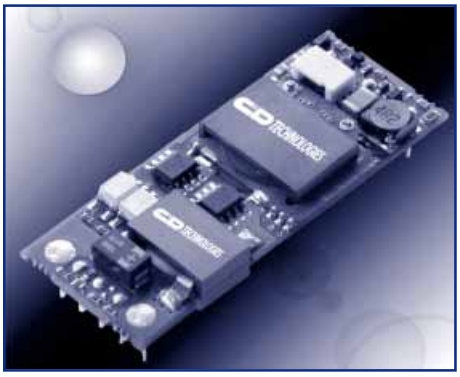
WPA50

18 Amp Single Output Eighth Brick DC/DC Converter



- Industry Standard Footprint & Size - 2.3" x 0.9" x 0.37" (58.42mm x 22.88mm x 9.4mm)
- High Efficiency - Up To 90%
- Wide Input Voltage Range: 36 – 75VDC
- Output Voltages: 1.2 V, 1.5V, 1.8V, 2.2V, 2.5V, 3.3V & 5.0V
- Through Hole and SMT Position Perfect™ Models
- Output Trim Function
- Remote Output Sense
- Remote ON/OFF (Positive or Negative Logic)
- Output Overcurrent Protection
- Input Side "L" Filter
- No Minimum Load Required
- Isolation Voltage of 2000 VDC
- High Reliability
- Fixed Frequency Operation
- Safety per UL/CUL 60950 and VDE to EN 60950. CE Approved. Basic Insulation. TNV-SELV Isolation Requirements
- C&D Technologies, Power Electronics Division is ISO9001:2000 Certified
- No Heatsinks
- Low Profile and Low Weight
- Thermal Shutdown
- Undervoltage Lockout

The WPA50 Series is a 50 Watt single output, low-profile DC-DC converter in an industry standard package of 2.3" x 0.9" x 0.37" (58.42mm x 22.86mm x 9.4mm). The WPA50 uses unique proprietary technologies to deliver ultra-high efficiencies and excellent thermal performance. It includes extensive control and protection features for maximum flexibility and provides a versatile solution for a whole range of applications with its input voltage range of 36-75 VDC and output voltages between 1.2VDC and 5.0VDC.

The power dissipation of the WPA50 series is so low that a heat sink is not required. The product features fast dynamic response characteristics and low output ripple critical for low voltage applications. WPA DC-DC converter modules are certified to UL/CUL 60950, and VDE to EN60950. It is designed to meet CISPR22/EN55022/FCC15J Class B specs for EMI levels with external filtering.

This high quality and highly reliable product is competitively priced and an ideal solution for distributed power, telecoms and datacom applications.

PRODUCT SELECTION CHART

MODEL	NOMINAL INPUT VOLTAGE (VDC)	RATED OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT MIN LOAD(A)	OUTPUT CURRENT RATED OUTPUT (A)	INPUT CURRENT RATED LOAD (A)	EFFICIENCY (%) MIN
WPA50R48S012	48	1.2	0.0	18	0.58	80
WPA50R48S015	48	1.5	0.0	18	0.70	82
WPA50R48S018	48	1.8	0.0	18	0.80	85
WPA50R48S022	48	2.2	0.0	18	0.99	85
WPA50R48S025	48	2.5	0.0	18	1.11	85
WPA50R48S033	48	3.3	0.0	15	1.20	88
WPA50R48S050	48	5.0	0.0	10	1.17	90

ABSOLUTE MAXIMUM RATINGS

Output Short-Circuit Duration	Continuous
Internal Power Dissipation	8 Watts
Lead Temperature (soldering, 10 seconds max)	+300°C
Continuous Input Voltage	75 VDC
Storage Temperature	+125°C
Input to Output Isolation	2000 VDC

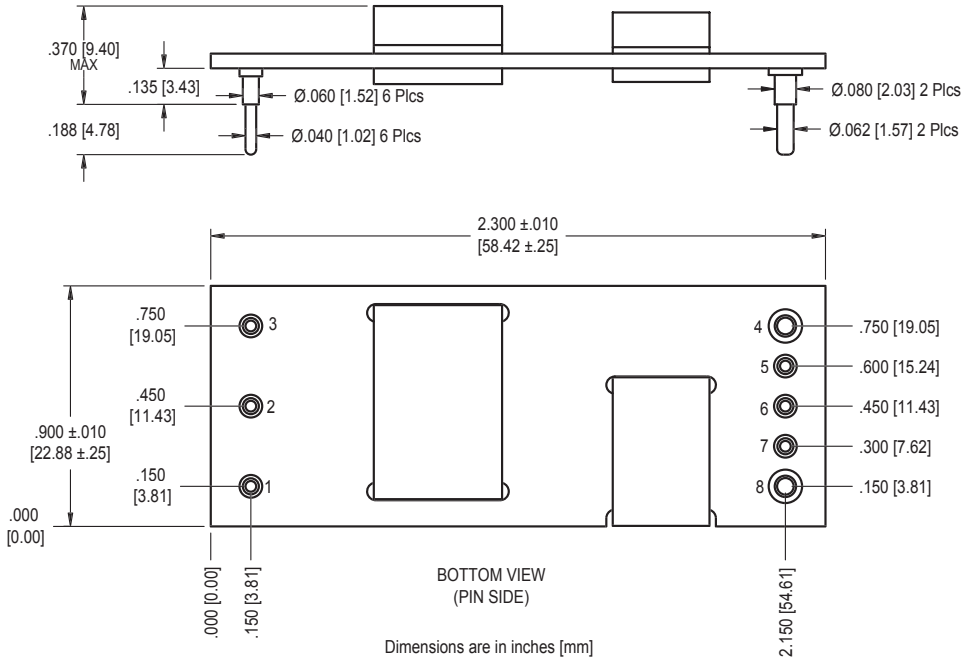
SPECIFICATIONS, ALL MODELS

Specifications are at T_A = +25°C, Airflow = 300LFM (1.5m/s) at nominal input voltage unless otherwise specified.

	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT	**INPUT**					
	Voltage Range	Vin = 48V, Io=I Rated	36	48	75	VDC
	Reflected Ripple Current	Vin = 48V, Io=I Rated		450	600	mApk-pk
	Inrush Charge			42		µC
	Maximum Input Current	Vin=36V				
	1.2 Vout			0.75		A
	1.5 Vout			0.93		A
	1.8 Vout			1.10		A
	2.2 Vout			1.31		A
	2.5 Vout			1.50		A
	3.3 Vout			1.60		A
	5.0 Vout			1.55		A
	INPUT CONTROL					
	Temperature Shutdown				115	℃
	Temperature Hysteresis				5	℃
	Quiescent Standby Current	Vin = 48V		3	4	mA
	Power Dissipation	No Load, Remote On/Off Disabled, Vin = 48Vdc			2.00	W
	Undervoltage Shutdown		31.50	32.5	35.0	V
	Undervoltage Hysteresis		0.50	2	3.00	V
OUTPUT	**ISOLATION**					
	Input/Output Isolation Voltage			2000	2250	VDC
	Resistance			10		MΩ
	Capacitance			1.5		nF
	Leakage Current	240 Vrms, 50Hz		100		µA
	OUTPUT					
	Rated Power	WPA50R48S012		22		W
		WPA50R48S015		27		W
		WPA50R48S018		33		W
		WPA50R48S022		40		W
		WPA50R48S025		45		W
		WPA50R48S033		50		W
		WPA50R48S050		50		W
	Voltage Setpoint Accuracy			1.0	1.5	% of VNOM
	Output Voltage Trim Range		-5.0		+8.0	% of VNOM
	Temperature Coefficient			±0.002	±0.005	%/°C
	Output Voltage Regulation					
	Line Regulation	Vin = 36V - 75V, Iout = Max		0.30	0.50	%
	Load Regulation	Vin = 48V, Iout = 0-Max		0.30	0.60	%
	Ripple & Noise (NOTE 1)	Vin = 48V, ≤ 20Mhz bandwidth			75	mVp-p
	Transient Response	Step change in output current (50%-100% Step @ 0.2A/ µs)				
	1.2 - 2.5 Vout	Vin = 48V			8	% of VNOM
	3.3 - 5.0 Vout	Vin = 48V			6	% of VNOM
	Turn-On Time	Vin = 48V		200	500	mS
	Remote Sense Compensation				8	%
	Overcurrent Protection	Vin = 48V	105		140	%
	GENERAL					
	Switching Frequency		380	400	420	KHz
	MTTF per ML-HDBK-217 Ground Benign	Circuit Stress Method TA = +25°		TBD		Hrs
	Operating Ambient Temperature		-40		85	℃

NOTE 1: Measured at 20 MHz bandwidth across a 10µf multi layer ceramic capacitor located approximately 1" from output terminals.

MECHANICAL (THROUGH HOLE)



PIN FUNCTIONS	
1	+Vin
2	Remote On/Off
3	-Vin
4	-Vout
5	- Sense
6	Trim
7	+ Sense
8	+Vout

NOTES:

Pin placement tolerance: +.010

Pin material: Copper

Pin Finish: Matte Tin over Nickel

Converter weight: [16g]

ORDERING INFORMATION (THROUGH HOLE)

To Find Model Number

WPA50R48S y -

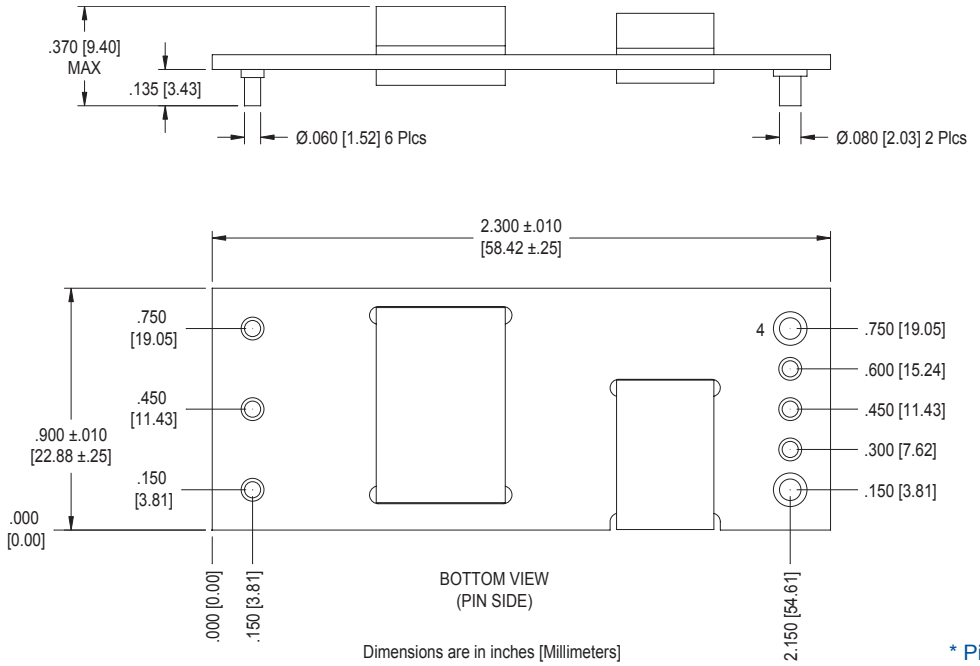
Device Family
50 Watt, Single Output,
Eighth Brick, 48VDC Input Range

Model Number
Selected from Product Selection Chart (above)
y = 012 = 1.2V, 015 = 1.5V, 018 = 1.8V, 022 = 2.2V,
025 = 2.5V, 033 = 3.3V, 050 - 5.0V,

Remote On/Off Logic
No Number = Positive Logic
1 = Negative Logic

Model Numbers	Part Numbers
WPA50R48S012	6064958
WPA50R48S015	6064959
WPA50R48S018	6064960
WPA50R48S022	6064961
WPA50R48S025	6064962
WPA50R48S033	6064963
WPA50R48S050	6064964
WPA50R48S012-1	6064967
WPA50R48S015-1	6064968
WPA50R48S018-1	6064969
WPA50R48S022-1	6064970
WPA50R48S025-1	6064971
WPA50R48S033-1	6064972
WPA50R48S050-1	6064973

MECHANICAL (SMT)



Dimensions are in inches [Millimeters]

PIN FUNCTIONS	
1	+Vin
2	Remote On/Off
3	-Vin
4	-Vout
5	- Sense
6	Trim
7	+ Sense
8	+Vout

NOTES:

Pin placement tolerance: +.010

Pin material: Copper

Pin Finish: Matte Tin over Nickel with Tin coating on contact surface

Converter weight: [16g]

* Pin Co-Planarity within 0.004”

ORDERING INFORMATION (SMT)

To Find Model Number

WPA50R48S y -

Device Family
50 Watt, Single Output,
Eighth Brick, 48VDC Input Range
Model Number
Selected from Product Selection Chart (above)
y = 012 = 1.2V, 015 = 1.5V, 018 = 1.8V, 022 = 2.2V,
025 = 2.5V, 033 = 3.3V, 050 - 5.0V,
Remote On/Off Logic
2 = Positive Logic, SMT
3 = Negative Logic, SMT

Model Numbers	Part Numbers
WPA50R48S012-2	WPA50R48S012-2
WPA50R48S015-2	WPA50R48S015-2
WPA50R48S018-2	WPA50R48S018-2
WPA50R48S022-2	WPA50R48S022-2
WPA50R48S025-2	WPA50R48S025-2
WPA50R48S033-2	WPA50R48S033-2
WPA50R48S050-2	WPA50R48S050-2
WPA50R48S012-3	WPA50R48S012-3
WPA50R48S015-3	WPA50R48S015-3
WPA50R48S018-3	WPA50R48S018-3
WPA50R48S022-3	WPA50R48S022-3
WPA50R48S025-3	WPA50R48S025-3
WPA50R48S033-3	WPA50R48S033-3
WPA50R48S050-3	WPA50R48S050-3

Operation

Remote Sense

The remote sense feature of the WPA50 can be used to compensate for voltage drops in the output power lines by sensing output voltage directly at the point of load. To enable this feature, connect the +Sense and –Sense pins to the +Vout and –Vout pins, respectively, at the point in the circuit where the tightest regulation is required (**Figure 1**). The sense leads conduct very little current compared with the power leads and therefore provide a more accurate indication of load voltage for regulation purposes. This enables the converter to increase (or decrease) its output voltage to compensate for any load distribution losses, allowing for a more precise load voltage. Refer to the product data sheet for the maximum output voltage compensation range of the sense function.

