AGILENT dc ELECTRONIC LOADS

GPIB control of current, voltage, and resistance
GPIB readback of current, voltage, and power
Built-in pulse waveform generation with programmable
amplitude, frequency, duty cycle, and slew rate
Continuous and pulse modes

Full protection from overcurrent, overvoltage, overpower, overtemperature, and reverse polarity

Electronic calibration

Trigger for external synchronization

Analog voltage control in constant

current mode

Parallel units in constant current mode for higher power

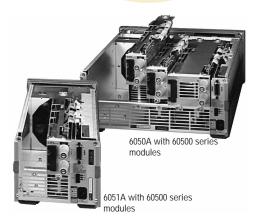
Remote voltage sense in constant voltage mode

Loads available for up to 240 V

Standard three-year warranty

VXIplug&play drivers





Agilent dc Electronic Loads

Agilent dc electronic loads are ideal for the test and evaluation of dc power sources and power components and are well-suited for applications in areas such as manufacturing, research and development, and incoming inspection.

The Agilent One-Box Solution

Agilent single-input loads and load mainframes are equipped with standard GPIB interfaces. This built-in IEEE-488 interface allows complete control of all load functions as well as readback of input voltage, current, power, and detailed operating status. Each stand alone load or load module also includes programming inputs that allow control of load current via an analog voltage. Other system features contributing to the one-box solution concept are internal voltage and current monitors and an internal transient generator with programmable amplitudes, frequency, duty cycle, and slew rate. The one-box solution saves space, cost, and time while making these dc electronic loads easy to integrate into automated test systems.

Agilent dc electronic loads are optimized to address a broad range of dynamic loading applications. They are specifically designed for stability in applications where fast transients are applied to the load inputs, such as during dc power supply startup characterization or transient response testing. Dynamic load performance can be further tailored to specific application needs with the programmable slew rate feature.

Fully-Compatible Operation

These dc electronic loads respond to instructions from the industry-standard SCPI command set. Moreover, the features of these dc electronic loads are fully compatible with one another. For example, test programs developed for 6060B 300 W single-input electronic load or 60502B 300 W single-input load module are interchangeable.

The dc electronic load family is also fully compatible with the 59510A relay accessory (see page 33). The 59510A provides physical isolation of the dc electronic load from the device under test or any other test instrument by switching power and sense leads. Capable of switching up to 60 A and 200 Vdc, the 59510A can be controlled by rear-panel signals on the electronic load.

Battery Testing

The 6050A Option J10, 6051A Option J10 and 6060B Option J10 electronic loads are modified for battery testing. These products provide tri-level pulse loading, to simulate accurate conditions on batteries. They also feature a programmable minimum battery voltage threshold (measured at load terminal). If the voltage of the battery under test falls below this threshold, the load will automatically turn off.

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dc Electronic Loads

6050A 6051A 6060B 6063B 60501B

60504B

60507B

60503B

System or Manual Applications

Agilent dc electronic loads are equally suitable for manual use on the bench. The front-panel LCD meters indicate voltage, current, and power readings. The full-function front-panel keypad allows easy, repeatable, and reliable control of the load when it is used manually. Six volatile user-definable states allow you to easily save settings for later recall. An additional user-definable powerup state allows you to define settings that are remembered when the unit is switched off and then recalled when it is switched on again.

Specifying System Performance

Because Agilent electronic loads feature an integrated GPIB programmer, pulse generator, current shunt, DMM, and cabling, their performance is specified as a system. Specifications cover all the integrated functions as one unit, which eliminates the need to calculate the actual performance of the automated test system based on each component's specification. The one-box solution makes the integration and documentation of your test system fast and easy.

Single-Input Products

The 6060B and 6063B are single-input loads with standard rearpanel inputs. They are also available with optional front-panel inputs in addition to the rear-panel inputs. Front-panel inputs (Option 020) make input connections to the electronic load convenient for bench applications. These front-panel terminals are capable of handling the entire current rating of the load and can accept wire gauges up to AWG#4 (22 mm²). They require no tools to tighten, making the connections quick and easy.

Mainframe Products

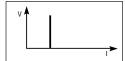
The 6050A 1,800-W and 6051A 600-W electronic load mainframes accept the user-installable load modules for easy system configuration and future reconfiguration, if desired. The 6050A holds up to six 60501B, 60502B, and 60503B load modules, or three 60504B and 60507B load modules, allowing up to 1,800 W of total maximum power. The 6051A holds up to two 60501B, 60502B, 60503B modules, or one 60504B or 60507B module allowing up to 600 W of total maximum power. One GPIB address is all you need for complete control and readback of all load modules within a single mainframe.

Operating Agilent Loads Below the Minimum Input Voltage Specification

Agilent electronic loads meet all specifications when operated above 3.0 \vee ; however, the dc operating characteristics also extend below this minimum-input voltage for static tests. Because of the FET technology used in the power input circuits, these electronic loads have a low minimum-input resistance allowing them to sink high currents even at low voltages.

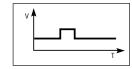
Figure A shows the operating range of a typical Agilent dc electronic load. Notice that low-voltage operation, down to zero volts, is possible at correspondingly-reduced current levels, depending on the minimum resistance of the load. These electronic loads, therefore, can be used in many applications that previously required zero-volt loads.

Constant Current



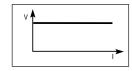
Power Supply Load Regulation Testing Battery Capacity Testing Capacitor Discharging

Pulse and Dynamic Loading



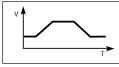
Power Supply Load Transient Response Power Component Testing Pulse Electroplating

Constant Voltage



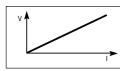
Current Source Testing Current Limit Testing Shunt Regulator

Programmable Slew Rate



Power Supply Testing Power Component Testing Power Supply Load Transient Response

Constant Resistance

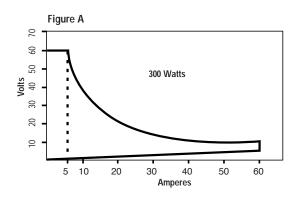


Characterizing Power Supply Crossover Power Supply Start-Up Delay Power Resistor Emulation

