

### Features

- 2" x 3" x 1.0" Package
- For 1U Applications
- 60W convection cooled
- Universal Input 90-264Vac
- Optional Power ON LED
- Approved to CSA/EN/IEC/UL60950-1, 2<sup>nd</sup> Edition
- Level V Efficiency Compliant Models
- Less than 0.5W no-load Power Consumption
- 3 Year Warranty
- RoHS Compliant



### Description

The GB60S Series models provide a highly reliable power source in high density 2" x 3" x 1.0" package. Fully compliant to the applicable safety and EMC standards, these models will allow easy integration into many industrial and ITE applications. All 4 models are CE marked to low voltage directive and approved to ITE standards of EN60950, 2<sup>nd</sup> edition.

### Model Selection

Model Number*	Volts	Output Current Convection Cooled	Output Power Convection Cooled	Ripple & Noise**	Total Regulation	OVP Threshold
GB60S12K	12V	4.58A	55W	120mV pk-pk	±2%	14.4-18Vdc
GB60S15K	15V	4.00A	60W	150mV pk-pk	±2%	18-22.5Vdc
GB60S24K	24V	2.50A	60W	240mV pk-pk	±2%	28.8-36Vdc
<b>GB60S36K</b>	<b>36V</b>	<b>1.67A</b>	<b>60W</b>	<b>360mV pk-pk</b>	<b>±2%</b>	<b>43.2-54Vdc</b>
GB60S48K	48V	1.25A	60W	480mV pk-pk	±2%	57.6-72Vdc

Notes: \* Models with 24V or higher output voltage meet efficiency requirements of Level V

\*\* Measured with noise probe directly across output terminals, and load terminated with 0.1µF ceramic and 10µF low ESR capacitors. At -20C, the noise and ripple is 2% of the output.

### General Specifications

<b>AC Input</b>	100-240Vac, 47-63Hz, 1Ø rated 80-270Vac, 47-440Hz operational	<b>Turn On Time</b>	2 sec. max. @120Vac
<b>Input Current</b>	120Vac: 1.4A, 240Vac: 0.75A	<b>Hold-up Time</b>	16mS min. @ 60W load, 120Vac input
<b>Inrush Current</b>	240Vac, cold start: will not exceed 40A	<b>Signals</b>	Optional Power ON LED
<b>Input Fuses</b>	4A, 250VAC fuse provided on all models	<b>Overload Protection</b>	Hiccup Mode, 120% to 180%, typical

**General Specifications** (continued)

<b>Earth Leakage Current</b>	<1mA@240Vac, NC	<b>Short Circuit Protection</b>	Hiccup Mode
<b>Power Factor</b>	Not Applicable	<b>Overtemperature Protection</b>	Self-recovering
<b>Efficiency</b>	88% typical (83% for 12V& 85% for 15V)	<b>Safety Standards</b>	CSA/EN/IEC/UL60950-1, 2 <sup>nd</sup> Edition. See below for detailed standards information.
<b>Output Power</b>	60W continuous (55W for 12V models)	<b>Isolation</b>	Input-Output: 4000Vac Input-Ground: 1800Vac Output-Ground: 500Vac
<b>Peak Output Power</b>	Not Applicable	<b>Operating Temperature</b>	-40C start up, -20C to 80C with derating specified in Fig.1
<b>Ripple and Noise</b>	See chart above	<b>Output Power Derating</b>	See Fig.1 on page 4
<b>Output Voltage</b>	See chart	<b>Storage Temperature</b>	-40°C to +85°C
<b>Voltage Adjustability</b>	Fixed	<b>Relative Humidity</b>	5% to 95%, non-condensing
<b>Minimum Load</b>	Not required	<b>Altitude</b>	Operating: 3000 meters Non-operating: 40,000 ft.
<b>Total Regulation</b>	+/- 2%. See chart	<b>MTBF</b>	Over 600,000 hours per Telcordia
<b>Transient Response</b>	500µS max. to 1%, 50% load step. 0.2A/µS, 3.5% deviation typical	<b>Vibration</b>	Random Vibration per MIL-STD-810E, Method 514.4, Cat. 1, Figure 514.4.1, 1 hour in each of 3 axes.
<b>Switching Frequency</b>	65kHz, typical	<b>Shock</b>	Half-sine, 40 gpk, 10 mS duration, +/- in each of 3 axes, 6 shocks total
<b>Dimensions</b>	2.0" x 3.0" x 1.0" 50.8 x 76.2 x 25.4mm	<b>Weight</b>	126g