In general, the line resistance, or load drop, between the output pins of the converter and load should be minimized. A large line resistance, with a regulated load voltage, will result in a higher output voltage at the converter output pins, +Vout and -Vout. To prevent exceeding the converter's output power limits, a higher output voltage will require a reduction in the maximum allowable output current in accordance with the voltage/current power relationship. To minimize the line resistance between the converter and load, the converter should be placed as close to the load as possible. Line resistance can further be decreased by using heavy gauge wire or increasing the PC board voltage bus cross section.

When using remote sense with dynamic loads, the transient response at the point of load may be limited by the inductance present in the power lines. Severe load steps may require the addition of a capacitor C_L across the output lines. When the load demands an immediate increase in load current, this capacitor helps to supply a portion of the current and reduces the burden on the converter.

When the load is physically distanced from the converter, the inductance of the power leads, and any bypass conductance at the load, can result in increased phase shift in the converter's feedback loop, causing instability. This situation can be eliminated by inserting bypass capacitors (C_B) from the outputs to the sense leads directly at the output pins. These capacitors provide AC feedback, removing the long power lines from the converter's feedback loop.

If remote sensing is not desired then +Sense and -Sense must be tied to their respective outputs for proper operation.

If +Sense and -Sense are not connected in this manner the ouput voltage could drift beyond the nominal range.

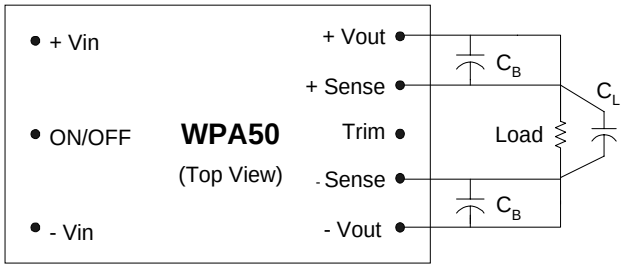


Figure 1 – Remote Sensing Circuit

Output Voltage Trim

The WPA50's output voltage may be adjusted high or low by an amount indicated on the product data sheet. As shown in **Figure 2**, to raise the converter's output voltage a resistor must be placed between the Trim pin and +Vout pin.

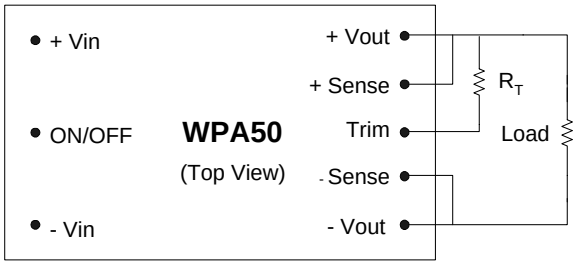


Figure 2 – Trim Up Circuit

To lower the converter output voltage a resistor must be placed between the Trim pin and -Vout pin as shown in **Figure 3**.

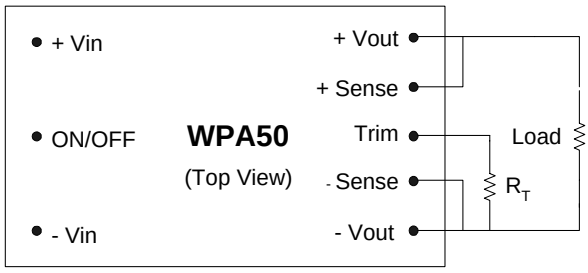


Figure 3 – Trim Down Circuit

The resistance value required to achieve the desired amount of positive/negative trim can be determined by referring to the trim table for each model. If trimming is not desired then the Trim pin may be left unconnected.

Remote ON/OFF Function

The WPA50 is equipped with a primary ON/OFF pin used to remotely turn the converter on or off via a system signal. The input is TTL open-collector and/or FET open-drain compatible. For the positive logic model a system logic low signal will turn the unit off. For negative logic models a system logic high signal will turn the converter off. For negative logic models where no control signal will be used the ON/OFF pin should be connected directly to –Vin to ensure proper operation. For positive logic models where no control signal will be used the ON/OFF pin should be left unconnected.

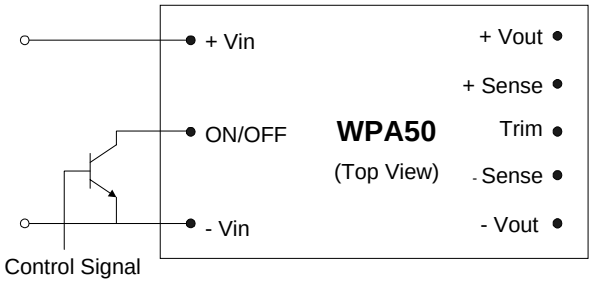


Figure 4 – Remote ON/OFF Control Circuit

Protective Functions

Temperature Shutdown

The over temperature shutdown feature of the WPA50 will cause the unit to shutdown at a typical pwb temperature of 120°C. This protective feature is comprised of a thermistor in the unit control loop. At a temperature of 120°C this circuit will cause the PWM to go into an idle mode, resulting in no output from the converter and preventing damage to the converter components. When the temperature of the unit drops below 120°C the fault condition will clear and the converter will resume normal operation. If the cause of the over temperature condition is not identified and corrected the unit will continue to cycle on and off.

Input Under-Voltage Shutdown

The nominal input voltage for the WPA50 is 48Vdc. At an input voltage of 32.5Vdc nominal the unit will shutdown on an input under-voltage condition. At an input voltage less than 32.5V the under-voltage sensing circuit will send a signal to the PWM causing it to go into idle mode. This will result in no output from the converter, protecting the unit from a high input current condition. When the input voltage returns to a level above 32.5V the unit will return to normal operation. The unit will typically turn on at an input voltage of 34.5V nominal as indicated on the Product Data Sheet. This is due to hysterisis designed into the protective circuit to prevent excessive cycling of the converter.

Over-Current Protection

To protect against fault or short-circuit conditions on the output, each module is equipped with current-limiting circuitry designed to provide continuous protection. After reaching the current limit point (typically 20% above the rated output current), the voltage will range between its rated value and zero, depending upon the amount of overload. The unit will remain in operation continuously during this period down to a short-circuit condition. Once the short or overload has been eliminated, the output voltage will return to normal without cycling the input power.

Safety

The WPA50 meets safety requirements per UL/CUL 60950 and VDE to EN60950. Basic Insulation. Meets TNV-SELV isolation requirements.

EMC Considerations

Analysis pending.

Performance Characterization

Thermal Derating

Maximum output current vs. ambient temperature at various airflow rates has been determined for each model of the WPA50. Each model was analyzed over an ambient temperature range of 0 to 85°C and at air flows up to 600LFM. In each case, the maximum load current is defined as the point at which a known component reaches its individual temperature limit.

Efficiency Performance

Efficiency data for each model was determined as a function of both load current and input voltage. Efficiency vs. Input Voltage was measured at full load, ambient temperature of 25°C and airflow of 300LFM. Efficiency vs. Load Current was measured at 25°C, a nominal input voltage of 48Vdc and airflow of 300LFM. Graphs are provided for each model in their respective section.

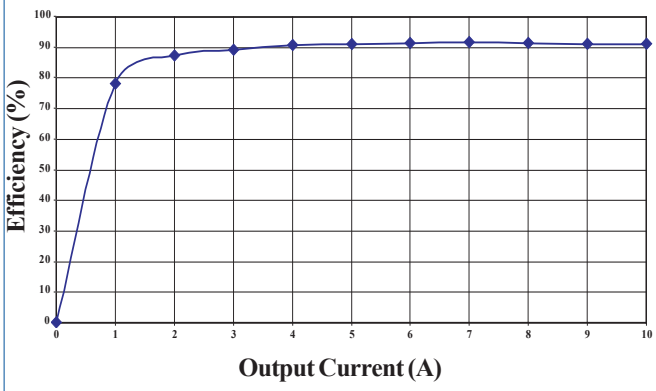
Start-Up, ON/OFF and Transient Response

For each model, waveforms are provided showing output voltage response and timing to input voltage power up/down, remote ON/OFF state change and load current transient responses. Output voltage transient responses are provided for step load changes of 50% - 100% & 100% - 50% of rated load current. Waveforms for each model are provided in their respective section.

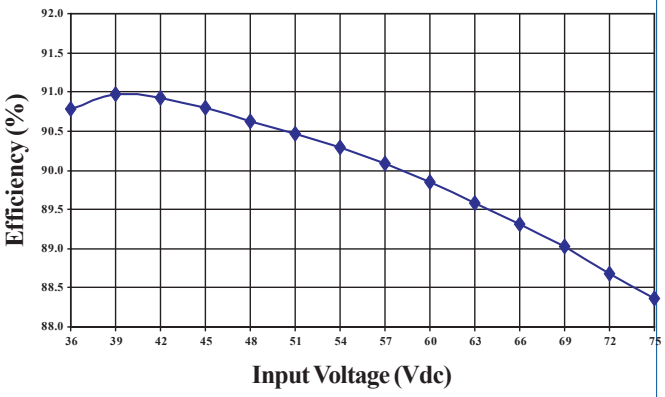
PERFORMANCE CURVES: MODEL WPA50R48050

MODEL WPA50R48050

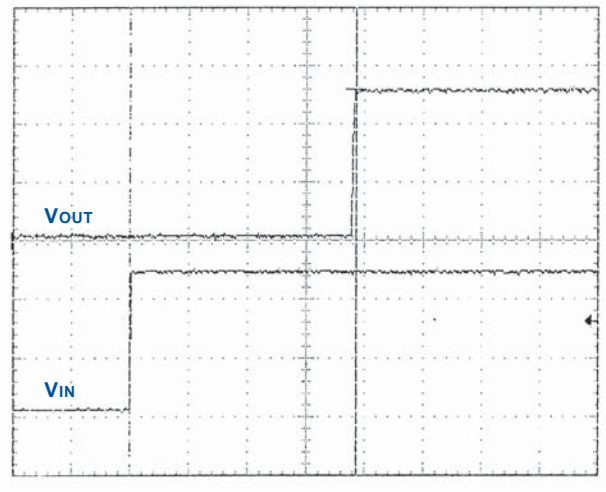
Efficiency vs. Output Current
@ T_A = +25°C; Vin = 48Vdc



Efficiency vs. Input Voltage
@ T_A = +25°C; I_O = 10A

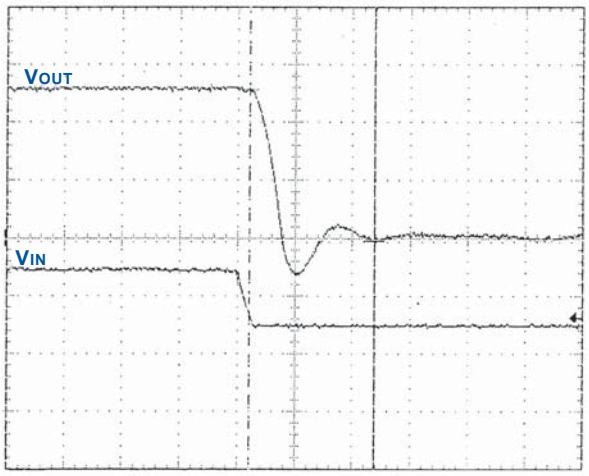


Turn On Time (VIN to VOUT)



