SpikeSafe™ Performance Series Precision Pulsed Current Source Specifications

Performance Series Precision Pulsed Current Sources

Mode Descriptions			Modes			
Mode	**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 Tj 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 Tj 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 Tj 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 Tj measurements using Single Pulse mode.		✓		✓
Pulsed Sweep with Bias Current	Like Pulsed Sweep, but with programmable bias current summed in with pulse sweep.	Determine Tj 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
Specifications subject to change.

www.vektrex.com | 030421 | Page 2

VEKTREX

Specifications	Model (Max Current)											
	0.5	2	3	4	5	8	10	16	20	32	40	60
Overall												
Recommended Min Current[7]	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[4,14]	200W	800W	1kW			1.6kW		3.2kW		6.4kW		3kW
Max Power, all Channels[4]	1.6kW	6.4kW	8kW			6.4kW						3kW
Output Conductor Pairs/Channel	1					2		4		8		
Conversion Mode	Buck/Boost				Buck	Buck/Boost		Buck				
Pulsing												
Pulse Width Range[11]	10µs-15000s											
Pulse Width Resolution (w/Pulse Width Offset)[16]	1µs (11ns)											
Pulse Width Accuracy (w/Pulse Width Offset)[2,16]	1µs (50ns)	1.5µs (50ns)		1µs (50ns)					1.3µs (50ns)			
Pulse Rise/Fall Time[3]	200ns-3µs	200ns-2µs	200ns-3µs						350ns-4.5µs			3µs-5µs
Typical Pulse Width Jitter	30ns											
Timebase Accuracy	50ppm											
Pulse Period Range[12]	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	0-12000000 (Multiple Pulse and Pulsed Sweep modes)											
Sweep Steps	3-10000 (Pulsed Sweep mode)											
Low Range Current												
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[13]	0.7%+200µA	0.4%+5mA	0.1%+1mA			0.1%+2mA		0.1%+4mA		0.1%+8mA		0.5%+4mA
High Range Current												
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[13]	0.2%+1mA	0.4%+5mA				0.4%+10mA		0.4%+20mA		0.4%+40mA		0.5%+40mA

Performance Series Precision Pulsed Current Sources | Specifications
Specifications subject to change.

www.vektrex.com | 030421 | Page 3

Performance Series Precision Pulsed Current Sources

VEKTREX

Specifications	Model (Max Current)											
	0.5	2	3	4	5	8	10	16	20	32	40	60
Misc.												
Nominal Current Ripple[1]	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[10]						70ppm						
Voltage Measure Accuracy[13]						3%+1V						
Bias Current[5]												
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[8]						10-70μs						
0.1% Settling Time After Falling Edge[9]						70-130μs						
Modulated Current[6, 14]												
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[3]						5-8μs						

Performance Series Precision Pulsed Current Sources | Specifications
Specifications subject to change.

www.vektrex.com | 030421 | Page 4

Specifications

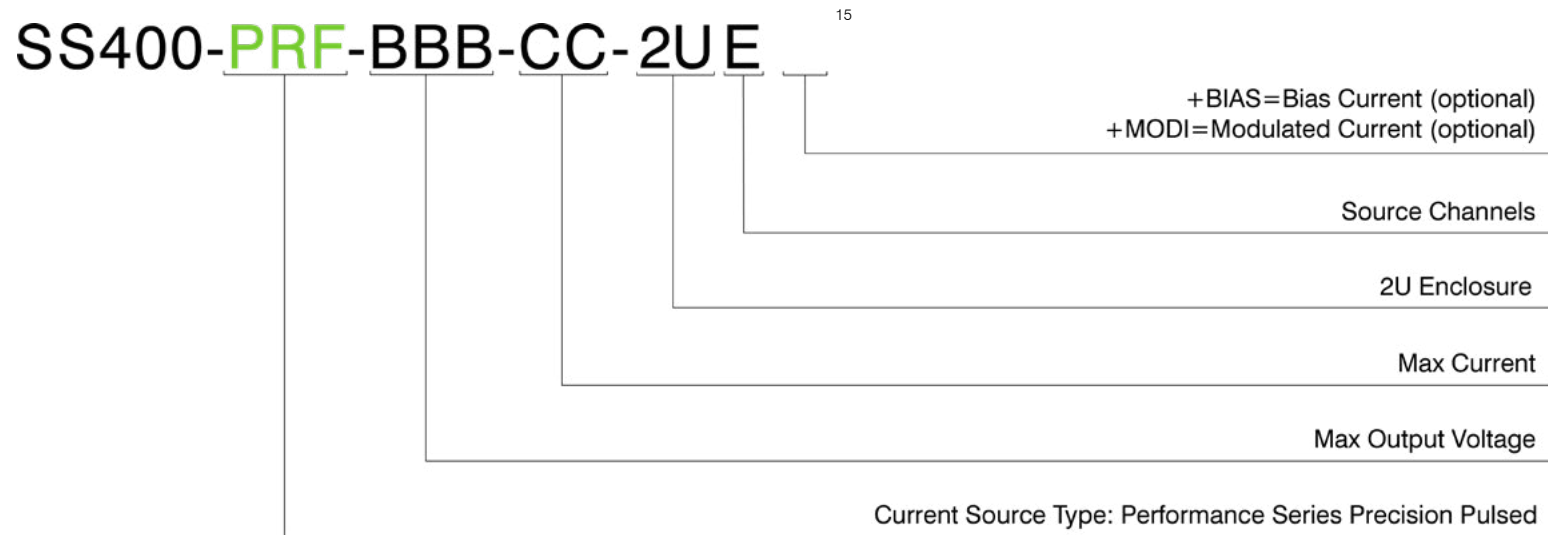|	
Available Packages	
2U-Chassis	Rack mount / bench top chassis 89mmH x 483mmW x 635mmD (including handles)
Current Out	
Output Current Drive Type	Floating, both + and - terminal driven, max 100V common mode to chassis ground
Output Cabling	Single or multi-conductor twisted pair
Recommended Max Output Cable Length	6m
Trigger In	
Signal Type	3.3V logic (5V tolerant)
Polarity	Programmable
Modes Supported	Multiple Pulse, Pulsed Sweep, Modulated Current
Programmable Delay	Programmable delay, $10\mu s$ to 30s
Delay Programming Resolution	$1\mu s$
Delay Jitter	Multiple Pulse Mode: $3.4\mu s$, Pulsed Sweep Mode: $107\mu s$
Trigger Out	
Signal Type	5V logic, 50Ω pull-up and open drain outputs
Polarity	Programmable
Modes Supported	All pulsed modes
Typical Current Delay After Trigger	$1.5\text{-}13\mu s$
Trigger Jitter	<10ns typical
Programmable Delay	Programmable delay, $10\mu s$ to 30s
Other External Interfaces	
Remote Pause	Optoisolated input, pauses output, selectable polarity
Remote Disable	Optoisolated input, halts output, selectable polarity
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: on-site or return to Vektrex
Operating Conditions	For indoor use only, 10 to 35C, 70%R.H., <2000m altitude
Cooling	Air cooled
Particulate Level	Clean lab conditions
Other	CE