Analog Programming



Battery Capacity Testing "Real-life" Load Simulation



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Electronic Loads



AGILENT dc ELECTRONIC LOADS

SPECIFICATIONS

	6060B, 60502B	6063B, 60503B	60501B	60504B	60507B
Amperes	0 to 60 A	0 to 10 A	0 to 30 A	0 to 120 A	0 to 60 A
Volts	3 to 60 V	3 to 240 V	3 to 60 V	3 to 60 V	3 to 150 V
Maximum power (at 40°C)	300 W	250 W	150 W	600 W	500 W
Constant current mode	00011	20011	10011	000 11	000 11
Ranges	0 to 6 A, 0 to 60 A	0 to 1 A, 0 to 10 A	0 to 3 A, 0 to 30 A	0 to 12 A, 0 to 120 A	0 to 6 A, 0 to 60 A
Accuracy	0.1% ±75 mA	0.15% ±10 mA	0.1% ±40 mA	0.12% ±130 mA	0.1% ±80 mA
Regulation	10 mA	8 mA	10 mA	10 mA	10 mA (w/≥3 V at the po
Constant voltage mode					
Accuracy	0.1% ±50 mV	0.12% ±120 mV	0.1% ±50 mV	0.1% ±50 mV	0.1% ±125 mV
Regulation (w/remote sense)	10 mV	10 mV	5 mV	20 mV	10 mV
Constant resistance mode	0.033 to 1.0 Ω	0.20 to 24.0 Ω	0.067 to 2 Ω	0.017 to 0.5 Ω	0.033 to 2.5 Ω
Ranges	1 to 1,000 Ω	24 to 10,000 Ω	2 to 2,000 Ω	0.5 to 500 Ω	2.5 to 2,500 Ω
	10 to 10,000 Ω	240 to 50,000 Ω	20 to 10,000 Ω	5 to 5,000 Ω	25 to 10,000 Ω
Accuracy	1 Ω : 0.8% \pm 8 m Ω	24 Ω: 0.8% ±200 mΩ	2Ω : 0.8%, $\pm 16\mathrm{m}\Omega$	0.5Ω : $0.8\%\pm 5m\Omega$	$2.5~\Omega$: $0.8\%~\pm16~m\Omega$
	(with ≥6 A at input)	(with ≥1 A at input)	(with ≥3 A at input)	(with ≥12 A at input)	(with ≥6 A at input)
	1 KΩ: 0.3% ±8 mS	10 KΩ: 0.3% ±0.3 mS	2 KΩ: 0.3% ±5 mS	500 Ω: 0.3% ±18 mS	2.5 KΩ: 0.3% ±5 mS
	(with ≥6 V at input)	(with ≥24 V at input)	(with ≥6 V at input)	(with ≥6 V at input)	(with ≥15 V at input)
	10 KΩ: 0.3% ±8 mS	50 KΩ: 0.3% ±0.3 mS	10 KΩ: 0.3% ±5 mS	5 KΩ: 0.3% ±18 mS	10 KΩ: 0.3% ±5 mS
Transiant manaratar	(with ≥6 V at input)	(with ≥24 V at input)	(with ≥6 V at input)	(with ≥6 V at input)	(with ≥15 V at input)
Transient generator Frequency range	0.25 Hz to 10 kHz	0.25 Hz to 10 kHz	0.25 Hz to 10 kHz	0.25 Hz to 10 kHz	0.25 Hz to 10 kHz
Accuracy	3%	3%	3%	3%	3%
Duty cycle range	3 to 97% (0.25 Hz to 1 kHz)	3 to 97% (0.25 Hz to 1 kHz)	3 to 97% (0.25 Hz to 1 kHz)	3 to 97% (0.25 Hz to 1 kHz)	3 to 97% (0.25 Hz to 1 k
buty cycle range	6 to 94% (1 to 10 kHz)	6 to 94% (1 to 10 kHz)	6 to 94% (1 to 10 kHz)	6 to 94% (1 to 10 kHz)	6 to 94% (1 to 10 kHz)
Accuracy	6% of setting ±2%	6% of setting ±2%	6% of setting ±2%	6% of setting ±2%	6% of setting ±2%
Current level high range		10-A range:	30-A range:	120-A range:	60-A range:
Accuracy	0.1% ±350 mA	0.18% ±50 mA	0.1% ±200 mA	0.15% ±700 mA	0.1% ±350 mA
Current level low range		1-A range:	3-A range:	12-A range:	6-A range:
Accuracy	0.1% ±80 mA	0.18% ±13 mA	0.1% ±40 mA	0.15% ±160 mA	0.1% ±85 mA
Voltage level	3 to 60 V	3 to 240 V	3 to 60 V	3 to 60 V	3 to 150 V
Voltage level accuracy		0.15% ±1.1 V	0.1% ±300 mV	0.15% ±300 mV	0.15% ±750 mV
Readback specifications		0.1370 ±1.1 V	0.170 ±300 III V	0.1370 ±300 1114	0.1370 ±730 111V
Current readback accuracy		0.12% ±10 mA	0.06% ±40 mA	0.1% ±110 mA	0.1% ±65 mA
Voltage readback accuracy		±(0.1% + 150 mV)	±(0.5% + 45 mV)	±(0.1% + 45 mV)	±(0.17% + 90 mV)
Ripple and noise	±(0.0070 + 10111V)	±(0.170 + 100 III v)	2(0.070 + 101114)	2(0.170 1 10 1114)	2(0.1770 1 701114)
(20-Hz to 10-MHz noise)	4 mA rms	1 mA rms	2 mA rms	6 mA rms	4 mA rms
Current	40 mA peak-to-peak	10 mA peak-to-peak	20 mA peak-to-peak	60 mA peak-to-peak	40 mA peak-to-peak
Voltago					
Voltage	6 mV rms	6 mV rms	5 mV rms	8 mV rms	10 mV rms
		6 mV rms	5 mV rms	8 mV rms	10 mV rms
Supplemental Cha	racteristics (N	6 mV rms on-warranted characteristi	5 mV rms cs determined by design tha	8 mV rms t are useful in applying the	10 mV rms product)
Supplemental Cha	racteristics (N 60-A range: 16 mA	6 mV rms on-warranted characteristi 10-A range: 2.6 mA	5 mV rms cs determined by design tha 30-A range: 8 mA	8 mV rms t are useful in applying the p 120-A range: 32 mA	10 mV rms product) 60-A range: 16 mA
Supplemental Cha Constant current mode Resolution	60-A range: 16 mA 6-A range: 1.6 mA	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA	8 mV rms t are useful in applying the 120-A range: 32 mA 12-A range: 3.2 mA	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA
Supplemental Cha Constant current mode Resolution Temperature coefficient	60-A range: 16 mA 6-A range: 1.6 mA	6 mV rms on-warranted characteristi 10-A range: 2.6 mA	5 mV rms cs determined by design tha 30-A range: 8 mA	8 mV rms t are useful in applying the p 120-A range: 32 mA	10 mV rms product) 60-A range: 16 mA
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Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution	racteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/' C ±1 mA/' C	5 mV rms cs determined by design that 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/' C ±3 mA/' C	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/' C ±8 mA/' C	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/*C ±5 mA/*C
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Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode	100 ppm/'C ±5 mV/'C 1Ω: 0.27 mΩ	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω : 6 m Ω	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/'C ± 8 mA/'C 16 mV 100 ppm/'C ± 5 mV/'C 0.5 Ω : 0.14 m Ω	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ