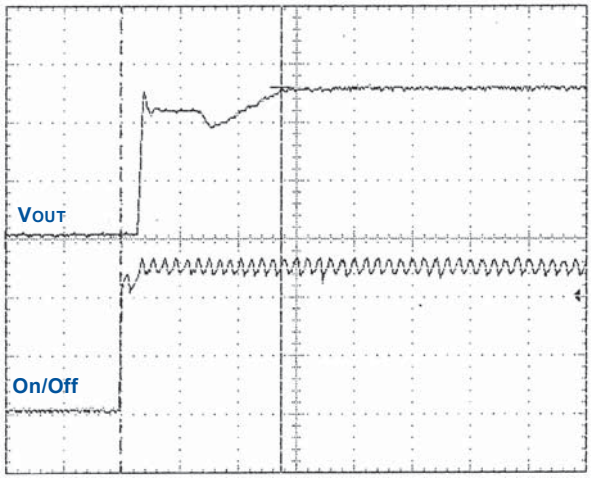
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



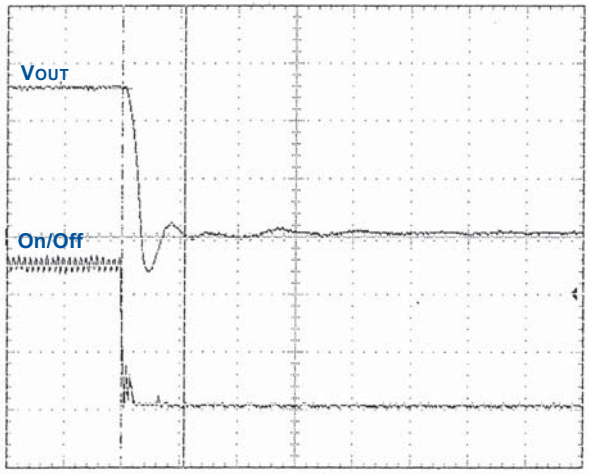
Time Scale = 50µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 1ms/div

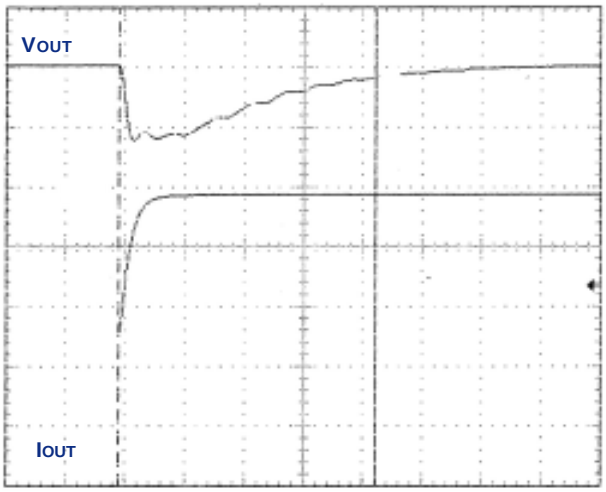
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

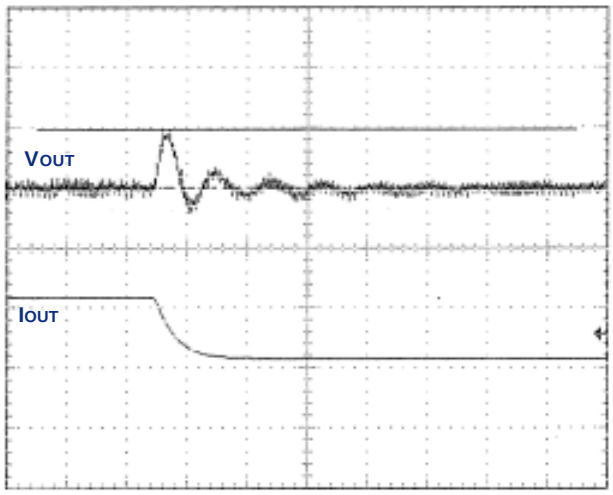
MODEL WPA50R48050 (CONTINUED)

Transient Response, 50% to 100% Load Step



Voltage Scale = 200mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 20mV/div; Time Scale = 50µs/div
di/dt = 0.2A/µs

Trim Up Table

Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
5.0000	0.0	-
5.0250	0.5	3678.2
5.0500	1.0	1526.7
5.0750	1.5	920.7
5.1000	2.0	634.9
5.1250	2.5	466.3
5.1500	3.0	356.6
5.1750	3.5	297.0
5.2000	4.0	220.2
5.2250	4.5	175.2
5.2500	5.0	139.4
5.2750	5.5	110.5
5.3000	6.0	85.8
5.3250	6.5	65.3
5.3500	7.0	47.7
5.3750	7.5	32.4
5.4000	8.0	19.0

Trim Down Table

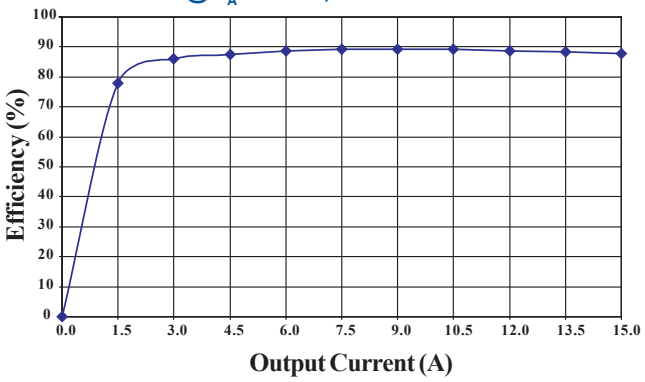
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
5.0000	0.0	-
4.9750	0.5	792.00
4.9500	1.0	297.19
4.9250	1.5	133.09
4.9000	2.0	50.49

PERFORMANCE CURVES: MODEL WPA50R48033

MODEL WPA50R48033

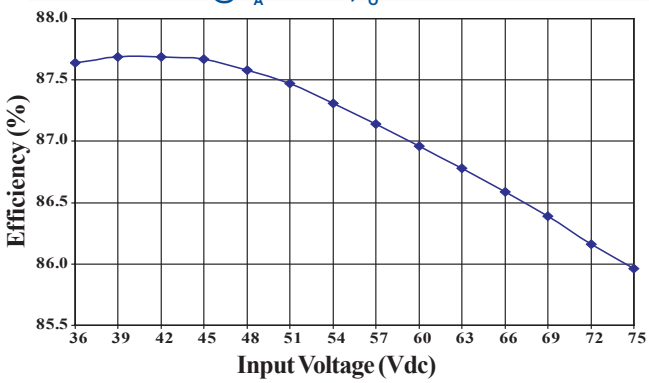
Efficiency vs. Output Current

@ T_A = +25°C; Vin = 48Vdc

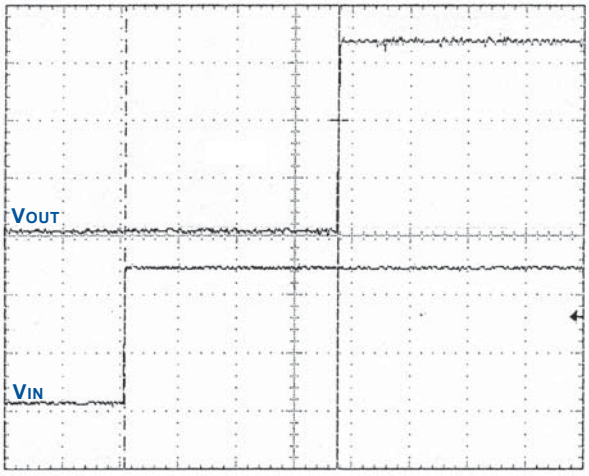


Efficiency vs. Input Voltage

@ T_A = +25°C; I_O = 15A

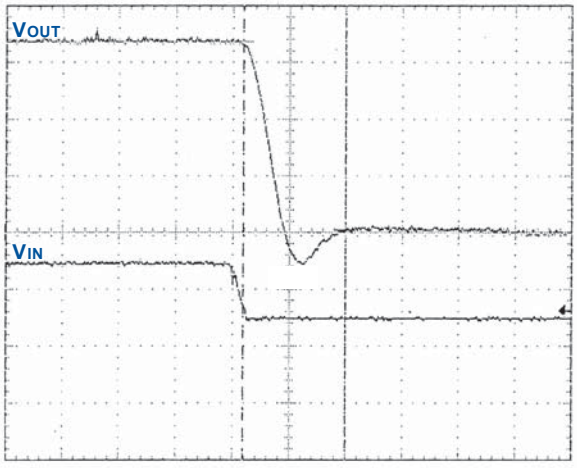


Turn On Time (VIN to VOUT)



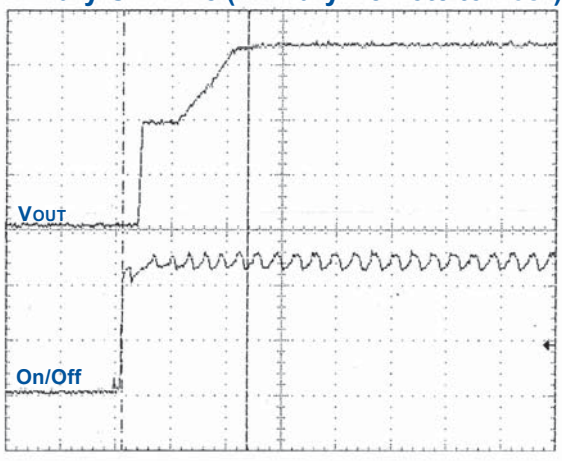
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



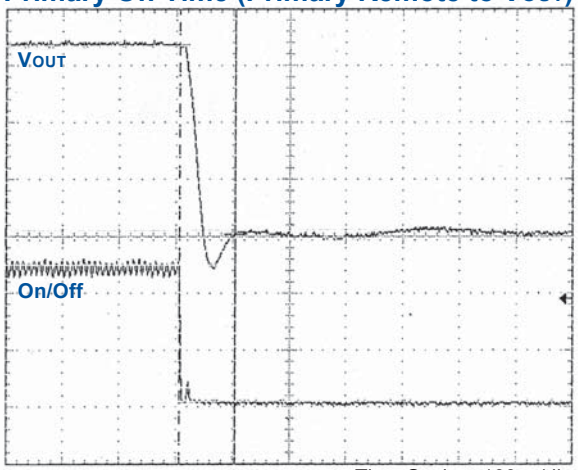
Time Scale = 50µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 1ms/div

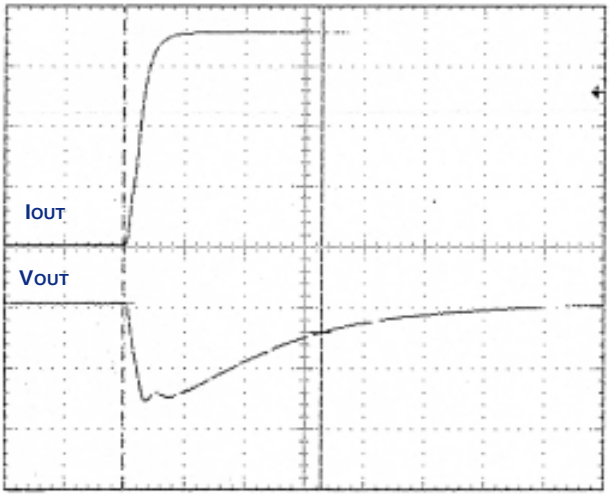
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

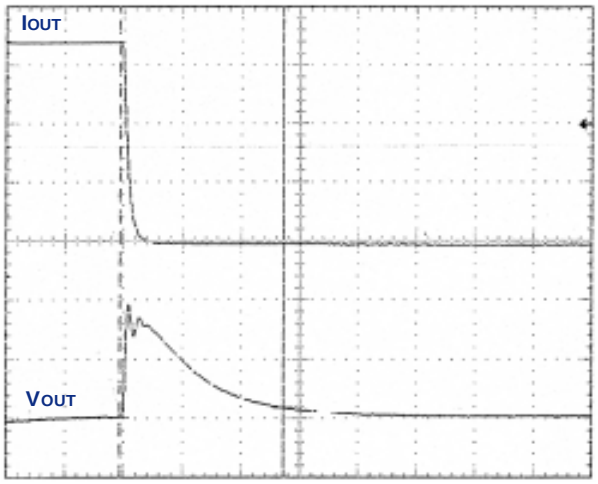
MODEL WPA50R48033 (CONTINUED)

Transient Response, 50% to 100% Load Step



Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 100mV/div; Time Scale = 200µs/div
di/dt = 0.2A/µs

Trim Up Table

Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
3.3000	0.0	-
3.3165	0.5	2434.5
3.3330	1.0	947.3
3.3495	1.5	572.8
3.3660	2.0	399.4
3.3825	2.5	300.0
3.3990	3.0	234.7
3.4155	3.5	189.9
3.4320	4.0	155.7
3.4485	4.5	130.3
3.4650	5.0	109.5
3.4815	5.5	92.9
3.4980	6.0	79.0
3.5145	6.5	67.3
3.5310	7.0	57.3
3.5475	7.5	48.6
3.5640	8.0	41.1

