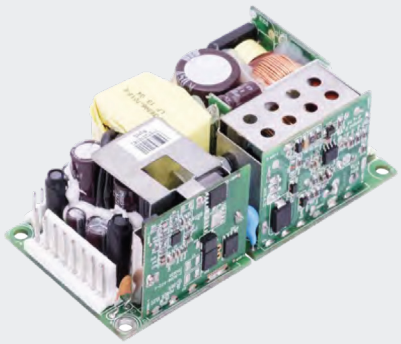
SL POWER
MINT3110 Series

110 Watts Triple Output
Medical Grade



Medical

Advanced Energy's SL Power MINT3110 series of open-frame AC-DC power supplies comprises three triple outputs models. All models feature medical safety approvals and accept a universal input of 90 to 264 VAC. These compact switch-mode power supplies feature output overvoltage, overload protection, with short-circuit protection on all outputs. MINT3110 series power supplies provide 80 Watts of output power with free air convection cooling and 110 Watts with 200 LFM of forced air.

AT A GLANCE

Total Power

80 to 110 Watts

Input Voltage

90 to 264 VAC

# of Outputs

Triple

SPECIAL FEATURES

- 2" x 4" x 1.3" Package
- 110 W with air, 80 W Convection Cooled
- Universal Input 90 to 264 VAC
- Efficiency 87% Typical
- Suitable for 1U Applications
- Class I and Class II Versions
- 2 x MOPP Isolation
- Power Fail Signal
- Remote Sense (V2 only)
- 3 Year Warranty
- RoHS Compliant

SAFETY

- CSA/IEC/EN/UL60601-1, 3rd Edtion
- CE Mark
- UKCA Mark

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ELECTRICAL SPECIFICATIONS

Input	
Input range	90 to 264 VAC, 47 to 63 Hz, 1Ø; 120 to 370 VDC
Input current	1.5 A @ 115 VAC, 0.75 A @ 230 VAC
Inrush current	45 A max., cold start @ 264 VAC input
Input fuses	2.5 A, 250 VAC fuses provided in both line & neutral
Leakage current Earth Touch	 <290 µA @ 264 VAC, 60 Hz, NC; <420 µA, SFC <90 µA @ 264 VAC, 60 Hz, NC; <170 µA, SFC
Efficiency	87% typical @ 230 VAC
Isolation voltage	Input/Ground: 1800 VAC (Basic) Input/Output: 4000 VAC (Reinforced) Output/Ground: 500 VAC (Operational)
Output	
Output power	110 W continuous with 200 LFM airflow, 80 W convection cooled
Ripple and noise	See "Ordering Information"
Total regulation	See "Ordering Information"
Output voltage	See "Ordering Information"
Switching Frequency	PFC: Variable 30-400kHz. Main Converter: Variable 35-180kHz, 65-70kHz at full load
Adjustment range	+/-5% from nominal on 5 V output
Turn on time	< 2 s @ 115 VAC (inversely proportional to input voltage and thermistor temperature)
Hold-up time	16 ms typical @ 110 W, 120 Vac input
Minimum load	Not required
Dynamic load regulation	< 3% of nominal output voltage @ 50% load change, di/dt = 0.2 A/µS
Reliability	
MTBF	245,000 hrs @ 25°C Ambient, 110 VAC input
Protection	
Input fuses	2.5 A, 250 VAC fuses provided in both line & neutral
Input transient protection	2kV (CM) and 1kV (DM) surge
Short circuit protection	Provided - no damage will occur if the output is shorted. Hiccup mode.
Overload protection	150% to 300% above rating for V2, V3, 110% to 200% for V1. Hiccup mode.
Overvoltage protection	Latching type, recycle AC input to reset. See "Ordering Information" for trip ranges.
Auxiliary Signals	
AC power fail	Stays HIGH during normal operation. Signal will go LOW with at least 6 mS warning before loss of DC output from AC failure.
Remote Sense (V2 only)	Will compensate for 0.5V drop max. Reverse connection protected.
DC OK	Open collector logic signal goes and stays HIGH, 100mS to 500mS after main output reaches regulation.

