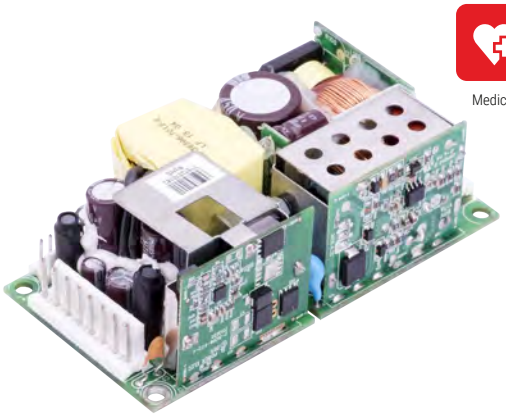
MINT3110 Family

110W Triple Output
Medical Grade



Medical

FEATURES AND BENEFITS

2" x 4" x 1.3" Package	FO0DTB0VM0JFD!71712.2-!4se!Fejujpo! ' !73479.2
Suitable for 1U Applications	2 x MOPP Isolation
Class I and Class II Versions	Power Fail Signal
110W w/air, 80W Convection Cooled	Remote Sense (optional)
Universal Input 90-264Vac	3 Year Warranty
Efficiency 87% Typical	RoHS Compliant

MODEL SELECTION

Model Number	Volts*		Output Current*** w/200LFM air	Convection	Ripple & Noise***	Total Regulation	OVP Threshold
MINT3110A0508K01	V1	5V	14.0A	10.0A	1.0% pk-pk	±2%	7.5V max.
	V2	12V	6.0A	4.5A	1.0% pk-pk	±3%	115%-135%
	V3	-12V	1.0A	1.0A	2.0% pk-pk	±10%	115%-135%
MINT3110A1708K01	V1	5V	14.0A	10.0A	1.0% pk-pk	±2%	7.5V max.
	V2	15V	4.5A	3.5A	1.0% pk-pk	±3%	115%-135%
	V3	-15V	1.0A	1.0A	2.0% pk-pk	±10%	115%-135%
MINT3110A1908K01	V1	5V	12.0A	8.0A	1.0% pk-pk	±2%	7.5V max.
	V2	24V	4.0A	3.0A	1.0% pk-pk	±3%	115%-135%
	V3	-24V	1.0A	1.0A	2.0% pk-pk	±10%	115%-135%

Notes:

1. * 5V output is adjustable with +/-5% range
2. ** Total convection power is 80 Watts
3. *** Measured with noise probe directly across output terminals, and load terminated with 0.1µF ceramic and 10µF low ESR capacitors. Ripple & Noise of V2 at no
4. load is 2% maximum

INPUT

AC Input	100-240Vac, ±10%, 47-63Hz, 1Ø 120–370Vdc
Input Current	115Vac: 1.5A, 230Vac: 0.75A
Inrush Current	264Vac, cold start: will not exceed 45A
Input Fuses	F1, F2: 2.5A, 250Vac fuses provided on all models
Earth Leakage Current	<290µA@264Vac, 60Hz, NC
Efficiency	87% typical at 230Vac

EMI/EMC COMPLIANCE

Conducted Emissions	EN55011/22 Class B, FCC Part 15, Subpart B, Class B
Radiated Emissions	EN55011/22 Class A; FCC Part 15, Subpart A, Class A
Static Discharge Immunity	EN61000-4-2, Criteria A, 8kV Contact Discharge, 8kV air discharge
Radiated RF Immunity	EN61000-4-3, 3V/m, Criteria A
EFT/Burst Immunity	EN61000-4-4, 2kV/5kHz, Criteria A
Line Surge Immunity	EN61000-4-5, 1kV differential, 2kV common-mode, Criteria A
Conducted RF Immunity	EN61000-4-6, 3Vms, Criteria A
Power Frequency Magnetic Field Immunity	EN61000-4-8, 3A/m, Criteria A
Voltage Dip Immunity	EN61000-4-11, 0% Vin, 0.5cycle; 40% Vin, 5cycle 70% Vin, 25 cycles; Criteria A
Line Harmonic Emissions	EN61000-3-2, Class A,B,C, & D
Flicker Test	EN61000-3-3, Complies (dmax<6%)

PROTECTION

Overvoltage Protection	See models chart for trip range
Short Circuit Protection	Provided - no damage will occur if the output is shorted
Overload Protection	150%-300% above rating for V2 & V3, 110% 200% for V1, Hiccup Mode

RELIABILITY

MTBF	245,000 hours, 25°C Ambient, 110Vac input

OUTPUT

Output Voltage	See models chart
Output Power	110W continuous with 200 lfm airflow, 80W convection cooled – See chart for specific voltage model ratings
Turn On Time	Less than 2 sec. @115Vac (inversely proportional to input voltage and thermistor temperature)
Hold-up Time	16mS typical at 110W, 120Vac input
Ripple and Noise	See models chart
Total Regulation	See models chart
Switching Frequency	PFC: Variable 30-400kHz. Main Converter: Variable 35-180kHz, 65-70kHz at full load
Minimum Load	Not required

ENVIRONMENT

Operating Temperature	-10°C to +70°C
Relative Humidity	5% to 95%, non-condensing
Weight	200g
Dimensions	W: 2.0" x L: 4.0" x H: 1.3"
Temperature Derating	Derate output power linearly above 50°C to 50% at 70°C
Altitude	Operating: -500 to 10,000 ft. Non-operating: -500 to 40,000 ft
Storage Temperature	-40°C to +85°C
Vibration	Operating: 0.003g²/Hz, 1.5grms overall, 3 axes, 10 min/axis Non-Operating: 0.026g²/Hz, 5.0grms overall, 3 axes, 1 hr/axis
Shock	Operating: Half-sine, 20gpk, 10ms, 3 axes, 6 shocks total Non-Operating: Half-sine, 40 gpk, 10 ms, 3 axes, 6 shocks total

ISOLATION

Isolation	Input-Output: 4000Vac, 2 x MOPP Input-Ground: 1800Vac, 1 x MOPP Output-Ground: 500Vac

