Programmable DC Electronic Load

PROGRAMMABLE DC ELECTRONIC LOAD
MODEL 63600 SERIES

Chroma's 63600 series DC electronic loads are designed for testing multi-output AC/DC power supplies, DC/DC converters, chargers, batteries, server power supplies, and power electronic components. They are excellent for research, development, production, and incoming inspection applications.

The 63600's state of the art design uses DSP technology to simulate non-linear loads using a unique CZ operation mode allowing realistic loading behavior.

The 63600 series can draw its rated current under very low voltage (0.4V typical). This unique feature guarantees the best loading performance for modern Point-of-Load conditions and fuel cells.

The 63600 series can simulate a wide range of dynamic loading applications, with programmable load levels, slew rates, duration, and conducting voltage. The 63600 also has a dynamic sweep function to meet the test requirements of ATX power supplies. The instrument allows up to 100 sets of system operating status which can be stored in the EEPROM and recalled instantly for automated testing application.
Real time measurement of voltage and current are integrated into each 63600 load module using a 16-bit measurement circuit with three current ranges. The user can perform online voltage measurements and adjustments or simulate short circuit tests using the simple keypad on the front panel.

With the VFD display and rotary knob, the 63600 loads offer versatile front panel operation. Users are able to control the 63600 family remotely via Ethernet, USB, or GPIB interface.

Also included in the 63600 are self-diagnostic routines and full protections against OP, OC, OT and alarm indicating OV, reverse polarity. This ensures the quality and reliability of the 63600 and provides protection to units under test.

Ethernet GPIB USB CE

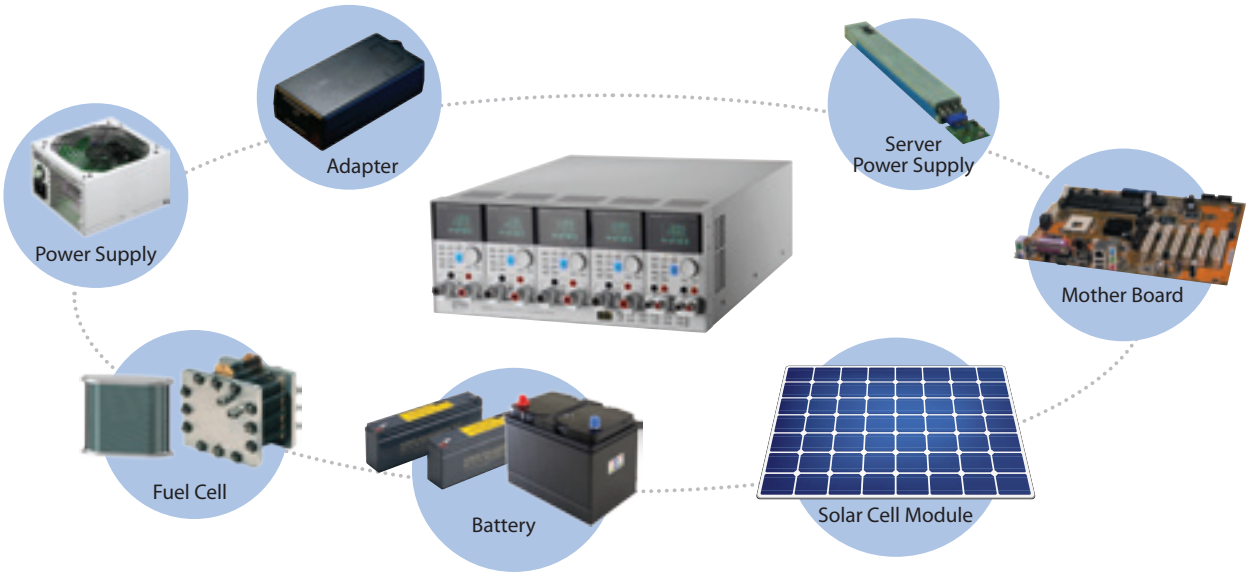
MODEL 63600 SERIES

Key Features :

- Max. power : 100W × 2(Dual), 300W & 400W
- Voltage range : up to 600V
- 5 module mainframe Max. 2000W, load modules up to 400W/ea
- Up to 10 channels in one mainframe, fit for testing multiple output SMPS
- 0.4V @ 80A (Typical) low voltage operating characteristics
- Flexible CC, CR, CV and CP operation modes
- CZ mode for turn on capacitive load simulation
- Parallel mode for high current and power application up to 2kW
- Multi channel synchronous control
- Auto frequency sweep up to 50kHz
- Real time power supply load transient response simulation and Vpk+/- measurement
- User defined waveform
- Max. Power Point Tracking
- User programmable 100 sequential front panel input status for user-friendly operation
- Precision voltage and current measurement
- Precision high speed digitizing measurement/ data capture
- Voltage, current and P_{max} measurement for OCP/OLP testing
- Timing measurement for batteries
- Short circuit simulation
- Self-test at power-on
- Full protection : OC, OP, OT protection and OV alarm
- Ethernet, USB and GPIB interfaces