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Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution	Tracteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 ΚΩ: 0.27 mS 10 KΩ: 0.027 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C ±0.6 mS/'C 10 KΩ: 300 ppm/'C	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/'C \pm 1 mA/'C 64 mV 120 ppm/'C \pm 10 mV/'C 24 Ω : 6 m Ω 10 K Ω : 0.011 mS 50 K Ω : 0.001 mS 24 Ω : 800 ppm/'C \pm 10 m Ω /'C 10 K Ω : 300 ppm/'C \pm 0.3 mS/'C 50 K Ω : 300 ppm/'C	5 mV rms cs determined by design that $30\text{-A range: } 8 \text{ mA}$ $3\text{-A range: } 0.8 \text{ mA}$ $100 \text{ ppm/'C} \pm 3 \text{ mA/'C}$ 16 mV $100 \text{ ppm/'C} \pm 5 \text{ mV/'C}$ 2Ω : $0.54 \text{ m}\Omega$ $2 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.014 MS $10 \text$	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ± 8 mA/°C 16 mV 100 ppm/°C ± 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C ± 0.2 m Ω /°C ± 0.2 m Ω /°C ± 0.2 m Ω /°C 500 Ω : 300 ppm/°C ± 0.2 m Ω /°C 5 K Ω : 300 ppm/°C ± 0.2 m Ω /°C 5 K Ω : 300 ppm/°C	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/*C ±5 mA/*C 40 mV 100 ppm/*C ±5 mV/*C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 Ω: 800 ppm/*C ±0.3 mΩ/*C 10 ΚΩ: 300 ppm/*C 10 ΚΩ: 300 ppm/*C
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient	Tracteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C \pm 5 mA/'C 16 mV 100 ppm/'C \pm 5 mV/'C Ω: 0.27 mΩ 1 KΩ: 0.27 mS 10 KΩ: 0.027 mS 1Ω: 800 ppm/'C \pm 0.4 mΩ/'C 1 KΩ: 300 ppm/'C \pm 0.6 mS/'C \pm 0.6 mS/'C \pm 0.6 mS/'C \pm 0.7 mS \pm 0.8 mS/'C \pm 0	$\begin{array}{l} 6 \text{ mV rms} \\ \text{on-warranted characteristi} \\ 10\text{-A range: } 2.6 \text{ mA} \\ 1\text{-A range: } 0.26 \text{ mA} \\ 150 \text{ ppm/'C } \pm 1 \text{ mA/'C} \\ \\ 64 \text{ mV} \\ 120 \text{ ppm/'C } \pm 10 \text{ mV/'C} \\ 24 \Omega: 6 \text{ m}\Omega \\ 10 \text{ K}\Omega: 0.011 \text{ mS} \\ 50 \text{ K}\Omega: 0.001 \text{ mS} \\ 24 \Omega: 800 \text{ ppm/'C} \\ \pm 10 \text{ m}\Omega/'C \\ 10 \text{ K}\Omega: 300 \text{ ppm/'C} \\ \pm 0.03 \text{ mS/'C} \\ \end{array}$	5 mV rms cs determined by design that $30\text{-A range: } 8 \text{ mA}$ $3\text{-A range: } 0.8 \text{ mA}$ $100 \text{ ppm/'C} \pm 3 \text{ mA/'C}$ 16 mV $100 \text{ ppm/'C} \pm 5 \text{ mV/'C}$ $2 \Omega: 0.54 \text{ m}\Omega$ $2 \text{ K}\Omega: 0.14 \text{ mS}$ $10 \text{ K}\Omega: 0.014 \text{ mS}$ $2 \Omega: 800 \text{ ppm/'C}$ $\pm 0.8 \text{ m}\Omega/\text{'C}$ $2 \text{ K}\Omega: 300 \text{ ppm/'C}$ $\pm 0.5 \text{ m}\Omega/\text{'C}$	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ± 8 mA/°C 16 mV 100 ppm/°C ± 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C ± 0.2 m Ω /°C 500 Ω : 300 ppm/°C ± 0.2 m Ω /°C	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 κΩ: 800 ppm/'C ±0.8 mΩ/'C ±0.8 mΩ/'C ±0.8 mΩ/'C ±0.3 mS/'C
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 ΚΩ: 0.27 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 KΩ: 300 ppm/'C ±0.6 mS/'C 10 KΩ: 300 p	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/'C ±1 mA/'C 64 mV 120 ppm/'C ±10 mV/'C 24 Ω: 6 mΩ 10 ΚΩ: 0.011 mS 50 ΚΩ: 0.001 mS 24 Ω: 800 ppm/'C ±10 mΩ/'C 10 ΚΩ: 300 ppm/'C ±0.03 mS/'C 50 ΚΩ: 300 ppm/'C ±0.03 mS/'C	5 mV rms cs determined by design that 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/'C ±0.8 mΩ/'C 2 KΩ: 300 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C ±0.5 mS/'C	$\begin{array}{l} 8 \text{ mV rms} \\ \text{t are useful in applying the p} \\ 120\text{-A range: } 32 \text{ mA} \\ 12\text{-A range: } 3.2 \text{ mA} \\ 120 \text{ ppm/"C} \pm 8 \text{ mA/"C} \\ \\ 16 \text{ mV} \\ 100 \text{ ppm/"C} \pm 5 \text{ mV/"C} \\ 0.5 \Omega: 0.14 \text{ m} \Omega \\ 500 \Omega: 0.54 \text{ mS} \\ 5 \text{ K} \Omega: 0.054 \text{ mS} \\ 0.5 \Omega: 800 \text{ ppm/"C} \\ \pm 0.2 \text{ m} \Omega \text{/"C} \\ 500 \Omega: 300 \text{ ppm/"C} \\ \pm 1.2 \text{ mS/"C} \\ 5 \text{ K} \Omega: 300 \text{ ppm/"C} \\ \pm 1.2 \text{ mS/"C} \\ \end{array}$	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 Ω: 800 ppm/'C ±0.8 mΩ/'C 2.5 ΚΩ: 300 ppm/'C ±0.3 mS/'C ±0.3 mS/'C
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/' C ±5 mA/' C 16 mV 100 ppm/' C ±5 mV/' C 1 Ω: 0.27 mΩ 1 KΩ: 0.27 mS 10 KΩ: 0.027 mS 1Ω: 800 ppm/' C ±0.4 mΩ/' C 1 KΩ: 300 ppm/' C ±0.6 mS/' C 10 KΩ: 300 ppm/ C ±0.	$\begin{array}{l} 6 \text{ mV rms} \\ \text{on-warranted characteristi} \\ 10\text{-A range: } 2.6 \text{ mA} \\ 1\text{-A range: } 0.26 \text{ mA} \\ 150 \text{ ppm/°C } \pm 1 \text{ mA/°C} \\ 64 \text{ mV} \\ 120 \text{ ppm/°C } \pm 10 \text{ mV/°C} \\ 24 \Omega: 6 \text{ m}\Omega \\ 10 \text{ K}\Omega: 0.011 \text{ mS} \\ 50 \text{ K}\Omega: 0.001 \text{ mS} \\ 24 \Omega: 800 \text{ ppm/°C} \\ \pm 10 \text{ m}\Omega/°C \\ 10 \text{ K}\Omega: 300 \text{ ppm/°C} \\ \pm 0.03 \text{ mS/°C} \\ 50 \text{ K}\Omega: 300 \text{ ppm/°C} \\ \pm 0.03 \text{ mS/°C} \\ \end{array}$	5 mV rms cs determined by design that $30\text{-A range: } 8 \text{ mA}$ $3\text{-A range: } 0.8 \text{ mA}$ $100 \text{ ppm/°C} \pm 3 \text{ mA/°C}$ 16 mV $100 \text{ ppm/°C} \pm 5 \text{ mV/°C}$ $2 \Omega: 0.54 \text{ m}\Omega$ $2 \text{ K}\Omega: 0.14 \text{ mS}$ $10 \text{ K}\Omega: 0.014 \text{ mS}$ $10 \text{ K}\Omega: 0.014 \text{ mS}$ $2 \Omega: 800 \text{ ppm/°C} \pm 0.8 \text{ m}\Omega/°C$ $2 \text{ K}\Omega: 300 \text{ ppm/°C} \pm 0.5 \text{ mS/°C}$ $10 \text{ K}\Omega: 300 \text{ ppm/°C} \pm 0.5 \text{ mS/°C}$ $10 \text{ K}\Omega: 300 \text{ ppm/°C}$ $0.25 \text{ Hz} \text{ to } 10 \text{ kHz}$	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 12-A range: 3.2 mA 120 ppm/°C \pm 8 mA/°C 16 mV 100 ppm/°C \pm 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C \pm 0.2 m Ω /°C 500 Ω : 300 ppm/°C \pm 1.2 mS/°C 5 K Ω : 300 ppm/°C \pm 1.2 mS/°C 0.25 Hz to 10 kHz	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C \pm 5 mA/'C 40 mV 100 ppm/'C \pm 5 mV/'C 2.5 Ω : 0.67 m Ω 2.5 K Ω : 0.10 mS 10 K Ω : 0.01 mS 2.5 Ω : 800 ppm/'C \pm 0.8 m Ω /'C 2.5 K Ω : 300 ppm/'C \pm 0.3 mS/'C 10 K Ω : 300 ppm/'C 0.25 Hz to 10 kHz