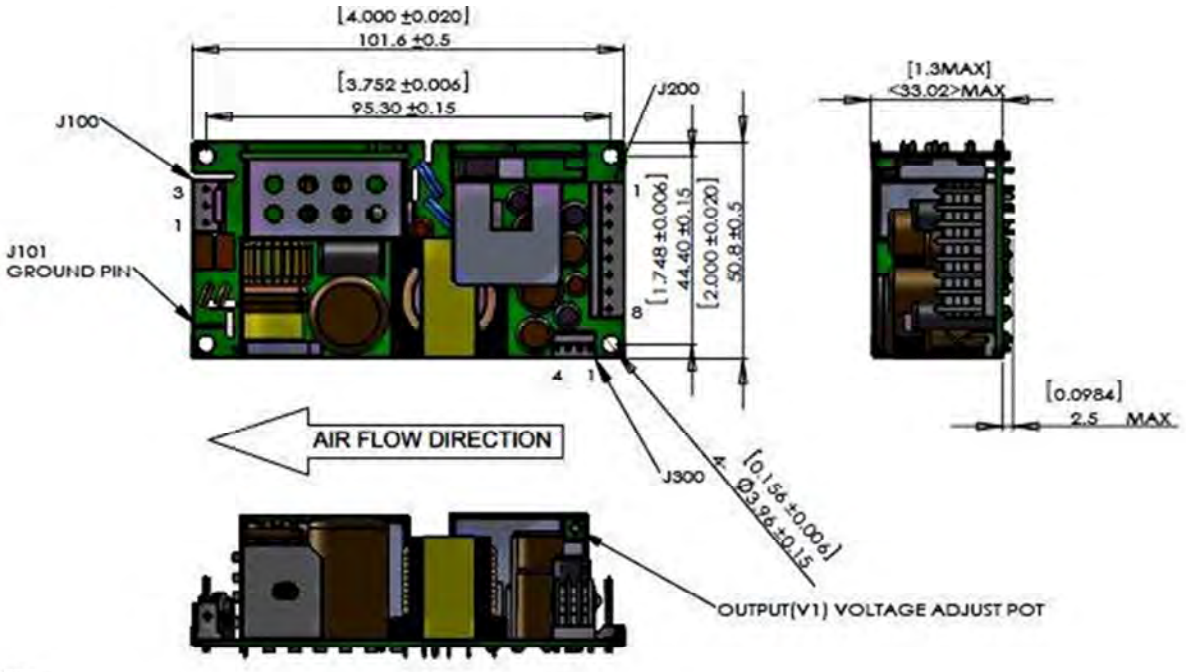
SAFETY

Safety Standards	EN/CSA/IEC/UL62368-1

AUXILIARY SIGNALS

AC Power Fail:	Remote Sense:	DC OK:
During normal operation, stays HIGH. Signal goes LOW with at least 6mS warning before loss of DC output from AC failure.	(5V output, optional) Will compensate for 0.5V drop min. Will operate without remote sense connected. Reverse connection protected.	Open collector logic signal goes and stays HIGH 100mS to 500mS after main output reaches regulation.

MECHANICAL DRAWING



Notes:

1. All dimensions in inches (mm), tolerance is +.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" (5m) in height

CONNECTOR INFORMATION

Input Connector J100	Ground J101	DC Output Connector J200			Signal Connector J300
PIN 1) AC NEUTRAL PIN 2) EMPTY PIN 3) AC LINE	0.187" FASTON TAB	PIN 1) +V1 PIN 2) +V1 PIN 3) GND	PIN 4) GND PIN 5) GND PIN 6) GND	PIN 7) V2 PIN 8) V3	PIN 1) Power Fail/DC OK PIN 2) GND PIN 3) +Remote Sense PIN 4) –Remote Sense
Mating Connector: Molex 09-50-3031 Pins= 08-52-0072 AMP #640250-3 Pins= 3-640706-1	Mating Connector: Molex 01-90020001	Mating Connector: Amp #640250-8 Pins=Amp #3-640706-1			Mating Connector: Amp #1375820-4 Pin= Amp #1375819

ISOLATION SPECIFICATIONS

Parameter	Conditions/Description	Min	Nom	Max	Units
Insulation Safety Rating	Input/Ground Input/Output Output/Ground	Basic (1 MOPP) Reinforced (2 MOPP) Operational			
Electric Strength Test Voltage	Input/Ground Input/Output Output/Ground	1800 4,000 500	-	-	Vac Vac Vac

LEAKAGE CURRENT

Parameter	Conditions/Description	Max
Earth Leakage Current	Normal Condition (NC) Single Fault Condition (SFC)	290µA 420µA
Touch Current	Normal Condition (NC) Single Fault Condition (SFC)	90µA 170µA

INPUT SPECIFICATIONS

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Voltage		90	115/230	264	Vac
Input Frequency		47	50/60	63	Hz
Input Current	115Vac/max load			1.5	A
Input Current	230Vac/max load			0.75	A
Inrush Current	264Vac, cold start, 25°C	-	-	45	A
Efficiency	Vi_{nom}, Io_{nom} MINT3110A0508K01 MINT3110A1708K01 MINT3110A1908K01	-	87%	-	%

OUTPUT SPECIFICATIONS

Parameter	Conditions/Description	Min	Nom	Max	Units
Output Current V1 Output Current V2 Output Current V3	MINT3110A0508K01	0 0 0	10.0 4.5 1	14.0 6.0 1	ADC
Output Current V1 Output Current V2 Output Current V3	MINT3110A1708K01	0 0 0	10.0 3.5 1	14.0 4.5 1	ADC
Output Current V1 Output Current V2 Output Current V3	MINT3110A1908K01	0 0 0	8.0 3.0 1	12.0 4.0 1	ADC

OUTPUT SPECIFICATIONS (CONTINUED)

Parameter	Conditions/Description	Min	Nom	Max	Units
Static Line Regulation V1	*Vi* min-*Vi* max, $Vi_{nom,}$ 0-100% *Io*1 max	-2	-	2	% *Vo* nom
Static Line Regulation V2	*Vi* min-*Vi* max, $Vi_{nom,}$ 0-100% *Io*2 max	-3	-	3	% *Vo* nom
Static Line Regulation V3	*Vi* min-*Vi* max, $Vi_{nom,}$ 0-100% *Io*3 max	-10	-	10	% *Vo* nom
Static Load Regulation V1 (Droop Characteristic)	*Vi* min-*Vi* max, $Vi_{nom,}$ 0-100% *Io*1 max	-2	-	2	% Vo nom
Static Load Regulation V2 (Droop Characteristic)	*Vi* min-*Vi* max, *Vi* nom, 0-100% *Io*2 max	-3	-	3	% Vo nom
Static Load Regulation V3 (Droop Characteristic)	*Vi* min-*Vi* max, *Vi* nom, 0-100% *Io*3 max	-10	-	10	% Vo nom
Hold-Up Time	Vin = 120Vac, Po = 110W	16	-	-	mS
Dynamic Load Regulation V1, V2, V3	Load change =50%, di/dt = 0.2A/µS	0	-	3	% Vo nom
Start-Up Time	*Vin* = 115Vac, *Io* nom	0	-	2	S
Ripple & Noise V1	20MHz bandwidth	0	-	1%	% Vo nom
Ripple & Noise V2	20MHz bandwidth	0	-	1%	% Vo nom
Ripple & Noise V3	20MHz bandwidth	0	-	2%	% Vo nom

