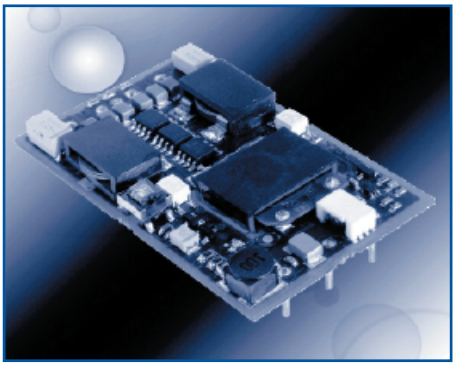
WPA60 Series

60 Watt Dual Output Quarter Brick DC/DC Converter



- 2.3" x 1.45" x 0.40" (58.42mm x 36.83mm x 10.16mm)
- Dual Outputs - Output 1/Output 2 Vdc: 1.5/1.0; 1.8/1.2; 2.2/1.5; 2.5/1.8; 3.3/1.2; 3.3/1.8; 3.3/2.5; 5.0/1.5; 5.0/3.3
- Through Hole and SMT Models
- Independently Regulated Outputs
- 36V - 75V Input Range
- Industry Standard Pinouts
- Input & Output Filtering
- Remote On/Off Function
- Meets Basic Insulation Requirements of EN60950
- UL/CUL 60950, VDE EN60950 Approved
- Fixed Frequency Operation
- No Minimum Load Requirements
- Output Short Circuit Protection
- Self-resetting Over Voltage Protection
- C&D Technologies, Power Electronics Division is ISO9001:2000 Certified

The WPA60 Series are high performance DC/DC converters providing two independent regulated outputs. For maximum flexibility, power can be traded between outputs as required. The unit delivers high performance across all line and load conditions.

The WPA60 Series are assembled by a fully automated process using surface mount components for increased reliability.

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.

Other features include:

- Full Regulation Down to Zero Load
- Undervoltage Lock-Out
- Auto-Start
- Internal Temperature Shutdown
- Auto-Reset
- Soft Start
- Remote On/Off (Available in Positive or Negative Logic)
- Short Circuit Protection
- Overvoltage Protection
- Output Voltage Adjust on Both Outputs

PRODUCT SELECTION CHART [1]

MODEL	NOMINAL INPUT VOLTAGE (VDC)	OUTPUT #1	OUTPUT #2	OUTPUT CURRENT MIN LOAD(A)	OUTPUT CURRENT MAX LOAD (A)	TYPICAL EFFICIENCY (%)
WPA60R48D1510*	48	1.5	1.0	0.0	12.0[2]	82
WPA60R48D1812*	48	1.8	1.2	0.0	12.0	82
WPA60R48D2215*	48	2.2	1.5	0.0	12.0	86
WPA60R48D2518*	48	2.5	1.8	0.0	12.0	86
WPA60R48D3312*	48	3.3	1.2	0.0	12.0	89
WPA60R48D3318*	48	3.3	1.8	0.0	12.0	89
WPA60R48D3325*	48	3.3	2.5	0.0	12.0	89
WPA60R48D0515*	48	5.0	1.5	0.0	12.0	89
WPA60R48D0533*	48	5.0	3.3	0.0	12.0	90

Input current at nominal input line = 1.45A (Output Power = 60W)
*Models available with -1 option (positive logic)
[1]Total output power not to exceed 60 Watts
[2]When the input voltage is less than 42 VDC the maximum allowable current on each output of the WPA60R48D1510 is 6A.

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				675	mApk-pk
	INPUT CONTROL					
	Temperature Shutdown	PCB		120		°C
	Temperature Hysteresis			5		°C
	Quiescent Standby Current	Vin = 48VDC		8	10	mA
	Undervoltage Lockout			32.5		V
	Undervoltage Shutdown			2		V

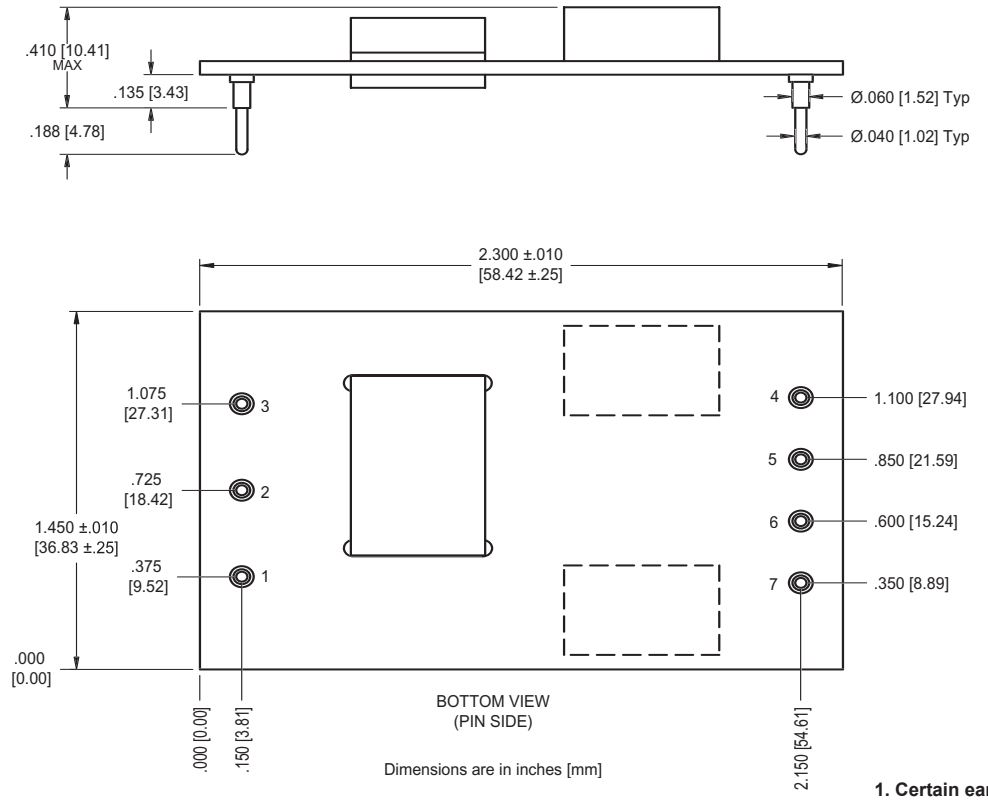
SPECIFICATIONS

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
GENERAL	**ISOLATION**					
	Rated Voltage		2000			VDC
	Resistance			10		MΩ
	Capacitance			1000		pF
	Leakage Current	240 VAC		90		µArms
	OUTPUT					
	Rated Power				60	W
	Voltage Setpoint Accuracy				±1.5	%
	Temperature Coefficient			±0.005		%/°C
	Output Voltage					
	(Over all conditions of I/P voltage	V1			2	% of Nom
	load & temperature)	V2			8	% of Nom
	Ripple & Noise (Note 1)	BW = 5Hz to 20MHz			90	mVp-p
	Output Adjust Range					
	Trim Up				8	%
	Trim Down				5	%
	Max Capacitive Load				10,000	µF
	Overvoltage Protection			15		%
	GENERAL					
	Switching Frequency			350		KHz
	MTTF per ML-HDBK-217	Circuit Stress Method				
	Ground Benign	TA = +25° Unmodified Database		1,000,000		Hr
	Package Weight			30		g
	TEMPERATURE					
	Operation/Specification	PCB Temperature	-40		+100	°C
	Storage	PCBTemperature	-55		+125	°C
	Shutdown Temperature	PCB Temperature		+120		°C

NOTE 1: Measured at 20 MHz bandwidth across a 6µf multi layer ceramic capacitor located approximately 1" from output terminals.

MECHANICAL (THROUGH HOLE)



PIN FUNCTIONS	
1	+Vin
2	Remote On/Off
3	-Vin
4	+Vout2
5	Return
6	Trim
7	+Vout1

NOTES:

Pin placement tolerance: ±.010

Pin material: Copper [1]

Pin Finish: Matte Tin over Nickel [1]

Converter weight: [24g]

1. Certain early production units may use Brass pins with a Tin/Lead over Nickel Finish

ORDERING INFORMATION (THROUGH HOLE)

To Find Model Number

WPA60R48D yz -

Device Family
- 60 Watt, Dual Output, Quarter Brick, 48VDC Input Range

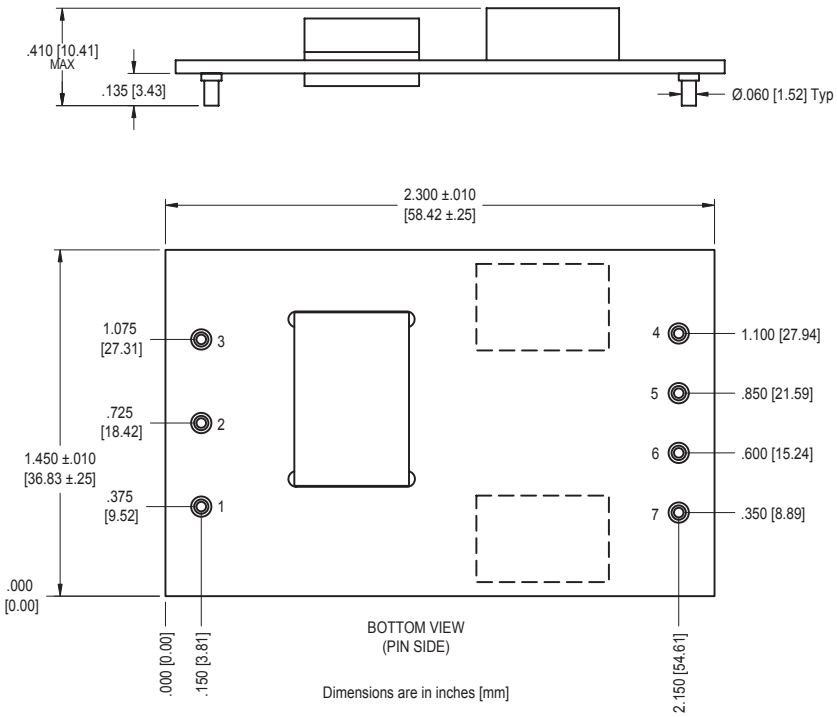
Model Number
- Selected from Product Selection Chart (above)
  - y = 15 = 1.5V, 18 = 1.8V, 22 = 2.2V, 25 = 2.5V, 33 = 3.3V, 05 - 5.0V,
  - z = 10 = 1.0V, 12 = 1.2V, 15 = 1.5V, 18 - 1.8V 25 = 2.5V, 33 = 3.3V

Remote On/Off Logic and Pin Configuration
- No Number = Positive Logic, Through Hole
- 1 = Negative Logic, Through Hole

Model Numbers	Part Numbers
WPA60R48D1510	6064965
WPA60R48D1812	6064957
WPA60R48D2215	6064956
WPA60R48D2518	6064955
WPA60R48D3312	6064953
WPA60R48D3318	6064952
WPA60R48D3325	6064951
WPA60R48D0515	6064966
WPA60R48D0533	6064954
WPA60R48D1510-1	6064993
WPA60R48D1812-1	6064992
WPA60R48D2215-1	6064991
WPA60R48D2518-1	6064990
WPA60R48D3312-1	6064989
WPA60R48D3318-1	6064988
WPA60R48D3325-1	6064987
WPA60R48D0515-1	6064994
WPA60R48D0533-1	6064986

MECHANICAL (SMT)

WPA60



PIN FUNCTIONS	
1	+Vin
2	Remote On/Off
3	-Vin
4	+Vout2
5	Return
6	Trim
7	+Vout1

PIN FUNCTIONS

1. +Vin
2. Remote ON/OFF
3. -Vin
4. +Vout2
5. Return
6. Trim
7. +Vout1

NOTES:

Pin placement tolerance: +.010

Pin material: Copper

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

Converter weight: [24g]

* Pin Co-Planarity within 0.004”

ORDERING INFORMATION (SMT)

To Find Model Number

WPA60R48D **yz** **-**

Device Family
60 Watt, Dual Output,
Quarter Brick, 48VDC Input Range

Model Number
Selected from Product Selection Chart (above)
y = 15 = 1.5V, 18 = 1.8V, 22 = 2.2V, 25 = 2.5V,
33 = 3.3V, 05 - 5.0V,
z = 10 = 1.0V, 12 = 1.2V, 15 = 1.5V, 18 - 1.8V
25 = 2.5V, 33 = 3.3V

Remote On/Off Logic and Pin Configuration
2 = Positive Logic, SMT
3 = Negative Logic, SMT

Model Numbers	Part Numbers
WPA60R48D1510-2	WPA60R48D1510-2
WPA60R48D1812-2	WPA60R48D1812-2
WPA60R48D2215-2	WPA60R48D2215-2
WPA60R48D2518-2	WPA60R48D2518-2
WPA60R48D3312-2	WPA60R48D3312-2
WPA60R48D3318-2	WPA60R48D3318-2
WPA60R48D3325-2	WPA60R48D3325-2
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WPA60R48D1510-3	WPA60R48D1510-3
WPA60R48D1812-3	WPA60R48D1812-3
WPA60R48D2215-3	WPA60R48D2215-3
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WPA60R48D3318-3	WPA60R48D3318-3
WPA60R48D3325-3	WPA60R48D3325-3
WPA60R48D0515-3	WPA60R48D0515-3
WPA60R48D0533-3	WPA60R48D0533-3

Operation

Output Voltage Trim

Each of the WPA60's output voltages may be simultaneously adjusted above or below the nominal set point by a value as indicated on the Product Data Sheet. As shown in **Figure 1**, to raise the converter output voltage a resistor must be placed between the Trim pin and Return pin.

