters:
 - Optical power (mw, lm, mcd)
 - Dominant Wavelength (Wd)
 - Peak Wavelength (Wp)
 - Full Width at Half Maximum (FWHM)
 - CIE_xy - CCT - CRI

Hardwares

- ✓ Automatic LED wafer/Chip prober
- ✓ Electrical test module
- ✓ Optical test module
- ✓ Optional ESD test module

SPECIFICATIONS

Model	58212-C	
Application		
Test Area	ψ 8 inch wafer	
Supported Device (Chuck is device selected)	Chip on wafer : 2", 4", 6", 8" Chip on tape : 2", 4", 6"	
Chuck Type	Lateral type, Vertical type, and Flip Chip type (Select one of them)	
Die Size	7 ~ 120 mil	
Pad Size	≥ 70 μm	
Electrical Parameter Measurements		
Power Range	≤ 20W	
Voltage	Source Range	± 10V / ± 100V / ± 200V
	Source Accuracy	0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. *2
	Measure Range	± 10V / ± 100V / ± 200V
Current	Measure Accuracy	0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. *2
	Source Range	± 20uA / ± 500uA / ± 20mA / ± 500mA / ± 2A
	Source Accuracy	0.08% + 0.06%F.S. / 0.08% + 0.05%F.S. / 0.08% + 0.05%F.S. / 0.3% + 0.1%F.S. / 0.3% + 0.3%F.S. *2
Current	Measure Range	± 20uA / ± 500uA / ± 20mA / ± 500mA / ± 2A
	Measure Accuracy	0.06% + 0.04%F.S. / 0.06% + 0.03%F.S. / 0.06% + 0.03%F.S. / 0.25% + 0.1%F.S. / 0.25% + 0.3%F.S. *2
Optical Measurements		
Spectrometer	Wavelength Rang	350 ~ 780 nm
	CIE _x y Repeatability	± 0.0015
	Wp Repeatability	± 0.5 nm
	Wd Repeatability (380~780nm)	± 0.3 nm
Optical Power	Repeatability	± 1%
Operation	Temperature	20° ~ 30°
Environment	Humidity	40% ~ 70%
Facility Requirements		
Machine Dimensions	1480mm x 1160mm x 1505mm	
Power Requirement	Single phase, 220VAC ± 10%, 50/60Hz, 20A	
Input Air	-0.2 Mpa / ψ 6 mm	
Weight	750 kg	



LED I-V curve

Note *2: Test condition is under point of sensing



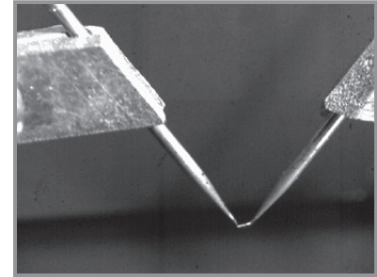
Model 58154 Series

Chroma 58154 series ESD (Electrostatic Discharge) Test Systems are PXI/PCI controlled module to simulate electrostatic discharge pulse during electronic device testing. The 58154 series offer both ESD STM5.1-2001-Human Body Model and ESD STM5.2-1999-Machine Model. The user friendly software offers programmable and flexible features, such as sampling test on a wafer, ESD model, ESD pulse polarity, ESD pulse interval in a sequence, and automatic testing function.



The 58154 series includes a control module and a pulse output external box. High voltage power supply unit (PSU) and pulse shaping circuits provide the ESD STM standards compliant pulse waveform.

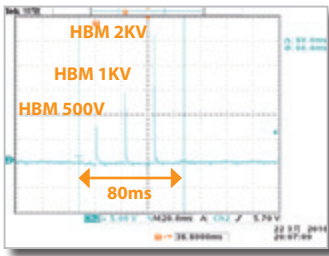
The 58154 series offer a flexible and total ESD test solution to customers. Furthermore, the ESD pulse is generally applied to the device under test before measuring device electric parameters and the 58154 series can be perfectly integrated with Chroma 58173 and 58173-FC to provide a total solution in production line.



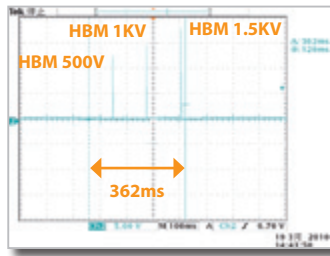
ESD Test on LED chip

Key Features

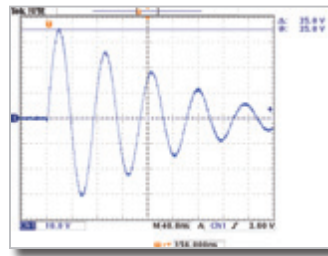
- ✓ Two modes ESD pulse generation : human body mode and machine mode
- ✓ Programmable auto test : pulse delay, cycle and polarity are programmable
- ✓ Resolution (58154) : 5V per-step for machine model, 20V per-step for human body mode
- ✓ Resolution (58154-B) : 10V per-step for machine model, 20V per-step for machine mode, 30V per-step for human body mode
- ✓ Resolution (58154-C) : 10V per-step for machine model, 30V per-step for human body mode
- ✓ Diversity control interface : PCI DIO card
- ✓ Up to 8000V (58154-C)



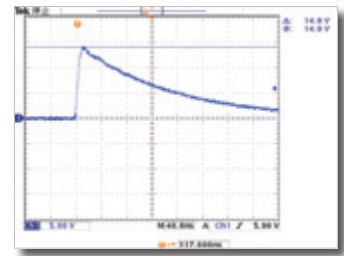
New Function and improvement -
3 HBM pulses within 80 ms



Traditional way -
3 HBM pulses within 362 ms



Machine Model waveform



Human Body Model waveform

SPECIFICATIONS			
Model	58154	58154-B	58154-C
Parameter	Value		
ESD Mode	Machine Model / Human body model		
Pulse Voltage	Machine model: 50V to 400V ± 5V Human body model: 500V to 4KV ± 20V	Machine model: 100V to 800V ± 10V Human body model: 250V to 6KV ± 30V	Machine model: 100V to 800V ± 10V Human body model: 250V to 8KV ± 30V
ESD Specification *1 *2	Machine model reference on STM5.2-2012 ; Human body model reference on JESD22-ALL5C		
Pulse Interval	20 ms to 1 s (User definable)		
Pulse Repetition	Single or multiple		
Pulse Polarity	Positive or negative (software control)		
AC Input	100 to 240V, 47 to 63 Hz		
Dimensions	434.6mm(W) x 97.7mm(H) x 306.8mm(D)		434.6mm(W) x 97.7mm(H) x 450mm(D)
Weight	12 kg		

Pattern No. : I311648, I398655, ZL 2009 2 0148342.2

Pattern Name : Discharge and remote feedback integrated testing system

Note*1 : The test condition is under output terminal of equipment

Note*2 : The accuracy of Chroma 58154 may vary in customer's setup conditions. To fix this problem, ESD tester needs to be tuned the value of the impedance to minimized waveform distortion, or customers provide their setup information in advance and Chroma tunes ESD testers before shipment to fit customer's test method.