Trim Down Table

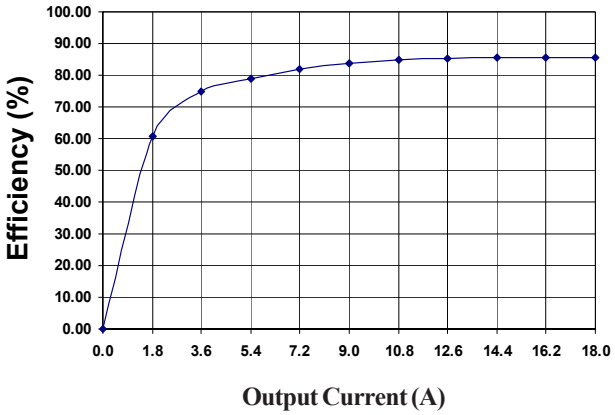
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
3.3000	0.0	-
3.2835	0.5	691.85
3.2670	1.0	357.20
3.2505	1.5	225.10
3.2340	2.0	155.89
3.2175	2.5	111.17
3.2010	3.0	79.55
3.1845	3.5	57.40
3.1680	4.0	40.37
3.1515	4.5	27.26
3.1350	5.0	16.52

PERFORMANCE CURVES: MODEL WPA50R48025

MODEL WPA50R48025

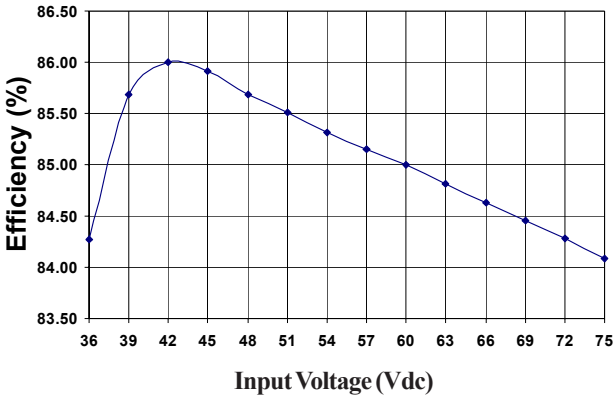
Efficiency vs. Output Current

@ T_A = +25°C; Vin = 48Vdc

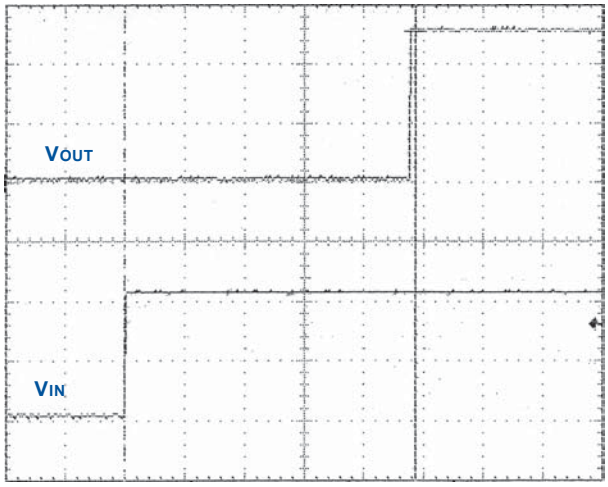


Efficiency vs. Input Voltage

@ T_A = +25°C; I_O = 18A

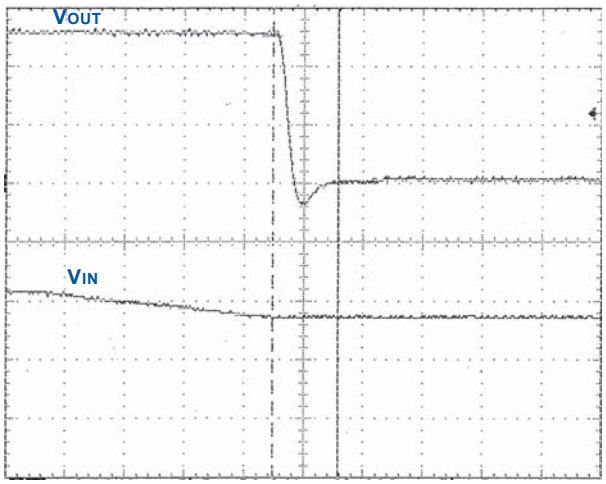


Turn On Time (VIN to VOUT)



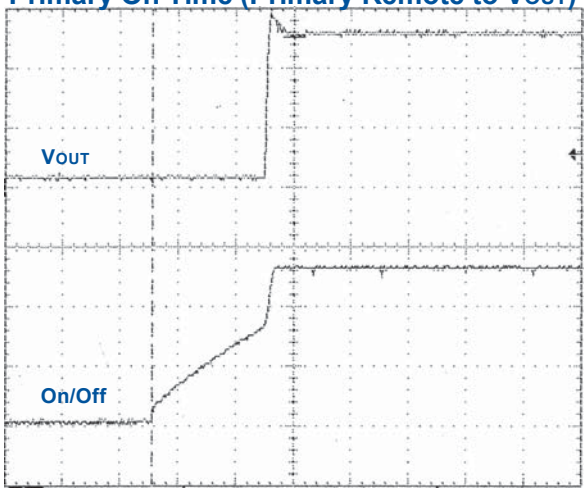
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



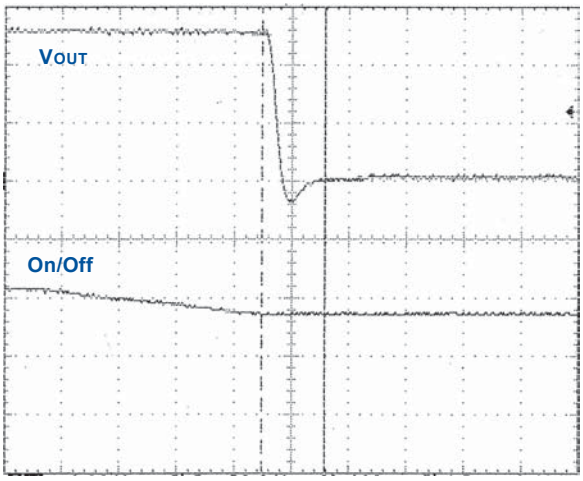
Time Scale = 100µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 2ms/div

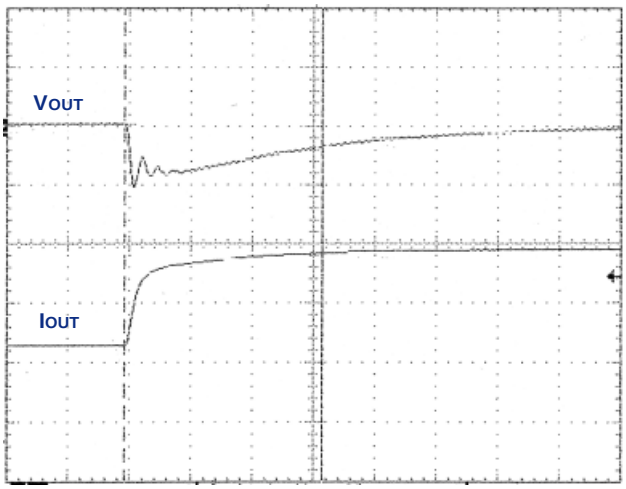
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

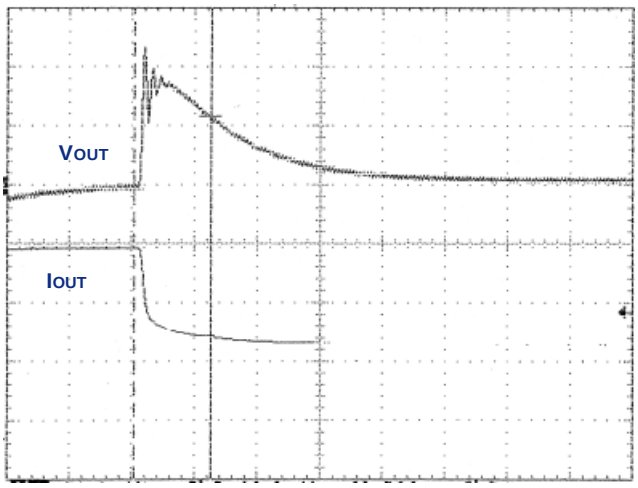
MODEL WPA50R48025

Transient Response, 50% to 100% Load Step



Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 50mV/div; Time Scale = 200µs/div
di/dt = 0.2A/µs

Trim Up Table

Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
2.5000	0.0	-
2.5125	0.5	1600.0
2.5250	1.0	909.0
2.5375	1.5	459.0
2.5500	2.0	248.0
2.5625	2.5	207.0
2.5750	3.0	151.9
2.5875	3.5	118.7
2.6000	4.0	93.2
2.6125	4.5	75.2
2.6250	5.0	59.5
2.6375	5.5	48.5
2.6500	6.0	38.4
2.6625	6.5	30.8
2.6750	7.0	24.1
2.6875	7.5	18.3
2.7000	8.0	13.5

Trim Down Table

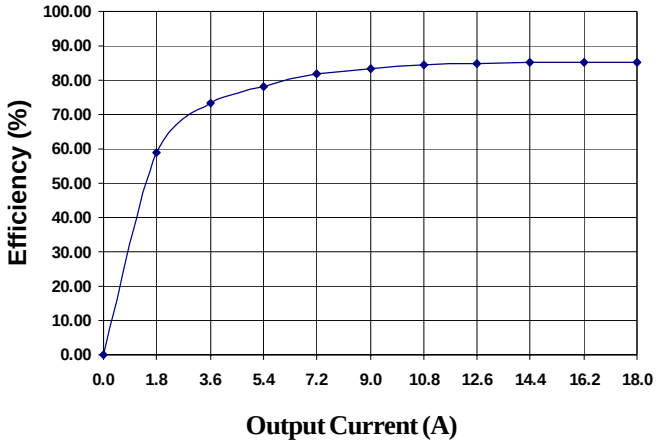
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
2.5000	0.0	-
2.4875	0.5	456.0
2.4750	1.0	283.0
2.4625	1.5	191.0
2.4500	2.0	139.0
2.4375	2.5	104.0
2.4250	3.0	79.0
2.4125	3.5	60.0
2.4000	4.0	46.0
2.3875	4.5	34.0
2.3750	5.0	26.0

PERFORMANCE CURVES: MODEL WPA50R48022

MODEL WPA50R48022

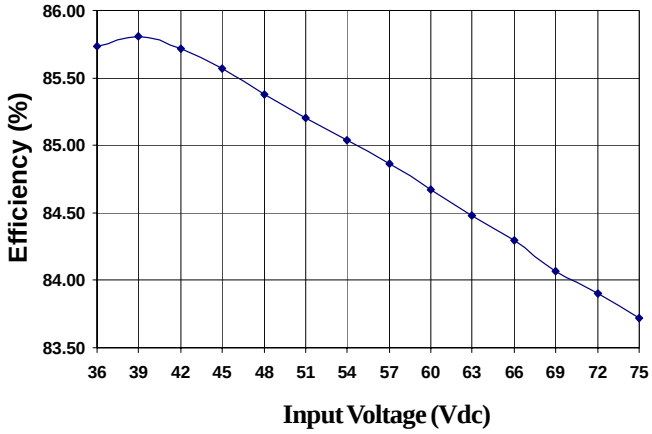
Efficiency vs. Output Current

@ T_A = +25°C; Vin = 48Vdc

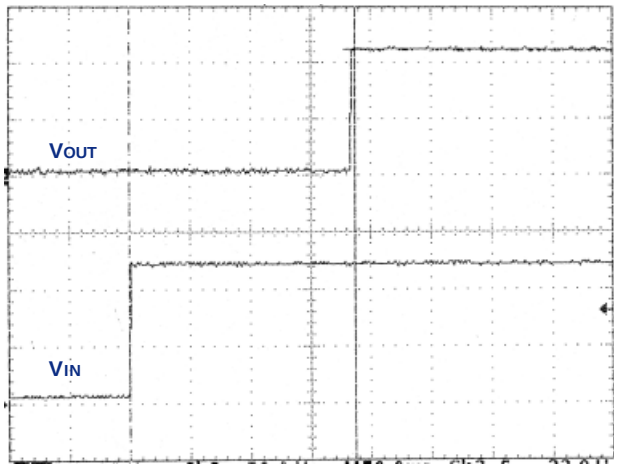


Efficiency vs. Input Voltage

@ T_A = +25°C; I_O = 18A

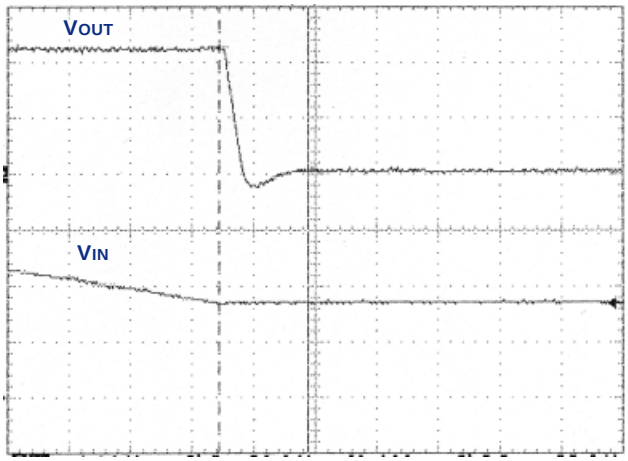


Turn On Time (VIN to VOUT)