Chroma

APPLICATIONS



DUT \ Functionality														
Electric Vehicle Components														
Battery	☀	☀		☀	☀	☀		☀	☀	☀	☀			
Charger		☀		☀					☀	☀	☀			☀
Generator		☀			☀	☀		☀	☀	☀				☀
Wiper current simulation		☀		☀				☀	☀	☀				☀
DC to DC converter	☀	☀	☀		☀	☀		☀	☀	☀	☀		☀	☀
Fuse		☀		☀		☀		☀	☀	☀	☀			
Relay		☀		☀		☀		☀	☀	☀	☀			
Connector		☀		☀		☀		☀	☀	☀	☀			
Body control module (BCM)		☀				☀		☀	☀	☀				
A/C controller		☀		☀				☀	☀	☀				
Storage power														
Battery	☀	☀		☀	☀	☀		☀	☀	☀	☀			☀
PV module		☀							☀	☀		☀		
Fuel cell	☀	☀		☀	☀	☀		☀	☀	☀	☀			☀
3C Products														
Adaptor		☀	☀	☀	☀				☀	☀	☀		☀	☀
Power supply		☀	☀	☀	☀	☀	☀	☀	☀	☀	☀		☀	☀
Server power		☀	☀	☀	☀	☀	☀	☀	☀	☀	☀		☀	☀
Printer power		☀	☀	☀	☀	☀		☀	☀	☀	☀		☀	☀
Charger		☀		☀		☀		☀	☀	☀	☀		☀	☀
VRM/POL	☀	☀		☀				☀	☀	☀			☀	☀
UPS		☀	☀	☀		☀		☀	☀	☀			☀	☀
Telecom power	☀	☀	☀	☀		☀	☀	☀	☀	☀	☀		☀	☀
DC to DC converter		☀	☀	☀	☀			☀	☀	☀	☀		☀	☀

- **Low Voltage Operating Characteristics**
  0.4V@80A (typical)
- **High Measurement Accuracy**
- **Dynamic Loading and Control**
  Up to 40 channels
- **Peak Current Test**
  (Programmable repetitive peak cycle)
- **Program Sequences**
- **Master / Slave Parallel Control**
- **Constant Impedance Mode (CZ mode)**
- **Sine Wave Dynamic Function**
- **Digitizing Function**
- **User Defined Waveform Function**
- **Timing Function**
- **Maximum Power Point Tracking Function**
- **Auto Sweep for Dynamic Loading Test**
- **Over Current Protection Test**

VERSATILE SYSTEM CONFIGURATION

Chroma's 63600 Series Programmable Electronic Load integrates micro-processing capability into each load module to optimize the speed and control among multiple load modules. All load modules are configured to work independently, though testing can be carried out simultaneously at multiple outputs via remote control to simulate real life application.

MODULE LOAD DESIGN

The Chroma 63600 electronic load mainframe accepts the user-installable 63600 series load modules for easy system configuration. The model 63600-5 mainframe holds five 63610 load modules to offer up to 10 100W load input channels with standard front-panel inputs. The maximum power for a single mainframe is 2kW when five 63640-80-80 load modules are paralleled. This is suitable for testing multiple output switch mode power supplies, and many other types of power products. Using the GO/NG output port, production snapshots are made available to show the immediate pass/fail judgment of UUT. All modules on the mainframe share a common GPIB address to synchronize and speed up the control of the load modules and read back the operating data.

APPLICATION OF SPECIFIC LOAD SIMULATION

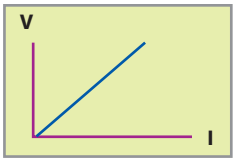
The 63600 series load modules operate in constant voltage, current, resistance, power, or impedance to satisfy a wide range of test requirements. For example, the CV is designed to simulate batteries for charger testing.

Constant Current

CC Applications:

1. *Load/Cross regulation test for CV power supply*
2. *Battery discharge time test and life cycle test*
3. *Fuel cell testing*
4. *Loading pattern simulation for automotive wiper*

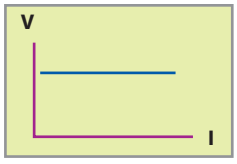
Constant Resistance



CR Applications:

1. *Test current limit point and slew rate for power supply*
2. *Soft start test for telecom power*
3. *Loading simulation for automotive temperature controller*

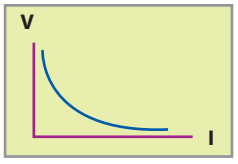
Constant Voltage



CV Applications:

1. *Charger test for mobile phone*
2. *Current limit test for fold back power supply*
3. *Fuel cell test.*
4. *Current source test*

Constant Power



CP Applications:

1. *CP power test*
2. *Battery capacity test and capacity life cycle test*
3. *Pout vs Eff% curve test*

PRECISE MEASUREMENTS

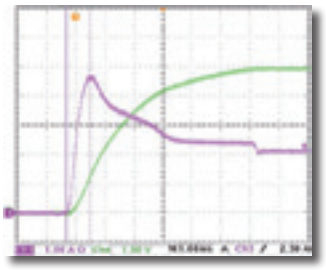
The 63600 series provides three operating current ranges and a built-in 16-bit, precision A/D converter, achieving 0.025%+0.01%F.S., 0.05%+0.05%F.S. and 0.1%+0.1%F.S. accuracy for voltage, current and power measurement respectively. Precise measurements like these are ideal for testing power efficiency and other critical parameters of the UUT's. The precise measurement of 63600 series also meets the requirements of ENERGY STAR® and 80 Plus.

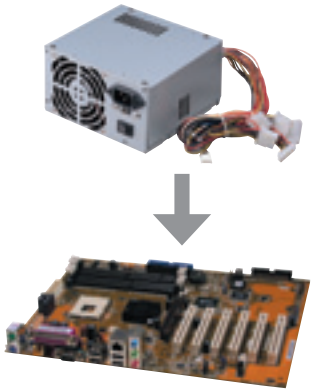
Besides, The 63600 series can measure OCP/OLP trip voltage and current by setting the step, step current, dwell time and so on. Then 63600 series will judge the test result for Pass or Fail and shows the maximum power (Pmax) on the display after completed the OCP/OLP test.

Two high-speed A/D are built in the 63600 series to measure the voltage and current at the same time and calculate the true power value for displaying without distortion

CONSTANT IMPEDANCE MODE (CZ MODE)

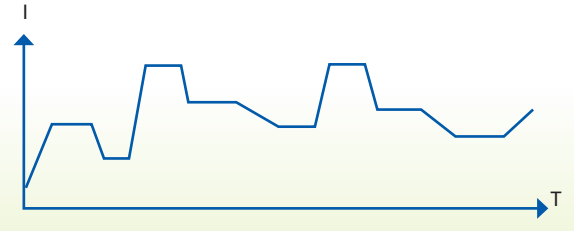
The unique CZ mode designed in 63600 series can improve the loading behavior of CC & CP mode and makes the simulated loading current more realistic.