LED Total Power Test System

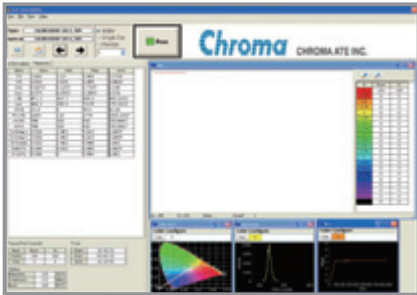
Model 58173-T

58173-T LED Test System focuses on LED Wafer/Chip Characteristics Analysis and provides optimized test performance. Its test items include a variety of voltage/current output measurement, optical power measurement, and spectrum analysis. On measurement, several electrical and optical characteristics analysis can be achieved at a time within 25 ms, and its electrical measurement supports high-voltage LED and high-brightness LED applications.

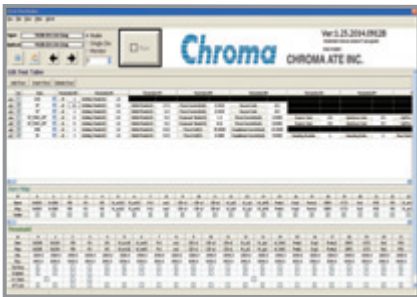
On system integration, 58173-T can easily integrate various Probers and Handlers for wafer probing and chip sorting. In addition, optional Switch Module allows Test System to perform multi-channel and multi-chip measurements.

Key Features

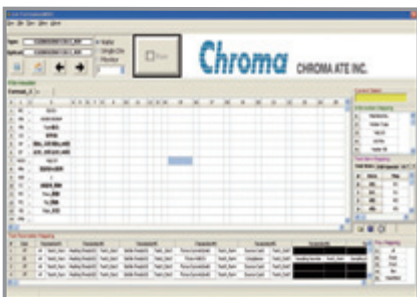
- ✓ High test speed: complete whole test within 25ms (selected test items)
- ✓ Super stable of temperature variation
- ✓ Support high voltage and high power LED test requirement
- ✓ Support multi-die test (option)
- ✓ Support ESD test (option)



Real-Time Production Information



Flexible Editable Test Parameters



Powerful Report File Editing

SPECIFICATIONS		
Model	58173-T	
Parameters		
Electrical Test Items	Forward Voltage(Vf), Reverse Leakage Current (Ir), Reverse Breakdown Voltage (Vrb), SCR	
Optical Test Items	Luminous Intensity (mcd), Lumen (lm), Radiant power (mw), Dominant Wavelength (Wd), Peak Wavelength (Wp), FWHM, CIE Chromaticity, CCT, CRI	
Electrical Parameter Measurements		
Power Range	≤ 20W, as figure 1 shows	
Voltage	Source Range	± 10V / ± 100V / ± 200V
	Source Accuracy	0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. *1
	Measurement Range	± 10V / ± 100V / ± 200V
	Measurement Accuracy	0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. *1
Current	Source Range	± 20uA / ± 500uA / ± 20mA / ± 500mA / ± 2°
	Source Accuracy	0.08% + 0.06%F.S. / 0.08% + 0.05%F.S. / 0.08% + 0.05%F.S. / 0.3% + 0.1%F.S. / 0.3% + 0.3%F.S. *1
	Measurement Range	± 20uA / ± 500uA / ± 20mA / ± 500mA / ± 2°
	Measurement Accuracy	0.06% + 0.04%F.S. / 0.06% + 0.03%F.S. / 0.06% + 0.03%F.S. / 0.25% + 0.1%F.S. / 0.25% + 0.3%F.S. *1
Optical Measurements		
Spectrometer	Wavelength Rang	350 ~ 780 nm
	Detector Pixels	2048 pixels
	Pixel Resolution	0.318 nm
	Optical Resolution	2.067 nm (FWHM)
CIExy	Repeatability	± 0.0015
Wp	Repeatability	± 0.5 nm
Wd (380~780nm)	Repeatability	± 0.2 nm
Radiant Flux (mW)	Repeatability	± 1%
Operation	Temperature	20° ~ 30°
Environment	Humidity	40% ~ 70%
Facility Requirements		
Power Requirement	800 VA	
Dimensions (W x D x H)	58221: 486 mm x 462 mm x 110 mm	
	58241: 486 mm x 475 mm x 110 mm	
	IPC: 426 mm x 451 mm x 177 mm	
Weight	35kg	

Note *1: Test condition is under point of sensing

LED Flip Chip Total Power Test System

Model 58173-FC

Chroma 58173-FC is specifically designed for flip-chip LED, in which the probing surface is opposite to the light emitting surface, thus having a no-interference optical path while still having stable probing is the key factor to make an accurate measurement.

The 58173-FC's transparent chuck design (figure 1) features in no vacuum holes within the testing area, ensuring no interference along the optical path for all chips, and providing a solid stage for probing, thus it makes the measurement much more accurate.

The 58173-FC also applies Chroma's innovative total power measurement method (figure2), which collects more LED partial flux than the conventional probers, and that also improves the speed and accuracy significantly. Benefited from Chroma's innovative unique optical and mechanical design, most of the LED output radiant flux are received by a wide photo detector. Other optical parameters, such as dominant wavelength, peak wavelength, CCT, etc. are measured by Chroma's spectrometer.

In addition, Chroma58173-FC is equipped with a wide-range electrical source and meter, so that Chroma 58173-FC not only fits your requirements today, but also foresees and provides the solution for your next generation requirements.

Key Features

- ☑ Unique vacuum-hole-free chuck design
- ☑ Wide LED electrical test range (200V/2A)
- ☑ Support LED SCR characteristic detect function
- ☑ Chroma Huge Photo Detector (Measurement Angle=148°)
- ☑ Unique edge sensor design to provide stable probing
- ☑ Robust chip position scanning algorithm, suitable for various DUT forms
- ☑ Light shield design to block other light interference
- ☑ Comprehensive analysis tool and statistic report for mass production

Hardwares

- ☑ Semi-automatic prober for flip-chip LED
- ☑ Electrical test module
- ☑ Optical test module
- ☑ Optional ESD test module

Test items

- ☑ Electrical parameters: forward voltage, reverse breakdown voltage, reverse leakage current, etc.
- ☑ SCR characteristic detection
- ☑ Total optical power, total flux
- ☑ Wavelength related: dominant wavelength, peak wavelength, FWHM, etc.



No vacuum hole design in transparent chuck

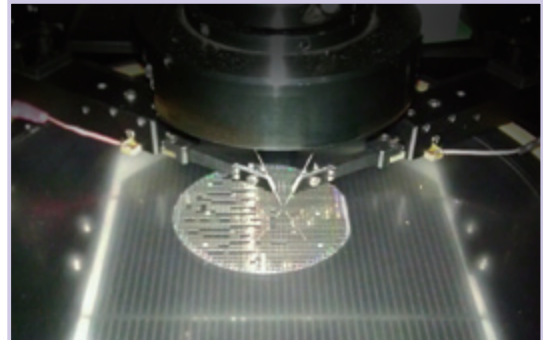


Figure 1 - Chuck with no vacuum holes that makes the measurement more accurate.

