

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***		Ripple & Noise***	Total Regulation	OVP Threshold
			w/200LFM air	Convection			
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:

- \* 5V output is adjustable with +/-5% range
- \*\* Total convection power is 80 Watts
- \*\*\* 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 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
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### 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: 0.003g <sup>2</sup> /Hz, 1.5grms overall, 3 axes, 10 min/axis Non-Operating: 0.026g <sup>2</sup> /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
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### SAFETY

Safety Standards	EN/CSA/IEC/UL62368-1
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### ISOLATION SPECIFICATIONS

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

### LEAKAGE CURRENT

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

### 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	$V_i$ , $I_o$ MINT3110A0508K01 MINT3110A1708K01 MINT3110A1908K01	-	87%	-	%

### OUTPUT SPECIFICATIONS

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



## OUTPUT SPECIFICATIONS (CONTINUED)

Parameter	Conditions/Description	Min	Nom	Max	Units
Static Line Regulation V1	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o1}$ max	-2	-	2	% $V_o$ nom
Static Line Regulation V2	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o2}$ max	-3	-	3	% $V_o$ nom
Static Line Regulation V3	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o3}$ max	-10	-	10	% $V_o$ nom
Static Load Regulation V1 (Droop Characteristic)	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o1}$ max	-2	-	2	% $V_o$ nom
Static Load Regulation V2 (Droop Characteristic)	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o2}$ max	-3	-	3	% $V_o$ nom
Static Load Regulation V3 (Droop Characteristic)	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o3}$ max	-10	-	10	% $V_o$ nom
Hold-Up Time	$V_{in} = 120V_{ac}$ , $P_o = 110W$	16	-	-	mS
Dynamic Load Regulation V1, V2, V3	Load change =50%, $di/dt = 0.2A/\mu S$	0	-	3	% $V_o$ nom
Start-Up Time	$V_{in} = 115V_{ac}$ , $I_o$ nom	0	-	2	S
Ripple & Noise V1	20MHz bandwidth	0	-	1%	% $V_o$ nom
Ripple & Noise V2	20MHz bandwidth	0	-	1%	% $V_o$ nom
Ripple & Noise V3	20MHz bandwidth	0	-	2%	% $V_o$ nom

## PROTECTION

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

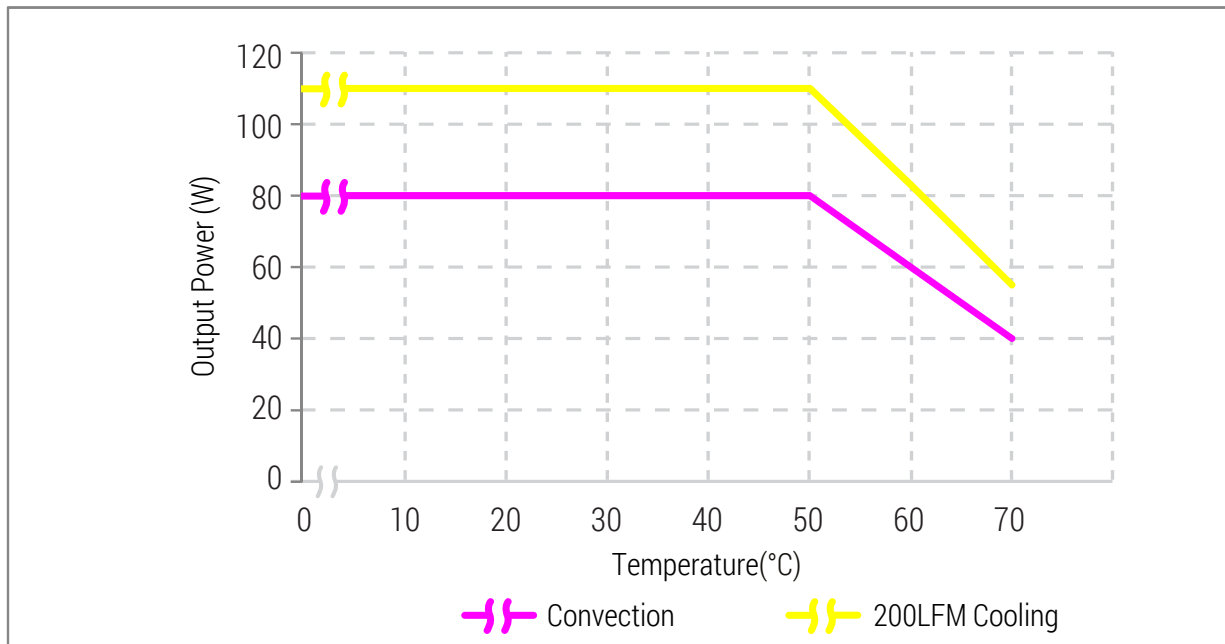
Parameter	Conditions/Description	Min	Nom	Max	Units
Input Fuse	T2.5A/250V internal fuse in both line & neutral	Not user accessible			
Input Transient Protection	2KV(CM) and 1KV(DM) surge			2	KV (CM)
Short Circuit Protection		Hiccup Mode			
Overload Protection		Hiccup Mode			
Overvoltage Protection	Latching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