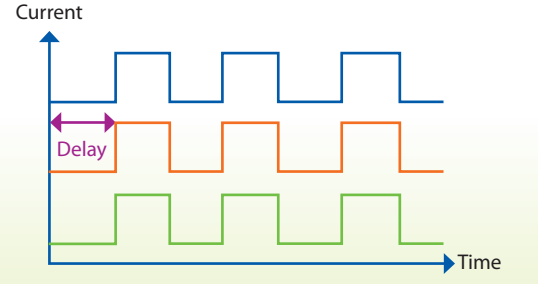


PROGRAM SEQUENCES

The 63600 series offers 100 programmable loading sequences that enable the user to simulate various real world conditions. In addition, each module can be operated independently or synchronized so that all modules start operating at the same time while running independent programs. Below are some examples of the most popular program sequences available.



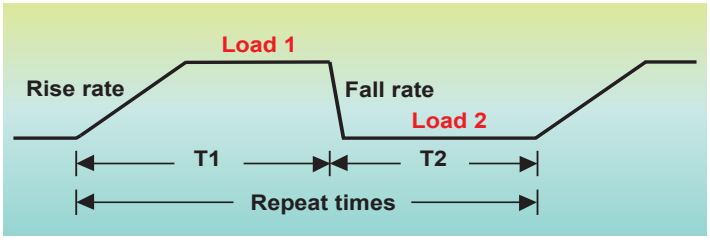
Simulations of all kinds of real current waveforms for battery discharge testing and other applications are possible. (Notebook, Electric car and Electric bike) (Single output channel for UUT)



Peak power cycle test for printer power (Three output channel for UUT)

DYNAMIC LOADING AND CONTROL

Modern electronic devices operate at very high speed and demand rapid transient response characteristics. To address these applications the 63600 offers high speed, programmable dynamic loading, sweep simulation and control capability never before achieved. The right figure shows the programmable parameters which can be set within the 63600 loads: Waveforms can be single shot or set to repeat.



The dynamic mode provides a unique simulation capability allowing users to set the number of times each cycle repeats from 1~65,535. Feature is excellent for determining the peak current which can be sustained by converters.

The 63600 also offers a unique dynamic frequency sweep with variable frequencies up to 50kHz. This capability is ideal for determining worst case voltage peaks (see Figure 1). Measurement of the Vpeak (+/-) can be achieved by this function with a sampling rate of 500 kHz (Figure 2). The dynamic loading mode can simulate different loading conditions for most test requirements. Dedicated remote load sensors and control circuits guarantee minimum waveform distortion during dynamic loading.

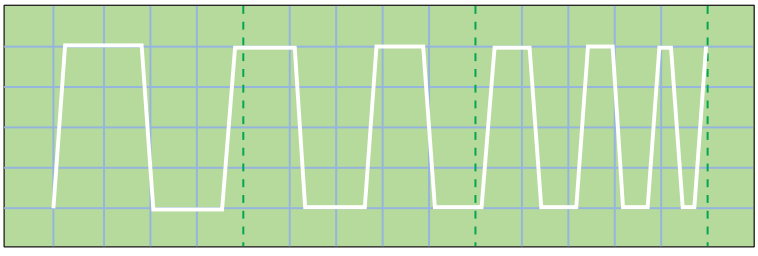


Figure 1 : Sweep Waveform

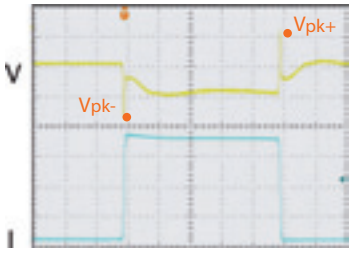


Figure 2 : Measurement of Vpeak

According to Intel’ s Design Guide for ATX 12V Power Supplies, measurement of output transient response requires simultaneous load steps when testing the power supply’ s +12VDC, +5VDC and +3VDC outputs (all steps must occur at the same time). The 63600 provides a dynamic synchronous function that can be used to perform this test on up to 10 outputs within each mainframe. The total dynamic synchronous channels can up to 40 when using 4 mainframes providing higher flexible and increased utility.

In addition to the dynamic loading function the 63600 provides Master/Slave (parallel) operation of individual loads. This capability provides for up to 2,000W per mainframe. Figure 3 shows the parallel synchronous dynamic loading and Figure 4 shows the parallel non-synchronous dynamic loading of previous designs. As show, the Vpeak value is significantly reduced and incorrect when using non-synchronous loading.

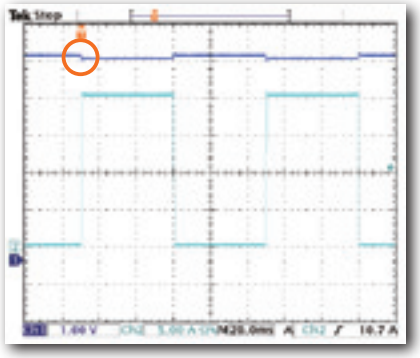


Figure 3 :
Parallel synchronous dynamic loading

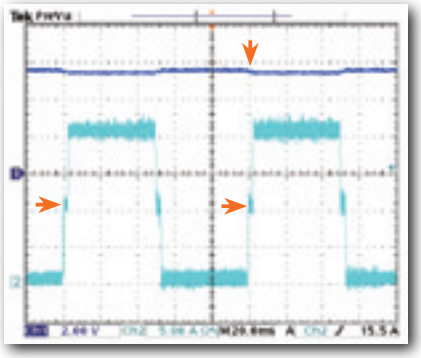
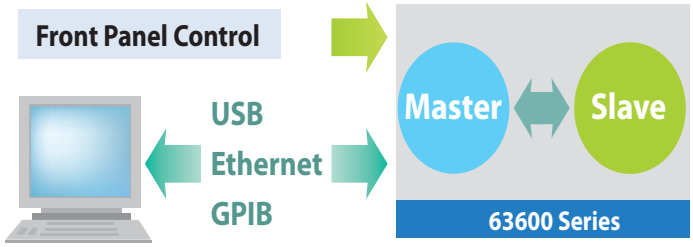


