Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Wide Input, Isolated DOSA Quarter Brick DC-DC Converters

Typical unit

FEATURES

- Fixed DC outputs, 12V @ 20A
- Industry standard quarter brick 2.3″ x 1.45″ x 0.46″ open frame package
- Wide range 18 to 60 Vdc input voltages with 2250 Volt Basic isolation
- Remote ON/Off enable control
- DOSA-compatible pinouts and form factor
- High efficiency synchronous rectifier topology
- Multiple-unit parallel operation for increased current
- Stable no-load operation
- Monotonic startup into pre-bias output condition
- Certified to UL/60950-1, CSA-C22.2 No. 60950-1, 2nd edition safety approvals
- Extensive self-protection, OVP, input undervoltage, current limiting and thermal shutdown
- Trimmable output from 10.8V to 13.2V

PRODUCT OVERVIEW

The UWQ series offers high output current (up to 20 Amps) in an industry standard "quarter brick" package requiring no heat sink for most applications. The UWQ series delivers fixed DC output voltages up to 240 Watts (12V @ 20A) for printed circuit board mounting. Wide range inputs of 18 to 60 Volts DC (48 Volts nominal) are ideal for datacom and telecom systems.

The UWQ-12/20-T48xS offers a load sharing option for paralleling up to three modules in the most demanding, power hungry applications. The UWQ-12/20-T48xT is trimmable from 10.8Vout to 13.2Vout and includes Sense pins to compensate for voltage drops at the load.

Advanced automated surface mount assembly and planar magnetics deliver galvanic isolation rated at 2250 Vdc for basic insulation. To power digital systems, the outputs offer fast settling to current steps and tolerance of higher capacitive loads. Excellent ripple and noise specifications assure compatibility to CPUs, ASICs, programmable logic and FPGAs. No minimum load is required. For systems needing controlled startup/shutdown, an external remote On/Off control may use either positive or negative logic.

A wealth of self-protection features include input undervoltage lockout and overtemperature shutdown using an on-board temperature sensor; overcurrent protection using the "hiccup" autorestart technique, provides indefinite short-circuit protection, along with output OVP. The synchronous rectifier topology offers high efficiency for minimal heat generation and "no heat sink" operation. The UWQ series is certified to safety standards UL/IEC/CSA 60950-1, 2nd edition. It meets class B EMI conducted emission compliance to EN55022, CISPR22 with an external filter.

APPLICATIONS

- Embedded systems, datacom and telecom installations, wireless base stations
- Disk farms, data centers and cellular repeater sites
- Remote sensor systems, dedicated controllers
- Instrumentation systems, R&D platforms, automated test fixtures
- Data concentrators, voice forwarding and speech processing systems

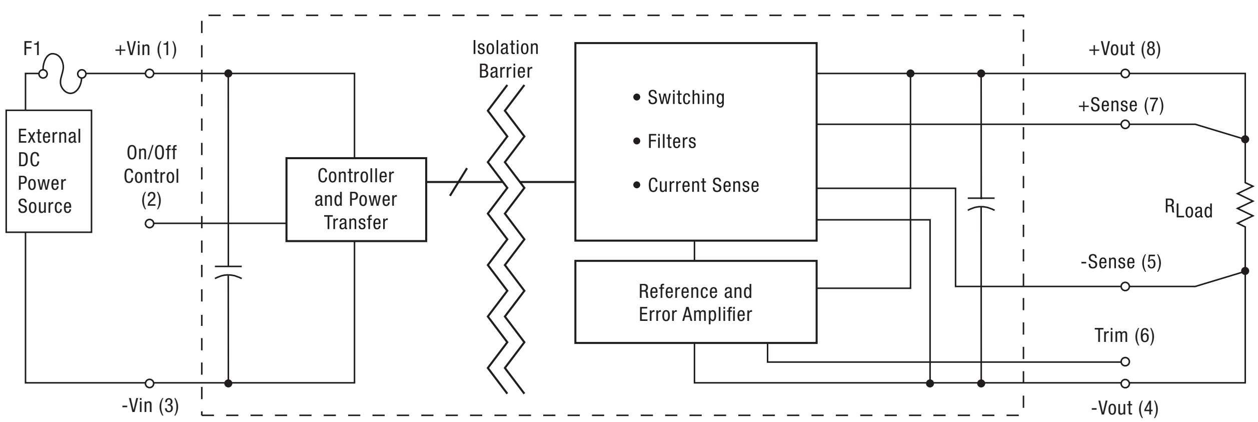


Figure 1. Connection Diagram

Typical topology is shown. Murata Power Solutions recommends an external fuse.

For full details go to www.murata-ps.com/rohs

PERFORMANCE SPECIFICATIONS SUMMARY AND ORDERING GUIDE ①

Root Model ①	Output							Input				Efficiency		Dimensions (open frame)	
	Vout (Volts)	Iout (Amps, max.)	Power (Watts)	R/N (mV pk-pk)		Regulation (Max.) ②		Vin Nom. (Volts)	Range (Volts)	Iin no load (mA)	Iin full load (Amps)				
				Typ.	Max.	Line	Load					Min.	Typ.	(inches)	(mm)
UWQ-12/20-T48	12	20	240	100	120	±1.0	±1.5	48	18-60	90	5.43	90%	92%	2.30x1.45x0.46 max.	58.4x36.8x11.7
UWQ-12/20-T48xS	12	20	240	100	120	±1.25	±2.5	48	18-60	90	5.43	90%	92%	2.30x1.45x0.46 max.	58.4x36.8x11.7
UWQ-12/20-T48xT	12	20	240	100	120	±0.25	±0.3	48	18-60	80	5.43	90%	92%	2.30x1.45x0.46 max.	58.4x36.8x11.7

① Please refer to the part number structure for additional ordering information and options.
② All specifications are typical at nominal line voltage and full load, +25°C unless otherwise noted. See detailed specifications. Output capacitors are 1 µF || 10 µF with a 22µF input capacitor. These caps are necessary for our test equipment and may not be needed for your application.

PART NUMBER STRUCTURE

UWQ - 12 / 20 - T48 N T B S Lx - C

- **Family Series:** Wide Input Quarter Brick
- **Nominal Output Voltage**
- **Maximum Rated Output:** Current in Amps
- **Input Voltage Range:** T48 = 18-60 Volts (48V nominal)
- **On/Off Control Logic**
  N = Negative logic
  P = Positive logic
- **Trim & Sense Option**
  Blank = No trim and sense
  T = Trim and sense
- **Baseplate (optional)**
  Blank = No baseplate, standard
  B = Baseplate installed, optional
- **Load Share Option**
  Blank = No share
  S = Load share
- **Pin length option**
  Blank = Standard pin length 0.180 in. (4.6 mm)
  L1 = 0.110 in. (2.79 mm) ①
  L2 = 0.145 in. (3.68 mm) ①
- **RoHS Hazardous Materials compliance**
  C = RoHS-6 (does not claim EU RoHS exemption 7b–lead in solder), standard

① Special quantity order is required; samples available with standard pin length only.
② Some model number combinations may not be available. See website or contact your local Murata sales representative.

Complete Model Number Example: **UWQ-12/20-T48NBL1-C**

Negative On/Off logic, baseplate installed, 0.110˝ pin length, RoHS-6 compliance

FUNCTIONAL SPECIFICATIONS, UWQ-12/20-T48

ABSOLUTE MAXIMUM RATINGS	Conditions ①	Minimum	Typical/Nominal	Maximum	Units
Input Voltage, Continuous	Full power operation	18	48	70	Vdc
Input Voltage, Transient	Operating or non-operating, 100 mS max. duration			75	Vdc
Isolation Voltage	Input to output			2250	Vdc
On/Off Remote Control	Power on or off, referred to -Vin	0		13.5	Vdc
Output Power		0		247.2	W
Output Current	Current-limited, no damage, short-circuit protected	0		20	A
Storage Temperature Range	Vin = Zero (no power)	-55		125	°C
Absolute maximums are stress ratings. Exposure of devices to greater than any of these conditions may adversely affect long-term reliability. Proper operation under conditions other than those listed in the Performance/Functional Specifications Table is not implied or recommended.					
INPUT	**Conditions ① ③**				
Operating voltage range		18	48	60	Vdc
Recommended External Fuse	Fast blow		20		A
Start-up threshold	Rising input voltage	16	16.75	17.5	Vdc
Undervoltage shutdown	Falling input voltage	14.75	15.5	16.75	Vdc
Internal Filter Type			L-C		
Input current					
Full Load Conditions	Vin = nominal		5.43	5.72	A
Low Line	Vin = minimum		14.65	15.34	A
Inrush Transient	Vin = 48V.		0.05	0.1	A2-Sec.
Output in Short Circuit			50	100	mA
No Load input current (T48xT models)	Iout = minimum, unit = ON		80	150	mA
No Load input current (all other models)	Iout = minimum, unit = ON		90	150	mA
Shut down mode input current			5	8	mA
Reflected (back) ripple current ②	Measured at input with specified filter		15	25	mA, RMS
Pre-biased startup	External output voltage < Vset		Monotonic		
GENERAL and SAFETY					
Efficiency	Vin=48V, full load	90	92		%
	Vin=min	89.5	91		%
Isolation					
Isolation Voltage, input to output	With or without baseplate	2250			Vdc
Isolation Voltage, input to baseplate	With baseplate	1500			Vdc
Isolation Voltage, output to baseplate	With baseplate	1500			Vdc
Insulation Safety Rating			basic		
Isolation Resistance			100		MΩ
Isolation Capacitance			1500		pF
Safety (certified to the following requirements)	UL-60950-1, CSA-C22.2 No.60950-1, IEC/60950-1, 2nd edition		Yes		
Calculated MTBF	Per Telcordia SR-332, issue 1, class 3, ground fixed, Tambient = +25°C		TBD		Hours x 10^3
DYNAMIC CHARACTERISTICS (T48xT models)					
Fixed Switching Frequency		250	275	300	KHz
Startup Time	Power On, to Vout regulation band		60	65	mS
Startup Time	Remote ON to Vout Regulated		60	65	mS
Dynamic Load Response	50-75-50% load step to 3% error band		220	275	µSec
Dynamic Load Peak Deviation	same as above		±500	±700	mV
DYNAMIC CHARACTERISTICS (all other models)					
Fixed Switching Frequency		180	200	220	KHz
Startup Time	Power On, to Vout regulation band		10	20	mS
Startup Time	Remote ON to Vout Regulated		10	20	mS
Dynamic Load Response	50-75-50% load step to 3% error band		200	250	µSec
Dynamic Load Peak Deviation	same as above		±1100	±1300	mV
FEATURES and OPTIONS					
Remote On/Off Control ④					
"N" suffix:					
Negative Logic, ON state	ON = pin grounded or external voltage	0		1	Vdc
Negative Logic, OFF state	OFF = pin open or external voltage	3.5		13.5	Vdc
Control Current	open collector/drain		1	2	mA
"P" suffix:					
Positive Logic, ON state	ON = pin open or external voltage	3.5		13.5	V
Positive Logic, OFF state	OFF = ground pin or external voltage	0		1	V
Control Current	open collector/drain		1	2	mA
Base Plate	"B" suffix		optional		

FUNCTIONAL SPECIFICATIONS, UWQ-12/20-T48, (CONT.)

OUTPUT	Conditions ①	Minimum	Typical/Nominal	Maximum	Units
Total Output Power		0.0	240	247.2	W
Voltage					
Setting Accuracy, fixed output	At 50% load, not user adjustable	11.64	12	12.36	Vdc
Output Voltage Range (T48xT models)	User-adjustable	-10		+10	% of Vnom.
Overvoltage Protection	Via magnetic feedback			15	Vdc
Current					
Output Current Range		0	20	20	A
Minimum Load			No minimum load		
Current Limit Inception	96% of Vnom., cold condition	23.5	25.5	27.5	A
Short Circuit					
Short Circuit Current	Hiccup technique, autorecovery within 1.25% of Vout		1	2	A
Short Circuit Duration (remove short for recovery)	Output shorted to ground, no damage		Continuous		
Short circuit protection method	Hiccup current limiting		Non-latching		
Regulation (standard 12/20-T48) ⑤					
Line Regulation	Vin=min. to max., Vout=nom., full load			±1	% of Vout
Load Regulation	Iout=min. to max., Vin=nom.			±1.5	% of Vout
Regulation (T48xS models) ⑤					
Line Regulation	Vin=min. to max., Vout=nom., full load			±1.25	% of Vout
Load Regulation	Iout=min. to max., Vin=nom.			±2.5	% of Vout
Regulation (T48xT models) ⑤					
Line Regulation	Vin=min. to max., Vout=nom., full load			±0.25	% of Vout
Load Regulation	Iout=min. to max., Vin=nom.			±0.3	% of Vout
Ripple and Noise ⑥	5 Hz- 20 MHz BW, Cout=1μF MLCC paralleled with 10μF tantalum		100	120	mV pk-pk
Temperature Coefficient	At all outputs		0.02		% of Vout./°C
Maximum Capacitive Loading	Low ESR		5000		μF
Current Share Accuracy (2 units in parallel) (T48xS models)	Percent deviation from ideal sharing (50%)			±10	%
Remote Sense Compliance (T48xT models)	Sense connected at load			10	% of Vout
MECHANICAL (Through Hole Models)					
Outline Dimensions (no baseplate)			2.3x1.45x0.46 max.		Inches
(Please refer to outline drawing)	LxWxH		58.4x36.8x11.68		mm
Outline Dimensions (with baseplate)			2.3x1.45x0.5		Inches
			58.4x36.8x12.7		mm
Weight	No baseplate		1.6		Ounces
	No baseplate		45		Grams
	With baseplate		2.24		Ounces
	With baseplate		63.5		Grams
Through Hole Pin Diameter			0.04 & 0.06		Inches
			1.016 & 1.52		mm
Through Hole Pin Material			Copper alloy		
TH Pin Plating Metal and Thickness	Nickel subplate		50		μ-inches
	Gold overplate		5		μ-inches
Baseplate Material			Aluminum		
ENVIRONMENTAL					
Operating Ambient Temperature Range	See derating curves	-40		85	°C
Operating Case Temperature	With baseplate, no derating	-40		110	°C
Storage Temperature	Vin = Zero (no power)	-55		125	°C
Thermal Protection/Shutdown	Measured at hotspot	135	140	150	°C
Electromagnetic Interference	External filter is required				
Conducted, EN55022/CISPR22			B		Class
RoHS rating			RoHS-6		

Notes

① Unless otherwise noted, all specifications apply at Vin = nominal, nominal output voltage and full output load. General conditions are near sea level altitude, no base plate installed and natural convection airflow unless otherwise specified. All models are tested and specified with external parallel 1 μF and 10 μF multi-layer ceramic output capacitors and a 22μF external input capacitor (see Technical Notes). All capacitors are low-ESR types wired close to the converter. These capacitors are necessary for our test equipment and may not be needed in the user's application.