ENVIRONMENTAL SPECIFICATIONS

Weight	200 grams
Dimensions	2.0" x 4.0" x 1.3" (W x L x H)
Vibration	Operating: 0.003 g^2/Hz, 1.5 grms overall, 3 axes, 10 min/axis Non-operating: 0.026 g^2/Hz, 5.0 grms overall, 3 axes, 1 hr/axis
Shock	Operating: Half-sine, 20 gpk, 10 ms, 3 axes, 6 shocks total Non-operating: Half-sine, 40 gpk, 10 ms, 3 axes, 6 shocks total
Operating temperature	-10°C to +70°C
Temperature derating	Derate output power linearly above 50°C to 50% at 70°C
Storage temperature	-40°C to +85°C
Altitude	Operating: -500 to 10,000 ft. Non-operating: -500 to 40,000 ft.
Relative humidity	5% to 95%, non-condensing

EMI/EMC COMPLIANCE

Conducted emissions	EN55011/22 Class B, FCC Part 15, Subpart B, Class B
Radiated emissions	EN55011/22 Class B, FCC Part 15, Subpart A, Class A
Static discharge immunity	EN61000-4-2, 8 kV contact discharge, 8 kV air discharge, criteria A[1]
Radiated RF immunity	EN61000-4-3, 3 V/m, criteria A[1]
EFT/Burst immunity	EN61000-4-4, 2kV/5kHz, criteria A[1]
Line surge immunity	EN61000-4-5, 1 kV differential, 2 kV common mode, criteria A[1]
Conducted RF immunity	EN61000-4-6, 3 Vrms, criteria A[1]
Power frequency magnetic field immunity	EN61000-4-8, 3 A/m, criteria A[1]
Voltage dip immunity	EN61000-4-11, 0% Vin, 0.5 cycle; 40% Vin, 5 cycles; 70% Vin, 25 cycles; criteria A[1]
Line harmonic emissions	EN61000-3-2, class A,B,C & D
Flicker test	EN61000-3-3, Complies (dmax < 6%)

Notes:
1. According to the standards, performance criteria are decoded as following:
A. Normal performance during and after the test
B. Temporary degradation, self-recoverable
C. Temporary degradation, operator intervention required to recover the operation
D. Permanent damage

ORDERING INFORMATION

Model Number	Output Voltage		Maximum Load with Convection Cooling	Maximum Load with 200LFM Forced Air	Total Regulation	Ripple & Noise[2]	OVP Threshold
MINT3110A0508K01	V1[1]	5 V	10.0 A	14.0 A	± 2%	1.0% pk-pk	7.5V max.
	V2	12 V	4.50 A	6.00 A	± 3%	1.0% pk-pk	115% to 135%
	V3	-12 V	1.00 A	1.00 A	± 10%	2.0% pk-pk	115% to 135%
MINT3110A1708K01	V1[1]	5 V	10.0 A	14.0 A	± 2%	1.0% pk-pk	7.5V max.
	V2	15 V	3.50 A	4.50 A	± 3%	1.0% pk-pk	115% to 135%
	V3	-15 V	1.00 A	1.00 A	± 10%	2.0% pk-pk	115% to 135%
MINT3110A1908K01	V1[1]	5 V	8.00 A	12.0 A	± 2%	1.0% pk-pk	7.5V max.
	V2	24 V	3.00 A	4.00 A	± 3%	1.0% pk-pk	115% to 135%
	V3	-24 V	1.00 A	1.00 A	± 10%	2.0% pk-pk	115% to 135%

Notes:

1. 5 V output is adjustable with +/-5% range.
2. Measured with noise probe directly across output terminals, and load terminated with 0.1 µF ceramic and 10 µF low ESR capacitors. All specifications are typical at 230 Vac, full load, at 25°C ambient unless noted.

