

ARTESYN LCC250 SERIES

250 Watts Conduction Mounting



PRODUCT DESCRIPTION

Advanced Energy's Artesyn LCC250 AC-DC power supply is a fully-enclosed conduction cooled series delivering full useable power at high temperatures. The LCC250 series, with IP64 protection against the ingress of dust and water, is ideal for applications such as outdoor signage and telecom installation like antenna and base station equipment. The power supplies are equally suitable for indoor use, such as in control consoles, indoor signage and desktops for medical applications, where the absence of cooling fans can help minimize dust and noise.

AT A GLANCE

Total Power

250 Watts

Input Voltage

90 to 264 Vdc

of Outputs

Single

SPECIAL FEATURES

- 250W full power at elevated temperatures
- Wide operating temperature range suited for outdoor application
- Conduction-cooled or convection
- IP64 rated
- Differential remote sense
- Output adjust
- Output on/off (positive or negative logic user selectable)
- 2 years warranty

SAFETY

- UL+CSA (62368-1 2nd Ed and ANSI ES60601-1 3rd Ed)
- TUV 62368-1 2nd Ed + 60601-1 3rd Ed and 61347-1;2-13
- China CCC
- CB Scheme
- IEC 62368-1
- IEC 60950-1 2nd Ed
- IEC 61347-1; 2-13
- IEC 60601-1
- CE Mark
- UKCA Mark

COMPLIANCE

- EMI Class B
- EN61000 Immunity
- MIL-STD461E; CE101; CE102; CS101; CS114

MODEL NUMBERS

Standard ¹	Output Voltage	Adjustment Range	Minimum Load	Maximum Load	Output Ripple (p-p) ²	Line/Load Regulation
LCC250-12U-4P	12.0Vdc	± 10%	0A	20.8A	1.0% ³	± 2%
LCC250-12U-4PE	12.0Vdc	± 10%	0A	20.8A	1.0% ³	± 2%
LCC250-12U-7P	12.0Vdc	± 10%	0A	20.8A	1.0% ³	± 2%
LCC250-12U-7PE	12.0Vdc	± 10%	0A	20.8A	1.0% ³	± 2%
LCC250-24U-4P	24.0Vdc	+14.6 / -15%	0A	10.4A	1.0% ⁴	± 2%
LCC250-24U-4PE	24.0Vdc	+14.6 / -15%	0A	10.4A	1.0% ⁴	± 2%
LCC250-24U-7P	24.0Vdc	+14.6 / -15%	0A	10.4A	1.0% ⁴	± 2%
LCC250-24U-7PE	24.0Vdc	+14.6 / -15%	0A	10.4A	1.0% ⁴	± 2%
LCC250-48U-4P	48.0Vdc	±15%	0A	5.2A	1.0% ⁵	± 2%
LCC250-48U-4PE	48.0Vdc	±15%	0A	5.2A	1.0% ⁵	± 2%
LCC250-48U-7P	48.0Vdc	±15%	0A	5.2A	1.0% ⁵	± 2%
LCC250-48U-7PE	48.0Vdc	±15%	0A	5.2A	1.0% ⁵	± 2%

Note 1: Suffix 4Px: Conduction cooling; Suffix 7Px: Convection cooling

Note 2: Output ripple measured at the end of the output cable terminated with 10µF tantalum cap in parallel with 0.1µF ceramic capacitor.

Note 3: 1% limit is achieved with 2 x 820µF/16V external cap (e.g. PLG1C821MDO1 from Nichicon or equivalent).

Otherwise, maximum limits are 1.5% at Ta ≥ 0 °C and 2.0% max at Ta < 0 °C.

Note 4: 1% limit is achieved with 2 x 820µF/35 V external cap (e.g. UPM1V821MHD1TO from Nichicon or equivalent). Otherwise, maximum limits are 1.5% at Ta ≥ -10 °C. 2.0% max ripple at Ta < -10 °C is met with below external capacitance.

Ambient Temperature (°C)	-20	-25	-30	-35	-40
Recommended External Capacitors (µF)	1000	2200	3300	12000	22000

Note 5: 1% limit is achieved with 3X 470µF/63V external cap. Otherwise, maximum limits are 1.5% max at Ta ≥ 0 °C and 2% max at Ta < 0 °C.

Note 6: Safety Approvals: China CCC approval applies to part numbers with “-xxE” suffixes only.

Options

None

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Stress in excess of those listed in the “Absolute Maximum Ratings” may cause permanent damage to the power supply. These are stress ratings only and functional operation of the unit is not implied at these or any other conditions above those given in the operational sections of this TRN. Exposure to any absolute maximum rated condition for extended periods may adversely affect the power supply’s reliability.

Table 1. Absolute Maximum Ratings						
Parameter	Model	Symbol	Min	Typ	Max	Unit
Input Voltage AC continuous operation	All models	$V_{IN,AC}$	90	-	264	Vac
Maximum Output Power	All models	$P_{O,max}$	-	-	250	W
Isolation Voltage	Input to output	All models	-	-	3000	Vac
	Input to safety ground	All models	-	-	1500	Vac
	Outputs to safety ground	All models	-	-	500	Vac
Ambient Operating Temperature	-4Px suffix	$T_{BASEPLATE}$	-40	-	+85	°C
	-7Px suffix	$T_{AMBIENT}$	-40	-	+85	°C
Storage Temperature	All models	T_{STG}	-40	-	+85	°C
Humidity (non-condensing)	Operating	All models	10	-	100	%
	Non-operating	All models	10	-	100	%
Altitude	Operating	All models	-500	-	13,000	feet
	Non-operating	All models	-1000	-	50,000	feet

ELECTRICAL SPECIFICATIONS

Input Specifications

Table 2. Input Specifications							
Parameter	Condition	Symbol	Min	Typ	Max	Unit	
Operating Input Voltage, AC		$V_{IN,AC}$	90	115/230	264	Vac _{RMS}	
Operating Input Voltage, DC		$V_{IN,DC}$	127	-	300	Vdc _{RMS}	
Input AC Source Frequency		$f_{IN,AC}$	47	50/60	63	Hz	
Maximum Input Current ($I_O = I_{O,max}$)	$V_{IN,AC} = 90Vac$	$I_{IN,max}$	-	-	3.4	A _{RMS}	
No Load Input Current ($V_O = On, I_O = 0A$)	$V_{IN,AC} = 90Vac$	$I_{IN,no-load}$	-	-	185	mA _{RMS}	
Harmonic Line Currents	All	THD	Per IEC1000-3-2				
Power Factor	$I_O = I_{O,max}$ $V_{IN,AC} = 90-264Vac$		0.92	-	-		
Startup Surge Current (Inrush) @ 25 °C	$V_{IN,AC} = 264Vac$		-	-	50	A _{PK}	
Input Fuse	Internal, L and N 5x20mm, Quick Acting 6.3A, 250V		-	-	6.3	A	
Leakage Current to earth ground	$V_{IN,AC} = 230Vac$ $f_{IN,AC} = 50/60 Hz$		-	-	275	uA	
PFC Switching Frequency	All	$f_{SW,PFC}$	45	-	55	kHz	
Operating Efficiency @ 25 °C	LCC250-12U	$I_O = I_{O,max}$ $V_{IN,AC} = 230Vac$	η	-	89	-	%
	LCC250-24U			-	91	-	
	LCC250-48U			-	91.5	-	

ELECTRICAL SPECIFICATIONS

Output Specifications

Table 3. Output Specifications							
Parameter		Condition	Symbol	Min	Typ	Max	Unit
Output Regulation	LCC250-12U-4P LCC250-12U-4PE LCC250-12U-7P LCC250-12U-7PE	Inclusive of set-point, temperature change, warm-up drift and dynamic load	V_o	11.76	12.0	12.24	V
	LCC250-24U-4P LCC250-24U-4PE LCC250-24U-7P LCC250-24U-7PE		V_o	23.52	24.0	24.48	
	LCC250-48U-4P LCC250-48U-4PE LCC250-48U-7P LCC250-48U-7PE		V_o	47.04	48.0	48.96	
Output Ripple, pk-pk	LCC250-12U-4P LCC250-12U-4PE LCC250-12U-7P LCC250-12U-7PE	Measure with a 0.1 μ F ceramic capacitor in parallel with a 10 μ F tantalum capacitor, 0 to 20MHz bandwidth	V_o	-	-	180	mV _{PK-PK}
	LCC250-24U-4P LCC250-24U-4PE LCC250-24U-7P LCC250-24U-7PE		V_o	-	-	360	
	LCC250-48U-4P LCC250-48U-4PE LCC250-48U-7P LCC250-48U-7PE		V_o	-	-	720	
Output Current	LCC250-12U-4P LCC250-12U-4PE LCC250-12U-7P LCC250-12U-7PE	All	I_o	-	-	20.8	A
	LCC250-24U-4P LCC250-24U-4PE LCC250-24U-7P LCC250-24U-7PE	All	I_o	-	-	10.4	
	LCC250-48U-4P LCC250-48U-4PE LCC250-48U-7P LCC250-48U-7PE	All	I_o	-	-	5.2	

ELECTRICAL SPECIFICATIONS

Output Specifications

Table 3. Output Specifications							
Parameter	Condition	Symbol	Min	Typ	Max	Unit	
Ripple Switching Frequency	All	$f_{SW,DC-DC}$	250	-	260	kHz	
Output Voltage Adjustment Range	LCC250-12U LCC250-24U LCC250-48U	$\%V_O$	-10 -15 -15	-	+10 +14.6 +15	% % %	
Constant Output Current Adjustment Range	All	$\%I_O$	-50	-	0	%	
V_O Load Capacitance	Start up	-	0	-	330	$\mu F/A$	
V_O Dynamic Response	Peak Deviation Settling Time	50% load change, slew rate = 1A/ms	$\pm\%V_O$ T_s	-	-	5	%
				-	-	500	μSec
V_O Long Term Stability Max change over 24 hours	After thermal equilibrium (30 mins)	$\pm\%V_O$	-	-	1	%	

ELECTRICAL SPECIFICATIONS

LCC250-12U-4P Performance Curves

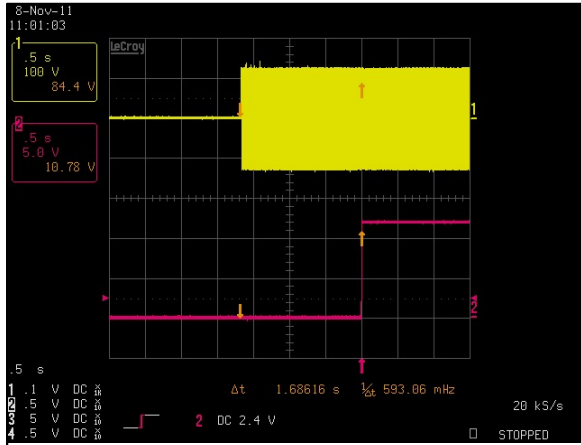


Figure 1: LCC250-12U-4P Turn-on delay via AC mains
 Vin = 90Vac Load: Io = 20.8A
 Ch 1: Vin Ch 2: Vo

