MQ7804M

Isolated 40~57VDC input, 5/12V/24V output, 50W DC-DC Converter with extended PoE AT interface

FEATURES

- Wide operating voltage:
  - 40V ~ 57V
- Extended 802.3at interface built-in
- Classification:
  - Class 5: MQ7804M
  - Class 4: MQ7804M-1 (working with UM-PSE50M/70M)
- Output Current:
  - 5V, 10A
  - 12V, 4.2A
  - 24V,2.1A
- Output voltage ripple: 120mVpp
- High Efficiency 90% (input 48V, 12V@4.2A)
- Overcurrent/shortcircuit protection
- High reliability: designed to meet 500k hour MTBF
- Minimal space on PCB:
  - 64.77 mm x 27 mm x 17.5 mm or
  - 2.55 in x 1.06 in x 0.69 in
- No derating to +55℃, natural convection
- UL/IEC/EN60950 compliant
- RoHS Compliant available
- Operating Temperature: -40℃ ~ +85℃

APPLICATIONS

- IP Camera
- IP Phone
- Wireless Access Point
- Video Supervisory

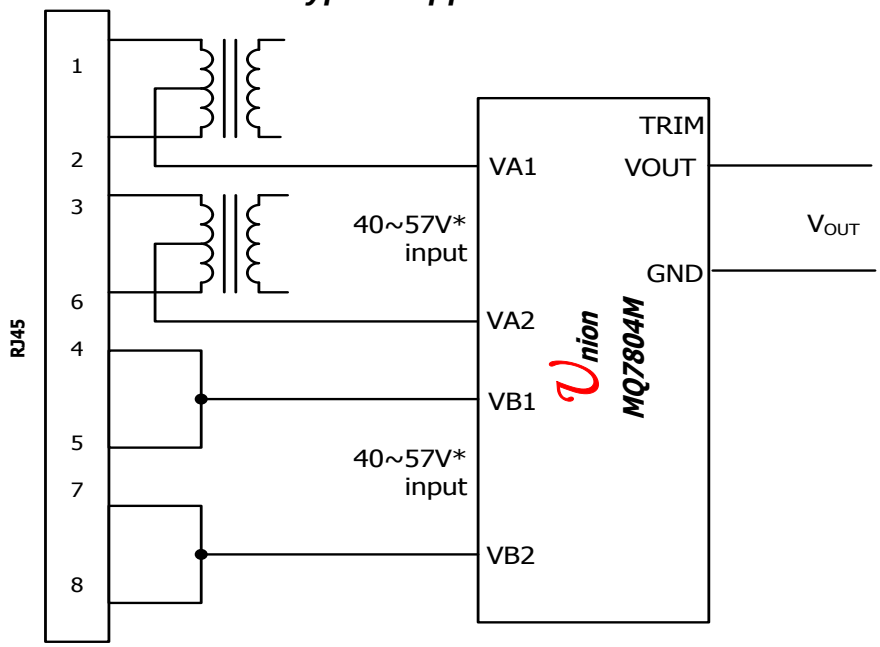
Description

The ***POE MQ7804M*** series of modules are designed to extract power from a conventional twisted pair Category 5 Ethernet cable, conforming to the IEEE 802.3af/at Power-over-Ethernet (PoE) standard but with 50W output power. The MQ7804M have two pairs of power inputs pins: - VA1&2 and VB1&2 to accommodate two PoE options.

The MQ7804M signature and control circuit provides the PoE AT compatibility signature and power classification required by the Power Sourcing Equipment (PSE) before applying up to power to the port. The MQ7804M is preset to Class 5 and MQ7804M-1 is preset to Class 4.

The high efficiency DC/DC converter operates over a wide input voltage range and provides a regulated low ripple and low noise output. The DC/DC converter also has built-in overload and short-circuit output protection.

********** *Typical Application Circuit* **********

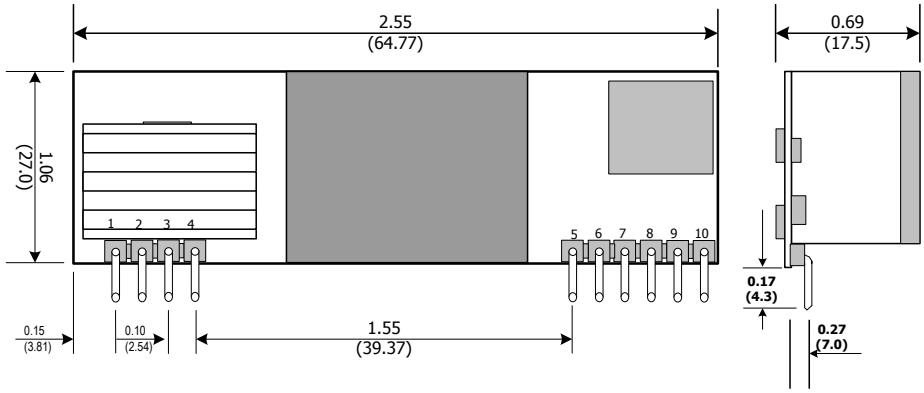


Performance Specifications (at Ta=+25℃)

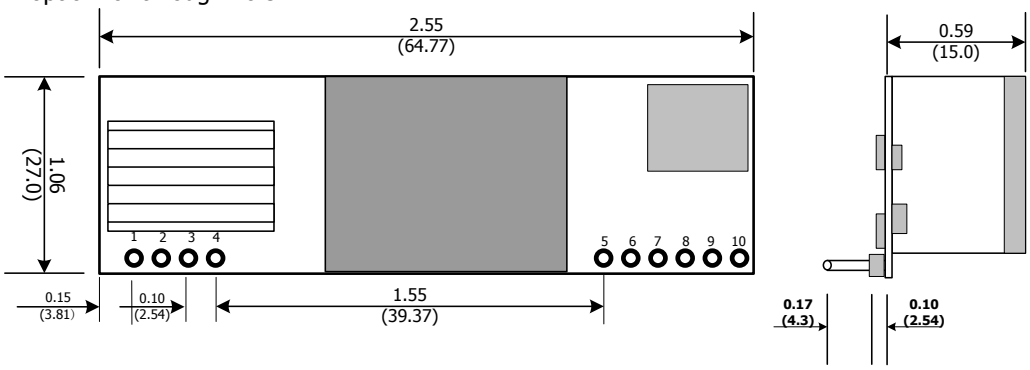
Model	Input V_{IN} Range (V)	Output				Efficiency (%)
		$I_{OUT.MAX}$ (A)	V_{out} (V)	Regulation		
				Line (%)	Load (%)	
MQ7804MT050-R	39 ~57	10	5	1	1	90
MQ7804MT120-R	40 ~ 57	4.2	12	1	1	90
MQ7804MT240-R		2.1	24	1	1	90

Mechanical Specifications

Dimensions are in inches (millimeters)



"–R" option for through hole



PIN	DESCRIPTION
1	VA1
2	VA2
3	VB1
4	VB2
5/6	GND
7/8	VOUT
9	TRIM
10	NC

Ordering Information

MQ7804MT120-R1

Union Microsystems Power Module P/N

SIP Package

Default is Class 5
1 means Class 4

Right Angle Option

Output Voltage Range
050 : 5V
120 : 12V
240 : 24 V

For examples:
MQ7804MT120-R means MQ7804M in SIP package, output voltage is 12V, right angle option, preset to class 5
MQ7804MT120-R1 means MQ7804M in SIP package, output voltage is 12V, right angle option, preset to class 4

Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com

MQ7804MT050 Electrical Specifications: *(T_A=+25℃)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Operating Input Voltage Range	10A Load	V_{IN}	39	42	57	V_{DC}
Input Turn-ON Threshold	10% Max Load, input rising	$V_{IN.ONTH}$		38		V_{DC}
Input Turn-OFF Threshold	10% Max Load, input falling	$V_{IN.OFFTH}$		37		V_{DC}
Maximum load	$V_{IN.MIN}$ to $V_{IN.MAX}$				10	A
Output Voltage Set point	100% load	ΔVo	-2		+2	$\%V_{O.SET}$
Output Ripple and Noise Voltage	V_{IN} =48V Io=10A,5~20MHz			120		mVpp
Transient Response	0% to 100%I_{Omax}, V_O = 12 V			2		mS
				250		mV
Efficiency	V_{IN}=48, 100% Load	η	89	90		%
Switching Frequency		Fo		250		KHz
Output Continuous Short-circuit Protection	V_{IN}=$V_{IN.MIN}$ To $V_{IN.MAX}$				YES	
Inrush Current	Vin=55V	I_{inrush}		150		mA
Operating Temperature	Natural convection		-40		85	℃
Output Power	V_{IN}=$V_{IN.MIN}$ To $V_{IN.MAX}$	Po	0		50	W
MTBF		500,000				Hours

MQ7804MT120 Electrical Specifications: *(T_A=+25℃)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Operating Input Voltage Range	4.2A Load	V_{IN}	40	48	57	V_{DC}
Input Turn-ON Threshold	10% Max Load, input rising	$V_{IN.ONTH}$		38		V_{DC}
Input Turn-OFF Threshold	10% Max Load, input falling	$V_{IN.OFFTH}$		37		V_{DC}
Maximum load	$V_{IN.MIN}$ to $V_{IN.MAX}$				4.2	A
Output Voltage Set point	100% load	ΔVo	-2		+2	$\%V_{O.SET}$
Output Ripple and Noise Voltage	V_{IN} =48V Io=4.2A,5~20MHz			120		mVpp
Transient Response	0% to 100%I_{Omax}, V_O = 12 V			2		mS
				250		mV
Efficiency	V_{IN}=48, 100% Load	η	89	90		%
Switching Frequency		Fo		250		KHz
Output Continuous Short-circuit Protection	V_{IN}=$V_{IN.MIN}$ To $V_{IN.MAX}$				YES	
Inrush Current	Vin=55V	I_{inrush}		150		mA
Operating Temperature	Natural convection		-40		85	℃
Output Power	V_{IN}=$V_{IN.MIN}$ To $V_{IN.MAX}$	Po	0		50	W
MTBF		500,000				Hours