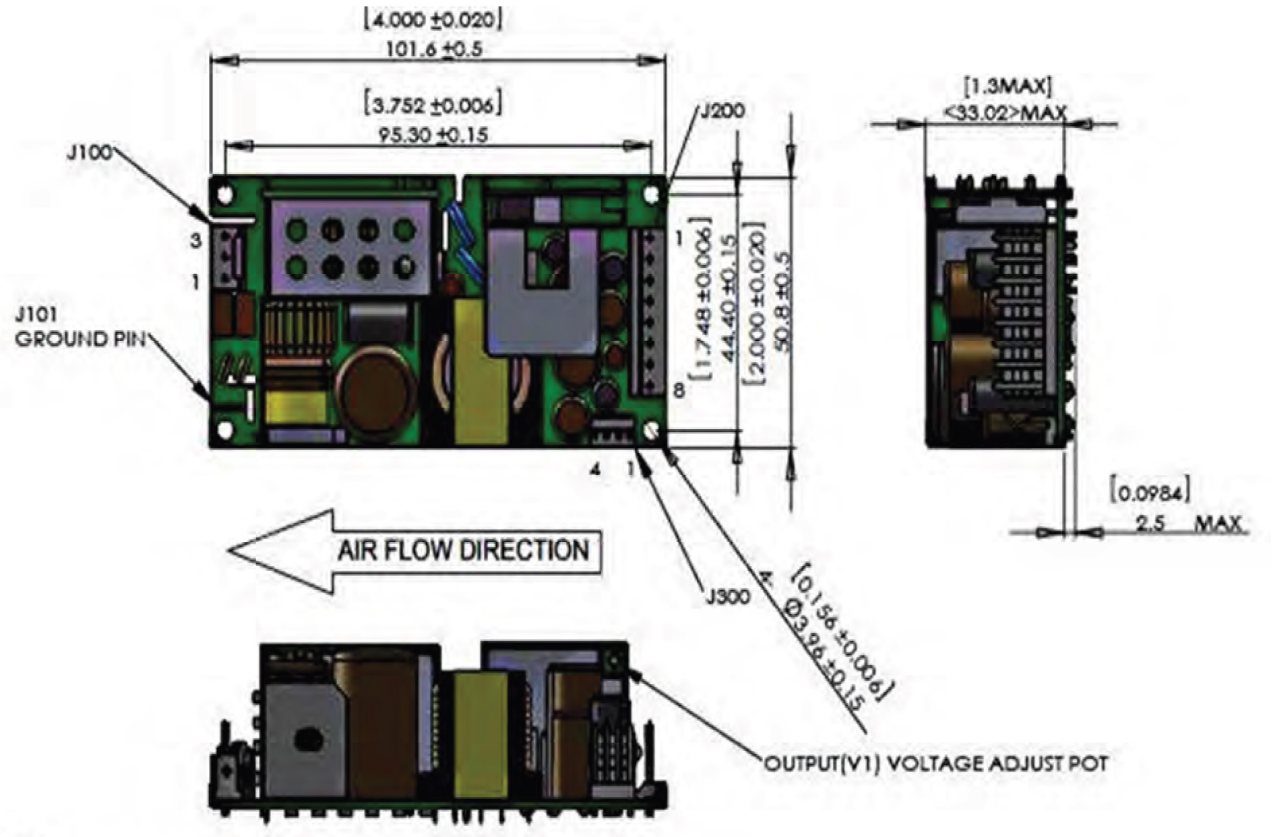
PIN ASSIGNMENTS

Connector	MINT3110	
J100 (Input connector)	PIN 1	AC Neutral
	PIN 2	SPARE
	PIN 3	AC Line
J200 (DC output connector)	PIN 1	+V1
	PIN 2	+V1
	PIN 3	RTN
	PIN 4	RTN
	PIN 5	RTN
	PIN 6	RTN
	PIN 7	V2
	PIN 8	V3
J300 (Signal connector)	PIN 1	Power Fail/DC_OK
	PIN 2	RTN
	PIN 3	+ Remote Sense (V2 only)
	PIN 4	- Remote Sense (V2 only)

CONNECTORS

	Connector	Mating Connector
J100 (Input connector)	/	MOLEX 09-50-3031. Pins = 08-52-0072 AMP #640250-3. Pins = Amp #3-640706-1
J102 (DC output connector)	/	AMP #640250-8. Pin = Amp #3-640706-1
J300 (Signal connector)	/	AMP #1375820-4. Pin = Amp #1375819
J101 (Ground)	0.187" FASTON TAB	MOLEX 01-90020001