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution	Tracteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C \pm 5 mA/'C 16 mV 100 ppm/'C \pm 5 mA/'C 100 ppm/'C \pm 5 mV/'C Ω : 0.27 m Ω 1 K Ω : 0.27 m Ω 1 K Ω : 0.27 m Ω 1 K Ω : 0.027 m Ω 1 C	$\begin{array}{l} 6 \text{ mV rms} \\ \text{on-warranted characteristi} \\ 10\text{-A range: } 2.6 \text{ mA} \\ 1\text{-A range: } 0.26 \text{ mA} \\ 150 \text{ ppm/"C} \pm 1 \text{ mA/"C} \\ 64 \text{ mV} \\ 120 \text{ ppm/"C} \pm 10 \text{ mV/"C} \\ 24 \Omega: 6 \text{ m}\Omega \\ 10 \text{ K}\Omega: 0.011 \text{ mS} \\ 50 \text{ K}\Omega: 0.001 \text{ mS} \\ 24 \Omega: 800 \text{ ppm/"C} \\ \pm 10 \text{ m}\Omega/"\text{C} \\ 10 \text{ K}\Omega: 300 \text{ ppm/"C} \\ \pm 0.03 \text{ mS/"C} \\ 50 \text{ K}\Omega: 300 \text{ ppm/"C} \\ \pm 0.03 \text{ mS/"C} \\ \end{array}$	5mV rms cs determined by design that $30\text{-A range: }8\text{mA}$ $3\text{-A range: }0.8\text{mA}$ $100\text{ppm/'C}\pm3\text{mA/'C}$ 16mV $100\text{ppm/'C}\pm5\text{mV/'C}$ $2\Omega\text{: }0.54\text{m}\Omega$ $2\text{K}\Omega\text{: }0.14\text{mS}$ $10\text{K}\Omega\text{: }0.014\text{mS}$ $2\Omega\text{: }800\text{ppm/'C}$ $\pm0.8\text{m}\Omega\text{/'C}$ $2\text{K}\Omega\text{: }300\text{ppm/'C}$ $\pm0.5\text{m}\Omega\text{/'C}$ $2\text{K}\Omega\text{: }300\text{ppm/'C}$ $\pm0.5\text{m}\Omega\text{/'C}$ $2\text{K}\Omega\text{: }300\text{ppm/'C}$ $\pm0.5\text{m}\Omega\text{/'C}$ $2\text{K}\Omega\text{: }300\text{ppm/'C}$ $\pm0.5\text{m}\Omega\text{/'C}$ $2\text{K}\Omega\text{: }300\text{ppm/'C}$ 0.25Hz to 10kHz $4\%\text{or less}$	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 12-D ppm/°C ± 8 mA/°C 16 mV 100 ppm/°C ± 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C ± 0.2 m Ω /°C 500 Ω : 300 ppm/°C ± 1.2 mS/°C 5 K Ω : 300 ppm/°C ± 1.2 mS/°C 0.25 Hz to 10 kHz 4% or less	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 Ω: 800 ppm/'C ±0.8 mΩ/'C 2.5 KΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 12: 0.27 mΩ 1 KΩ: 0.27 mS 10 KΩ: 0.027 mS 10 KΩ: 0.027 mS 10 KΩ: 0.027 mS 10 KΩ: 300 ppm/'C ±0.6 mS/'C 300	$\begin{array}{l} 6 \text{ mV rms} \\ \text{on-warranted characteristi} \\ 10\text{-A range: } 2.6 \text{ mA} \\ 1\text{-A range: } 0.26 \text{ mA} \\ 150 \text{ ppm/"C} \pm 1 \text{ mA/"C} \\ \\ 64 \text{ mV} \\ 120 \text{ ppm/"C} \pm 10 \text{ mV/"C} \\ 24 \Omega: 6 \text{ m}\Omega \\ 10 \text{ K}\Omega: 0.011 \text{ mS} \\ 50 \text{ K}\Omega: 0.001 \text{ mS} \\ 24 \Omega: 800 \text{ ppm/"C} \\ \pm 10 \text{ m}\Omega/"C} \\ \pm 10 \text{ m}\Omega/"C} \\ 0.03 \text{ mS/"C} \\ \\ 50 \text{ K}\Omega: 300 \text{ ppm/"C} \\ \pm 0.03 \text{ mS/"C} \\ \\ 0.25 \text{ Hz to } 10 \text{ kHz} \\ 4\% \text{ or less} \\ 3 \text{ to } 97\% (0.25 \text{ Hz to } 1 \text{ kHz}) \\ \end{array}$	5 mV rms cs determined by design that 30-A range: 8 mA 3-A range: 0.8 mA $100 \text{ ppm/'C} \pm 3 \text{ mA/'C}$ 16 mV $100 \text{ ppm/'C} \pm 5 \text{ mV/'C}$ 2Ω : $0.54 \text{ m}\Omega$ $2 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.014 mS	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ± 8 mA/°C 16 mV 100 ppm/°C ± 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C ± 0.2 m Ω /°C 500 Ω : 300 ppm/°C ± 1.2 mS/°C 5 K Ω : 300 ppm/°C ± 1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz)	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 300 ppm/'C ±0.8 mΩ/'C 2.5 ΚΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C 40.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Duty cycle range Transient generator Resolution Duty cycle range	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 ΚΩ: 0.27 mS 10 ΚΩ: 0.027 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 KΩ: 300 ppm/'C ±0.6 mS	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/'C \pm 1 mA/'C 64 mV 120 ppm/'C \pm 10 mV/'C 24 Ω : 6 m Ω 10 K Ω : 0.011 mS 50 K Ω : 0.011 mS 24 Ω : 800 ppm/'C \pm 10 m Ω /'C 10 K Ω : 300 ppm/'C \pm 0.3 mS/'C 50 K Ω : 300 ppm/'C \pm 0.03 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz)	5 mV rms cs determined by design that 30 -A range: 8 mA 3 -A range: 0.8 mA 100 ppm/'C ± 3 mA/'C 16 mV 100 ppm/'C ± 5 mV/'C 16 mV 100 ppm/'C ± 5 mV/'C 16 mS 10 KΩ: 10 14 mS 10 KΩ: 10 14 mS 10 KΩ: 10 14 mS 10 KΩ: 10 15 mS/'C 10 KΩ: 10 16 mV/°C 10 KΩ: 10 17 mS/°C 10 KΩ: 10 18 mΩ/°C 10 18 mΩ/°C 10 KΩ: 10 19 ppm/°C 10 KΩ: 10 10 kHz 10 10 kHz 10 10 kHz 10 10 mS/°C	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/'C ± 8 mA/'C 16 mV 100 ppm/'C ± 5 mV/'C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/'C ± 0.2 m Ω /'C 500 Ω : 300 ppm/'C ± 0.2 m Ω /'C 5 K Ω : 300 ppm/'C ± 1.2 mS/'C 5 K Ω : 300 ppm/'C ± 1.2 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz)	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/*C ±5 mA/*C 40 mV 100 ppm/*C ±5 mV/*C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 Ω: 800 ppm/*C ±0.3 mΩ/*C 10 ΚΩ: 300 ppm/*C ±0.3 mS/*C
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 Ω: 0.27 mS 10 KΩ: 0.027 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 KΩ: 300 ppm/'C ±0.6 mS/'C 10 KΩ: 300 ppm/'C ±0.6 mS/	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω : 6 m Ω 10 K Ω : 0.011 mS 50 K Ω : 0.001 mS 24 Ω : 800 ppm/°C ±10 m Ω /°C 10 K Ω : 300 ppm/°C ±0.03 mS/°C 50 K Ω : 300 ppm/°C ±0.03 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 4% 6 to 94% (1 to 10 kHz) 4%	5 mV rms cs determined by design that 30 -A range: 8 mA 3 -A range: 0.8 mA 100 ppm/'C ± 3 mA/ 'C 16 mV 100 ppm/'C ± 5 mV/'C 2 2 Ω : 0.54 m Ω 2 K Ω : 0.14 mS 10 K Ω : 0.14 mS 10 K Ω : 0.014 mS 10 C 10 K Ω : 0.014 mS 10	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ± 8 mA/°C 16 mV 100 ppm/°C ± 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C ± 0.2 m Ω /°C 500 Ω : 300 ppm/°C ± 0.2 m Ω /°C 500 Ω : 300 ppm/°C ± 1.2 mS/°C 5 K Ω : 300 ppm/°C ± 1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4%	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 300 ppm/'C ±0.3 mΩ/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution Current level high range	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 Ω: 0.027 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 KΩ: 300 ppm/'C ±0.6 mS/'C ±0.6	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω : 6 m Ω 10 K Ω : 0.011 mS 50 K Ω : 0.001 mS 24 Ω : 800 ppm/°C ±10 m Ω /°C 10 K Ω : 300 ppm/°C ±0.03 mS/°C 50 K Ω : 300 ppm/°C ±0.03 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range:	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/°C ±3 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/°C ±0.8 mΩ/°C 2 KΩ: 300 ppm/°C ±0.5 mS/°C 10 KΩ: 300 ppm/°C ±0.5 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 4% 30-A range:	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 12-A range: 3.2 mA 120 ppm/°C \pm 8 mA/°C 16 mV 100 ppm/°C \pm 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C \pm 0.2 m Ω /°C 500 Ω : 300 ppm/°C \pm 1.2 mS/°C 5 K Ω : 300 ppm/°C \pm 1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 4% 120-A range:	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 KΩ: 0.10 mS 10 KΩ: 0.01 mS 2.5 Ω: 800 ppm/'C ±0.8 mΩ/'C 2.5 KΩ: 300 ppm/'C ±0.3 mS/'C 10 KΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range:
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Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range	Name		5 mV rms cs determined by design tha 30-A range : 8 mA 3-A range : 0.8 mA $100 \text{ ppm/'C} \pm 3 \text{ mA/'C}$ 16 mV $100 \text{ ppm/'C} \pm 5 \text{ mV/'C}$ 2Ω : $0.54 \text{ m}\Omega$ $2 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.014 mS 2Ω : 800 ppm/'C $\pm 0.8 \text{ m}\Omega$ /'C $2 \text{ K}\Omega$: 300 ppm/'C $\pm 0.5 \text{ m}S$ /'C $10 \text{ K}\Omega$: 300 ppm/'C $\pm 0.5 \text{ m}S$ /'C $10 \text{ K}\Omega$: 300 ppm/'C $10 \text{ m}\Omega$: 1	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ±8 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 0.5 Ω: 0.14 mΩ 500 Ω: 0.54 mS 5 KΩ: 0.054 mS 0.5 Ω: 800 ppm/°C ±0.2 mΩ/°C 500 Ω: 300 ppm/°C ±1.2 mS/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 120-A range: 520 mA 12-A range:	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 300 ppm/'C ±0.8 mΩ/'C 2.5 ΚΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 260 mA 6-A range:
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Duty cycle range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range Resolution	Tracteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 Ω: 0.27 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 KΩ: 300 p	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/'C ±1 mA/'C 64 mV 120 ppm/'C ±10 mV/'C 24 Ω: 6 mΩ 10 KΩ: 0.011 mS 50 KΩ: 0.001 mS 24 Ω: 800 ppm/'C ±10 mΩ/'C 50 KΩ: 300 ppm/'C ±0.03 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range: 43 mA 1-A range: 4 mA	5 mV rms cs determined by design that 30-A range : 8 mA 3-A range : 0.8 mA $100 \text{ ppm/'C} \pm 3 \text{ mA/'C}$ 16 mV $100 \text{ ppm/'C} \pm 5 \text{ mV/'C}$ 2Ω : $0.54 \text{ m}\Omega$ $2 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.14 mS $10 \text{ K}\Omega$: 0.014 mS 2Ω : 800 ppm/'C $2 \text{ K}\Omega$: 300 ppm/'C $2 \text{ L}\Omega$: 300 ppm/'C $2 \text{ L}\Omega$: 300 ppm/'C 300 Pm/'C $300 Pm$	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ±8 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 0.5 Ω: 0.14 mΩ 500 Ω: 0.54 mS 5 KΩ: 0.054 mS 0.5 Ω: 800 ppm/°C ±0.2 mΩ/°C 500 Ω: 300 ppm/°C ±1.2 mS/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 120-A range: 520 mA 12-A range: 52 mA	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 300 ppm/'C ±0.8 mΩ/'C 2.5 ΚΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 260 mA 6-A range: 26 mA
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range Resolution Current level low range Resolution Current temperature coefficient	Tracteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 ΚΩ: 0.27 mS 10 ΚΩ: 0.027 mS 1 Ω: 800 ppm/'C ±0.4 mΩ/'C 1 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 KΩ: 300 ppm/'C ±0.6 mS/'C 10 KHz	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/'C ±1 mA/'C 64 mV 120 ppm/'C ±10 mV/'C 24 Ω: 6 mΩ 10 KΩ: 0.011 mS 50 KΩ: 0.001 mS 24 Ω: 800 ppm/'C ±10 mΩ/'C 50 KΩ: 300 ppm/'C ±0.03 mS/'C 50 KΩ: 300 ppm/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range: 43 mA 1-A range: 4 mA 180 ppm/'C ±1.2 mA/'C	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C 2 M: 300 ppm/'C spm/'C	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ±8 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 0.5 Ω: 0.14 mΩ 500 Ω: 0.54 mS 5 KΩ: 0.054 mS 0.5 Ω: 800 ppm/°C ±0.2 mΩ/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 120-A range: 520 mA 12-A range: 52 mA 150 ppm/°C ±10 mA/°C	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 Ω: 800 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 260 mA 6-A range: 26 mA
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range Resolution Current level low range Resolution Current temperature coefficient Voltage level resolution	Tacteristics (N 60-A range: 16 mA 6-A range: 1.6 mA 100 ppm/'C ±5 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 1 Ω: 0.27 mΩ 1 ΚΩ: 0.27 mS 10 ΚΩ: 0.027 mS 10 ΚΩ: 0.027 mS 10 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 ΚΩ: 300 ppm/'C ±0.6 mS/'C 10 KΩ: 300 ppm/'C ±0.6 mS/'C 10 KHz 10	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω: 6 mΩ 10 KΩ: 0.011 mS 50 KΩ: 0.001 mS 24 Ω: 800 ppm/°C ±10 mΩ/°C 10 KΩ: 300 ppm/°C ±0.03 mS/°C 50 KΩ: 300 ppm/°C ±0.03 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range: 4 mA 180 ppm/°C ±1.2 mA/°C 1 V	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/'C ±0.8 mΩ/'C 2 KΩ: 300 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C ±0.5 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 30-A range: 130 mA 3-A range: 13 mA 100 ppm/'C ±5 mA/'C 260 mV	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 12-A range: 3.2 mA 120 ppm/°C \pm 8 mA/°C 16 mV 100 ppm/°C \pm 5 mV/°C 0.5 Ω : 0.14 m Ω 500 Ω : 0.54 mS 5 K Ω : 0.054 mS 5 K Ω : 0.054 mS 0.5 Ω : 800 ppm/°C \pm 1.2 m Ω /°C 500 Ω : 300 ppm/°C \pm 1.2 mS/°C 5 K Ω : 300 ppm/°C \pm 1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 4% 120-A range: 520 mA 150 ppm/°C \pm 10 mA/°C 260 mV	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 Ω: 800 ppm/'C ±0.3 mΩ/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 260 mA 150 ppm/'C ±5 mA/'C 650 mV