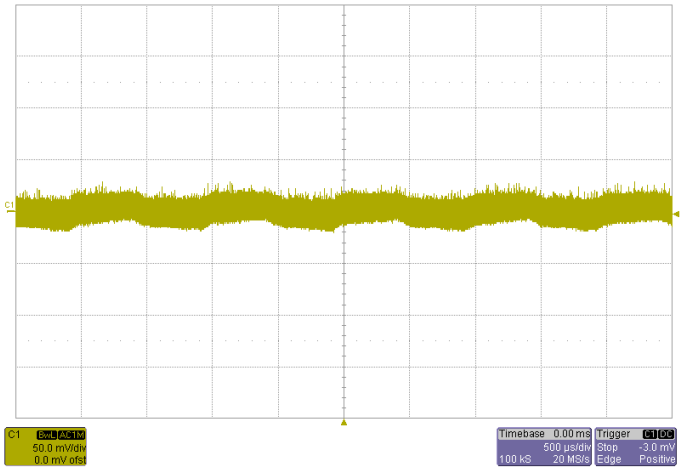
MQ7804MT240 Electrical Specifications: *(T_A=+25℃)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Operating Input Voltage Range	2.1A Load	V_{IN}	40	48	57	V_{DC}
Input Turn-ON Threshold	10% Max Load, input rising	$V_{IN.ONTH}$		38		V_{DC}
Input Turn-OFF Threshold	10% Max Load, input falling	$V_{IN.OFFTH}$		36		V_{DC}
Maximum load	$V_{IN.MIN}$ to $V_{IN.MAX}$				2.1	A
Output Voltage Set point	100% load	ΔVo	-2		+2	$\%V_{O.SET}$
Output Ripple and Noise Voltage	V_{IN} =48V Io=2.1A,5~20MHz			120		mVpp
Transient Response	0% to 100%I_{Omax}, V_O = 24 V			2		mS
				250		mV
Efficiency	V_{IN}=48, 100% Load	η	90	90		%
Switching Frequency		Fo		250		KHz
Output Continuous Short-circuit Protection	$V_{IN=}V_{IN.MIN}$ To $V_{IN.MAX}$				YES	
Inrush Current	Vin=55V	I_{inrush}		150		mA
Operating Temperature	Natural convection		-40		85	℃
Output Power	$V_{IN=}V_{IN.MIN}$ To $V_{IN.MAX}$	Po	0		50	W
MTBF		500,000				Hours

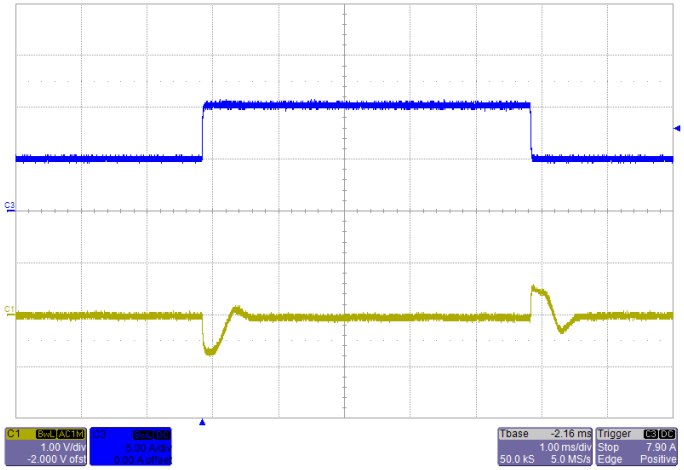
Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com

Typical Characteristics, Vout=5V

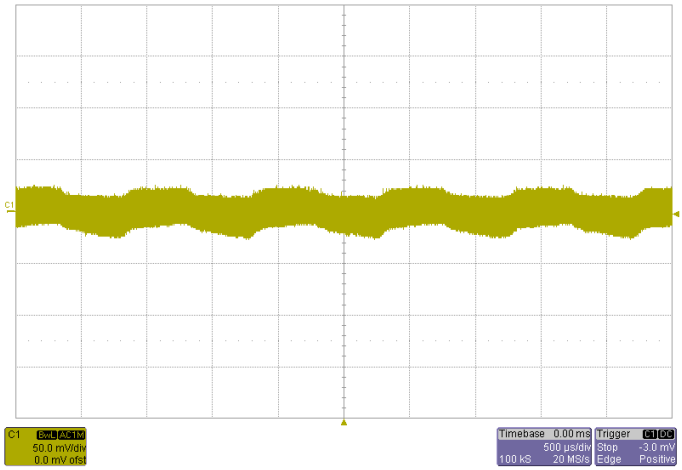
General conditions:



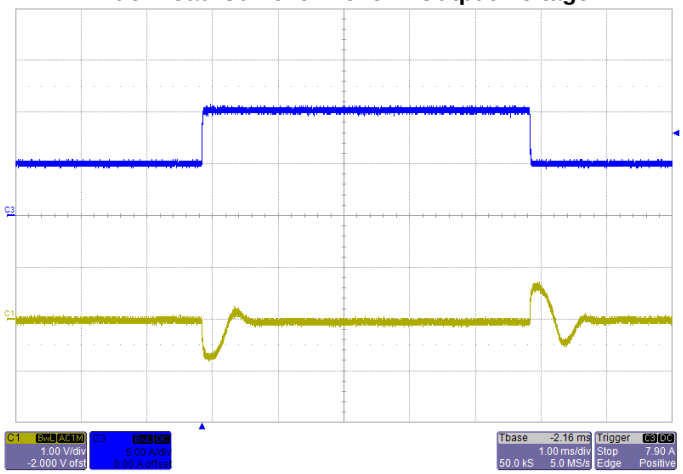
Noise V_{IN} =40V, I_O=10A, 5~20MHz Bandwidth



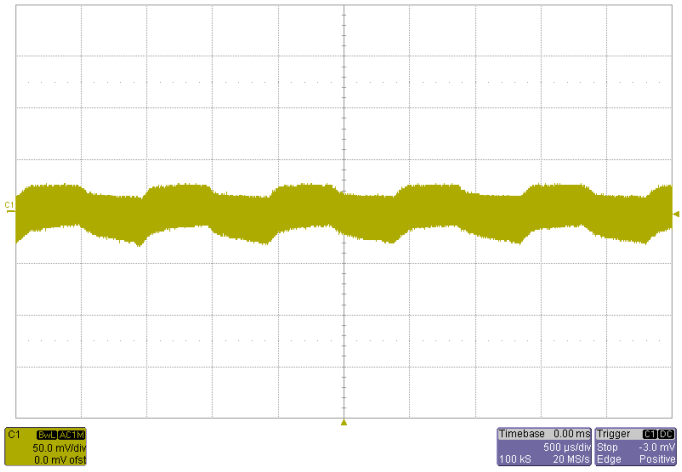
Transient Response V_{IN}=40V, Step from 5A~10A~5A, Blue: Load Current Yellow: Output Voltage



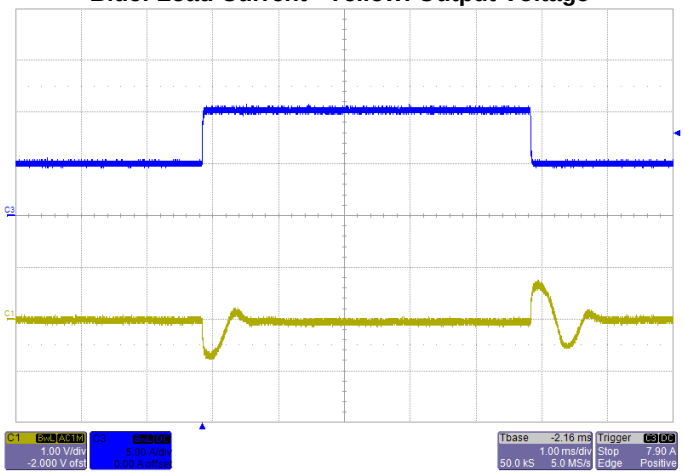
Noise V_{IN} =48V, I_O=10A, 5~20MHz Bandwidth



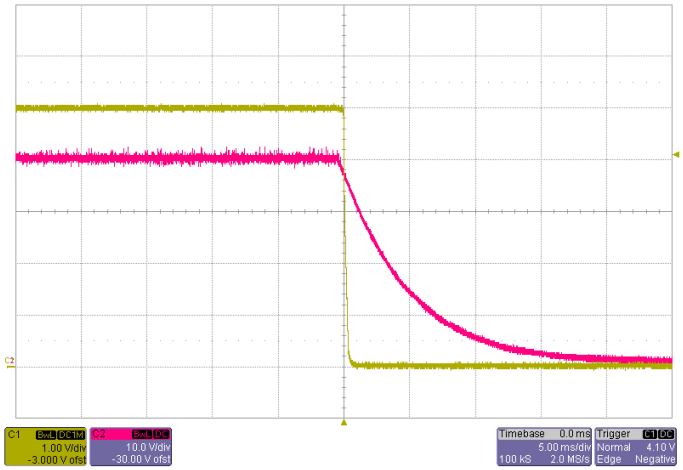
Transient Response V_{IN}=48V, Step from 5A~10A~5A, Blue: Load Current Yellow: Output Voltage



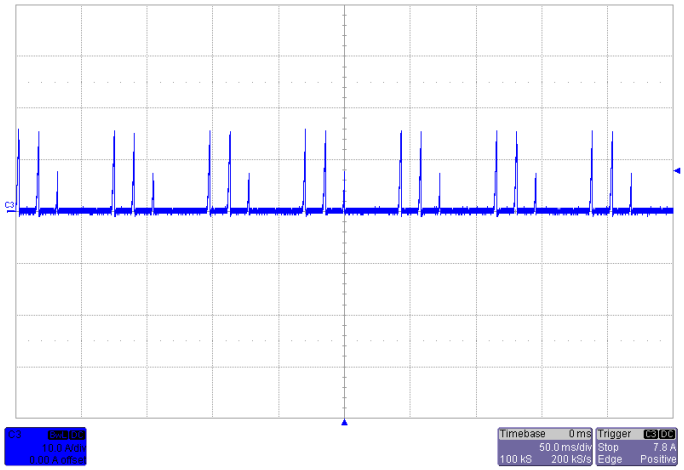
Noise V_{IN} =57V, I_O=10A, 5~20MHz Bandwidth



