

IT8700P+

High Speed Multi-channel DC Electronic Load



Your Power Testing Solution

Cal Power

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IT8700P+ High Speed Multi-channel DC Electronic Load



IT8700P+ series high-speed multi-channel DC electronic load is an upgraded version of the original IT8700P series with higher speed and higher precision. Its modules support master-slave paralleling connection for power extension. It's compatible with IT8700P mainframe, the new modules and old modules can work together. The IT8700P+ modules have faster dynamic response and can make the minimum rise time of current less than rising time of minimum current $< 10 \mu s$. In addition, the low internal resistance makes it suitable for low-voltage loading test. Faster loop speed can accurately control current without overshoot which improves test efficiency. Furthermore, it has three current ranges for higher accuracy and lower ripple. The voltage and current measurement speed of this series has been upgraded to 250kHz. It has built-in LAN, USB and RS232 interfaces, and supports SCPI protocol. Therefore, IT8700P+ is good for system integration and is suitable for R&D and production line testing of super capacitors, fuel cells, lithium ion batteries, high-speed AC-DC and DC-DC power supplies such as computer power supplies and communication power supplies.

FEATURE

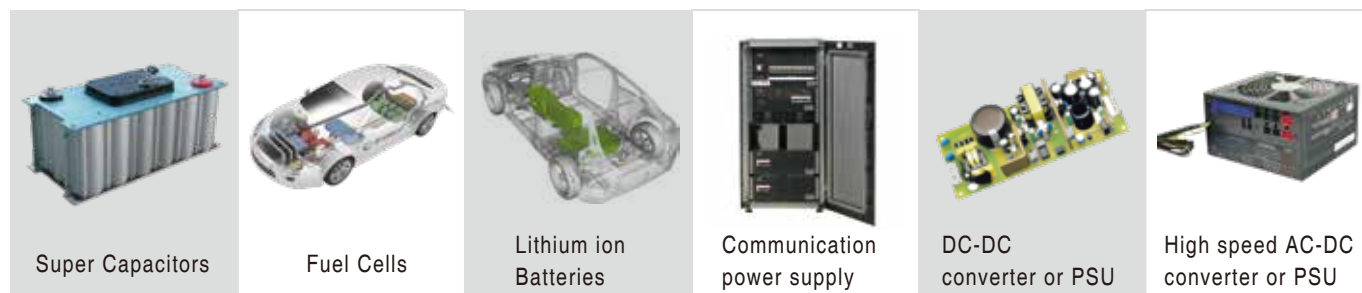
- Three-stage current range, higher accuracy and lower ripple
- Supports master-slave parallel connection of 16-channel modules, flexibly extends power
- Faster dynamic response, minimum current rise time $< 10 \mu s$
- Ultra-low internal resistance, suitable for testing low-voltage capacitors, fuel cells, etc.
- Faster loop speed, precise control of current without overshoot
- The voltage and current measurement speed is upgraded to 250kHz, good for system integration
- Comprehensive protection functions: OVP/OCP/OPP/OTP, Sense protection
- Compatible with IT8700P mainframe, old and new modules can be matched
- Short-circuit peak current measurement function
- Available front/rear terminals*1
- 8 operating modes: CC/ CV/ CR/ CW/ CV+CC/ CR+CC/ CW+CC/ CV+CR (CR-LED)
- Automatic test function to tell whether the test results exceed the set specifications
- Built-in LAN, USB, RS232 interfaces
- CV loop speed is adjustable to match different DUTs
- Multi channel synchronous control

*1 Current is no more than 15A if connecting with front terminals

Model	Voltage	Current	Power
IT8723P+	80 V	45 A	2 x 300 W
IT8732P+	80 V	60 A	400 W
IT8733P+	80 V	120 A	600 W

Main Frame	
IT8701P	Mainframe for 2 modules (including three interfaces)
IT8702P	Mainframe for 4 modules (including three interfaces)
IT8703P	Expansion mainframe for 4 modules