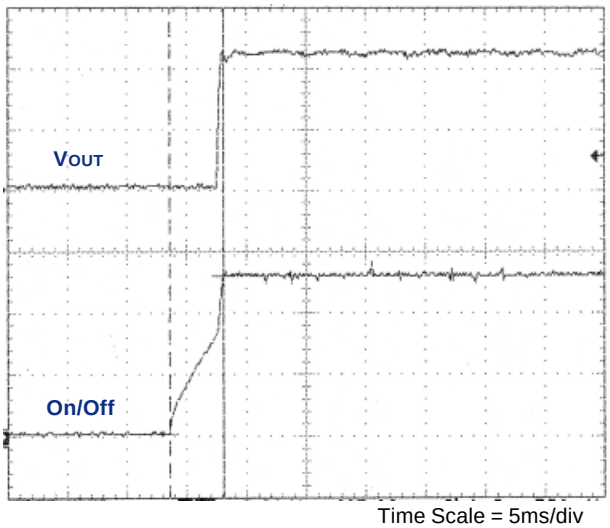
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



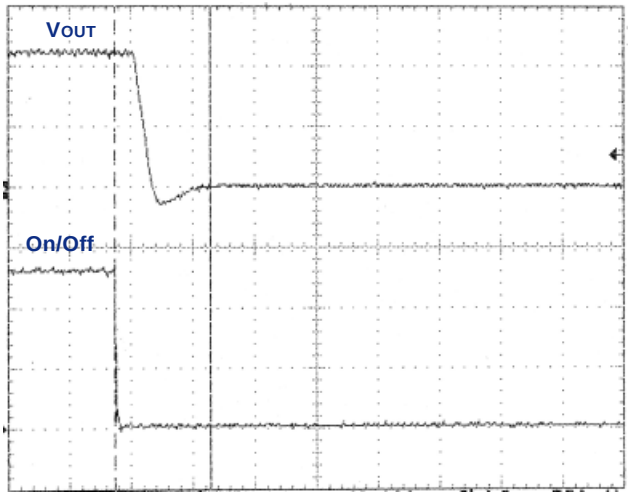
Time Scale = 100µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 5ms/div

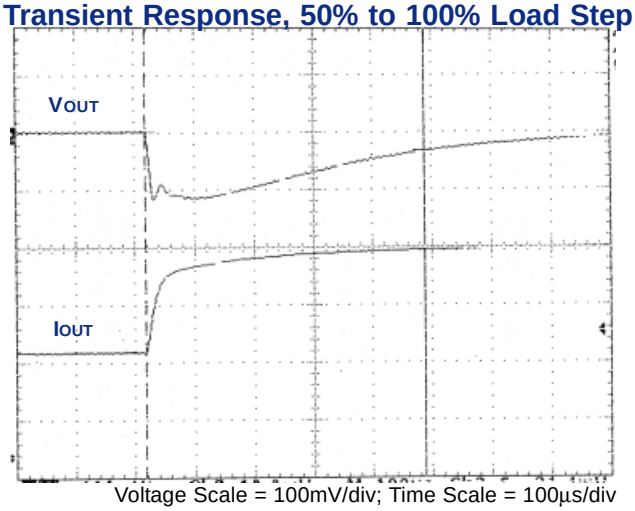
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

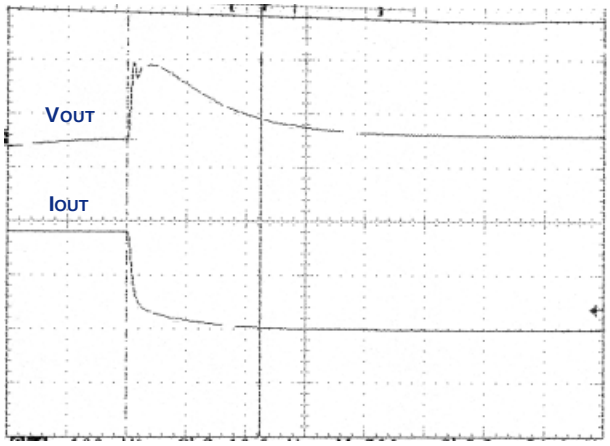
MODEL WPA50R48022

Transient Response, 50% to 100% Load Step



Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 100mV/div; Time Scale = 200µs/div
di/dt = 0.2A/µs

Trim Up Table

Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
2.2000	0.0	-
2.2110	0.5	915.0
2.2220	1.0	696.5
2.2330	1.5	325.5
2.2440	2.0	205.5
2.2550	2.5	149.0
2.2660	3.0	113.0
2.2770	3.5	88.0
2.2880	4.0	71.0
2.2990	4.5	56.5
2.3100	5.0	46.5
2.3210	5.5	38.0
2.3320	6.0	31.0
2.3430	6.5	25.0
2.3540	7.0	20.5
2.3650	7.5	16.0
2.3760	8.0	12.5

Trim Down Table

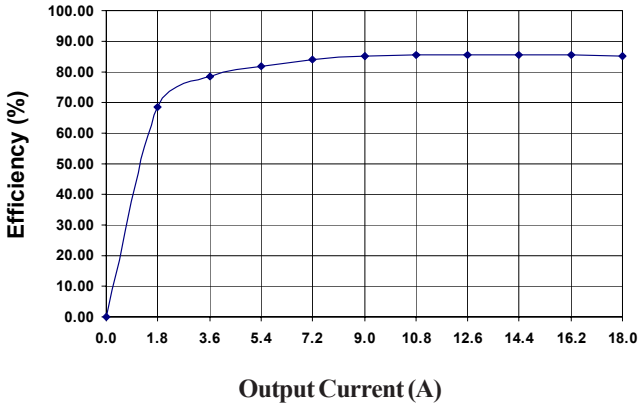
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
2.2000	0.0	-
2.1890	0.5	645.5
2.1780	1.0	358.0
2.1670	1.5	238.0
2.1560	2.0	475.7
2.1450	2.5	134.2
2.1340	3.0	106.7
2.1230	3.5	84.8
2.1120	4.0	69.5
2.1010	4.5	57.2
2.0900	5.0	46.8

PERFORMANCE CURVES: MODEL WPA50R48018 (CONTINUED)

MODEL WPA50R48018

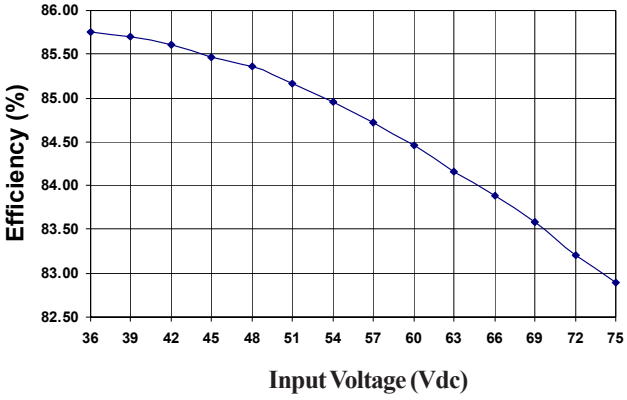
Efficiency vs. Output Current

@ T_A = +25°C; Vin = 48Vdc

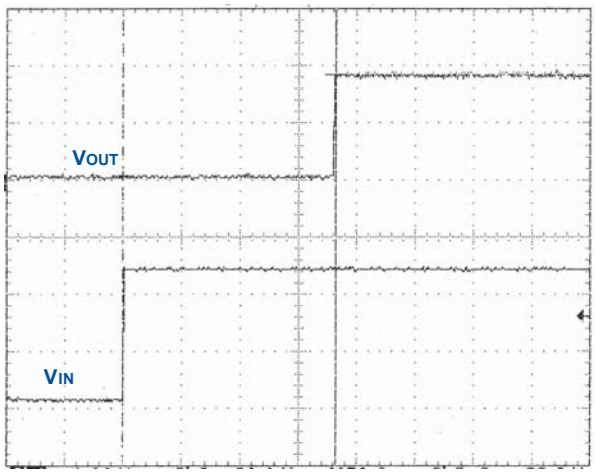


Efficiency vs. Input Voltage

@ T_A = +25°C; I_O = 18A

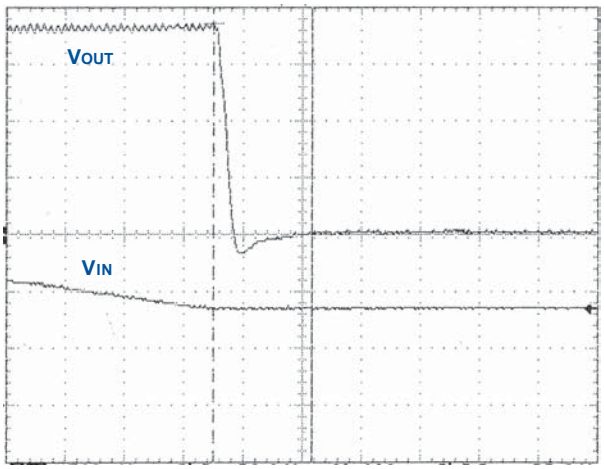


Turn On Time (VIN to VOUT)



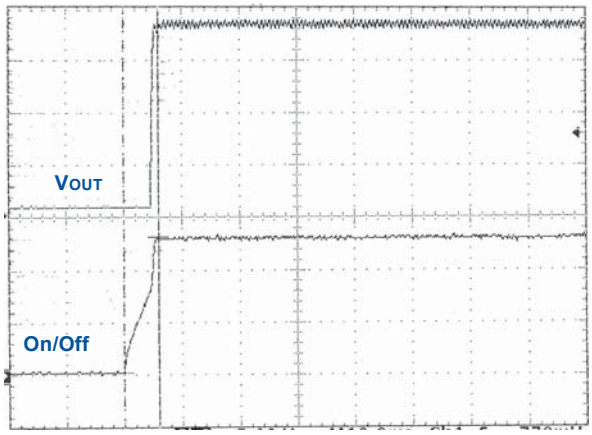
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



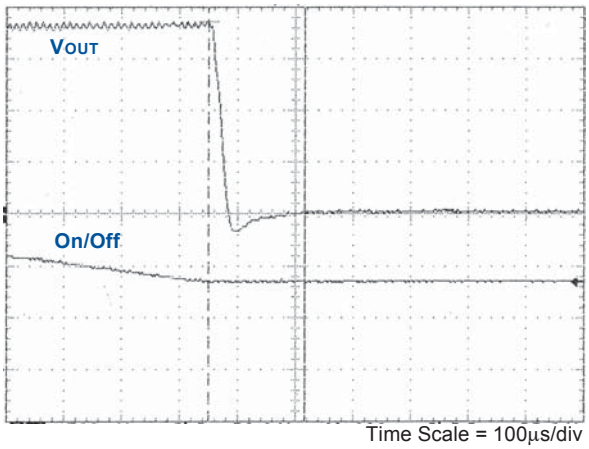
Time Scale = 100µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 10ms/div

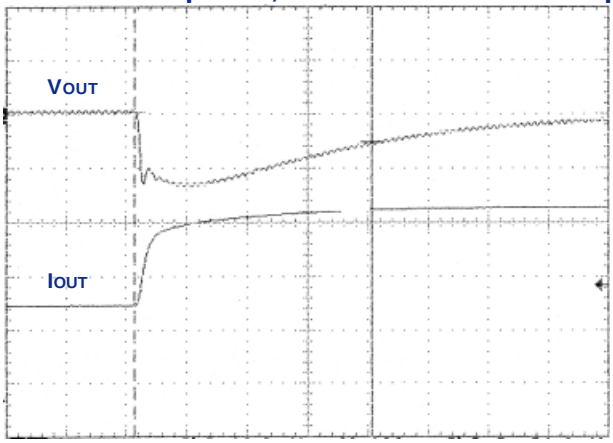
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

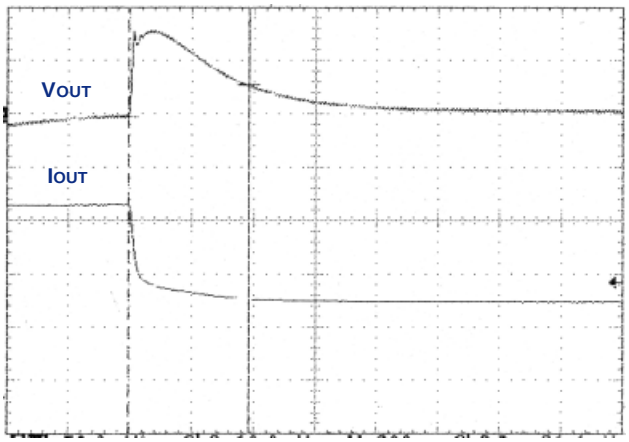
MODEL WPA50R48018

Transient Response, 50% to 100% Load Step



Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 100mV/div; Time Scale = 200µs/div
di/dt = 0.2A/µs

Trim Up Table

Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
1.8000	0.0	-
1.8090	0.5	435.5
1.8180	1.0	215.0
1.8270	1.5	137.0
1.8360	2.0	95.5
1.8450	2.5	71.0
1.8540	3.0	55.5
1.8630	3.5	44.0
1.8720	4.0	36.0
1.8810	4.5	29.5
1.8900	5.0	24.0
1.8990	5.5	20.0
1.9080	6.0	16.0
1.9170	6.5	13.0
1.9260	7.0	10.5
1.9350	7.5	8.5
1.9440	8.0	6.0