MECHANICAL DRAWING

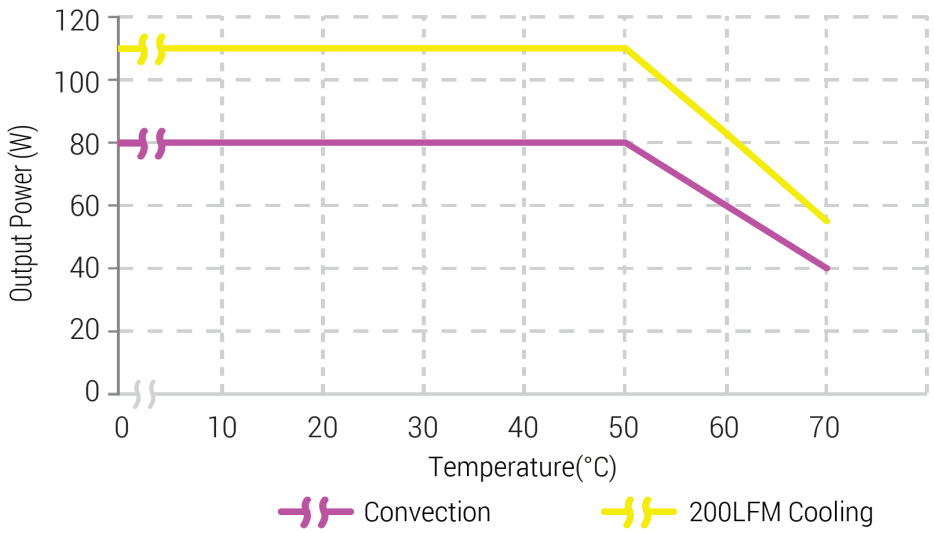


Notes:

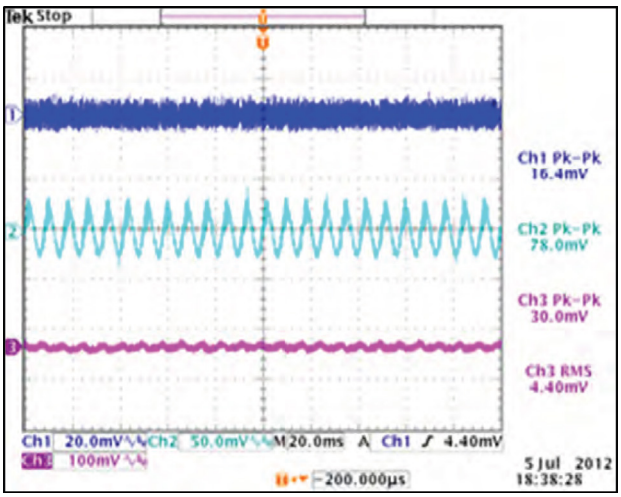
1. All dimensions in inches (mm), tolerance is ±0.02”.
2. Mounting holes should be grounded for EMI purpose.
3. Mounting J101 is safety ground connection.
4. This power supply requires mounting on metal standoffs 0.25” in height.

CHARACTERISTIC CURVES

Output vs. Temperature:
80 W convection cooled and 110 W continuous with 200 LFM airflow. Derate output power to 50% at 70°C.

