

# **SpikeSafe™ Performance Series Precision Pulsed Current Source Specifications**

Mode	Mode Descriptions		Modes			
	Description	Typical Application	PRF	PRF + BIAS	PRF + MODI	PRF + BIAS + MODI
DC	Constant current.	Any constant current application. LM-85, light measurement, characterization, R&D, production.	✓	✓	✓	✓
Single Pulse	Single pulse output (one transition on and off) according to configured pulse parameters.	Any single pulse application. LM-85, light measurement, characterization, R&D, production.	✓	✓	✓	✓
Continuous Pulse	Continuous current pulse train that transitions on and off according to configured pulse parameters.	Continuous pulse light measurements to reduce junction heating. Any other continuous pulse application.	✓	✓	✓	✓
Modulated Current (MODI)	A programmable sequence of DC current steps that define a waveform. Sequences may be finite or run indefinitely.	Cell phone flash emulation, rectifier ripple emulation. Requires purchase of optional Modulated Current function.			✓	✓
Pulsed Sweep	A series of N current pulses that increase or decrease in amplitude. Step number reported upon error.	I-V plots for LEDs, lasers, and other semiconductors. L-I plots for optoelectronics, overcurrent protection circuit tests, pulse withstand testing.	✓	✓	✓	✓
Bias	Constant DC bias current - generally used for K-factor determination.	Thermal resistance and T <sub>j</sub> measurements.		✓		✓
Multiple Pulse	Similar to Single Pulse mode, but allows a programmable number of pulses to be output.	Simulated lightning strikes test. Other fixed pulse count device testing.	✓	✓	✓	✓
DC Dynamic	Constant current - current changes may occur while the source channel is enabled.	L-I-V sweeps, programmed ramps, low speed > 10s pulsing	✓	✓	✓	✓
Continuous Dynamic	Continuous pulse train - current changes may occur while the source channel is enabled.	PWM, production binning, closed-loop power control.	✓	✓	✓	✓
Continuous Pulse with Bias Current	A continuous current pulse train that drops to bias level during off times.	Thermal resistance and T <sub>j</sub> measurements using Continuous Pulse mode.		✓		✓
Continuous Dynamic with Bias Current	A continuous current pulse train (identical to Continuous Dynamic mode), but the bias current source is always enabled and drawing the bias current through the load.	Thermal resistance and T <sub>j</sub> measurements using Continuous Dynamic mode.		✓		✓
Single Pulse with Bias Current	Identical to Single Pulse mode, but the bias current source is always enabled and drawing the bias current through the load.	Thermal resistance and T <sub>j</sub> measurements using Single Pulse mode.		✓		✓
Pulsed Sweep with Bias Current	Like Pulsed Sweep, but with programmable bias current summed in with pulse sweep.	Determine T <sub>j</sub> rise during I-V or L-I-V plots for LEDs, lasers, and other semiconductors. Allows Pulsed Sweep to be optimized to minimize time and junction heating.		✓		✓

# Performance Series Precision Pulsed Current Sources



Specifications	Model (Max Current)											
	0.5	2	3	4	5	8	10	16	20	32	40	60
<b>Overall</b>												
Recommended Min Current <sup>7</sup>	339µA	5.9mA				11.8mA		23.6mA		47.3mA		285mA
Min Output Voltage	0V											
Max Output Voltage	50V, 100V, 200V, 300V, 400V					50V, 100V, 200V					50V	
Independent Channels/Module	1, 2, 4, 8				1, 2, 4		1, 2		1			
Max Power, per Channel <sup>4, 14</sup>	200W	800W	1kW			1.6kW		3.2kW		6.4kW		3kW
Max Power, all Channels <sup>4</sup>	1.6kW	6.4kW	8kW			6.4kW					3kW	
Output Conductor Pairs/Channel	1				2		4		8			
Conversion Mode	Buck/Boost				Buck	Buck/Boost		Buck				
<b>Pulsing</b>												
Pulse Width Range <sup>11</sup>	10µs-15000s											
Pulse Width Resolution	1µs											
Pulse Width Accuracy <sup>2</sup>	1µs	1.5µs	1µs				1.3µs					
Pulse Rise/Fall Time <sup>3</sup>	200ns-3µs	200ns-2µs	200ns-3µs				350ns-4.5µs				3µs-5µs	
Typical Pulse Width Jitter	30ns											
Timebase Accuracy	50ppm											
Pulse Period Range <sup>12</sup>	30µs-30000s, depending on settings											
Duty Cycle Range	0-100%											
Multi Channel Pulse Synchronization	Settable, synchronized (+/-1µs), or staggered (1/N*Period)										+/-2µs	
Pulse Count: Multi Pulse Mode	0-2147483647											
Pulse Count: Pulsed Sweep Mode	3-10000											
<b>Low Range Current</b>												
Max Current	40mA	200mA				400mA		800mA		1.6A		3.2A
Setpoint Resolution	1µA	5µA				10µA		20µA		40µA		80µA
Output Current Accuracy	0.05%+10µA	0.04%+175µA				0.04%+350µA		0.04%+700µA		0.04%+1.4mA		0.2%+8mA
Current Measure Accuracy <sup>13</sup>	0.7%+200µA	0.4%+5mA	0.1%+1mA			0.1%+2mA		0.1%+4mA		0.1%+8mA		0.5%+4mA
<b>High Range Current</b>												
Max Current	500mA	2A	3A	4A	5A	8A	10A	16A	20A	32A	40A	60A
Setpoint Resolution	10µA	50µA	100µA			200µA		400µA		800µA		1.6mA
Output Current Accuracy	0.05%+75µA	0.08%+500µA	0.08%+1mA			0.08%+2mA		0.08%+4mA		0.08%+8mA		0.3%+24mA
Current Measure Accuracy <sup>13</sup>	0.2%+1mA	0.4%+5mA				0.4%+10mA		0.4%+20mA		0.4%+40mA		0.5%+40mA