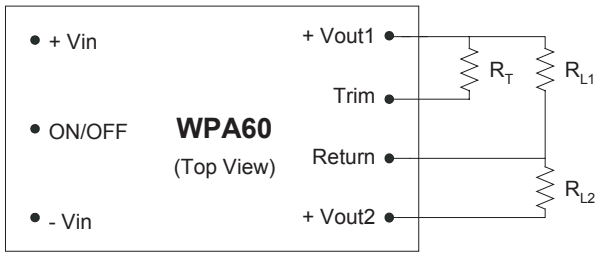


Figure 1 – Trim Up Circuit

To lower the converter output voltage a resistor must be placed between the Trim pin and Vout1 pin as shown in **Figure 2**.

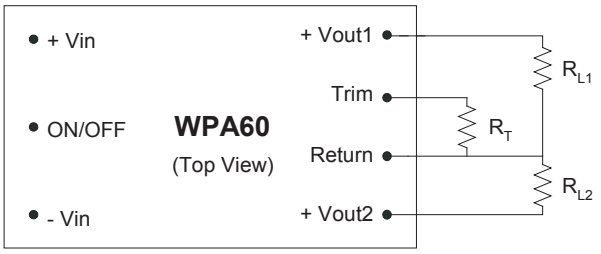


Figure 2 – Trim Down Circuit

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

Remote ON/OFF Function

The WPA60 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 open for normal operation.

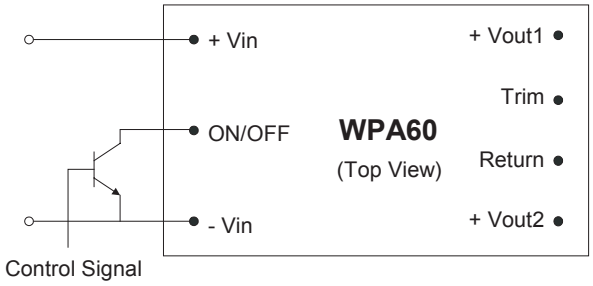


Figure 3 – Remote ON/OFF Control Circuit

Protective Functions

Temperature Shutdown

The over temperature shutdown feature of the WPA60 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 WPA60 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.

Output Short Circuit Protection

When a short circuit condition appears on the output the converter will go into hiccup mode. In hiccup mode the converter will cycle on and off repeatedly until the short circuit condition is cleared.

Safety

The WPA60 meets safety requirements per UL/ CUL 60950 and VDE to EN60950. Additionally, the converter meets CISPR22/ EN55022/ FCC15J Class B specs for EMI levels with external filtering.

Performance Characterization

Thermal Derating

Maximum ouput current vs. ambient temperature at various airflow rates has been determined for each model of the WPA60. From these graphs, the combination of maximum ambient temperature and minimum airflow for select output current combinations can be determined. Each model was analyzed for maximum allowable output power over an ambient temperature range of 0 to 85°C and for airflows up to 600LFM. In each case the maximum allowable power at a given airflow and ambient temperature is defined as the point at which a known component reaches its individual temperature limit.

Efficiency

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

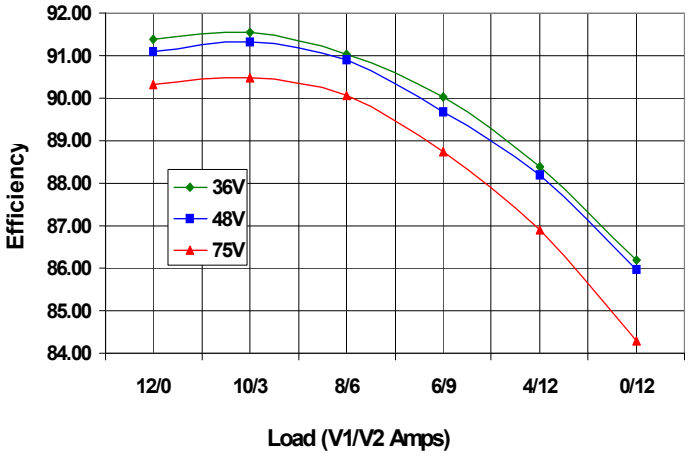
Start-Up, ON/OFF and Transient Response

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. Separate traces are provided showing the on/off timing sequence of the two outputs relative to one another. Output voltage transient responses are provided for step load changes of 50% - 100% of rated load current and 100% - 50% of rated load. Waveforms for each model are provided in their respective section.

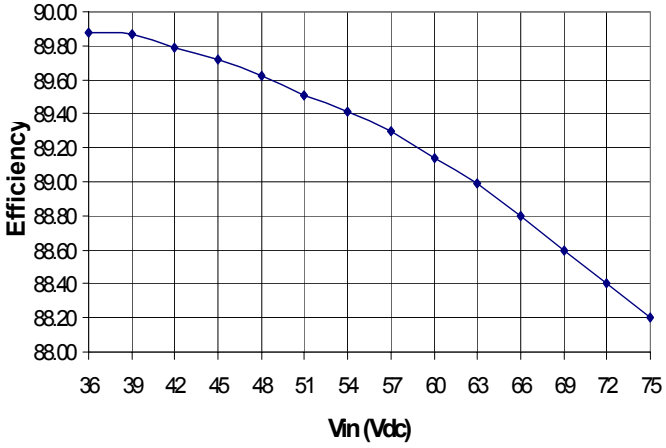
PERFORMANCE CURVES: WPA60R48D0533 and WPA60R48D0533-1

MODEL WPA60R48D0533

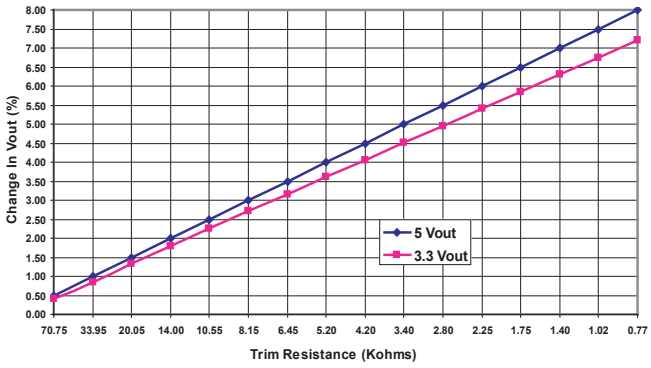
Efficiency vs. Output Current
@ T_A = +25°C



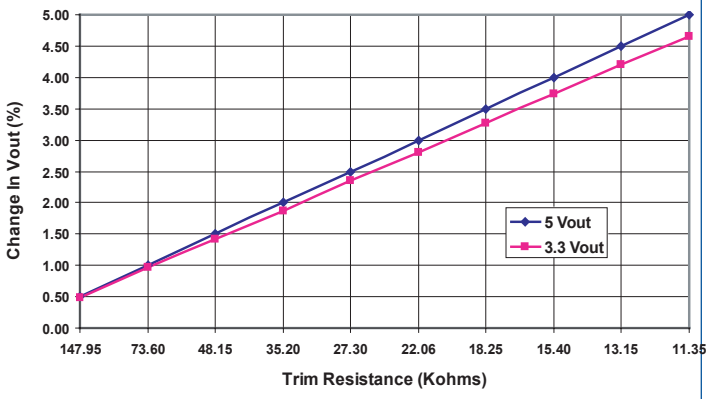
Efficiency vs. Input Voltage
@ T_A = +25°C



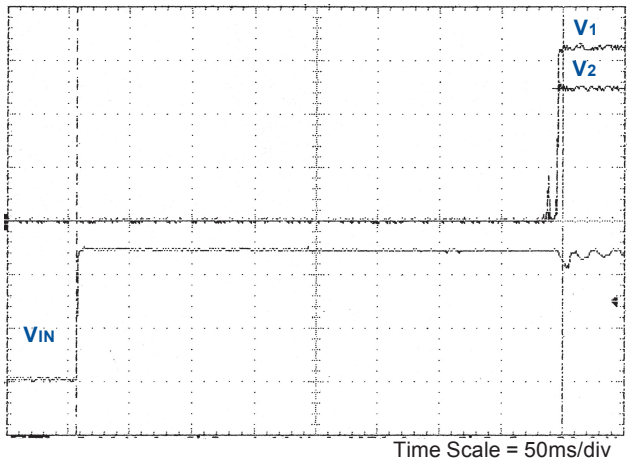
Trim Up Graph



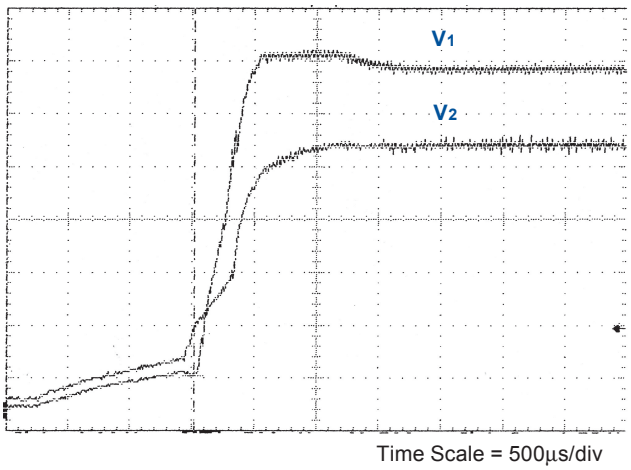
Trim Down Graph



Turn On Time (V_{IN} to V_{OUT})

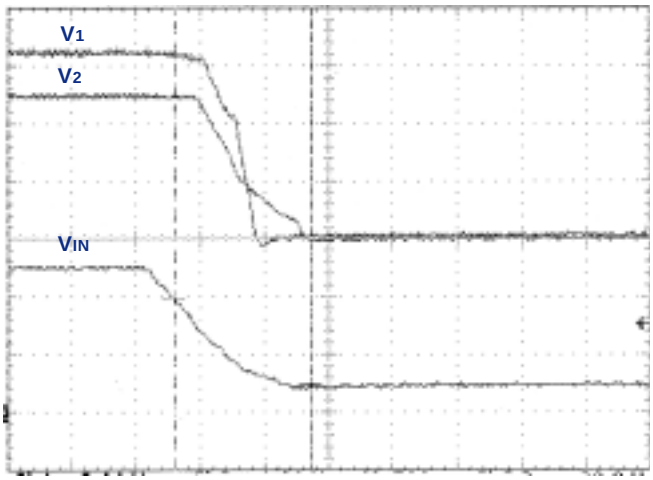


Rise Time (V_1 and V_2)



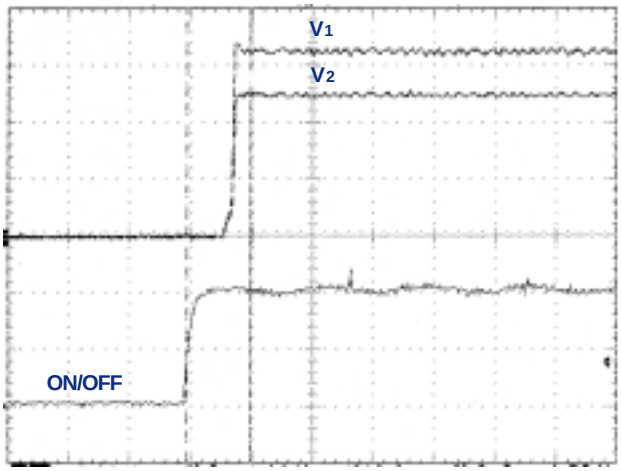
PERFORMANCE CURVES: WPA60R48D0533 and WPA60R48D0533-1

Turn Off Time (V_{IN} to V_{OUT})



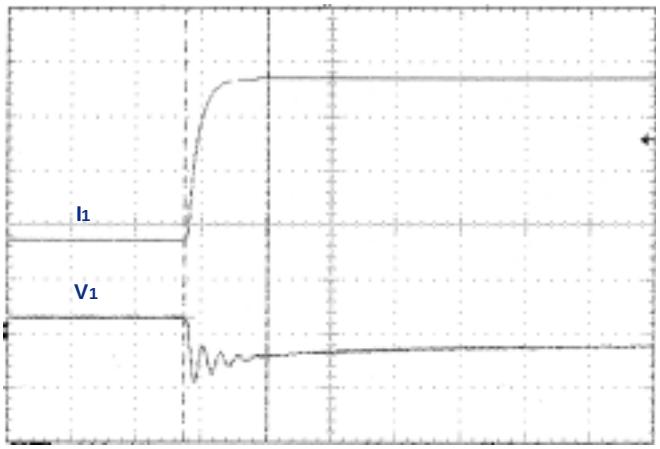
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