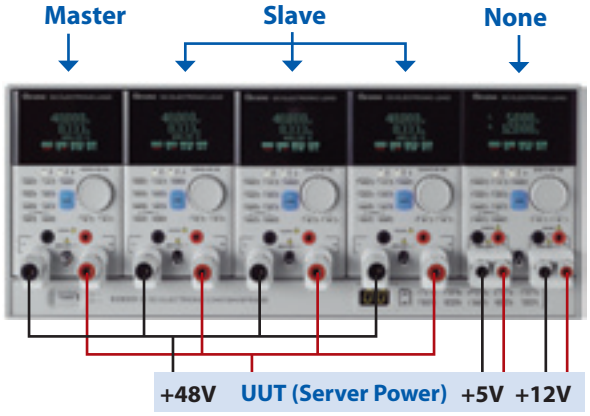
Figure 4 :
Parallel non-synchronous dynamic loading

MASTER / SLAVE PARALLEL CONTROL

When the need is for increased power, paralleling two or more loads can be done to achieve the desired load current. The 63600 provides the user with smart Master/Slave mode controls which enables the user to program the load currents of the Master and have them automatically calculated and downloaded to the slave modules. Using several loads in parallel to emulate a single load dramatically simplifies operation and allows the 63600 to be used for both multiple output power supplies and larger single output supplies. The 63600 can controlled and reconfigured with USB, Ethernet, and GPIB interfaces for automated testing applications.

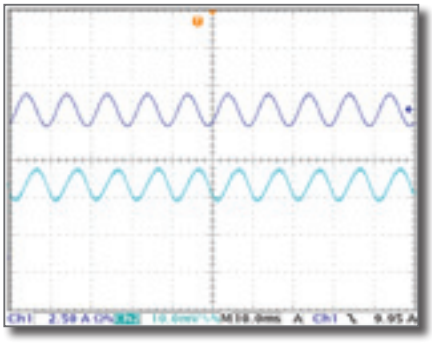


Application for High Power



SINE WAVE DYNAMIC FUNCTION

The 63600 has a unique sine wave loading function which allows setting of a current bias (I_DC), a loading sine wave (I_AC) and sine wave frequency without the need for an external function generator. As see in the figure right, CH1 is the actual load current and CH2 is the voltage waveform of the UUT. This function can be used in D2D/ATX Power supplies for sine wave dynamic testing.



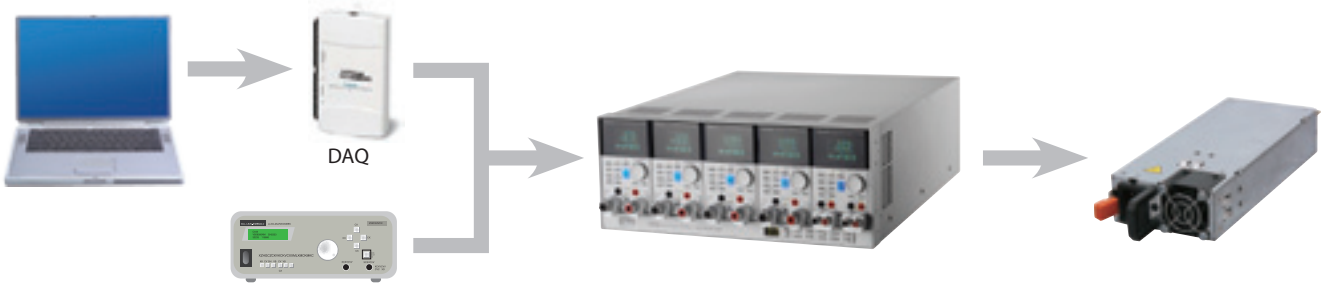
DIGITIZING FUNCTION

The 63600 offers a digitizing function that makes the load very convenient for recording transients in both voltage and current waveforms. The following are the specifications of setting parameters :

Sampling Time : 2µs to 40ms / R : 2µs (Setting the interval of sampling time)
Sampling Point : 1 to 4096 (Setting the total sampling points)

USER DEFINED WAVEFORM

In addition to common constant current, constant voltage, constant power and constant resistance modes of conventional loads, the 63600 accepts digital data from DAQ cards or analog data from function generators to allow for complex waveforms to be created as depicted below. The 63600 also provides an enhanced feature, User Defined Waveform (UDW), to simulate the actual current profiles and waveforms.

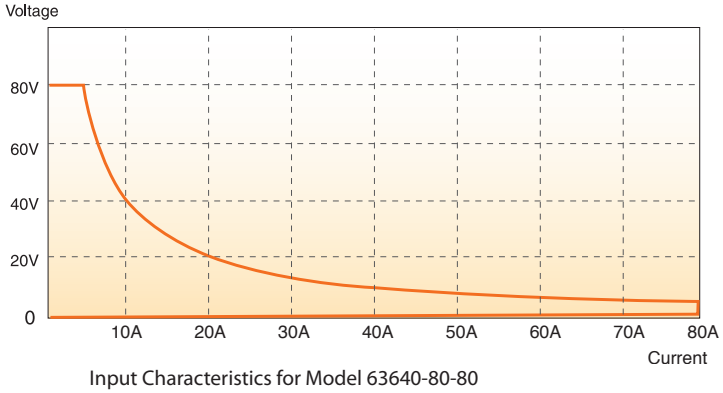


To reconstruct the actual current waveform, one can simply upload the captured waveform data into any module via a Chroma softpanel. Each module is capable of storing up to 10 sets of waveforms with each comprising up to 1.2 millions data points to meet the more strenuous test requirements.