## CHARACTERISTIC CURVES

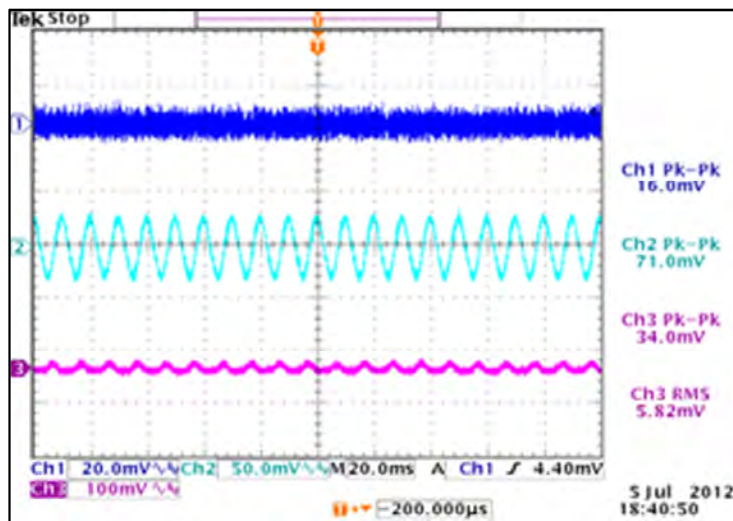
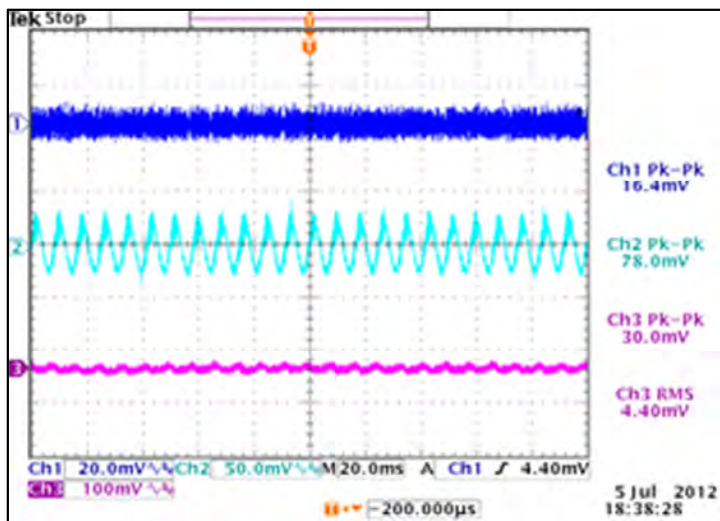
### Output vs. Temperature

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



### Ripple & Noise

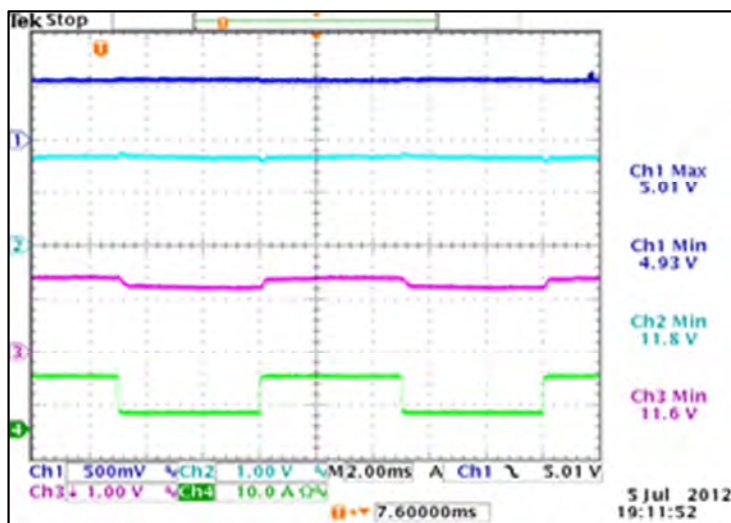
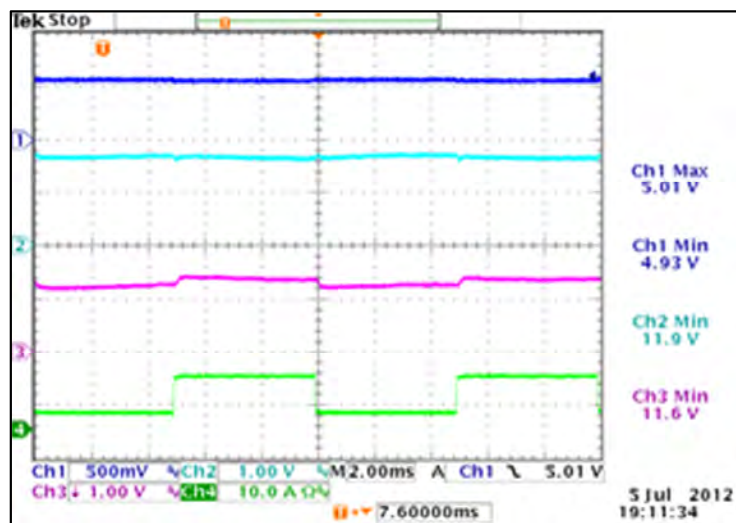
To verify that the output ripple and noise does not exceed the level specified in the product specification. Measured using a scope probe socket with 0.1µF ceramic and a 10µF electrolytic capacitor connected in parallel across it, BW limit with 20MHz