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Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range Resolution	Name	6 mV rms On-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω: 6 mΩ 10 KΩ: 0.011 mS 50 KΩ: 0.001 mS 24 Ω: 800 ppm/°C ±10 mΩ/°C 10 KΩ: 300 ppm/°C ±0.03 mS/°C 50 KΩ: 300 ppm/°C ±0.03 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range: 43 mA 1-A range: 4 mA 180 ppm/°C ±1.2 mA/°C 1V 10-A range: 0.17 A/ms to 0.83 A/µs	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/'C ±0.8 mΩ/'C 2 KΩ: 300 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C ±0.5 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 30-A range: 130 mA 3-A range: 130 mA 100 ppm/'C ±5 mA/'C 260 mV 150 ppm/'C ±5 mV/'C 30-A range: 0.5 A/ms to 2.5 A/µs	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ±8 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 0.5 Ω: 0.14 mΩ 500 Ω: 0.54 mS 5 KΩ: 0.054 mS 0.5 Ω: 800 ppm/°C ±0.2 mΩ/°C 500 Ω: 300 ppm/°C ±1.2 mS/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 120-A range: 520 mA 150 ppm/°C ±10 mA/°C 260 mV 150 ppm/°C ±5 mV/°C 120-A range: 2 A/ms to 10 A/µs	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/' C ±5 mA/' C 40 mV 100 ppm/' C ±5 mV/' C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 300 ppm/' C ±0.3 mS/' C 10 ΚΩ: 300 ppm/' C ±0.3 mS/' C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 26 mA 150 ppm/' C ±5 mA/' C 650 mV 150 ppm/' C ±5 mV/' C 60-A range: 1 A/ms to 5 A/μs
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Duty cycle range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range Resolution	Name	6 mV rms on-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω: 6 mΩ 10 KΩ: 0.011 mS 50 KΩ: 0.001 mS 24 Ω: 800 ppm/°C ±10 mΩ/°C 50 KΩ: 300 ppm/°C ±0.03 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range: 4 mA 1-A range: 4 mA 180 ppm/°C ±1.2 mA/°C 1V 120 ppm/°C ±10 mV/°C 10-A range: 0.17 A/ms to 0.83 A/μs 1-A range:	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/'C ±0.8 mΩ/'C 2 KΩ: 300 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C ±0.5 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 3-A range: 130 mA 3-A range: 130 mA 100 ppm/'C ±5 mA/'C 260 mV 150 ppm/'C ±5 mV/'C 30-A range: 0.5 A/ms to 2.5 A/μs 3-A range:	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ±8 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 0.5 Ω: 0.14 mΩ 500 Ω: 0.54 mS 5 KΩ: 0.054 mS 0.5 Ω: 800 ppm/°C ±0.2 mΩ/°C 500 Ω: 300 ppm/°C ±1.2 mS/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 120-A range: 52 mA 150 ppm/°C ±10 mA/°C 260 mV 150 ppm/°C ±5 mV/°C 120-A range: 2 A/ms to 10 A/µs 12-A range:	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/'C ±5 mA/'C 40 mV 100 ppm/'C ±5 mV/'C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 300 ppm/'C ±0.8 mΩ/'C 2.5 ΚΩ: 300 ppm/'C ±0.3 mS/'C 10 ΚΩ: 300 ppm/'C ±0.3 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 260 mA 6-A range: 26 mA 150 ppm/'C ±5 mA/'C 60-A range: 1 A/ms to 5 A/μs 6-A range:
Supplemental Cha Constant current mode Resolution Temperature coefficient Constant voltage mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Constant resistance mode Resolution Temperature coefficient Transient generator Frequency range Resolution Duty cycle range Resolution Current level high range Resolution Current level low range Resolution	Name	6 mV rms On-warranted characteristi 10-A range: 2.6 mA 1-A range: 0.26 mA 150 ppm/°C ±1 mA/°C 64 mV 120 ppm/°C ±10 mV/°C 24 Ω: 6 mΩ 10 KΩ: 0.011 mS 50 KΩ: 0.001 mS 24 Ω: 800 ppm/°C ±10 mΩ/°C 10 KΩ: 300 ppm/°C ±0.03 mS/°C 50 KΩ: 300 ppm/°C ±0.03 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 10-A range: 43 mA 1-A range: 4 mA 180 ppm/°C ±1.2 mA/°C 1V 10-A range: 0.17 A/ms to 0.83 A/µs	5 mV rms cs determined by design tha 30-A range: 8 mA 3-A range: 0.8 mA 100 ppm/'C ±3 mA/'C 16 mV 100 ppm/'C ±5 mV/'C 2 Ω: 0.54 mΩ 2 KΩ: 0.14 mS 10 KΩ: 0.014 mS 2 Ω: 800 ppm/'C ±0.8 mΩ/'C 2 KΩ: 300 ppm/'C ±0.5 mS/'C 10 KΩ: 300 ppm/'C ±0.5 mS/'C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 30-A range: 130 mA 3-A range: 130 mA 100 ppm/'C ±5 mA/'C 260 mV 150 ppm/'C ±5 mV/'C 30-A range: 0.5 A/ms to 2.5 A/µs	8 mV rms t are useful in applying the p 120-A range: 32 mA 12-A range: 3.2 mA 120 ppm/°C ±8 mA/°C 16 mV 100 ppm/°C ±5 mV/°C 0.5 Ω: 0.14 mΩ 500 Ω: 0.54 mS 5 KΩ: 0.054 mS 0.5 Ω: 800 ppm/°C ±0.2 mΩ/°C 500 Ω: 300 ppm/°C ±1.2 mS/°C 5 KΩ: 300 ppm/°C ±1.2 mS/°C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4% 120-A range: 520 mA 150 ppm/°C ±10 mA/°C 260 mV 150 ppm/°C ±5 mV/°C 120-A range: 2 A/ms to 10 A/µs	10 mV rms product) 60-A range: 16 mA 6-A range: 1.6 mA 120 ppm/' C ±5 mA/' C 40 mV 100 ppm/' C ±5 mV/' C 2.5 Ω: 0.67 mΩ 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 0.01 mS 2.5 ΚΩ: 0.10 mS 10 ΚΩ: 300 ppm/' C ±0.8 mΩ/' C 2.5 ΚΩ: 300 ppm/' C ±0.3 mS/' C 10 ΚΩ: 300 ppm/' C ±0.3 mS/' C 0.25 Hz to 10 kHz 4% or less 3 to 97% (0.25 Hz to 1 k 6 to 94% (1 to 10 kHz) 4% 60-A range: 260 mA 150 ppm/' C ±5 mA/' C 650 mV 150 ppm/' C ±5 mV/' C 60-A range: 1 A/ms to 5 A/µs