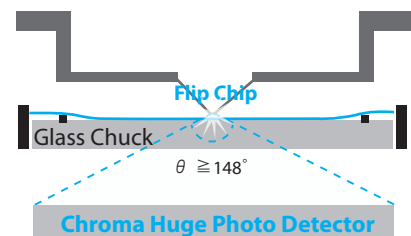
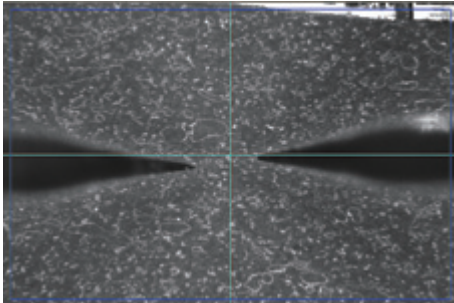


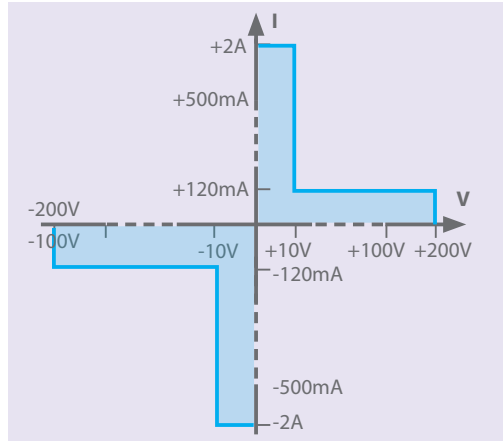
Figure 2 - Chroma's Innovative Method of LED Flip Chip Total Flux Measurement by Huge Photo Detector



Powerful Scanning Algorithm



User-friendly on screen pin adjustment



Wide voltage/current test range

SPECIFICATIONS

Model	58173-FC	
Application		
Die Size	7~120mil	
Pad Size	≥ 70 μ m	
Ring Size	5.3 inch For Extended Ring / 7.3 inch For Extended Ring	
Maximum Optical Receiving Angle	144° *1	
Electrical Parameter Measurements		
PowerRange	≤ 20W, as figure shows	
Voltage	Range	10V / 100V / 200V
	Source Accuracy	0.05% + 0.03%F.S / 0.05% + 0.03%F.S / 0.05% + 0.03%F.S *2
	Measure Accuracy	0.03% + 0.02%F.S / 0.03% + 0.02%F.S / 0.03% + 0.02%F.S *2
Current	Range	20 μ A / 500 μ A / 20mA / 500mA / 2A
	Source Accuracy	0.08% + 0.06%F.S / 0.08% + 0.05%F.S / 0.08% + 0.05%F.S / 0.3% + 0.1%F.S / 0.3% + 0.3%F.S *2
	Measure Accuracy	0.06% + 0.04%F.S / 0.06% + 0.03%F.S / 0.06% + 0.03%F.S / 0.3% + 0.1%F.S / 0.3% + 0.3%F.S *2
SCR Test Function	Yes	
Wavelength / Color Measurements		
Spectrometer	Detector Type	2048 Pixels
	Wavelength range	380~780nm
	Pixel Resolution	0.32 nm
Radiant Flux repeatability (mW)	Range	3W Max.
	Repeatability	± 3%
Wp	Repeatability	± 1 nm
Wd	Repeatability	± 0.3 nm
Operation Environment	Temperature	20° ~ 30°
	Humidity	40% ~ 70%
Mechanical Specifications		
Glass Chuck Size	5.3 inch For Extended Ring / 7.3 inch For Extended Ring	
Scan CCD	Resolution 1024X768 Pixel	
θ axis	± 15°	
Dimension	970 (L) × 970 (W) × 2250 (H) mm	
Weight	580 kg	
Power Input	220V	

Note *1 : LED dies distribution diameter after extension has to be smaller than 5"

Note *2 : Test condition is under point of sensing

LED Total Power Test System

Model 58173

Chroma 58173 comes with an unique design and a whole new method for LED total power measurement. In bare wafer/chip LED test production, due to the existence of probing mechanism, total flux is derived from partial flux measurement in LED epitaxy industry (Figure 1). However, the conventional method encounters problems and issues in measurement accuracy, S/N ratio, measurement speed, etc. All of these are serious concerns in production line.

Chroma has developed a high speed and high accuracy measurement method for LED total power/flux (Figure 2). This innovative test method may collect most of the optical power emitted from LED, much more than the conventional one. Thus applying this test method may improve the measurement accuracy dramatically and significantly. Benefited from Chroma's innovative unique optical and mechanical design, most of the LED output radiant flux are received by a wide photo detector. Other optical parameters, such as dominant wavelength, peak wavelength, CCT, etc. are measured by Chroma's spectrometer.

In addition, the 58173 is equipped with a wide-range electrical source and meter, so that the 58173 not only fits your requirements today, but also foresees and provides the solution for next generation requirements.

Key Features

- ☑ Wide LED electrical test range (200V/2A)
- ☑ Support LED SCR characteristic detect function
- ☑ Chroma Huge Photo Detector (Measurement Angle=144°)
- ☑ Unique edge sensor design to provide stable probing
- ☑ Robust chip position scanning algorithm, suitable for various DUT forms
- ☑ Light shield design to block other light interference
- ☑ Comprehensive analysis tool and statistic report for mass production

Hardwares

- ☑ Semi-automatic LED wafer/chips prober
- ☑ Electrical test module
- ☑ Optical test module
- ☑ Optional ESD test module

Test items

- ☑ Electrical parameters : forward voltage, reverse breakdown voltage, reverse leakage current, etc.
- ☑ SCR characteristic detection
- ☑ Total optical power, total flux
- ☑ Wavelength related : dominant wavelength, peak wavelength, FWHM, etc.

Standard Optical Module

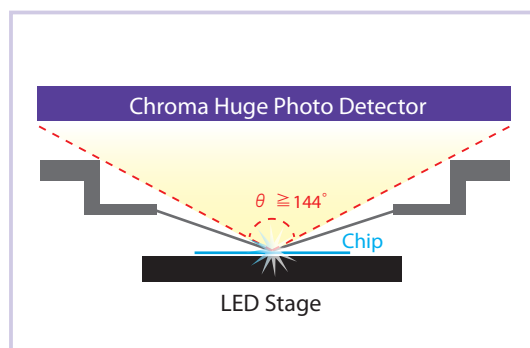


Figure 1 - Chroma's Innovative Method of LED Total Flux Measurement by Huge Photo Detector



Optional Optical Modules

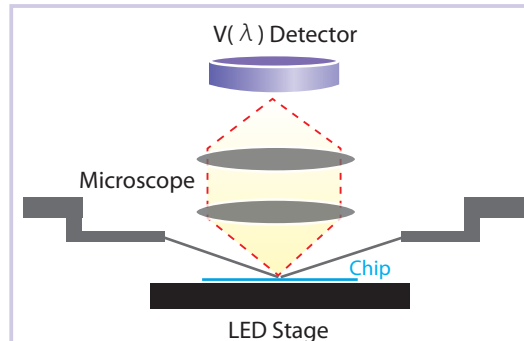


Figure 2 - Conventional Method of LED Wafer/chip Total Flux Measurement by Microscope Module