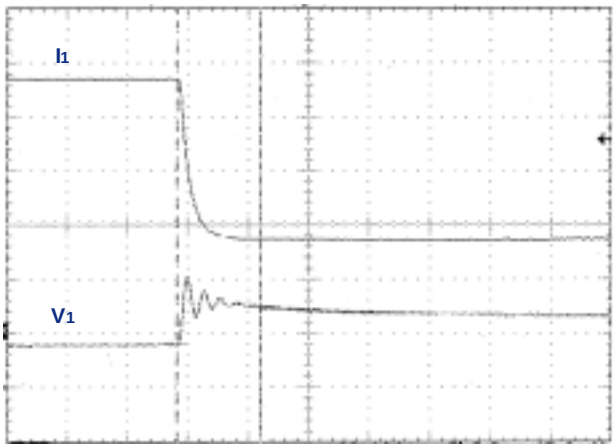
Time Scale = 10ms/div

CH1 (5.0Vdc) Transient Response 50% to 100% Load Step



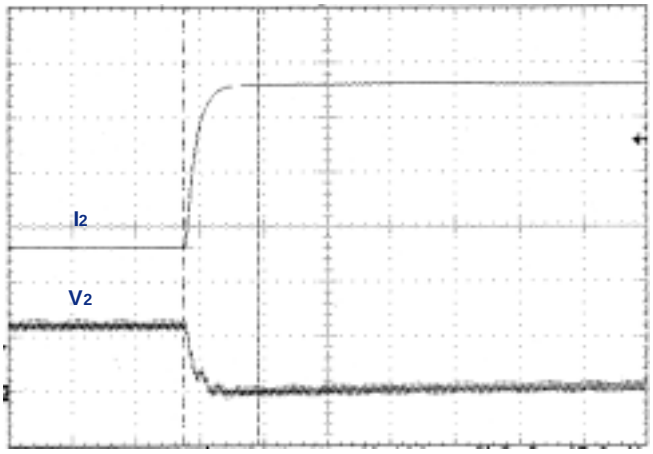
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (5.0Vdc) Transient Response 100% to 50% Load Step



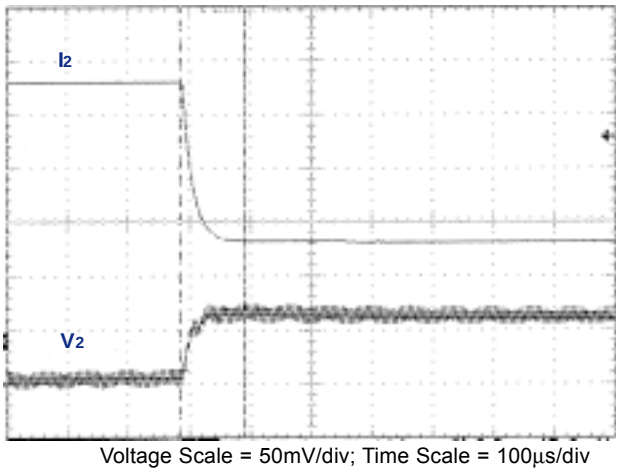
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (3.3Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (3.3Vdc) Transient Response 100% to 50% Load Step

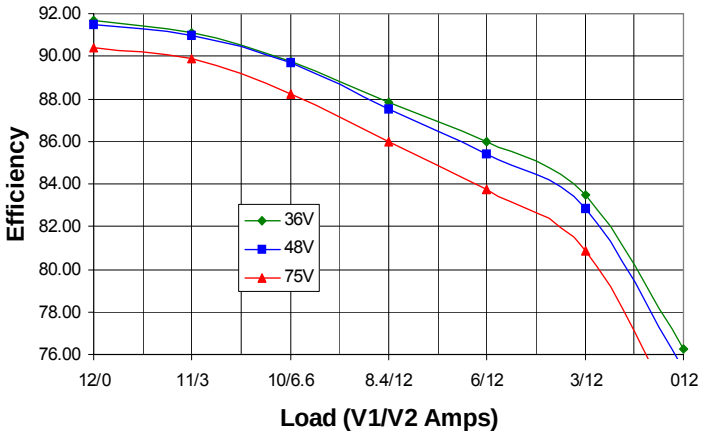


Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

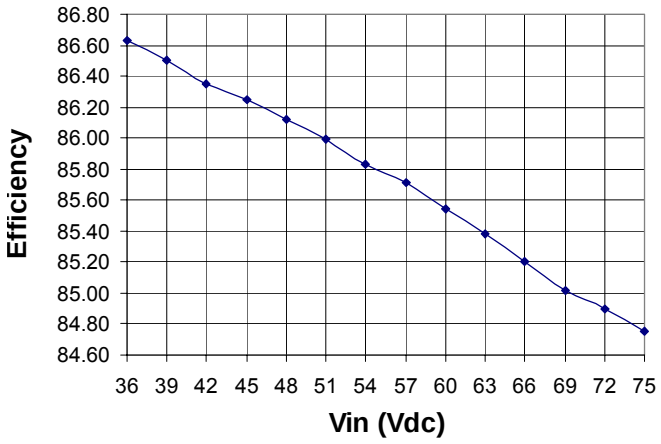
PERFORMANCE CURVES: WPA60R48D0515 and WPA60R48D0515-1

MODEL WPA60R48D0515

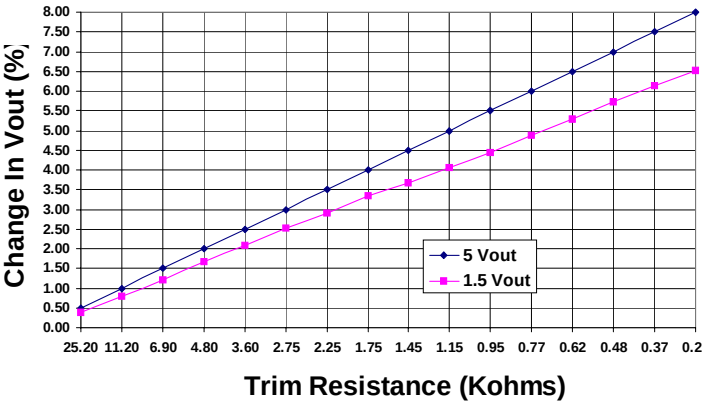
Efficiency vs. Output Current
@ T_A = +25°C



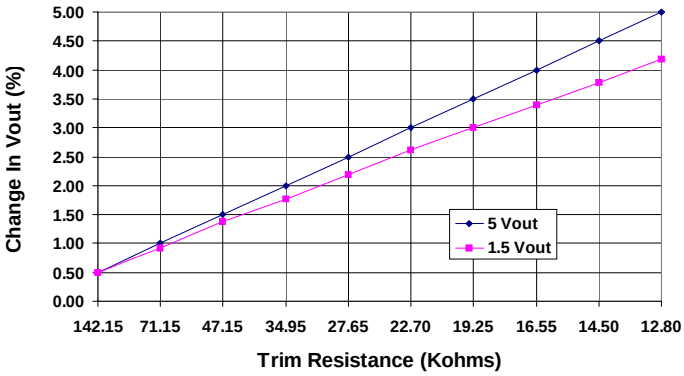
Efficiency vs. Input Voltage
@ T_A = +25°C



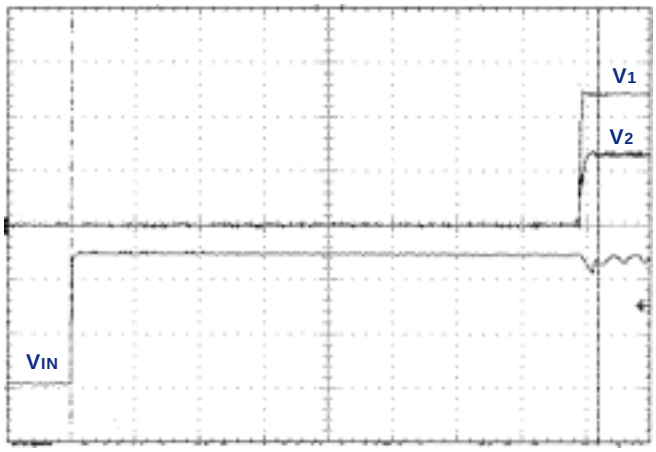
Trim Up Graph



Trim Down Graph

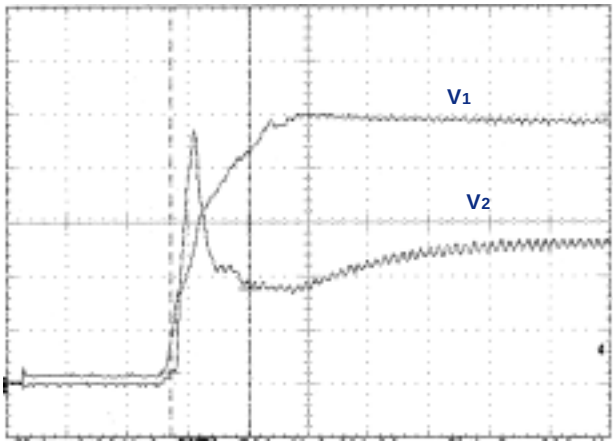


Turn On Time (V_{IN} to V_{OUT})



Time Scale = 50ms/div

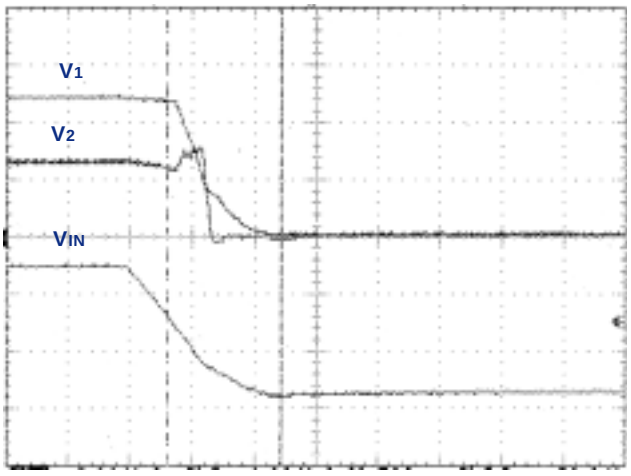
Rise Time (V_1 and V_2)



Time Scale = 1ms/div

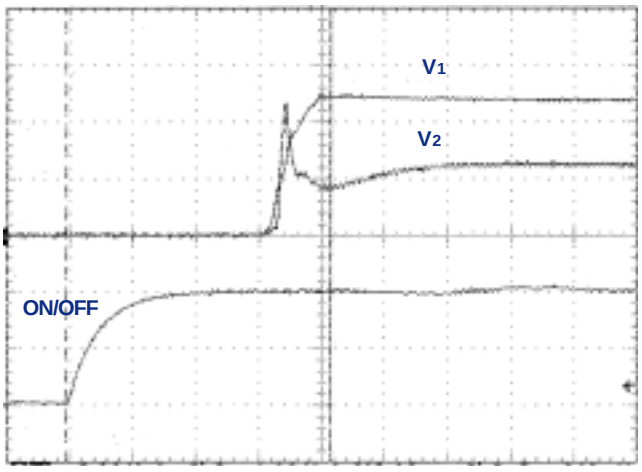
PERFORMANCE CURVES: WPA60R48D0515 and WPA60R48D0515-1

Turn Off Time (V_{IN} to V_{OUT})



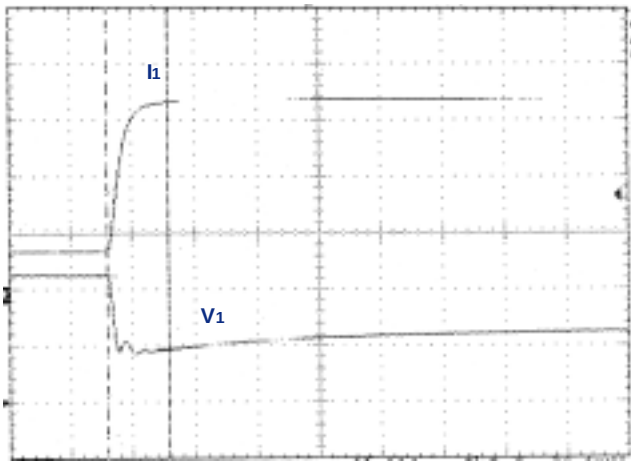
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