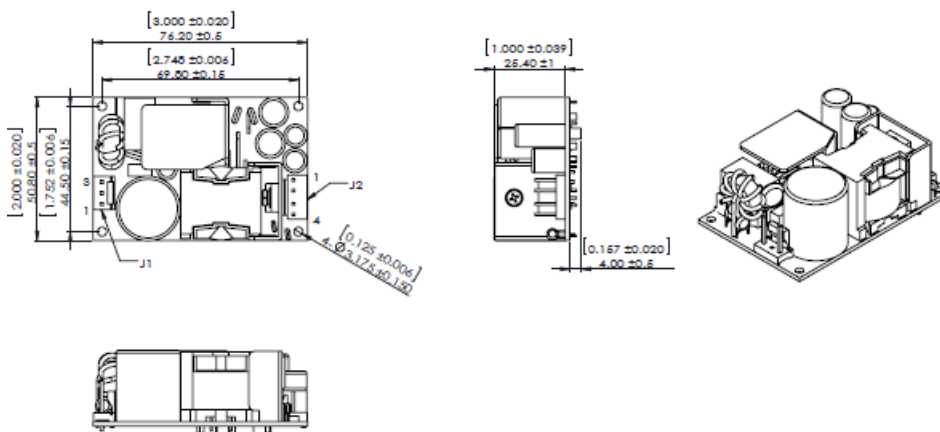
**Notes:**

1. Specifications subject to change without notice.
2. All dimensions in inches (mm), tolerance is  $\pm 0.02$ ".
3. Mounting holes should be connected together for EMI purpose
4. FG is safety ground connection
5. Specifications are for convection rating at factory settings with 115Vac input and 25°C ambient unless otherwise stated.
6. This power supply requires mounting on metal standoffs 0.20" (5mm) in height.

### EMI/EMC Compliance

Conducted Emissions	EN55011/22 Class B, FCC Part 15 Class B
Radiated Emissions	EN55011/22 Class A, FCC Part 15 Class A with 6dB margin
Static Discharge Immunity	EN61000-4-2, 6kV Contact Discharge, 8kV air discharge
Radiated RF Immunity	EN61000-4-3, 3V/m
EFT/Burst Immunity	EN61000-4-4, 2kV/5kHz
Line Surge Immunity	EN61000-4-5, 1kV differential, 2kV common-mode
Conducted RF Immunity	EN61000-4-6, 3Vrms
Power Frequency Magnetic Field Immunity	EN61000-4-8, 3A/m
Voltage Dip Immunity	EN61000-4-11 100Vac, 95% dip/0.5 cycle (Criteria A), 60%/5cycles (Criteria B), 30%/25 cycles (Criteria A).
Line Harmonic Emissions	EN61000-3-2 Class A
Flicker Test	EN61000-3-3, Complies (dmax<6%)

### Mechanical Drawing



### Connector Information

Input Connector J100	DC Output Connector J2	Ground
PIN 1) AC LINE PIN 2) EMPTY PIN 3) AC NEUTRAL	PIN 1) +Vout PIN 3) -Vout PIN 2) +Vout PIN 4) -Vout	19-30258-0187 (Keystone 1285)(Zierick 895)(.187*0.020)
Mating Connector: Tyco/AMP 640250- 3 Pins = 770461-1	Mating Connector: AMP 640250-4 Pins = 770461-1	Molex 01-90020005

## Characteristic Curves

### Output vs. Temperature

-40C start up. At -20C, the supply meet its full spec except ripple & noise might be increased from 1% to 2% of the output voltage  
 55W convection cooled, derating output power to 30W at 70°C for outputs 12V and 15V  
 60W convection cooled, derating output power to 50W at 60°C and 40W at 70°C for Output Voltages ≥ 24V  
 20W convection cooled at 80C