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Supplemental Characteristics (cont'd)

bandwidth Analog programming accuracy Current (low range) 4.59 Temperature coefficient 100 Voltage 0.89 Temperature coefficient 100 Analog programming voltage Readback specifications 17 nc 20	% ±200 mV) ppm/'C ±1 mV/'C 10 10 V mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel)	10 kHz (-3 dB frequency) 3% ±8 mA 3% ±20 mA 150 ppm/°C ±1 mA/°C 0.5% ±150 mV 120 ppm/°C ±10 mV/°C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	10 kHz (-3 dB frequency) 4.5% ±40 mA 4.5% ±130 mA 100 ppm/° C ±3 mA/° C 0.8% ±200 mV 100 ppm/° C ±1 mV/° C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/° C ±3 mA/° C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/° C ±1.2 mV/° C	10 kHz (-3 dB frequency) 4% ±200 mA 4% ±400 mA 100 ppm/°C ±12 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel)	10 kHz (-3 dB frequency) 4.5% ±75 mA 4.5% ±200 mA 150 ppm/'C ±6 mA/'C 0.8% ±375 mV 120 ppm/'C ±12.5 mV/'C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/'C ±5 mA/'C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/'C ±5 mV/'C		
Accuracy	% ±250 mA D ppm/'C ±6 mA/'C % ±200 mV D ppm/'C ±1 mV/'C D 10 V mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C D ±85 mA	3% ±20 mA 150 ppm/°C ±1 mA/°C 0.5% ±150 mV 120 ppm/°C ±10 mV/°C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	4.5% ±130 mA 100 ppm/°C ±3 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/°C ±3 mA/°C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	4% ±400 mA 100 ppm/°C ±12 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	4.5% ±200 mA 150 ppm/' C ±6 mA/' C 0.8% ±375 mV 120 ppm/' C ±12.5 mV/' C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/' C ±5 mA/' C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/' C ±5 mV/' C		
Current (low range) 4.59 Current (high range) 4.59 Temperature coefficient 100 Voltage 0.89 Temperature coefficient 100 Analog programming 0 to 0 t	% ±250 mA D ppm/'C ±6 mA/'C % ±200 mV D ppm/'C ±1 mV/'C D 10 V mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C D ±85 mA	3% ±20 mA 150 ppm/°C ±1 mA/°C 0.5% ±150 mV 120 ppm/°C ±10 mV/°C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	4.5% ±130 mA 100 ppm/°C ±3 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/°C ±3 mA/°C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	4% ±400 mA 100 ppm/°C ±12 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	4.5% ±200 mA 150 ppm/' C ±6 mA/' C 0.8% ±375 mV 120 ppm/' C ±12.5 mV/' C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/' C ±5 mA/' C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/' C ±5 mV/' C		
Current (high range) 4.59 Temperature coefficient 100 Voltage 0.89 Temperature coefficient 100 Analog programming 0 to voltage Readback specifications 17 in Current readback resolution 20 in Temperature coefficient 50 p. 20 in Temperature coeffic	% ±250 mA D ppm/'C ±6 mA/'C % ±200 mV D ppm/'C ±1 mV/'C D 10 V mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C D ±85 mA	3% ±20 mA 150 ppm/°C ±1 mA/°C 0.5% ±150 mV 120 ppm/°C ±10 mV/°C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	4.5% ±130 mA 100 ppm/°C ±3 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/°C ±3 mA/°C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	4% ±400 mA 100 ppm/°C ±12 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	4.5% ±200 mA 150 ppm/'C ±6 mA/'C 0.8% ±375 mV 120 ppm/'C ±12.5 mV/'C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/'C ±5 mA/'C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/'C ±5 mV/'C		
Temperature coefficient 100 Voltage 0.89 Temperature coefficient 100 Analog programming 0 to voltage Readback specifications 17 nr Current readback resolution 20 nr Temperature coefficient 50 pr Temperature coefficie	D ppm/'C ±6 mA/'C % ±200 mV D ppm/'C ±1 mV/'C D 10 V mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C D ±85 mA	150 ppm/'C ±1 mA/'C 0.5% ±150 mV 120 ppm/'C ±10 mV/'C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/'C ±1 mA/'C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/'C ±8 mV/'C 3% ±10 mA	100 ppm/°C ±3 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/°C ±3 mA/°C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	100 ppm/°C ±12 mA/°C 0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	150 ppm/°C ±6 mA/°C 0.8% ±375 mV 120 ppm/°C ±12.5 mV/°C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/°C ±5 mA/°C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±5 mV/°C		
Voltage 0.89 Temperature coefficient 100 Analog programming 0 to voltage Readback specifications 17 rn Temperature coefficient 50 rg Voltage readback resolution 17 rn 20 rn Temperature coefficient 50 rg Temperature coefficient 50 rg Analog monitor accuracy Current monitor (0 to 10 V out) 49% Temperature coefficient 50 rg Temperature coefficient 50 rg Temperature coefficient 50 rg Temperature coefficient 50 rg Remote sensing 5- V. Minimum operating voltage (at full rated current)	% ±200 mV D ppm/°C ±1 mV/°C D 10 V mA (via HP-IB) mA (front panel) ppm/°C ±5 mA/°C mV (via HP-IB) mV (front panel) ppm/°C ±1.2 mV/°C D ±85 mA	0.5% ±150 mV 120 ppm/°C ±10 mV/°C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/°C ±3 mA/°C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	0.8% ±200 mV 100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	0.8% ±375 mV 120 ppm/' C ±12.5 mV/' C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/' C ±5 mA/' C 40 mV (via HP-IB) 100 mpm/' C ±5 mV/' C		
Temperature coefficient 100 Analog programming 0 to voltage Readback specifications 17 rr Current readback resolution 20 rr Temperature coefficient 50 rr Analog monitor accuracy Current monitor (0 to 10 V out) 10 to 10 V out) 10 to 10 V out 10 V out 10 to 10 V out 10	Dppm/'C ±1 mV/'C D 10 V mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C D ±85 mA	120 ppm/' C ±10 mV/' C 0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/' C ±1 mA/' C 67 mV (via HP-IB) 100 ppm/' C ±8 mV/' C 3% ±10 mA	100 ppm/° C ±1 mV/° C 0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/° C ±3 mA/° C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/° C ±1.2 mV/° C	100 ppm/°C ±1 mV/°C 0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	120 ppm/'C ±12.5 mV/'C 0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/'C ±5 mA/'C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/'C ±5 mV/'C		
Analog programming voltage Readback specifications 17 n Current readback resolution 20 n Temperature coefficient 50 p Voltage readback resolution 17 n 20 n Temperature coefficient 50 p Analog monitor accuracy Current monitor (0 to 10 V out) 50 p Voltage monitor (0 to 10 V out) 0.12 p Temperature coefficient 50 p Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage (at full rated current)	mA (via HP-IB) mA (front panel) ppm/*C ±5 mA/*C mV (via HP-IB) mV (front panel) ppm/*C ±1.2 mV/*C ±85 mA	0 to 10 V 2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	0 to 10 V 9 mA (via HP-IB) 10 mA (front panel) 65 ppm/*C ±3 mA/*C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/*C ±1.2 mV/*C	0 to 10 V 34 mA (via HP-IB) 100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	0 to 10 V 17 mA (via HP-IB) 20 mA (front panel) 100 ppm/*C ±5 mA/*C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/*C ±5 mV/*C		
voltage Readback specifications 17 m Current readback resolution 2 on 17 m Temperature coefficient 50 p Voltage readback resolution 17 m 20 m Temperature coefficient 50 p Analog monitor accuracy Current monitor (0 to 10 V out) 49% Temperature coefficient 50 p Voltage monitor (0 to 10 V out) 0.25 Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage (at full rated current)	mA (via HP-IB) mA (front panel) ppm/'C ±5 mA/'C mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C	2.7 mA (via HP-IB) 10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	9 mA (via HP-IB) 10 mA (front panel) 65 ppm/* C ±3 mA/* C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/* C ±1.2 mV/* C	34 mA (via HP-IB) 100 mA (front panel) 100 ppm/*C ±8 mA/*C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/*C ±2 mV/*C	17 mA (via HP-IB) 20 mA (front panel) 100 ppm/°C ±5 mA/°C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±5 mV/°C		
Current readback resolution 20 m Temperature coefficient 50 m Temperature coefficient 70 m Temperature coefficient 50 m Temperature	mA (front panel) ppm/"C ±5 mA/"C mV (via HP-IB) mV (front panel) ppm/"C ±1.2 mV/"C	10 mA (front panel) 100 ppm/°C ±1 mA/°C 67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	10 mA (front panel) 65 ppm/°C ±3 mA/°C 17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	100 mA (front panel) 100 ppm/°C ±8 mA/°C 20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	20 mA (front panel) 100 ppm/*C ±5 mA/*C 40 mV (via HP-IB) 100 mV (front panel) 100 ppm/*C ±5 mV/*C		
Voltage readback resolution 17 m 20 n 20 n Temperature coefficient 50 p Analog monitor accuracy 4% Current monitor (0 to 10 V out) 4% Temperature coefficient 50 p Voltage monitor (0 to 10 V out) 0.25 Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage 2 vc (at full rated current) 2 vc	mV (via HP-IB) mV (front panel) ppm/'C ±1.2 mV/'C	67 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	17 mV (via HP-IB) 20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	20 mV (via HP-IB) 20 mV (front panel) 100 ppm/°C ±2 mV/°C	40 mV (via HP-IB) 100 mV (front panel) 100 ppm/°C ±5 mV/°C		
Temperature coefficient 50 p. Analog monitor accuracy Current monitor (0 to 10 V out) 49% Temperature coefficient 50 p. Voltage monitor (0 to 10 V out) 50 p. Temperature coefficient 50 p. Remote sensing 5- V. Minimum operating voltage (at full rated current)	mV (front panel) ppm/°C ±1.2 mV/°C 5 ±85 mA	100 mV (front panel) 100 ppm/°C ±8 mV/°C 3% ±10 mA	20 mV (front panel) 50 ppm/°C ±1.2 mV/°C	20 mV (front panel) 100 ppm/°C ±2 mV/°C	100 mV (front panel) 100 ppm/°C ±5 mV/°C		
Analog monitor accuracy Current monitor (0 to 10 V out) 49% Temperature coefficient 50 p Voltage monitor (0 to 10 V out) 0.25 Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage (at full rated current)	±85 mA	3% ±10 mA					
Current monitor (0 to 10 V out) 4% Temperature coefficient 50 p Voltage monitor (0 to 10 V out) 0.25 Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage (at full rated current) 2 vc			4% +40 mA	40/ 470 - 4	20/ . OF A		
Temperature coefficient 50 p Voltage monitor (0 to 10 V out) 0.25 Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage (at full rated current)			4% +40 mA	40/ 470 4	20/ .05 4		
Voltage monitor (0 to 10 V out) 0.25 Temperature coefficient 50 p Remote sensing 5-V Minimum operating voltage (at full rated current)	nnm/°C +6 mΔ/°C			4% ±170 mA	3% ±85 MA		
Temperature coefficient 50 p Remote sensing 5-Vi Minimum operating voltage 2 vo (at full rated current)	ppin o ±o mA/ o	100 ppm/°C ±1 mA/°C	60 ppm/°C ±3 mA/°C	100 ppm/°C ±10 mA/°C	100 ppm/°C ±6 mA/°C		
Remote sensing 5-V Minimum operating voltage 2 voltated (at full rated current)	5% ±40 mV	0.4% ±240 mV	0.25% ±40 mV	0.4% ±60 mV	0.4% ±120 mV		
Minimum operating voltage 2 vo (at full rated current)	ppm/°C ±0.2 mV/°C	70 ppm/°C ±1.2 mV/°C	50 ppm/°C ±0.2 mV/°C	100 ppm/°C ±2 mV/°C	100 ppm/°C ±5 mV/°C		
(at full rated current)	5-Vdc maximum between sense and load input						
D 11 1 1 0.00	olts (1.2 V typical)	2 volts (1.2 V typical)	2 volts (1.2 V typical)	2 volts (1.4 V typical)	2 volts (1.4 V typical)		
Programmable short 0.03	33 Ω (0.020 Ω typical)	0.20 Ω (0.10 Ω typical)	0.066 Ω (0.040 Ω typical)	0.017 Ω (0.012 Ω typical)	0.033 Ω (0.025 Ω typical)		
Programmable open 20 k (typical)	kΩ	80 kΩ	20 kΩ	20 kΩ	20 kΩ		
Drift (over 8-hour interval)							
Current 0.03	3% ±10 mA	0.03% ±15 mA	0.03% ±5 mA	0.03% ±20 mA	0.03% ±10 mA		
Voltage 0.01	1% ±10 mV	0.01% ±20 mV	0.01% ±10 mV	0.01% ±10 mV	0.01% ±25 mV		
dc isolation voltage ±24	±240 Vdc, between any input and chassis ground						
Digital inputs V. =	$V_{H} = 0.9 \text{ V max at } I_{H} = -1 \text{ mA} / V_{H} = 3.15 \text{ V min (pull-up resistor on input)}$						
Digital outputs Vol.	$V_{\text{OL}} = 0.72 \text{ V max at } I_{\text{OL}} = 1 \text{ mA} / V_{\text{OH}} = 4.4 \text{ V min at } I_{\text{OH}} = -20 \mu\text{A}$						
Net weight 606	60B: 6.12 kg (13.5 lb)	6063B: 6.12 kg (13.5 lb)	3.2 kg (7 lb)	5.4 kg (13 lb)	5.4 kg (13 lb)		
	502B: 3.2 kg (7 lb)	60503B: 3.2 kg (7 lb)] ,	",] ,		
Shipping weight 6066		6063B: 8.16 kg (18 lb)	4.5 kg (10 lb)	7.3 kg (16 lb)	7.3 kg (16 lb)		