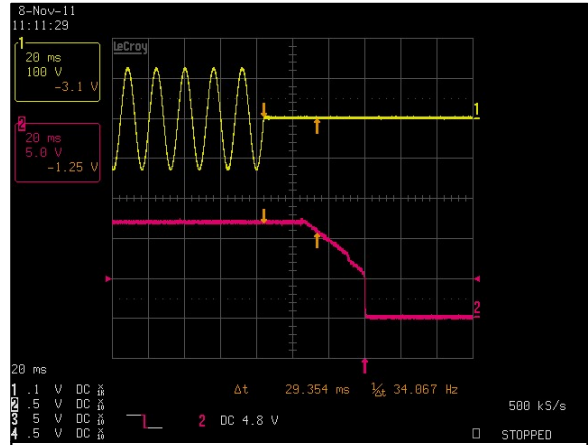


Figure 2: LCC250-12U-4P Hold-up Time
 Vin = 90Vac / 63Hz / 0° Load: Io = 20.8A
 Ch 1: Vin Ch 2: Vo

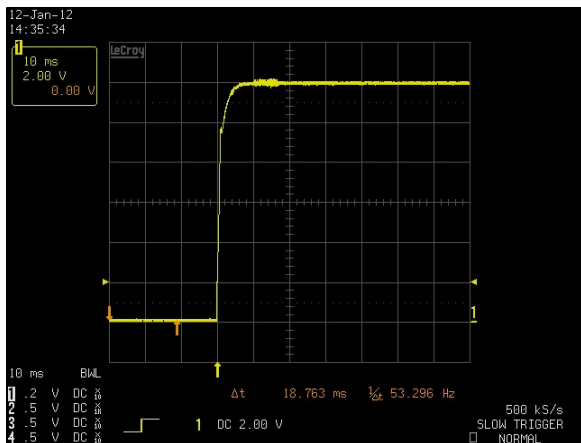


Figure 3: LCC250-12U-4P Output Startup Characteristic
 Vin = 90Vac Load: Io = 20.8A
 Ch 1: Vo

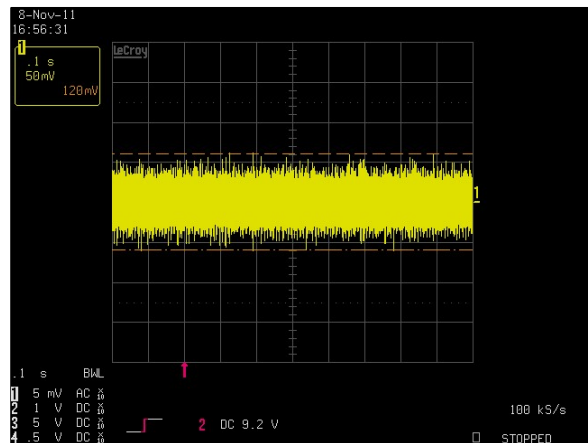


Figure 4: LCC250-12U-4P Ripple and Noise Measurement
 Vin = 90Vac Load: Io = 20.8A
 Ch 1: Vo

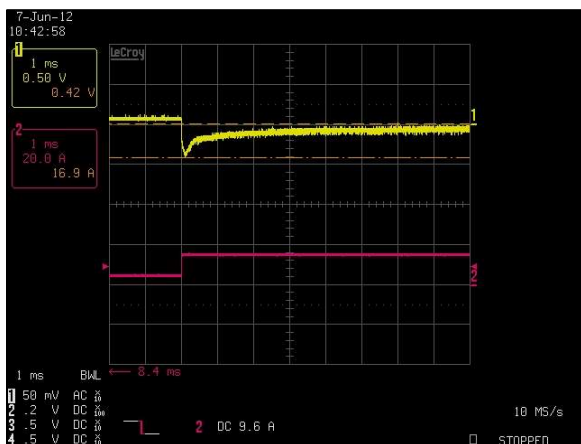


Figure 5: LCC250-12U-4P Transient Response - Vo Deviation
 25% to 75% load change 1A/uS slew rate Vin = 230Vac
 Ch 1: Vo Ch 2: Io

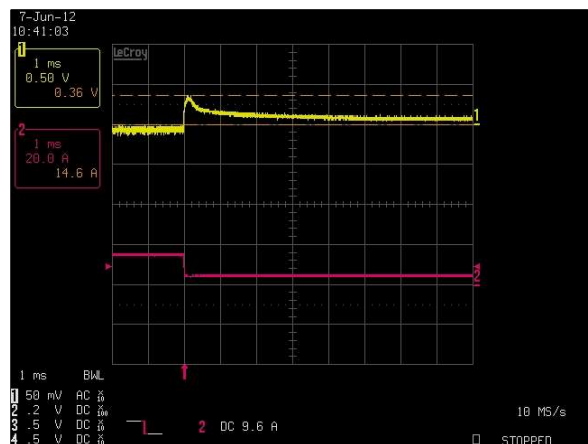
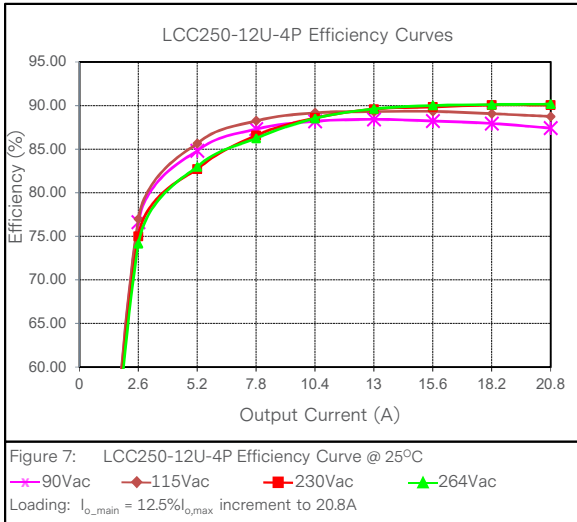


Figure 6: LCC250-12U-4P Transient Response - Vo Deviation
 75% to 25% load change 1A/uS slew rate Vin = 230Vac
 Ch 1: Vo Ch 2: Io

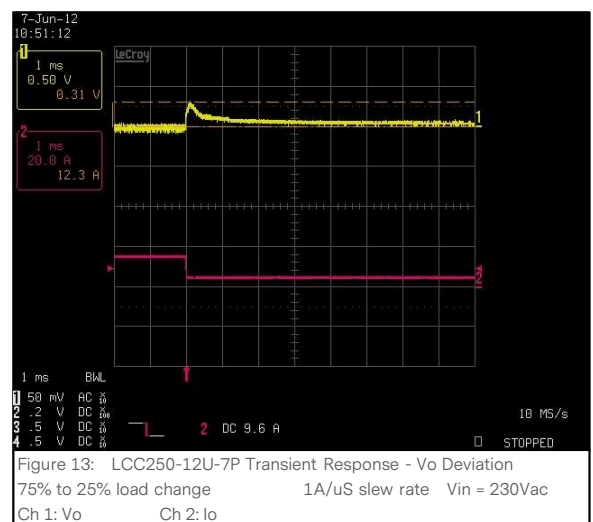
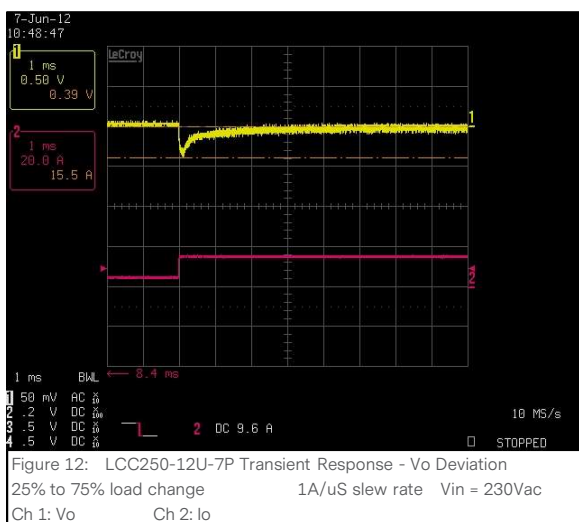
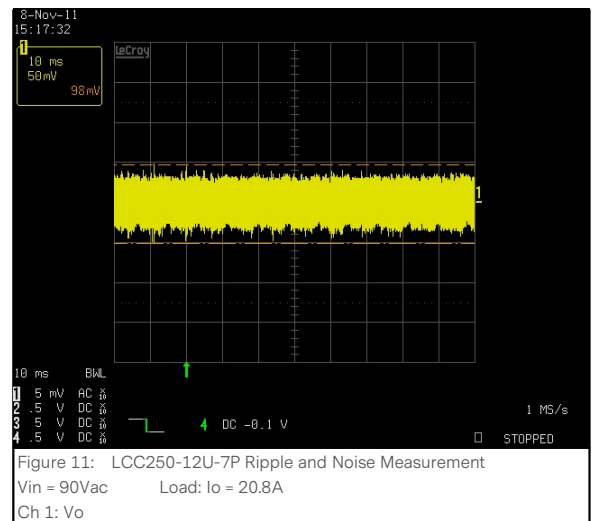
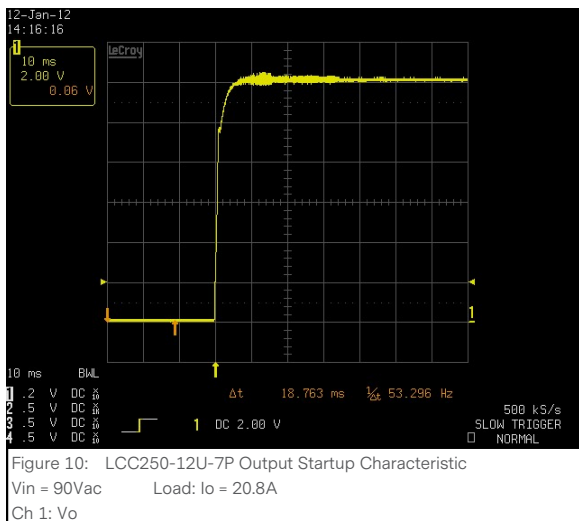
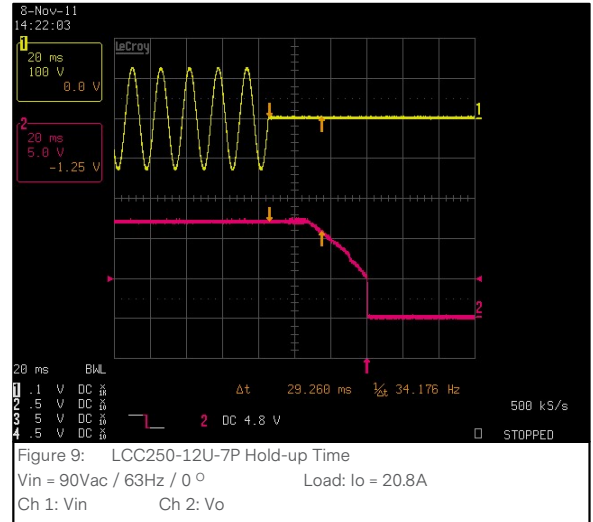
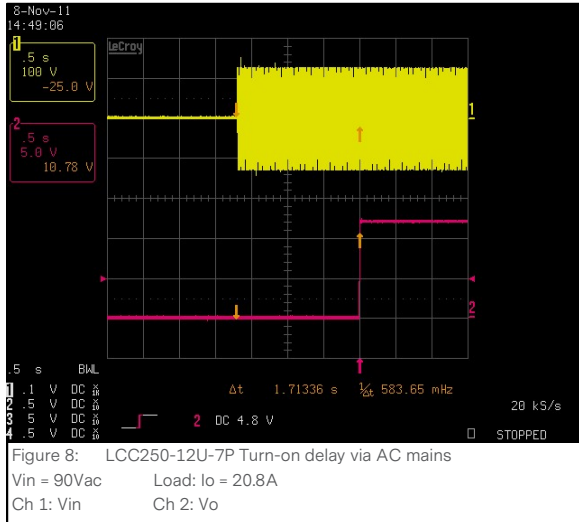
ELECTRICAL SPECIFICATIONS