PROTECTION

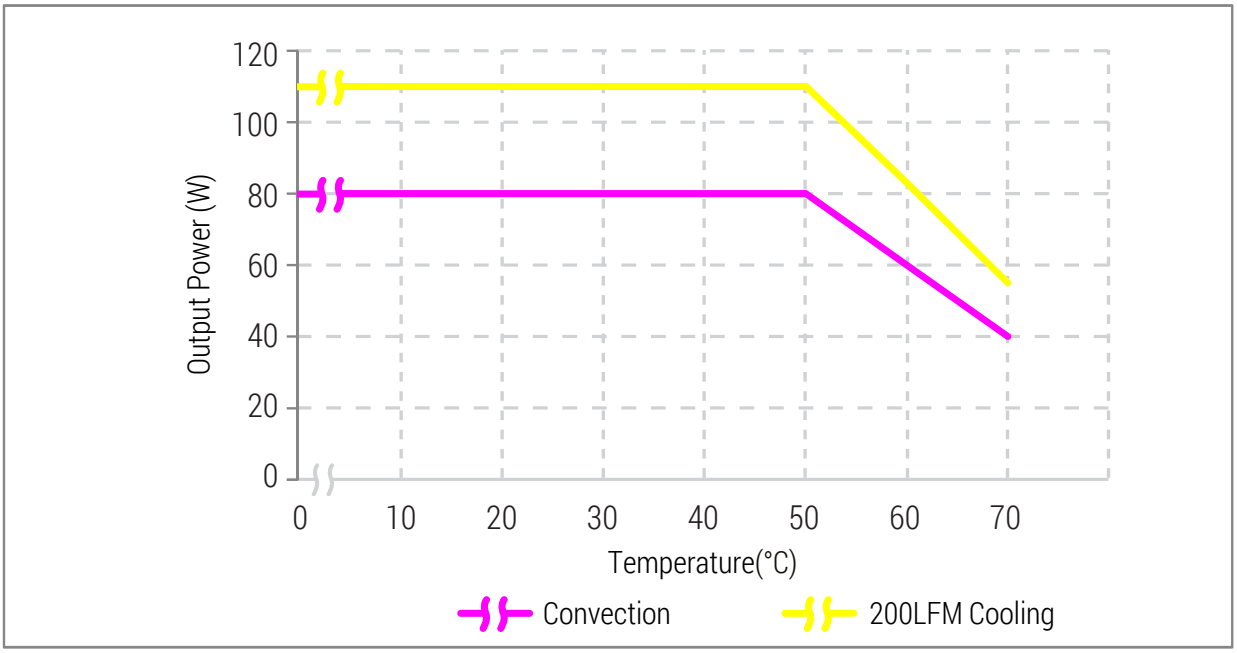
All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Fuse	T2.5A/250V internal fuse in both line & neutral	Not user accessible			
Input Transient Protection	2KV(CM) and 1KV(DM) surge			2	KV (CM)
Short Circuit Protection		Hiccup Mode			
Overload Protection		Hiccup Mode			
Overvoltage Protection	Latching Type, recycle AC input to reset	See models chart for trip ranges			

CHARACTERISTIC CURVES

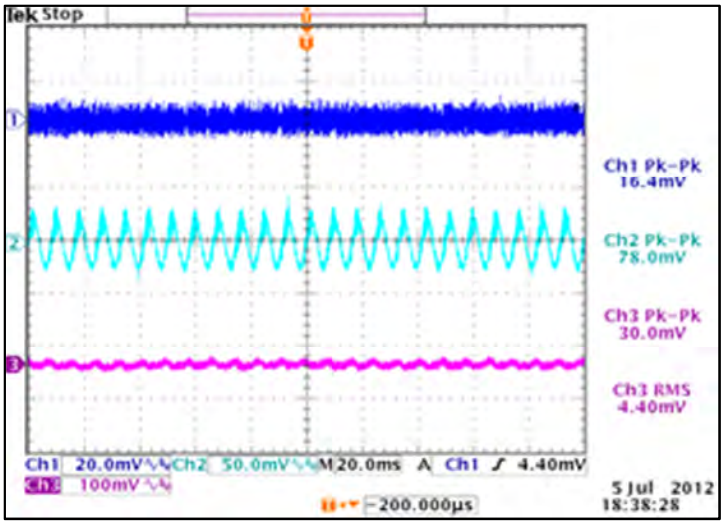
Output vs. Temperature

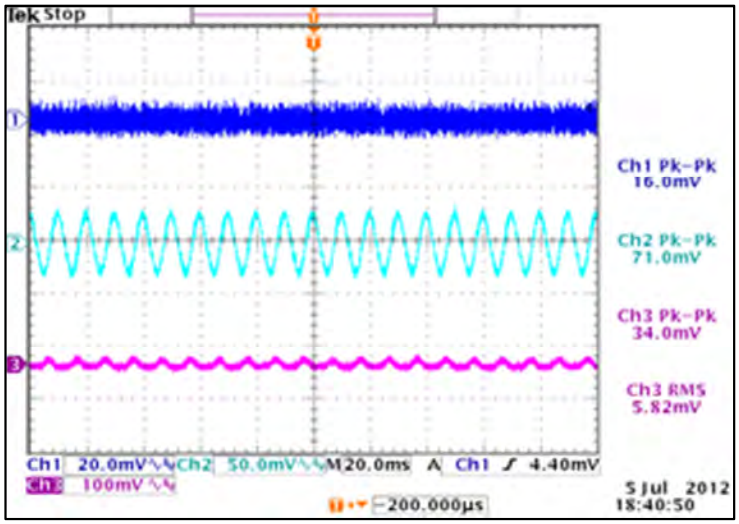
80W convection cooled and 110W continuous with 200 LFM airflow. Derate output power to 50% at 70°C.



Ripple & Noise

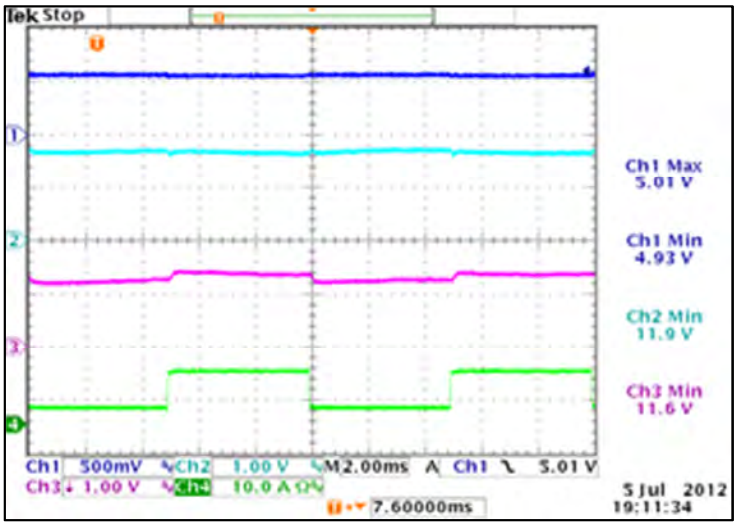
To verify that the output ripple and noise does not exceed the level specified in the product specification. Measured using a scope probe socket with 0.1μF ceramic and a 10μF electrolytic capacitor connected in parallel across it, BW limit with 20MHz