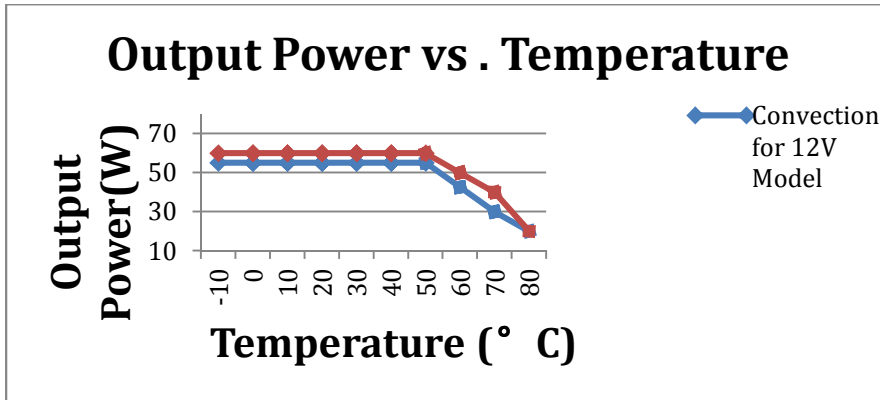


Fig.1

### Efficiency vs. Loading

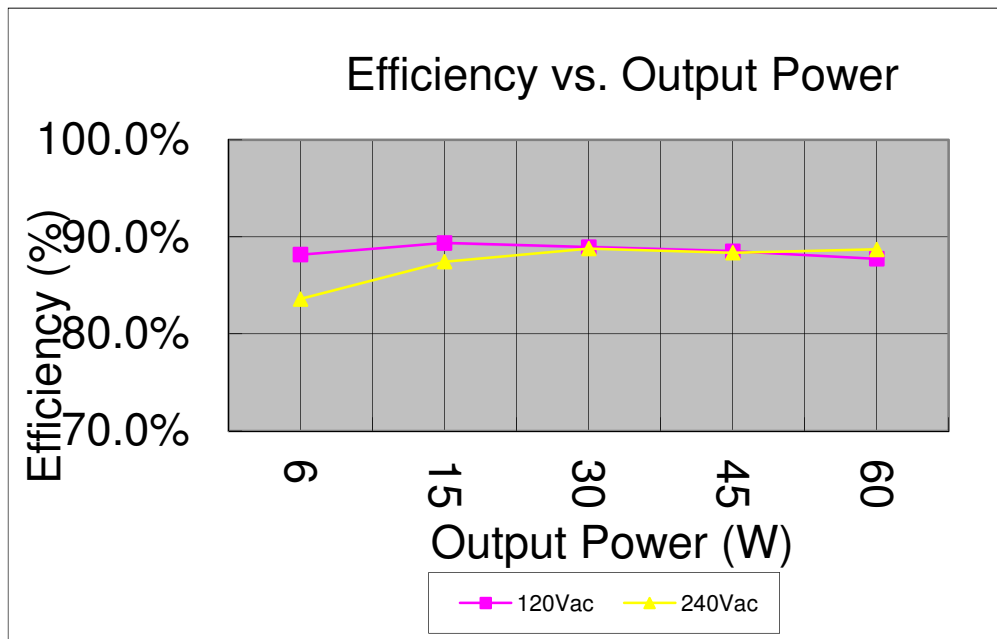
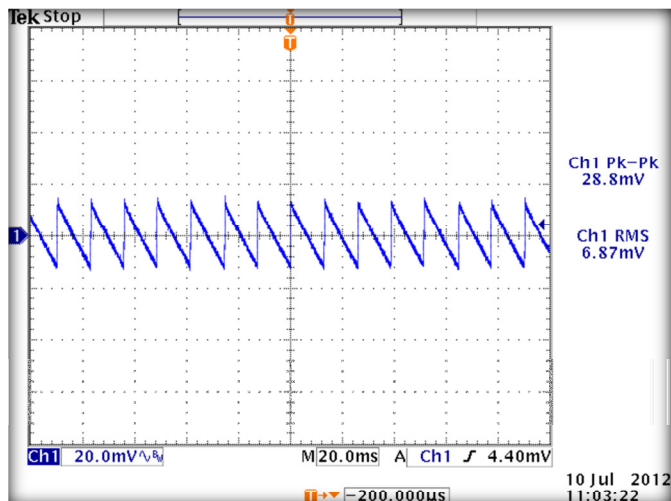