Applications



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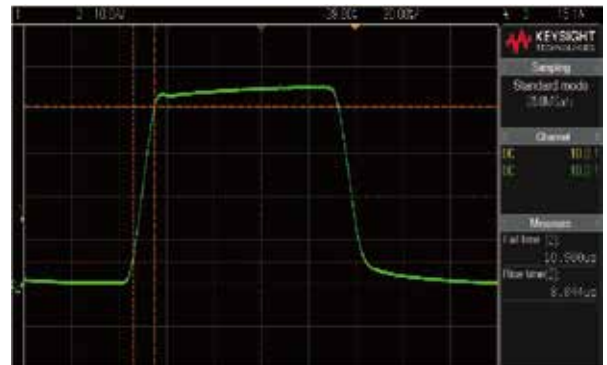
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Flexible modules combination

The IT8700P+ series is designed with removable modules, so that you can choose different modules according to your needs. These modules can work with the original IT8700P series modules too. There are high-performance microprocessor chips in each load module and mainframe. Parallel architecture is adopted to achieve faster testing. The load modules are controlled synchronously by the system, and the power supply with multiple outputs can also be tested synchronously.

Fast dynamic response

Power supplies often have high requirements for instantaneous signals and dynamic response. In order to meet faster and faster testing requirements, IT8700P+ series provides high-speed, programmable dynamic sequence control. The current rise time is no more than 10 μ s, much faster than the last generation. So it can be used for high-speed dynamic test of communication power supply and computer power supply. There are three modes of the dynamic test function, namely continuous mode, pulse mode and toggle mode.



IT8723P+ dynamic current loading from 1A~45A, with slew rate 4.5A/ μ s

Master-slave parallel connection

The IT8700P+ series supports master-slave parallel connection, 8 units (16 channels) at most can be connected in parallel, and the power can be extended to 4800W. Thanks to the flexible power extension, it can be used to test various DUTs and increase equipment utilization. The current sharing mode makes no sacrifice of the dynamic performance after parallel connection.

3 current ranges, well applied to Energy Star standard test for consumer electronics products

IT8700P+ provides 3 current ranges and higher measurement accuracy for DUTs that require high current accuracy like batteries. No need to build a complex test bench, the low current range of the IT8700P+ can be used for Energy Star standard testing in sleep, idle and standby modes of consumer electronics products. Actually it is suitable for almost all consumer electronics products that require precise current setting and measurement at the μ A and mA levels.

Low voltage loading

The parameters can be set under each current range of the IT8700P+ modules. When operating in low and medium ranges, the minimum loading voltage is no more than 0.1V, while in the high current range, the minimum loading voltage at full current is no more than 0.5V. It achieves lower input impedance after parallel connection, which is good for the testing of fuel cells, super capacitors, DC-DC converters and other low-voltage, high-current electronic components.

Fast measurement of I-V characteristic

The voltage and current measurement of IT8700P+ is fast (up to 250kHz). It can be applied to various testing applications such as charging piles, automotive electronics; renewable energy and so on.

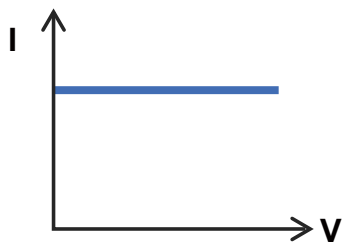


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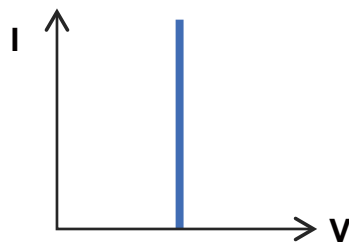
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8 operation modes

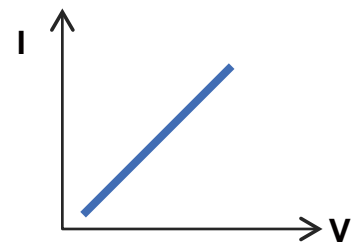
Besides the four basic operation modes of CC/CV/CR/CW, IT8700P+ provides additional 4 compound operation modes : CV/ CC/ CR+CC/CW+CC/CV+CR(CR-LED). Under CV/CR/CW operation mode, the maximum current (I-Limit) is settable. This can effectively solve the problem of instantaneous surge current during testing and avoid triggering DUT's protection, or even burning out or any other injury caused by possible misoperation or environmental factors. So it can be used in various applications.