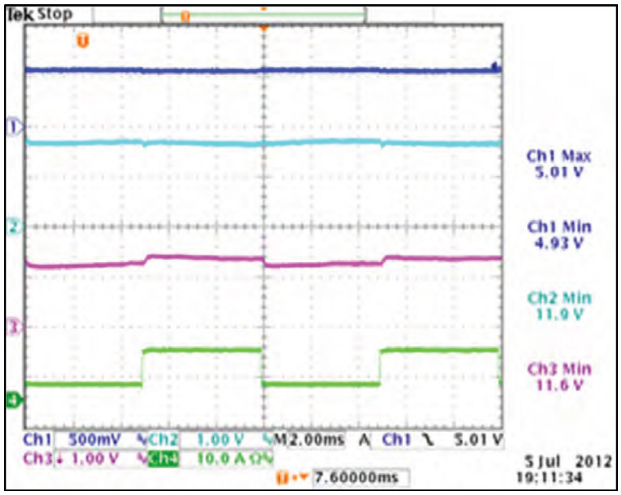


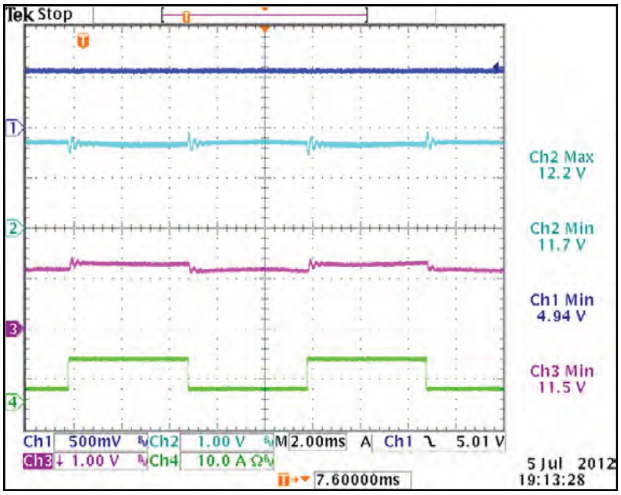
Ripple vs. Noise:
To verify that the output ripple and noise does not exceed the level specified in the product specification. Measured using a scope probe socket with 0.1µF ceramic and a 10µF electrolytic capacitor connected in parallel across it, BW limit with 20MHz.

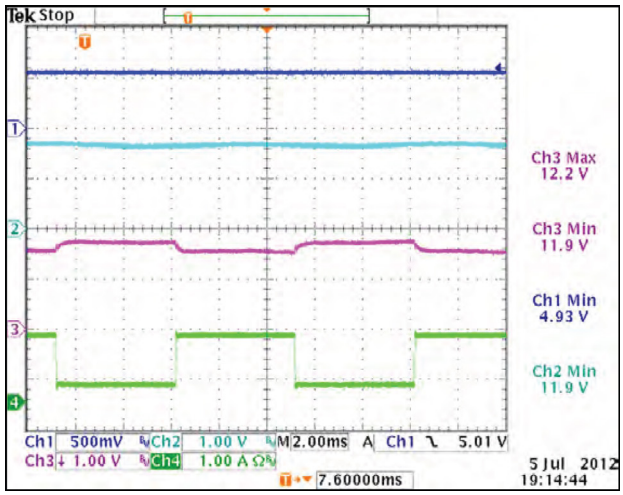


CHARACTERISTIC CURVES

Output Transient Response V1, V2, V3:
50% load step within the regulation limits of minimum and maximum load, di/dt < 0.2 A/µS. Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%.