② Input (back) ripple current is tested and specified over 5 Hz to 20 MHz bandwidth. Input filtering is Cin = 33 μF/100V, Cbus = 220μF/100V and Lbus = 12 μH.

③ All models are stable and regulate to specification under no load.

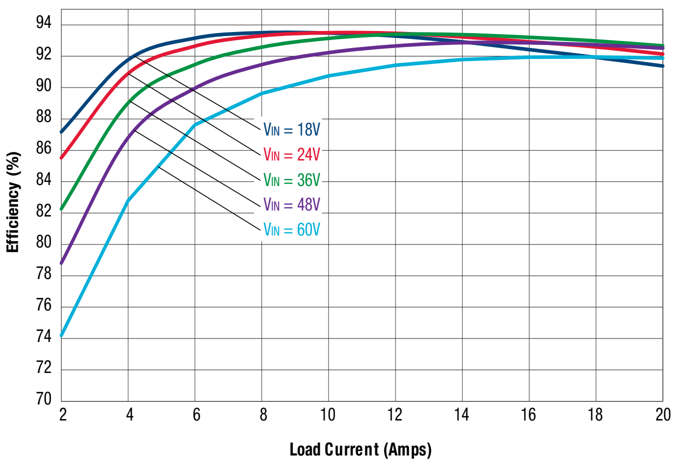
④ The Remote On/Off Control is referred to -Vin.

⑤ Regulation specifications describe the output voltage changes as the line voltage or load current is varied from its nominal or midpoint value to either extreme. The load step is ±25% of full load current.

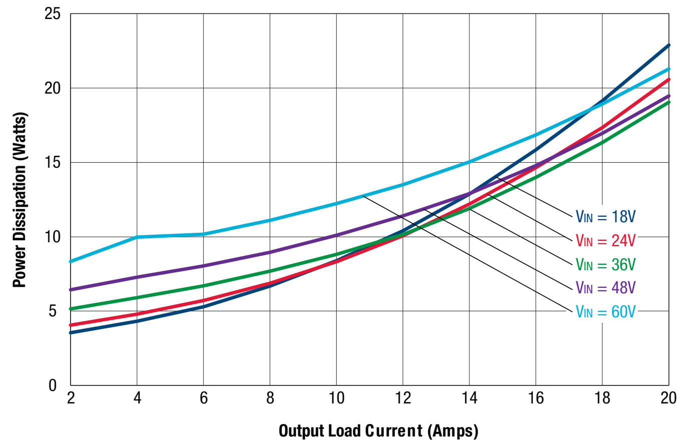
⑥ Output Ripple and Noise is measured with Cout = 1 μF || 10 μF, 20 MHz oscilloscope bandwidth and full resistive load.

PERFORMANCE DATA, UWQ-12/20-T48-C

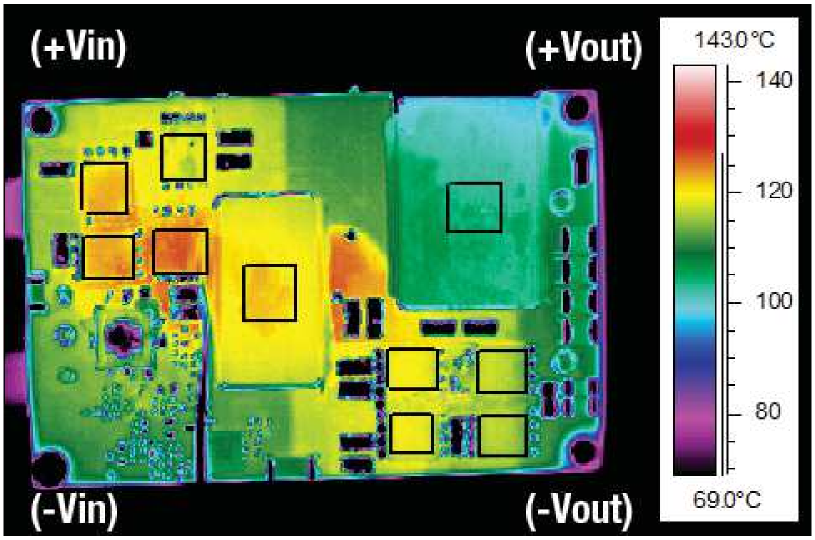
Efficiency vs. Line Voltage and Load Current @ +25°C



Power Dissipation vs. Load Current @ +25°C

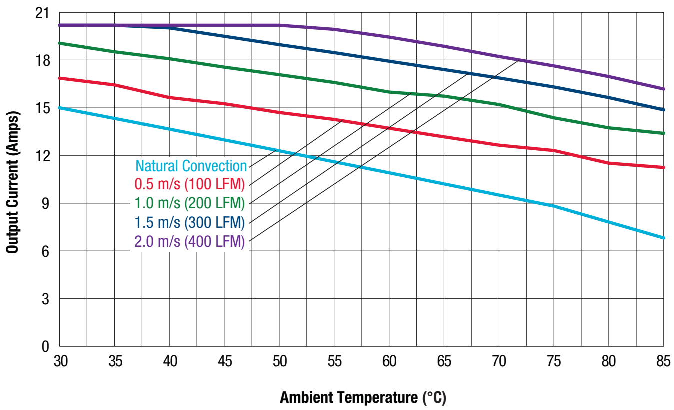


Thermal image with hot spot at 10.8A with 25°C ambient temperature. Natural convection is used with no forced airflow.
Identifiable and recommended maximum value to be verified in application.

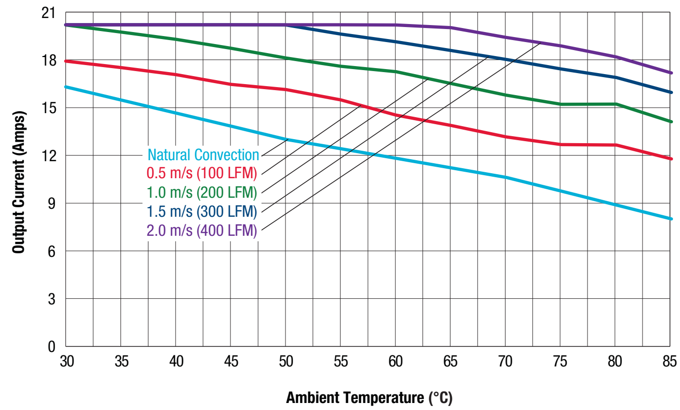


PERFORMANCE DATA, UWQ-12/20-T48-C

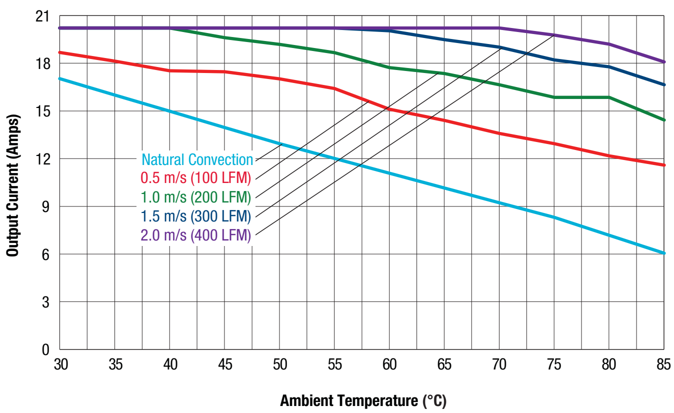
Maximum Current Temperature Derating at sea level
(Vin = 18V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



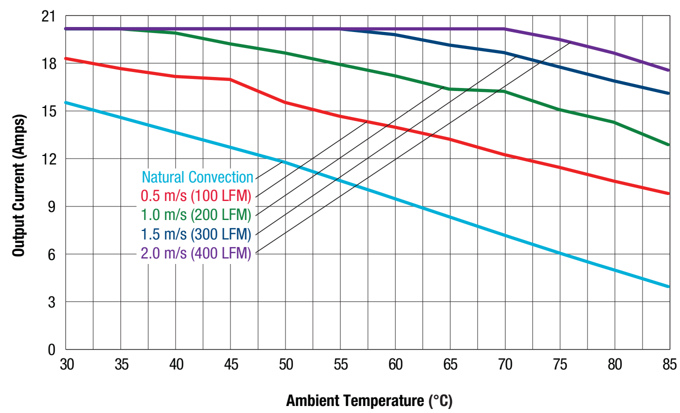
Maximum Current Temperature Derating at sea level
(Vin = 24V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



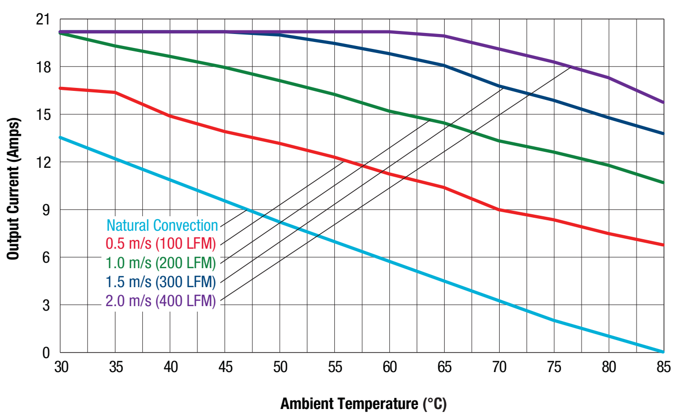
Maximum Current Temperature Derating at sea level
(Vin = 36V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



Maximum Current Temperature Derating at sea level
(Vin = 48V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)

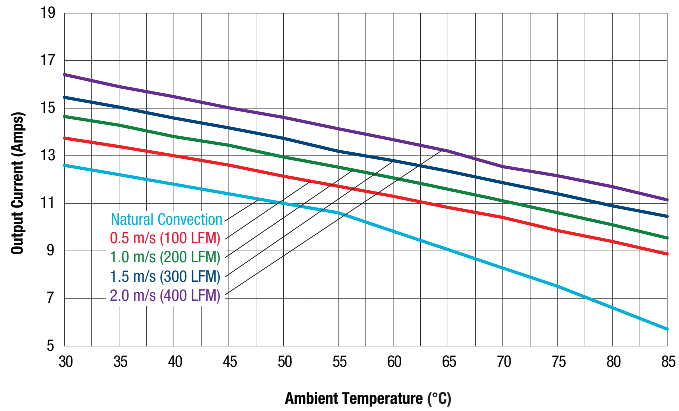


Maximum Current Temperature Derating at sea level
(Vin = 60V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)

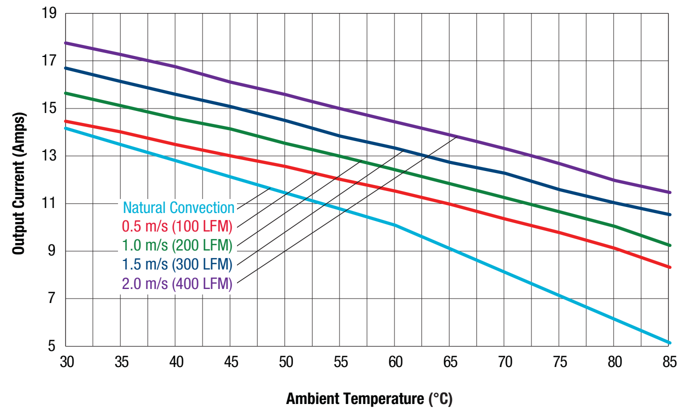


PERFORMANCE DATA, UWQ-12/20-T48-C

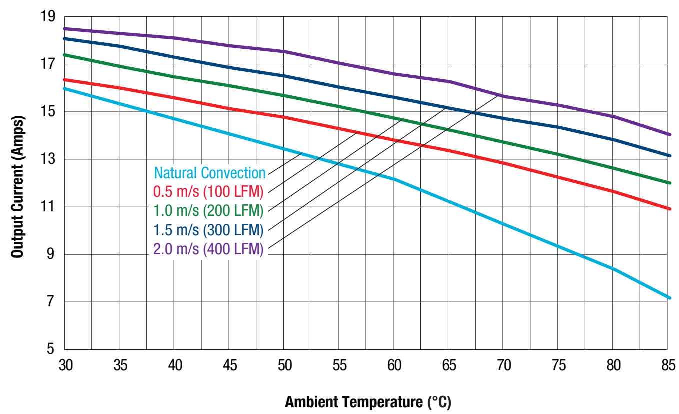
Maximum Current Temperature Derating at sea level
(Vin = 18V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)



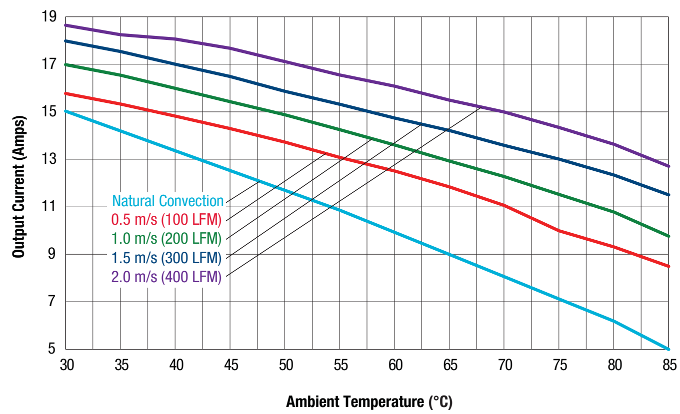
Maximum Current Temperature Derating at sea level
(Vin = 24V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)



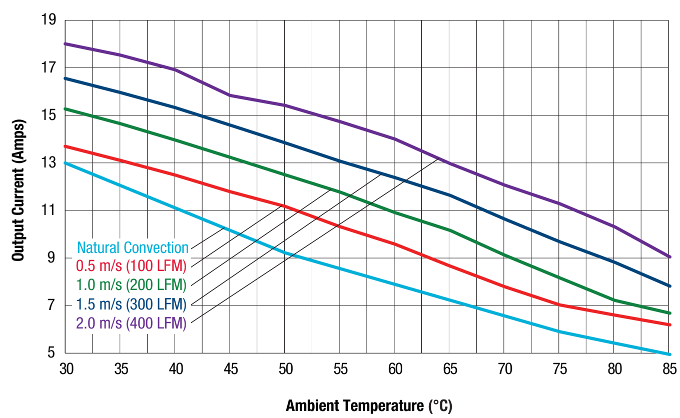
Maximum Current Temperature Derating at sea level
(Vin = 36V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)