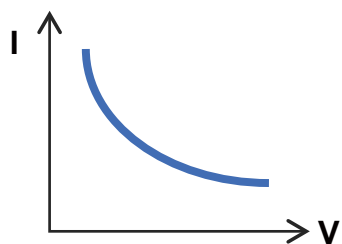
CC



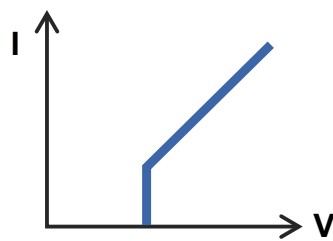
CV



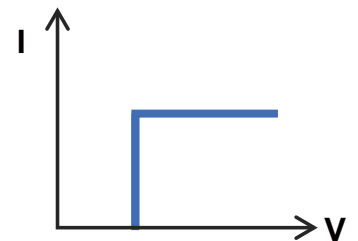
CR



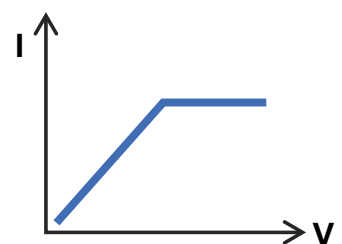
CW



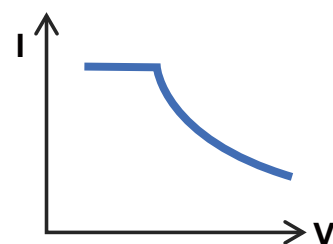
LED(CV+CR)



CV+CC



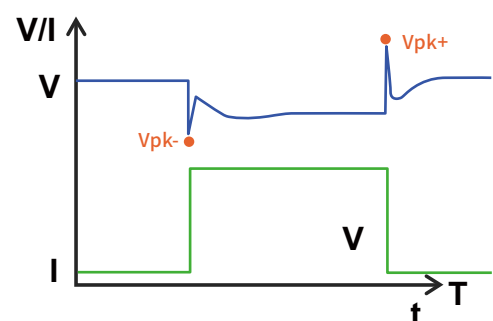
CR+CC



CW+CC

Peak voltage measurement(Vpk)

When measuring the dynamic current of a switching power supply, an oscilloscope was usually necessary to capture the instantaneous voltage and current waveforms and obtain Vpk+ and Vpk- accordingly. But with digital data acquisition function, IT8700P can directly obtain the Vpk+ and Vpk- values without an oscilloscope.