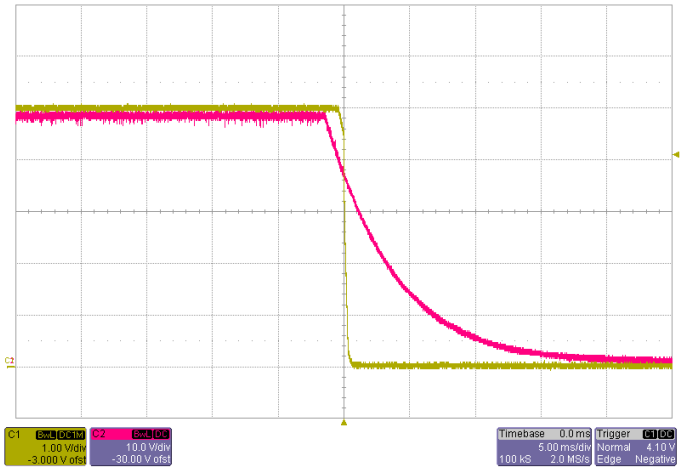
Transient Response V_{IN}=57V, Step from 5A~10A~5A, Blue: Load Current Yellow: Output Voltage



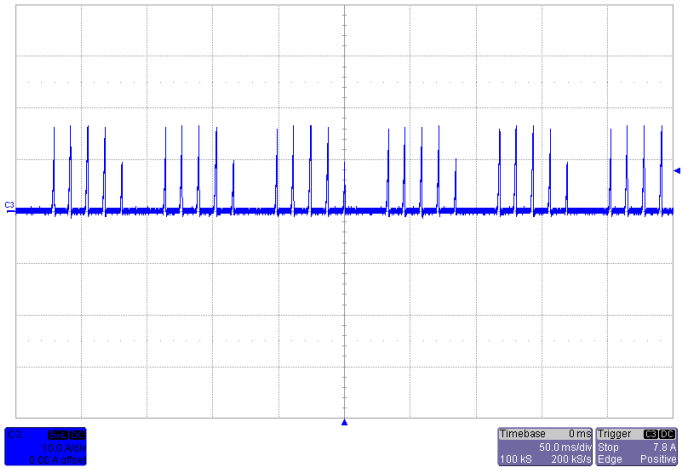
Power Down Vin=40V
Yellow: Output Voltage, Red: Input Voltage



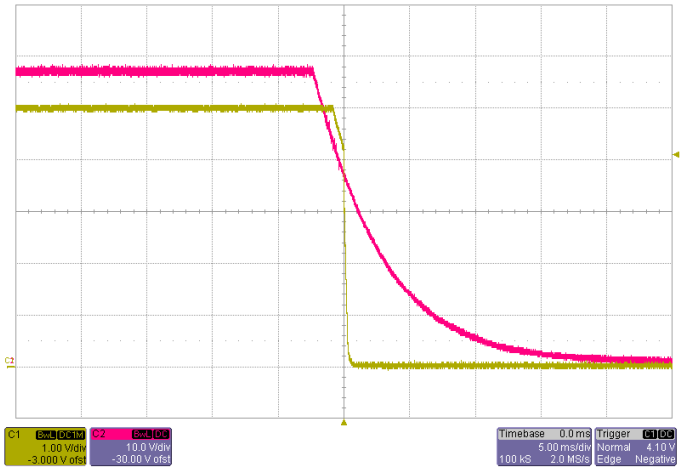
Short-Circuit Output, V_{IN} =40V
Blue: Load Current Yellow: Output Voltage



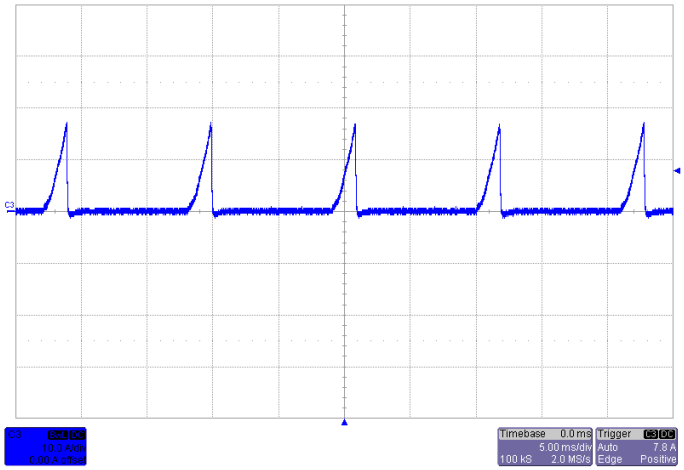
Power Down Vin=48V
Yellow: Output Voltage, Red: Input Voltage



Short-Circuit Output, V_{IN} =48V
Blue: Load Current Yellow: Output Voltage

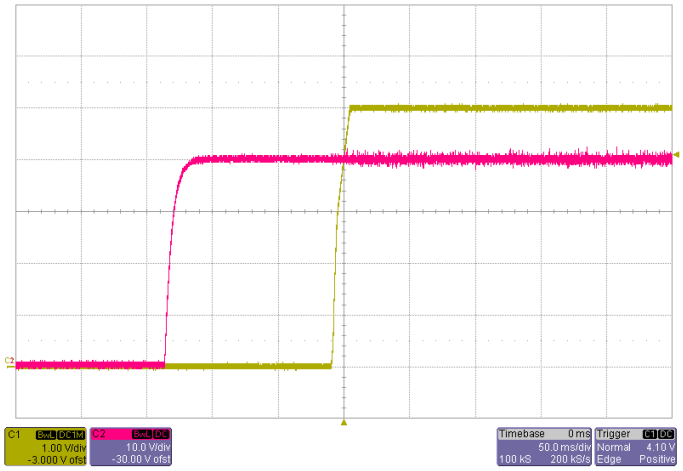


Power Down Vin=57V
Yellow: Output Voltage, Red: Input Voltage

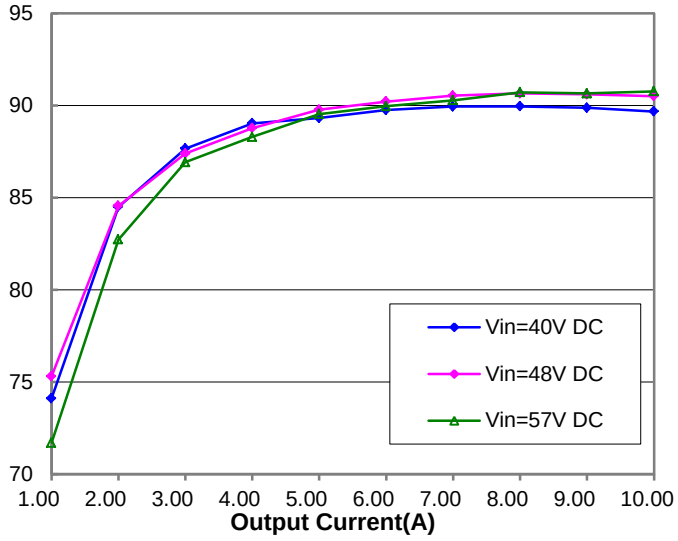


Short-Circuit Output, V_{IN} =57V
Blue: Load Current Yellow: Output Voltage

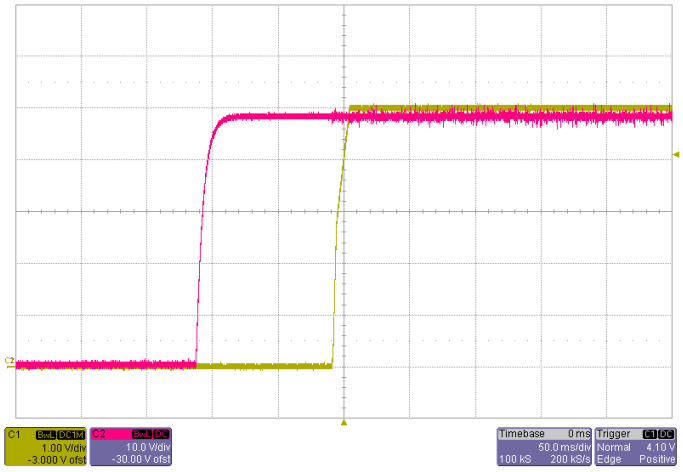
Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com



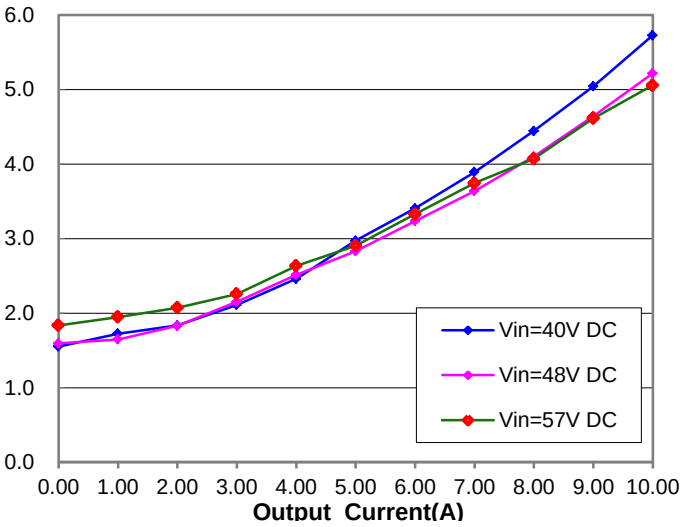
Startup form 40V
Yellow: Output Voltage, Red: Input Voltage



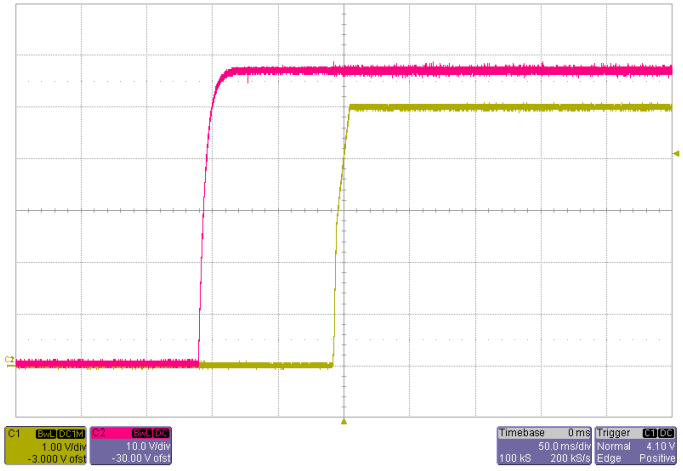
Efficiency



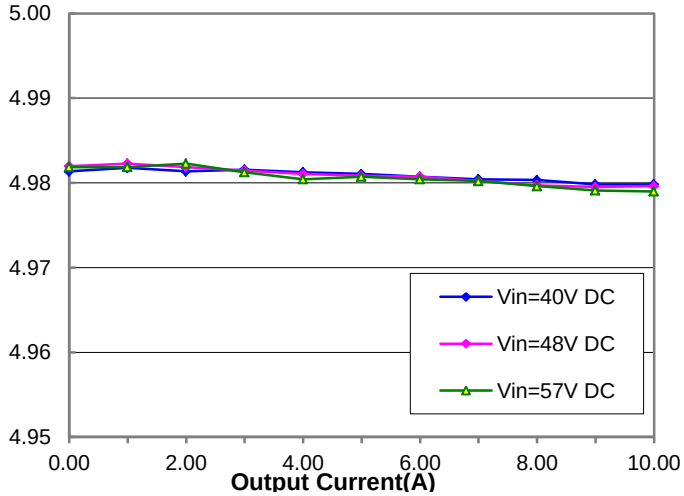
Startup form 48V
Yellow: Output Voltage, Red: Input Voltage