LCC250-12U-4P Performance Curves



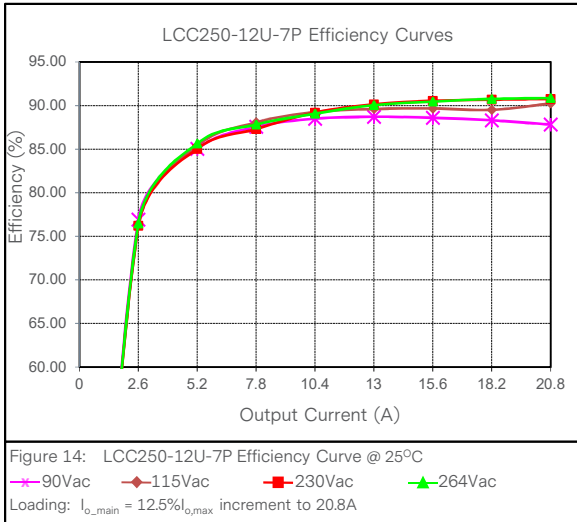
ELECTRICAL SPECIFICATIONS

LCC250-12U-7P Performance Curves



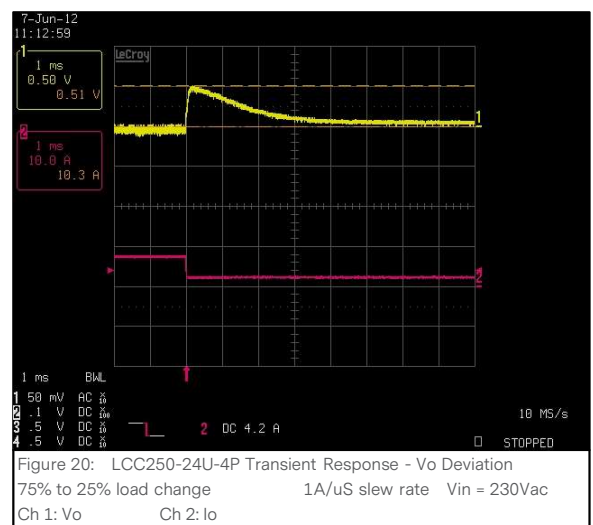
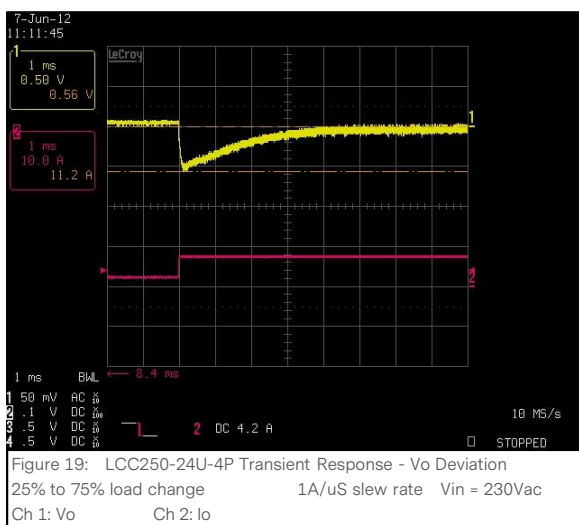
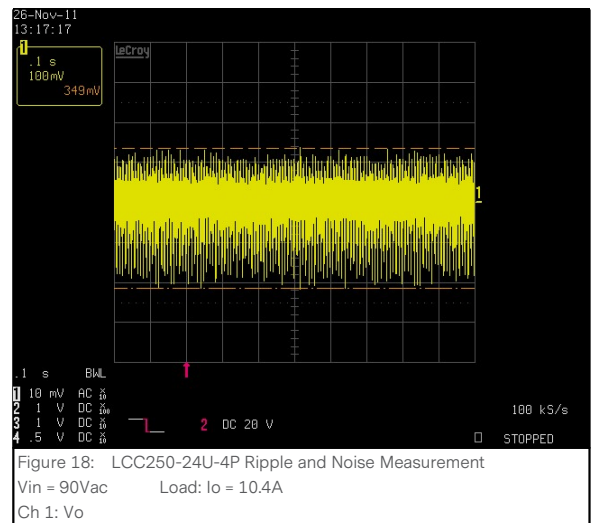
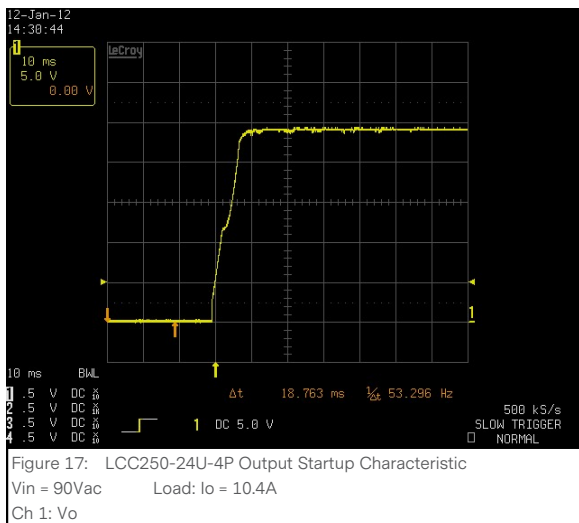
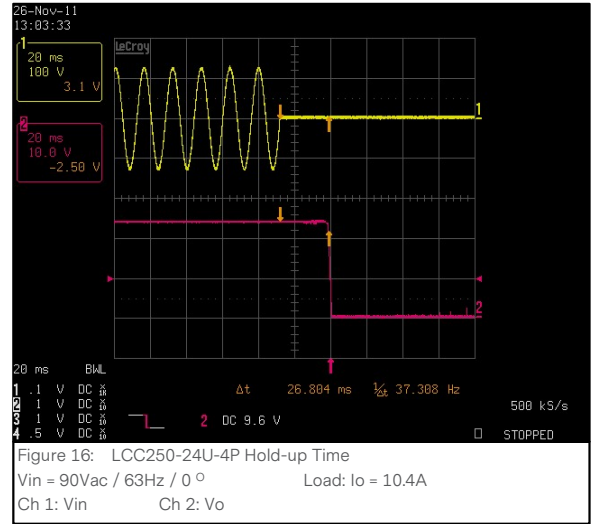
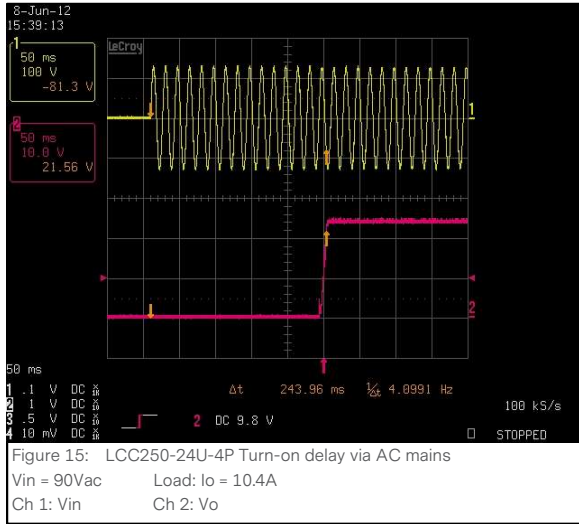
ELECTRICAL SPECIFICATIONS