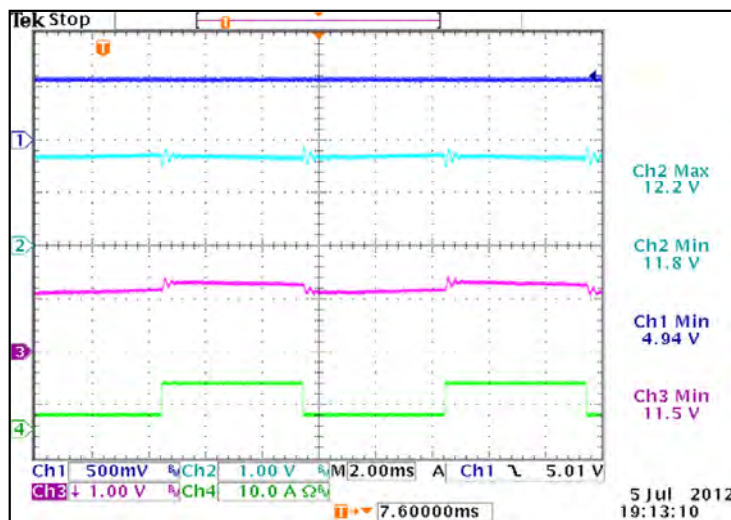
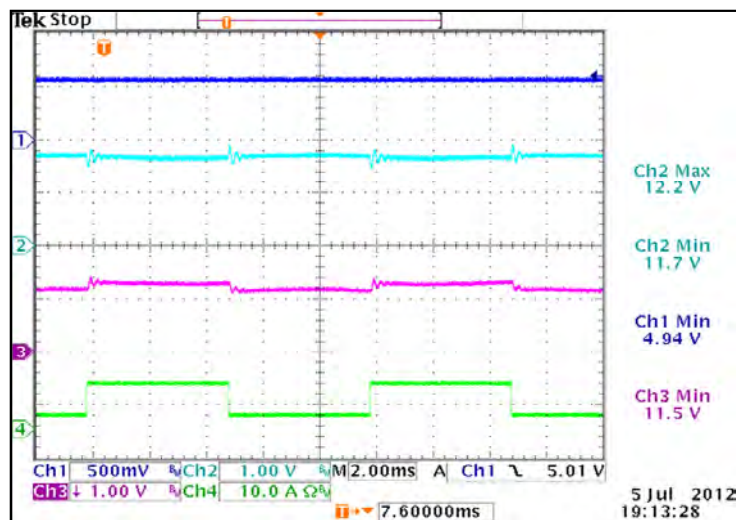
### Output Transient Response V1

50% load step within the regulation limits of minimum and maximum load,  $di/dt < 0.2A/\mu\text{Sec}$ . 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

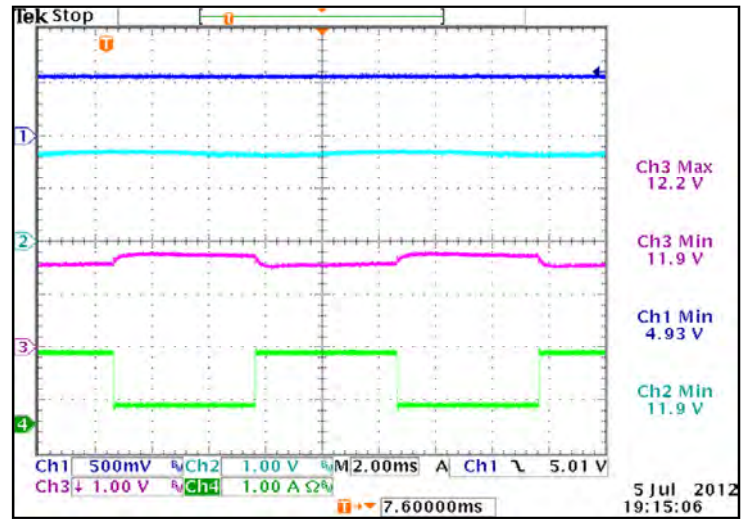
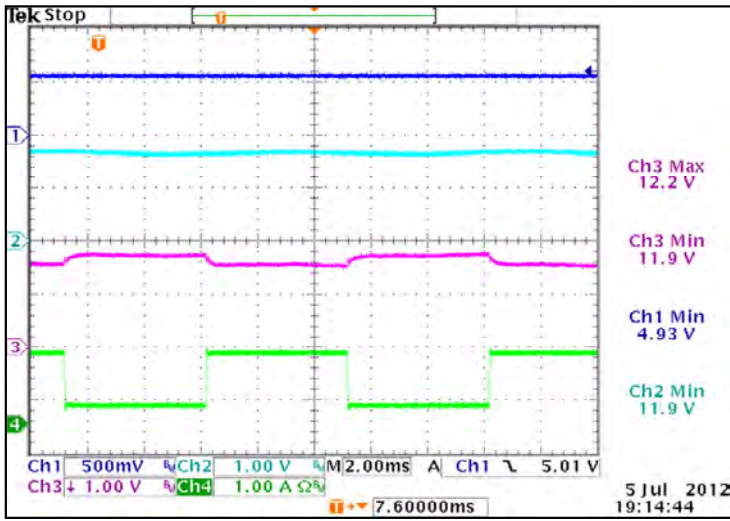
50% load step within the regulation limits of minimum and maximum load,  $di/dt < 0.2A/\mu\text{Sec}$ . Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%





