



ULTRAVOLT FL SERIES

FLOATING HOT DECK LVPS WITH ISOLATED DIGITAL AND ANALOG I/O

The UltraVolt® FL series of floating-hot-deck, low-voltage power supplies offers an integrated solution for systems requiring LV power & controls with high-voltage isolation. Combining a highly isolated, DC-to-DC, multi-output low-voltage power supply (LVPS) with an advanced isolated digital & analog I/O topology, the FL sub-system provides both power and controls to floatinghot-deck circuitry. This solution, when combined with one or more UV HVPS or other circuitry, can provide high-performance solutions.

PRODUCT HIGHLIGHTS

- Isolated up to 15 kV
- DC leakage current of <10 nA</p>
- AC leakage capacitance of <40 pF
- 3 regulated floating LV power outputs
- Isolated digital and analog I/O to and from floating hot deck
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

TYPICAL APPLICATIONS

- Floating/stacked ion or e-beam biases
- Floating pulsers and gated grids
- Floating high side current monitors
- Floating filament bias
- Floating capacitance meters
- Floating leakage testers

AT A GLANCE

Nominal Output Voltage

Output #1: +12/+24 VDC Output #2: -15 VDC Output #3: +5.6 VDC

Maximum Output Power

12,24 W

Isolation Voltage

15 kV

Temperature Coefficient

<50 ppm/°C

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FL SERIES





ELECTRICAL SPECIFICATIONS

Parameter	Conditions	Models		Units
Input		12 V	24 V	
Voltage Range	Full Power	+12 ±5%	+24 ±10%	VDC
Voltage Range	Derated Power Range	+10.8 to +16	+21.6 to +30	VDC
Current	Standby (Disabled)	<90	<50	mA
Current	No Load	<0.15	<0.15	А
Current	Max Load	<1.6	<1.4	А
AC Ripple Current	Nominal Input, Full Load	<80	<100	mA pk to pk
Local Controls: Reference		All Types		
Output Voltage	T = +25°C, Initial Value	+5.1 ±2% VE		VDC
Output Impedance	T=+25°C	464 ±1% Ω		Ω
Stability	Over Full Temperature Range	0.2 mV/°C		mV/°C
Local Controls: Reference LVPS Enable/Disable		All Types		
Power Supply On	Open, or a Voltage Above TTL High	+2.4 to 32		VDC
Power Supply Off	Grounded, or a Voltage Below TTL Low	0 to +0.7 ±0.2 (Isink 1 mA min) VDC		VDC
Input/Output Isolation		12 V	24 V	
Isolation Voltage	Continuous	15	15	kV
Leakage Current	All Inputs to All Outputs	<10 std, <100 "-E"	< 10 std, < 100 "-E"	nA
Leakage Capacitance	All Inputs to All Outputs	<40 std, <50 "-E"	<50 std or "-E"	pF

arameter Conditions Models			Units	
Isolated Power Outputs		15FL12-12W	15FL12-24W	
Output #1 Power	Nominal Input, Max lout	12	24	W
Output #1 Voltage	Nominal Input Voltage Range	+12 ±2%	+24 ±2%	VDC
Output #1 Current	Min to Max	0 to 1	0 to 1	A
Output #1 Line Regulation	Nominal Input Range, Full Load	<0.1%	<0.1%	VDC
Output #1 Load Regulation	No Load to Full Load	<0.1%	<0.1%	VDC
Output #1 Ripple	Full Load	<2%	<1%	V pk to pk
Output #2 Voltage	Nominal Input Voltage Range	-15 ±1	-15 ±1	VDC
Output #2 Current	Min to Max	0 to 10	0 to 10	mA
Output #2 Line Regulation	Nominal Input Range, Full Load	<0.1%	<0.1%	VDC
Output #2 Load Regulation	No Load to Full Load	<2%	<2%	VDC
Output #2 Ripple	Full Load	<2%	<2%	VDC
Output #3 Voltage	Nominal Input Voltage Range	+5.6 ±5%	+5.6 ±5%	VDC
Output #3 Current	Min to Max	0 to 10	0 to 10	mA
Output #3 Line Regulation	Nominal Input Range, Full Load	<1%	<1%	VDC
Output #3 Load Regulation	No Load to Full Load	<1%	<1%	VDC
Output #3 Ripple	Full Load	<1%	<1%	V pk to pk



ELECTRICAL SPECIFICATIONS (CONTINUED)