Trim Down Table

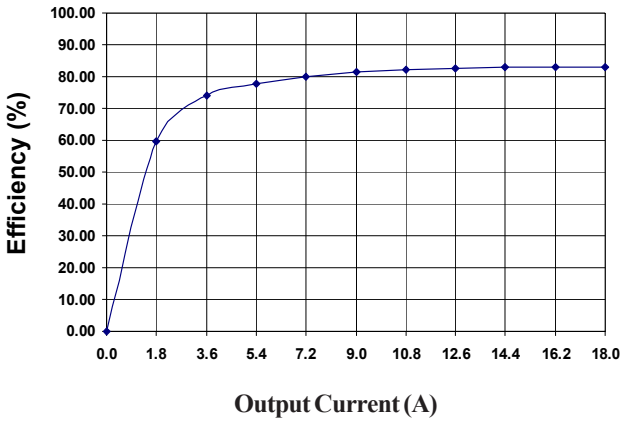
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
1.8000	0.0	-
1.7910	0.5	939
1.7820	1.0	459
1.7730	1.5	299
1.7640	2.0	217
1.7550	2.5	169
1.7460	3.0	138
1.7370	3.5	112
1.7280	4.0	95
1.7190	4.5	82
1.7100	5.0	72

PERFORMANCE CURVES: MODEL WPA50R48015

MODEL WPA50R48015

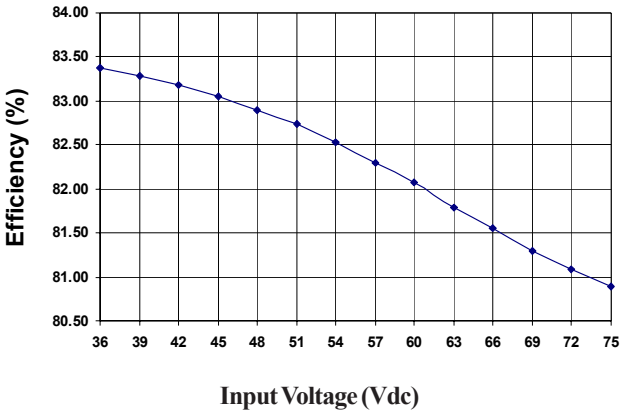
Efficiency vs. Output Current

@ T_A = +25°C; Vin = 48Vdc

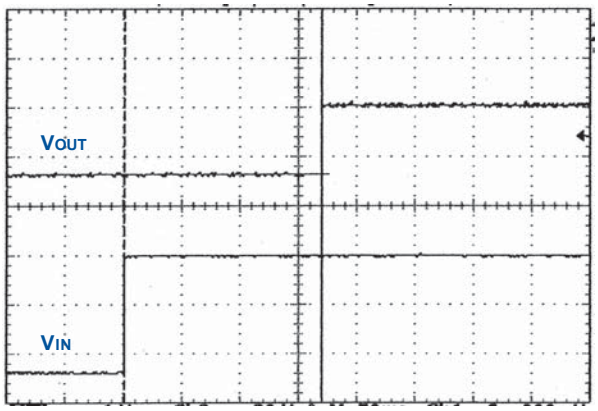


Efficiency vs. Input Voltage

@ T_A = +25°C; I_O = 18A

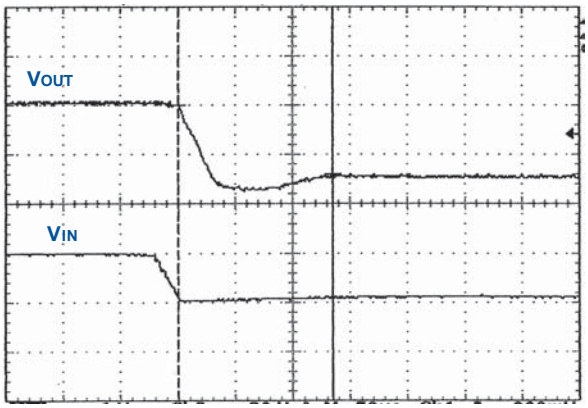


Turn On Time (VIN to VOUT)



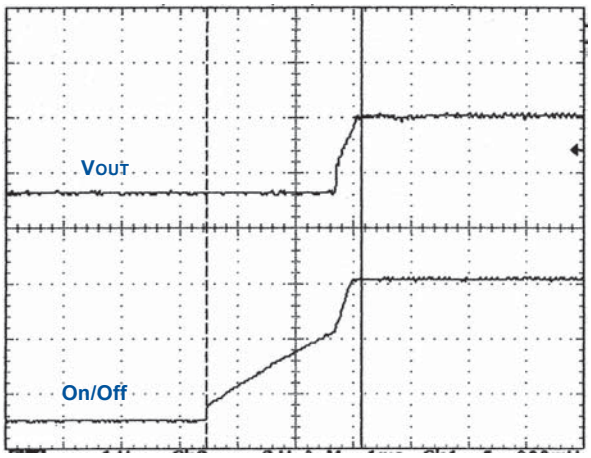
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



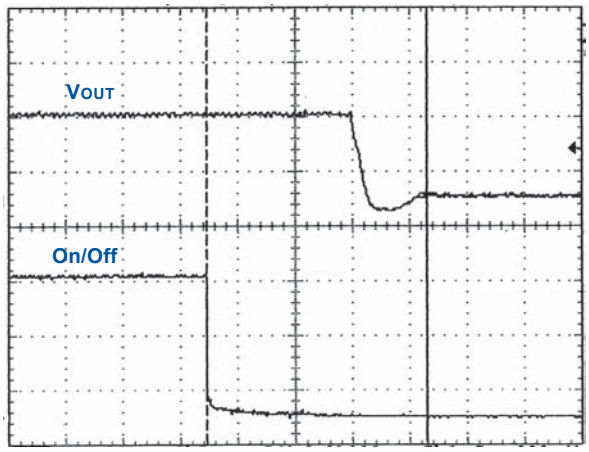
Time Scale = 50µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 1ms/div

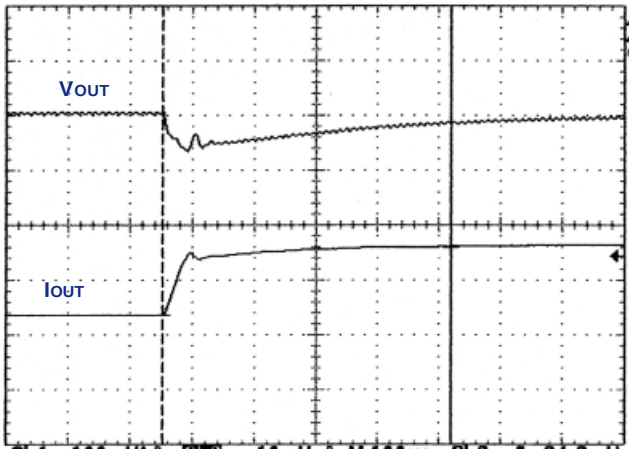
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

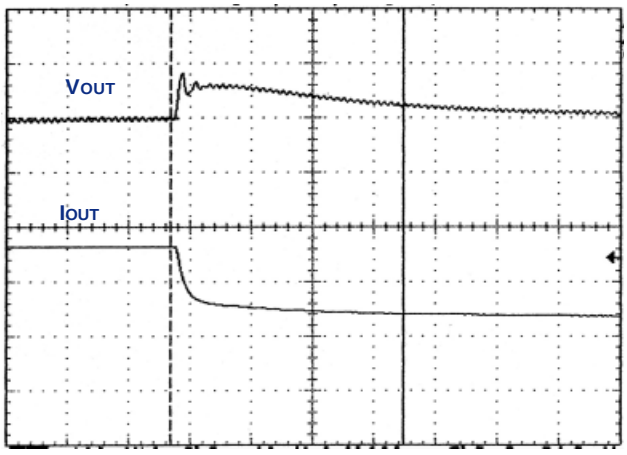
MODEL WPA50R48015

Transient Response, 50% to 100% Load Step



Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Trim Up Table

Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
1.5000	0.0	-
1.5075	0.5	620.0
1.5150	1.0	381.0
1.5225	1.5	158.0
1.5300	2.0	82.5
1.5375	2.5	56.5
1.5450	3.0	41.0
1.5525	3.5	30.5
1.5600	4.0	23.5
1.5675	4.5	18.5
1.5750	5.0	14.5
1.5825	5.5	11.5
1.5900	6.0	9.0
1.5975	6.5	6.5
1.6050	7.0	5.5
1.6125	7.5	4.0
1.6200	8.0	3.0

Trim Down Table

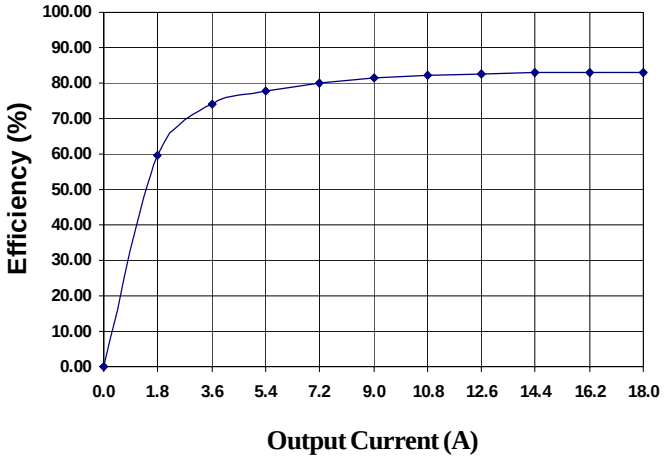
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
1.5000	0.0	-
1.4925	0.5	389.5
1.4850	1.0	271.0
1.4775	1.5	208.5
1.4700	2.0	166.5
1.4625	2.5	138.5
1.4550	3.0	117.0
1.4475	3.5	100.5
1.4400	4.0	88.0
1.4325	4.5	78.5
1.4250	5.0	69.5

PERFORMANCE CURVES: MODEL WPA50R48012

MODEL WPA50R48012

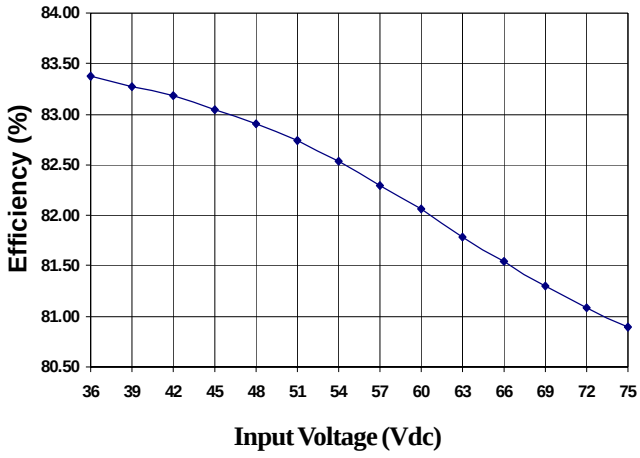
Efficiency vs. Output Current

@ T_A = +25°C; Vin = 48Vdc

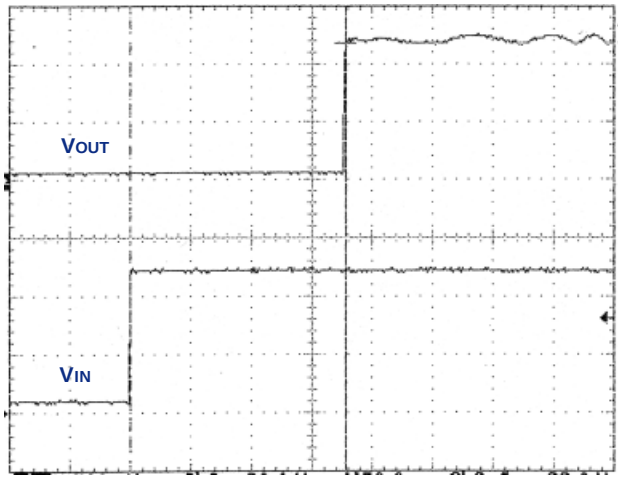


Efficiency vs. Input Voltage

@ T_A = +25°C; I_O = 18A

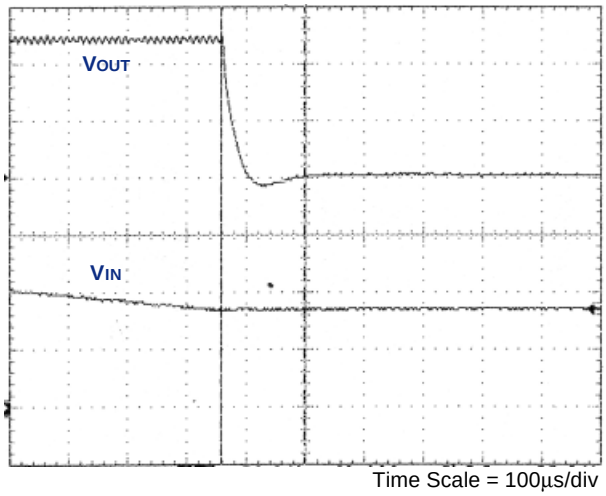


Turn On Time (VIN to VOUT)