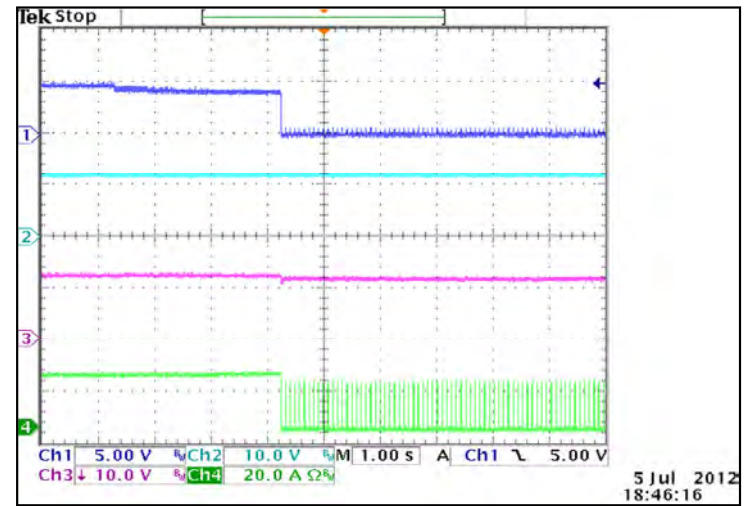
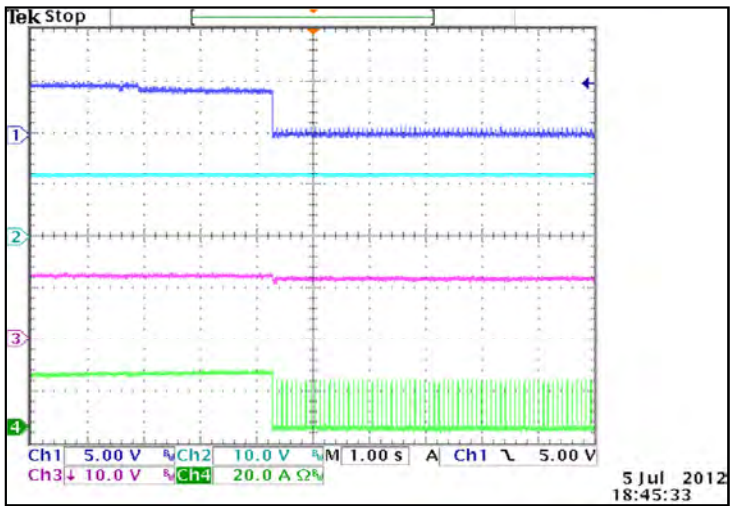
### Output Transient Response V3

50% load step within the regulation limits of minimum and maximum load,  $di/dt < 0.2A/\mu Sec$ . 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

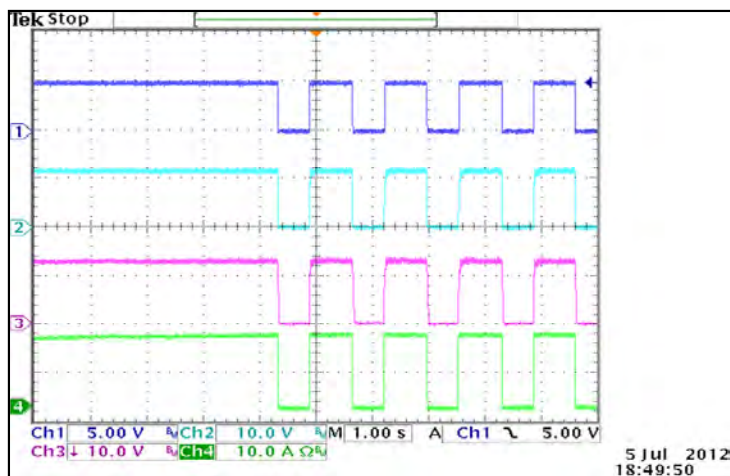
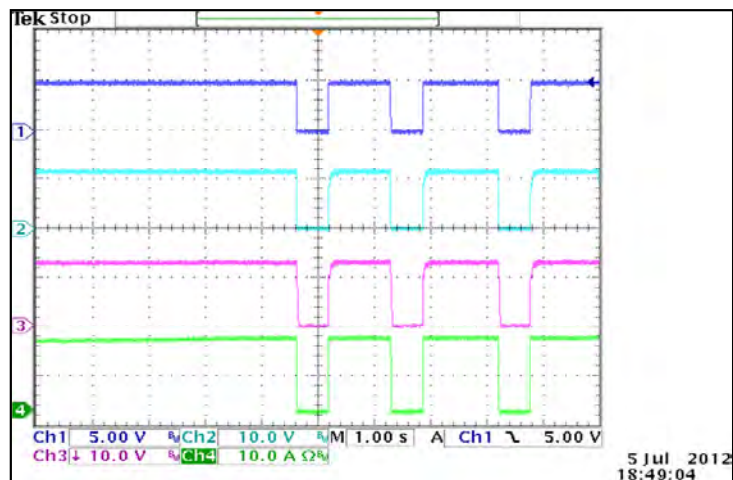