LCC250-12U-7P Performance Curves



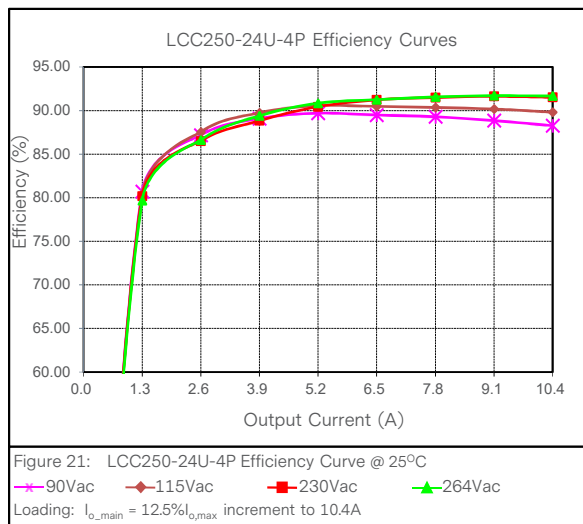
ELECTRICAL SPECIFICATIONS

LCC250-24U-4P Performance Curves



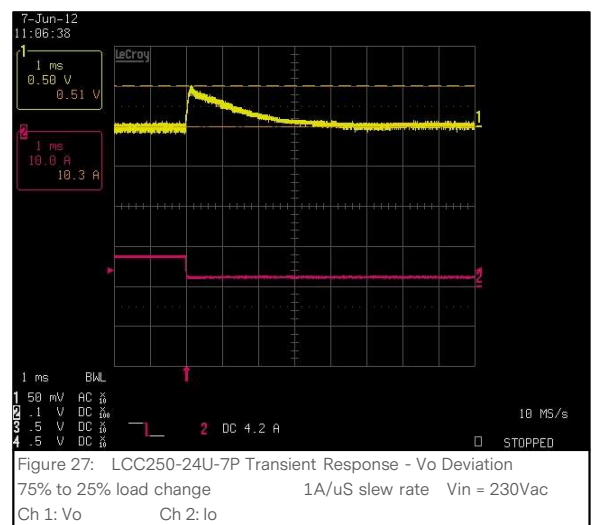
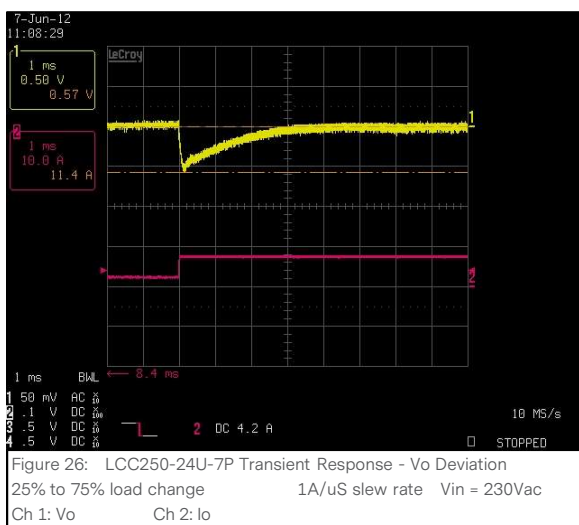
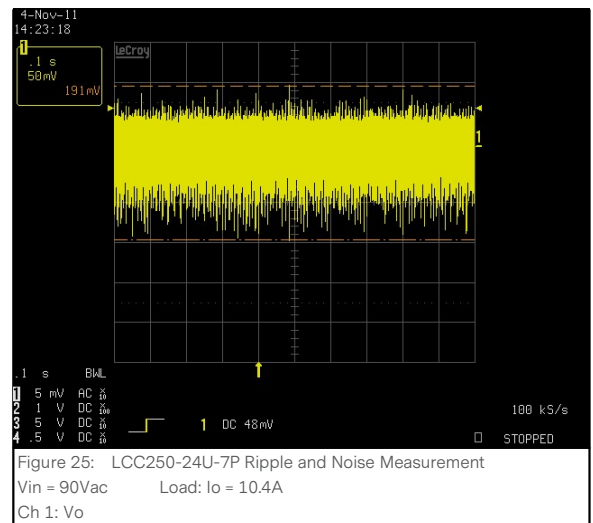
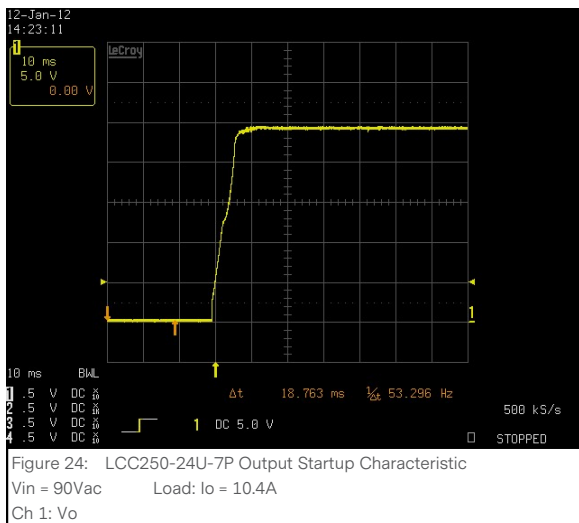
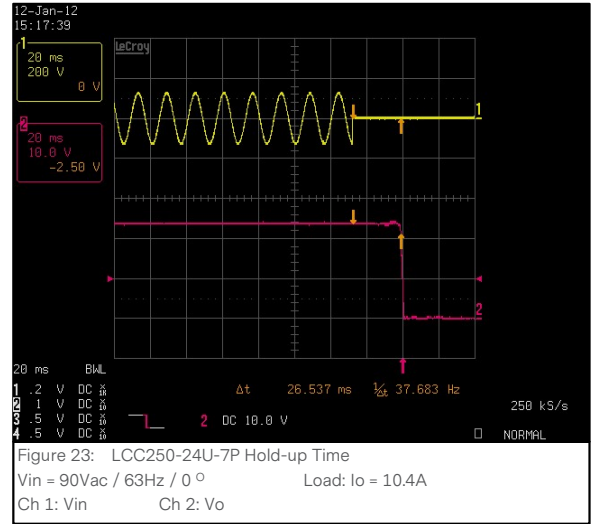
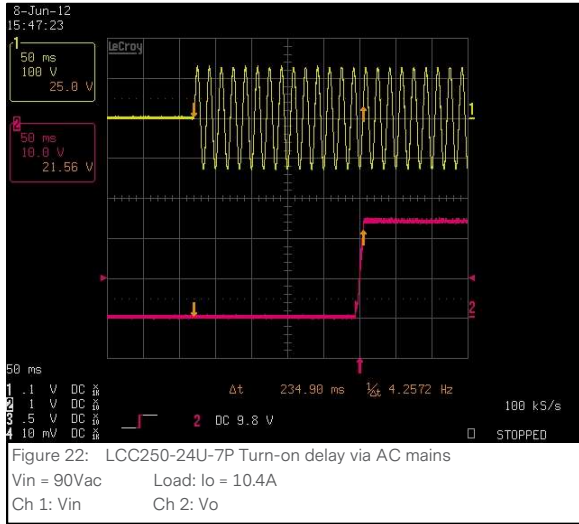
ELECTRICAL SPECIFICATIONS

LCC250-24U-4P Performance Curves



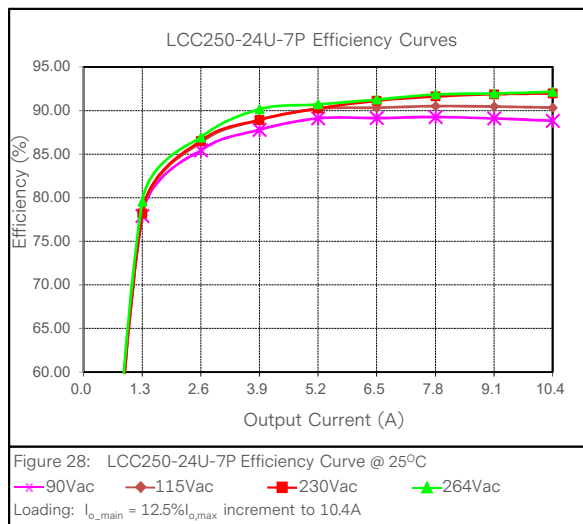
ELECTRICAL SPECIFICATIONS

LCC250-24U-7P Performance Curves



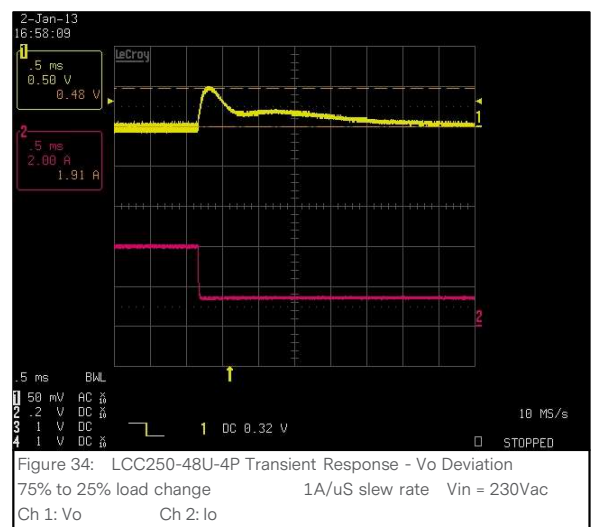
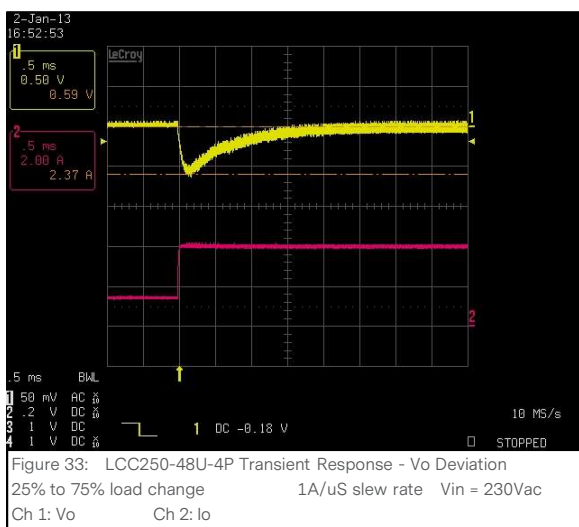
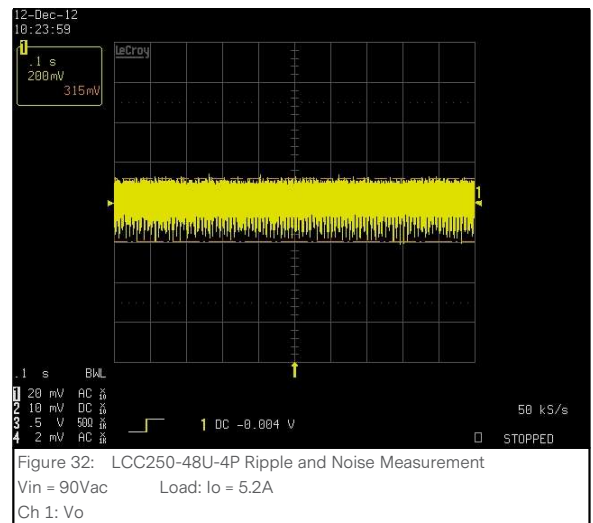
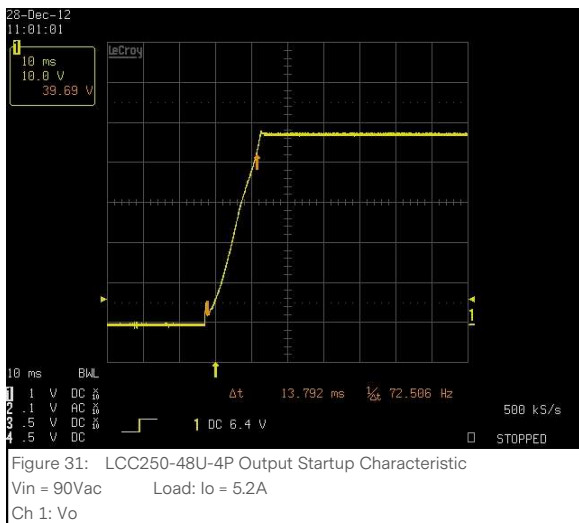
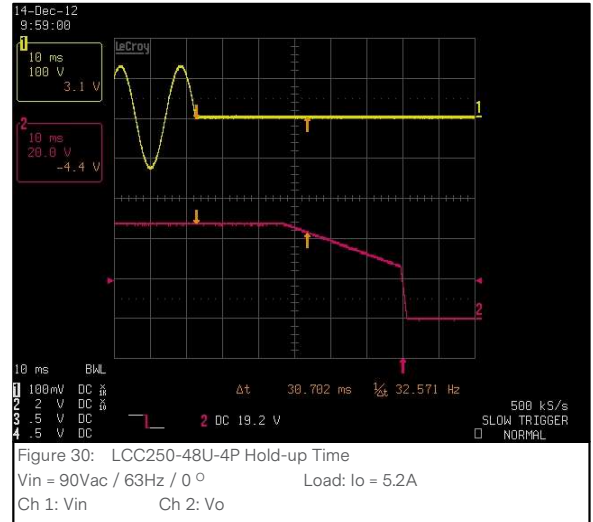
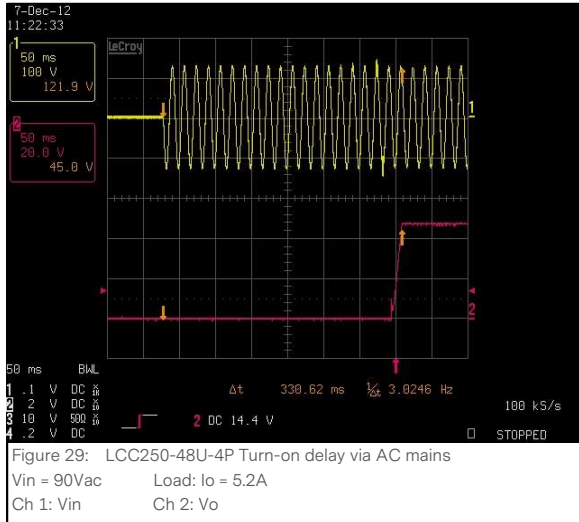
ELECTRICAL SPECIFICATIONS