Specifications	Model (Max Current)											
	0.5	2	3	4	5	8	10	16	20	32	40	60
<b>Misc.</b>												
Nominal Current Ripple <sup>1</sup>	0.01%+160μA	<1A: 0.03%+300μA >1A: 0.06%	<1A: 0.03%+300μA >1A: 0.03%+500μA	<1A: 0.03%+300μA >1A: 0.012%+1mA	<1A: 0.03%+300μA >1A: 0.012%+2mA	<5A: 0.05%+250μA >5A: 0.02%+1.8mA	<5A: 0.05%+250μA >5A: 0.02%+4mA	<10A: 0.05%+200μA >10A: 0.02%+3mA				
DC Ramp Rate: Low Speed Setting	10V/s, 50mA/s				10V/s, 100mA/s			10V/s, 200mA/s		10V/s, 400mA/s		
DC Ramp Rate: Default Setting	10V/s, 500mA/s				10V/s, 1A/s			10V/s, 2A/s		10V/s, 4A/s		
DC Ramp Rate: High Speed Setting	1000V/s, 50A/s				1000V/s, 100A/s			1000V/s, 200A/s		1000V/s, 400A/s		
Current Stability <sup>10</sup>	70ppm											
Voltage Measure Accuracy <sup>13</sup>	3%+1V											
<b>Bias Current<sup>5</sup></b>												
Max Current	33mA				66mA			132mA		264mA		
Setpoint Resolution	1μA				2μA			4μA		8μA		
Bias Current Accuracy	0.35%+60μA				0.35%+120μA			0.35%+240μA		0.35%+480μA		
Fall Time to Bias Current	200ns-3μs											500ns-6μs
5% Settling Time After Falling Edge <sup>8</sup>	10-70μs											
0.1% Settling Time After Falling Edge <sup>9</sup>	70-130μs											
<b>Modulated Current<sup>6, 14</sup></b>												
Sequence Step Amplitude Range	0-100%											
Min Step Width	1ms											
Max Step Width	10s											
Step Width Accuracy	10μs											
Max Number of Steps	20											
Max Number of Step Sequences (Loops)	3											
Loop Count	1 to 32767 or infinite											
Current Rise/Fall Time Each Step <sup>3</sup>	5-8μs											

## Specifications

### Available Packages

2U-Chassis	Rack mount / benchtop chassis 89mmH x 483mmW x 635mmD (including handles)
------------	---

### External Interfaces

Trigger Out	TTL output equal to pulse on time
Trigger Polarity	Programmable
Trigger to Pulse Rising Edge	2-25 $\mu$ s to rising edge of pulse. Based on current setpoint.
Trigger Jitter	< 10ns typical
Remote Pause	Optoisolated input, pauses output, selectable polarity
Remote Disable	Optoisolated input, halts output, selectable polarity
Output Current Drive Type	Differential drive
Output Cabling	Single or multiconductor twisted pair
Recommended Max Output Cable Length	6m