In addition, 63600 series also provides voltage peak measurements during actual loading conditions. Avoiding the need for using an oscilloscope to capture the voltage peak, saving time and costs.

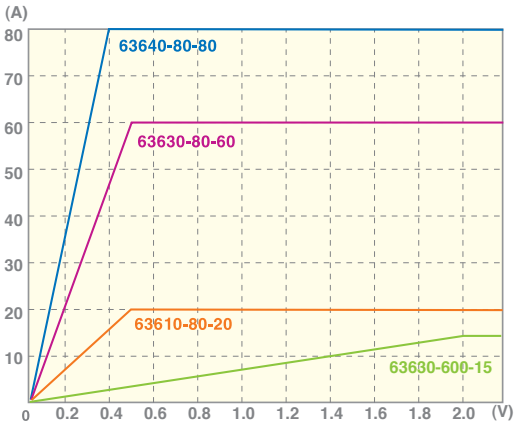
LOW VOLTAGE OPERATION

Each 63600 load module contains 3 load current ranges with a minimum full current operating voltage of 0.5V for each range. At the minimum voltage (0.4V), the 63640-80-80 load can draw maximum current defined by the current range. Based on this design, the 63600 is well suited for testing DC/DC converters, fuel cells, and other low voltage - high current devices. Low voltage operation is possible towards zero volts with corresponding reduced current levels (see de-rating curves).



Input Characteristics for Model 63640-80-80

Low Voltage & V-I Curve Operating Characteristics
(Typical of 63600 Series)



Note: All specifications are measured at load input terminals. (Ambient temperature of 25 ˚C)

TIMING FUNCTION

The 63600 loads include a unique timing & measurement function allowing precise time measurements in the range of 2ms to 100,000s. This feature allows users to set the final voltage & timeout values for battery discharge testing and other similar applications.

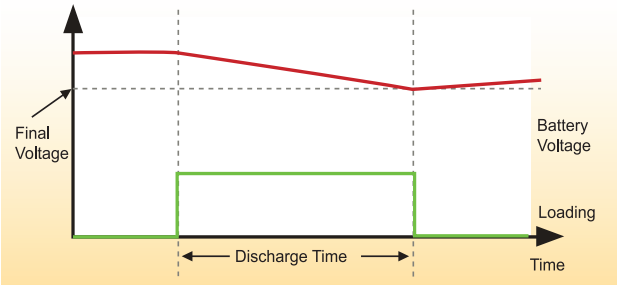
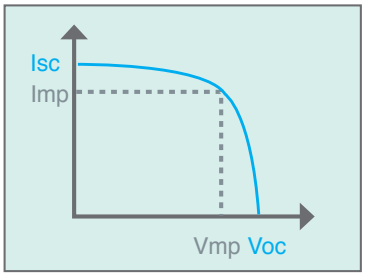


Figure 5 : Battery Discharge Testing

MPPT FUNCTION

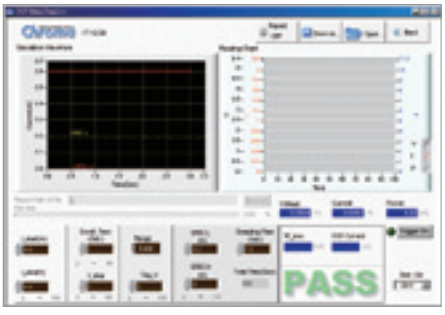
The 63600 series loads also include built-in Maximum Power Point Tracking function which is used for solar panel test. Just connect the solar panel to the 63600 loads, the loads will track the maximum power point of solar panel using a high speed built-in algorithm. The 63600 can also calculate the consumption of energy automatically.



SOFT PANEL

The 63600 loads can be operated from the front panel controls or from available softpanels. This user friendly software includes all functions of 63600s and is easy to understand and operate. The 63600 can be controlled via GPIB, USB and Ethernet interfaces for remote control and automated testing applications.