Maximum Current Temperature Derating at sea level
(Vin = 48V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)

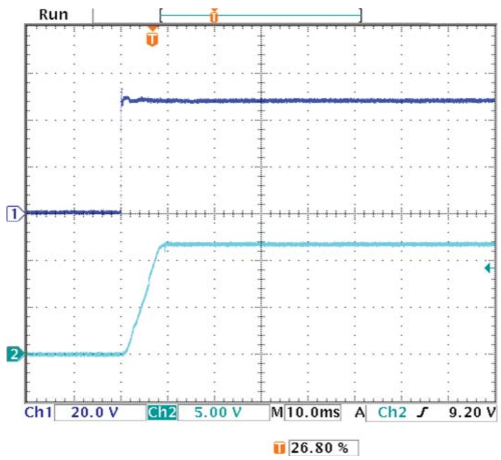


Maximum Current Temperature Derating at sea level
(Vin = 60V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)

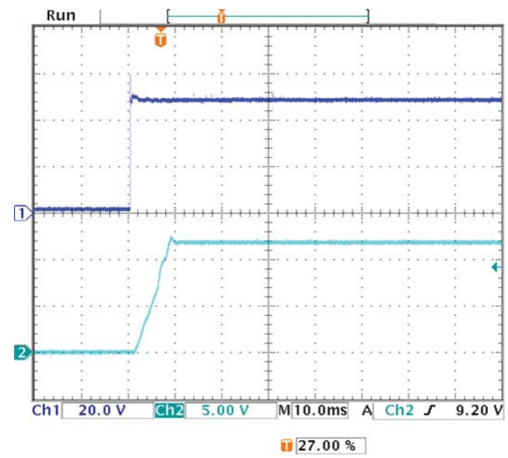


PERFORMANCE DATA, UWQ-12/20-T48-C

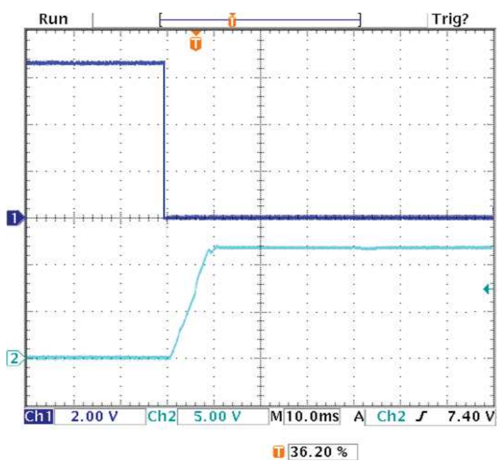
Start-up Delay (Vin = 48V, Iout = 0A, Cload = 0, Ta = +25°C) Ch1 = Vin, Ch2 = Vout



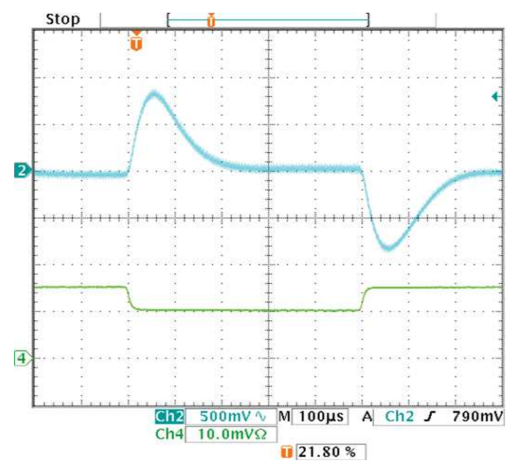
Start-up Delay (Vin = 48V, Iout = 20A, Cload = 5000μF, Ta = +25°C) Ch1 = Vin, Ch2 = Vout



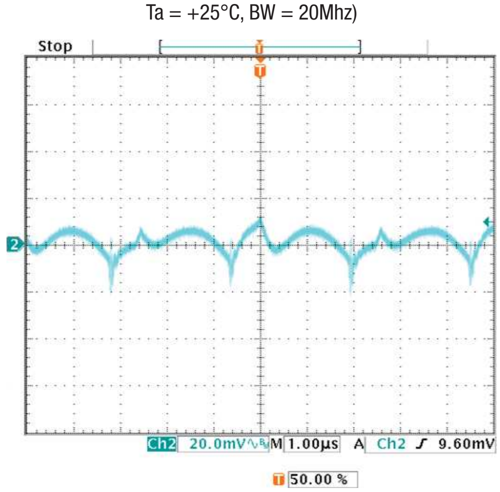
On/Off Enable Delay (Vin = 48V, Vout = nom, Iout = 20A, Cload = 5000μF, Ta = +25°C) Ch1 = Enable, Ch2 = Vout.



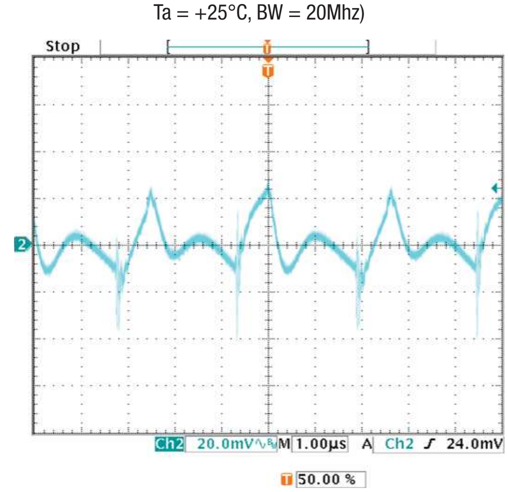
Stepload Transient Response (Vin = 48V, Iout = 50-75-50% of Imax, Cload = 1μF || 10μF, Io = 10A/div, Ta = +25°C) Ch2 = Vout, Ch4 = Iout



Output ripple and Noise (Vin = 48V, Iout = 0A, Cload = 1μF || 10μF, Ta = +25°C, BW = 20Mhz)

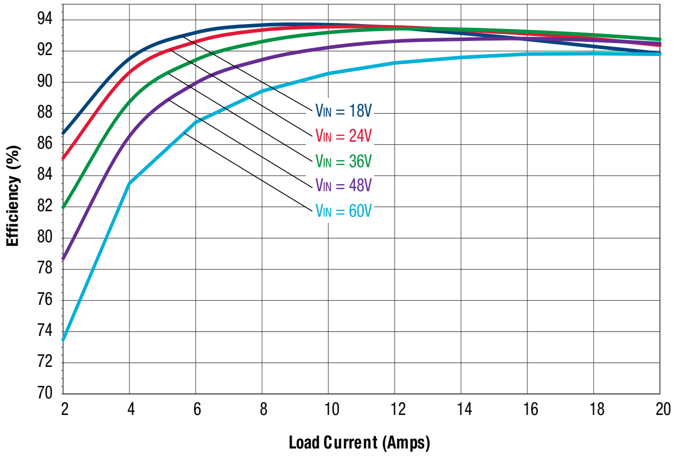


Output ripple and Noise (Vin = 48V, Iout = 20A, Cload = 1μF || 10μF, Ta = +25°C, BW = 20Mhz)

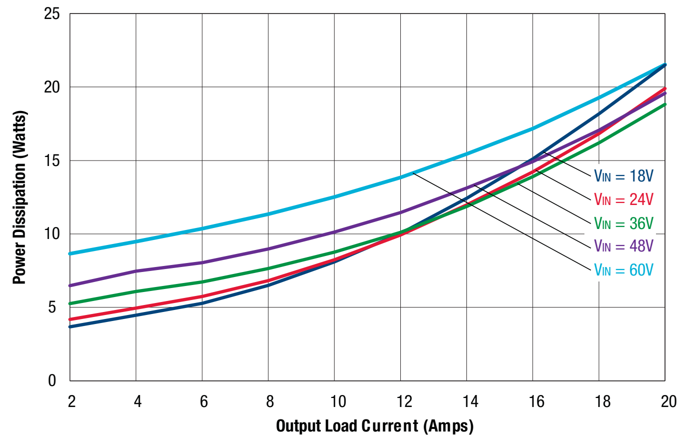


PERFORMANCE DATA, UWQ-12/20-T48xS

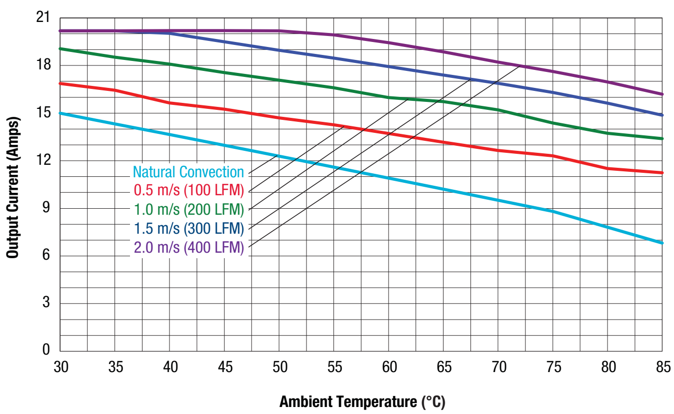
Efficiency vs. Line Voltage and Load Current @ +25°C



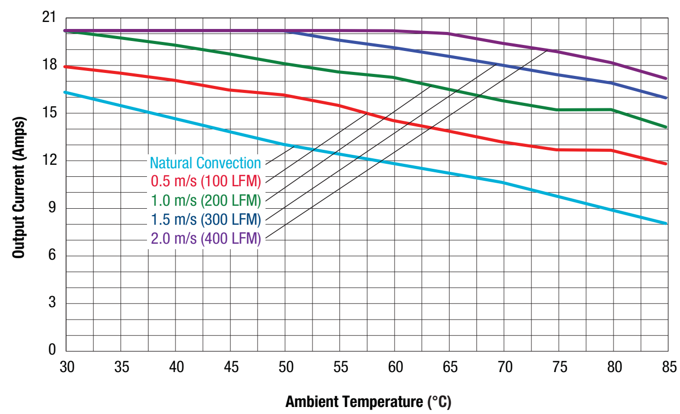
Power Dissipation vs. Load Current @ +25°C



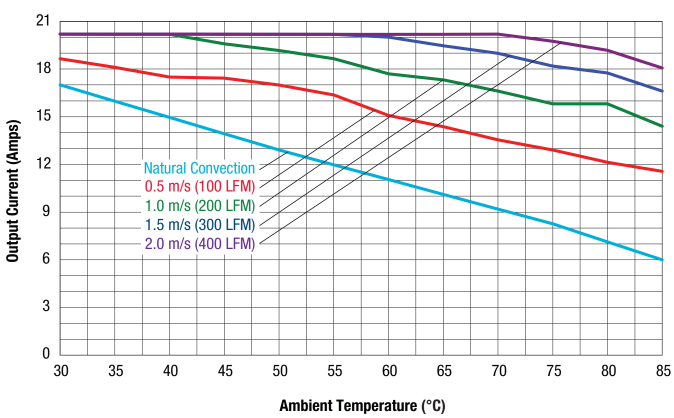
Maximum Current Temperature Derating at sea level
(Vin = 18V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



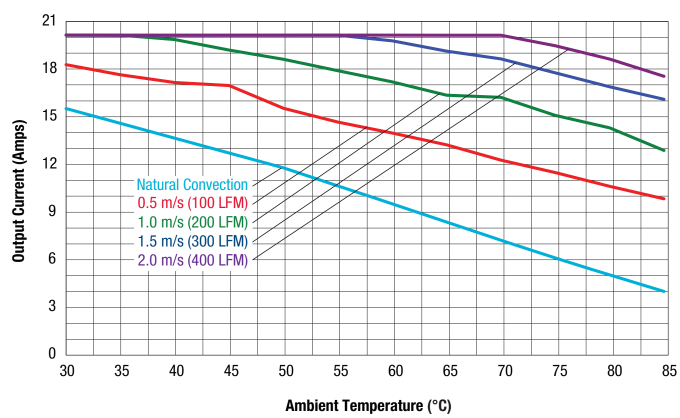
Maximum Current Temperature Derating at sea level
(Vin = 24V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



Maximum Current Temperature Derating at sea level
(Vin = 36V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)

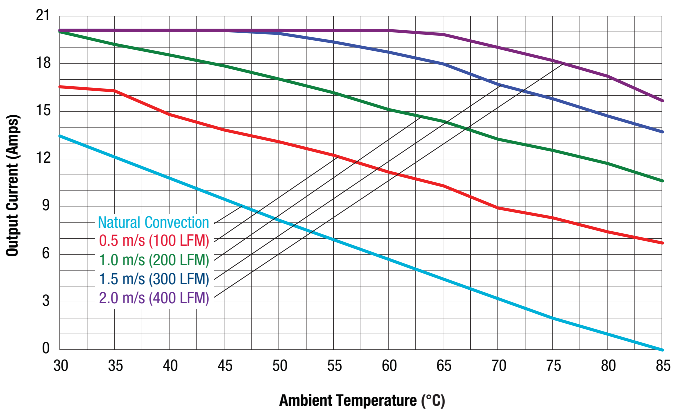


Maximum Current Temperature Derating at sea level
(Vin = 48V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)

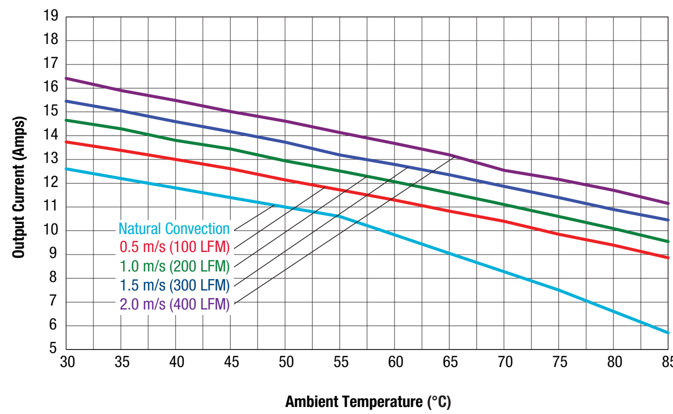


PERFORMANCE DATA, UWQ-12/20-T48xS

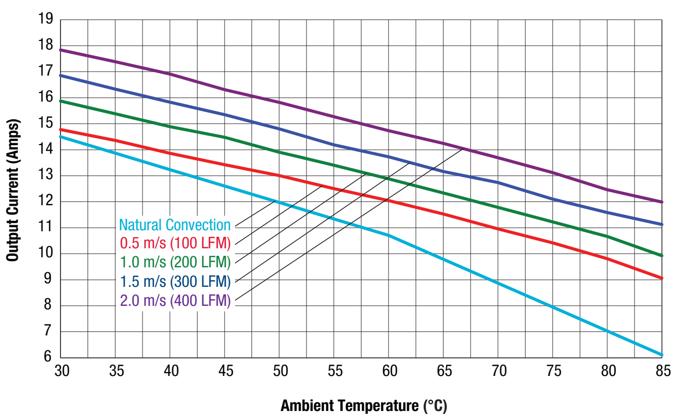
Maximum Current Temperature Derating at sea level
(Vin = 60V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