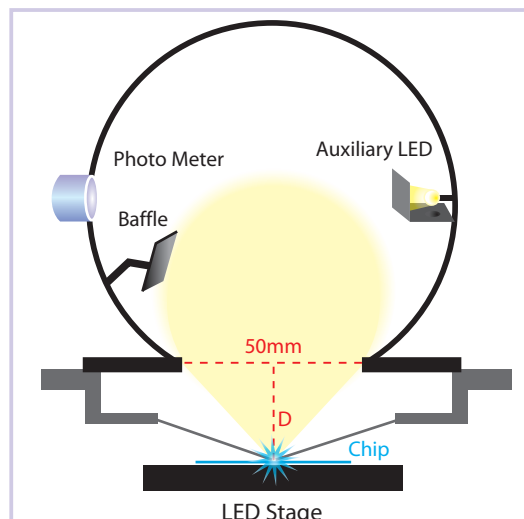
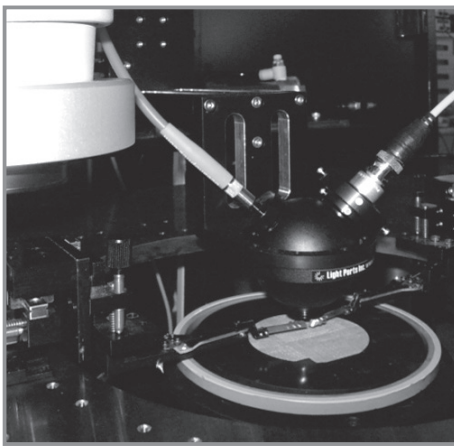
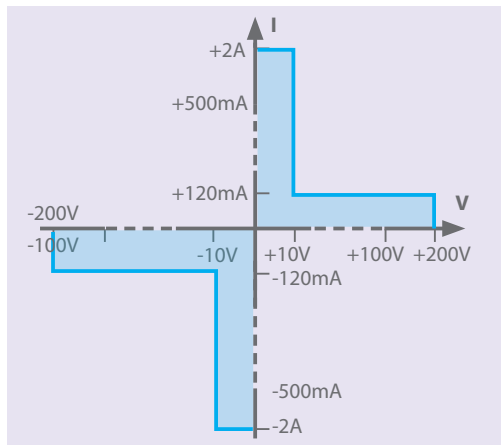


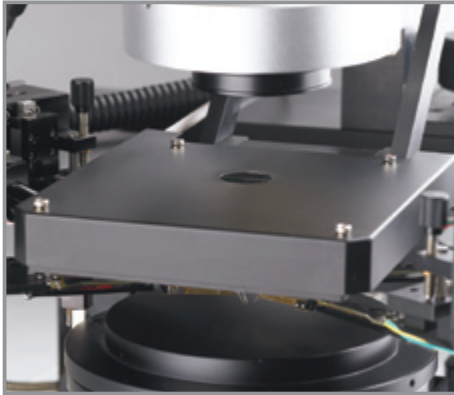
Figure 3 - Conventional Method of LED Wafer/chip Total Flux Measurement by Integrating Sphere



Integrating Sphere



Wide voltage/current test range



Chroma® Huge Photo Detector

SPECIFICATIONS		
Model		58173
Application		
Die Size		7~120mil
Pad Size		≥ 70 μ m
Maximum Optical Receiving Angle		144°
Electrical Parameter Measurements		
PowerRange		≤ 20W, as figure shows 10V / 100V / 200V
Voltage	Range	
	Source Accuracy	0.05% + 0.03%F.S / 0.05% + 0.03%F.S / 0.05% + 0.03%F.S *1
	Measure Accuracy	0.03% + 0.02%F.S / 0.03% + 0.02%F.S / 0.03% + 0.02%F.S *1
Current	Range	20 μ A / 500 μ A / 20mA / 500mA / 2A
	Source Accuracy	0.08% + 0.06%F.S / 0.08% + 0.05%F.S / 0.08% + 0.05%F.S / 0.3% + 0.1%F.S / 0.3% + 0.3%F.S *1
	Measure Accuracy	0.06% + 0.04%F.S / 0.06% + 0.03%F.S / 0.06% + 0.03%F.S / 0.3% + 0.1%F.S / 0.3% + 0.3%F.S *1
SCR Test Function		Yes
Wavelength / Color Measurements		
Spectrometer	Detector Type	2048 Pixels
	Wavelength range	380~780nm
	Pixel Resolution	0.32 nm
Radiant Flux repeatability (mW)	Range	3W Max.
	Repeatability	± 3%
Wp	Repeatability	± 1 nm
Wd	Repeatability	± 0.3 nm
Operation Environment	Temperature	20° ~ 30°
	Humidity	40% ~ 70%
Mechanical Specifications		
Scan CCD		Resolution 1024X768 Pixel
θ axis		± 15°
Dimension		970 (L) × 970 (W) × 2250 (H)mm
Weight		580kg
Power Input		220V

Note *1: Test condition is under point of sensing

LED Electrical Test Module

Model 58221-200-2

Chroma 58221-200-2 is a module specially designed to test the electrical features of LED in full range. It has all functions required for testing the LED electrical features. The 58221-200-2 supplies high accuracy current source up to $\pm 200V/\pm 120mA$ for High voltage (HV) and up to $\pm 10V/\pm 2A$ for High Power (HP). Besides the standalone operation the 58222-200-2 is featured in, the USB interface and other integrated design can also be applied for synchronous measurement.

H.V. **H.P.**

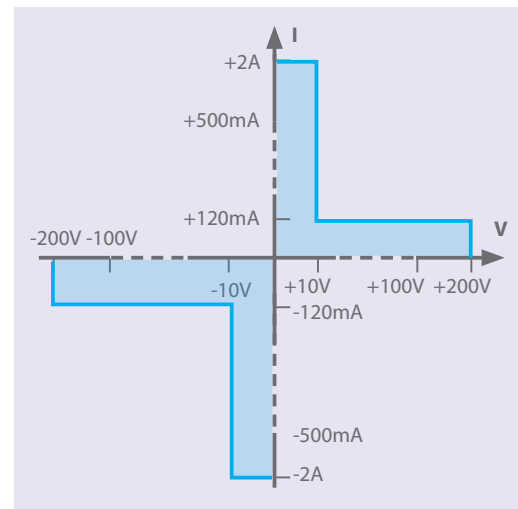


Key Features

- ✓ Focuses on LED test application
- ✓ Cover High Voltage (HV) and High Power (HP) LED test requirement
- ✓ Build-in hardware sequencer
- ✓ Build-in program memory and data memory
- ✓ Support LED SCR characteristic detect function

Test items

- ✓ Forward voltage (Vf)
- ✓ Reverse breakdown voltage (Vrb) Leakage (Ir)
- ✓ LIV
- ✓ I-V characterization