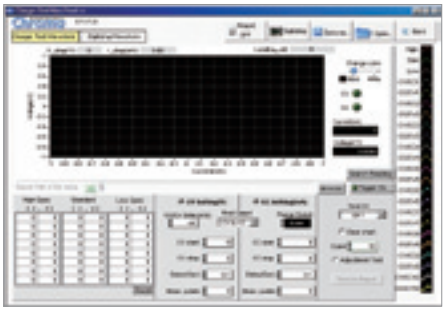
Main Operation Menu



OCP Test

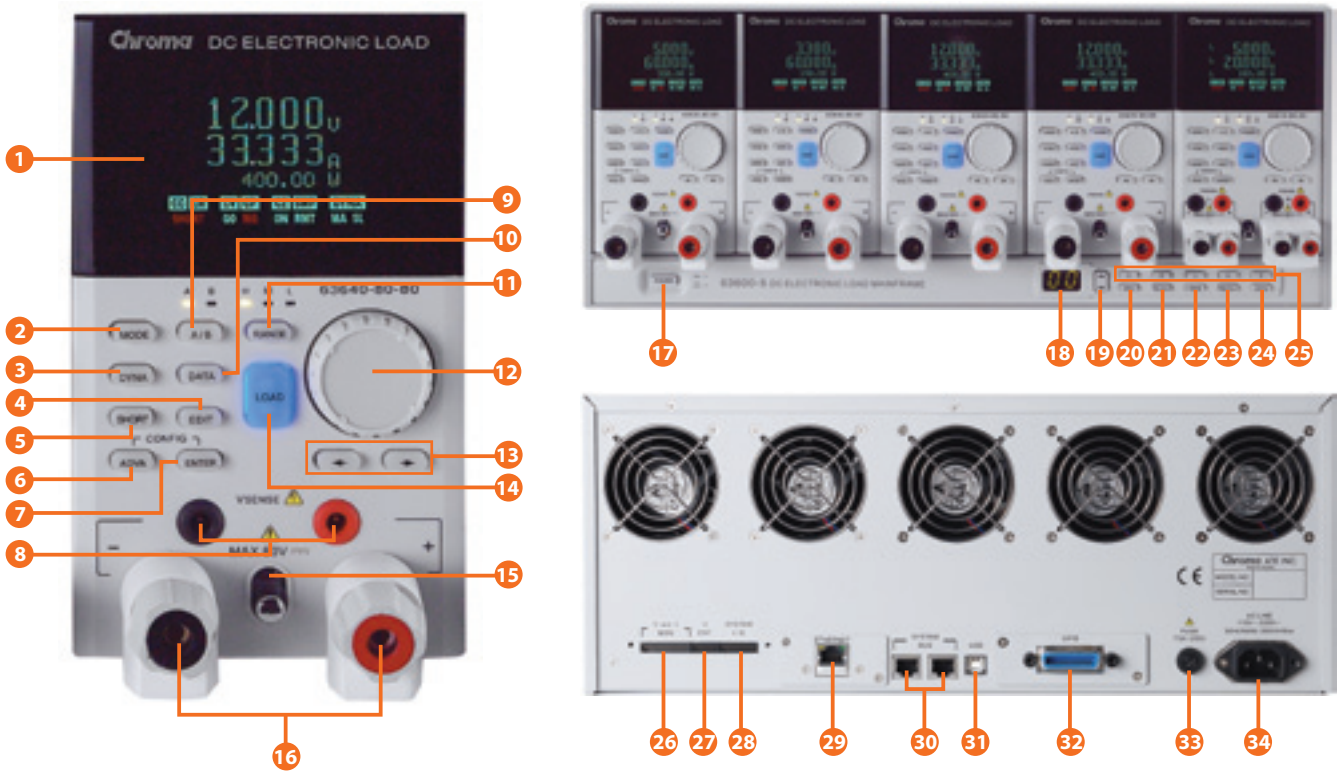
User Defined Waveform

Battery Discharge Test



Charger Test

PANEL DESCRIPTION



1. **LCD Display:** Used for setting and measurements
2. **MODE key:** Used to select the operating mode : CC, CR, CV, CP or CZ
3. **DYNA key:** To select dynamic test mode
4. **EDIT key:** Used for setting and editing
5. **SHORT key:** Used to apply a short circuit across the input
6. **ADVA key:** Used to select the other testing functions
7. **Enter key:** Used for confirming data entry
8. **Voltage sense terminal**
9. **A/B key:** Used to select static A or B load (63630, 63640)
   L/R key: Used to select left or right channel of input load (63610)
10. **DATA key:** Used to select the other parameters
11. **RANGE key:** Used to select HIGH, MIDDLE or LOW loading range
12. **Rotary knob:** Used to adjust loading and parameter setting
13. **Cursor key:** Used for setting and editing
14. **LOAD key:** Used to enable or disable the load input
15. **Module lock:** Used to remove the module
16. **Load terminal**
17. **Power switch**
18. **LED display:** Used to display the memory address
19. **Up / Down key:** Used to select the next or previous memory address
20. **SPEC key:** Used to setup High/Low limits for GO/NG test
21. **LOCK key:** Used to lock the setting data
22. **SAVE key:** Used to save the front panel input status into memory
23. **RECALL key:** Used to recall the front panel input status from memory
24. **LOCAL key:** Used to recover local control
25. **Shortcut key:** Used to save loading profile for all channels
26. **Voltage & Current monitor output:** Analog output to proportional to the voltage and current waveform
27. **V EXT:** Input for external wave in control
28. **System I/O:** Used for system input/output control signals
29. **Ethernet connector**
30. **System Bus:** Used for master/slave control system data communication
31. **USB connector**
32. **GPIB connector**
33. **AC input fuse**
34. **AC Input connector**

ORDERING INFORMATION

63600-1 : 63600 Mainframe for Single Modules
63600-2 : 63600 Mainframe for 2 Modules
63600-5 : 63600 Mainframe for 5 Modules
63610-80-20 : DC Load Module, 80V/20A/100Wx2
63630-80-60 : DC Load Module, 80V/60A/300W
63630-600-15 : DC Load Module, 600V/15A/300W
63640-80-80 : DC Load Module, 80V/80A/400W

A636000 : GPIB Interface for 63600-2/63600-5 Mainframe
A636001 : Ethernet Interface for 63600-2/63600-5 Mainframe
A636003 : External Signal Board (Test Pin) for 63600-2/63600-5 Mainframe
A636005 : External Signal Board (BNC) for 63600-2/63600-5 Mainframe
A636007 : Rack Mounting Kit for 63600-2 mainframe
A636008 : Rack Mounting Kit for 63600-5 mainframe (for Europe only)
A632006 : NI USB-6211 Bus-Powered Multifunction DAQ

MAINFRAME SPECIFICATION

Model	63600-1*	63600-2	63600-5
Number of slots	1 slot	2 slots	5 slots
Operating temperature	0~40˚C	0~40˚C	0~40˚C
Input Rating	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Switchable, 47~63Hz	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Switchable, 47~63Hz	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Auto Range, 47~63Hz
Mainframe dimension (HxWxD)	177x70.22x554.9mm / 7.0x2.76x21.8 inch	177x210x554mm / 7.0x8.27x21.8 inch	177x447x554mm / 7.0x17.6x21.8 inch (Full Rack)
Weight	7.5kg / 16.53lbs	11.5kg / 23.35lbs	15.6kg / 34.39lbs