LCC250-24U-7P Performance Curves



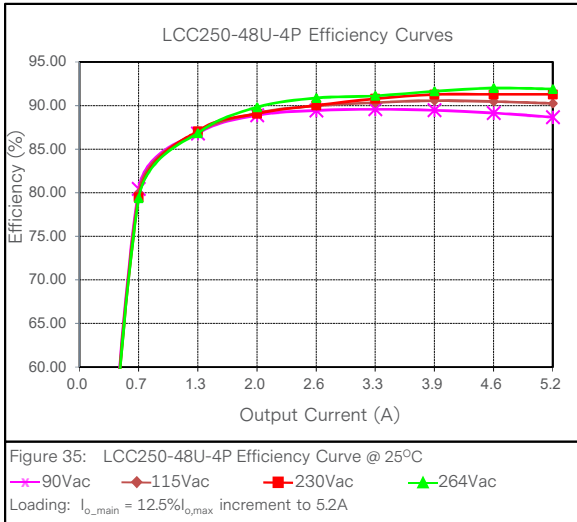
ELECTRICAL SPECIFICATIONS

LCC250-48U-4P Performance Curves



ELECTRICAL SPECIFICATIONS

LCC250-48U-4P Performance Curves



ELECTRICAL SPECIFICATIONS

LCC250-48U-7P Performance Curves

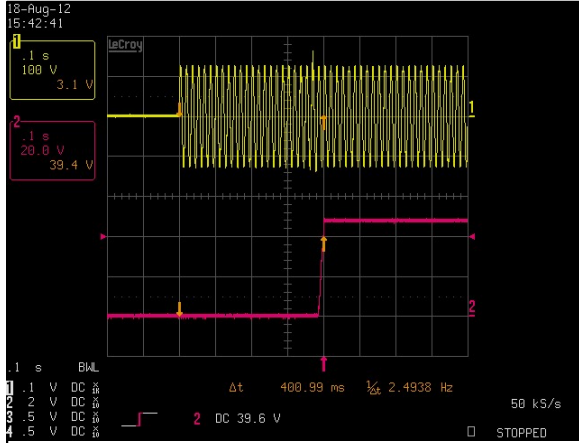


Figure 36: LCC250-48U-7P Turn-on delay via AC mains
 Vin = 90Vac Load: Io = 5.2A
 Ch 1: Vin Ch 2: Vo

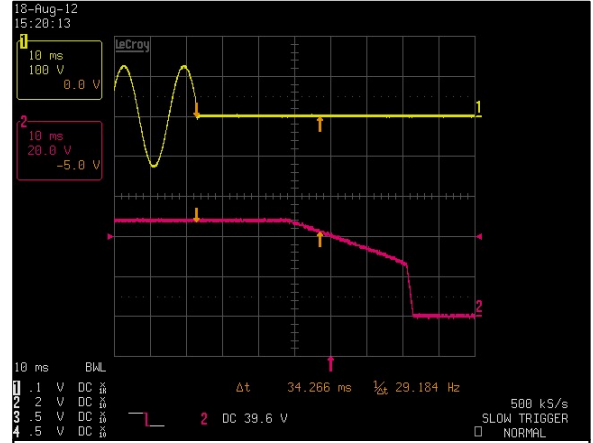


Figure 37: LCC250-48U-7P Hold-up Time
 Vin = 90Vac / 63Hz / 0° Load: Io = 5.2A
 Ch 1: Vin Ch 2: Vo

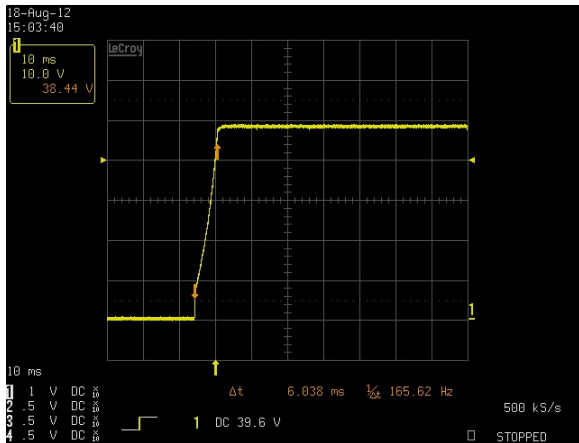


Figure 38: LCC250-48U-7P Output Startup Characteristic
 Vin = 90Vac Load: Io = 5.2A
 Ch 1: Vo

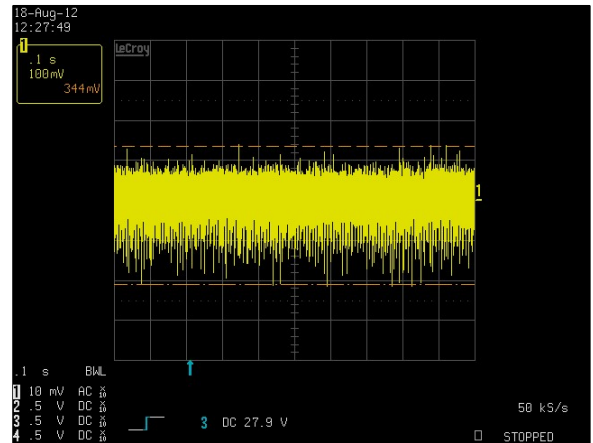


Figure 39: LCC250-48U-7P Ripple and Noise Measurement
 Vin = 90Vac Load: Io = 5.2A
 Ch 1: Vo

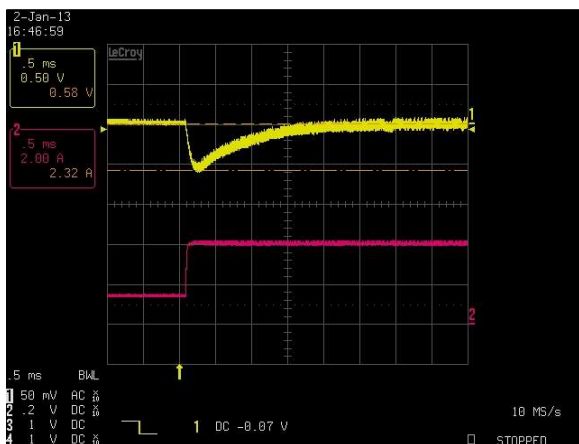


Figure 40: LCC250-48U-7P Transient Response - Vo Deviation
 25% to 75% load change 1A/uS slew rate Vin = 230Vac
 Ch 1: Vo Ch 2: Io

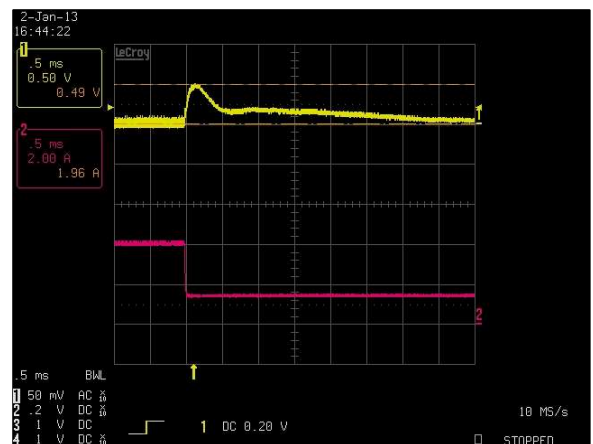
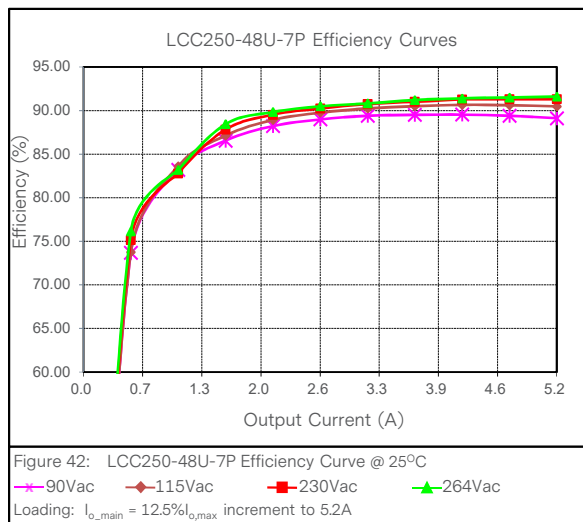


Figure 41: LCC250-48U-7P Transient Response - Vo Deviation
 75% to 25% load change 1A/uS slew rate Vin = 230Vac
 Ch 1: Vo Ch 2: Io

ELECTRICAL SPECIFICATIONS

LCC250-48U-7P Performance Curves



ELECTRICAL SPECIFICATIONS

Cable Definitions

Table 5. Cable Definitions for LCC250 Series				
Cable	Length	Designation	Wire Color	Wire Gauge
AC Input Cable	L1 = 300 ± 10 mm	L = Live	Brown	AWG#18
		N = Neutral	Blue	AWG#18
		PE = Primary Earth	Green/Yellow	AWG#18
DC Output Cable	L2 = 300 ± 10 mm	+Output	Blue	AWG#14
		-Output	Gray	AWG#14
Control Cable	L3 = 300 ± 10 mm	Dimming	Brown	AWG#26
		Dimming Return	Yellow	AWG#26
		ON/OFF	Orange	AWG#26
		ON/OFF Return	White	AWG#26
		Sense	Red	AWG#26
		Sense Return	Black	AWG#26

ELECTRICAL SPECIFICATIONS

Protection Function Specifications

Input Fuse

LCC250 series is equipped with an internal non user serviceable 6.3A High Rupturing Capacity (HRC) 250 Vac fuse for fault protection in both the Line and Neutral lines input.

Over Voltage Protection (OVP)

The power supply latches off during output overvoltage with the AC line recycled to reset the latch.

LCC250-12U OVP

Parameter	Min	Typ	Max	Unit
V _O Output Overvoltage	13.2	/	16.2	V

LCC250-24U OVP

Parameter	Min	Typ	Max	Unit
V _O Output Overvoltage	26.4	/	32.4	V

LCC250-48U OVP

Parameter	Min	Typ	Max	Unit
V _O Output Overvoltage	52.8	/	64.8	V

Over Current Protection (OCP)

LCC250 series includes internal current limit circuitry to prevent damage in the event of overload or short circuit. Recovery is automatic when the overload is removed. The OCP range is defined will be not exceed 150% of full load at any condition.

LCC250-12U OCP

Parameter	Min	Typ	Max	Unit
V _O Output Overcurrent	20.8	/	31.2	A

LCC250-24U OCP

Parameter	Min	Typ	Max	Unit
V _O Output Overcurrent	10.4	/	15.6	A

LCC250-48U OCP

Parameter	Min	Typ	Max	Unit
V _O Output Overcurrent	5.2	/	7.8	A

ELECTRICAL SPECIFICATIONS

Protection Function Specifications

Short Circuit Protection (SCP)

The LCC250 series will protect itself when any output is shorted to ground or to any other output. The power supply will withstand a continuous short circuit with no permanent damage, applied to its main output during start-up or while running. A short is defined as impedance less than 50 milliohms.

Over Temperature Protection (OTP)

The power supply is internally protected against over temperature conditions. The OTP is auto recovery mode.