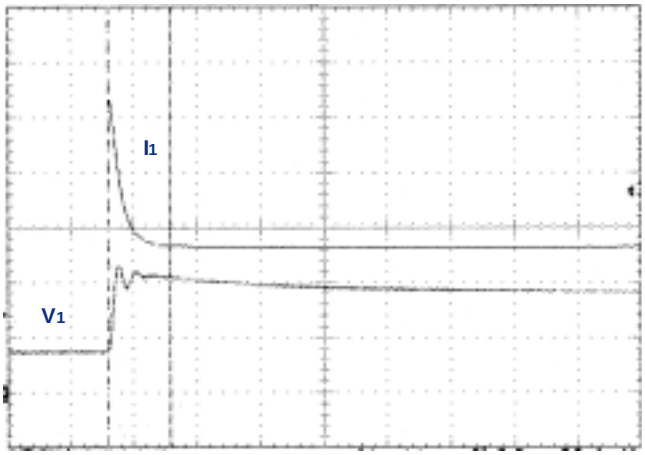
Time Scale = 2ms/div

CH1 (5.0Vdc) Transient Response 50% to 100% Load Step



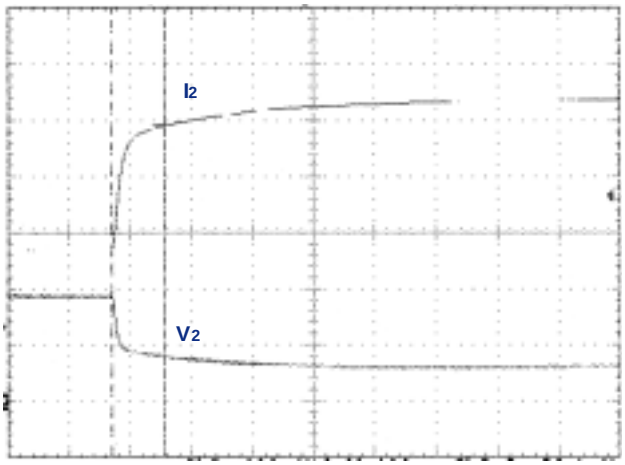
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (5.0Vdc) Transient Response 100% to 50% Load Step



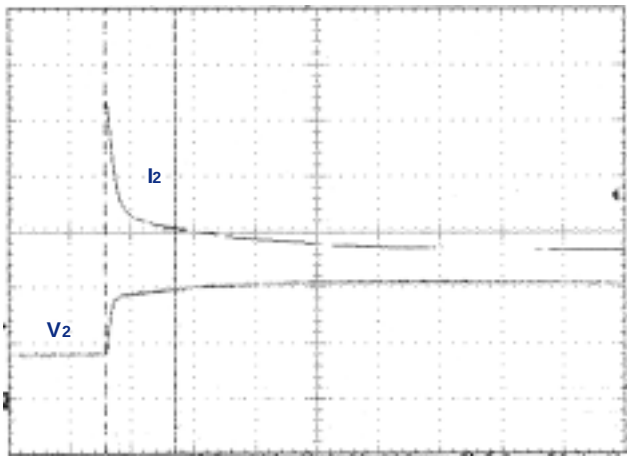
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.5Vdc) Transient Response 50% to 100% Load Step



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

CH2 (1.5Vdc) Transient Response 100% to 50% Load Step

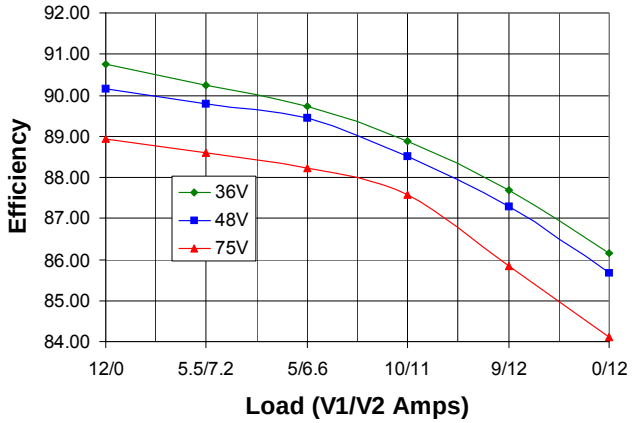


Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

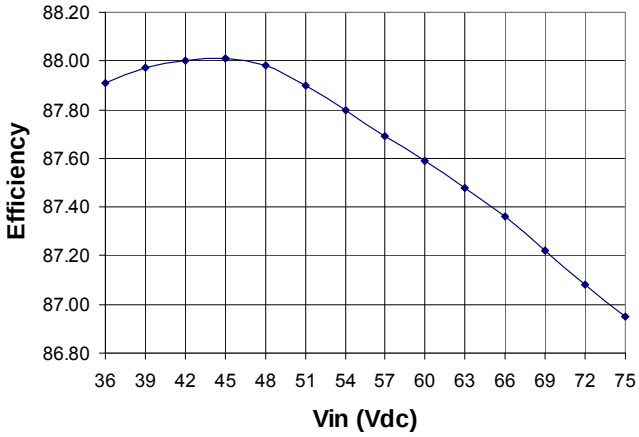
PERFORMANCE CURVES: WPA60R48D3325 and WPA60R48D3325-1

MODEL WPA60R48D3325

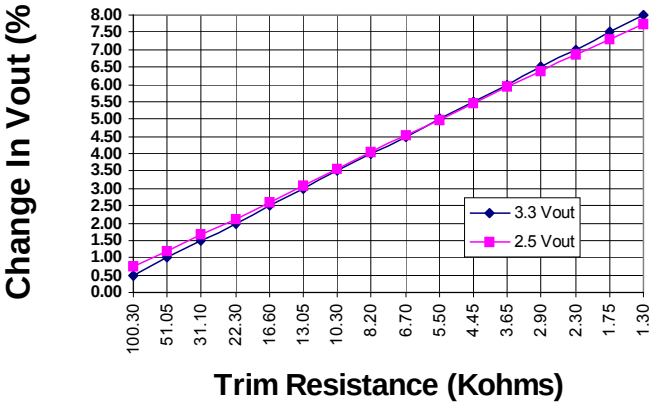
Efficiency vs. Output Current
@ T_A = +25°C



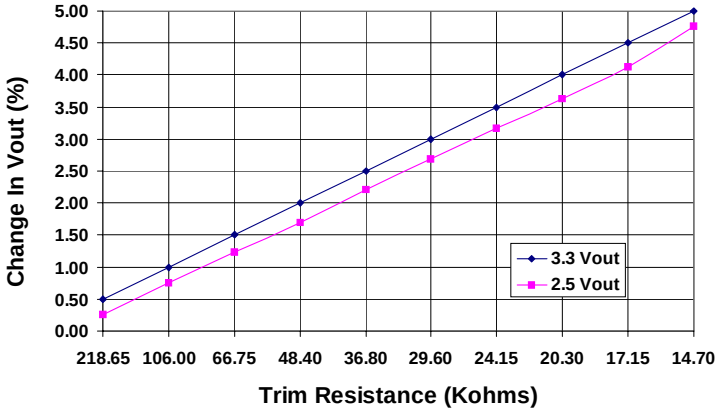
Efficiency vs. Input Voltage
@ T_A = +25°C



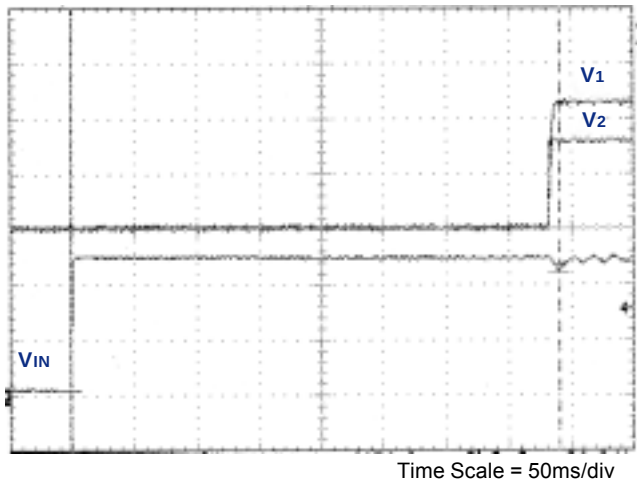
Trim Up Graph



Trim Down Graph

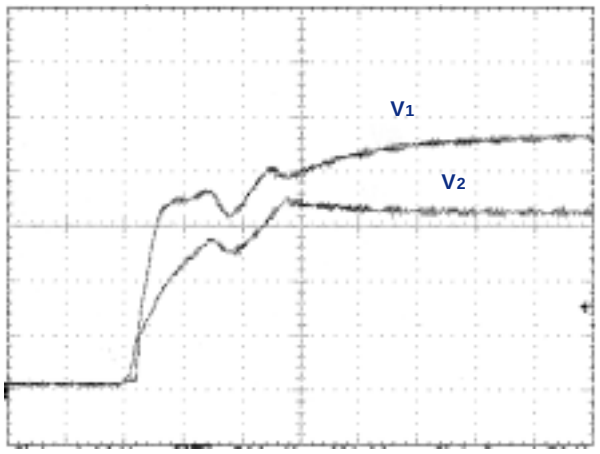


Turn On Time (V_{IN} to V_{OUT})



Time Scale = 50ms/div

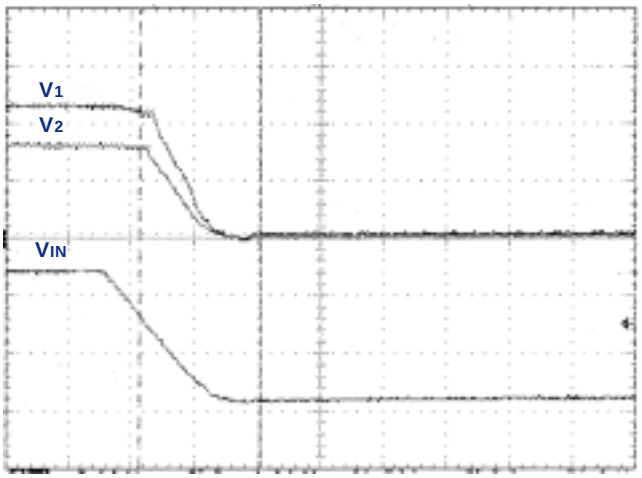
Rise Time (V_1 and V_2)



Time Scale = 1ms/div

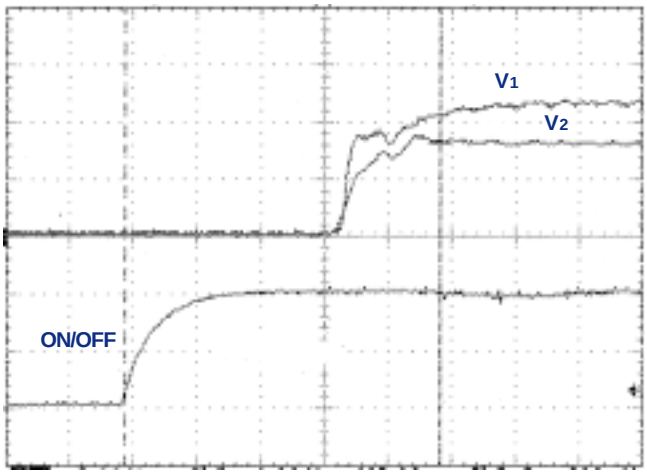
PERFORMANCE CURVES: WPA60R48D3325 and WPA60R48D3325-1

Turn Off Time (V_{IN} to V_{OUT})



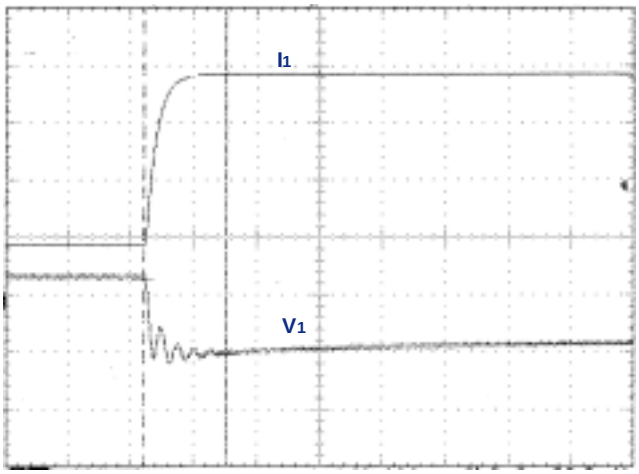
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