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IT8700P+ Specification

Parameter		IT8723P+		
Rated value	Voltage	0.1~18V		0.1~80V
	Current	0 ~ 0.9A	0 ~ 4.5A	0~45A
	Power	0 ~ 60W	0~300W	
	Resistance	0.05Ω ~ 10Ω		0.05Ω ~ 7500Ω
	Min. resistance	≧ 50mΩ	≧ 15mΩ	
	MOV	0.06V at 0.9A	0.07V at 4.5A	0.7V at 45A
Set resolution	Input leak current	0.06mA		0.2mA
	Voltage	1mV		10mV
	Current	0.1mA	0.1mA	1mA
	Power	10mW		1mA
Readback resolution	Resistance	16bit		
	Voltage	0.1 mV		1 mV
	Current	0.1mA	0.1mA	1mA
Set accuracy	Power	10mW		
	Voltage	±(0.05%+0.025%FS)		±(0.05%+0.025%FS)
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
	Power *3	0.2%+0.2%FS		
Readback accuracy	Resistance *1	0.01%+0.08S *2		0.01%+0.0008S
	Voltage	±(0.025%+0.025%FS)		
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	
	Power	±(0.2%+0.2%FS)		
Set temperature drift coefficient(% of Output/ °C +Offset)	Voltage	≤ 100ppm/°C + 100ppm/°C*FS		
Readback Temperature drift coefficient(% of Output/ °C +Offset)	Current	≤ 100ppm/°C + 100ppm/°C*FS		
	Voltage	≤ 100ppm/°C + 100ppm/°C*FS		
Dynamic response *4	Current	≤ 100ppm/°C + 100ppm/°C*FS		
	Rising	0.0001 ~ 0.09A/uS	0.0001 ~ 0.45A/uS	0.001 ~ 4.5A/uS
	Falling	0.0001 ~ 0.09A/uS	0.0001 ~ 0.45A/uS	0.001 ~ 4.5A/uS
	Min.rising time*5	≧ 10uS	≧ 10uS	≧ 10uS
AC parameter	Dynamic frequency	0.001 ~ 20KHz		
	Voltage	110V ±10% or 220V ±10%		
	Frequency	50/60Hz		
	Imax.	0.3A		
Set stability-30min(% of Output/ °C +Offset)	Power factor	≥ 0.99		
	Voltage	±(0.05%+0.025%FS)		±(0.05%+0.025%FS)
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
	Voltage	±(0.05%+0.025%FS)		±(0.05%+0.025%FS)
Set stability-8h(% of Output/ °C +Offset)	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Readback stability-30min (% of Output/ °C +Offset)	Voltage	±(0.025%+0.025%FS)		
Readback stability-8h (% of Output/ °C +Offset)	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	
	Voltage	±(0.025%+0.025%FS)		±(0.05%+0.05%FS)
Sense voltage	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	
Storage temperature		≤ 2V		
Protection		-20°C ~ 70°C		
	OPP	66W	310W	310W
	OCP	0.99A	4.95A	49.5A
	OVP	18.5V		85V
Interfaces	OTP	95°C		
		Ether Net, GPIB, USB, RS232		
	Isolation(output to ground)	500V/DC/1mA		
	Isolation(input to ground)	1.5KV/AC/5mA		
	Units parallel connected	≤ 16(channel)		
	Protection level	IP20		
	Safety regulation	IEC 61010		
	Cooling	fan		
	Working temperature	0 ~ 40°C		
	Dimension(mm)	82mm*183mm*573mm		
	N.W.	5kg		

*1 Input voltage/current is not less than 10%FS (FS is full scale)

*2 Range of resistance readback value: (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08))

*3 Input voltage/current is not less than 10%FS

*4 The loading current is not less than 2%FS

*5 Minimum rise time: 10%~90% of current rise time

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IT8700P+ High Speed Multi-channel DC Electronic Load