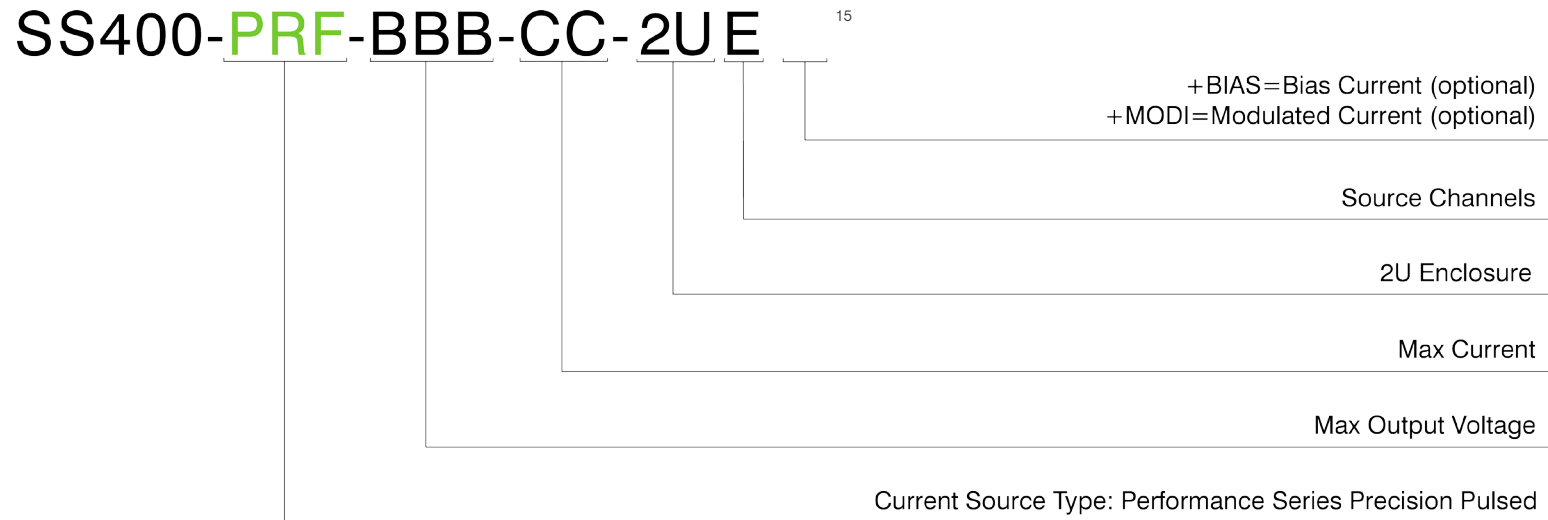
### Input Power

A/C Power	Selectable; single and three phase available; 50-60Hz
Power Conversion	Two-stage: DC-DC converter + analog current regulator

### General

Remote Control	100-base T Ethernet, TCP/IP with SCPI syntax
Monitoring System	Built-in acquisition system monitors & reports voltage, current, and fault conditions
Device Protection	2nd generation SpikeSafe™ protection including high-speed over current shutdown, slow start up, leakage detection and other protection algorithms
Calibration Interval	2 years
Operating Conditions	For indoor use only, 10 to 35C, 70%R.H., <2000m altitude
Cooling	Air cooled
Particulate Level	Clean lab conditions
Other	CE

## Model Number Guide



## Notes

### All specifications at 23C +/-5C, pulsing specifications: outside cable <3m

<sup>1</sup> RMS, 20MHz BW, primary frequency 100kHz or 200kHz

<sup>2</sup> Typical performance with automatic adjustments enabled, compensation settings tuned for best shape,  $I > 10\% I_{max}$

<sup>3</sup> Typical performance with compensation settings tuned for fastest rise and best pulse shape,  $I > 10\% I_{max}$

<sup>4</sup> With suitable auxiliary bulk power supply:  $V_{bulk} \geq \text{Compliance Voltage} + 20V$  for Buck models,  $\text{Compliance Voltage}/2$  for Buck/Boost Models

<sup>5</sup> Requires BIAS option

<sup>6</sup> Requires MODI option

<sup>7</sup> Output current that guarantees 3% accuracy at calibration limit

<sup>8</sup> Typical time to recover to 95% of bias value, typical cable compensation  $I_{bias} > 50\%$  Max bias

<sup>9</sup> Typical time to recover to 99.9% of bias value, typical cable compensation  $I_{bias} > 50\%$  Max bias

<sup>10</sup> Typical p-p current variation over 1 hour, after warm up at 23C

<sup>11</sup> Max Pulse Width is 10sec for: Pulsed Sweep, Bias Pulsed Sweep, and Multi Pulse modes. Minimum off-time is  $300\mu s$  for Pulsed Sweep and Bias Pulsed Sweep

<sup>12</sup> Max Pulse Period is 30sec (up to 20sec max off-time) for: Pulsed Sweep, Bias Pulsed Sweep, and Multi Pulse modes

<sup>13</sup> 2-wire measurement designed for load monitoring. SpikeSafe Performance Current Sources may be paired with available high-speed DMM's for precise voltage and current measurements

<sup>14</sup> Instantaneous internal power dissipation limited in dynamic pulsing modes by  $(V_{compliance} - V_{load} + 5.5) * I_{setpoint} \leq 75W * n$ , where  $n$  = conductor pairs/channel

Instantaneous internal power dissipation limited in dynamic DC and MODI modes by  $(V_{compliance} - V_{load} + 3) * I_{setpoint} \leq 75W * n$

Average internal power dissipation limited in dynamic pulsing modes by  $(V_{compliance} - V_{load} + 5.5) * I_{setpoint} \leq 25W * n$

Average internal power dissipation limited in dynamic DC and MODI modes by  $(V_{compliance} - V_{load} + 3) * I_{setpoint} \leq 25W * n$

<sup>15</sup> Additional power options must be specified. Please contact your sales representative or email [sales@vektrex.com](mailto:sales@vektrex.com)

Email [sales@vektrex.com](mailto:sales@vektrex.com) or visit [www.vektrex.com](http://www.vektrex.com) to get more information and request a quote.