Wide voltage/current test range

SPECIFICATIONS				
Model	58221-200-2			
Current Source Accuracy				
Range	Programming Resolution	Source Accuracy 23°C ± 5°C ± (Reading + Range)	Default Measurement Resolution	Measurement Accuracy 23°C ± 5°C ± (Reading + Range)
± 20 μA	1nA	0.05% + 0.04%	1nA	0.05% + 0.04%
± 500 μA	50nA	0.05% + 0.04%	50nA	0.05% + 0.04%
± 20mA	1 μA	0.05% + 0.04%	1 μA	0.05% + 0.04%
± 500mA	50 μA	0.08% + 0.04%	50 μA	0.08% + 0.04%
± 2A	100 μA	0.05% + 0.1% (≥0.1A range) 0.1% + 0.3% (<0.1A range)	100 μA	0.05% + 0.1% (≥0.1A range) 0.08% + 0.1% (<0.1A range)
Voltage Source Accuracy				
Range	Programming Resolution	Source Accuracy 23°C ± 5°C ± (Reading + Range)	Default Measurement Resolution	Measurement Accuracy 23°C ± 5°C ± (Reading + Range)
± 10V	1mV	0.03% + 0.02%	1mV	0.03% + 0.02%
± 100V	10mV	0.03% + 0.02%	10mV	0.03% + 0.02%
± 200V	10mV	0.03% + 0.02%	10mV	0.03% + 0.02%
General Specification				
Interface	USB/Stand alone			
Trigger	Available			
RAM (16 bits)	16M			
Operatoin Environment	0°C~5°C (32°F~122°F) ; Humidity : < 70% R.H. Non-condensing			
Max. Power Consumption (VA)	120VA			
Dimensions (WxHxD)	432x110x432 mm			
Weight (kg)	10			

LED Burn-in Tester

Model 58266

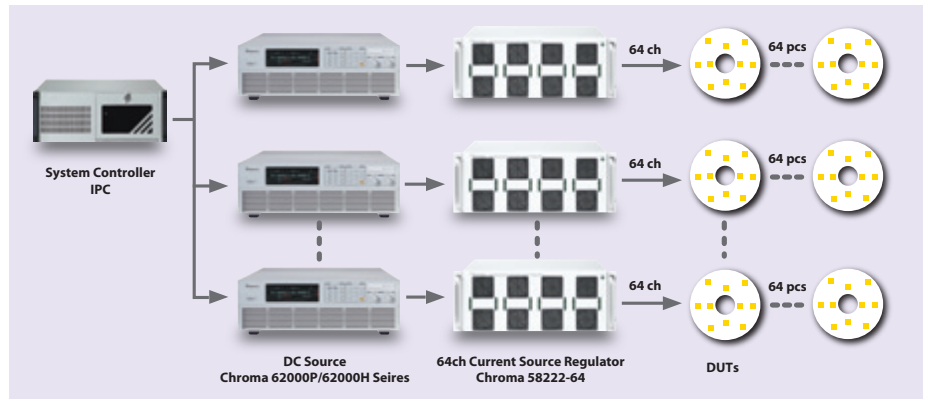
Chroma 58266 is a LED Burn-in Tester that each channel can offer a constant current up to 500mA but also has 0~400V voltage measurement function. For product application, various programmable power supplies can be applied for multi-channel constant current output and voltage measurement. The user can integrate several power supplies based on the demands of channels and current for multi-channel test.

Key Features

- ✓ Flexible channels output: 32/64/128 channels
- ✓ Each channel can offer up to 500mA /400V
- ✓ Each channel can parallel connection for high current requirement. Ex: 2-ch: 1A, 4-ch: 2A
- ✓ High accuracy of current output and voltage measurement

System Architecture

- ✓ DUT: single LED, LED array, LED light bar or LED module
- ✓ Support channels: 64 ch
- ✓ Force Current: Max. 500mA per-channel
- ✓ Support parallel connection: Ex: 2-ch: 1A
- ✓ Voltage measurement: Max. 400V



CONFIGURATION			
Programmable DC Power Supply	LED Burn-in Tester	Force	Measure
		I range	V Range
Model 62012P-40-12 40V/120A/1200W	Model 58266	500mA	30V
Model 62012P-100-50 100V/50A/1200W	Model 58266	400mA	35V
Model 62024P-80-60 80V/60A/2400W	Model 58266	500mA	32V
Model 62024P-100-50 100V/50A/2400W	Model 58266	170mA	95V
Model 62024P-600-8 600V/8A/2400W	Model 58266	500mA	70V
Model 62050P-100-100 100V/100A/5000W	Model 58266	440mA	75V
Model 62050H-450 450V/34A/15KW (380V/3 Φ 4W)	Model 58266	500mA	300V
		80mA	400V
		500mA	95V
		500mA	400V

SPECIFICATIONS				
Model	58266			
Voltage Accuracy (23°C ± 5°C)				
Range	0~4V	0~40V	0~400V	0~400V
Default Measurement Resolution	1mV	10mV	100mV	100mV
Measure Accuracy ±(%rdg. + offset)	0.2%+5mV	0.2%+50mV	0.3%+500mV	0.3%+500mV
Current Accuracy (23°C ± 5°C)				
Range	10 μA	1mA	100mA	500mA
Programming Resolution	5nA	500nA	50 μA	200 μA
Source Accuracy ±(%rdg. + offset)	0.1%+20nA	0.1%+300nA	0.1%+200 μA	0.2%+1mA
Temperature Coefficient	10~18°C & 28~50°C ; ±(0.5 × accuracy specification)/°C			
Max. Voltage Difference of all Channel	10V @ 500mA ; 50V @ 100mA ; 100V @ 50mA			
Operation Environment	Temperature : 10~50°C ; Humidity : 10~70%RH			
Storage Environment	Temperature : -20~70°C ; Humidity : 5~95%RH			

LED Light Bar Test System

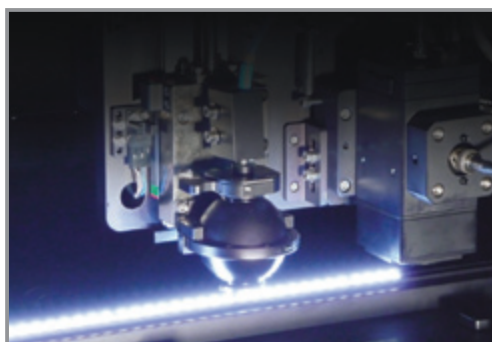
Model 58182

Chroma 58182 LED Light Bar Test System is a fully automatic test system able to measure the top-view/side-view light bar uniformity composed of white light or RGB LED. With image recognition function, it can accurately capture the location of LED and identify the center of LED under the measurement. With automatic mechanical and optical measurement function, the 58182 can perform extremely accurate optical and electrical measurement.

The 58182 integrates image recognition function, automatic mechanical and optical measurement. It can not only improve the yield rate by sifting out the defect products, but also reduce the product verification time and development cost. In addition, the 58182 has a flexible measurement platform to adapt different type of top-view / side-view LED light bar measurement, and friendly user interface to reduce user's learning time. Consequently, the 58182 is the best choice for testing top-view/side-view light bar.