Parameter	Conditions	Models	Units	
Isolated Controls: TTL Channel "Up"		All Types with -I/O Option		
Local Input	Source Voltage, Sink Current 10 MΩ internal pull up to +15 V		VDC	
		<1 V low, >2.5 V high	VDC	
Isolated Output	Inverted and Buffered TTL	Open collector with internal 1 k Ω pull up to + 5V (Can sink 10 mA max)	VDC	
Bandwidth	Varying Duty Cycle	DC to >300	kHz	
Isolated Controls: Analog "Up"		All Types with -I/O Option		
Local Input Voltage	Range	0 to +5	VDC	
Isolated Output Voltage	Range	0 to +5	VDC	
Local Input Impedance		10 Meg	Ω	
Isolated Output Impedance		Buffered low impedance	-	
Initial Offset Error		<±1%	mV	
Gain Error	Full Scale	< ±2%	VDC	
Linearity Error	0 to Full Scale	< ±1%	VDC	
Stability	30 Min Warmup, Per 8 h, Per Day	< 0.01% / < 0.02%	VDC	
Temperature Coefficient	0 to +55°C	< ±50	ppm/°C	
Bandwidth	Symmetric or Asymmetric Signal	DC to 30 (-3dB point is 47 Hz)	Hz	
-RB' Isolated Controls: TTL Channel "Down"		All Types with -I/O-R/B Option		
Isolated 'Hot Deck' Input	Source Voltage, Sink Current	$10M\Omega$ internal pull up to +15 V	VDC	
		<1 V low, >2.5 V high	VDC	
Local Output	Inverted and Buffered TTL	Open collector with internal 1 k Ω pull up to +5 V Can sink 10 mA max	VDC	
Bandwidth	Varying Duty Cycle	DC to >300	kHz	
-RB' Isolated Controls: Analog Channe	els #1 and #2 "Down"	All Types with -I/O-R/B Option		
Isolated 'Hot Deck' +Input	Range	0 to +5, 0 to +10 with >+15 VDC input power	VDC	
Isolated 'Hot Deck' -Input	Range	0 to -5, 0 to -10 with >+15 VDC input power	VDC	
Isolated 'Hot Deck' + or -Input impedance	Signal Source	>10	MΩ	
Local Output +Voltage	Range	0 to +5, 0 to +10 with >+15 VDC input power	VDC	
Local Output -Voltage	Range	0 to -5, 0 to -10 with >+15 VDC input power	VDC	
Local Output Impedance	Signal Source	Buffered low impedance	Ω	
Initial Offset Error	Signal Source	< ± 5	mVDC	
Gain Error	Full Scale	<±1%	VDC	
Linearity Error	O to Full Scale	<±1%	VDC	
Stability	30 Min Warmup, Per 8 h, Per Day	< 0.01%/< 0.02%	VDC	
Temperature Coefficient	-20 to +55°C	< ±50	ppm/°C	
Bandwidth	Symmetric or Asymmetric Signal	DC to 30 (-3dB point is 47 Hz)	Hz	



ELECTRICAL SPECIFICATIONS (CONTINUED)

Parameter	Conditions	Models		Units
Environmental		All Types		
Operating Temperature	Full Load, Case Measurement	-20 to +55°C		
Storage Temperature	Non-operating, Case Measurement	-55 to +85°C		
Thermal Shock Temperature	Mil-Std-810, Method 503-4, Proc. II	-20 to +55°C		
Operating Altitude	All Operating Conditions	Sea level to vacuum		
Storage Altitude	Non-operating	Sea level to vacuum		
Shock and Vibration		Standard	-RB Option	
Shock	Mil-Std-810, Method 516.5, Proc. IV 2	20 Gs	20 Gs	
Vibration	Mil-Std-810, Method 514.5, Fig.	10 Gs	10 Gs	



MECHANICAL SPECIFICATIONS

Construction		
Case	Epoxy-filled DAP box certified to ASTM-D-5948	
Volume	Standard: 163.9 cc (10.3 in ³)	
	-R/B Option: 182 cc (11.1 in ³)	
Weight	Standard: 340.2 g (12.0 oz)	
	-R/B Option: 377.1 g (13.3 oz)	
Tolerance Overall ±0.050" (1.27 mm) Pin to Pin ±0.015" (0.38 mm)		

Note: 24-watt versions are an additional 0.062" (1.57 mm) in height. -M equipped units are an additional 0.030" (0.76 mm) in height. Contact Advanced Energy for drawings of models equipped with -E options.



INTERFACE

Local Connections			
Pin	Function		
1	Input Power Ground Return		
2	Positive Power Input		
3	LVPS Enable/Disable		
4	TTL Up HVPS Enable/Disable (-I/O Only)		
5	Signal Ground Return		
6	Analog Up/ HVPS Remote Programming Input (-I/O Only)		
7	+5 V Reference Output		

Additional Local Connections (-R/B Option)		
Pin	Function	
8	+lout Monitor Output (Analog Down Channel 1)	
9	-lout Monitor Output (Analog Down Channel 1)	
10	+Eout Monitor Output (Analog Down Channel 2)	
11	-Eout Monitor Output (Analog Down Channel 2)	
12	N/C	
13	N/C	
14	TTL Output (Digital Down Channel 1)	

Isolated / Floating Connections		
Pin	Function	
8	Floating Power Ground Return	
9	Floating +12 VDC or +24 VDC Output	
10	Floating -15 VCD Output	
11	Floating TTL Up/HVPS Enable/Disable (-I/O Only)	
12	Floating Signal Ground Return	
13	Floating Analog Up/HVPS Remote Programming Input (-I/O Only)	
14	Floating +5.6 VDC Reference Output	

Additional Isolated/Floating Connections (-R/B Only)			
Pin	Function		
1	Floating +lout Monitor Output (Analog Down Channel 1)		
2	Floating -lout Monitor Output (Analog Down Channel 1)		
3	Floating +Eout Monitor Output (Analog Down Channel 2)		
4	Floating -Eout Monitor input (Analog Down Channel 2)		
5	N/C		
6	N/C		
7	Floating TTL Input (Digital Down Channel 1)		



ORDERING INFORMATION

Туре	15 kV Isolation	15FL
Input Voltage	12 VDC Nominal	12
	24 VDC Nominal	24
Power	Watts Output (12 Vin Only)	-12W
	Watts Output (24 Vin Only)	-24W
Options	(1) Digital Up Channel and (2) Analog Up Channels	-I/O
	(1) Digital Down Channel and (2) Analog Down Channels	-R/B
	Partial Mu-Metal Shield	-M
Case	Plastic Case—Diallyl Phthalate	Standard
	"Eared" Chassis Mounting Plate (15 kV only)	-E