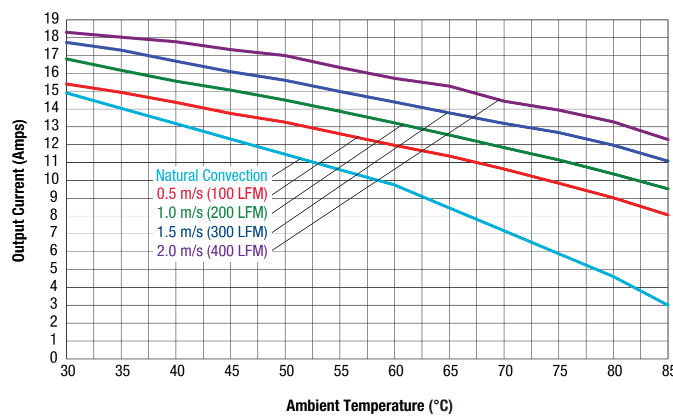
Maximum Current Temperature Derating at sea level
(Vin = 18V, air flow from Pin 3 to Pin 1 on PCB, without baseplate)



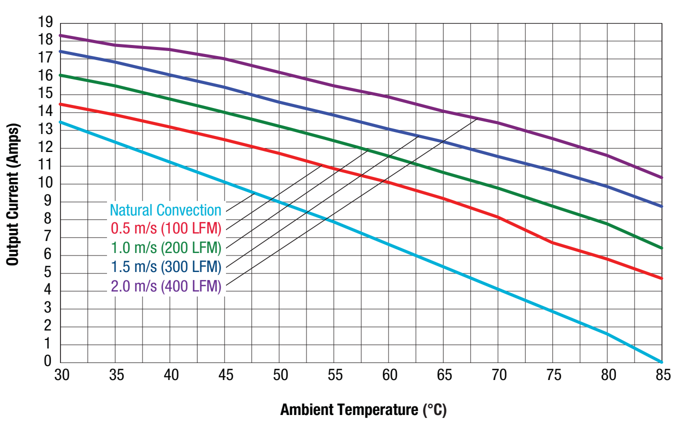
Maximum Current Temperature Derating at sea level
(Vin = 24V, air flow from Pin 3 to Pin 1 on PCB, without baseplate)



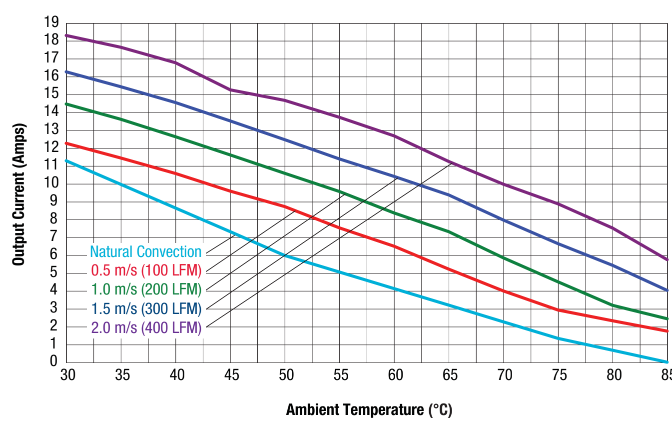
Maximum Current Temperature Derating at sea level
(Vin = 36V, air flow from Pin 3 to Pin 1 on PCB, without baseplate)



Maximum Current Temperature Derating at sea level
(Vin = 48V, air flow from Pin 3 to Pin 1 on PCB, without baseplate)

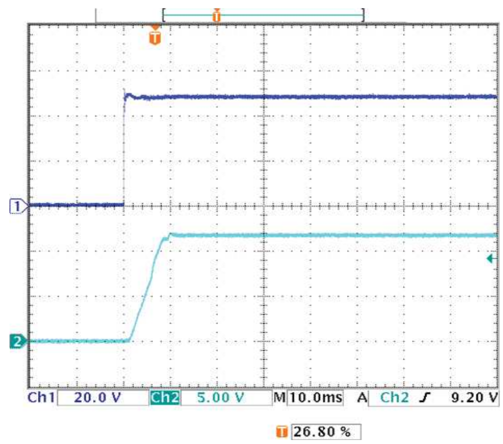


Maximum Current Temperature Derating at sea level
(Vin = 60V, air flow from Pin 3 to Pin 1 on PCB, without baseplate)

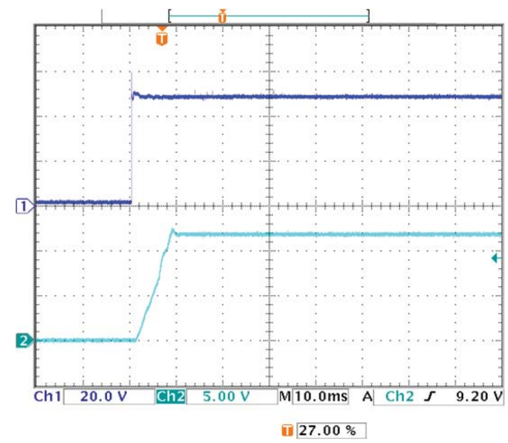


PERFORMANCE DATA, UWQ-12/20-T48xS

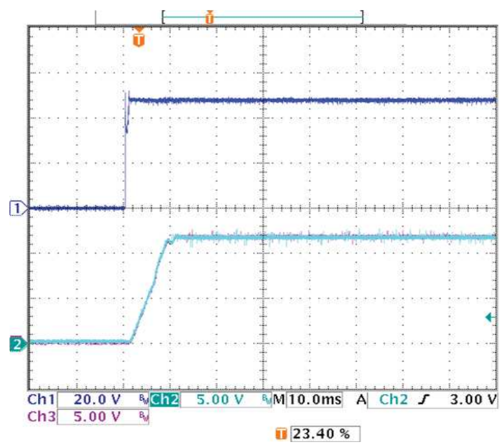
Start-up Delay (Vin=48V, Iout=0A, Cload=5000μF, Ta=+25°C) Ch1= Vin, Ch2= Vout



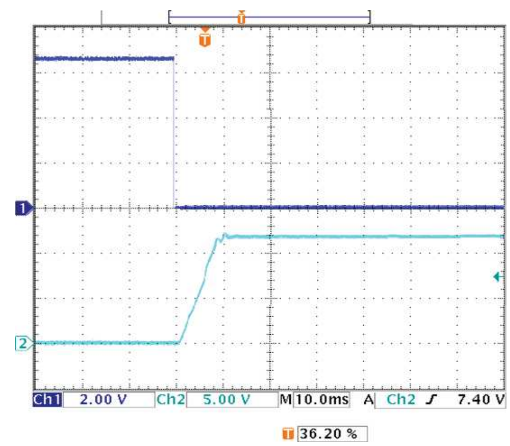
Start-up Delay (Vin=48V, Iout=20A, Cload=5000μF, Ta=+25°C) Ch1= Vin, Ch2= Vout



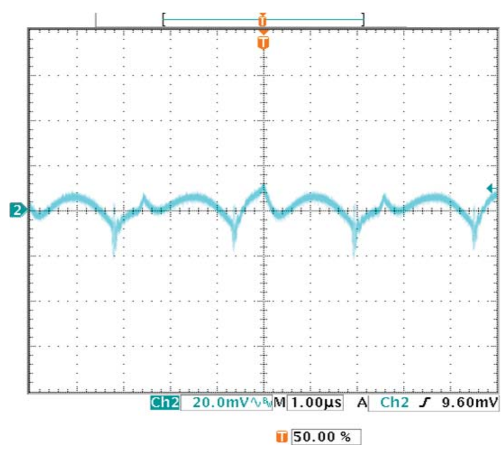
Start-up Parallel Operation (Vin=48V, Iout=full load, Cload=10000μF, Ta=+25°C) Ch1= Vin, Ch2, Ch3= Vout



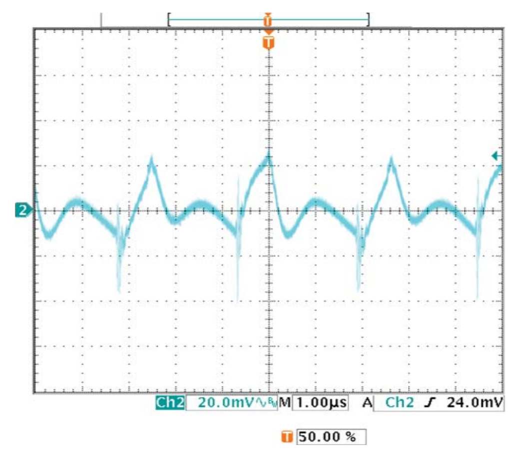
Enable Start-up Delay (Vin=48V, Iout=20A, Cload=5000μF, Ta=+25°C) Ch1= Enable, Ch2= Vout



Output Ripple and Noise (Vin=48V, Iout=0A, Cload= 1μF || 10μF, Ta=+25°C, BW=20Mhz)

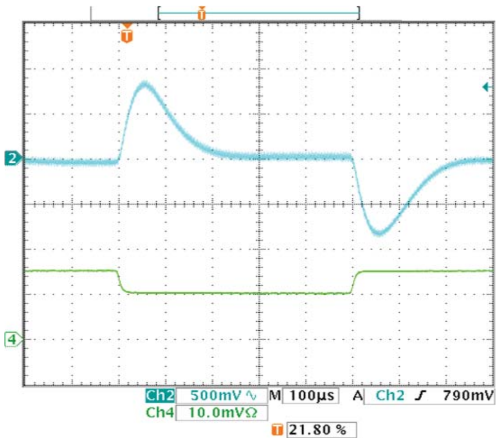


Output Ripple and Noise (Vin=48V, Iout=20A, Cload= 1μF || 10μF, Ta=+25°C, BW=20Mhz)

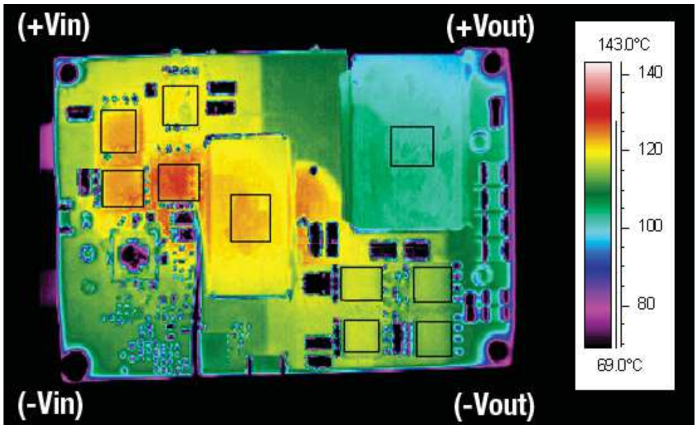


PERFORMANCE DATA, UWQ-12/20-T48xS

Stepload Transient Response (Vin=48V, Iout=50-75-50% of Imax, Cload=1μF || 10μF, Io=10A/div, Ta=+25°C) Ch2=Vout, Ch4=Iout

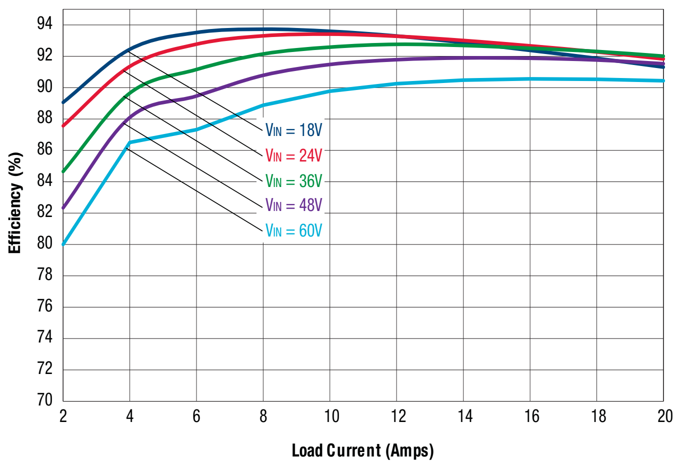


Thermal image with hot spot at 10.8A with 25°C ambient temperature.
Natural convection is used with no forced airflow.
Identifiable and recommended maximum value to be verified in application.