Power Dissipation(W)

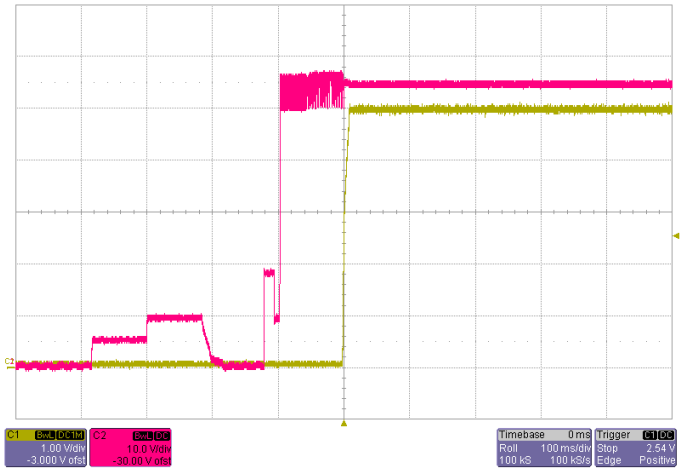


Startup form 57V
Yellow: Output Voltage, Red: Input Voltage

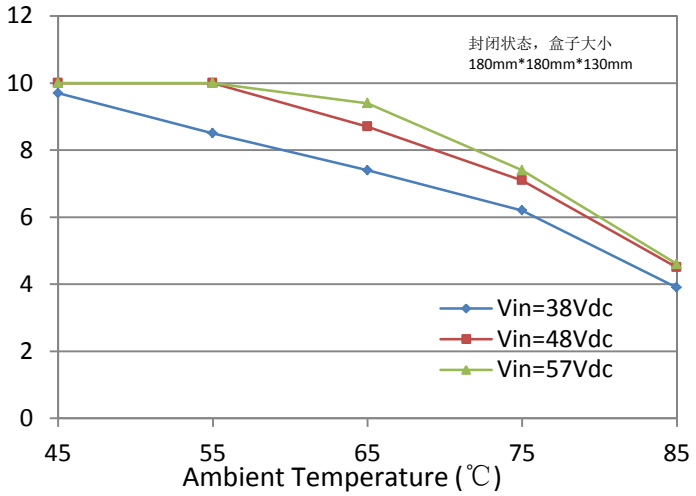


Regulation(V)

Union Microsystems
Tel: *+86 21 5109 5021*
Fax: *+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com



Full load startup form PSE (Model: PSE:UM-POE06A,Io=5A)
Red: Input Voltage, Yellow: Output Voltage, Blue: Input Current

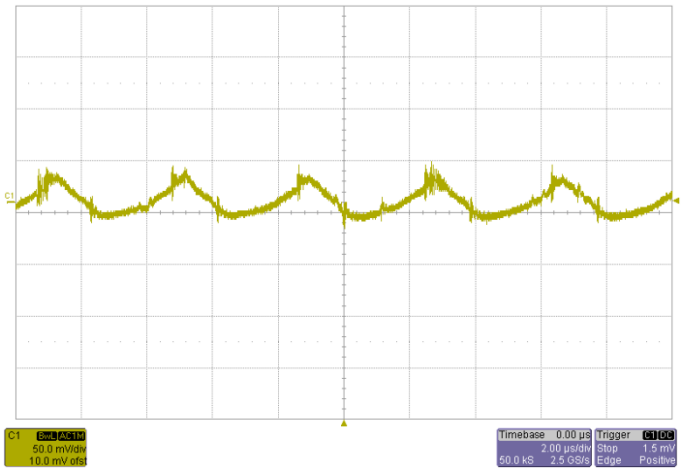


Derating

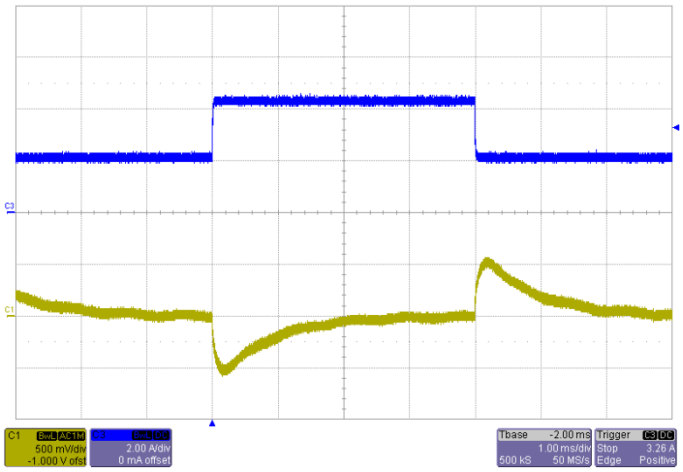
Union
Union Microsystems
Tel: +86 21 5109 5021
Fax:+86 21 5106 2878
sales@union-pwr.com
www.union-pwr.com

Typical Characteristics, Vout=12V

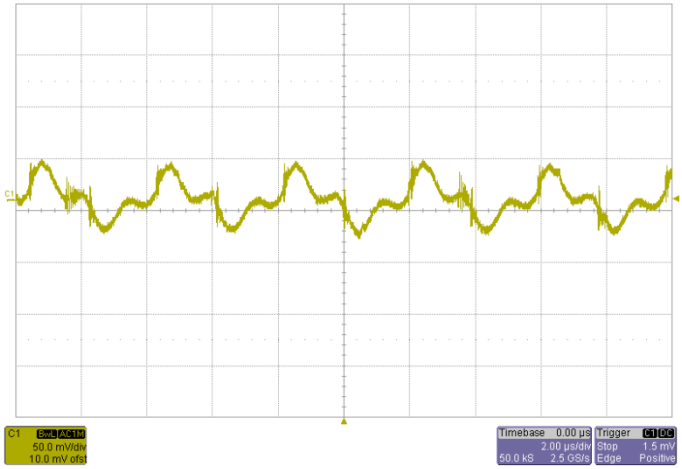
General conditions:



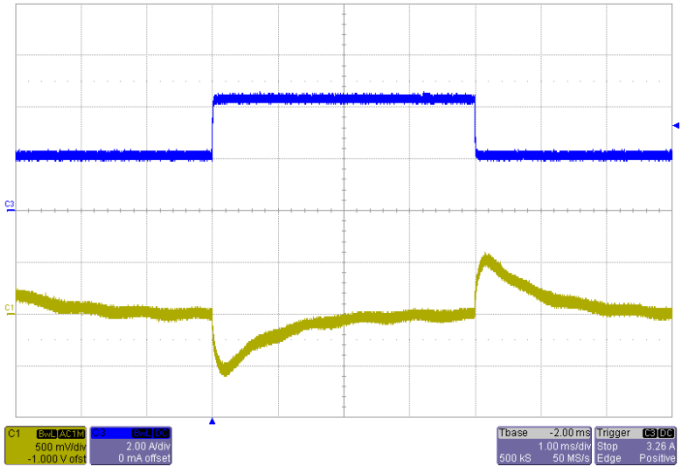
Noise V_{IN} =40V, I_O=4.2A, 5~20MHz Bandwidth



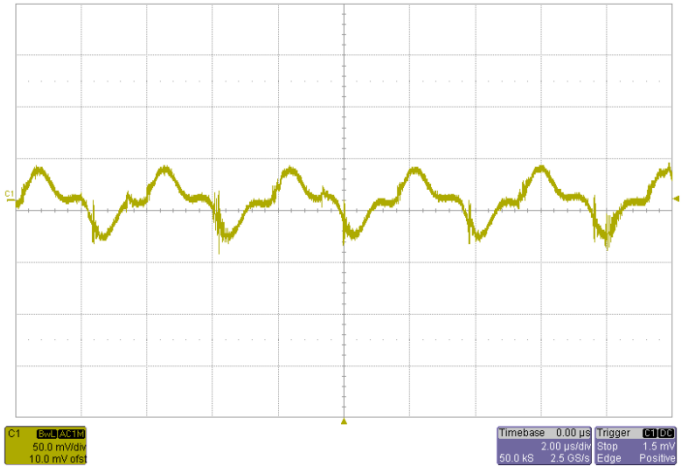
Transient Response V_{IN}=40V, Step from 2.1A~4.2A~2.1A, Blue: Load Current Yellow: Output Voltage



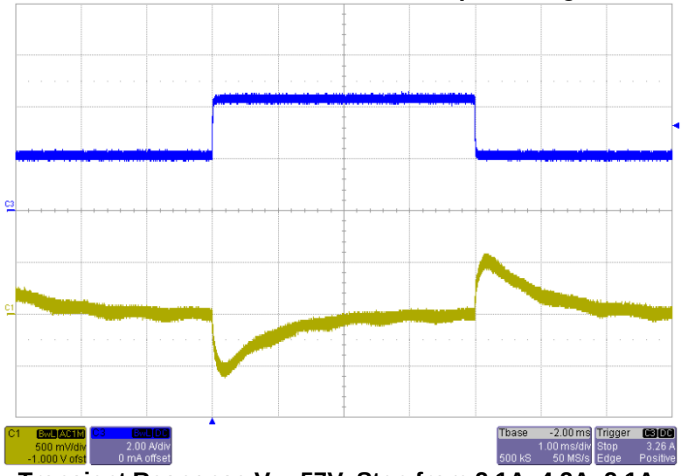
Noise V_{IN} =48V, I_O=4.2A, 5~20MHz Bandwidth