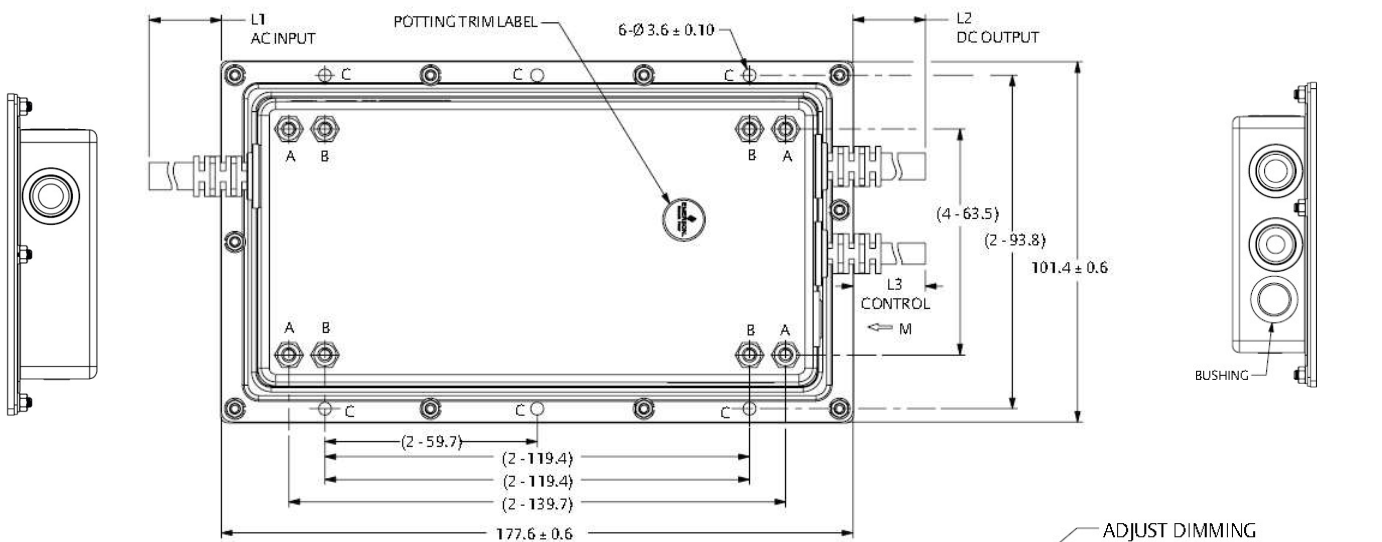
No load Protection

The power supply will not suffer damage if any or all outputs have no load.

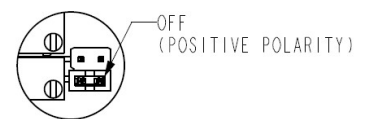
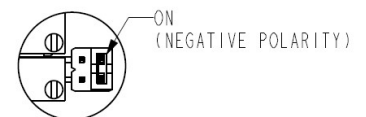
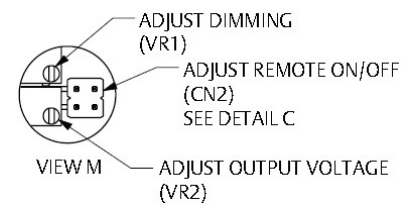
MECHANICAL SPECIFICATIONS

Mechanical Outlines (unit: mm)

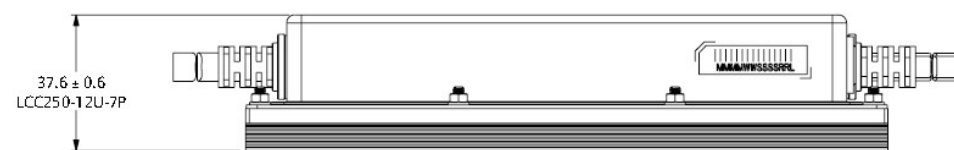
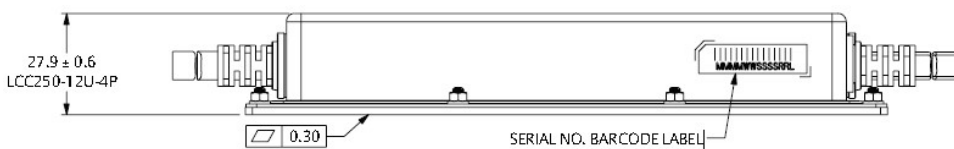
12V Mechanical Outlines



SYMBOL A INDICATED: #6-32, THREAD,
 SYMBOL B INDICATED: M3X0.5 THREAD,
 FOR MOUNTING SCREW LENGTH SHALL BE LESS THAN 4.0MM,
 TORQUE 8KG-F MAX..



DETAIL C



MECHANICAL SPECIFICATIONS

Mechanical Outlines (unit: mm)

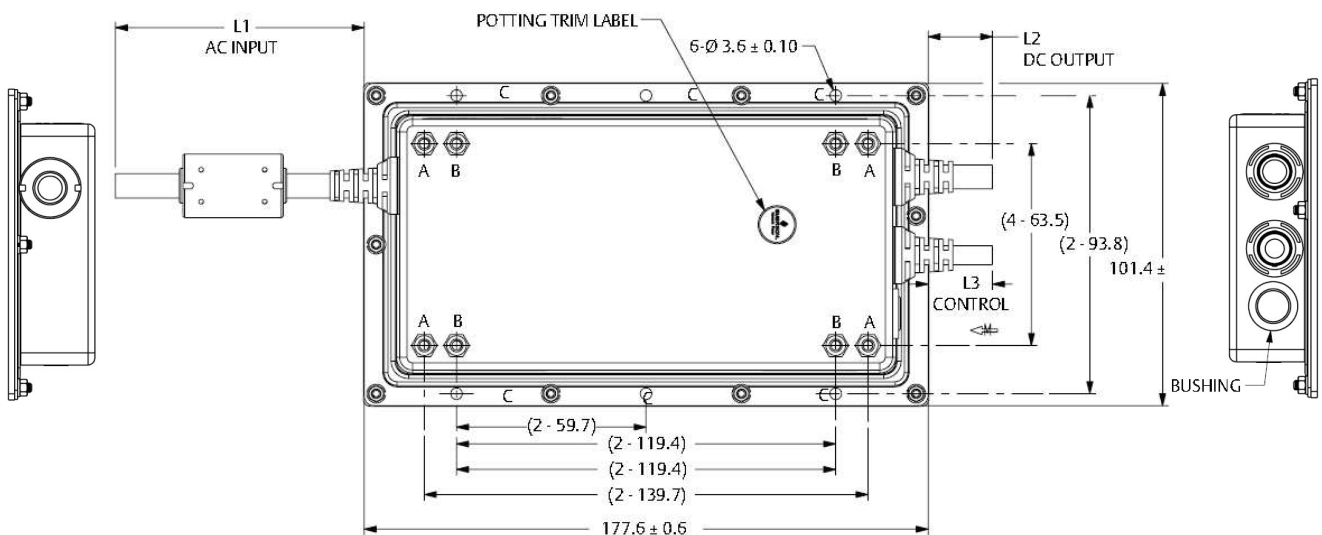
24V/48V Mechanical Outlines



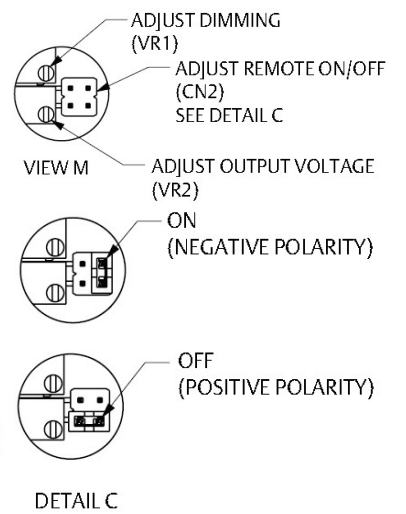
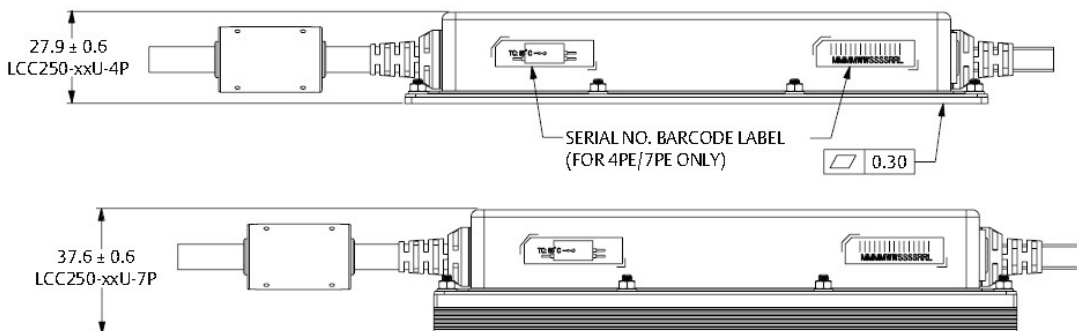
LCC250-xxU-4P/4PE



LCC250-xxU-7P/7PE



SYMBOL A INDICATED: #6-32, THREAD,
 SYMBOL B INDICATED: M3X0.5 THREAD,
 FOR MOUNTING SCREW LENGTH SHALL BE LESS THAN 4.0MM,
 TORQUE 8KG-F MAX..



MECHANICAL SPECIFICATIONS

Weight

The LCC250 series weight is 3.5 lbs.(1.51kg) maximum.

ENVIRONMENTAL SPECIFICATIONS

EMC Immunity

The LCC250 series are designed to meet the following EMC immunity specifications

Table 6. Environmental Specifications	
Document	Description
FCC Part 15 Subpart J Class B	Conducted and Radiated Class B with a ground plane for radiated interference
EN 61000-3-2	Harmonics class C
EN 61000-4-2	Electromagnetic Compatibility (EMC) - Testing and measurement techniques – Electrostatic discharge immunity test. ESD up to 4 KV contact, 8KV discharge, performance Criteria B
EN 61000-4-3	RFI 3v/m
EN 61000-4-4	Electrical Fast Transients level 3 minimum
EN 61000-4-5	Surge level 3 minimum
EN 61000-4-6	Radio frequency common mode, Levels 3V (rms) Modulated AM 80%. 1 kHz, 150 ohm source imp
EN 61000-4-8	Power Frequency Magnetic Immunity, 1 A/m.
EN 61000-4-11	AC Input transients [Reference EN 60601-1:2001]
EN55024:1998	Information Technology Equipment-Immunity Characteristics, Limits and Method of Measurements
EN55022	Level B for conducted and level B for radiated (stand alone)
EN55024	Information Technology Equipment-Immunity Characteristics, Limits and Method of Measurements
Mil-STD-461E	CE101:CE102,CS101&CS114(Refer to MIL-STD-461E Test Report)

ENVIRONMENTAL SPECIFICATIONS

Safety Certifications

The LCC250 series are intended for inclusion in other equipment and the installer must ensure that it is in compliance with all the requirements of the end application. This product is only for inclusion by professional installers within other equipment and must not be operated as a standard alone product.

Table 7. Safety Certifications for LCC250 Series Power Supply System	
Standard	Description
UL 62368-1 (2nd Ed) CAN/CSA-C22.2 No. 62368-1 (2nd Ed)	US and Canada Requirements
TUV-SUD EN 62368-1/A12:2011	European Requirements
ANSI/AAMI ES60601-1:2005 3rd Ed; CAN/CSA-C22.2 No. 60601-1 (2008)	US and Canada: Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance
TUV-SUD EN 60601-1:2006	European approval: Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance
IEC 62368-1 IEC 60950-1:2005 (2nd Ed); am1:2009	ITE CB Report
IEC 60601-1:2005	Medical CB Report
TUV-SUD EN 61347-1:2008; EN 61347-2-13:2006	Lamp Control Gear - Part 2-13: Particular requirements for DC or AC supplied electronic control gear for LED modules.
IEC 61347-1/A1:2010, IEC 61347-2-13:2006	CB Report via TUV-SUD
GB9254-2008; GB4943-2001; GB17625.1-2003	China CCC Approval*
CE Mark (LVD)	European Requirements
UKCA Mark	UK Requirements

* Applies to "-xPE" part number suffix.