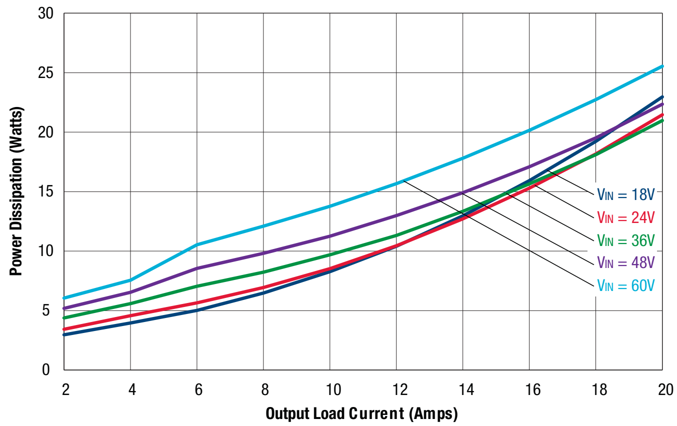


PERFORMANCE DATA, UWQ-12/20-T48xT

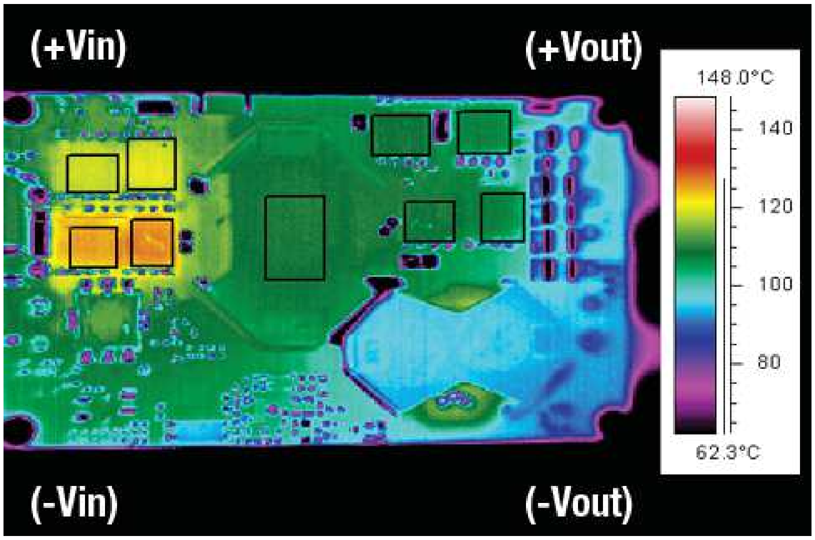
Efficiency vs. Line Voltage and Load Current @ +25°C



Power Dissipation vs. Load Current @ +25°C

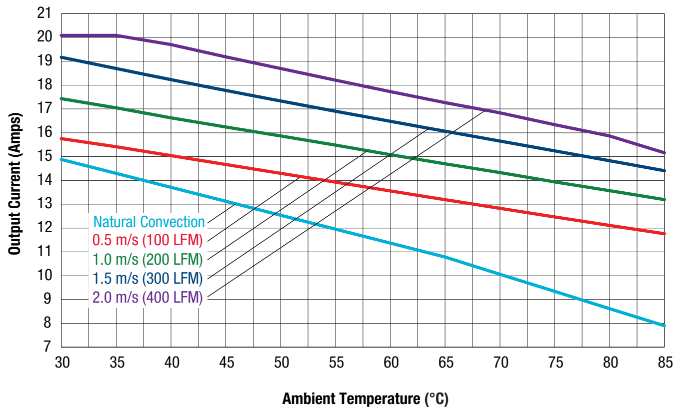


Thermal image with hot spot at 8.9A with 25°C ambient temperature. Natural convection is used with no forced airflow.
Identifiable and recommended maximum value to be verified in application

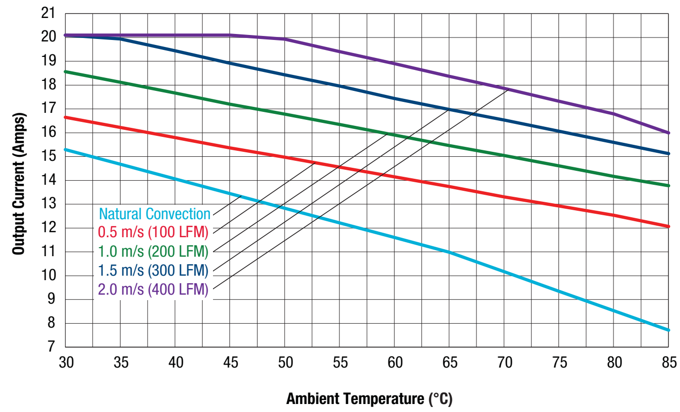


PERFORMANCE DATA, UWQ-12/20-T48xT

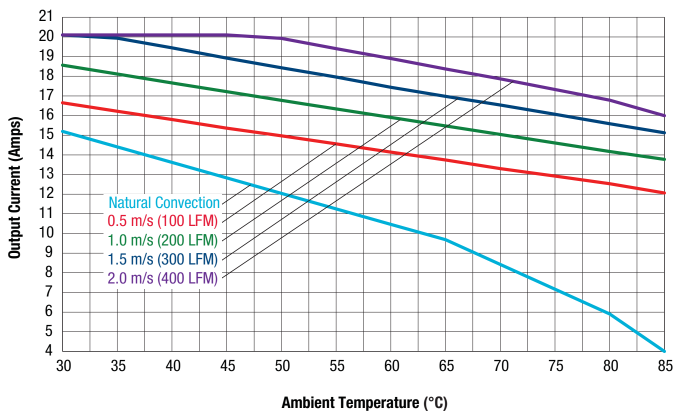
Maximum Current Temperature Derating at sea level
(Vin = 18V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



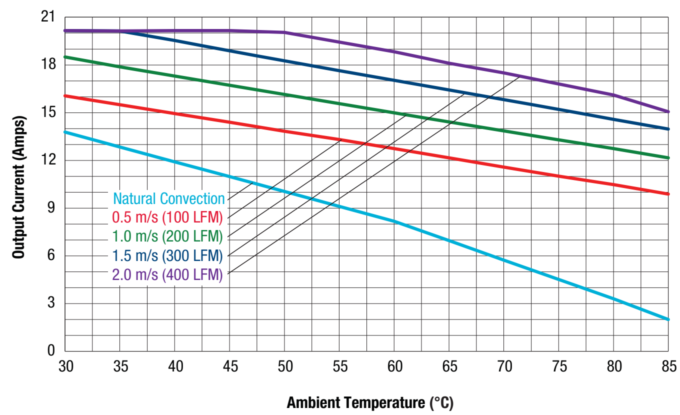
Maximum Current Temperature Derating at sea level
(Vin = 24V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



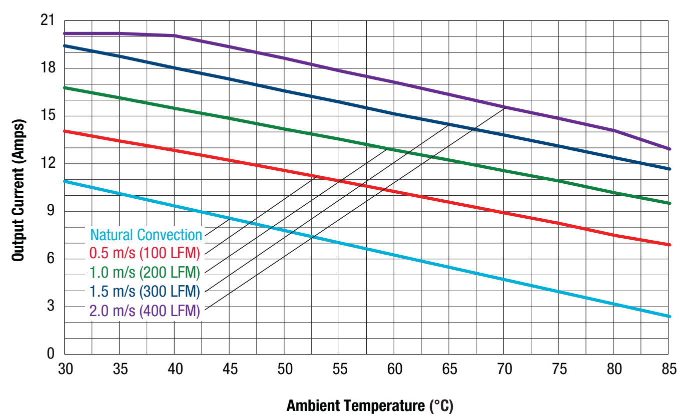
Maximum Current Temperature Derating at sea level
(Vin = 36V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)



Maximum Current Temperature Derating at sea level
(Vin = 48V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)

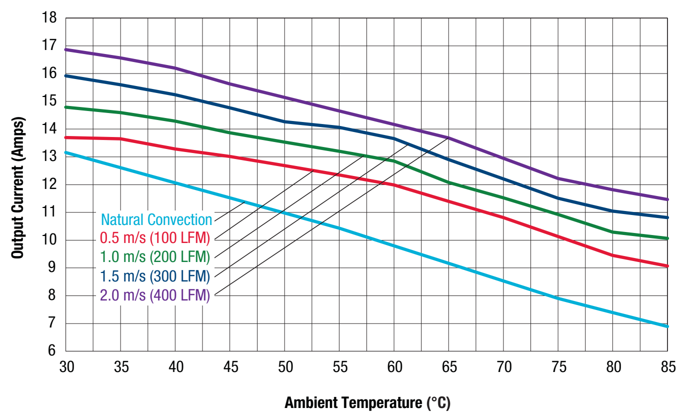


Maximum Current Temperature Derating at sea level
(Vin = 60V, air flow from Pin 3 to Pin 1 on PCB, with baseplate)

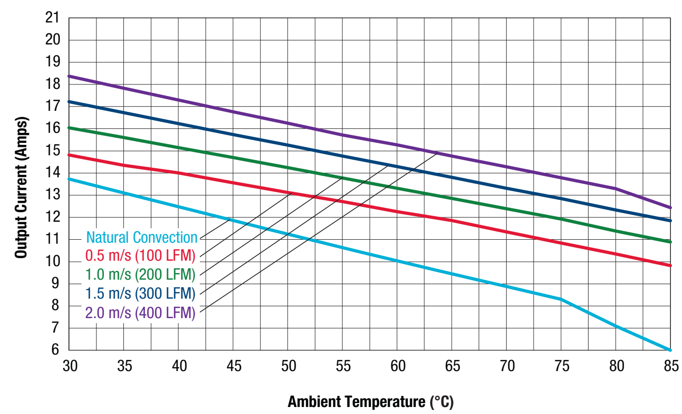


PERFORMANCE DATA, UWQ-12/20-T48xT

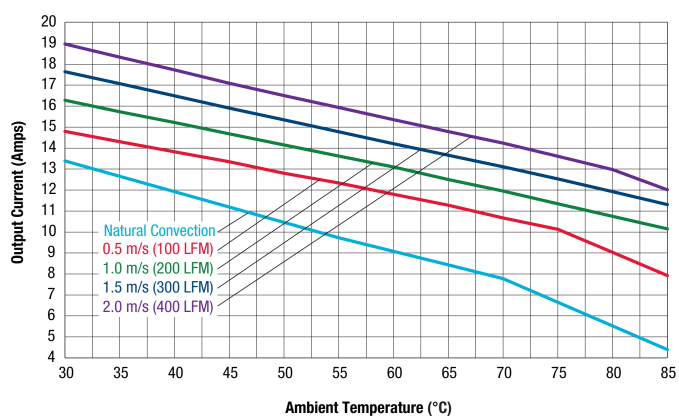
Maximum Current Temperature Derating at sea level
(Vin = 18V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)



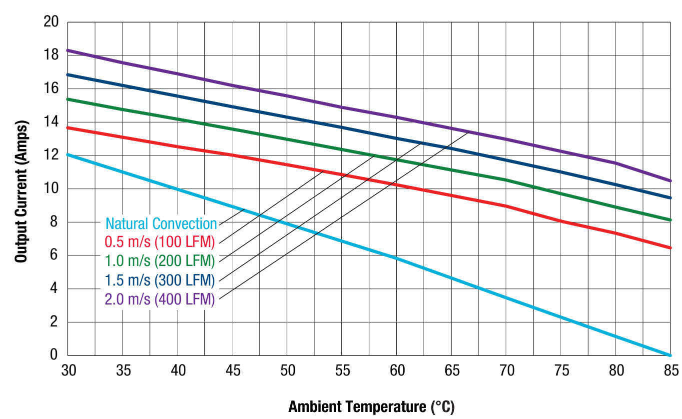
Maximum Current Temperature Derating at sea level
(Vin = 24V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)



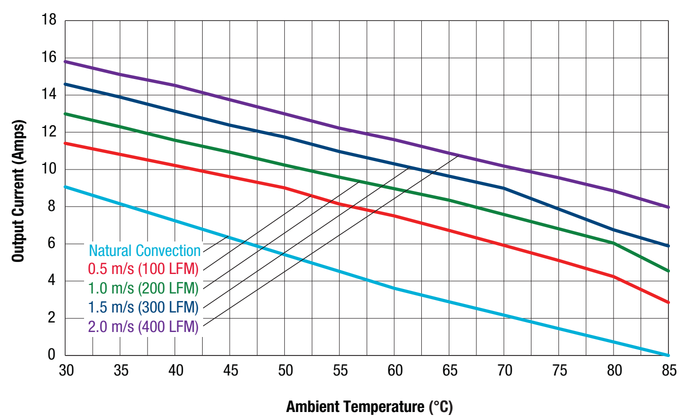
Maximum Current Temperature Derating at sea level
(Vin = 36V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)



Maximum Current Temperature Derating at sea level
(Vin = 48V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)

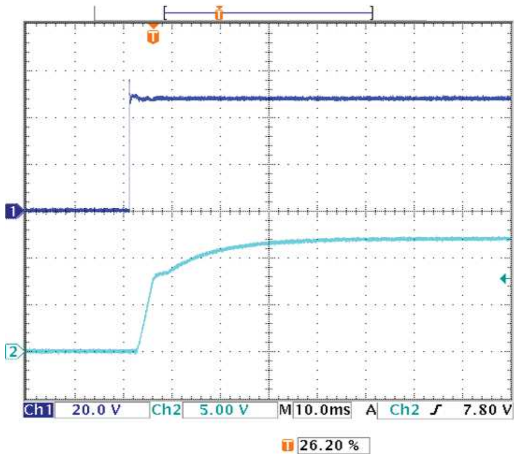


Maximum Current Temperature Derating at sea level
(Vin = 60V, air flow from Pin 3 to Pin 1 on PCB, no baseplate)

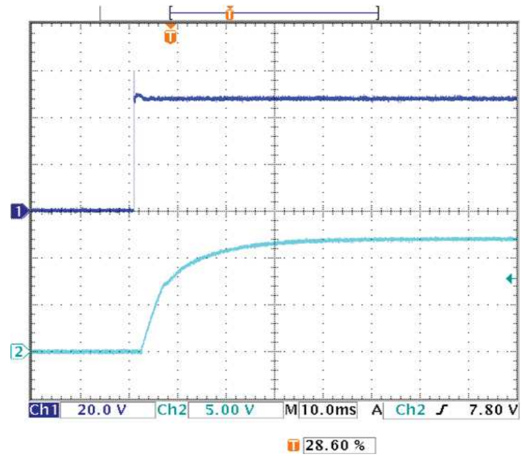


TYPICAL PERFORMANCE DATA, UWQ-12/20-T48xT

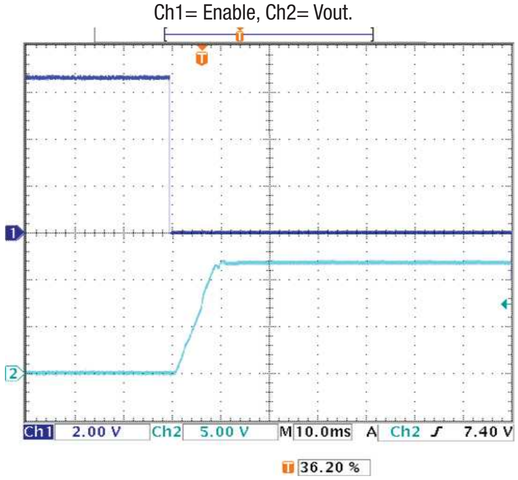
Start-up Delay (Vin=48V, Iout=0A, Cload=5000μF, Ta=+25°C) Ch1= Vin, Ch2= Vout



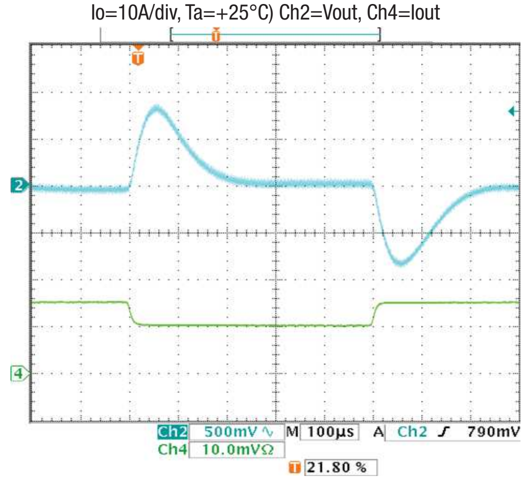
Start-up Delay (Vin=48V, Iout=20A, Cload=5000μF, Ta=+25°C) Ch1= Vin, Ch2= Vout



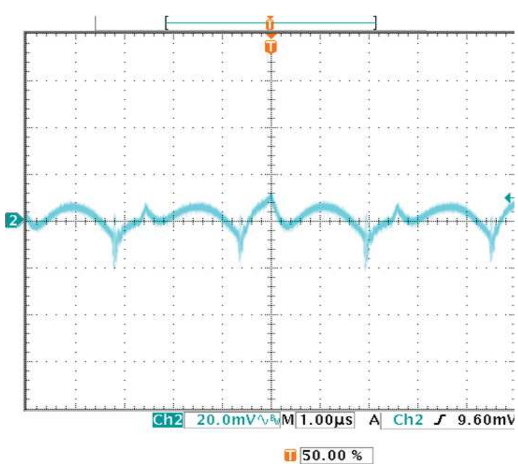
On/Off Enable Delay (Vin=48V, Vout=nom, Iout=20A, Cload=5000μF, Ta=+25°C) Ch1= Enable, Ch2= Vout.