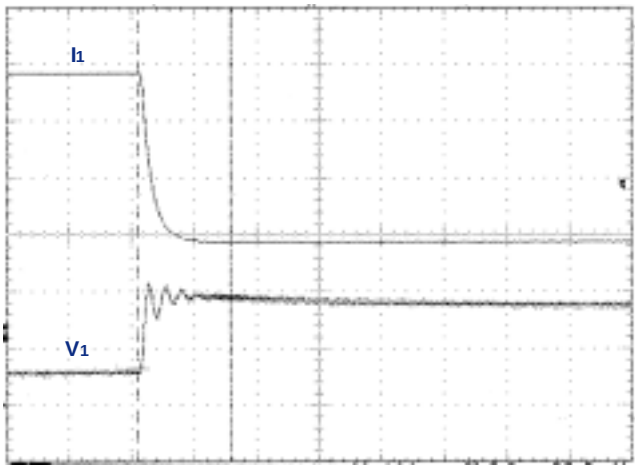
Time Scale = 2ms/div

CH1 (3.3Vdc) Transient Response 50% to 100% Load Step



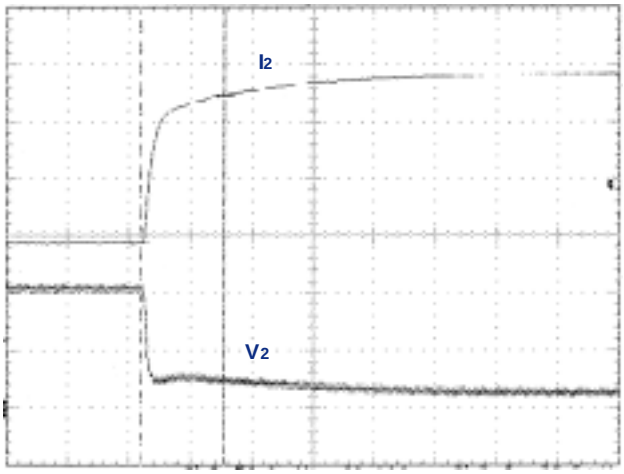
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (3.3Vdc) Transient Response 100% to 50% Load Step



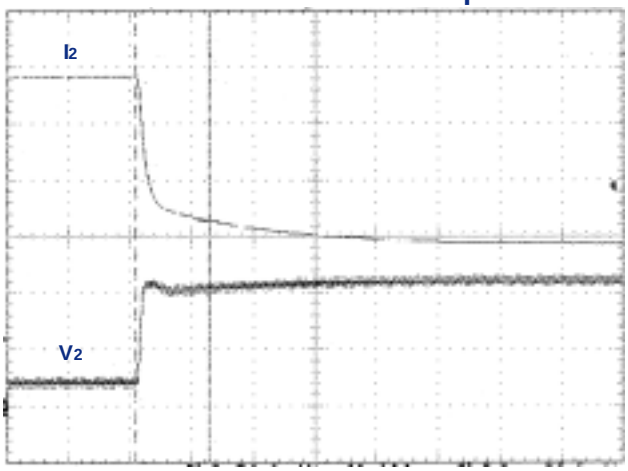
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (2.5Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

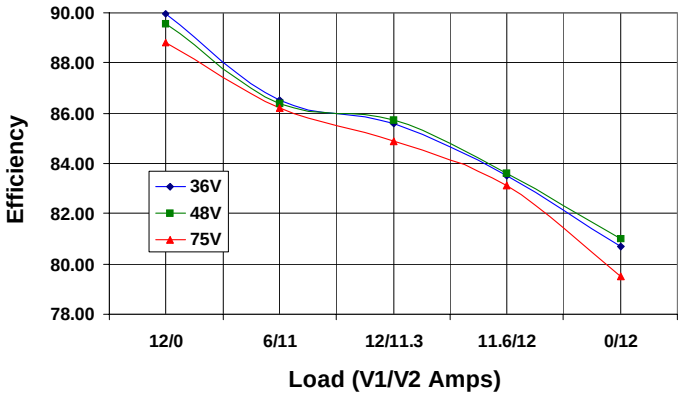
CH2 (2.5Vdc) Transient Response 100% to 50% Load Step



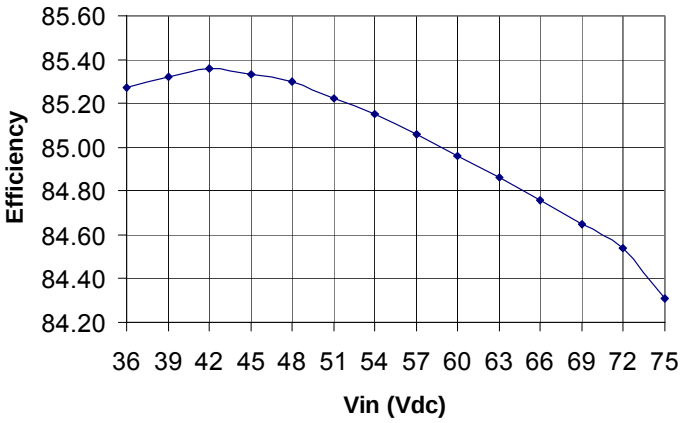
Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

PERFORMANCE CURVES: WPA60R48D3318 and WPA60R48D3318-1

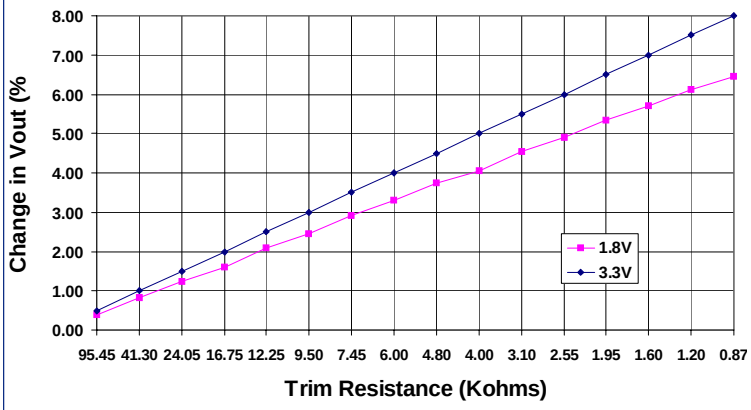
Efficiency vs. Output Current
@ T_A = +25°C



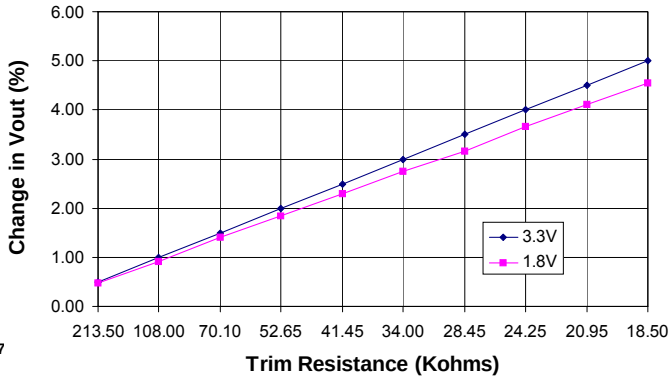
Efficiency vs. Input Voltage
@ T_A = +25°C



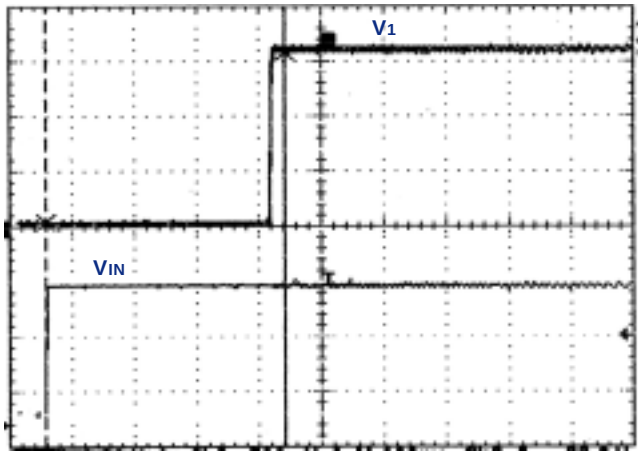
Trim Up Graph



Trim Down Graph

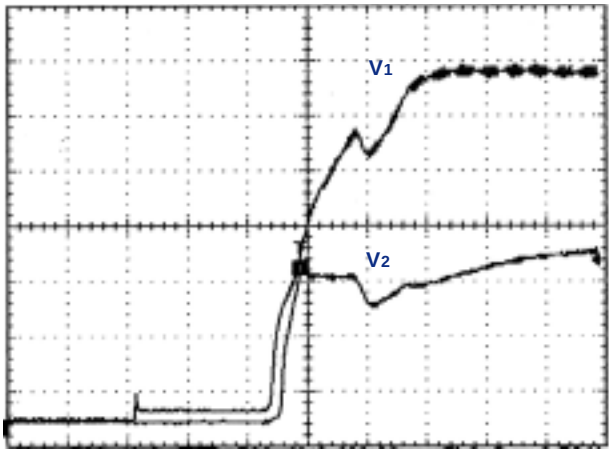


Turn On Time (V_{IN} to V_{OUT})



Time Scale = 100ms/div

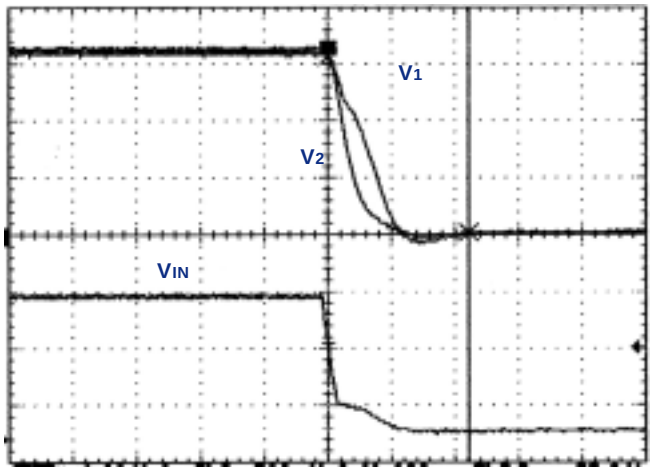
Rise Time (V_1 and V_2)



Time Scale = 1ms/div

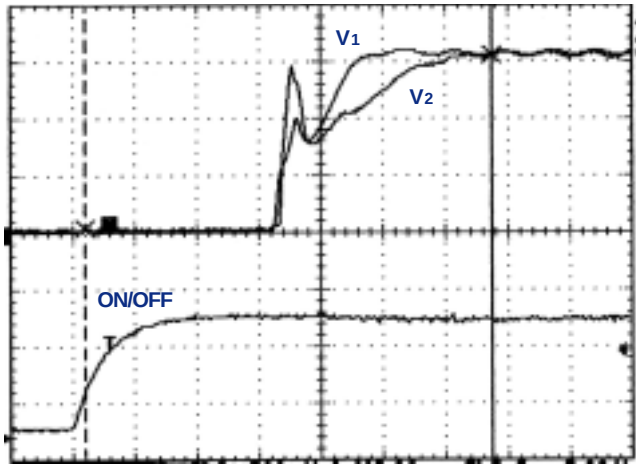
PERFORMANCE CURVES: WPA60R48D3318 and WPA60R48D3318-1

Turn Off Time (V_{IN} to V_{OUT})



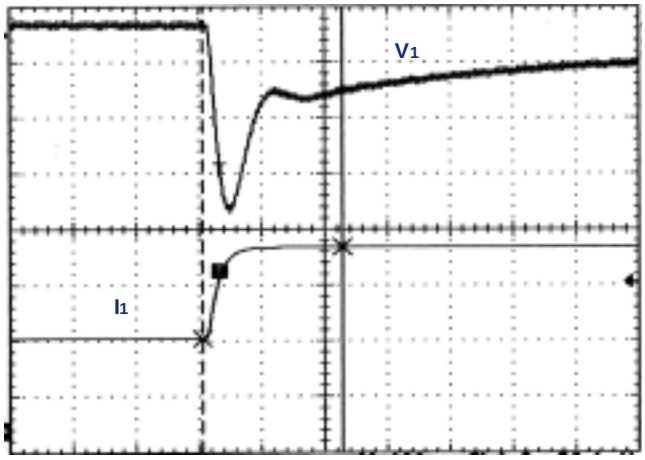
Time Scale = 100µs/div

Primary On Time (Primary Remote to V_{OUT})



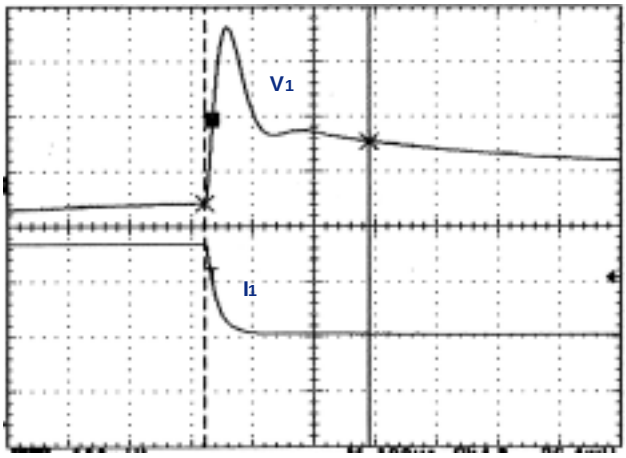
Time Scale = 2ms/div

CH1 (3.3Vdc) Transient Response 50% to 100% Load Step



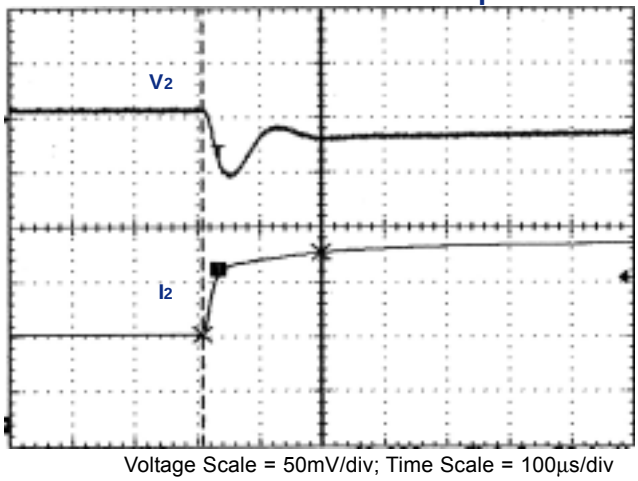
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (3.3Vdc) Transient Response 100% to 50% Load Step