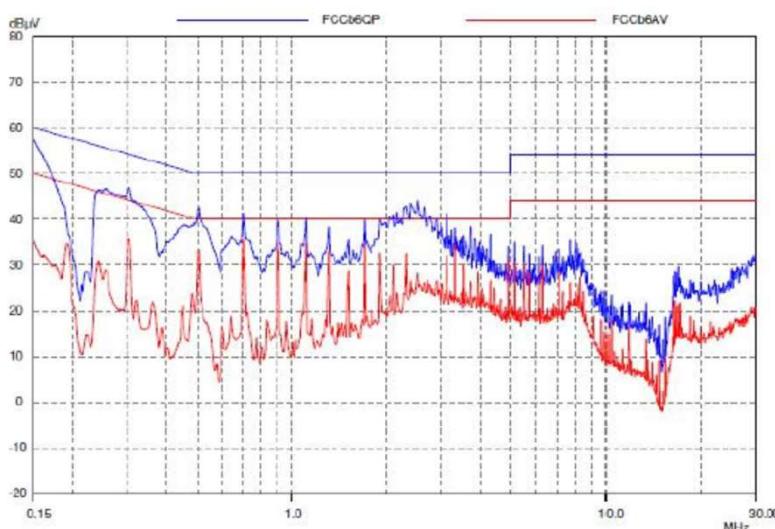
ENVIRONMENTAL SPECIFICATIONS

EMI Emissions

The LCC250 series has been designed to comply with the Class B limits of EMI requirements of EN55022 (FCC Part 15) and CISPR 22 (EN55022) for emissions and relevant sections of EN61000 (IEC 61000) for immunity. The unit is enclosed inside a metal box, tested at 250W using resistive load.

Conducted Emissions

The applicable standard for conducted emissions is EN55022 (FCC Part 15). Conducted noise can appear as both differential mode and common mode noise currents. Differential mode noise is measured between the two input lines, with the major components occurring at the supply fundamental switching frequency and its harmonics. Common mode noise, a contributor to both radiated emissions and input conducted emissions, is measured between the input lines and system ground and can be broadband in nature.



The LCC250 power supplies have internal EMI filters to ensure the convertor’s conducted EMI levels comply with EN55022 (FCC Part 15) Class B and EN55022 (CISPR 22) Class B limits. The EMI measurements are performed with resistive loads at maximum rated loading.

Sample of EN55022 Conducted EMI Measurement at 120Vac input.

Note: Blue Line refers to Artesyn Quasi Peak margin, which is 6dB below the CISPR international limit. Red Line refers to the Artesyn Average margin, which is 6dB below the CISPR international limit.

Parameter	Model	Symbol	Min	Typ	Max	Unit
FCC Part 15, class B	All	Margin	-	-	6	dB
VCCI Class II	All	Margin	-	-	6	dB
EN 61204-3, 2001 or latest	All	Margin	-	-	6	dB
CISPR 22 (EN55022) class B	All	Margin	-	-	6	dB

ENVIRONMENTAL SPECIFICATIONS

Radiated Emissions

Unlike conducted EMI, radiated EMI performance in a system environment may differ drastically from that in a stand-alone power supply. The shielding effect provided by the system enclosure may bring the EMI level from Class A to Class B. It is thus recommended that radiated EMI be evaluated in a system environment. The applicable standard is EN55022 Class A (FCC Part 15). Testing ac-dc convertors as a stand-alone component to the exact requirements of EN55022 can be difficult, because the standard calls for 1m leads to be attached to the input and outputs and aligned such as to maximize the disturbance. In such a set-up, it is possible to form a perfect dipole antenna that very few ac-dc convertors could pass. However, the standard also states that 'an attempt should be made to maximize the disturbance consistent with the typical application by varying the configuration of the test sample.

ENVIRONMENTAL SPECIFICATIONS

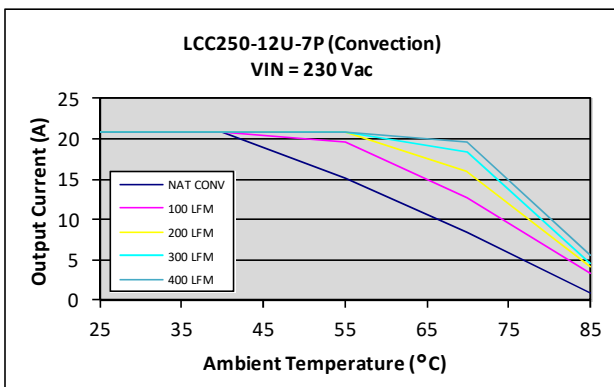
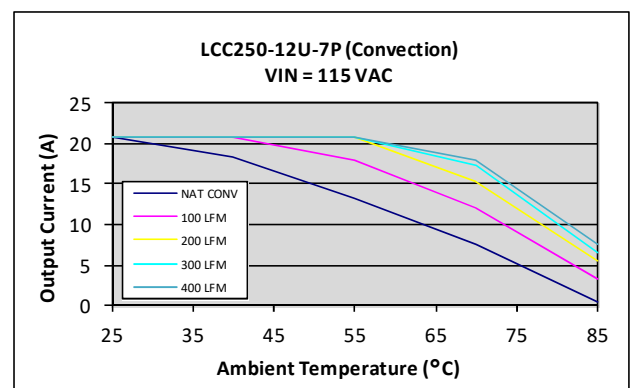
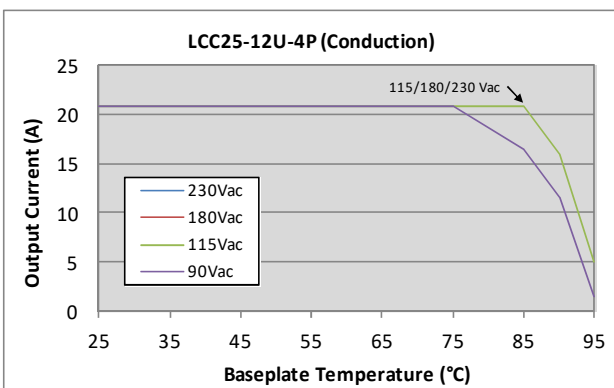
Operating Temperature and Output Power Derating

The LCC250 series power supplies will start and operate within stated specifications at an ambient temperature from -40°C to 85°C under all load conditions with derating.

Suffix 4P (conduction) can operate from -40°C to +85°C baseplate temperature at full load; 95 °C max baseplate with output derating.

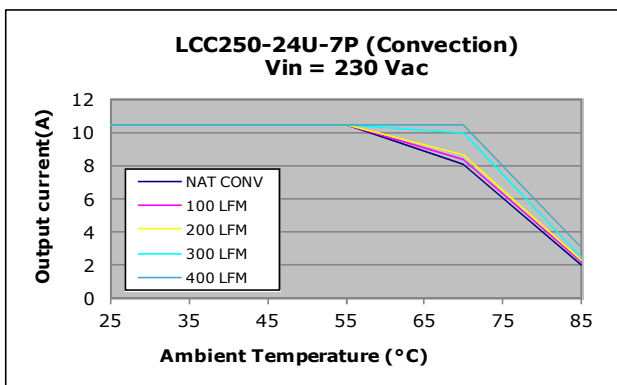
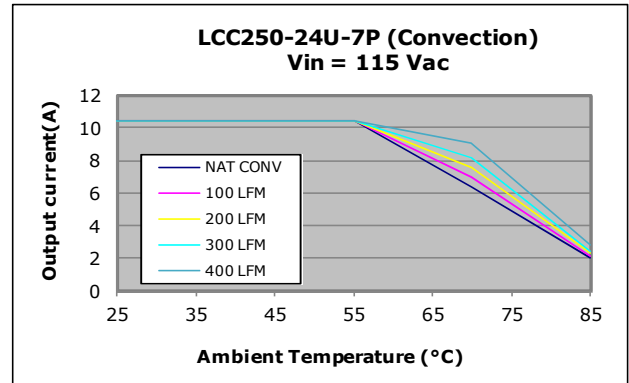
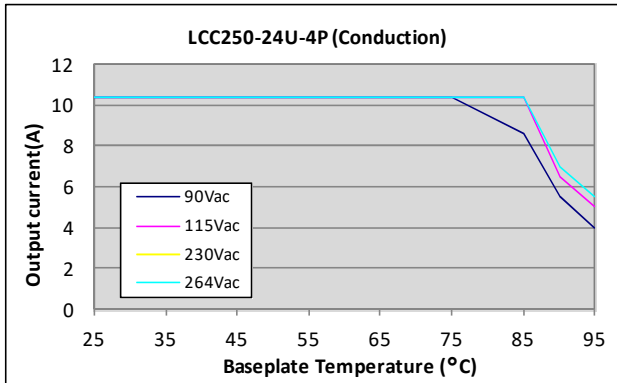
Suffix 7P (convection) can operate from -40°C to +55°C ambient temperature at full load with 200LFM airflow and 30% load at maximum 85°C ambient.

LCC250-12U-4P/7P Derating Curve



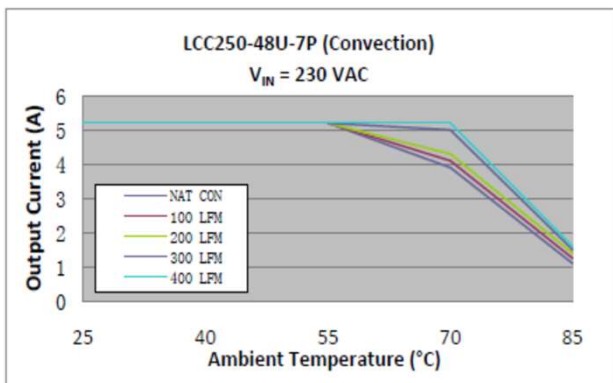
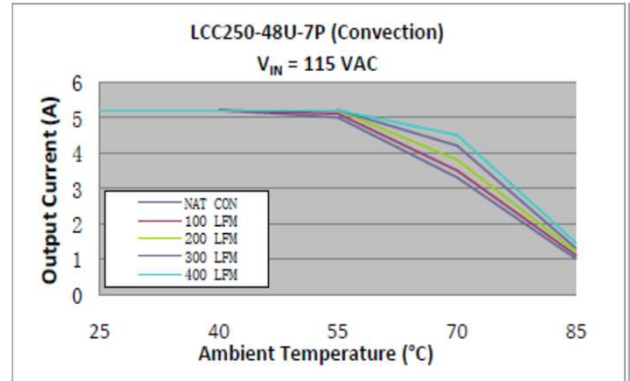
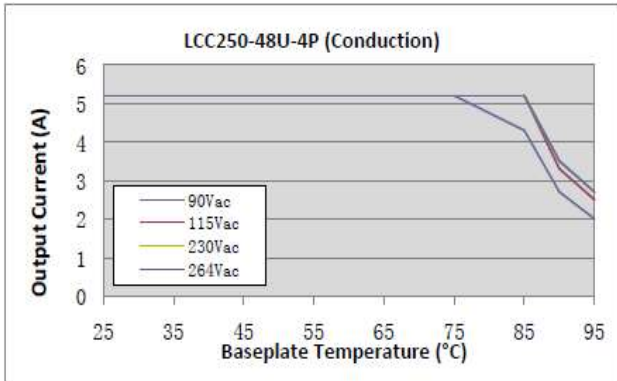
ENVIRONMENTAL SPECIFICATIONS

LCC250-24U-4P/7P Derating Curve



ENVIRONMENTAL SPECIFICATIONS

LCC250-48U-4P/7P Derating Curve



ENVIRONMENTAL SPECIFICATIONS

Storage and Shipping Temperature

The LCC250 series power supplies can be stored or shipped at temperatures between -40 °C to +85 °C and relative humidity from 10% to 100% non-condensing.