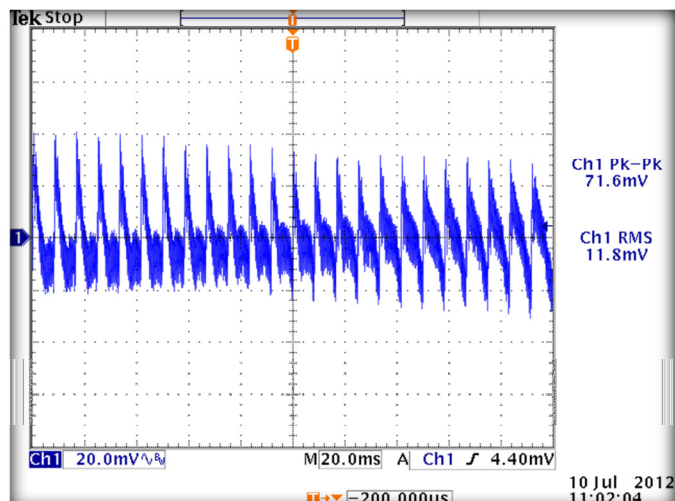
Fig.2

### Ripple & Noise

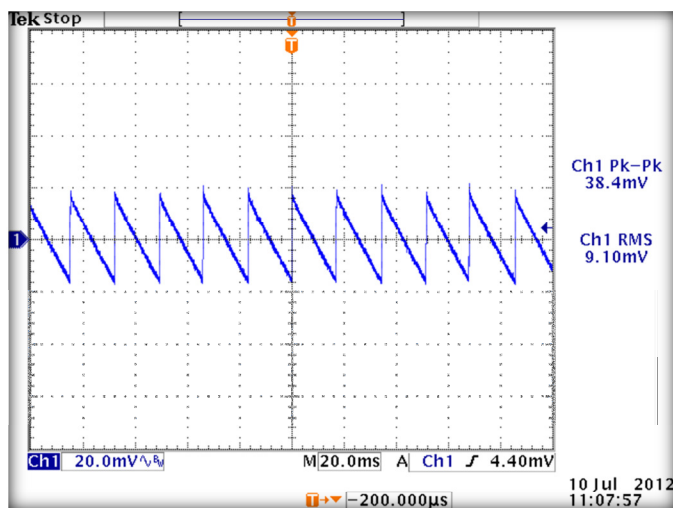
To verify that the output ripple and noise does not exceed the level specified in the product specification, measured using a scope probe socket with 0.1uF ceramic and a 10uF electrolytic capacitor connected in parallel across it, 20MHz BW.



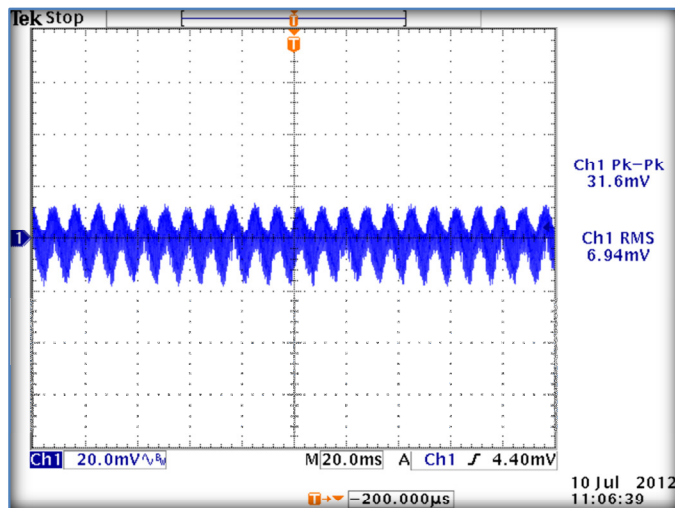
[24V OUT, NO LOAD, 90VAC, 60Hz](#)



[24V OUT, FULL LOAD, 90VAC, 60Hz](#)