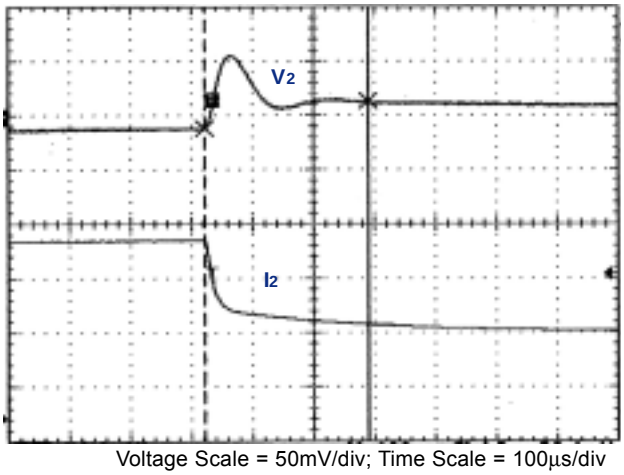
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.8Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

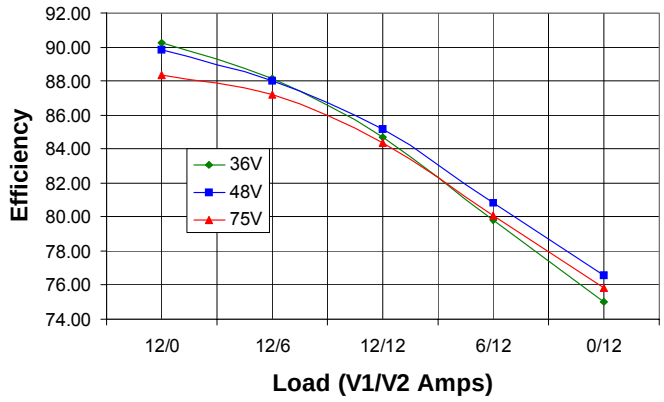
CH2 (1.8Vdc) Transient Response 100% to 50% Load Step



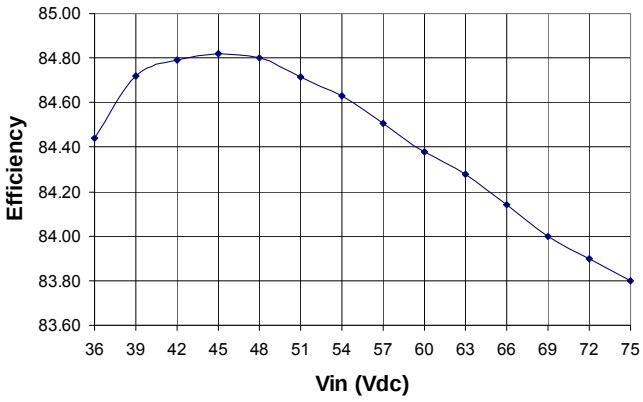
Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

PERFORMANCE CURVES: WPA60R48D3312 and WPA60R48D3312-1

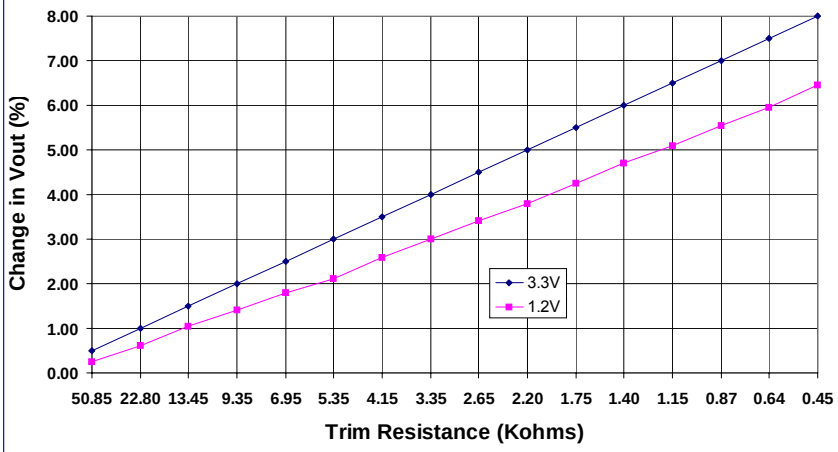
Efficiency vs. Output Current
@ T_A = +25°C



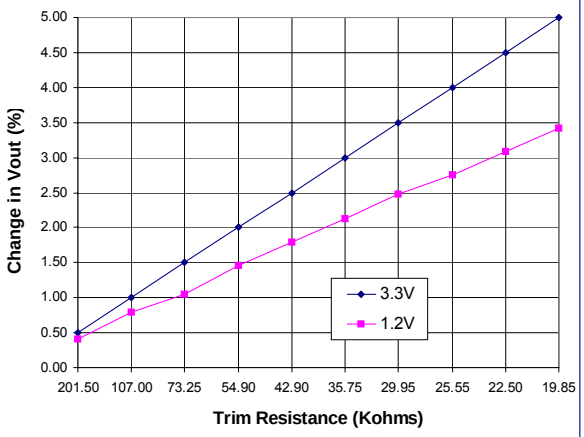
Efficiency vs. Input Voltage
@ T_A = +25°C



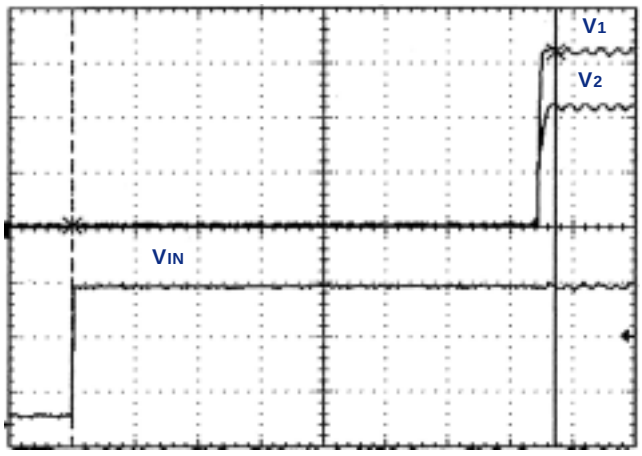
Trim Up Graph



Trim Down Graph

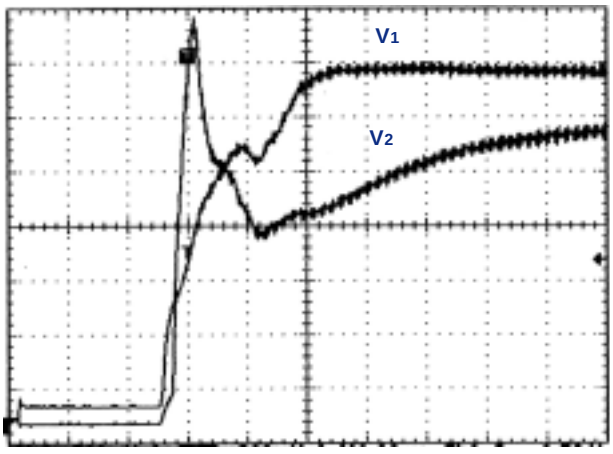


Turn On Time (V_{IN} to V_{OUT})



Time Scale = 100ms/div

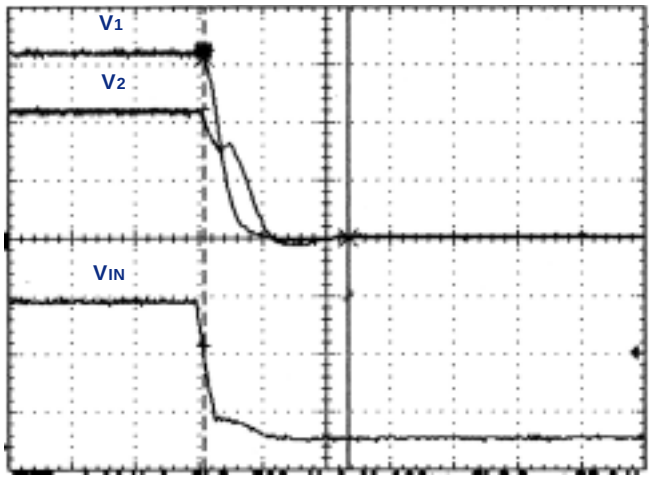
Rise Time (V_1 and V_2)



Time Scale = 1ms/div

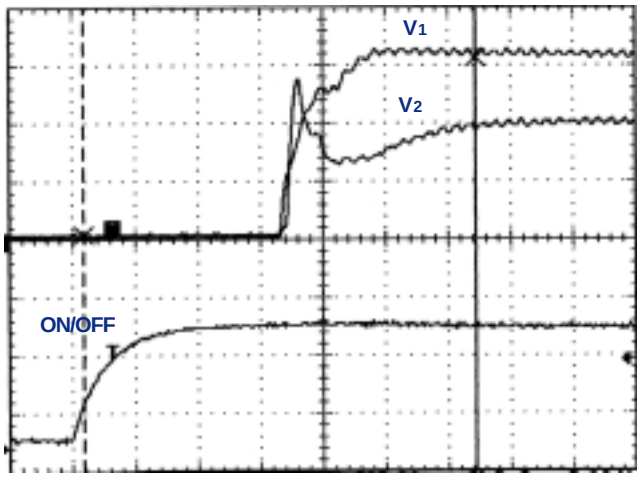
PERFORMANCE CURVES: WPA60R48D3312 and WPA60R48D3312-1

Turn Off Time (V_{IN} to V_{OUT})



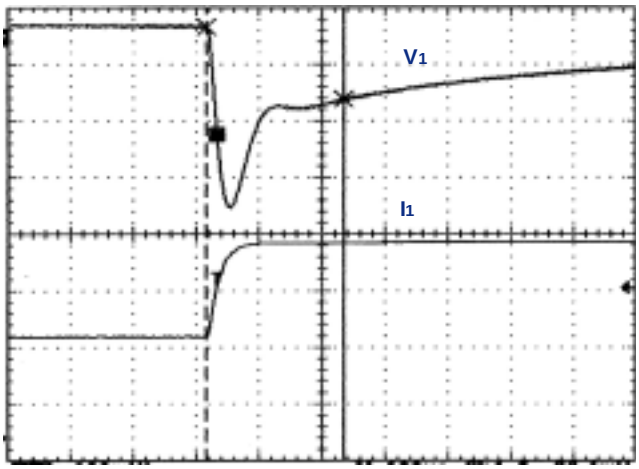
Time Scale = 100µs/div

Primary On Time (Primary Remote to V_{OUT})



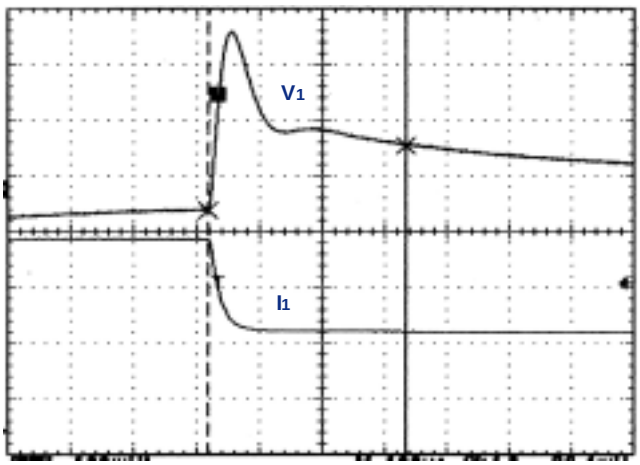
Time Scale = 2ms/div

CH1 (3.3Vdc) Transient Response 50% to 100% Load Step



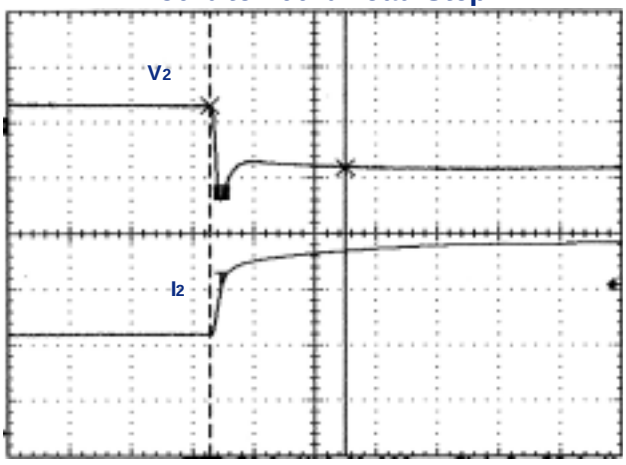
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (3.3Vdc) Transient Response 100% to 50% Load Step