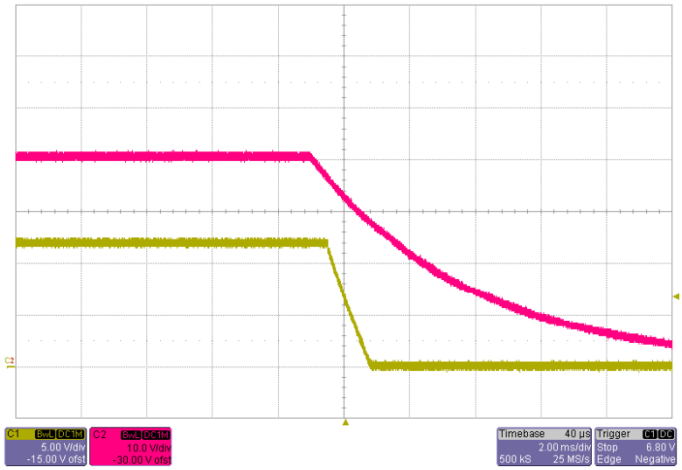
Transient Response V_{IN}=48V, Step from 2.1A~4.2A~2.1A, Blue: Load Current Yellow: Output Voltage



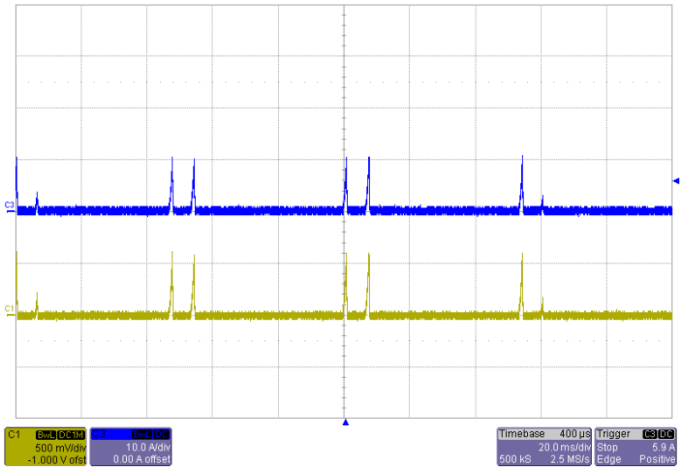
Noise V_{IN} =57V, I_O=4.2A, 5~20MHz Bandwidth



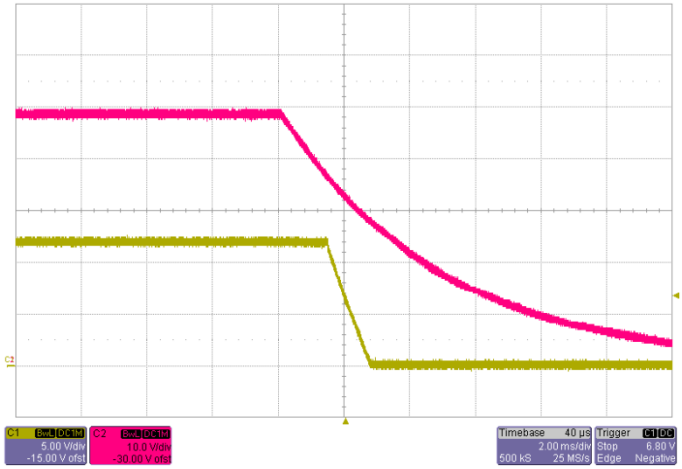
Transient Response V_{IN}=57V, Step from 2.1A~4.2A~2.1A, Blue: Load Current Yellow: Output Voltage



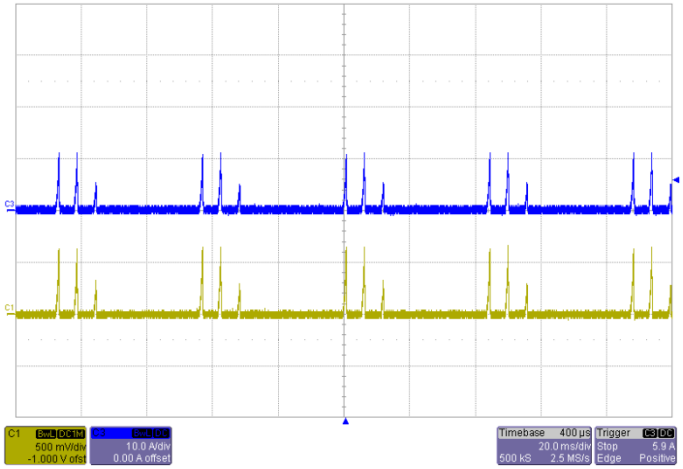
Power Down Vin=40V
Yellow: Output Voltage, Red: Input Voltage



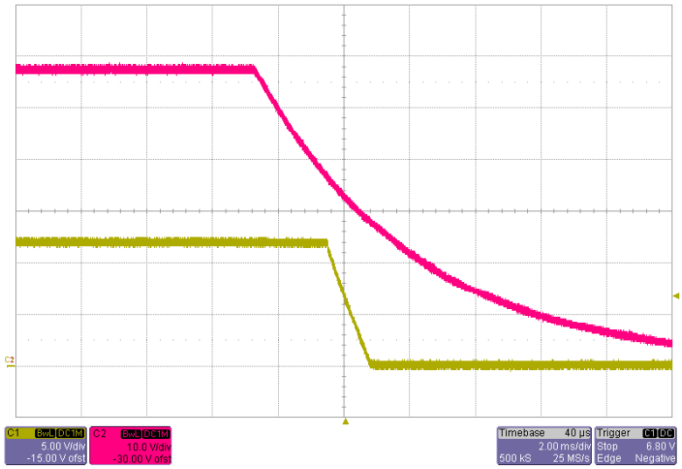
Short-Circuit Output, V_{IN} =40V
Blue: Load Current Yellow: Output Voltage



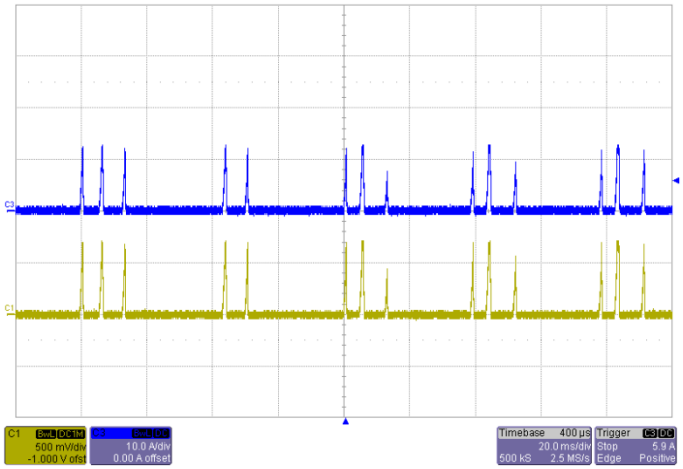
Power Down Vin=48V
Yellow: Output Voltage, Red: Input Voltage



Short-Circuit Output, V_{IN} =48V
Blue: Load Current Yellow: Output Voltage

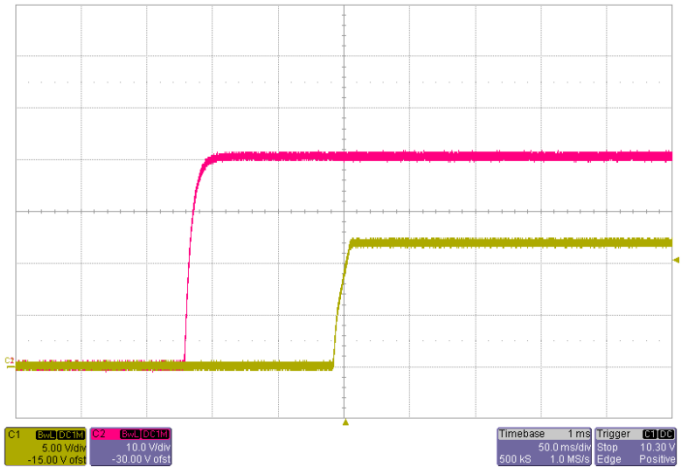


Power Down Vin=57V
Yellow: Output Voltage, Red: Input Voltage

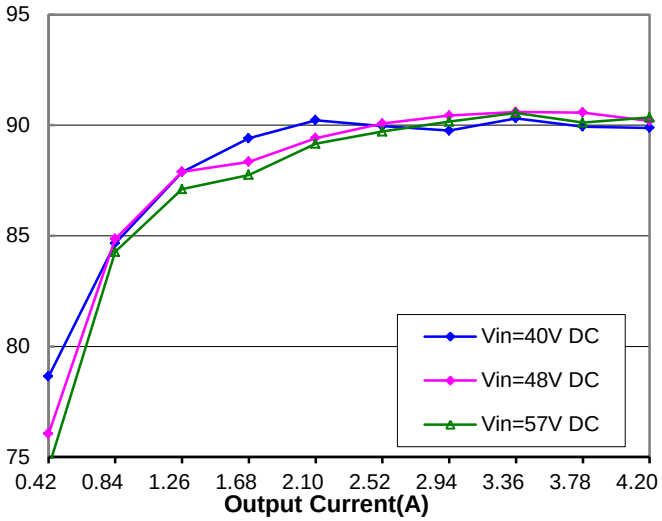


Short-Circuit Output, V_{IN} =57V
Blue: Load Current Yellow: Output Voltage

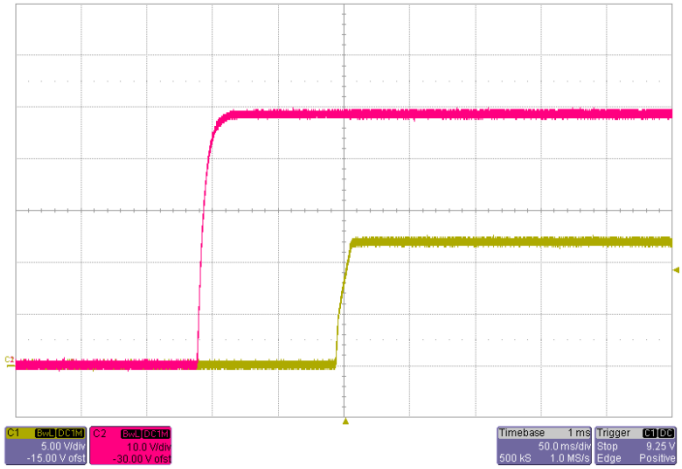
Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com