Performance Series Precision Pulsed Current Sources | Specifications
Specifications subject to change.

www.vektrex.com | 030421 | Page 5

Model Number Guide

SS400-PRF-BBB-CC-2U E ¹⁵

+BIAS=Bias Current (optional)
+MODI=Modulated Current (optional)

Source Channels

2U Enclosure

Max Current

Max Output Voltage

Current Source Type: Performance Series Precision Pulsed

Performance Series Precision Pulsed Current Sources | Specifications
Specifications subject to change.

www.vektrex.com | 030421 | Page 6

Notes

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

[1] RMS, 20MHz BW, primary frequency 100kHz or 200kHz

[2] Typical performance with automatic adjustments enabled, compensation settings tuned for best shape, I > 10% Imax, Pulse Width <10s

[3] Typical performance with compensation settings tuned for fastest rise and best pulse shape, I > 10% Imax

[4] With suitable auxiliary bulk power supply: Vbulk ≥ Compliance Voltage +20V for Buck models, Compliance Voltage/2 for Buck/Boost Models

[5] Requires BIAS option

[6] Requires MODI option

[7] Output current that guarantees 3% accuracy at calibration limit

[8] Typical time to recover to 95% of bias value, typical cable compensation Ibias>50% Max bias

[9] Typical time to recover to 99.9% of bias value, typical cable compensation Ibias>50% Max bias

[10] Typical p-p current variation over 1 hour, after warm up at 23C

[11] Max Pulse Width is 10sec for: Pulsed Sweep, Bias Pulsed Sweep, and Multiple Pulse modes

[12] Max Pulse Period is 40sec (up to 30sec max off-time) for: Pulsed Sweep, Bias Pulsed Sweep, and Multiple Pulse modes
Min Pulse Period is 10μs or 300μs for Multiple Pulse and Sweep Modes

[13] 2-wire measurement designed for load monitoring. I > Imin. Ton > 10μs.
SpikeSafe Performance Current Sources may be paired with available high-speed DMMs for precise voltage and current measurements

[14] Instantaneous internal power dissipation limited in dynamic pulsing modes by (Vcompliance - Vload + 5.5) * Isetpoint ≤ 75W * n, where n = conductor pairs/channel
Instantaneous internal power dissipation limited in dynamic DC and MODI modes by (Vcompliance - Vload + 3) * Isetpoint ≤ 75W * n
Average internal power dissipation limited in dynamic pulsing modes by (Vcompliance - Vload + 5.5) * Isetpoint ≤ 25W * n
Average internal power dissipation limited in dynamic DC and MODI modes by (Vcompliance - Vload + 3) * Isetpoint ≤ 25W * n

[15] Additional power options must be specified. Please contact your sales representative or email sales@vektrex.com

[16] Pulse Width Offset is a correction factor that is automatically added to the pulse width setting. By setting this factor, nominal pulse width errors can be reduced. The setting range for Pulse Width Offset is +/- 50μs.

Email **sales@vektrex.com** or visit **www.vektrex.com** to get more information and request a quote.

Performance Series Precision Pulsed Current Sources | Specifications
Specifications subject to change.

www.vektrex.com | 030421 | Page 7