Key Features

- ☑ Measure the top-view/side-view light bar uniformity composed of white light
- ☑ Equipped with image recognition function to capture the LED location accurately
- ☑ Excellent optical performance
- ☑ ESD damaged sorting function
- ☑ FPC/PCB light bar adaptability



CIE127 Partial Flux Measurement Module



CIE127 Condition B measurement Module

SPECIFICATIONS				
Model		58182		
Optical Module		CIE 127 condition B optical tube or Partial flux measurement module		
Average Intensive (mcd)	Range	100~10000mcd		
	Accuracy	± 5%		
	Repeatability	± 2%		
CIE x, y	Accuracy	± 0.004		
	Repeatability	± 0.002		
Spectrometer	Wavelength Range	380~780nm		
	Optical resolution	2nm		
	A/D	16 bits		
Light Bar length		600mm		
Offer Channels		20 X 12 Ch		
Power Supply	Voltage	0~200V	0~60V	0~300V
	Current	10uA~5mA	1mA~2A	40mA~2A
	Voltage accuracy	0.3%+0.1%F.S	0.01%+10mV	0.05%+0.05%F.S
	Current accuracy	0.3%+0.1%F.S	0.01%+1mA	0.03%+40mA
Data output	Format	Excel (*.csv)		
	Output items	mcd, CIEx, CIEy		
XY moving range		600x250mm		
Dimension		1300 (D) × 2360 (W) × 1815 (H)mm		

LED Light Bar Electrical Test System

Model 58183

Chroma 58183 is a PC base test system for LED light bar electrical test. In hardware design, Chroma 58183 not only offers a accurately current (10uA~5mA) to test LED electrical features but also can integrate an extra high power supply for high current test. Otherwise, Chroma 58183 offers multi-channels test function. It is widely used in many application. In LED light bar manufactory, 58183 can test more 10 pieces Light bar at the one time. In LED backlight manufactory, 58183 can test 4 pieces LED backlight via a 4 channels control box. To sum up, 58183 is a very strong and powerful tool for LED light bar and LED backlight manufactories.

Key Features

- ☑ Integrating customer's extened power supply
- ☑ PC base design
- ☑ Support multi- channels test
- ☑ Using general DUT adapter to offer test application widely
- ☑ Software support authority management



SPECIFICATIONS			
Model		58183	
System specifications			
Power supply	Output voltage	1~200V	
	Output current	10μA~5mA *1	
Program Accuracy	Voltage Range	1~200V	
	Voatage Accuracy	± 0.3% ± 0.2% FS	
	Current Range	100μA / 5mA	
	Current Compliance	± 5% ± 0.2% FS	
Applicative Type		Top / Side-view LED light bar	
Dimension (D x W x H)		IPC 418 x 330 x 175 , RelayBox 430 x 276 x 102 mm	
Weight		18 Kg(IPC 13Kg, RelayBox 5Kg)	
Electrical measurement specifications			
Testing condition		2 wires	
Voltage	Accruacy (1~200V)	± 0.3% ± 0.2% FS	
	Resolution	50mV	
RelayBox specifications(Not in live wire)			
		Ch1~24	Ch25~32
Switch voltage		200VDC	300VDC
Carry current		300mA	600mA
Life expectancy of mechanical		10 ⁶	10 ⁶
Power IN			
IPC		110 / 220V,50~60Hz, 7 / 3.5A	
RelayBox		110 / 220V,50~60Hz,2A	
Others			
General purpose relay		32 Channels	
Operation environment		Temperature:10~40°C ; Humidity:10%~70%	

Note*1 : Specifications not contain AUX Power, need to check relaybox loss if use AUX Power.

LED Lighting Test System (For Laboratory)

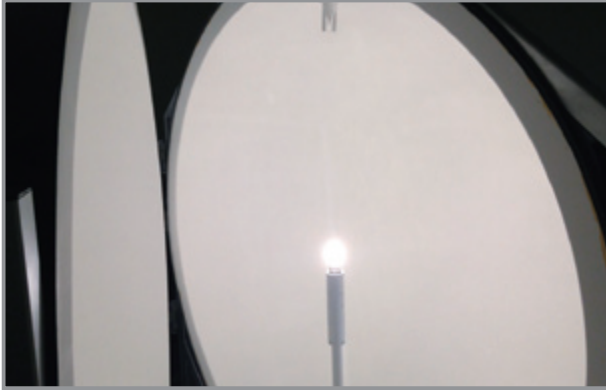
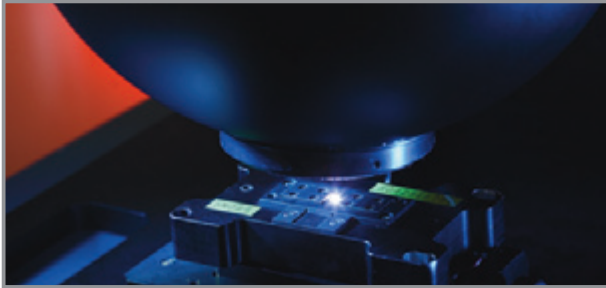
Model 58158

Chroma 58158 LED Lighting Test System, compliances the AC LED Device National Standard, has integrated Chroma's Power Electronics Test Equipment - Programmable AC Power Source and Digital Power Meter to offer users a real AC environment for measuring AC LED.

Furthermore, the 58158 also integrates Chroma DC Power Supplies with the flexible optical test platform which equips with integrating sphere, photo detector, and etc.. Users can measure optical and electrical parameters of AC/DC LED through a friendly software interface.

Key Features

- ✓ Simulate the real AC test condition and environment
- ✓ Integrate AC, DC, and optical features test to one platform
- ✓ Support DC test for AC LED
- ✓ Support dual-optical test module in one platform (Integrating sphere or average intensity) (optional)
- ✓ Support AC /DC LIV analysis
- ✓ Offer standard light source for calibration



For Laboratory Test

Optional Integrating Spheres



SPECIFICATIONS (50 cm Integrating Sphere)		
Model		58158
Measurement Items		
Optical Measurement Items		Lumens (lm), CIE(x,y), CIE(u',v'), CCT, CRI
Electrical Measurement Items		Frequency, Real power P, power factor PF, THD (Option), Vf (Option)
Optical Measurement		
Photo Detector	Wavelength Range	380~780nm
	Lumens Range *1	<5,000 lm (>5K lm optional)
Spectrometer	Detector Type	2048 Pixels Linear CCD array (optional)
	Optical Fiber Connector	SMA 905
Lumen accuracy		± 5%
CIE _x y accuracy		± 0.004
Lumen Repeatability *2		± 0.5%
CIE _x y Repeatability *2		± 0.005
Electrical AC Source		
Output Rating-AC		500VA
Voltage	Range/Phase	150V/300V/Auto
	Accuracy	0.2%+0.2%F.S.
	Resolution	0.1V
	Line Regulation	0.10%
	Load Regulation	0.20%
Max.Current / Phase	RMS	4A/2A (150V/300V)
	peak	24A/12A (150V/300V)
Electrical AC Meter		
Power	Range (W)	1.5W~1KW (Model 66201) ; 1.5W~10KW (Model 66202)
	Power Factor Accuracy *3	0.006+(0.003/PF)KHz
Harmonic	Range	2~50 order
DC Measurement (Optional)		
DC Power Supply	Output Voltage	0~64V (> 64V optional)
	Output Current	0~3A (> 3A Optional)
	Ripple and Noise	1400 uVrms & 14 mVp-p / < 1mA
	Line Regulation	0.01% +4mV / 0.01% + 300 μ A
	Load Regulation	< 6mV / 0.01% + 300 μ A
	Program Accuracy	0.02% + 10mV / 0.01%+1mA
	Read back Accuracy	0.02% + 10mV / 0.01%+1mA
Others		
Dimension (H x W x D)		1081 x 532 x 700 mm
Weight		100k g
Power Consumption		300 W
Operating		100~240V VAC 50/60HZ
Software Support DC Source		
Chroma 6200P-300-8, Chroma 11200 (650V), Chroma 11200 (800V), Keithley 24XX Series		