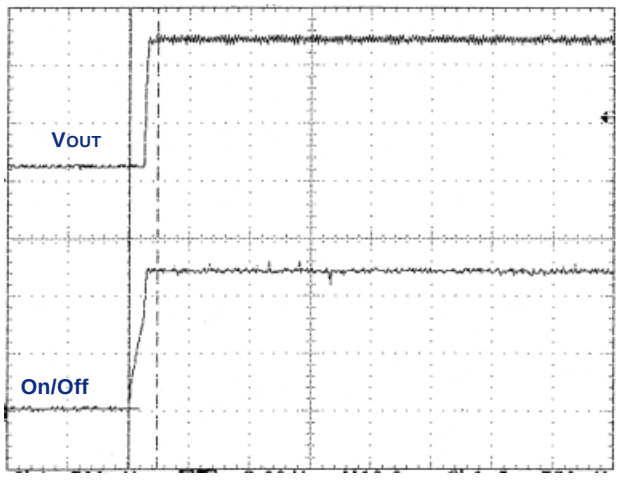
Time Scale = 50ms/div

Turn Off Time (VIN to VOUT)



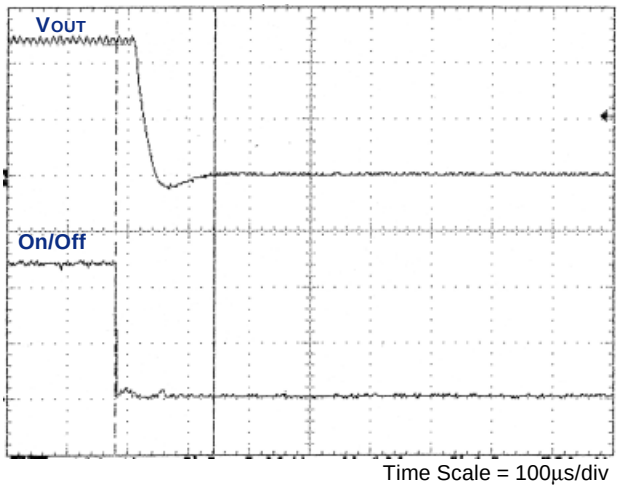
Time Scale = 100µs/div

Primary On Time (Primary Remote to VOUT)



Time Scale = 10ms/div

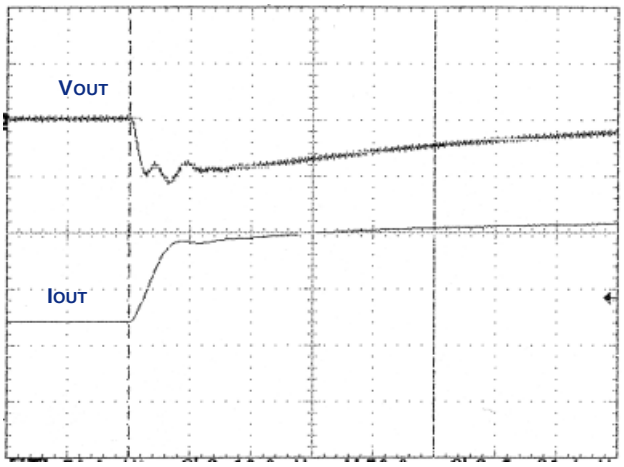
Primary Off Time (Primary Remote to VOUT)



Time Scale = 100µs/div

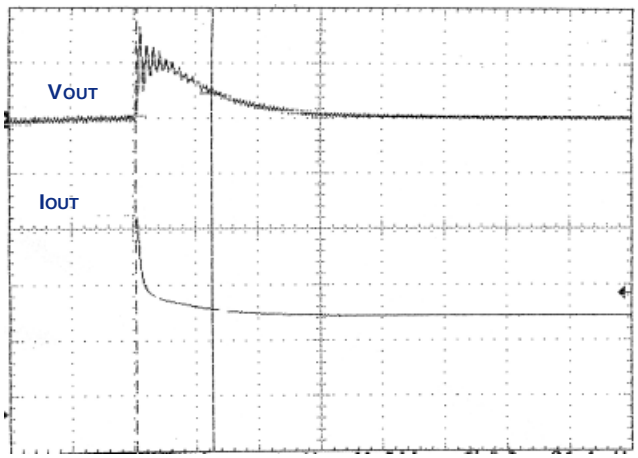
MODEL WPA50R48012

Transient Response, 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 50µs/div
di/dt = 0.2A/µs

Transient Response, 100% to 50% Load Step



Voltage Scale = 50mV/div; Time Scale = 200µs/div
di/dt = 0.2A/µs

Trim Up Table

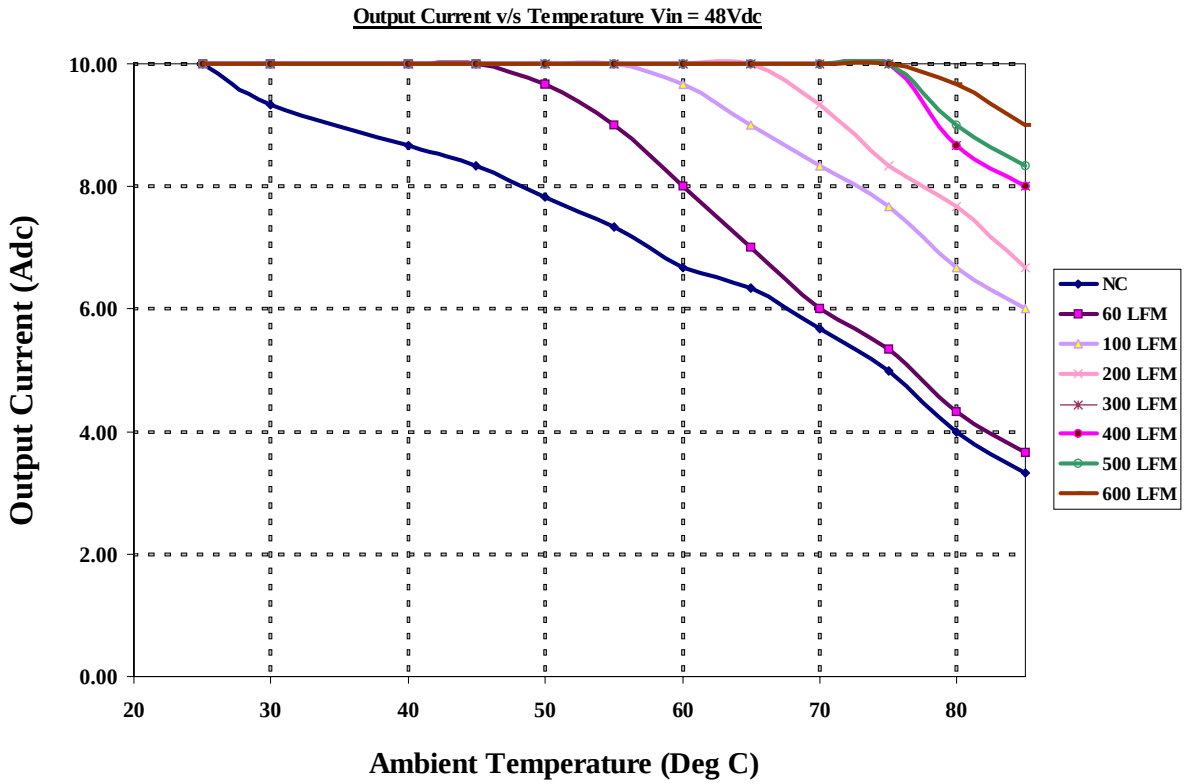
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
1.200	0.0	-
1.206	0.5	159.0
1.212	1.0	98.0
1.218	1.5	68.5
1.224	2.0	51.0
1.230	2.5	40.5
1.236	3.0	32.0
1.242	3.5	26.0
1.248	4.0	21.0
1.254	4.5	17.5
1.260	5.0	14.5
1.266	5.5	11.5
1.272	6.0	9.5
1.278	6.5	7.5
1.284	7.0	6.0
1.290	7.5	4.5
1.296	8.0	3.5

Trim Down Table

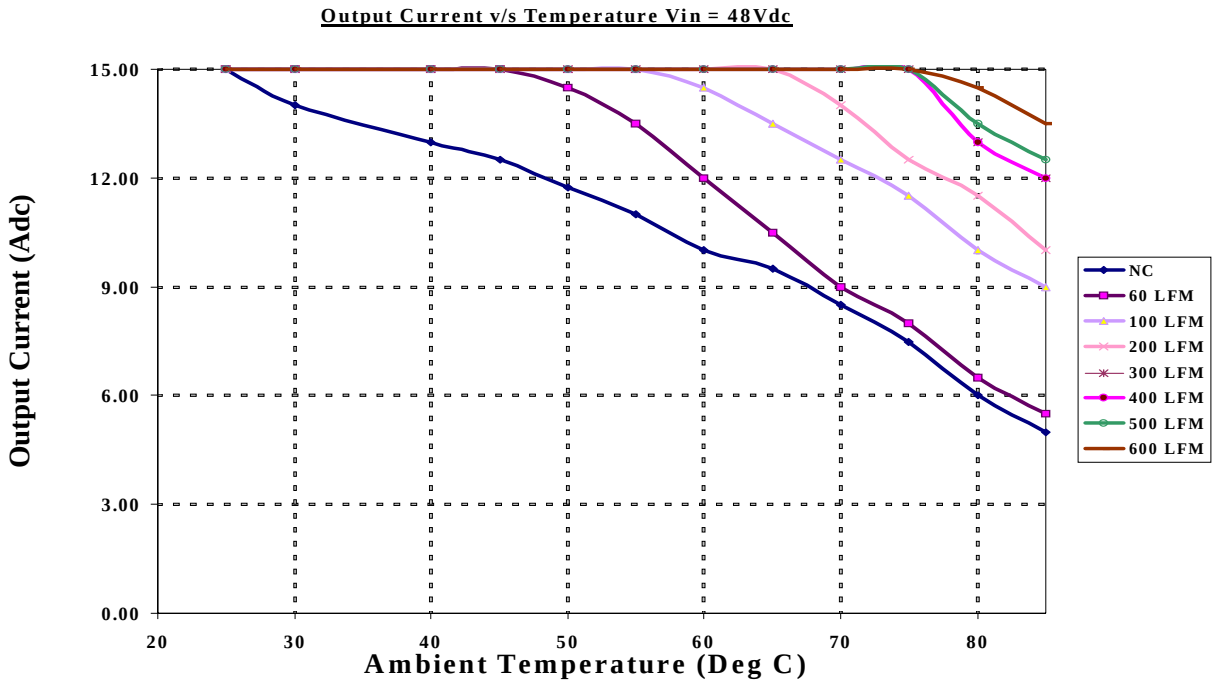
Vout (Vdc)	% Vnom	Trim Resistance (kOhm)
1.200	0.0	-
1.194	0.5	1839.5
1.188	1.0	651.0
1.182	1.5	300.5
1.176	2.0	194.0
1.170	2.5	142.0
1.164	3.0	108.5
1.158	3.5	87.0
1.152	4.0	72.0
1.146	4.5	60.0
1.140	5.0	51.0

THERMAL DERATING CURVES

Thermal Derating (WPA50R48S050)



Thermal Derating (WPA50R48S033)