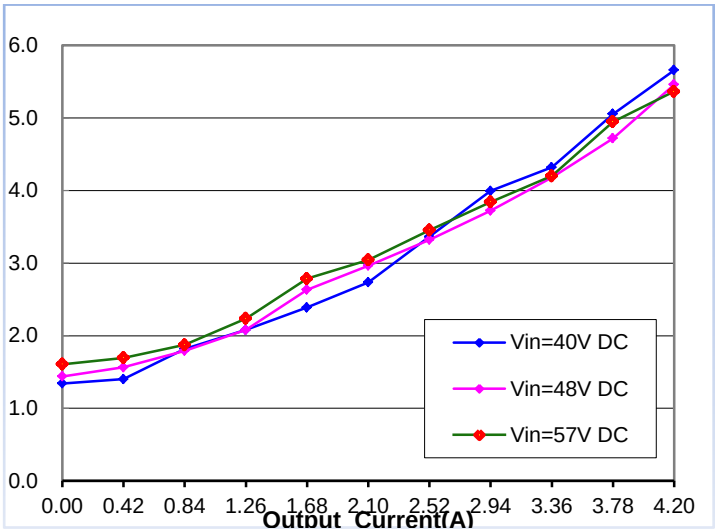
Startup form 40V
Yellow: Output Voltage, Red: Input Voltage



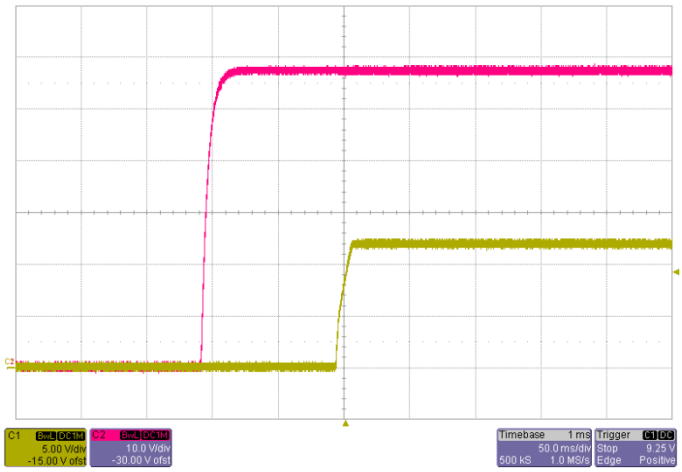
Efficiency



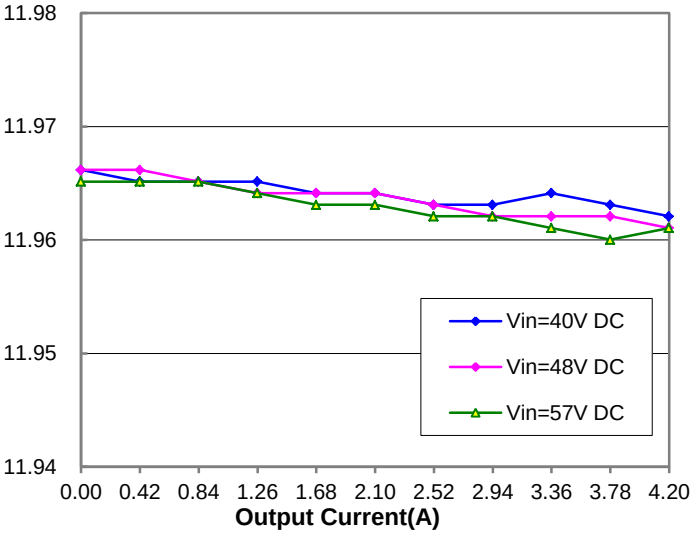
Startup form 48V
Yellow: Output Voltage, Red: Input Voltage



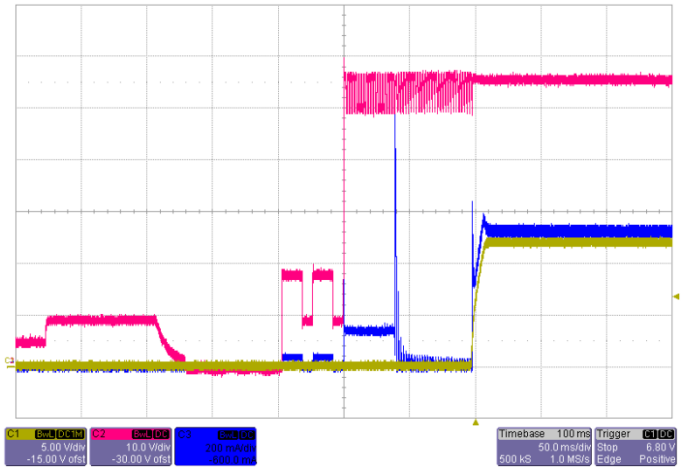
Power Dissipation



Startup form 57V
Yellow: Output Voltage, Red: Input Voltage



Regulation



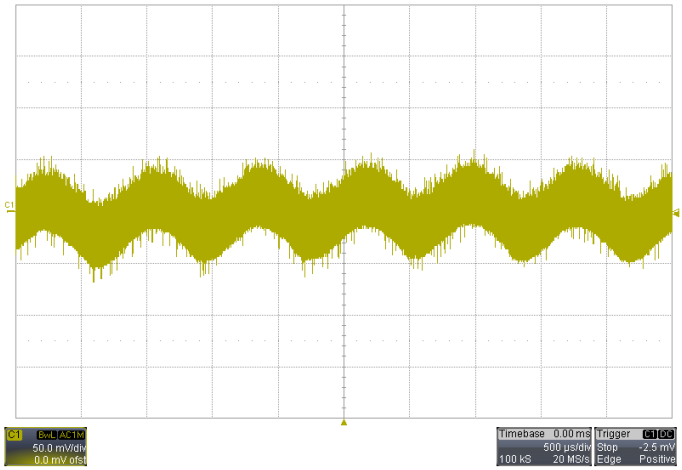
Full load startup form PSE (Model: UMPSE40M, Union)
Red: Input Voltage, Yellow: Output Voltage, Blue: Input Current

Derating

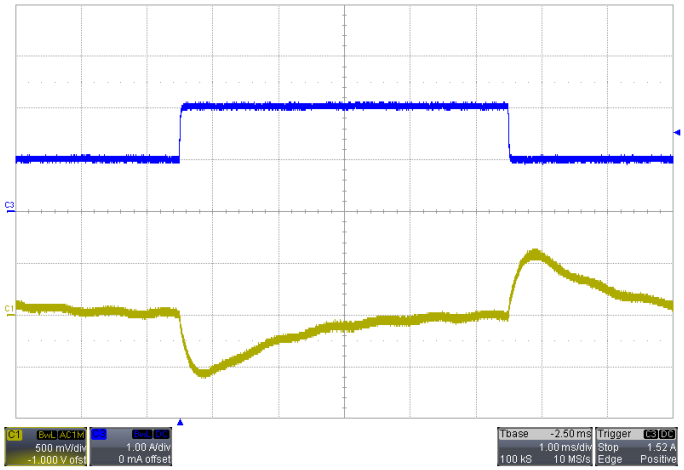
Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com

Typical Characteristics, Vout=24V

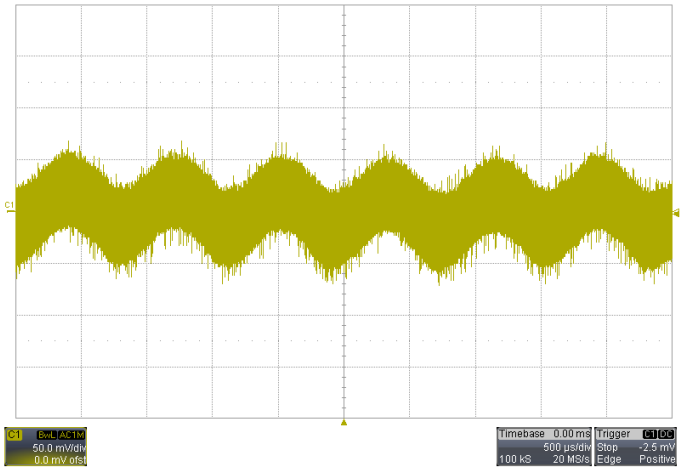
General conditions:



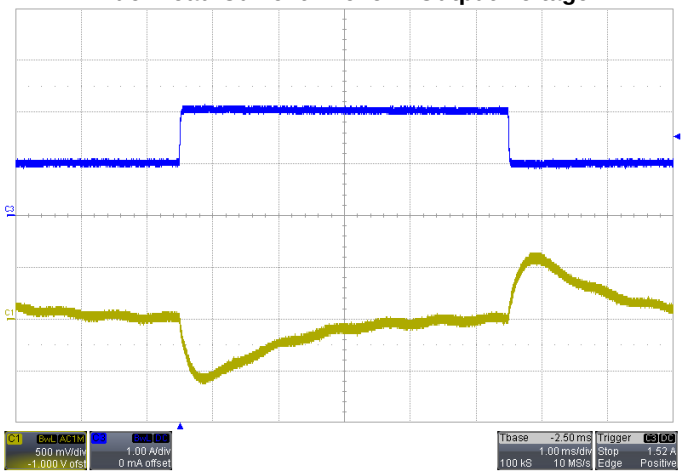
Noise V_{IN} =40V, I_O=2.1A, 5~20MHz Bandwidth



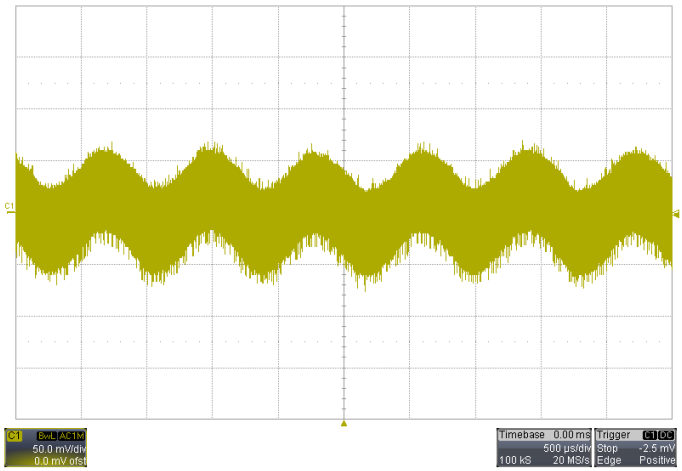
Transient Response V_{IN}=40V, Step from 2.1A~1.05A~2.1A, Blue: Load Current Yellow: Output Voltage