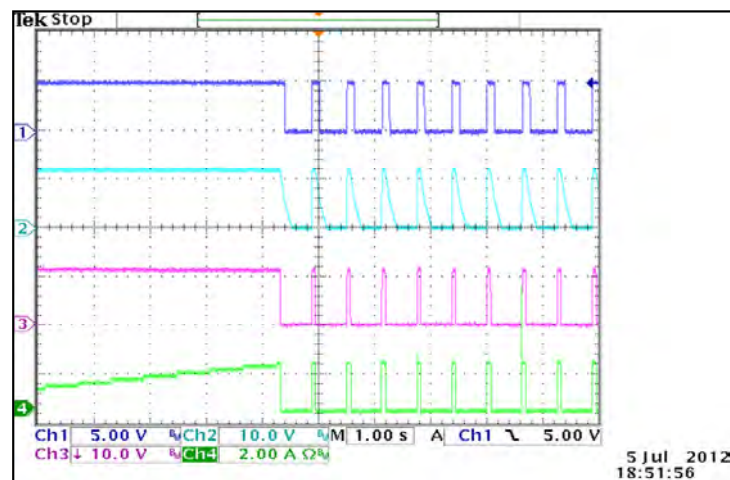
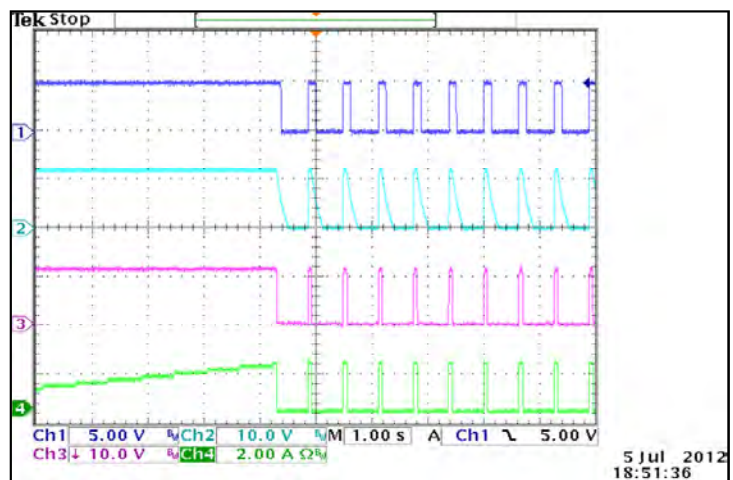
### Output Overload Characteristic V2

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



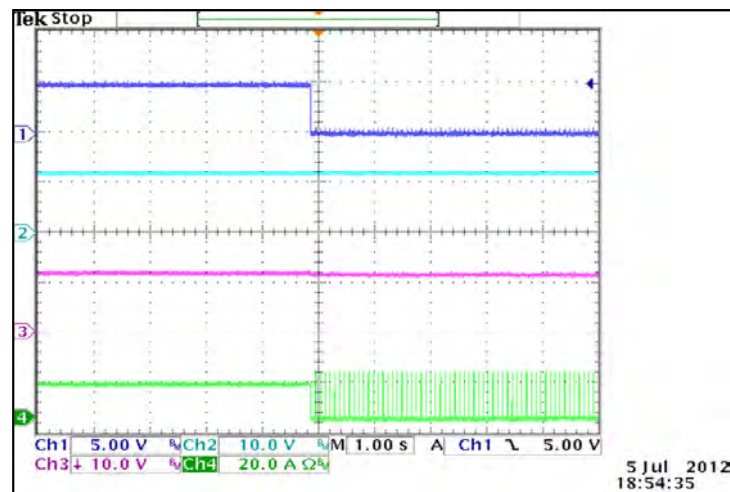
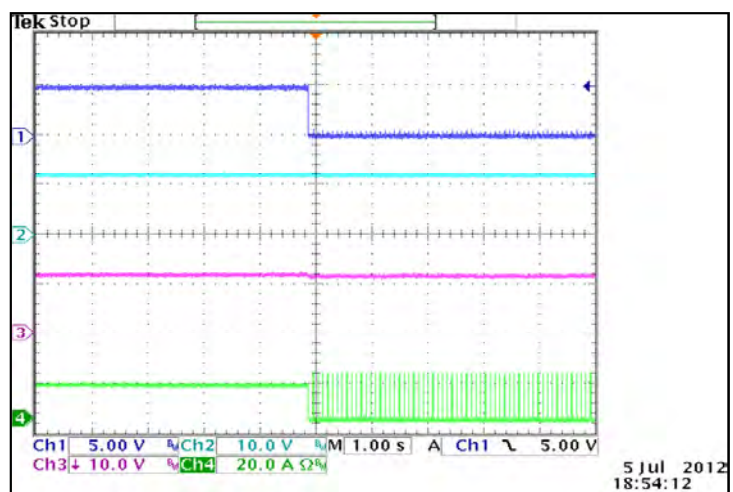
### Output Overload Characteristic V3