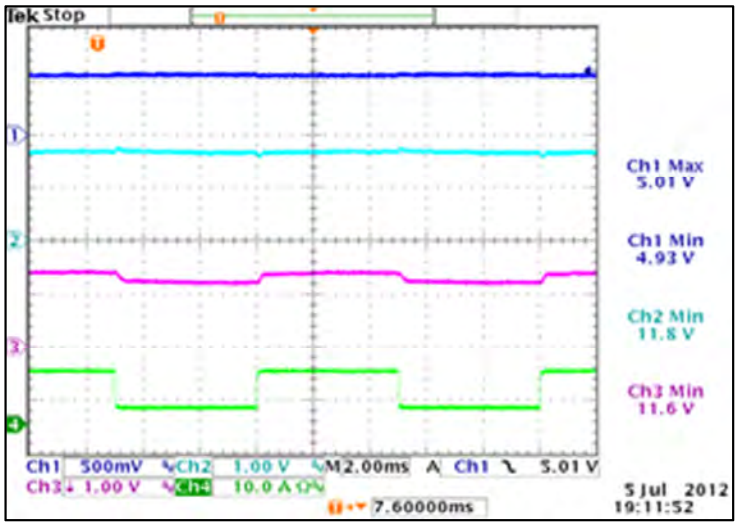




Output Transient Response V1

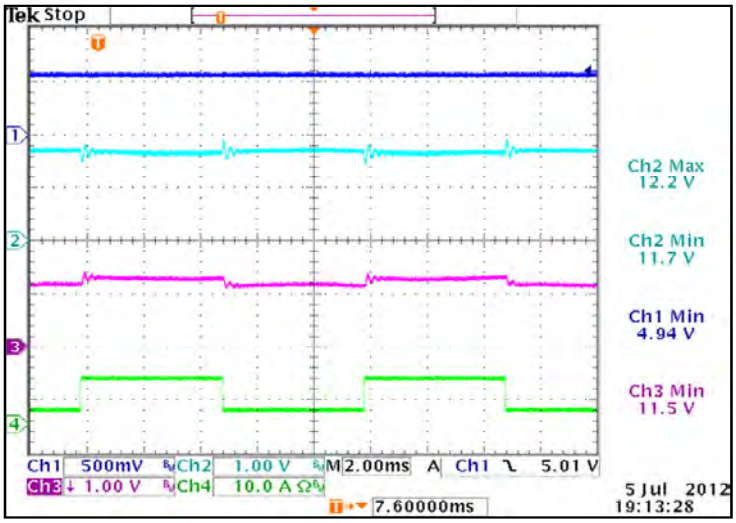
50% load step within the regulation limits of minimum and maximum load, di/dt<0.2A/µSec. Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%

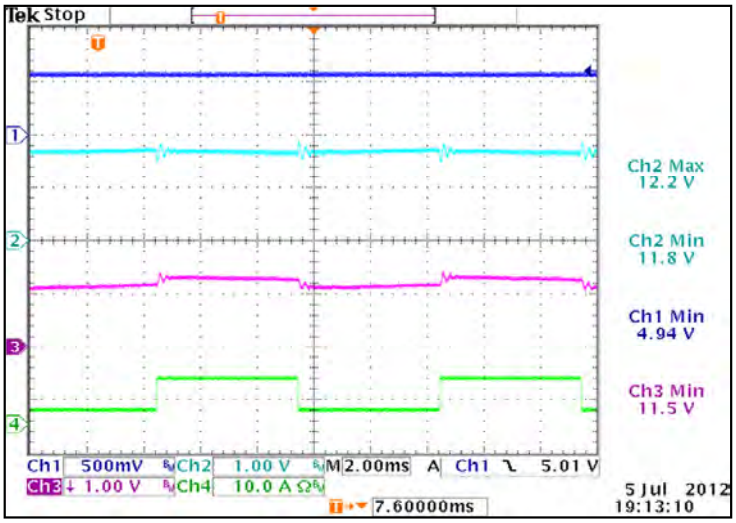




Output Transient Response V2

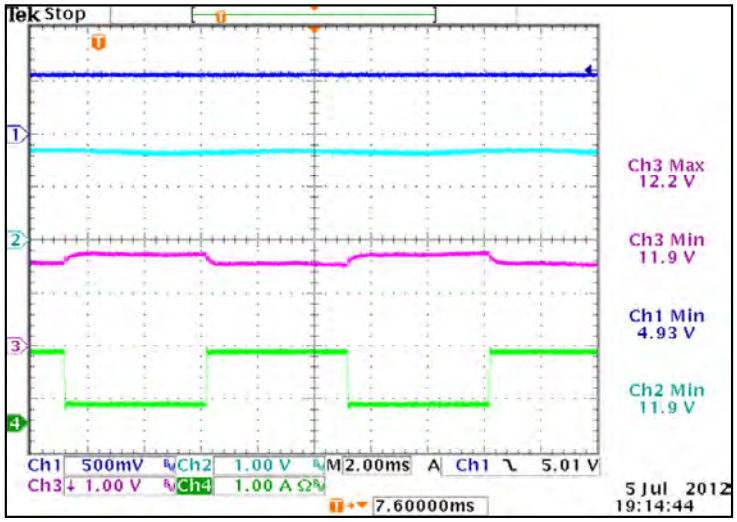
50% load step within the regulation limits of minimum and maximum load, di/dt<0.2A/µSec. Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%