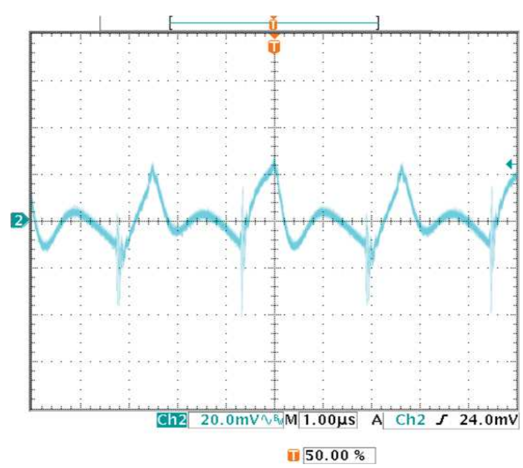
Stepload Transient Response (Vin=48V, Iout=50-75-50% of Imax, Cload=1μF || 10μF, Io=10A/div, Ta=+25°C) Ch2=Vout, Ch4=Iout



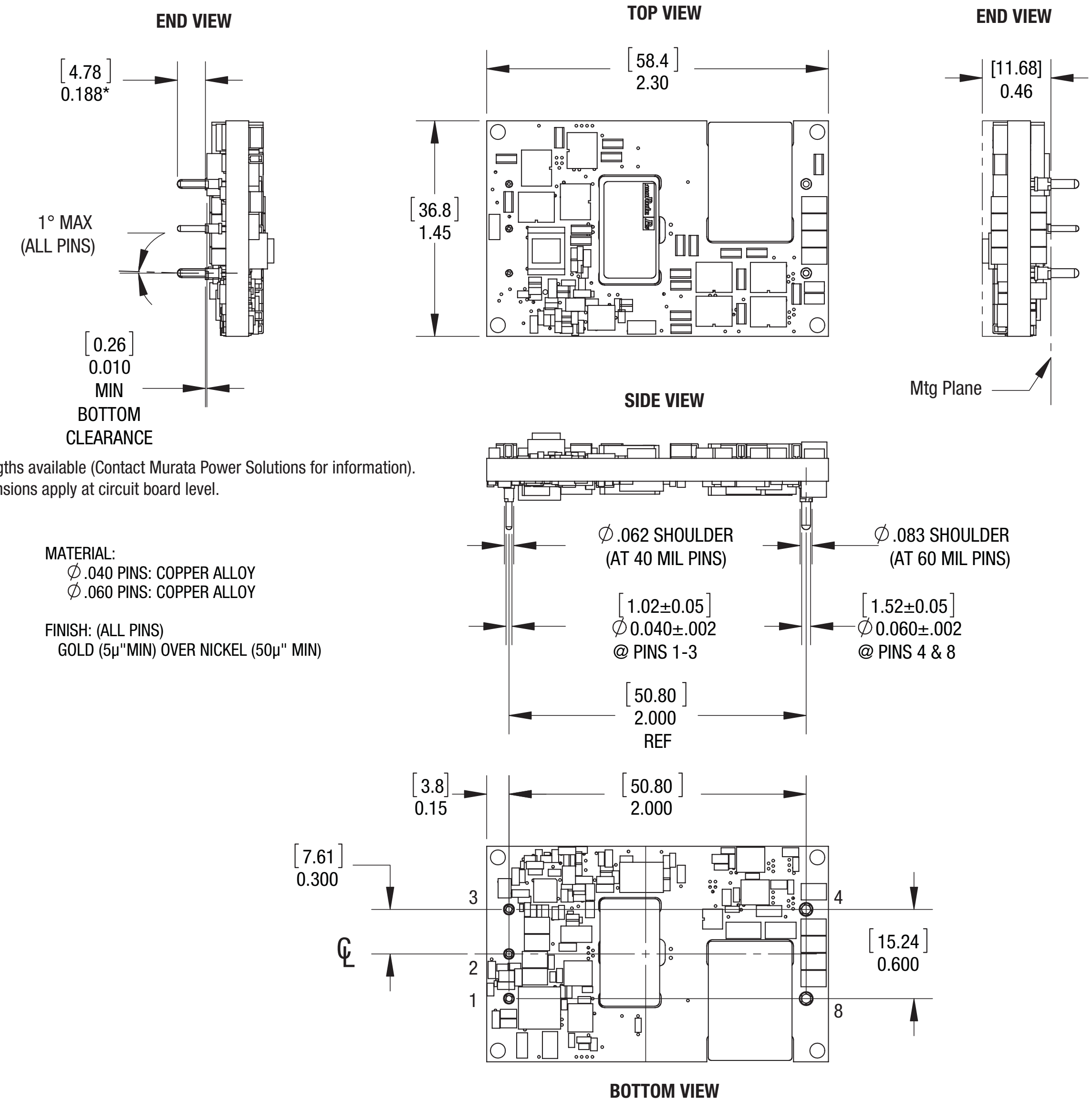
Output ripple and Noise (Vin=48V, Iout=0A, Cload= 1μF || 10μF, Ta=+25°C, BW=20Mhz)



Output ripple and Noise (Vin=48V, Iout=20A, Cload= 1μF || 10μF, Ta=+25°C, BW=20Mhz)



MECHANICAL SPECIFICATIONS (OPEN FRAME)—STANDARD AND T48xS MODELS

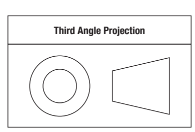


*Alternate pin lengths available (Contact Murata Power Solutions for information).
Pin location dimensions apply at circuit board level.

MATERIAL:
∅.040 PINS: COPPER ALLOY
∅.060 PINS: COPPER ALLOY

FINISH: (ALL PINS)
GOLD (5µ"MIN) OVER NICKEL (50µ" MIN)

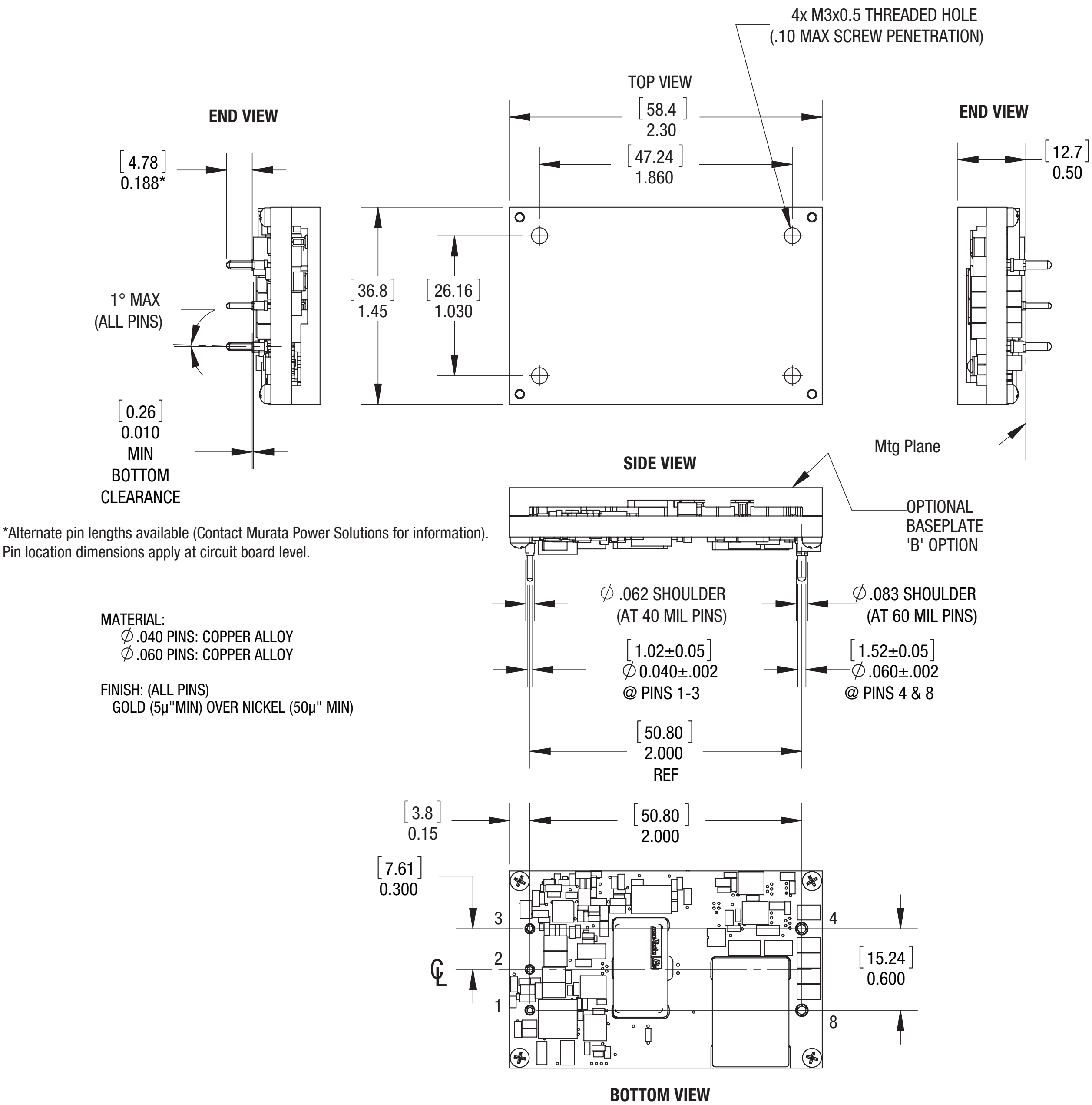
Dimensions are in inches (mm) shown for ref. only.



Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2°

I/O Connections (pin side view)			
Pin	**Function**	**Pin**	**Function**
1	+Vin	4	-Vout
2	Remote On/Off Control		
3	-Vin	8	+Vout

MECHANICAL SPECIFICATIONS (BASEPLATE)—STANDARD AND T48xS MODELS

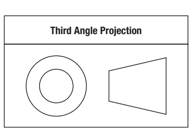


*Alternate pin lengths available (Contact Murata Power Solutions for information).
Pin location dimensions apply at circuit board level.

MATERIAL:
Ø .040 PINS: COPPER ALLOY
Ø .060 PINS: COPPER ALLOY

FINISH: (ALL PINS)
GOLD (5µ"MIN) OVER NICKEL (50µ" MIN)

Dimensions are in inches (mm) shown for ref. only.



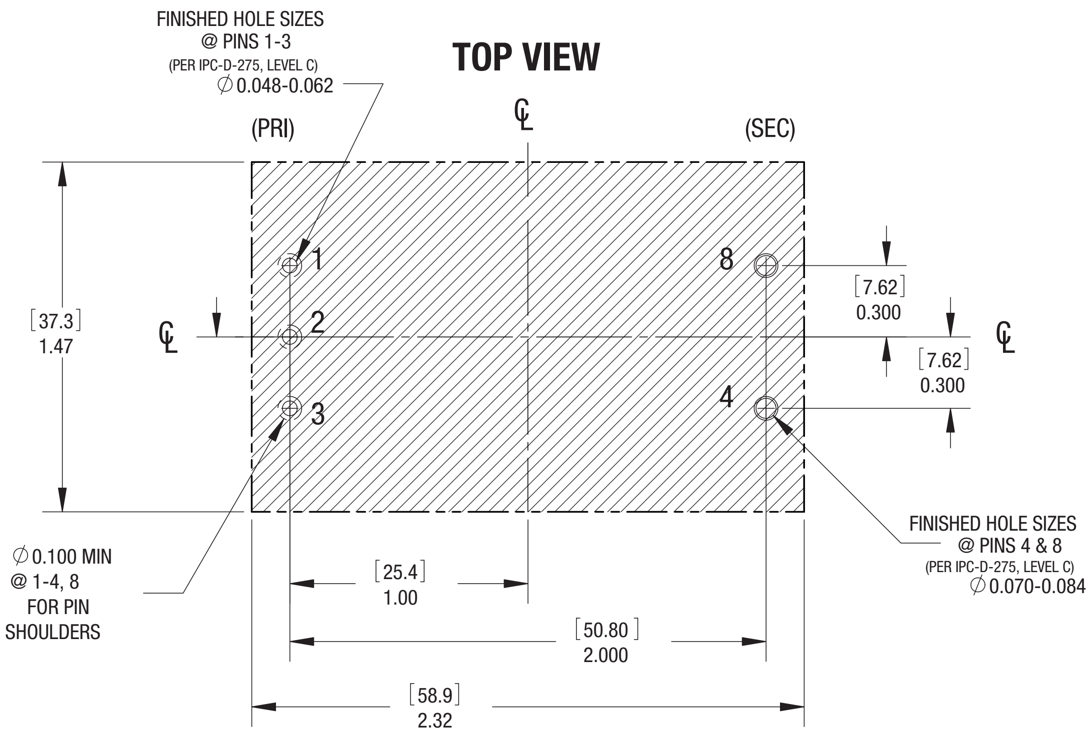
Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2˚

I/O Connections (pin side view)			
Pin	Function	Pin	Function
1	+Vin	4	-Vout
2	Remote On/Off Control		
3	-Vin	8	+Vout

RECOMMENDED FOOTPRINT—STANDARD AND T48xS MODELS

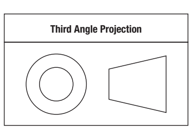
Recommended Footprint (view through converter)

REF: DOSA Standard Specification for Quarter-Brick DC/DC Converters



It is recommended that no parts be placed beneath converter (hatched area).