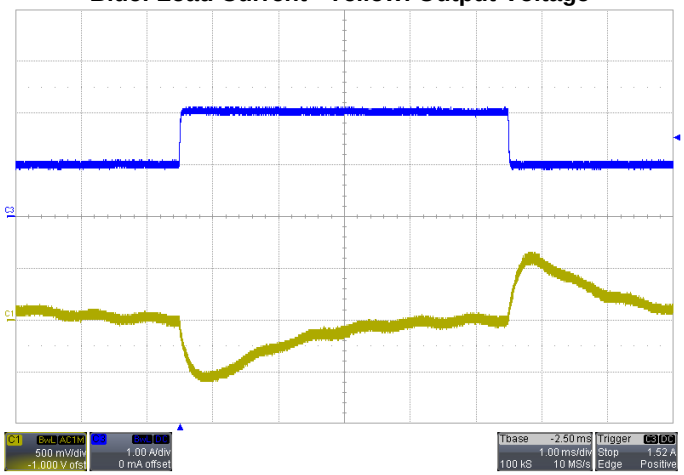
Noise V_{IN} =48V, I_O=2.1A, 5~20MHz Bandwidth



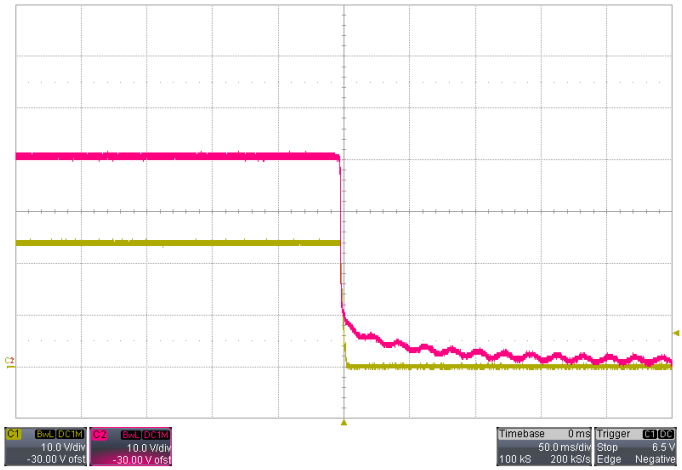
Transient Response V_{IN}=48V, Step from 2.1A~1.05A~2.1A, Blue: Load Current Yellow: Output Voltage



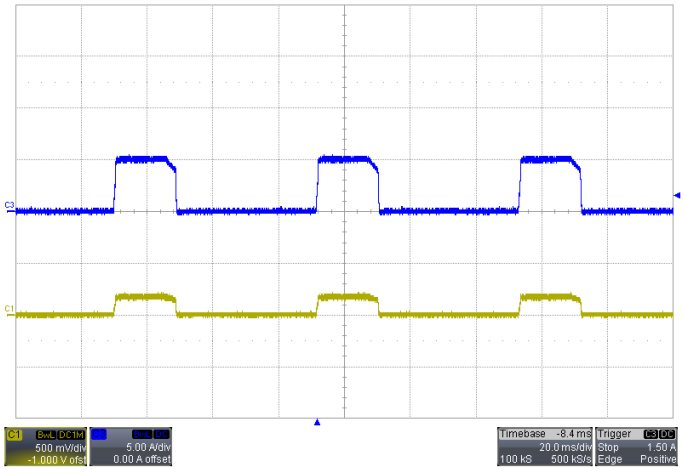
Noise V_{IN} =57V, I_O=2.1A, 5~20MHz Bandwidth



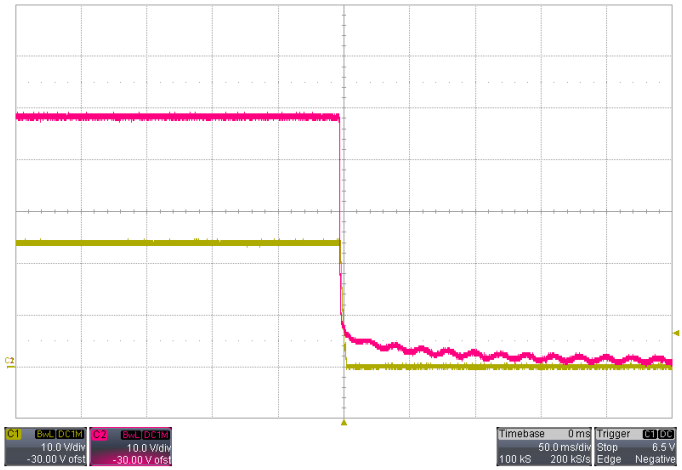
Transient Response V_{IN}=57V, Step from 2.1A~1.05A~2.1A, Blue: Load Current Yellow: Output Voltage



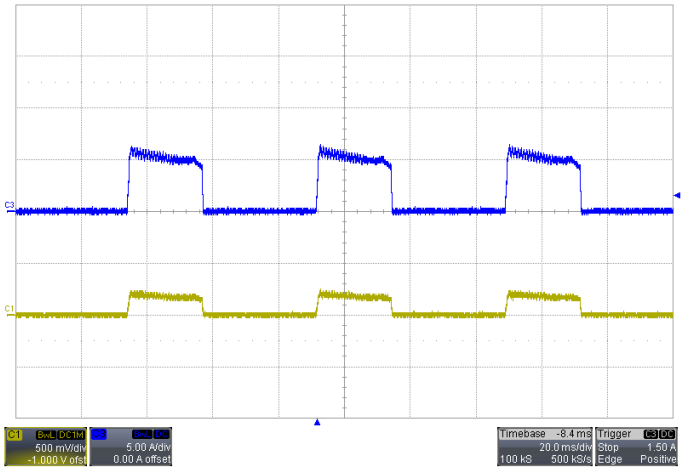
Power Down Vin=40V
Yellow: Output Voltage, Red: Input Voltage



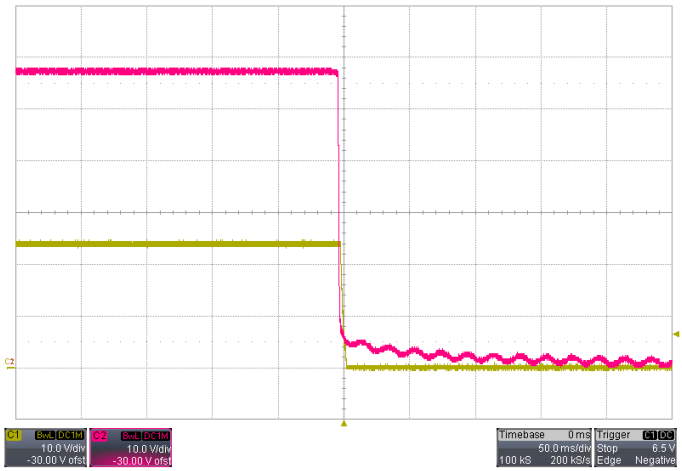
Short-Circuit Output, V_{IN} =40V
Blue: Load Current Yellow: Output Voltage



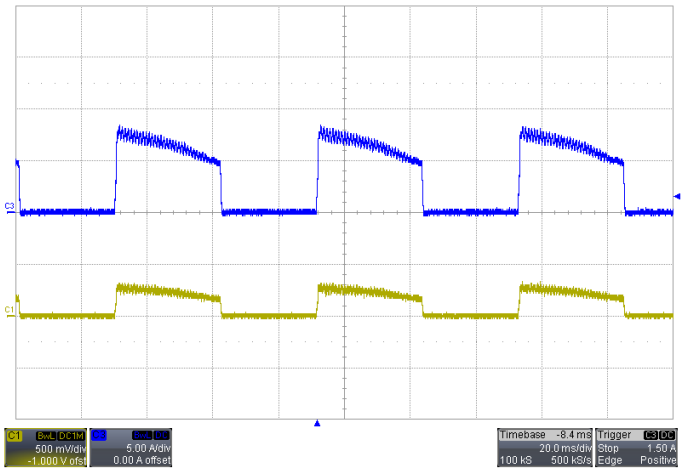
Power Down Vin=48V
Yellow: Output Voltage, Red: Input Voltage



Short-Circuit Output, V_{IN} =48V
Blue: Load Current Yellow: Output Voltage

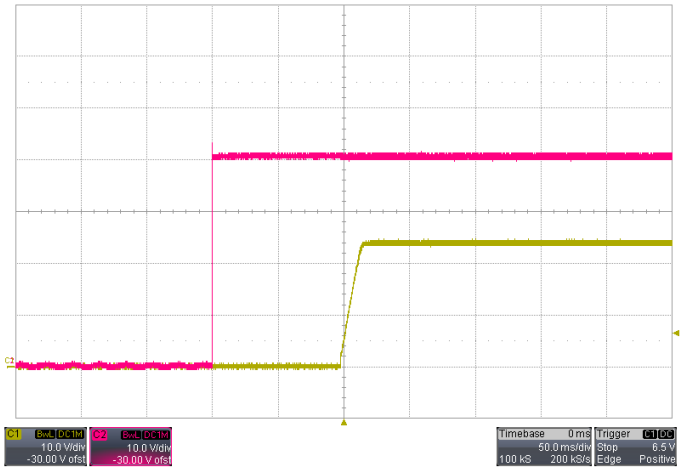


Power Down Vin=57V
Yellow: Output Voltage, Red: Input Voltage

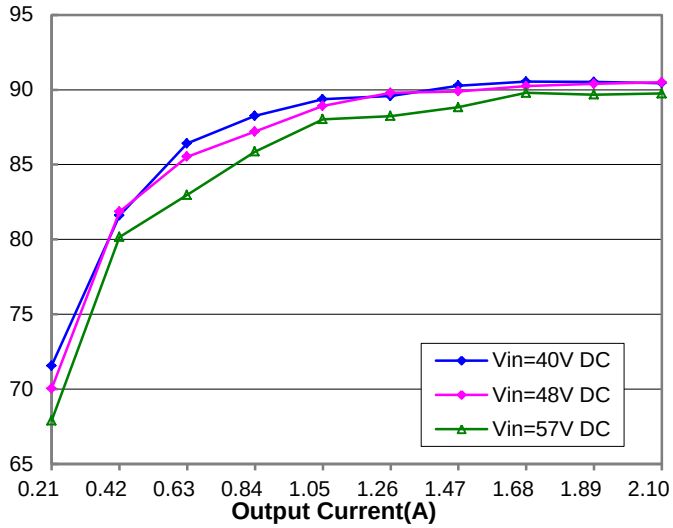


Short-Circuit Output, V_{IN} =57V
Blue: Load Current Yellow: Output Voltage

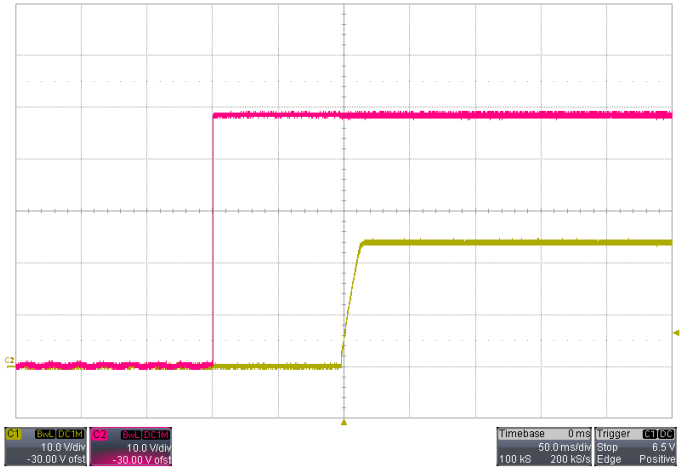
Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com