IT8700P+ Specification

Parameter		IT8732P+		
Rated value	Voltage	0.1 ~ 18V		0.1 ~ 80V
	Current	0 ~ 1.2A	0 ~ 6A	0 ~ 60A
	Power	0 ~ 96W	0 ~ 400W	
	Resistance	0.05Ω ~ 10Ω		0.05Ω ~ 7500Ω
	Min. resistance	≧ 50mΩ	≧ 15mΩ	
	MOV	0.06V at 1.2A	0.05V at 6A	0.5V at 60A
Set resolution	Input leak current	0.06mA		0.2mA
	Voltage	1mV		10mV
	Current	0.1mA	0.1mA	1mA
	Power	10mW		16bit
Readback resolution	Resistance	16bit		
	Voltage	0.1 mV		1 mV
	Current	0.1mA	0.1mA	1mA
Set accuracy	Power	10mW		
	Voltage	±(0.05%+0.025%FS)		±(0.05%+0.025%FS)
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
	Power ^{*3}	0.2%+0.2%FS		
Readback accuracy	Resistance ^{*1}	0.01%+0.08S ^{*2}		0.01%+0.0008S
	Voltage	±(0.025%+0.025%FS)		
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	
	Power	±(0.2%+0.2%FS)		
Set temperature drift coefficient(% of Output/ C +Offset)	Voltage	≤ 100ppm/°C + 100ppm/°C*FS		
	Current	≤ 100ppm/°C + 100ppm/°C*FS		
	Voltage	≤ 100ppm/°C + 100ppm/°C*FS		
	Current	≤ 100ppm/°C + 100ppm/°C*FS		
Dynamic response	Rising ^{*4}	0.0001 ~ 0.1A/uS	0.0001 ~ 0.5A/uS	0.001 ~ 5A/uS
	Falling ^{*4}	0.0001 ~ 0.1A/uS	0.0001 ~ 0.5A/uS	0.001 ~ 5A/uS
	Min.rising time ^{*5}	≧ 10uS	≧ 10uS	≧ 10uS
	Dynamic frequency	0.001 ~ 20KHz		
AC parameter	Voltage	110V ±10% or 220V ±10%		
	Frequency	50/60Hz		
	Imax.	0.3A		
	Power factor	≥ 0.99		
Set stability-30min(% of Output/ C +Offset)	Voltage	±(0.05%+0.025%FS)		±(0.05%+0.025%FS)
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Set stability-8h(% of Output/ C +Offset)	Voltage	±(0.05%+0.025%FS)		±(0.05%+0.025%FS)
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
Readback stability-30min (% of Output/ C +Offset)	Voltage	±(0.025%+0.025%FS)		
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	
Readback stability-8h (% of Output/ C +Offset)	Voltage	±(0.025%+0.025%FS)		±(0.05%+0.05%FS)
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	
Sense voltage		≤ 2V		
Storage temperature		-20°C ~ 70°C		
Protection	OPP	100W	410W	410W
	OCP	1.32A	6.6A	66A
	OVP	18.5V		85V
	OTP	95°C		
Interfaces		Ether Net, GPIB, USB, RS232		
Isolation(output to ground)		500V/DC/1mA		
Isolation(input to ground)		1.5KV/AC/5mA		
Units parallel connected		≤ 16(channel)		
Protection level		IP20		
Safety regulation		IEC 61010		
Cooling		fan		
Working temperature		0 ~ 40°C		
Dimension(mm)		82mm*183mm*573mm		
N.W.		5kg		

*1 Input voltage/current is not less than 10%FS (FS is full scale)

*2 Range of resistance readback value: (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08))

*3 Input voltage/current is not less than 10%FS

*4 Rise/fall slew rate: 10%~90% of current rising from 0 to Max.current

*5 Minimum rise time: 10%~90% of current rise time

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IT8700P+ High Speed Multi-channel DC Electronic Load