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



### Output Overload Characteristic V1

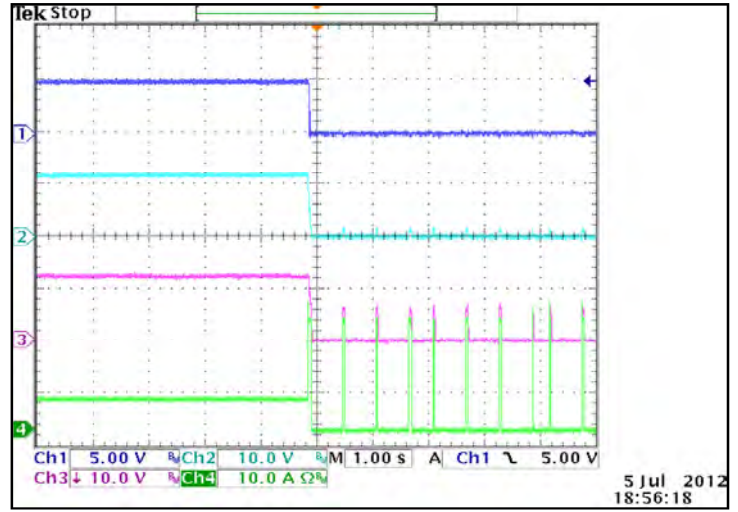
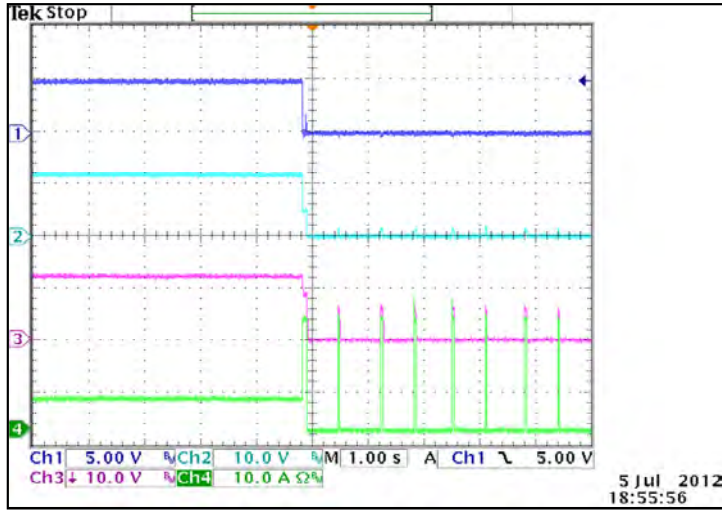
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention





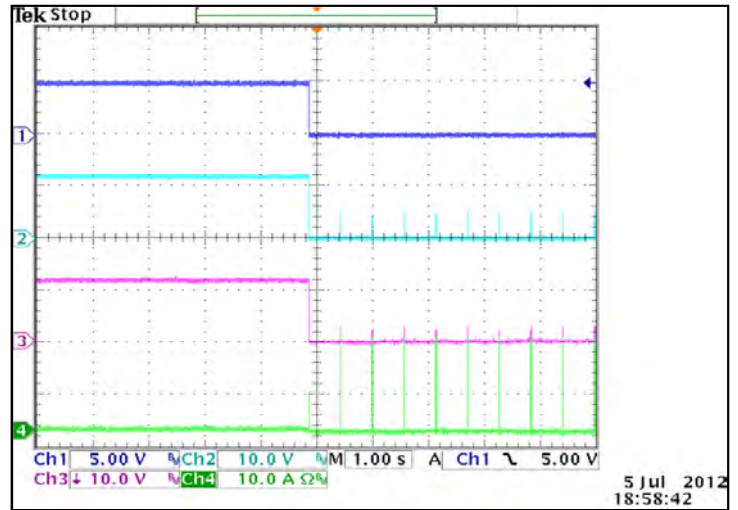
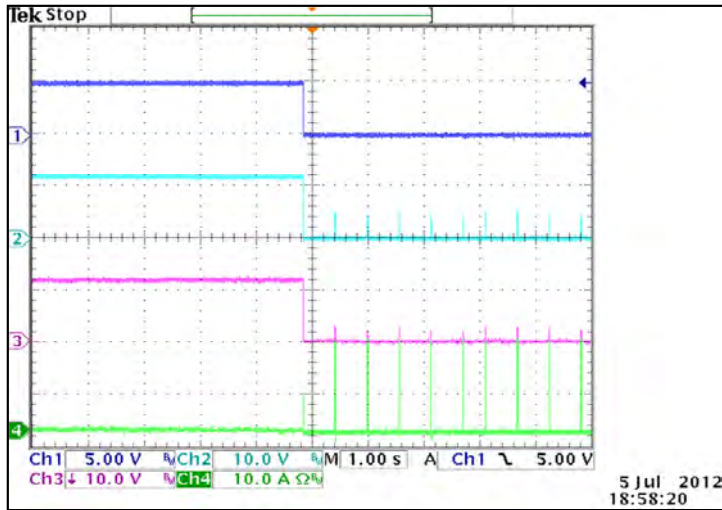
### Output Overload Characteristic V2