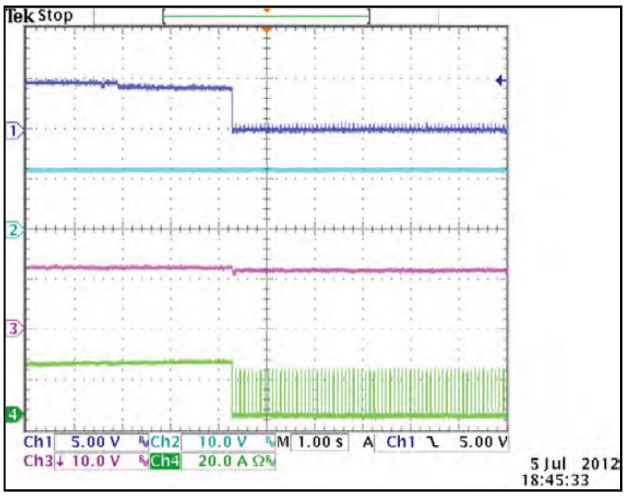


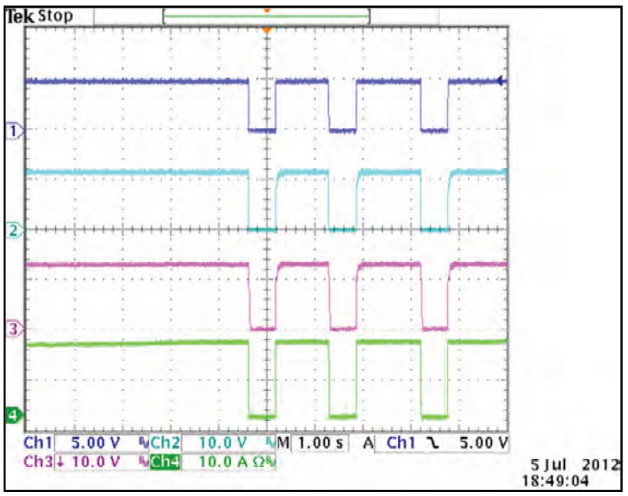


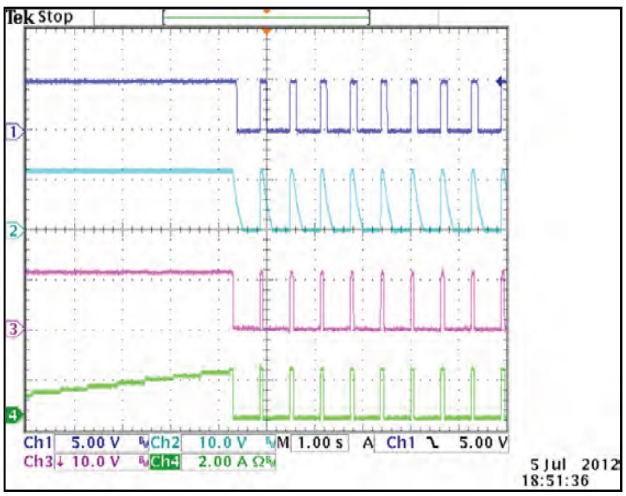


CHARACTERISTIC CURVES

Output Overload Characteristic V1, V2, V3:
Power supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention.