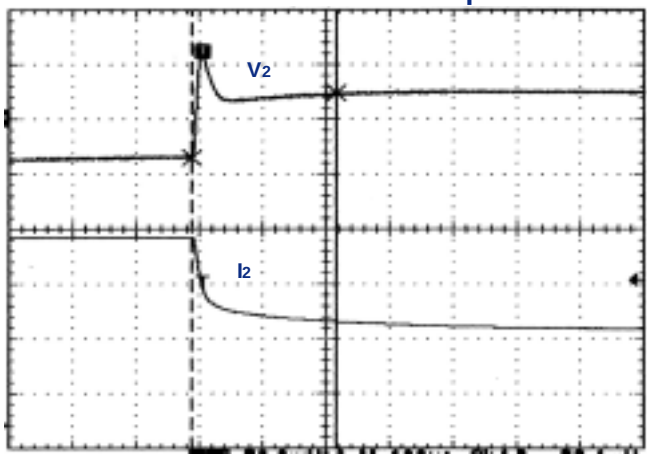
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.2Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

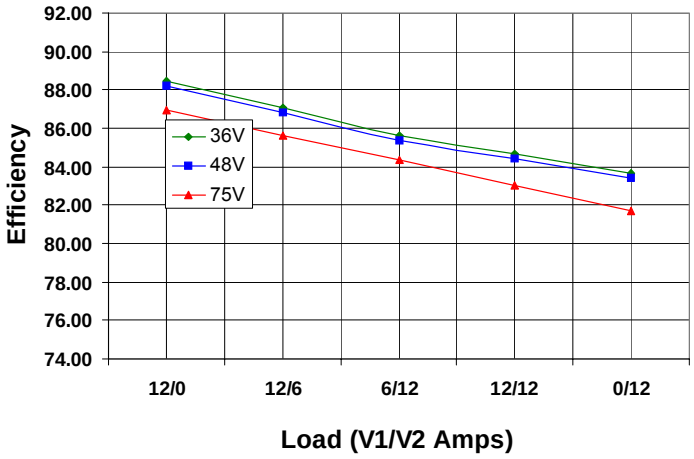
CH2 (1.2Vdc) Transient Response 100% to 50% Load Step



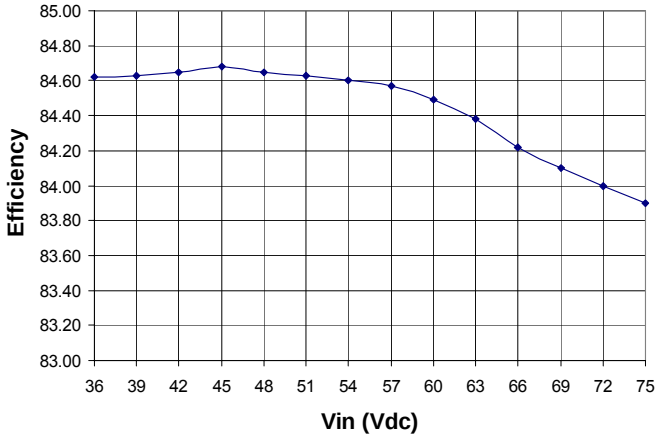
Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

PERFORMANCE CURVES: WPA60R48D2518 and WPA60R48D2518-1

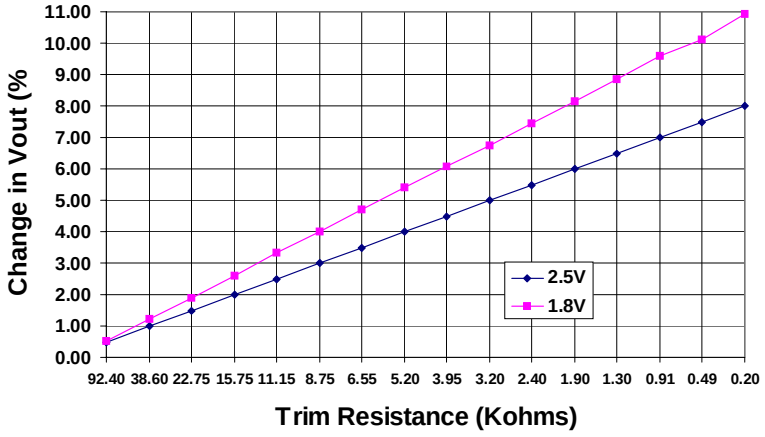
Efficiency vs. Output Current
@ T_A = +25°C



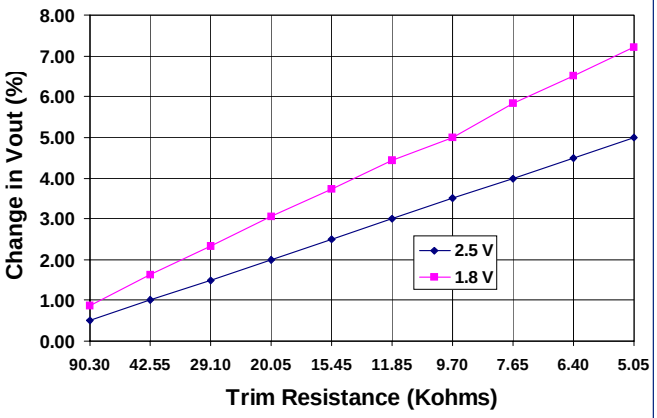
Efficiency vs. Input Voltage
@ T_A = +25°C



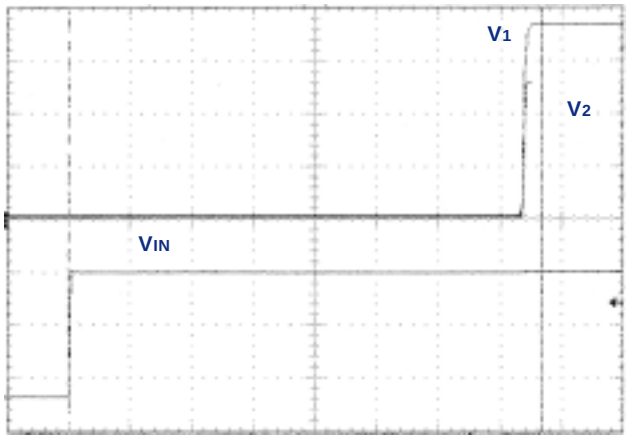
Trim Up Graph



Trim Down Graph

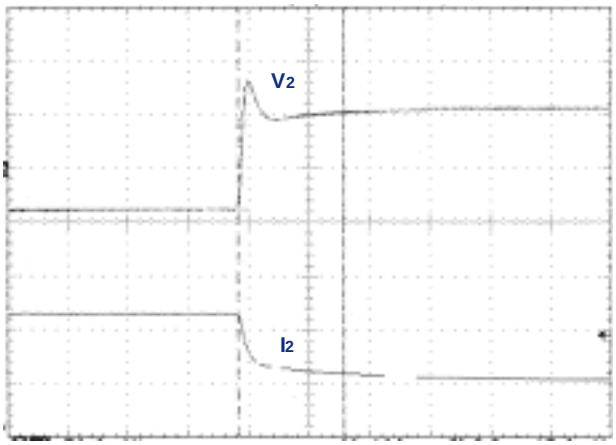


Turn On Time (V_{IN} to V_{OUT})



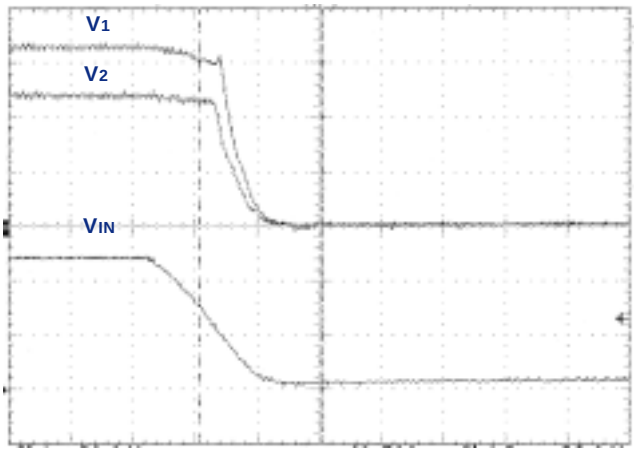
Time Scale = 100ms/div

CH2 (1.8Vdc) Transient Response 100% to 50% Load Step



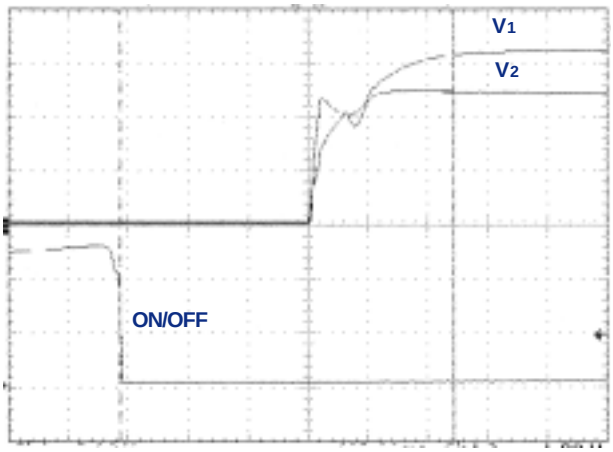
Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

Turn Off Time (V_{IN} to V_{OUT})



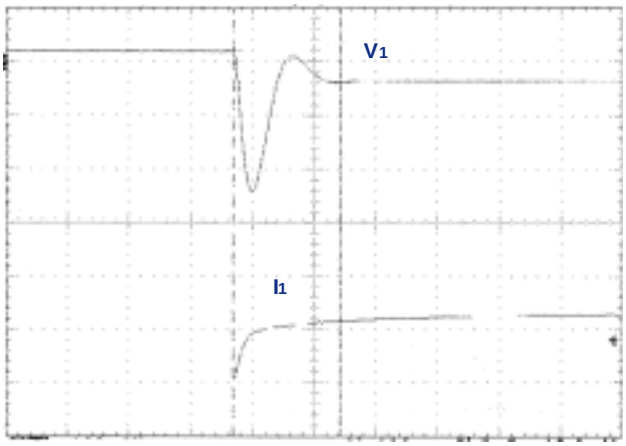
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



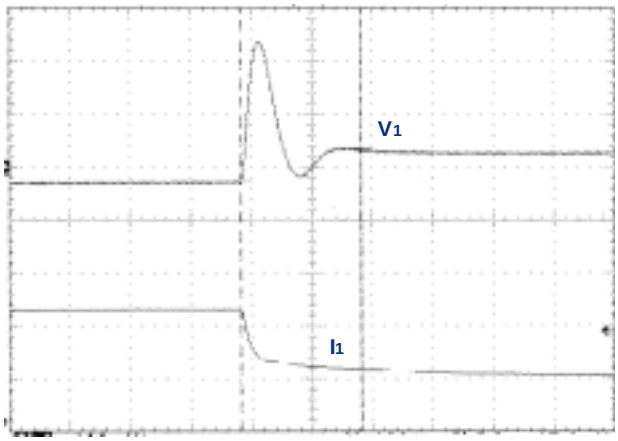
Time Scale = 2ms/div

CH1 (2.5Vdc) Transient Response 50% to 100% Load Step



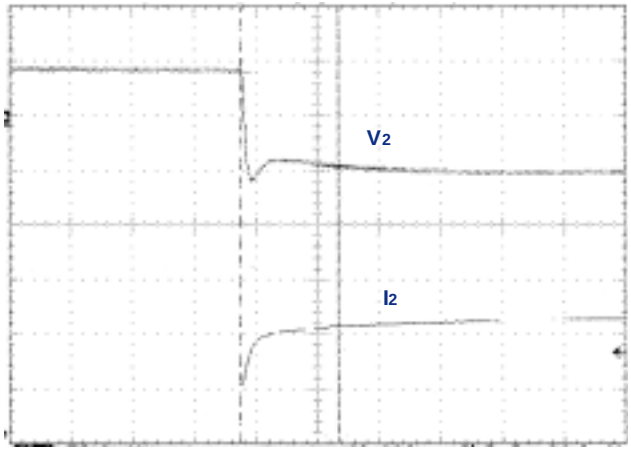
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (2.5Vdc) Transient Response 100% to 50% Load Step