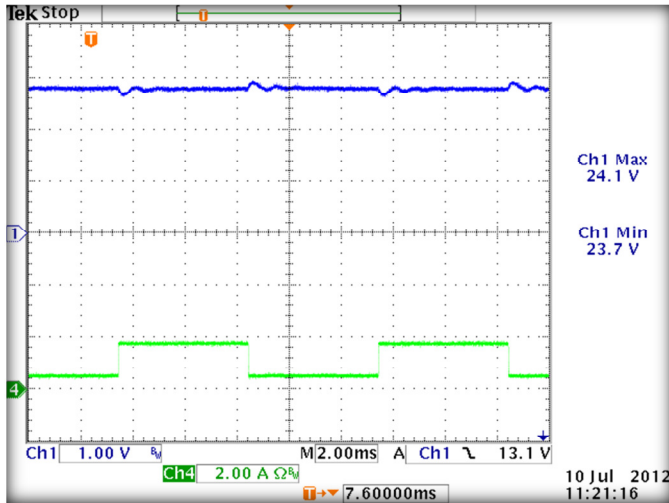
[24V OUT, NO LOAD, 264VAC, 50Hz](#)



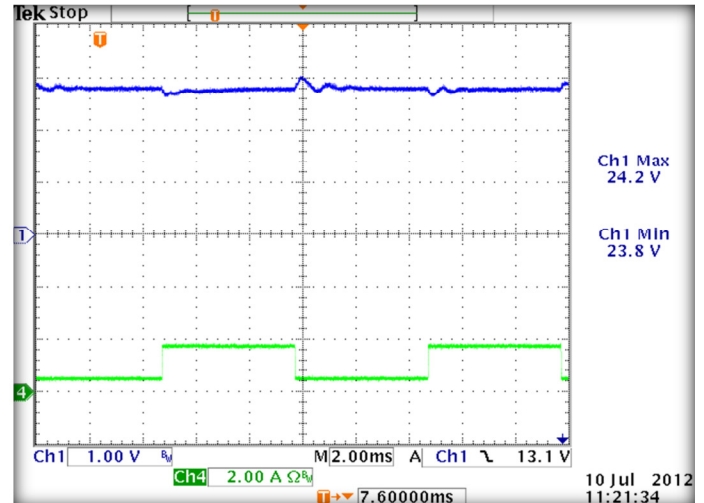
[24V OUT, FULL LOAD, 264VAC, 50Hz](#)

### Output Transient Response

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 3.5%

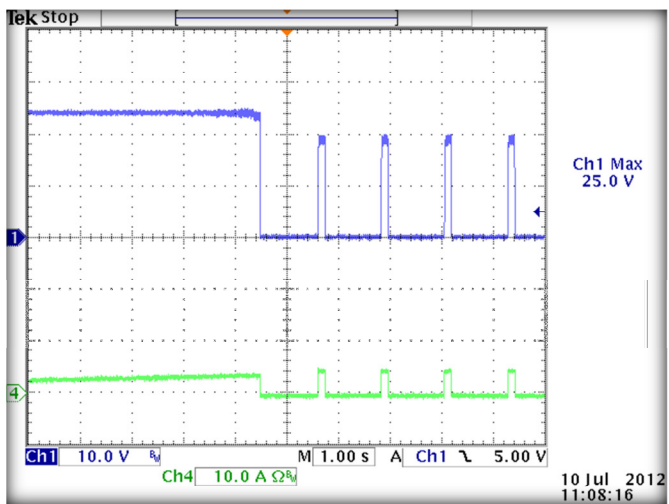


[24V OUT, 120VAC, 25% TO 75% LOAD STEP](#)

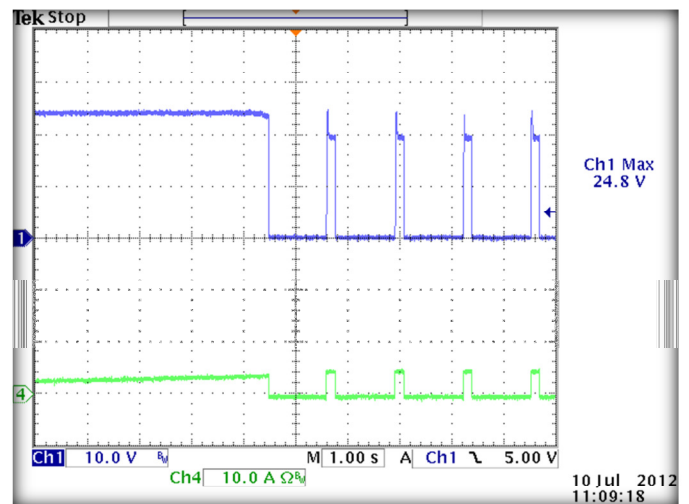


[24V OUT, 240VAC, 25% TO 75% LOAD STEP](#)