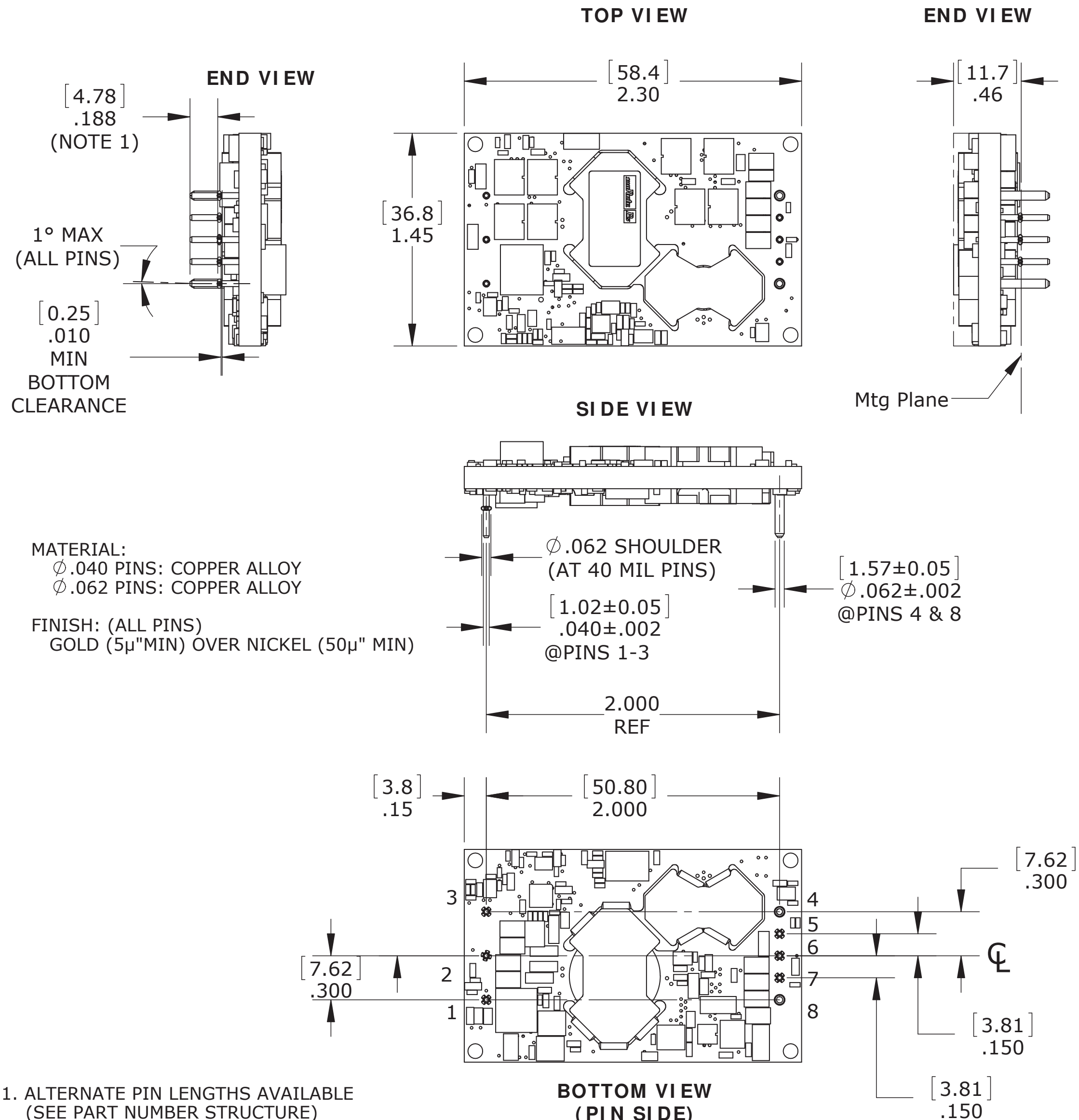
Dimensions are in inches (mm) shown for ref. only.



Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2˚

I/O Connections (pin side view)			
Pin	**Function**	**Pin**	**Function**
1	+Vin	4	-Vout
2	Remote On/Off Control		
3	-Vin	8	+Vout

MECHANICAL SPECIFICATIONS (OPEN FRAME)—T48xT MODELS

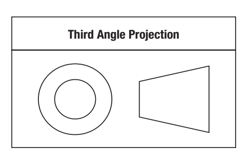


1. ALTERNATE PIN LENGTHS AVAILABLE (SEE PART NUMBER STRUCTURE)
2. COMPONENTS SHOWN ARE FOR REF ONLY
3. DIMENSIONS ARE IN INCHES [mm]
4. PIN LOCATION DIMENSIONS APPLY AT CIRCUIT BOARD LEVEL
5. THESE CONVERTERS MEET THE MECHANICAL SPECIFICATIONS OF A QUARTER BRICK DC-DC CONVERTER

INPUT/OUTPUT CONNECTIONS	
Pin	Function
1	+Vin
2	Remote On/Off *
3	-Vin
4	-Vout
5	-Sense
6	Trim
7	+Sense
8	+Vout

*The Remote On/Off can be provided with either positive (P suffix) or negative (N suffix) logic.

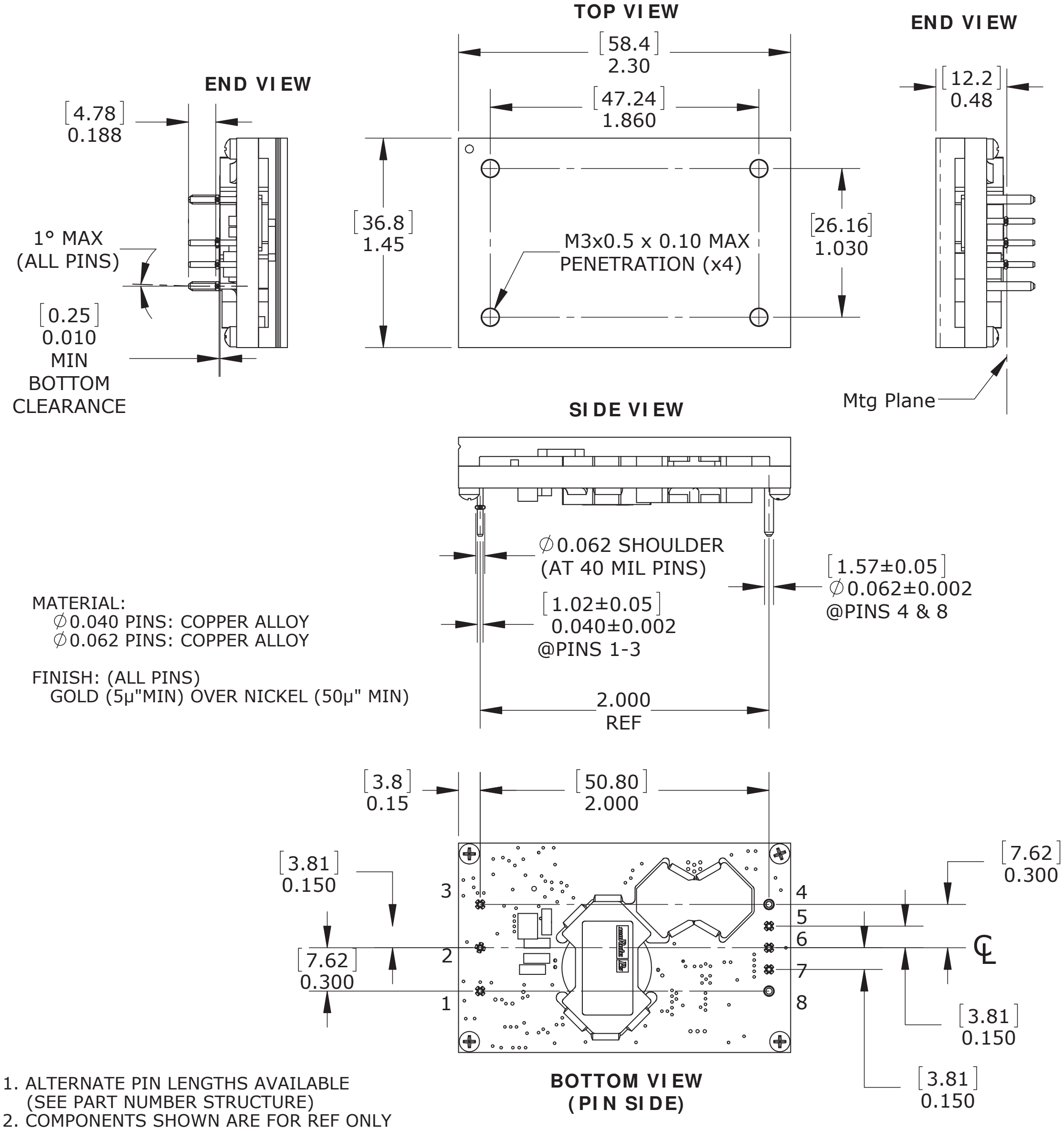
Dimensions are in inches (mm shown for ref. only).



Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2˚

Components are shown for reference only and may vary between units.

MECHANICAL SPECIFICATIONS (BASEPLATE)—T48xT MODELS

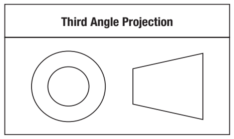


1. ALTERNATE PIN LENGTHS AVAILABLE (SEE PART NUMBER STRUCTURE)
2. COMPONENTS SHOWN ARE FOR REF ONLY
3. DIMENSIONS ARE IN INCHES [mm]
4. PIN LOCATION DIMENSIONS APPLY AT CIRCUIT BOARD LEVEL
5. THESE CONVERTERS MEET THE MECHANICAL SPECIFICATIONS OF A QUARTER BRICK DC-DC CONVERTER

INPUT/OUTPUT CONNECTIONS	
Pin	Function
1	+Vin
2	Remote On/Off *
3	-Vin
4	-Vout
5	-Sense
6	Trim
7	+Sense
8	+Vout

*The Remote On/Off can be provided with either positive (P suffix) or negative (N suffix) logic.

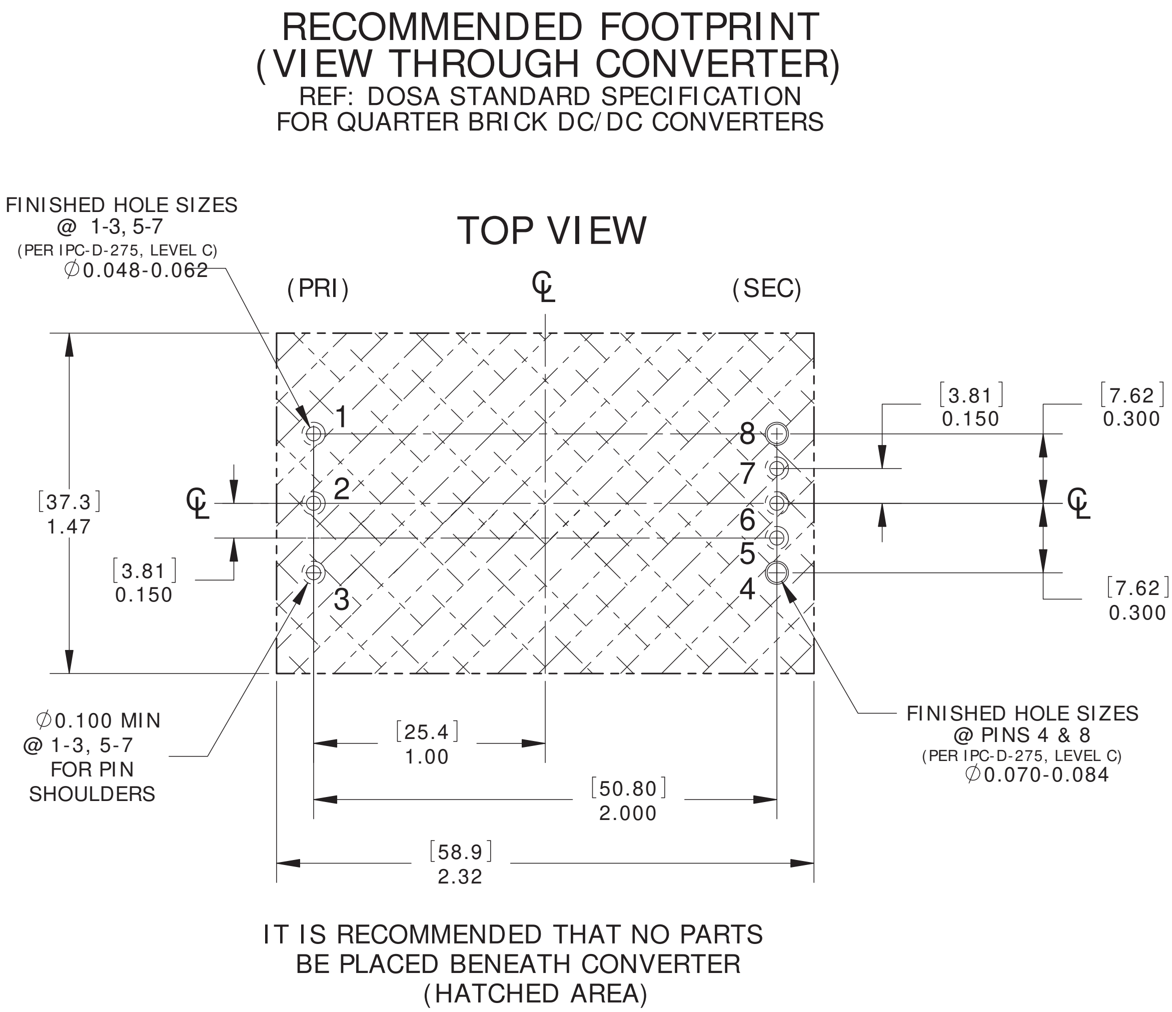
Dimensions are in inches (mm shown for ref. only).



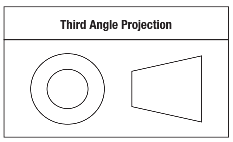
Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2˚

Components are shown for reference only and may vary between units.