* None digital interface option

SPECIFICATIONS-1

Model	63610-80-20			63630-80-60		
Configuration	100Wx2			300W		
Voltage *1 *8	0~80V			0~80V		
Current	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Power *2	0~16W	0~30W	0~100W	0~30W	0~60W	0~300W
Static Mode						
Typical Min. Operating Voltage (DC)	0.5V@0.2A	0.5V@2A	0.5V@20A	0.5V@0.6A	0.5V@6A	0.5V@60A
Constant Current Mode						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.01mA	0.1mA	1mA	0.01mA	0.1mA	1mA
Accuracy	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Constant Resistance Mode						
Range	CRL : 0.04~80Ω (100W/6V) CRM: 1.44~2.9kΩ (100W/16V) CRH : 5.76~12kΩ (100W/80V)			CRL : 0.015~30Ω (300W/6V) CRM: 0.3~600Ω (300W/16V) CRH : 1.5~3kΩ (300W80V)		
Resolution *9	0.3288mS			0.9864mS		
Accuracy *3	0.1%+0.075S (6V) 0.1%+0.01S (16V) 0.1%+0.00375S (80V)			0.1%+0.2S (6V) 0.1%+0.03S (16V) 0.1%+0.01S (80V)		
Constant Voltage Mode						
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Resolution	0.1mV	1mV	1mV	0.1mV	1mV	1mV
Accuracy	0.05%+0.1%F.S.			0.05%+0.1%F.S.		
Constant Power Mode						
Range	0~2W	0~10W	0~100W	0~6W	0~30W	0~300W
Resolution *9	1mW	10mW	100mW	3.2mW	32mW	320mW
Accuracy *4	0.3%+0.3%F.S.			0.3%+0.3%F.S.		
Dynamic Mode - CC						
Min. Operating Voltage	1.5V			1.5V		
Frequency	100Hz~50kHz/0.01Hz~1kHz			100Hz~50kHz/0.01Hz~1kHz		
Duty	1~99% (Min. Rise Time Dominated)			1~99% (Min. Rise Time Dominated)		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew Rate	0.04A/ms~0.02A/μs	0.4A/ms~0.2A/μs	4A/ms~2A/μs	0.12A/ms~0.06A/μs	1.2A/ms~0.6A/μs	12A/ms~6A/μs
Resolution	0.01mA/μs	0.1mA/μs	1mA/μs	0.01mA/μs	0.1mA/μs	1mA/μs
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10 μs			10 μs		
Current						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.01mA	0.1mA	1mA	0.01mA	0.1mA	1mA
Ext Wave Mode(20kHz) : CC						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Level	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		

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SPECIFICATIONS-1

Measurement						
Voltage Read Back						
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Resolution	0.1069mV	0.2849mV	1.3537mV	0.1069mV	0.2849mV	1.3537mV
Accuracy *5	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.
Current Read Back						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.003349mA	0.034628mA	0.329561mA	0.009942mA	0.101748mA	1.009878mA
Accuracy *5	0.05%+0.05%F.S.			0.05%+0.05%F.S.		
Power Read Back						
Range	0~16W	0~30W	0~100W	0~30W	0~60W	0~300W
Accuracy *5	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Voltage Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Current Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~0.2A	0~2A	0~20A	0~0.1A	0~1A	0~10A
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
General						
Program mode						
Sequence No.	100/Program			100/Program		
Dwell / SEQ	0.1ms ~ 30s (Resolution : 0.1ms)			0.1ms ~ 30s (Resolution : 0.1ms)		
Load Setting	Refer to Static mode specifications			Refer to Static mode specifications		
Spec Check	Voltage/Current/Power			Voltage/Current/Power		
Protection						
Over Power	Yes			Yes		
Over Current	Yes			Yes		
Over Voltage Alarm*8	Yes			Yes		
Over Temperature	Yes			Yes		
Reverse	Yes			Yes		
Interface						
USB	Standard			Standard		
Ethernet	Optional			Optional		
GPIB	Optional			Optional		
System BUS	Master/Slave			Master/Slave		
Dout						
No. of bits	2 bits per mainframe			2 bits per mainframe		
Level - H	1.8V/3.3V/5V switchable			1.8V/3.3V/5V switchable		
Level - L	<0.6V@I_{sink}=10mA			<0.6V@I_{sink}=10mA		
Drive	Pull_up resistor = 4.7kΩ			Pull_up resistor = 4.7kΩ		
Din (TTL Compatible, Rising Edge)						
No. of bits	2 bits per mainframe			2 bits per mainframe		
External Trig. for Digitizing						
No. of bits	1 bit per mainframe			1 bit per mainframe		
External Trig. for Auto Sequences (TTL Compatible, Rising Edge)						
No. of bits	1 bit per mainframe			1 bit per mainframe		
Load ON - O/P						
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
Short ON - O/P						
No. of channels	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe			2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe		
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
Short circuit						
Current *6	Set to 100% of rated current			Set to 100% of rated current		
Input Resistance (Load Off)	700kΩ (Typical)			700kΩ (Typical)		
Dimensions (HxWxD)	142x86x514mm / 5.6x3.4x20.2 inch			142x86x514mm / 5.6x3.4x20.2 inch		
Weight	5kg / 11 lbs			4kg / 8.8 lbs		
Operating Temperature	0~40˚C			0~40˚C		
Storage Temperature	-20~80˚C			-20~80˚C		
Power	Supply from mainframe			Supply from mainframe		
EMC & Safety	CE			CE		