### Output Overload Characteristic



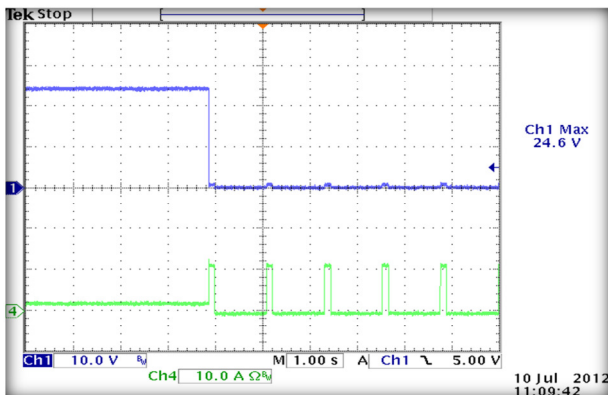
[24V OUT, 90VAC](#)



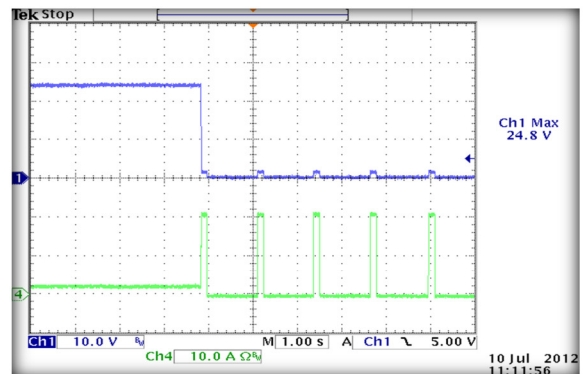
[24V OUT, 264VAC](#)

### Short Circuit Protection

Supply shall protect itself against Short Circuit conditions. No damage will occur if the output is shorted.



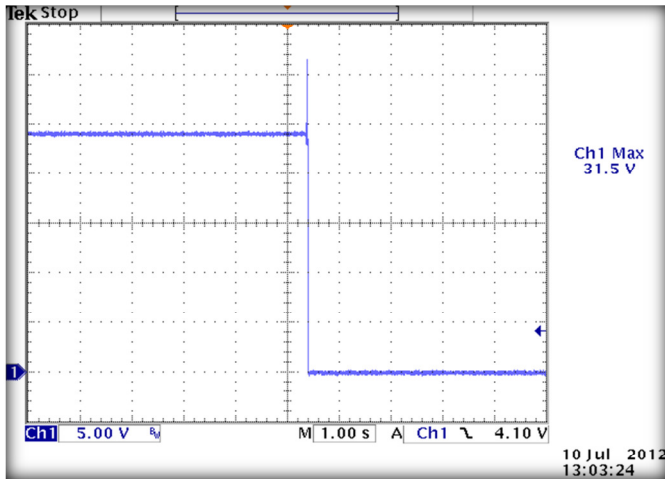
[24V OUT, 264VAC](#)



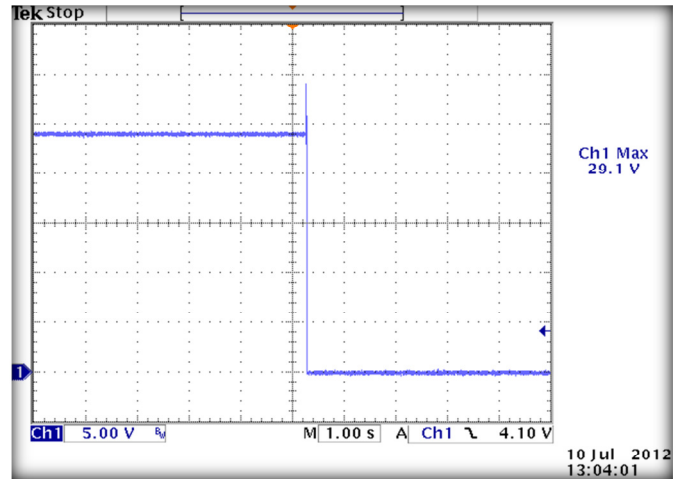
[24V OUT, 90VAC](#)

### Overvoltage Protection

OVP firing reduces output voltage to <50% of nominal in <50ms. See models chart for trip ranges.