Notes *1: 20 inch Integrating Sphere

Notes *2 : The unit under test is 10W halogen lamp

Notes *3 : The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges

ORDERING INFORMATION

Integrating sphere	50cm	1m	2m
Luminaire	small lamp, bulb, MR-16	middle lamp, 2 feet T8/T5 tube	large lamp, 4 feet T8/T5 tube, street light
Application	laboratory	laboratory	laboratory

Note : Customization for 3m integrating sphere

LED Lighting In-line Test System (For Production)

Model 58158-SC

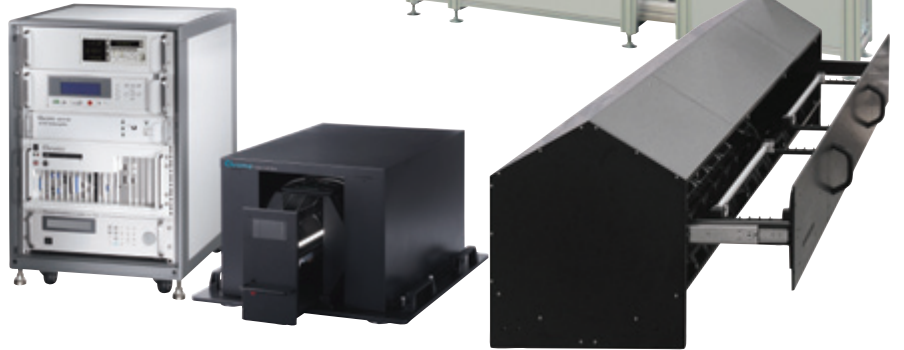
The design concept of Chroma LED high speed measurement module is to combine several large size detectors and add up the luminous flux obtained by each detector to calculate the total flux of LED light. This design not only overcomes the shortcoming of previous inconvenient measurement for total flux by conventional integrating sphere, it also implements the inline test on production line. Chroma is able to provide the customer a fully automatic production line that covers both quality and productivity.

Key Features

- ☑ Mass production application: LED lamp, LED bulb, LED bar, LED streetlight, and other luminaries
- ☑ Less error comparing to integrating sphere measurement
- ☑ High speed test and flicker measurement
- ☑ Provide standard light source for calibration which is international standard traceable
- ☑ Thermal control fixture adaptable (option)

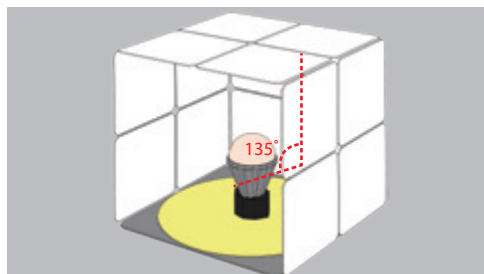
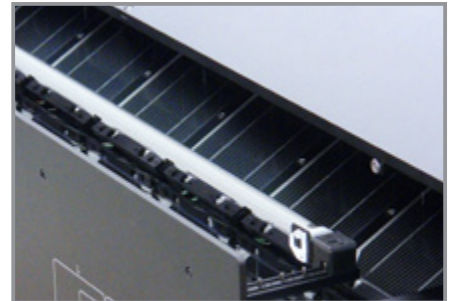
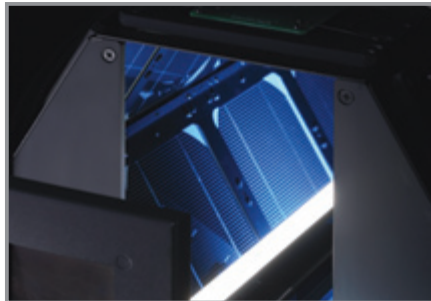
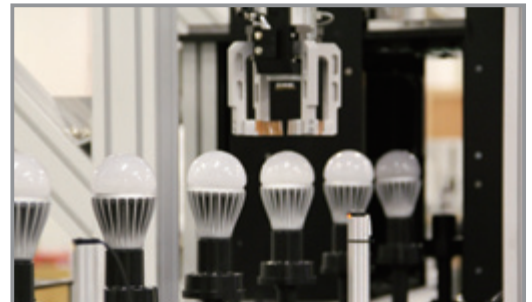
Test Items

- ☑ Optical power characteristics : Lm, lm/w, LED operating frequency (Flicker)
- ☑ Color characteristics : CIE_xy, Duv, CIEu'v', CCT, CRI
- ☑ Power characteristics : AC mode : Power Factor (PF), Irms, Vrms, THD
DC mode : Forward voltage

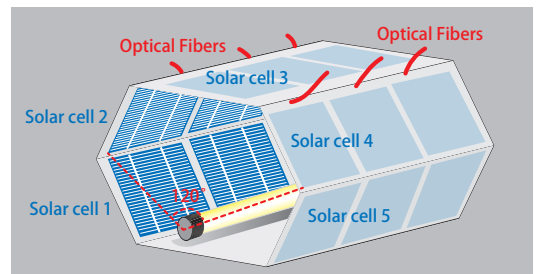


Instruments

Solar Cell Modules



Solar Cell Module for Omnidirectional lamp



Solar Cell Module for JEL 801 LED Tube

SPECIFICATIONS		
Model		58158-SC
Measurement Items		
Optical Measurement Items		Lumens (lm), CIE(x,y), CIE(u',v'), CCT, CRI
Electrical Measurement Items		Frequency, Real power P, power factor PF, THD (Option), Vf (Option)
Optical Measurement		
Photo Detector	Wavelength Range	380~780nm
	Lumens Range	<5,000 lm (>5K lm optional)
Spectrometer	Detector Type	2048 Pixels Linear CCD array
	Optical Fiber Connector	SMA 905
Lumen measurement Repeatability		± 0.5%
CIExy Repeatability *1		± 0.005
CCT Repeatability		± 5K
CRI Repeatability		± 1
Electrical AC Source		
Output Rating-AC		500VA
Voltage	Range/Phase	150V/300V/Auto
	Accuracy	0.2%+0.2%F.S.
	Resolution	0.1V
	Line Regulation	0.10%
	Load Regulation	0.20%
Max.Current / Phase	RMS	4A/2A (150V/300V)
	peak	24A/12A (150V/300V)
Electrical AC Meter		
Power	Range (W)	1.5W~1KW (Model 66201) ; 1.5W~10KW (Model 66202)
	Power Factor Accuracy *2	0.006+(0.003/PF)KHz
Harmonic	Range	2~50 order
DC Measurement (Optional)		
DC Power Supply	Output Voltage	0~64V (> 64V optional)
	Output Current	0~3A (> 3A Optional)
	Ripple and Noise	1400 uVrms & 14 mVp-p / < 1mA
	Line Regulation	0.01% +4mV / 0.01% + 300 μ A
	Load Regulation	< 6mV / 0.01% + 300 μ A
	Program Accuracy	0.02% + 10mV / 0.01%+1mA
Others		
Dimension (H x W x D)		1081 x 532 x 700 mm
Weight		100k g
Power Consumption		300 W
Operating		100~240V VAC 50/60HZ
Software Support DC Source		
Chroma 58221-200-2, Chroma 6200P-300-8, Chroma 11200 (650V), Chroma 11200 (800V), Keithley 24XX Series		