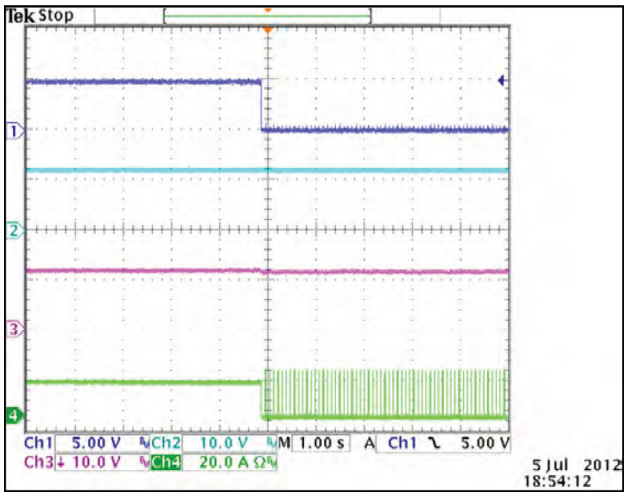


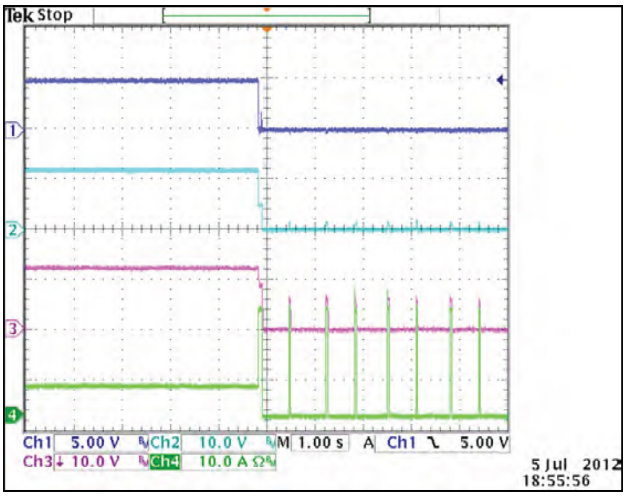


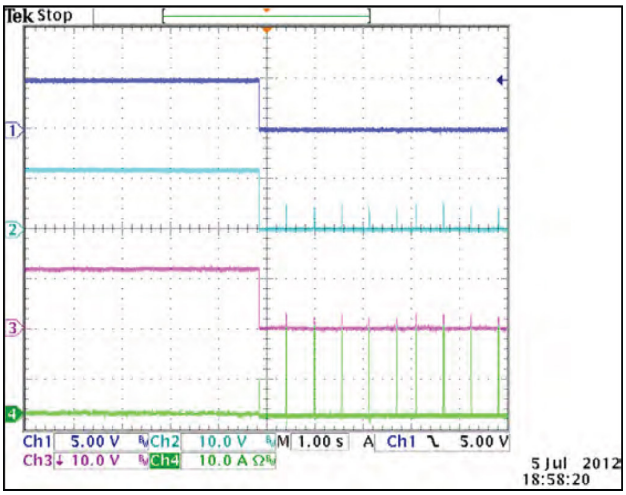


CHARACTERISTIC CURVES

Output Short Circuit Characteristic V1, V2, V3:
Power supply shall protect itself against Short Circuit conditions. The Power Supply shall recover from Short Circuit Conditions without operator intervention.