SPECIFICATIONS-2

Model	63630-600-15			63640-80-80		
Configuration	300W			400W		
Voltage *1 *8	0~600V			0~80V		
Current	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Power *2	0~90W	0~300W	0~300W	0~60W	0~60W	0~400W
Static Mode						
Typical Min. Operating Voltage (DC)	2V@0.15A	2V@1.5A	2V@15A	0.4V@0.8A	0.4V@8A	0.4V@80A
Constant Current Mode						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.005mA	0.05mA	0.5mA	0.01mA	0.1mA	1mA
Accuracy	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Constant Resistance Mode						
Range	CRL : 0.133~270Ω (300W/80V) CRM: 1.92~4kΩ (300W/150V) CRH: 208~200kΩ (300W/600V)			CRL : 0.01~20Ω (400W/6V) CRM: 0.36~720Ω (400W/16V) CRH : 1.45~2.9kΩ (400W/80V)		
Resolution *9	0.2435mS			1.322mS		
Accuracy *3	0.1%+0.02S (80V) 0.1%+0.0005S (150V) 0.1%+0.0003S (600V)			0.1%+0.275S (6V) 0.1%+0.036S (16V) 0.1%+0.01375S (80V)		
Constant Voltage Mode						
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Resolution	1mV	10mV	10mV	0.1mV	1mV	1mV
Accuracy	0.05%+0.1%F.S.			0.05%+0.1%F.S.		
Constant Power Mode						
Range	0~6W	0~30W	0~300W	0~8W	0~40W	0~400W
Resolution *9	5.625mW	56.25mW	562.5mW	4mW	40mW	400mW
Accuracy *4	0.3%+0.3%F.S.			0.3%+0.3%F.S.		
Dynamic Mode - CC						
Min. Operating Voltage	3V			1.5V		
Frequency	100Hz~50kHz/0.01Hz~1kHz			100Hz~50kHz/0.01Hz~1kHz		
Duty	1~99% (Min. Rise Time Dominated)			1~99% (Min. Rise Time Dominated)		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew rate	0.03A/ms~0.015A/μs	0.3A/ms~0.15A/μs	3A/ms~1.5A/μs	0.16A/ms~0.08A/μs	1.6A/ms~0.8A/μs	16A/ms~8A/μs
Resolution	0.005mA/μs	0.05mA/μs	0.5mA/μs	0.01mA/μs	0.1mA/μs	1mA/μs
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10 μs			10 μs		
Current						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.005mA	0.05mA	0.5mA	0.01mA	0.1mA	1mA
Ext Wave Mode(20kHz) : CC						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Level	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Measurement						
Voltage Read Back						
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Resolution	1.4194mV	2.661mV	10.645mV	0.1069mV	0.2849mV	1.3537mV
Accuracy *5	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.
Current Read Back						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.00275mA	0.0266mA	0.255mA	0.013695mA	0.138766mA	1.31406mA
Accuracy *5	0.05%+0.05%F.S.			0.05%+0.05%F.S.		
Power Read Back						
Range	0~90W	0~300W	0~300W	0~60W	0~60W	0~400W
Accuracy *5	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Voltage Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Current Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		

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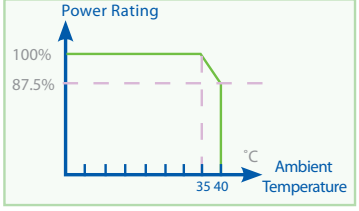
SPECIFICATIONS-2

General		
Program mode		
Sequence No.	100/Program	100/Program
Dwell / SEQ	0.1ms ~ 30s (Resolution : 0.1ms)	0.1ms ~ 30s (Resolution : 0.1ms)
Load Setting	Refer to Static mode specifications	Refer to Static mode specifications
Spec Check	Voltage/Current/Power	Voltage/Current/Power
Protection		
Over Power	Yes	Yes
Over Current	Yes	Yes
Over Voltage Alarm*8	Yes	Yes
Over Temperature	Yes	Yes
Reverse	Yes	Yes
Interface		
USB	Standard	Standard
Ethernet	Optional	Optional
GPIB	Optional	Optional
System BUS	Master/Slave	Master/Slave
Dout		
No. of bits	2 bits per mainframe	2 bits per mainframe
Level - H	1.8V/3.3V/5V switchable	1.8V/3.3V/5V switchable
Level - L	<0.6V@I_{sink}=10mA	<0.6V@I_{sink}=10mA
Drive	Pull_up resistor = 4.7kΩ	Pull_up resistor = 4.7kΩ
Din (TTL Compatible, Rising Edge)		
No. of bits	2 bits per mainframe	2 bits per mainframe
External Trig. for Digitizing		
No. of bits	1 bit per mainframe	1 bit per mainframe
External Trig. for Auto Sequences (TTL Compatible, Rising Edge)		
No. of bits	1 bit per mainframe	1 bit per mainframe
Load ON - O/P		
Level	TTL Compatible, Level, Active High	TTL Compatible, Level, Active High
Short ON - O/P		
No. of channels	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe
Level	TTL Compatible, Level, Active High	TTL Compatible, Level, Active High
Short circuit		
Current *6	Set to 100% of rated current	Set to 100% of rated current
Input Resistance (Load Off)	2MΩ (Typical)	700kΩ (Typical)
Dimensions (HxWxD)	142x86x514mm / 5.6x3.4x20.2 inch	142x86x514mm / 5.6x3.4x20.2 inch
Weight	5kg / 11 lbs	4.5kg / 9.9 lbs
Operating Temperature	0~40˚C	0~40˚C
Storage Temperature	-20~80˚C	-20~80˚C
Power	Supply from mainframe	Supply from mainframe
EMC & Safety	CE	CE

NOTE*1 : The maximum current loading below the minimum operating voltage (0.5V) will follow a derating curve.
NOTE*2 : The 400W power rating of the 63640-80-80 specified at an ambient temperature of 35˚C, please refer to the power rating curve on the right.
NOTE*3 : Does not apply to setting current < 0.25% full scale current in high range. Does not apply to setting current < 0.05% full scale current in low and middle range.
NOTE*4 : The full scale is Vmax x Imax.
NOTE*5 : The DC level measurements are made over a period of 20ms, and does not measure any transient signals in the DC measurements.
NOTE*6 : Its limits are the maximum power and maximum current of the current ragne.
NOTE*7 : The 63600 is guaranteed to meet specified performance at temperature range of 25±5˚C.
NOTE*8 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*9 : Please refer to user's manual for detail specifications, and S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.



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