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



### Output Overload Characteristic V3

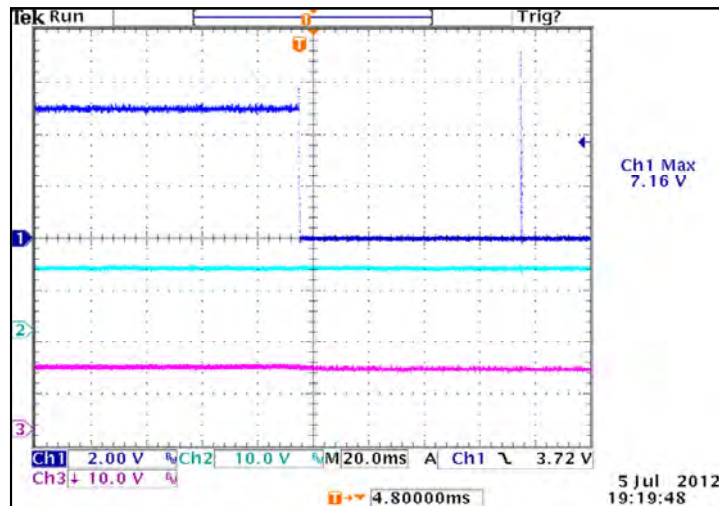
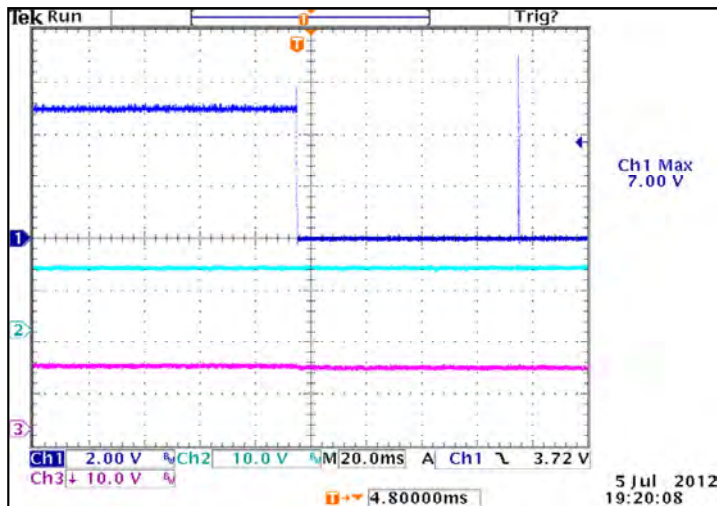
Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention





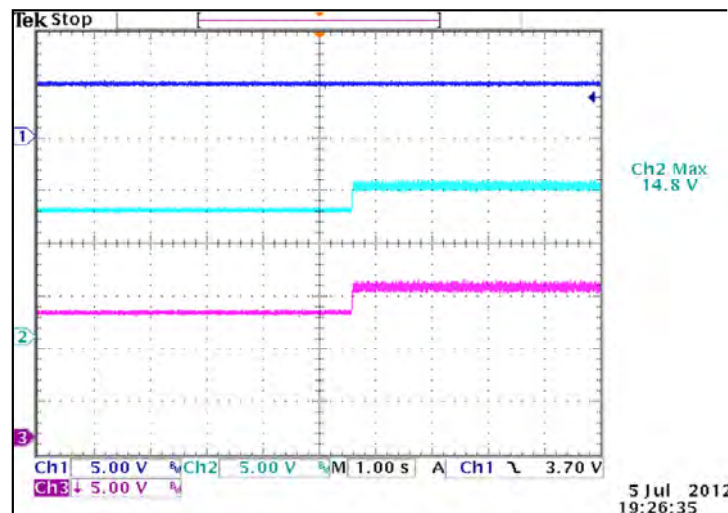
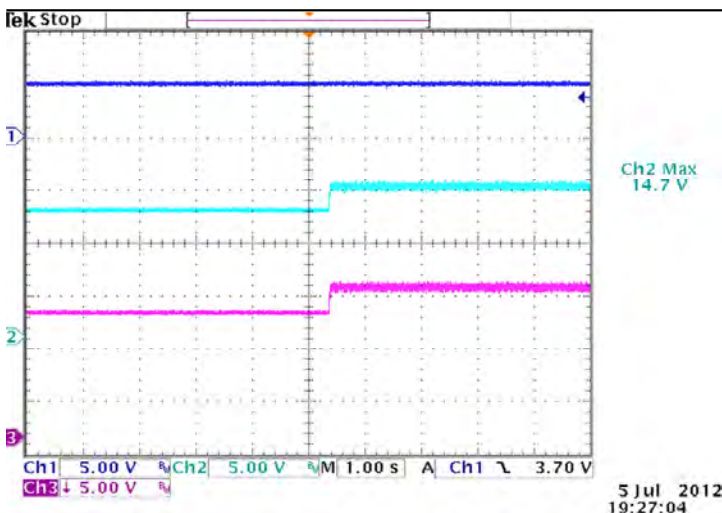
## Output Overload Characteristic V1