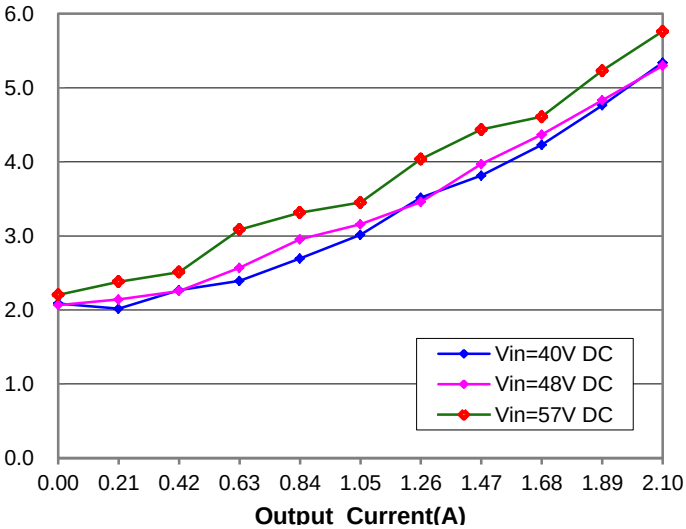
Startup form 40V
Yellow: Output Voltage, Red: Input Voltage



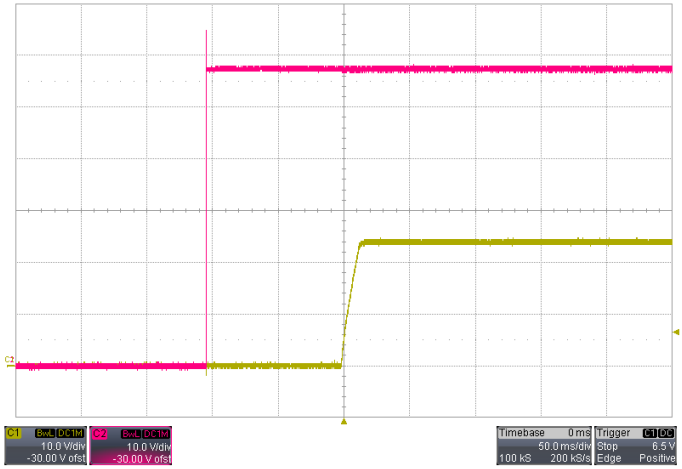
Efficiency (%)



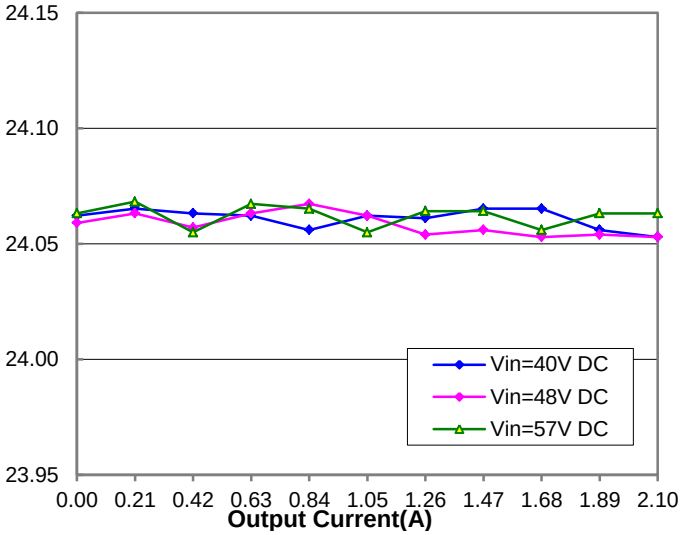
Startup form 48V
Yellow: Output Voltage, Red: Input Voltage



Power Dissipation(W)

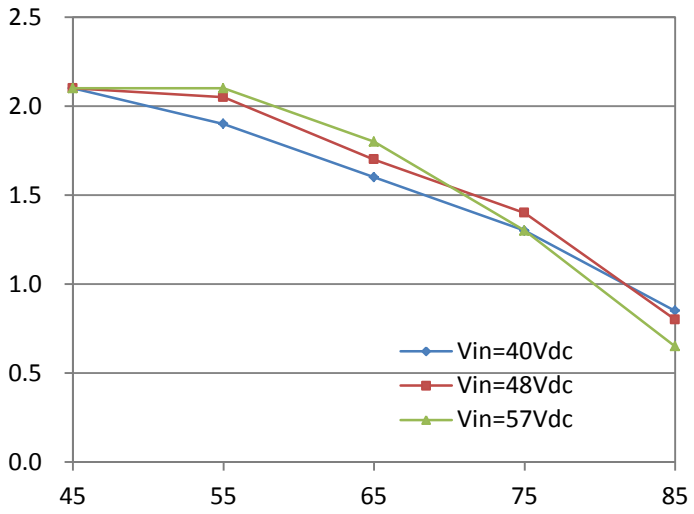


Startup form57V
Yellow: Output Voltage, Red: Input Voltage



Regulation(V)

Union Microsystems
Tel: *+86 21 5109 5021*
Fax: *+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com



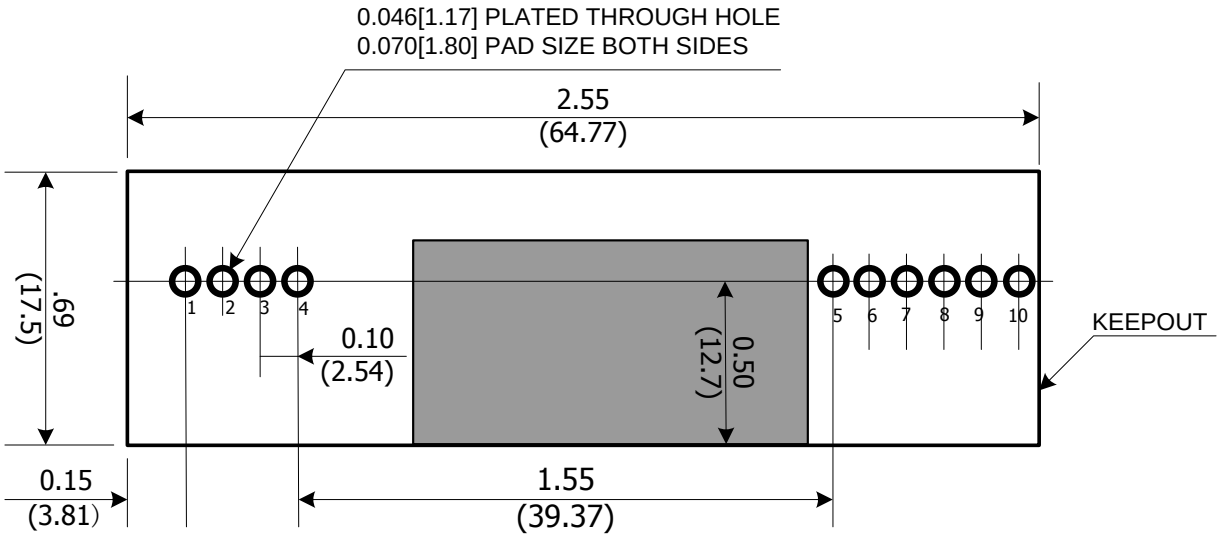
Derating

Full load startup form PSE (Model:)
Red: Input Voltage, Yellow: Output Voltage, Blue: Input Current

Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com

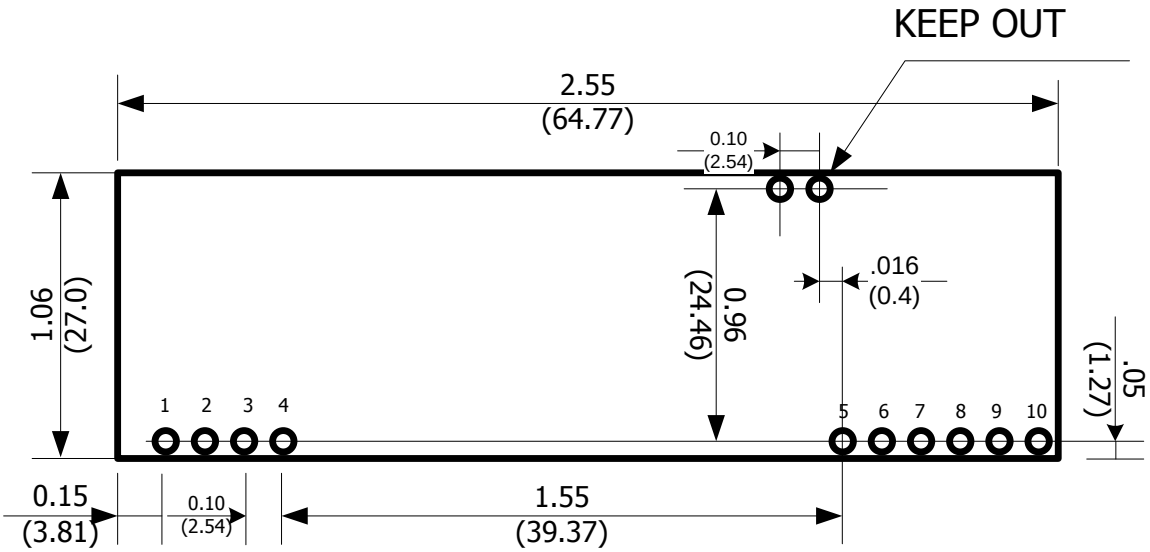
Recommended Hole Pattern

Dimensions are in inches (millimeters)



Recommended Hole Pattern for "R" option

Dimensions are in inches (millimeters)



Union Microsystems
Tel: *+86 21 5109 5021*
Fax:*+86 21 5106 2878*
sales@union-pwr.com
www.union-pwr.com