IT8700P+ Specification

Parameter	IT8733P+		
Rated value	Voltage	0.1 ~ 18V	
	Current	0 ~ 2.4A	0 ~ 12A
	Power	0 ~ 120W	0 ~ 600W
	Resistance	0.05Ω ~ 10Ω	
	Min. resistance	≧ 50mΩ	≧ 13mΩ
	MOV	0.12V at 2.4A	0.15V at 12A
Set resolution	Input leak current	0.06mA	
	Voltage	1mV	
	Current	0.1mA	1mA
	Power	10mW	
Readback resolution	Resistance	16bit	
	Voltage	0.1 mV	
	Current	0.1mA	0.1mA
Set accuracy	Power	10mW	
	Voltage	±(0.05%+0.025%FS)	
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)
	Resistance *1	0.01%+0.08S *2	
Readback accuracy	Power	±(0.05%+0.05%FS)	
	Voltage	±(0.025%+0.025%FS)	
	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)
	Power	±(0.2%+0.2%FS)	
Set temperature drift coefficient(% of Output/ C+Offset)	Voltage	≤ 100ppm/°C + 100ppm/°C*FS	
	Current	≤ 100ppm/°C + 100ppm/°C*FS	
	Voltage	≤ 100ppm/°C + 100ppm/°C*FS	
	Current	≤ 100ppm/°C + 100ppm/°C*FS	
Readback Temperature drift coefficient(% of Output/ C+Offset)	Voltage	≤ 100ppm/°C + 100ppm/°C*FS	
	Current	≤ 100ppm/°C + 100ppm/°C*FS	
	Voltage	≤ 100ppm/°C + 100ppm/°C*FS	
	Current	≤ 100ppm/°C + 100ppm/°C*FS	
Dynamic response	Rising *4	0.0001 ~ 0.1A/uS	0.0001 ~ 0.5A/uS
	Falling *4	0.0001 ~ 0.1A/uS	0.0001 ~ 0.5A/uS
	Min.rising time *5	≧ 10uS	≧ 10uS
	Dynamic frequency	0.001 ~ 20KHz	
AC parameter	Voltage	110V ±10% or 220V ±10%	
	Frequency	50/60Hz	
	I _{max} .	0.3A	
	Power factor	≥ 0.99	
Set stability-30min(% of Output/ C+Offset)	Voltage	±(0.05%+0.025%FS)	
Set stability-8h(% of Output/ C+Offset)	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)
Readback stability-30min(% of Output/ C+Offset)	Voltage	±(0.05%+0.025%FS)	
Readback stability-8h(% of Output/ C+Offset)	Current	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)
Sense voltage	Voltage	≤ 2V	
Storage temperature		-20°C ~ 70°C	
Protection	OPP	125W	610W
	OCP	2.64A	13.2A
	OVP	18.5V	
	OTP	100°C	
Interfaces		Ether Net, GPIB, USB, RS232	
Isolation(output to ground)		500V/DC/1mA	
Isolation(input to ground)		1.5KV/AC/5mA	
Units parallel connected		≤ 16(channel)	
Protection level		IP20	
Safety regulation		IEC 61010	
Cooling		fan	
Working temperature		0 ~ 40°C	
Dimension(mm)		82mm*183mm*573mm	
N.W.		5kg	

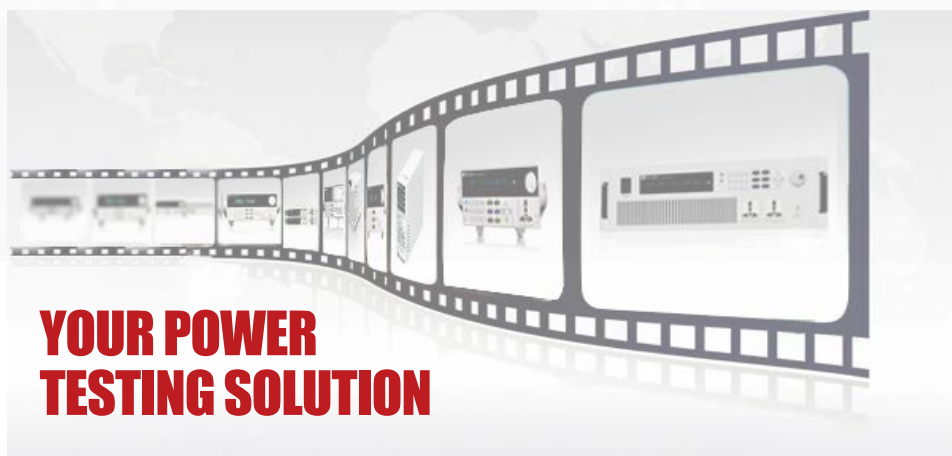
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*2 Range of resistance readback value: (1/(1/R+(1/R)*0.01%+0.08),1/(1/R-(1/R)*0.01%-0.08))

*3 Input voltage/current is not less than 10%FS

*4 Rise/fall slew rate: 10%~90% of current rising from 0 to Max.current

*5 Minimum rise time: 10%~90% of current rise time



This information is subject to change without notice. For more information, please contact ITECH.

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