Notes: 1. Operating temperature range is 0° to 55° C. All specifications apply for 25° C ±5° C, except as noted.

2. Maximum continuous power available is derated linearly from 40° C to 75% of maximum at 55° C.
3. DC current accuracy specifications apply 30 seconds after input is applied.

Net Weight: 6050A: 9.5 kg (21 lb); 6051A: 5.5 kg (12 lb) Shipping Weight: 6050A: 13.6 kg (30 lb); 6051A: 7.5 kg (17 lb)

6050A: 425.5 mm W x 177 mm H x 624.7 mm D $(16.75 \text{ in } \times 7 \text{ in } \times 24.6 \text{ in})$ 6051A: 213 mm W x 177 mm H x 624.7 mm D (8.4 in x 7 in x 24.6 in)6060B, 6063B: 425.5 mm W x 88.1 mm H x 396 mm D (16.75 in x 3.5 in x 13.7 in).

See pages 49 and 50 for dimension drawings

GPIB Interface Capabilities

The following GPIB functions are implemented: SH1, AH1, L4, SR1, DC1, DT1, and RL1

 $\textbf{Regulatory Compliance:} Listed \ to \ UL \ 1244; \ certified \ to \ CSA556B;$ conforms to IEC 61010-1. See page 69 for more information.

(Option Descriptions

Opt 020 Front-Panel Inputs (for 6060B and 6063B only) **Opt 100** 87 to 106 Vac, 47 to 66 Hz input (for Japan only) Opt 220 191 to 233 Vac, 47 to 66 Hz input Opt 240 209 to 250 Vac, 47 to 66 Hz input

- * Opt 800 Rack-mount Kit for two units (for 6051A) mounted side-by-side (p/n 5061-9694 and 5063-9215)
- * Opt 908 Rack-mount Kit (p/n 5063-9215 with 6050A, p/n 5063-9245 with 6051A, and p/n 5063-9212 with 6060B and 6063B)
- * Opt 909 Rack-mount Kit with Handles (p/n 5063-9222 when mounting 6050A and p/n 5063-9219 when mounting 6060B and 6063B)
- Opt 910 Extra manual set, including one each of the operating manual, programming reference manual, and service manual. The programming manual is available with the mainframe, and therefore not with individual modules.
- Options 908 and 909 for the 6050A, and Options 800 and 908 for the 6051A, require either the slide kit (p/n 1494-0059) or support rails (p/n E3663AC) to support the weight of the load mainframe.

Electronic Loads