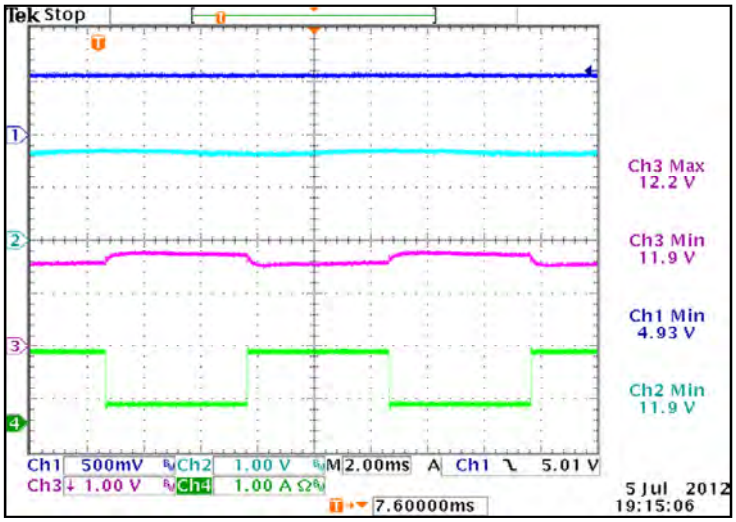




Output Transient Response V3

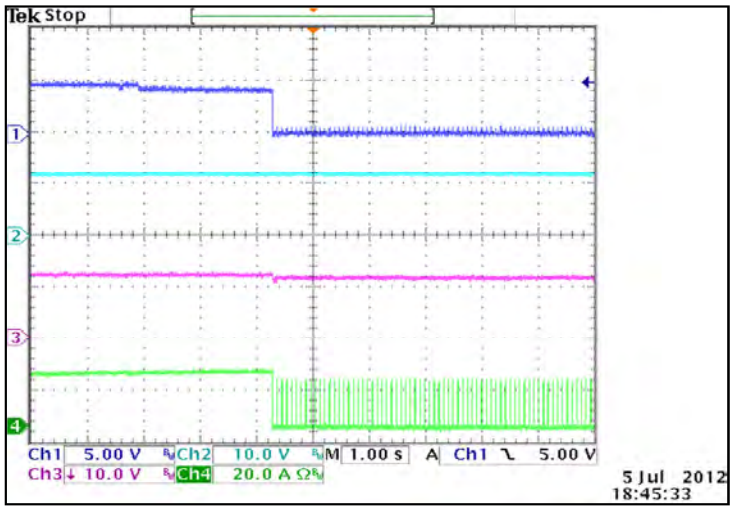
50% load step within the regulation limits of minimum and maximum load, di/dt<0.2A/µSec. Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%

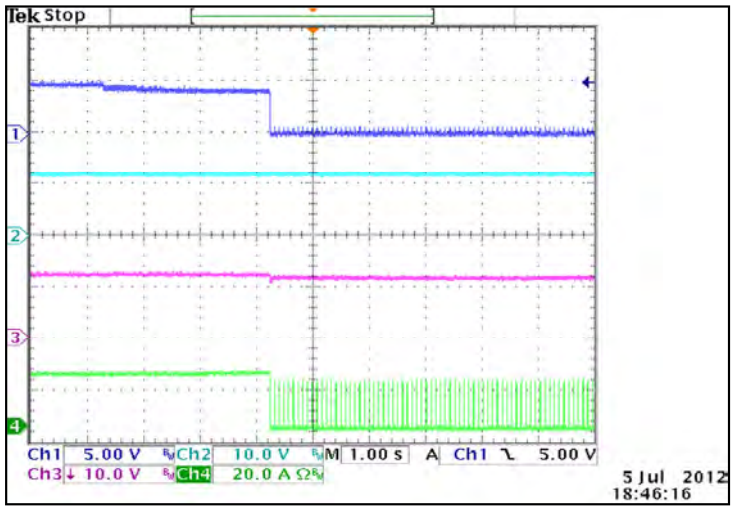




Output Overload Characteristic V1

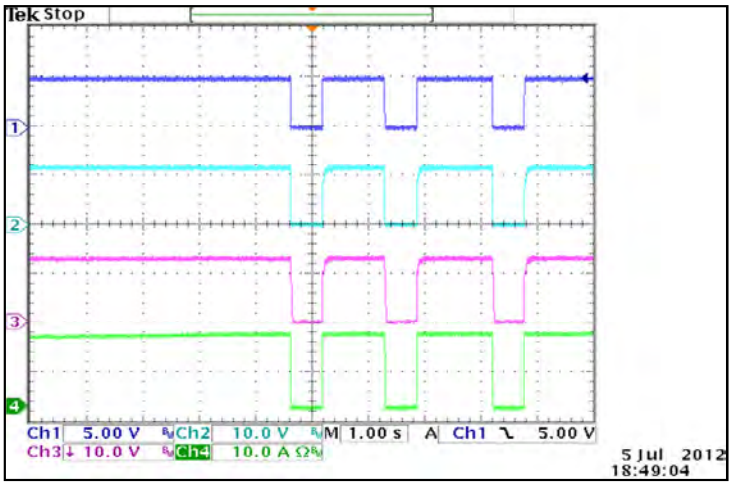
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention

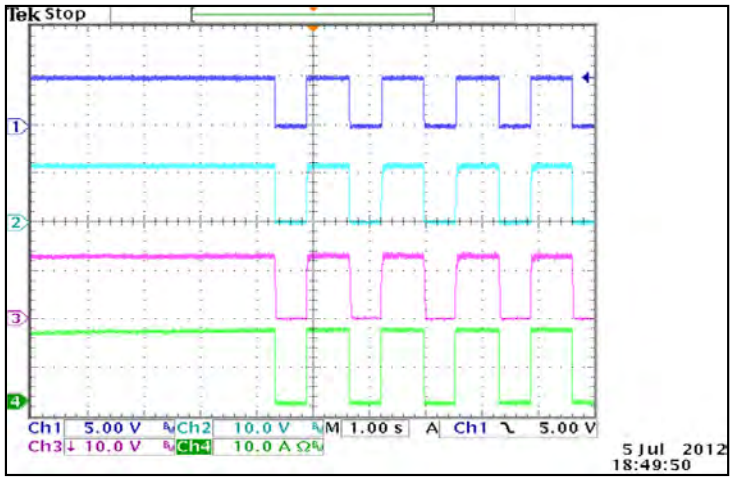




Output Overload Characteristic V2

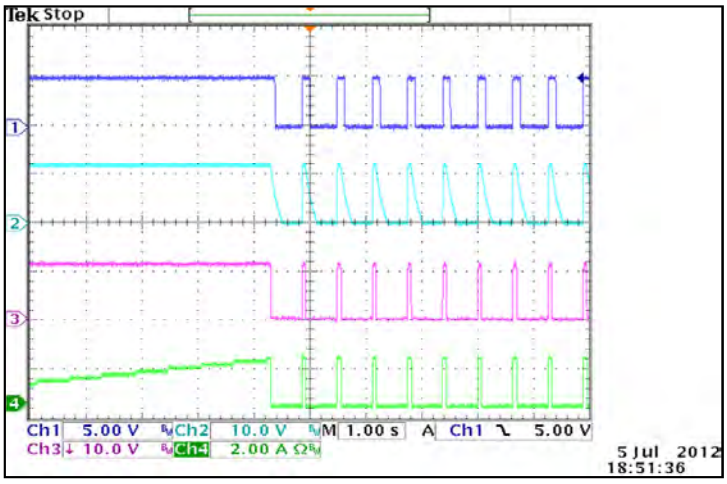
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention

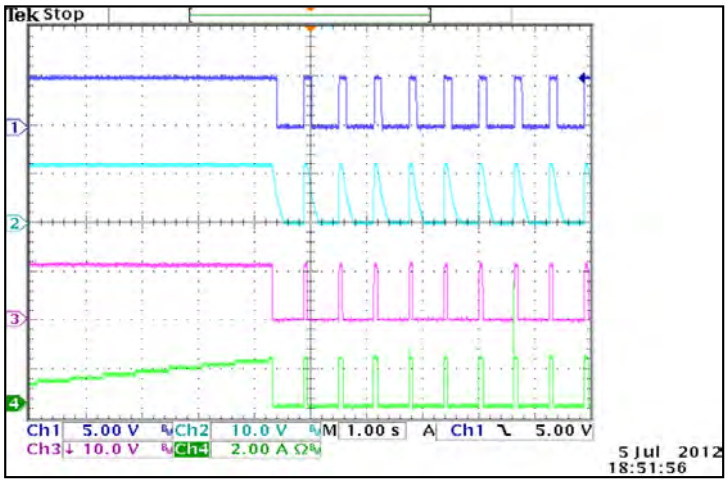




Output Overload Characteristic V3

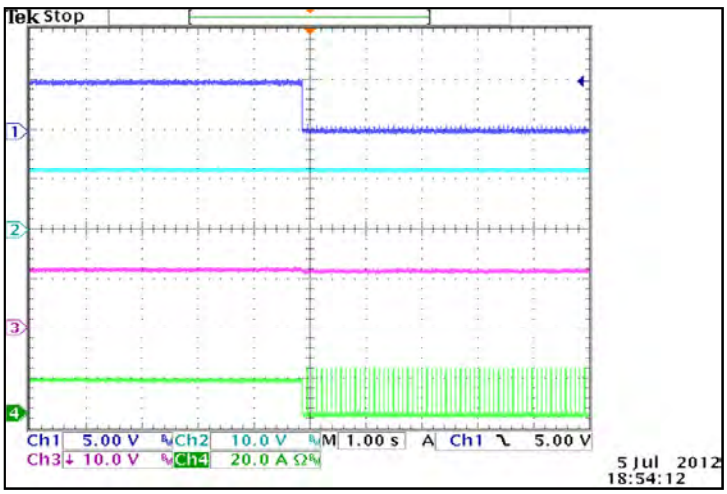
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention

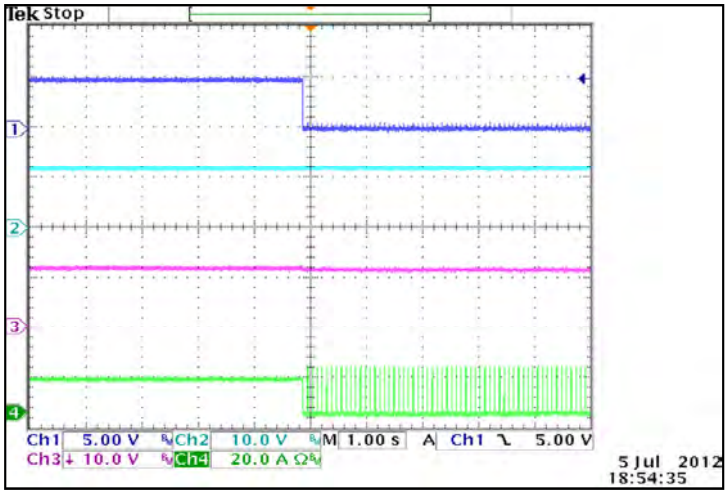




Output Overload Characteristic V1

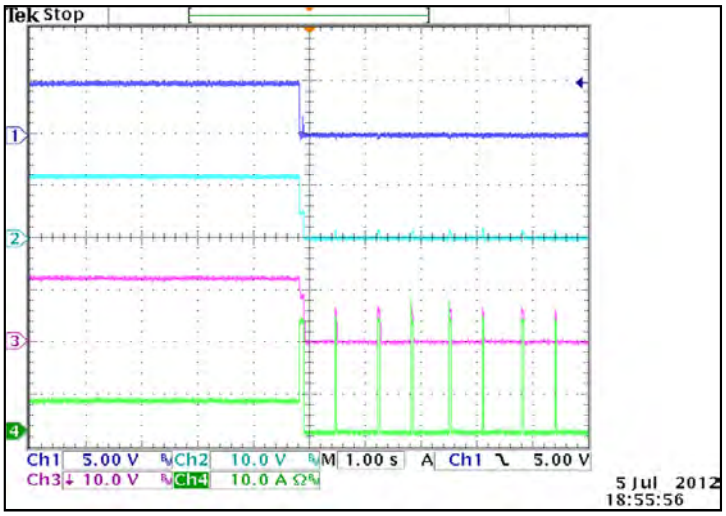
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention

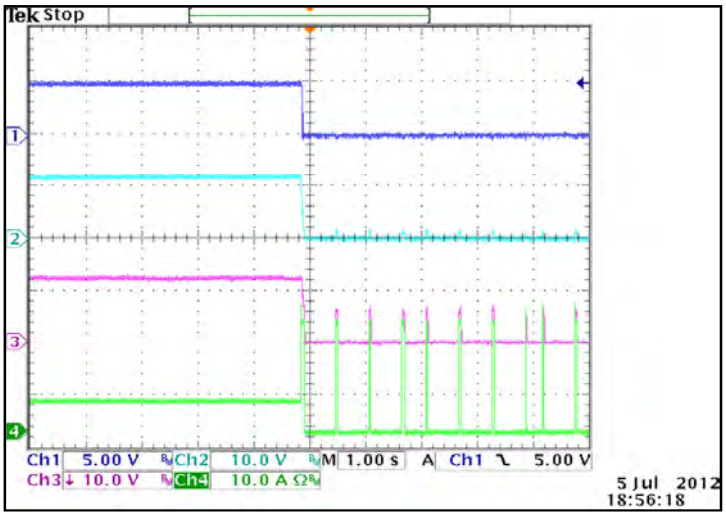




Output Overload Characteristic V2

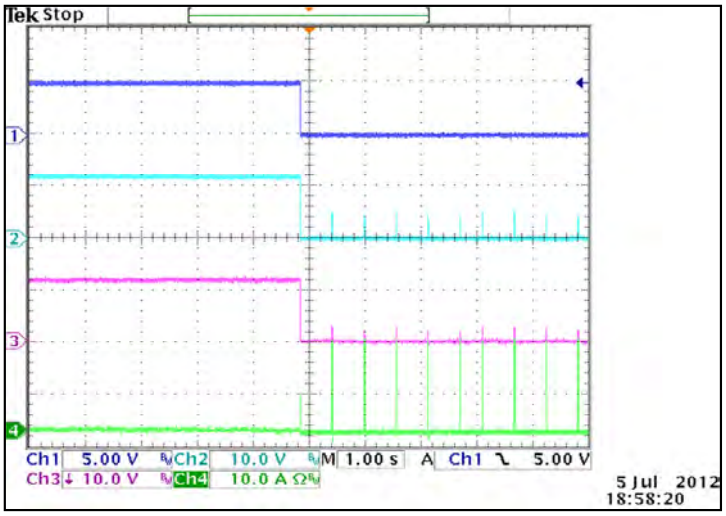
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention

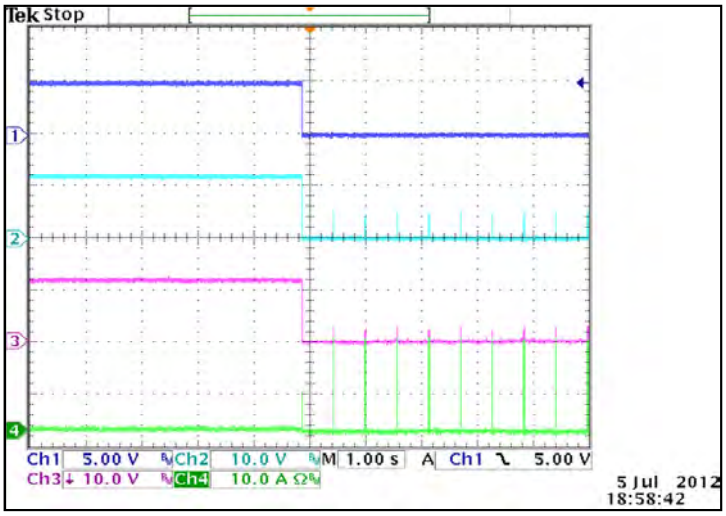




Output Overload Characteristic V3

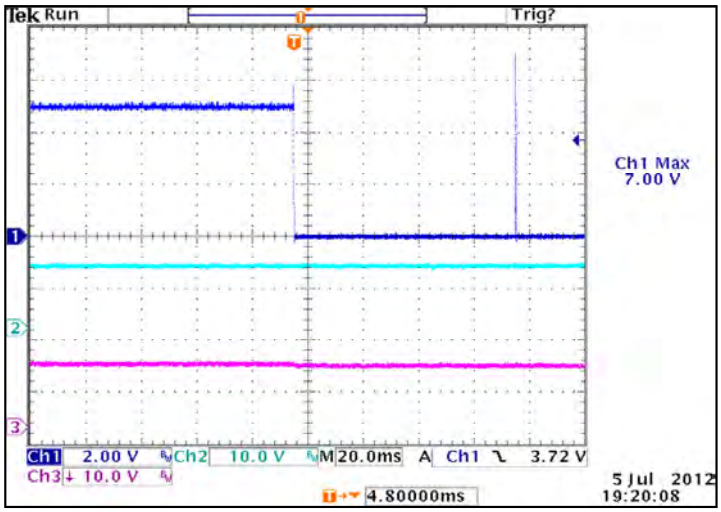
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention

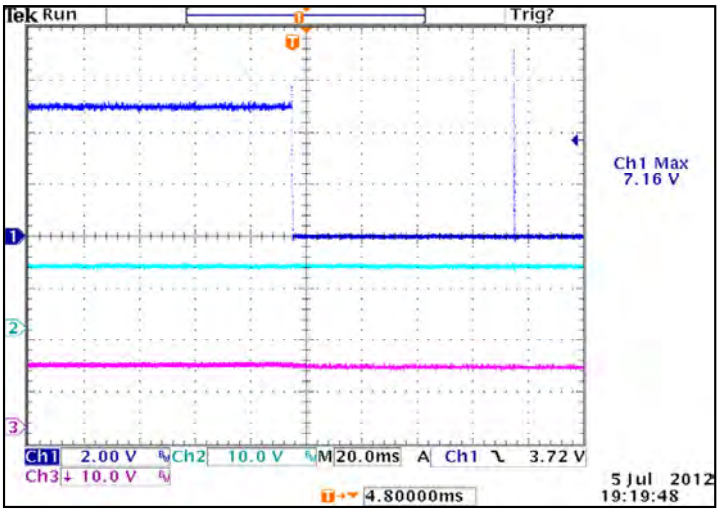




Output Overload Characteristic V1

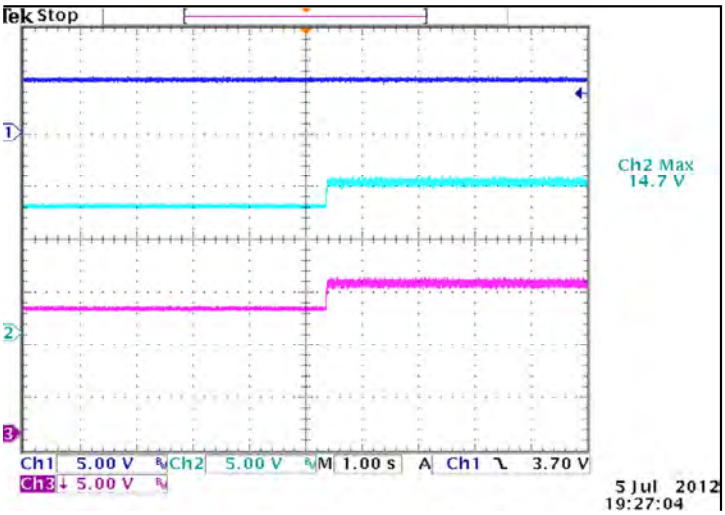
Supply shall protect itself against Overload conditions. The Power Supply shall latch and require AC input recycle to reset

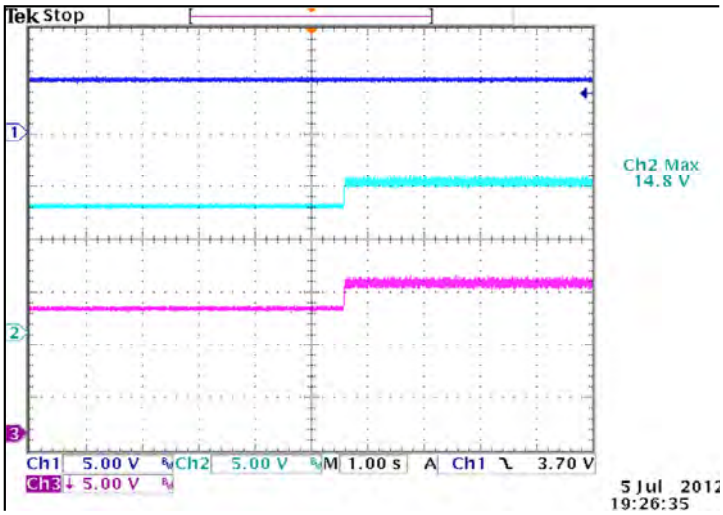




Output Overload Characteristic V2

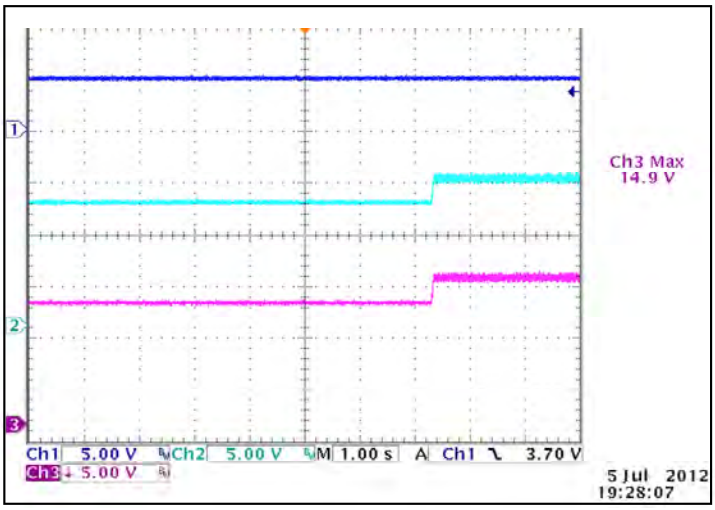
Supply shall protect itself against Overload conditions. The Power Supply shall latch and require AC input recycle to reset