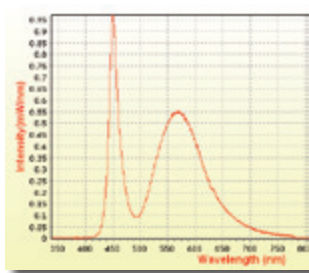
Notes *1 : The unit under test is 10W halogen lamp

Notes *2 : The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges

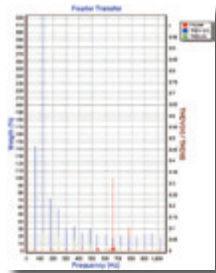
Analysis Tools



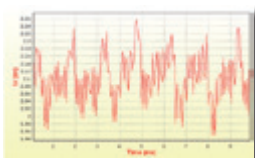
Power Analysis :
Im, Im/W, PF, Power



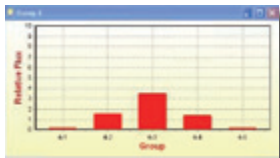
LED Spectrum Analysis :
CCT, CRI, Duv



THD Analysis



Flicker Analysis



Flicker Analysis

High Speed LED Bulb In-line Test System

Model 5102

Chroma 5102 is a LED Bulb Automation Test Line. It adopts unique and innovative technologies that use Mono-Crystalline Silicon Solar Cell as photodetectors and distribute them around LED Bulb. Based on photoelectric conversion principle of solar cell, and solar panel's relatively large area at lower cost, Chroma 5102 significantly reduced not only the size of the measurement equipment, but also greatly enhance the test speed. Loading and unloading each LED bulb can be completed in five seconds. Chroma 5102 shows great performance of test speed at one LED bulb per 6 seconds, including the time for photoelectric test.

In addition, Chroma 5102 works with optional modules to enhance testing and production. To test LED bulbs in steady state, user may purchase Pre-Burn Module. For directive LED bulbs, user can purchase Center Beam Test Module. To print label or logo on LED bulbs, user may purchase optional laser equipment for printing.

Key Features

- ✓ Over 10K pcs throughput per day
- ✓ Test LED bulb in steady state
- ✓ Omni-directional LED bulb light spatial distribution measurement
- ✓ Support Flicker Measurement



Pre-burn



Loading / Unloading to Pre-burn Oven



Loading to Tray



Optical Testing

SPECIFICATIONS		
Model	5102	
Applicable Tester	Tester	58158-SC LED lighting test system
	Test Capability	Refer to Model 58158-SC specification
Suitable LED Lamps	Applicable Lamp	Directional lamp, Non-directional lamp and Omni-directional lamp
	Applicable Base	Medium Screw (E27)
Change Kit	Pick and Place module (Lamp orientation) ; E27 to GU10	
Optional Work Station	Open/ short test module	
	High capacity Pre-burn module (468 PCS Medium Screw socket)	
	Center Beam test module (For Directional lamp)	
	Laser printing module holder	
Handler Index Time	5 sec/per-lamp (excluding lamp test time)	
Lamp Tray	Weight	Net weight : 1.8 kg
	Capacity	A19 Lamp : 28 pcs
Sorting Bin	Pass Bin	2 trays
	Fail Bin	1 tray
System Facility Requirement	Dimensions (W x D x H)	Main line : 5190 mm x 1800 mm x 2400 mm Pre-burn module : 2346 mm x 2063 mm x 1514 mm
	Power Requirement	AC Φ 220V, Max 50A
	Air Requirement	Main line : Air pressure 6kg/cm ² Pre-burn module : Φ 10 inch tube, 46m ³ /min air flow rate

High Speed LED Tube In-line Test System

Model 5104

Chroma 5104 LED Tube Automation Test Line adopts unique and innovative technologies that use Mono-Srystalline Silicon Solar Cell as photodetectors and distribute them around LED tube. Based on photoelectric conversion principle of solar cell, and solar cell's relatively large area at lower cost, Chroma 5104 significantly reduced not only the size of the measurement equipment, but also greatly enhance the test speed. Loading and unloading each LED tube can be completed in five seconds.

Chroma 5104 shows great performance of test speed at one LED tube per 6 seconds, including the time for photoelectric test.

Key Features

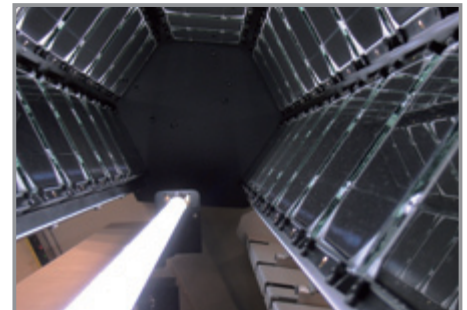
- ☑ Over 10K pcs throughput per day
- ☑ Support a variety of LED tube measurement
- ☑ Support JEL801 Light Intensity Distribution Measurement
- ☑ Support Flicker Measurement



SPECIFICATIONS		
Model	5104	
Applicable Tester	Tester	58158-SC LED lighting test system
	Test Capability	Refer to Model 58158-SC specification
Suitable LED Lamps	Applicable Lamp	2 ft, 4 ft, 5 ft LED T5 / T8 / T10 non-glass tube
	Applicable Base	Standard : Bi-pin G13 Optional : Gx16t-5, G5
Change Kit	Gx16t-5 socket for JEL standard G5 socket for T5 tube	
Optional Function	Flicker test	
	Mix bin detection for 4 ft LED tube	
	Barcode reader	
Handler Index Time	5 sec / per-lamp (excluding lamp test time)	
System Facility Requirement	Dimension (W x D x H)	2050 mm x 2270 mm x 1972 mm
	Power Requirement	AC Φ 220V, Max 20A
	Air Requiement	20.5Mpa, 360L/min, Φ 10 mm



Loading



Optical Testing



Unloading



Binning



**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

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

Building 7, ShiShan Industrial Gallery,
No. 855, Zhu Jiang Rd., SuzhouNew District,
Jiang Su, China
Tel: +86-512-6824-5425
Fax: +86-512-6824-0732
www.chroma.com.cn

**JAPAN
CHROMA JAPAN CORP.**

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

**U.S.A.
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

CHROMA SYSTEMS SOLUTIONS, INC.

19772 Pauling, Foothill Ranch, CA 92610
T +1-949-600-6400
F +1-949-600-6401
sales@chromausa.com
www.chromausa.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