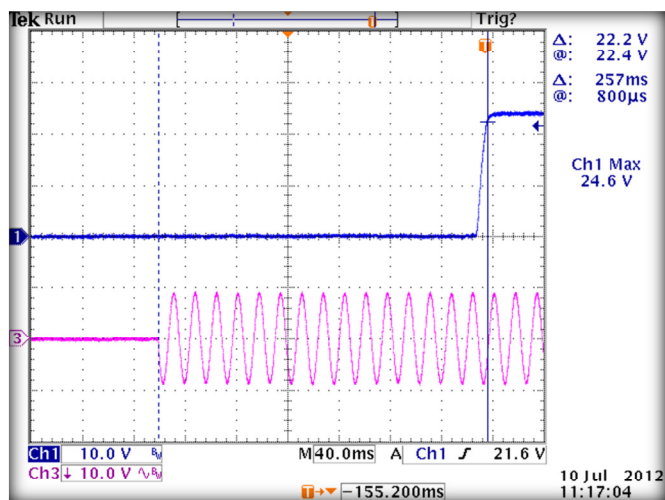


24V OUT, FULL LOAD, 90VAC, 60Hz

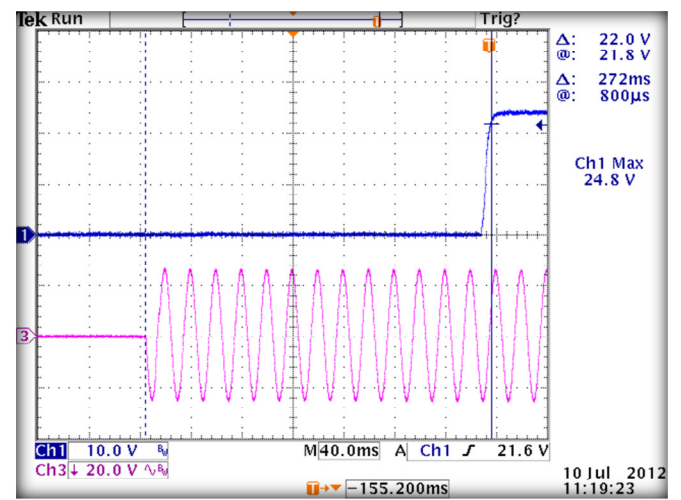


24V OUT, FULL LOAD, 264VAC, 50Hz

### Turn On Time

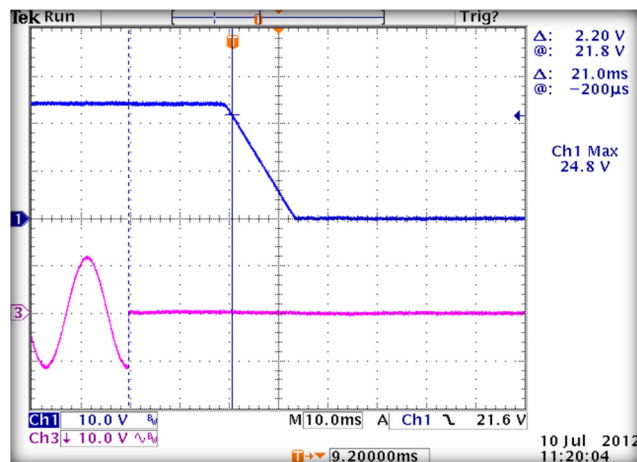


24V OUT, FULL LOAD, 90VAC, 60Hz



24V OUT, FULL LOAD, 264VAC, 50Hz

### Hold Up Time



24V OUT, FULL LOAD, 120VAC, 60Hz