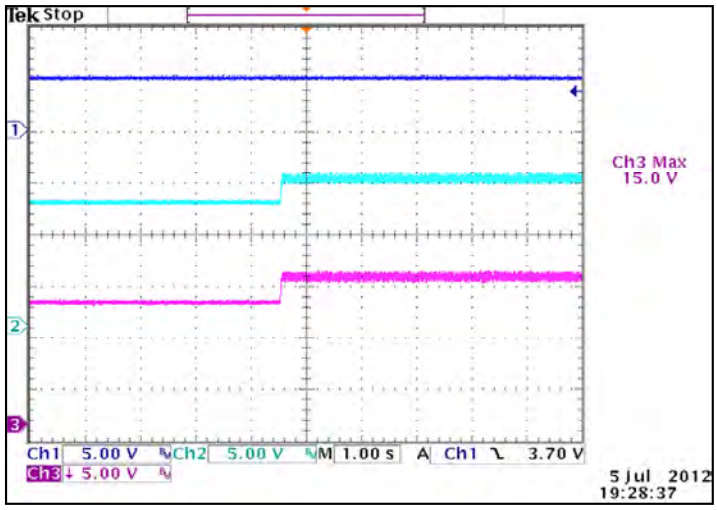




Output Overload Characteristic V3

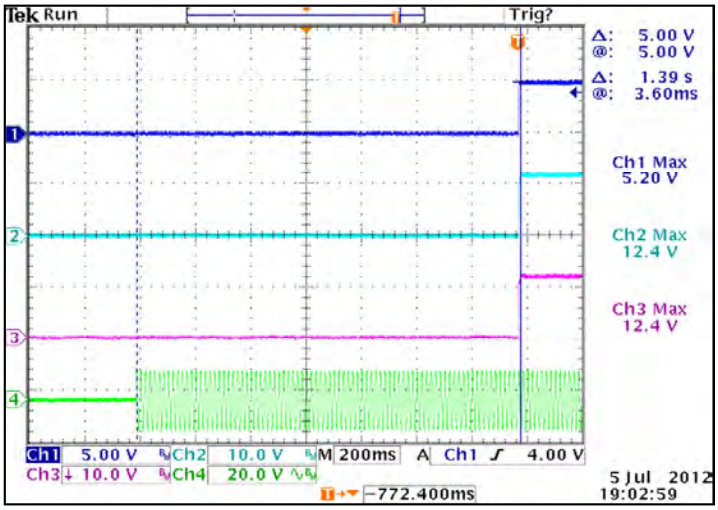
Supply shall protect itself against Overload conditions. The Power Supply shall latch and require AC input recycle to reset





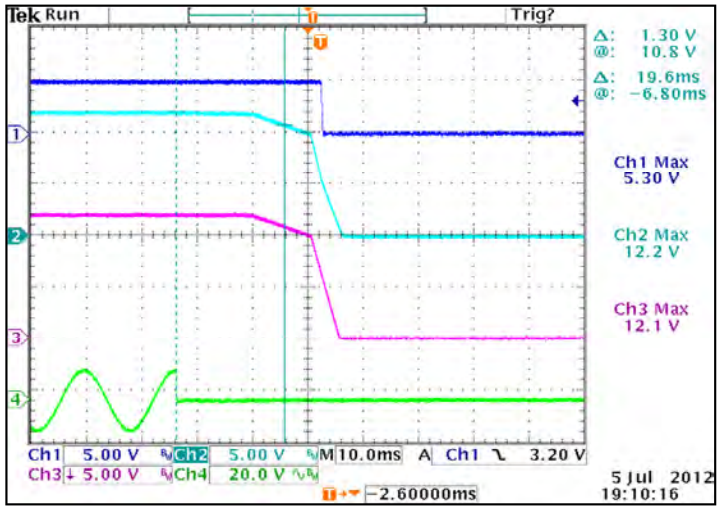
Startup Time

Start up time is <2seconds



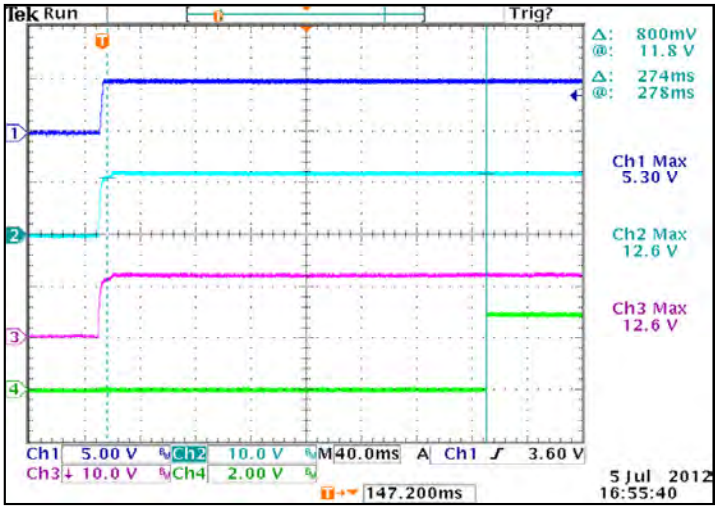
Hold-up Time

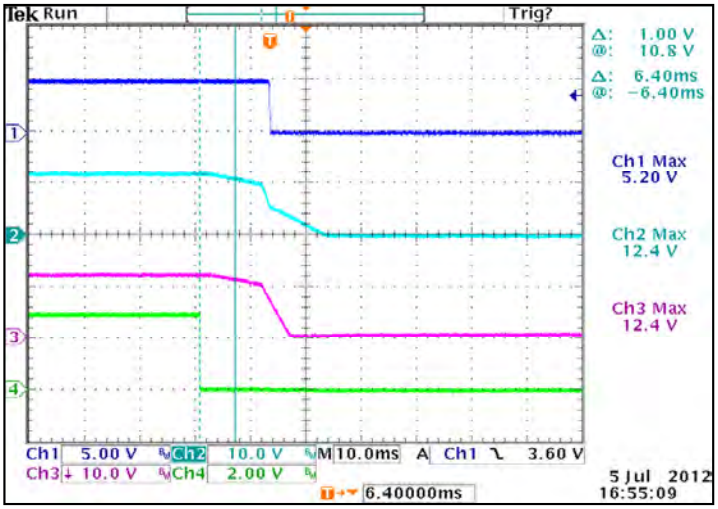
Hold up time is 16mS minimum



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





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