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



## Output Overload Characteristic V2

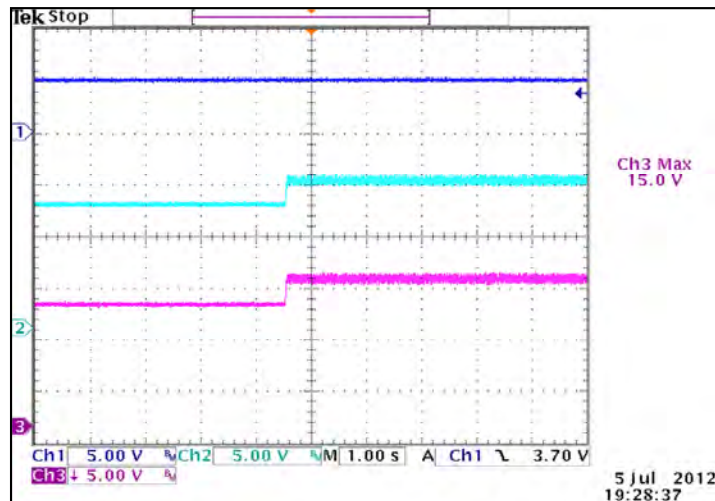
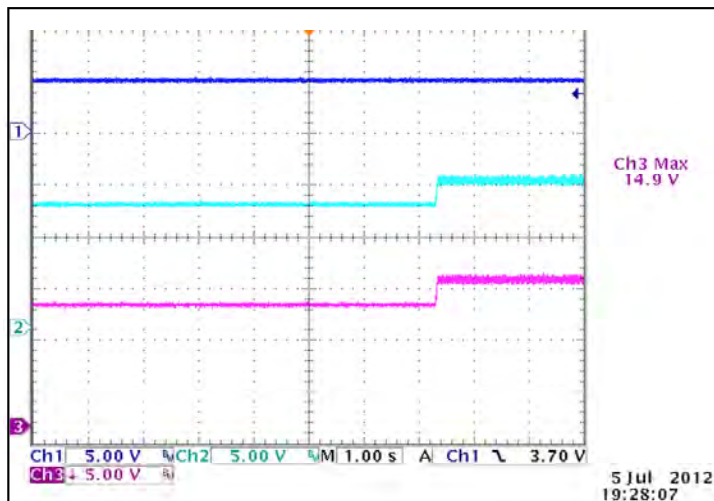
Supply shall protect itself against Overload conditions. The Power Supply shall latch and require AC input recycle to reset





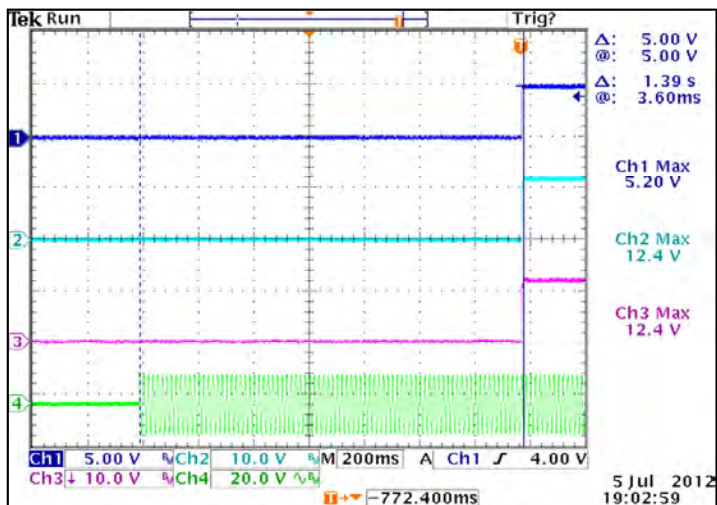
### Output Overload Characteristic V3

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



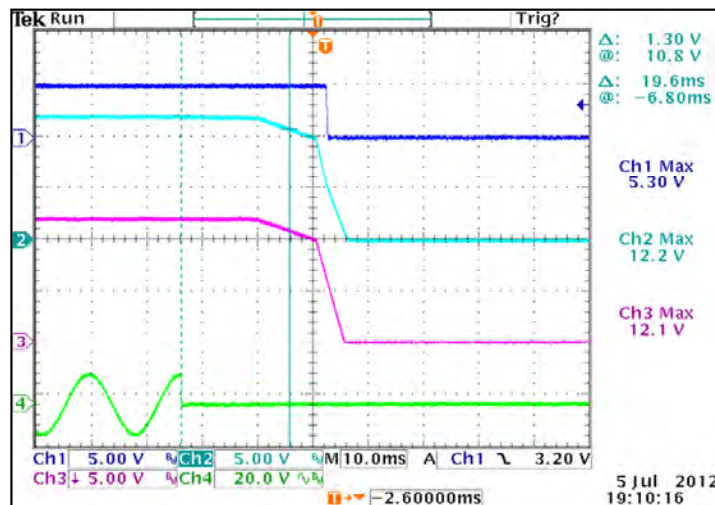
### Startup Time

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