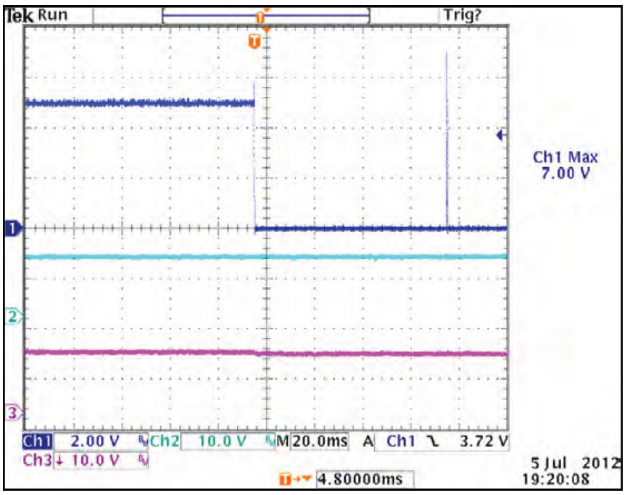


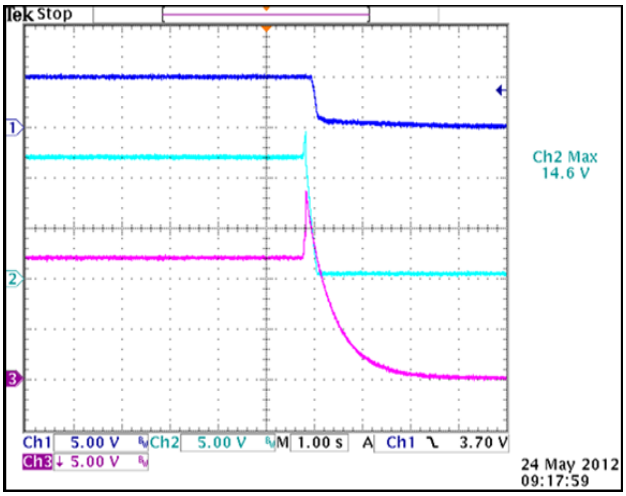




CHARACTERISTIC CURVES

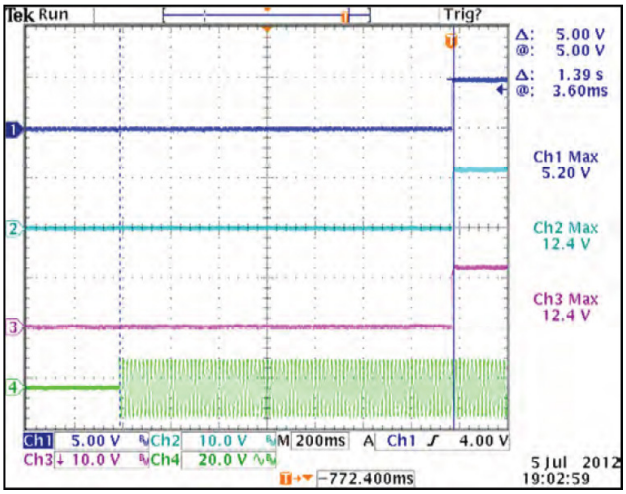
Output Overvoltage Characteristic V1, V2/V3:
Power supply shall protect itself against Overvoltage conditions. The Power Supply shall latch and require AC input recycle to reset.

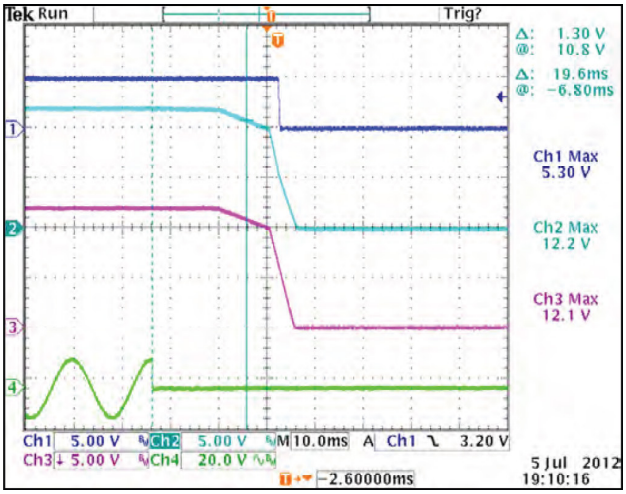




Startup Time
Start up time is less than 2 seconds.

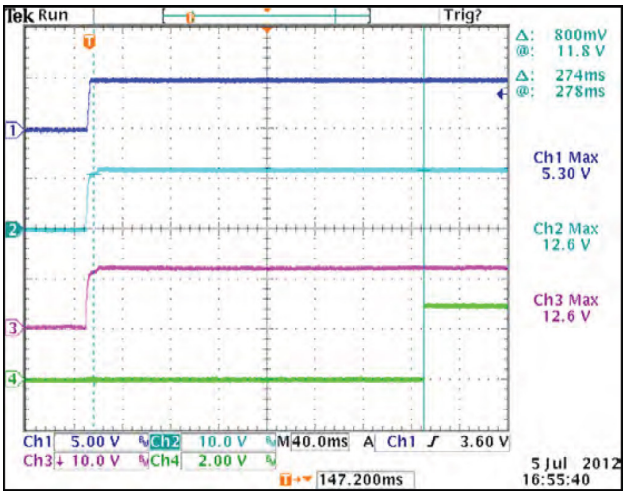
Hold-up Time
Hold up time is 16mS minimum.

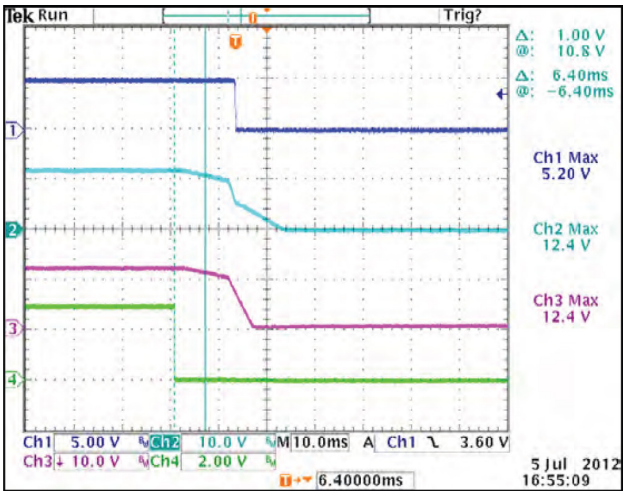




CHARACTERISTIC CURVES

Power Fail Signal Timing
Active Low TTL logic signal goes high 100-500 ms after main output. It goes low at least 6 mS before loss of regulation.





ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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