Altitude

The LCC250 series will operate within specifications at altitudes up to 13,000 feet above sea level, derating 1 °C per 1000 feet above 10,000 feet. The power supply will not be damaged when stored at altitudes of up to 50,000 feet above sea level.

Humidity

The LCC250 series will operate within specifications when subjected to a relative humidity from 10% to 100% non condensing. The LCC250 series can be stored in a relative humidity from 10% to 100% non-condensing.

Vibration

The LCC250 series will pass the following vibration specifications:

Operating Random Vibration

Acceleration	4.0	gRMS
Frequency Range	8-500	Hz
Sweep Rate	1	Oct/Min
No of Sweep	3 mutually perpendicular axis	
Direction	3 mutually perpendicular axis	
PSD Profile	FREQ	Level
	8-200 Hz	2.0 g
	200-500 Hz	4.0 g

ENVIRONMENTAL SPECIFICATIONS

Shock

The LCC250 series power supply will pass the following shock specifications:

Operating Half-Sine Shock

Acceleration	30	G
Duration	11	mSec
Pulse	Half-Sine	
Direction	X, Y, Z direction	
Number of Shock	3 shock on each of 18 faces	

POWER AND CONTROL SIGNAL DESCRIPTIONS

AC Input Cable

This cable supplies the AC Mains to the LCC250 power supply.

L = Live – Brown
N = Neutral – Blue
PE = Primary – Green/Yellow

Output Cable - Main Output

The two cables provide the main output for the LCC250. The +Output (V_O) and the Output Return pins are the positive and negative rails, respectively of the V_O output of the LCC250 power supply. The Output (V_O) is electrically isolated from the power supply chassis.

+Output – Blue
-Output – Gray

Output Cable - Control Signals

The LCC250 series contains 2-wire dimming interface, ON/OFF signal and remote sense signal.

Dimming, Dimming Return - Brown, Yellow

The interface will be referenced to the output side of the power supply with an open-circuit voltage not to exceed 10.5V. Internally the power supply will clamp the signal so that an open-circuit or applied voltage does not command a current exceeding the rated current. An applied voltage up to 15V will not damage the dimming interface. The power supply will not source more than 500uA to any device(s) connected to the dimming interface, including any device that applies a short circuit to this interface.

Sense, Sense Return - Red, Black



Remote sense capable of stable offset of 1.0Vdc(+/-0.5Vdc) will be provided with terminals adjacent to Output.

On/Off, On/Off Return - Orange, White

ON/OFF level. Unit will turn off when on/off signal connect to GND. If the on/off signal floating the unit will turn on. The Turn on delay time will not exceed 1.5S.

The elapsed time between the application of input power and the attainment of all output voltages to their nominal values will not exceed 1.5s under all line, load, and temperature conditions.

POWER AND CONTROL SIGNAL DESCRIPTIONS

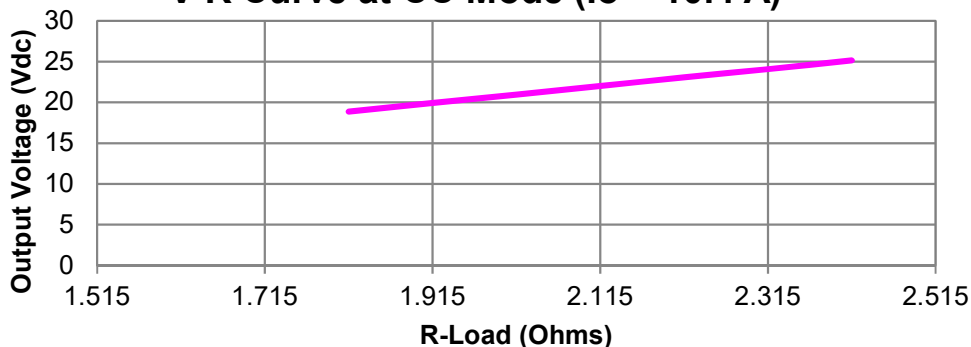
Jumper setting	Orange/White wire	Unit status
	Disconnected	ON (standard factory setting)
	Connected	OFF
	Disconnected	OFF
	Connected	ON

APPLICATION NOTES

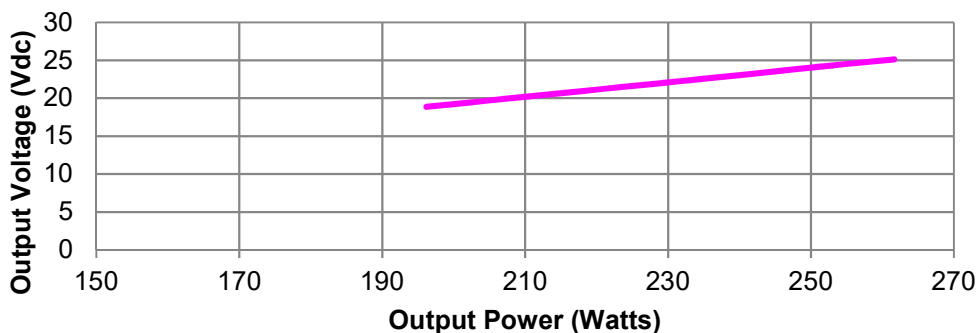
CC Mode and Dimming

The LCC250 series has the dimming and constant current limit function. The current can be adjusted by external voltage(0-10.5Vdc). An applied voltage up to 15Vdc will not damage the dimming interface. Below is the example for CC mode and dimming curves.

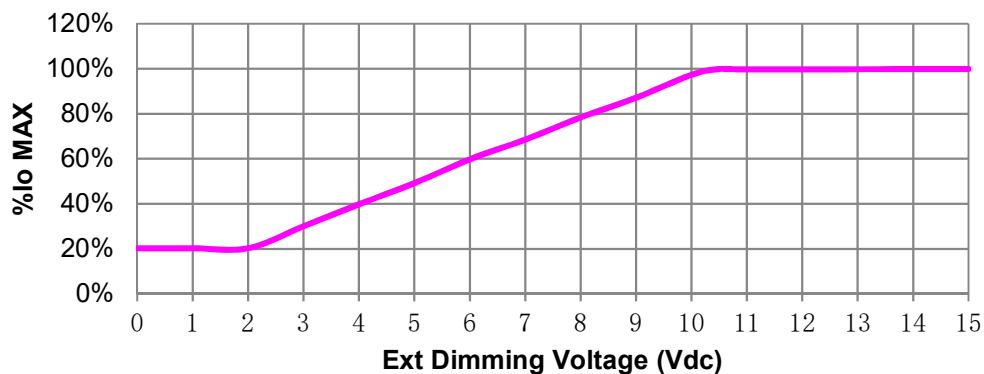
V-R Curve at CC Mode (Io = 10.4 A)



O/P Voltage vs. Power at CC Mode (I = 10.4 A)



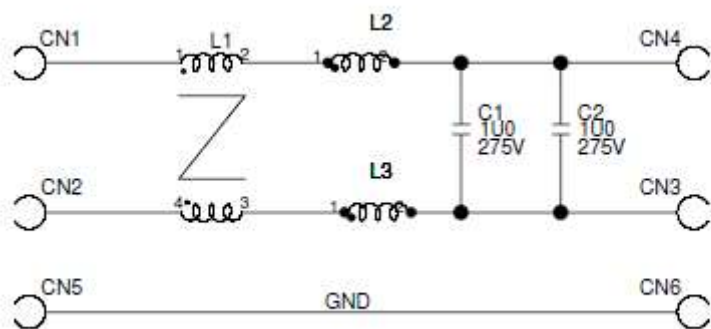
External Dimming Voltage vs. Output Current



APPLICATION NOTES

EMI Filter For LCC250-12U

The LCC250 series 12 V unit requires external filtering for MIL-STD-461E compliance. The filter is with discrete component implementation per below.



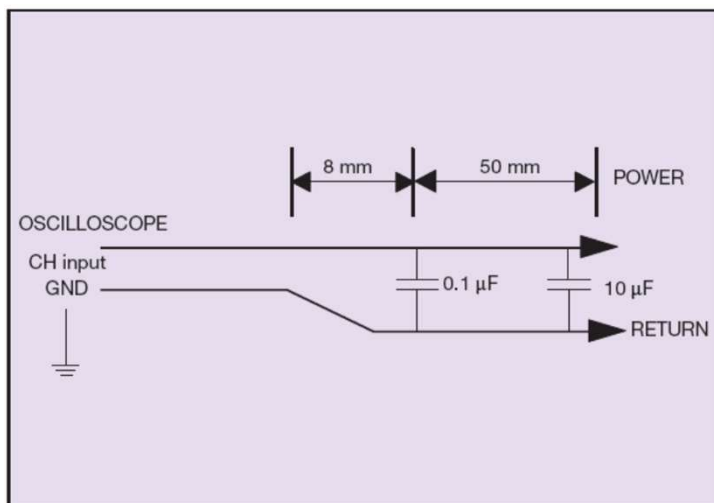
Material List for Extral EMI filter:

L1	Common Mode Choke	Core	12400013060	CORE-F T25X15X10 TL7
		Wire	AWG#19 Magnet Wire	42Turns
		Inductance	8mH~20mH	
L2	Differential Mode Choke	Core	12400006020	CORE-IP T20.2X12.6X9.53 52
		Wire	AWG#19 Magnet Wire	81Turns
		Inductance	360uH~478uH	
L3	Differential Mode Choke	Core	12400006020	CORE-IP T20.2X12.6X9.53 52
		Wire	AWG#19 Magnet Wire	81Turns
		Inductance	360uH~478uH	
CX1	X-CAP	06930210502	CAP-MP 1U0 K 275VAC X2 B32923	
CX2	X-CAP	06930210502	CAP-MP 1U0 K 275VAC X2 B32923	

APPLICATION NOTES

Output Ripple and Noise Measurement

The setup outlined in the diagram below has been used for output voltage ripple and noise measurements on the LCC250 series. When measuring output ripple and noise, a scope jack in parallel with a 0.1 μ F ceramic chip capacitor, and a 10 μ F tantalum capacitor should be used. Oscilloscope should be set to 20 MHz bandwidth for this measurement.



RECORD OF REVISION AND CHANGES

Issue	Date	Description	Originators
1.1	01.16.2013	First Issue	K. Wang
1.2	05.03.2013	Update type error	K. Wang
1.3	03.25.2015	Add the CC Mode and Dimming Curve	K. Wang
1.4	10.06.2015	Delete the reference to PWM dimming	K. Wang
1.5	08.01.2016	Delete a repeat sentence/ update the picture	K. Wang
1.6	02.02.2017	Add the EMI Filter information	K. Wang
1.7	11.07.2017	Update the mechanical drawing	A. Zhang
1.8	08.29.2018	Update the input to output isolation voltage from 4000Vac to 3000Vac	K. Wang
1.9	10.25.2019	Add the note for 4Px and 7Px suffix	K. Wang
2.0	11.10.2020	Update safety cert from 60950-1 and 62368-1	K. Wang
2.1	04.24.2022	UKCA Mark	K. Wang



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