RECOMMENDED FOOTPRINT—T48xT MODELS



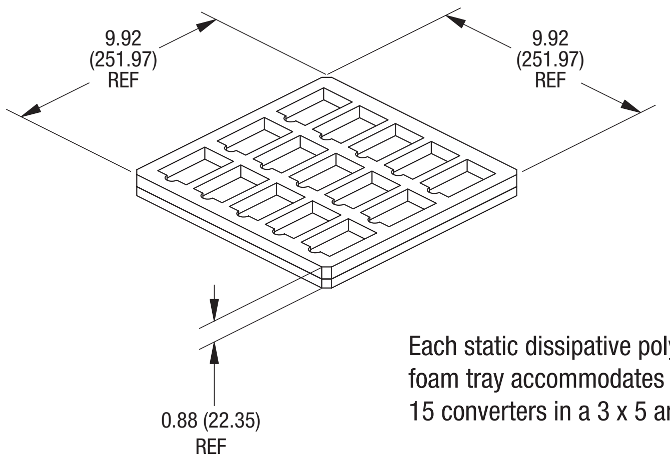
Dimensions are in inches (mm shown for ref. only).



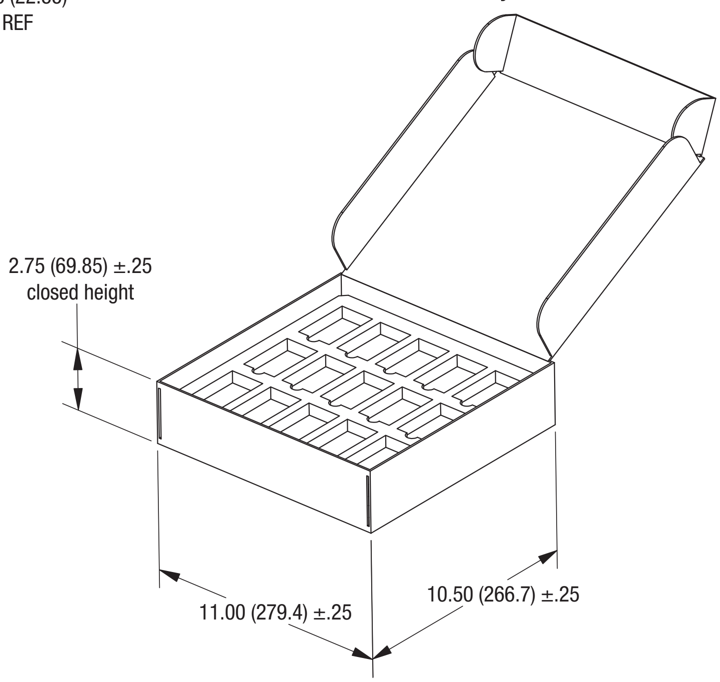
Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2˚

Components are shown for reference only and may vary between units.

STANDARD PACKAGING

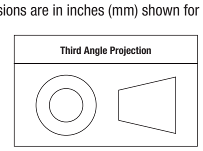


Each static dissipative polyethylene foam tray accommodates 15 converters in a 3 x 5 array.



Carton accommodates two (2) trays yielding 30 converters per carton

Dimensions are in inches (mm) shown for ref. only.



Tolerances (unless otherwise specified):
.XX ± 0.02 (0.5)
.XXX ± 0.010 (0.25)
Angles ± 2˚

TECHNICAL NOTES

Input Fusing

Certain applications and/or safety agencies may require fuses at the inputs of power conversion components. Fuses should also be used when there is the possibility of sustained input voltage reversal which is not current-limited. For greatest safety, we recommend a fast blow fuse installed in the ungrounded input supply line.

The installer must observe all relevant safety standards and regulations. For safety agency approvals, install the converter in compliance with the end-user safety standard.

Parallel Load Sharing (S Option, Load Sharing)

Two or more converters may be connected in parallel at both the input and output terminals to support higher output current (total power, see figure 2) or to improve reliability due to the reduced stress that results when the modules are operating below their rated limits. For applications requiring current share, follow the guidelines below. The output voltage will decrease when the load current is increased. Our goal is to have each converter contribute nearly identical current into the output load under all input, environmental and load conditions.

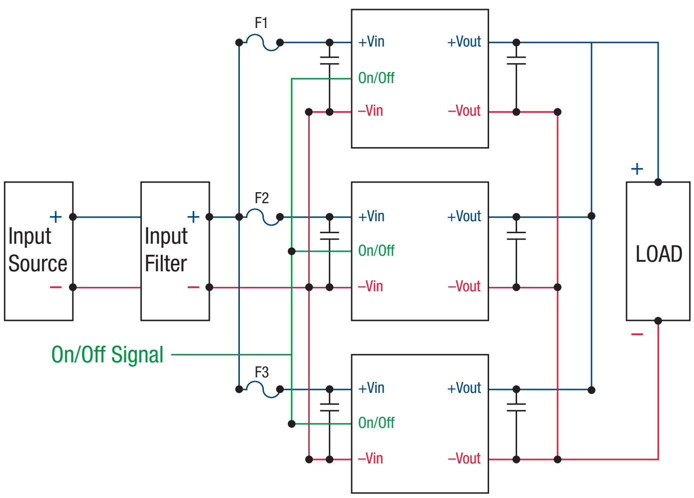


Figure 2. Load Sharing Block Diagram

Using Parallel Connections – Load Sharing (Power Boost)

- All converters must be powered up and powered down simultaneously. Use a common input power source.
- It is required to use a common Remote On/Off logic control signal to turn on modules (see figure 2).
- When Vin has reached steady state, apply control signal to the all modules. Figure 3 illustrates the turn on process for positive logic modules.
- First power up the parallel system (all converters) with a load not exceeding the rated load of each converter and allow converters to settle (typically 20-100mS) before applying full load. As a practical matter, if the loads are downstream PoL converters, power these up shortly after the converter has reached steady state output. Also be aware of the delay caused by charging up external bypass capacitors.
- It is critical that the PCB layout incorporates identical connections from each module to the load; use the same trace rating and airflow/thermal environments. If you add input filter components, use identical components and layout.
- When converters are connected in parallel, allow for a safety factor of at least 10%. Up to 90% of max output current can be used from each module.

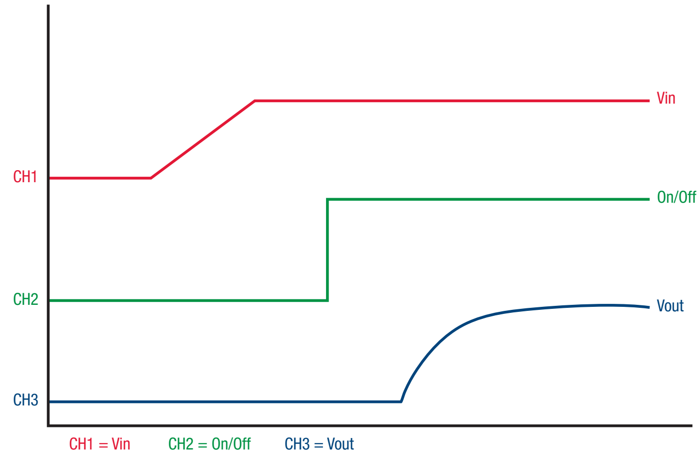


Figure 3. Typical Turn On for Positive Logic Modules

CAUTION: This converter is not internally fused. To avoid danger to persons or equipment and to retain safety certification, the user must connect an external fast-blow input fuse as listed in the specifications. Be sure that the PC board pad area and etch size are adequate to provide enough current so that the fuse will blow with an overload.

Using Parallel Connections – Redundancy (N+1)

The redundancy connections in figure 4 requires external user supplied "OR"ing diodes or "OR"ing MOSFETs for reliability purposes. The diodes allow for an uninterruptable power system operation in case of a catastrophic failure (shorted output) by one of the converters.

The diodes should be identical part numbers to enhance balance between the converters. The default factory nominal voltage should be sufficiently matched between converters. The OR'ing diode system is the responsibility of the user. Be aware of the power levels applied to the diodes and possible heat sink requirements.

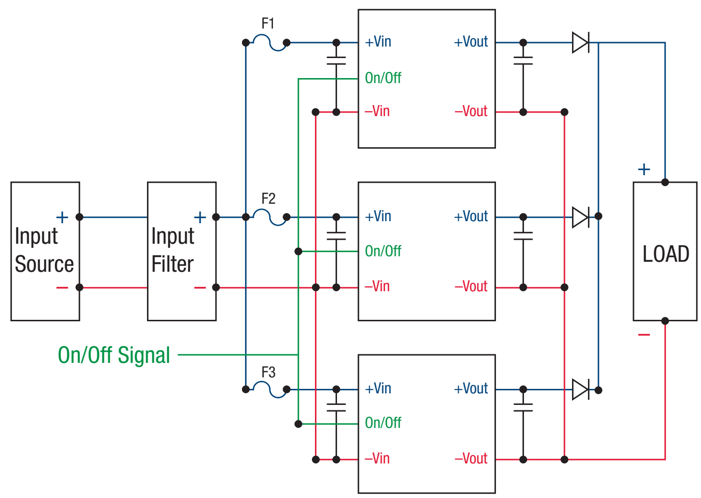


Figure 4. Redundant Parallel Connections

Schottky power diodes with approximately 0.3V drops or "OR"ing MOSFETs may be suitable in the loop whereas 0.7 V silicon power diodes may not be advisable. In the event of an internal device fault or failure of the mains power modules on the primary side, the other devices automatically take over the entire supply of the loads. In the basic N+1 power system, the "N" equals the number of modules required to fully power the system and "+1" equals one back-up module that will take over for a failed module. If the system consists of two power modules, each providing 50% of the total load power under normal operation and one module fails, another one delivers full power to the load. This means you can use smaller and less expensive power converters as the redundant elements, while achieving the goal of increased availability.

Input Under-Voltage Shutdown and Start-Up Threshold

Under normal start-up conditions, converters will not begin to regulate properly until the rising input voltage exceeds and remains at the Start-Up Threshold Voltage (see Specifications). Once operating, converters will not turn off until the input voltage drops below the Under-Voltage Shutdown Limit. Subsequent restart will not occur until the input voltage rises again above the Start-Up Threshold. This built-in hysteresis prevents any unstable on/off operation at a single input voltage.

Users should be aware however of input sources near the Under-Voltage Shutdown whose voltage decays as input current is consumed (such as capacitor inputs), the converter shuts off and then restarts as the external capacitor recharges. Such situations could oscillate. To prevent this, make sure the operating input voltage is well above the UV Shutdown voltage AT ALL TIMES.

Start-Up Delay

Assuming that the output current is set at the rated maximum, the Vin to Vout Start-Up Delay (see Specifications) is the time interval between the point when the rising input voltage crosses the Start-Up Threshold and the fully loaded regulated output voltage enters and remains within its specified regulation band. Actual measured times will vary with input source impedance, external input capacitance, input voltage slew rate and final value of the input voltage as it appears at the converter.

These converters include a soft start circuit to moderate the duty cycle of the PWM controller at power up, thereby limiting the input inrush current.

The On/Off Remote Control interval from inception to V_{OUT} regulated assumes that the converter already has its input voltage stabilized above the Start-Up Threshold before the On command. The interval is measured from the On command until the output enters and remains within its specified regulation band. The specification assumes that the output is fully loaded at maximum rated current.

Input Source Impedance

These converters will operate to specifications without external components, assuming that the source voltage has very low impedance and reasonable input voltage regulation. Since real-world voltage sources have finite impedance, performance is improved by adding external filter components. Sometimes only a small ceramic capacitor is sufficient. Since it is difficult to totally characterize all applications, some experimentation may be needed. Note that external input capacitors must accept high speed switching currents.

Because of the switching nature of DC-DC converters, the input of these converters must be driven from a source with both low AC impedance and adequate DC input regulation. Performance will degrade with increasing input inductance. Excessive input inductance may inhibit operation. The DC input regulation specifies that the input voltage, once operating, must never degrade below the Shut-Down Threshold under all load conditions. Be sure to use adequate trace sizes and mount components close to the converter.

I/O Filtering, Input Ripple Current and Output Noise

All models in this converter series are tested and specified for input reflected ripple current and output noise using designated external input/output components, circuits and layout as shown in the figures below. External input capacitors (C_{IN} in the figure) serve primarily as energy storage elements, minimizing line voltage variations caused by transient IR drops in the input conductors. Users should select input capacitors for bulk capacitance (at appropriate frequencies), low ESR and high RMS ripple current ratings. In the figure below, the C_{BUS} and L_{BUS} components simulate a typical DC voltage bus. Your specific system configuration may require additional considerations. Please note that the values of C_{IN}, L_{BUS} and C_{BUS} may vary according to the specific converter model.

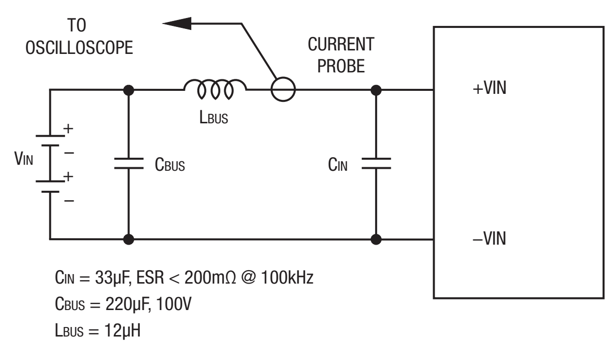


Figure 5. Measuring Input Ripple Current

In critical applications, output ripple and noise (also referred to as periodic and random deviations or PARD) may be reduced by adding filter elements such as multiple external capacitors. Be sure to calculate component temperature rise from reflected AC current dissipated inside capacitor ESR.

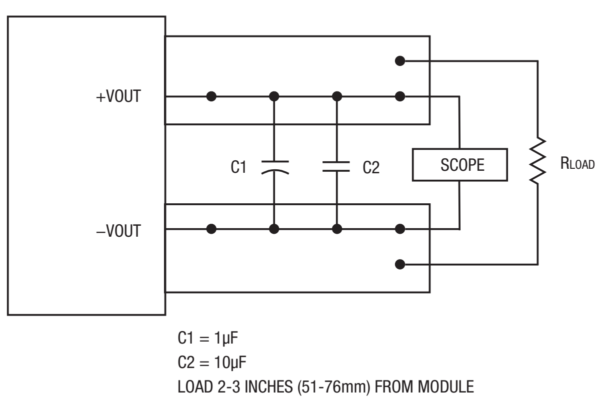


Figure 6. Measuring Output Ripple and Noise (PARD)