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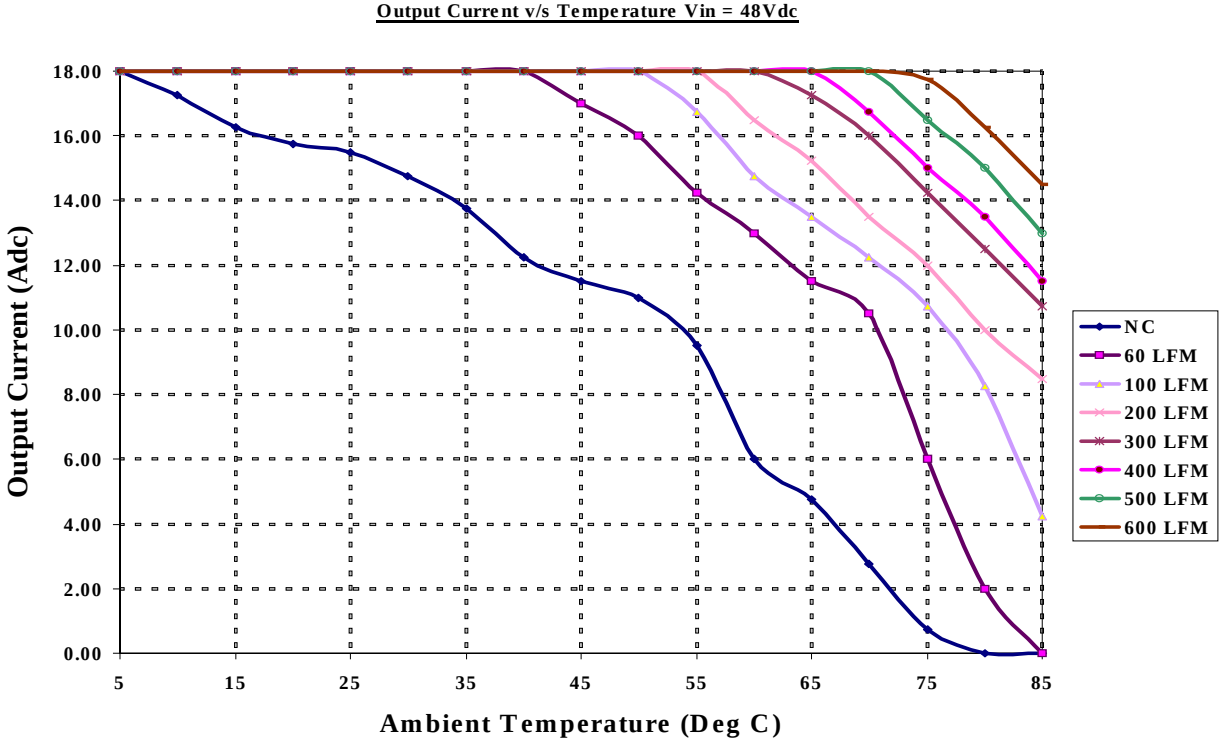
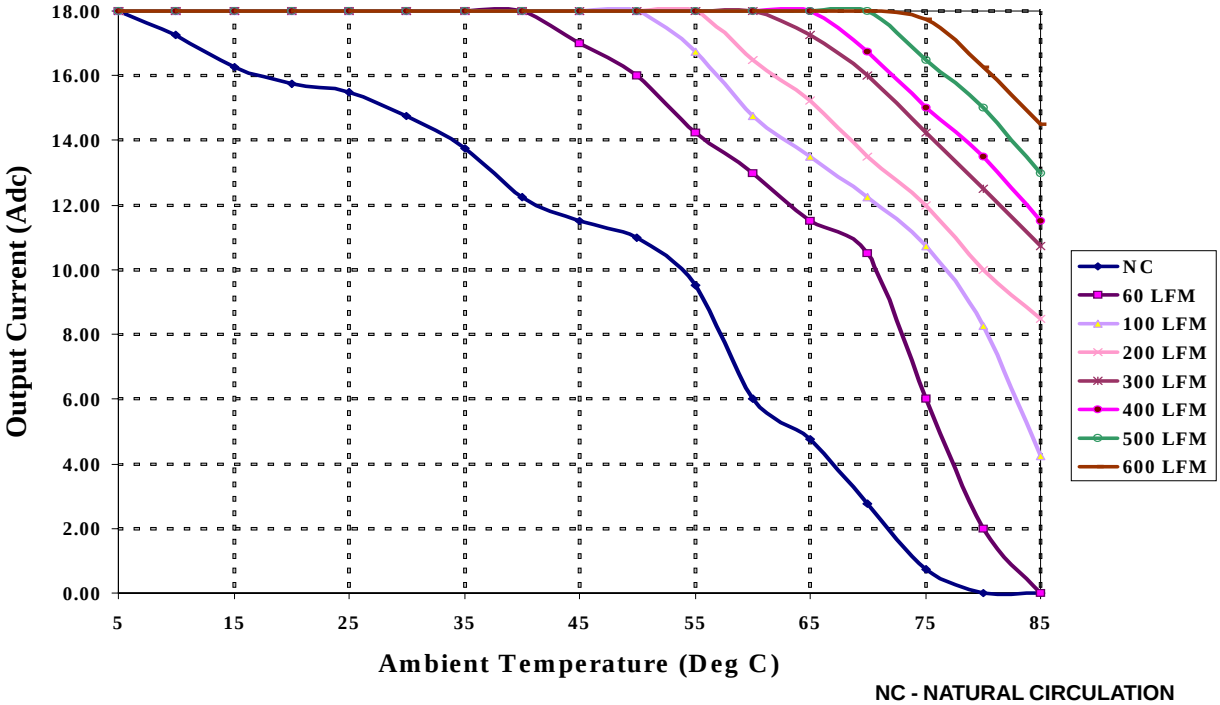
THERMAL DERATING CURVES

Thermal Derating (WPA50R48S025)



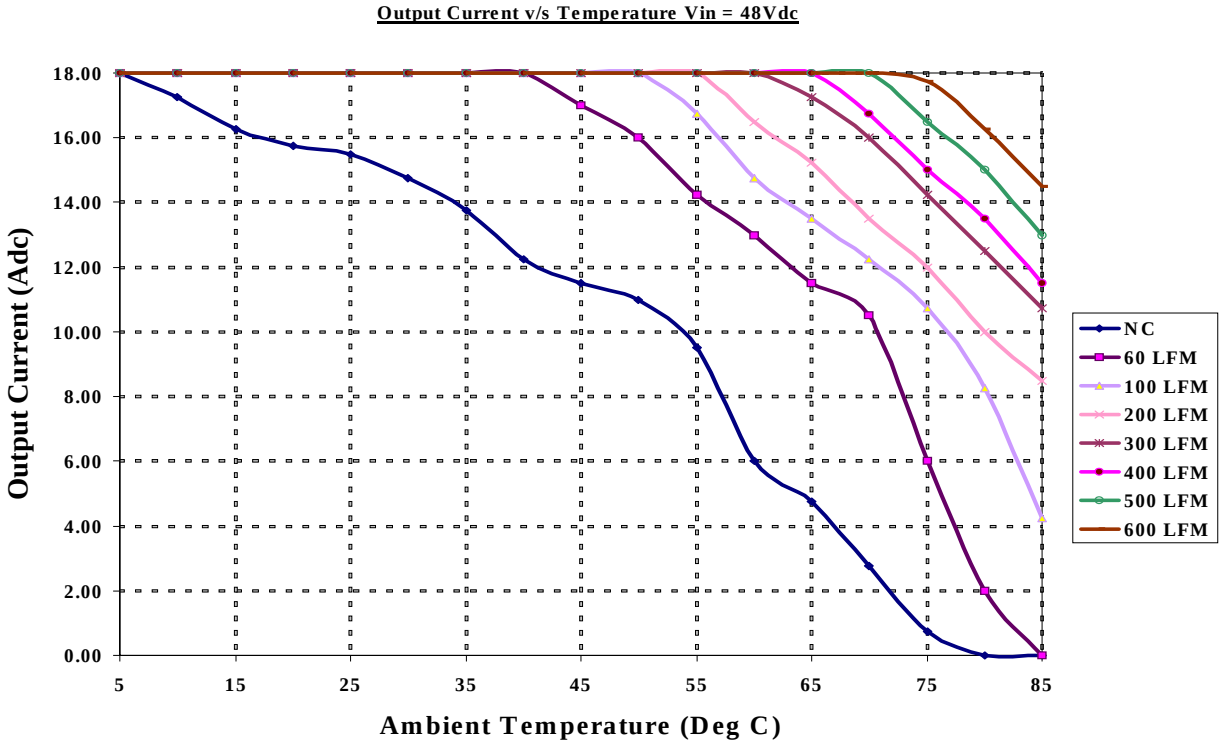
Thermal Derating (WPA50R48S022)



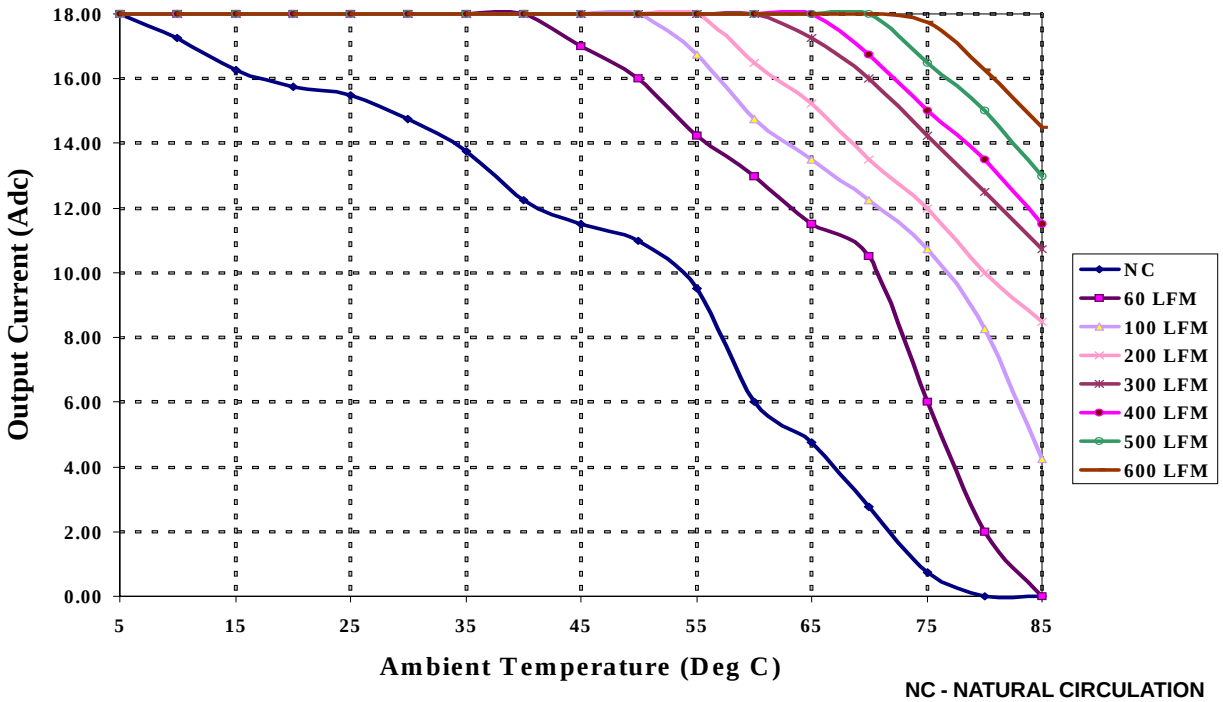
NC - NATURAL CIRCULATION

THERMAL DERATING CURVES

Thermal Derating (WPA50R48S018)



Thermal Derating (WPA50R48S015)



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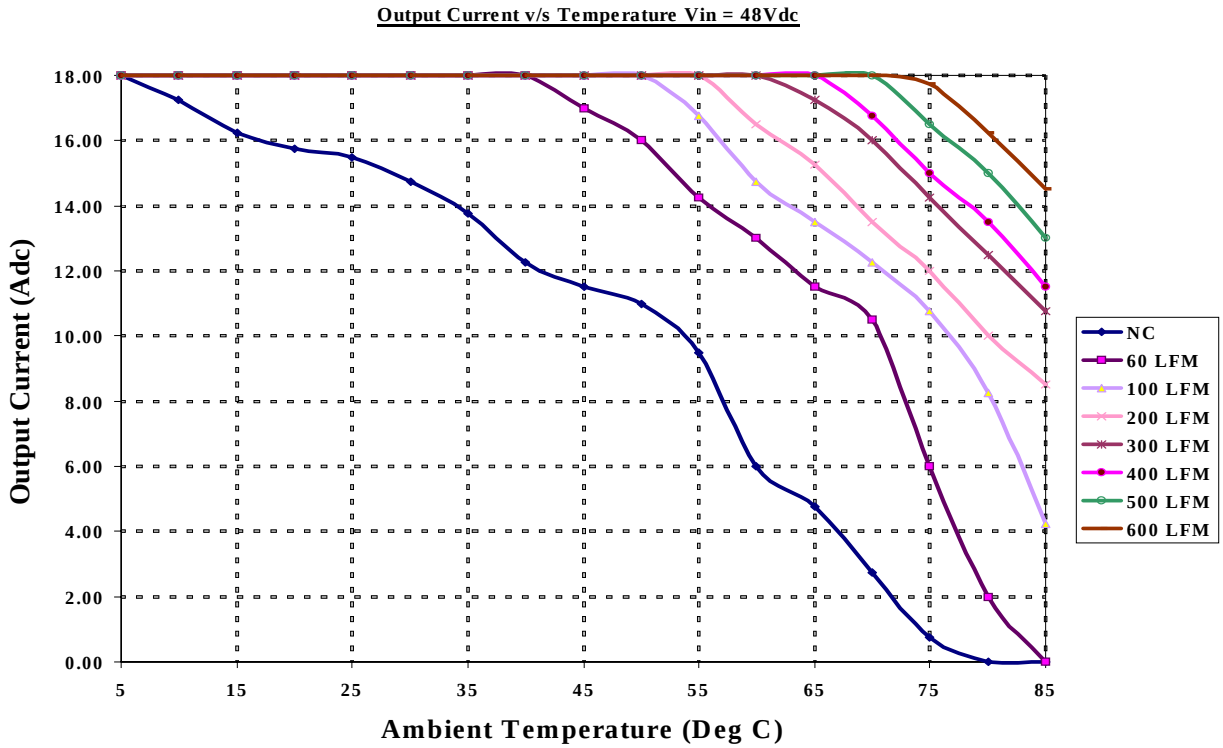
Thermal Derating (WPA50R48S012)



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