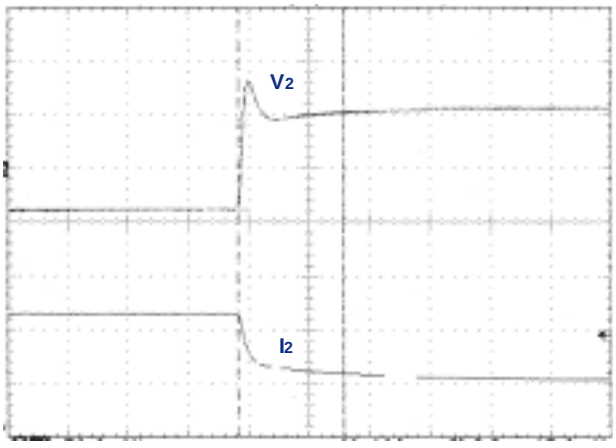
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.8Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

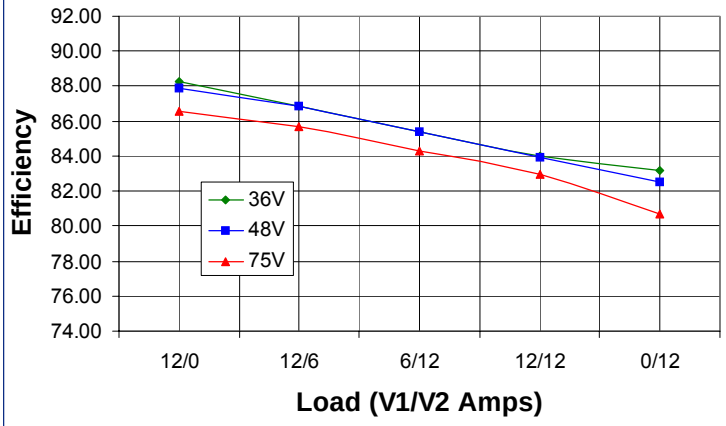
CH2 (1.8Vdc) Transient Response 100% to 50% Load Step



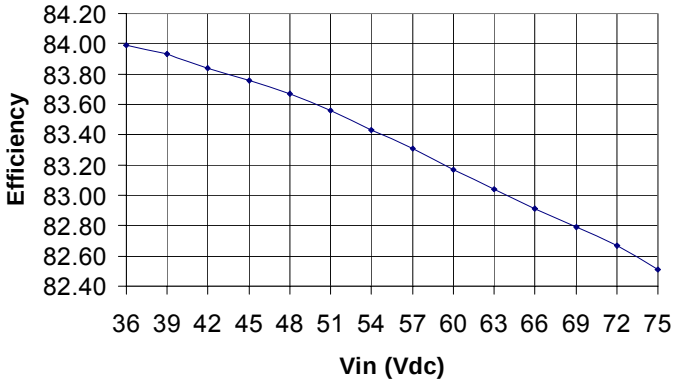
Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

PERFORMANCE CURVES: WPA60R48D2215 and WPA60R48D2215-1

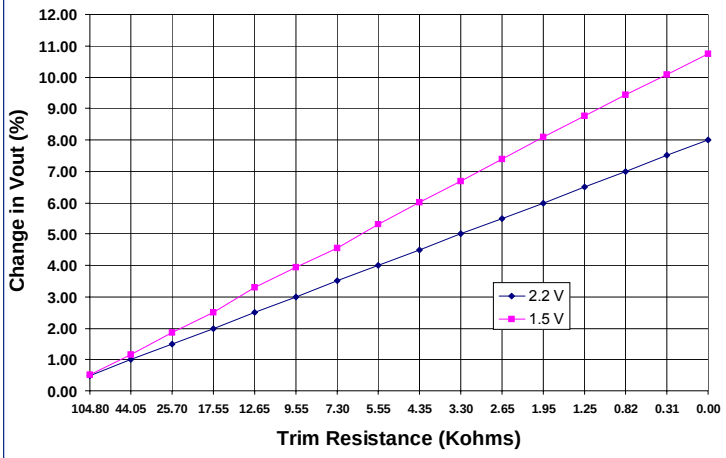
Efficiency vs. Output Current
@ T_A = +25°C



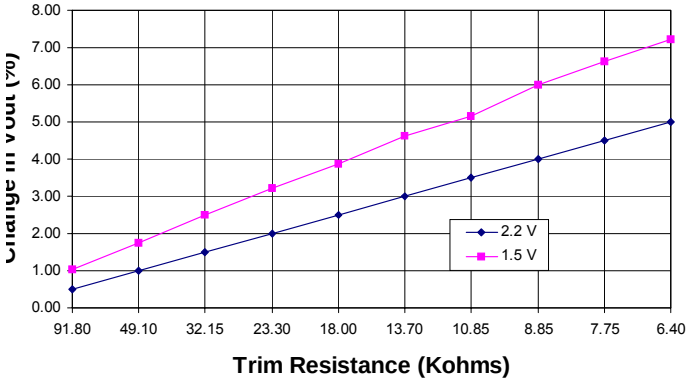
Efficiency vs. Input Voltage
@ T_A = +25°C



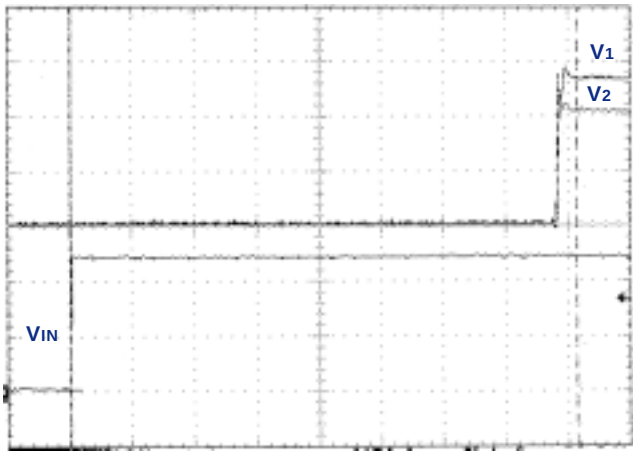
Trim Up Graph



Trim Down Graph

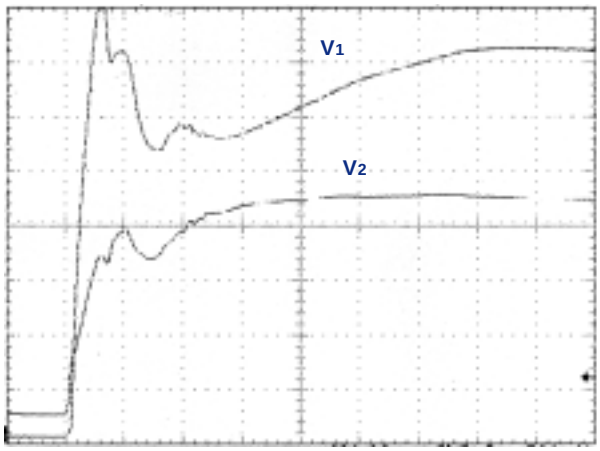


Turn On Time (V_{IN} to V_{OUT})



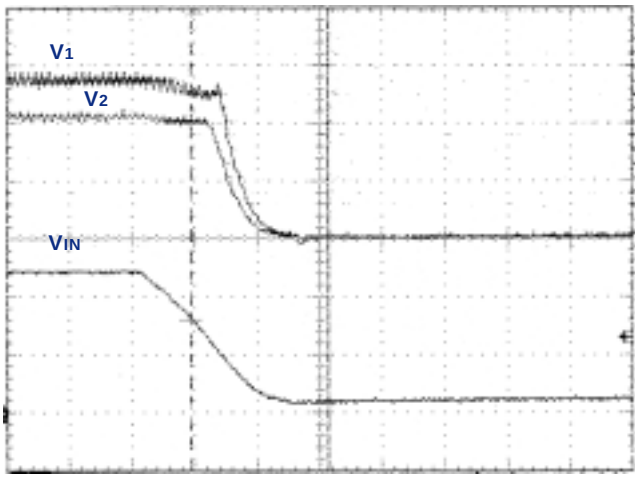
Time Scale = 50ms/div

Rise Time (V_1 and V_2)



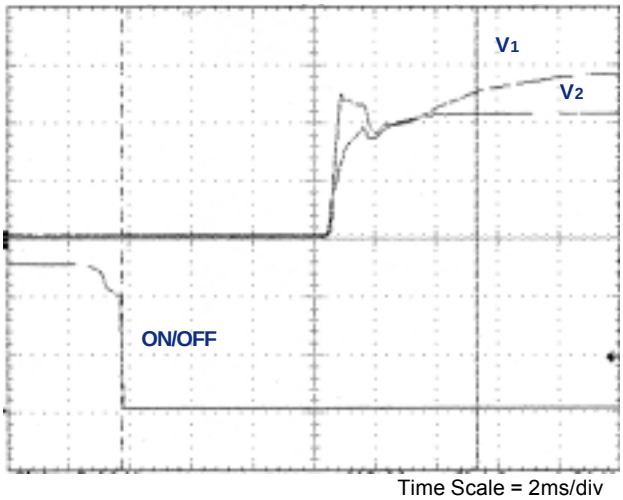
Time Scale = 1ms/div

Turn Off Time (V_{IN} to V_{OUT})



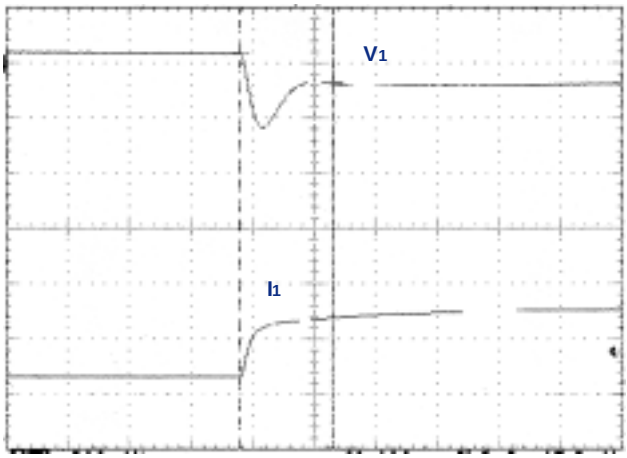
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



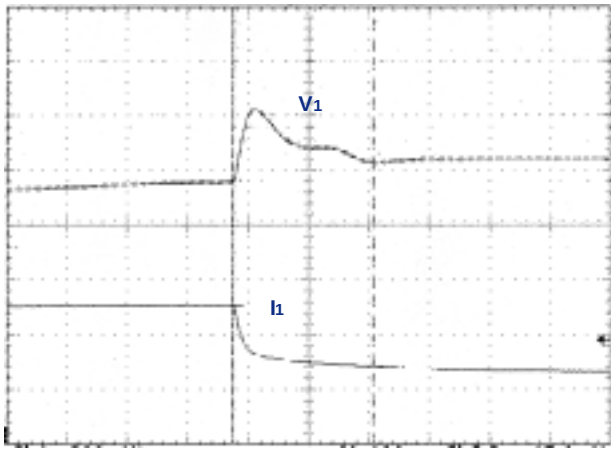
Time Scale = 2ms/div

CH1 (2.2Vdc) Transient Response 50% to 100% Load Step



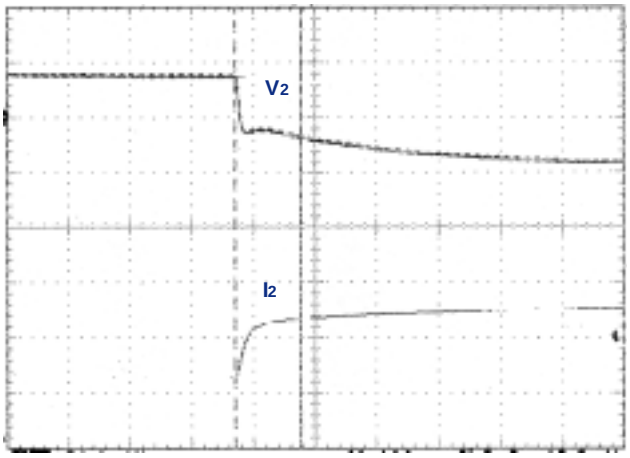
Voltage Scale = 200mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (2.2Vdc) Transient Response 100% to 50% Load Step



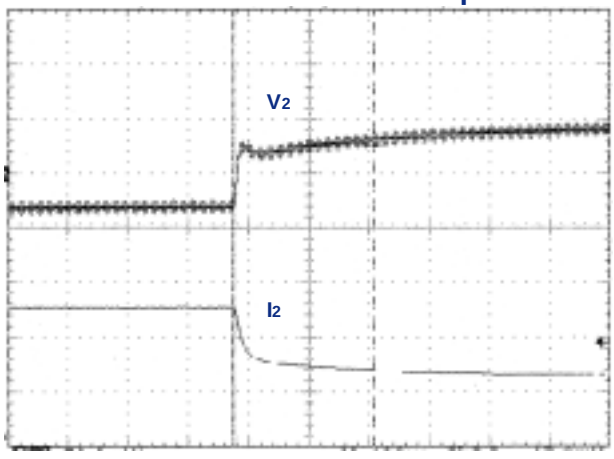
Voltage Scale = 200mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.5Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

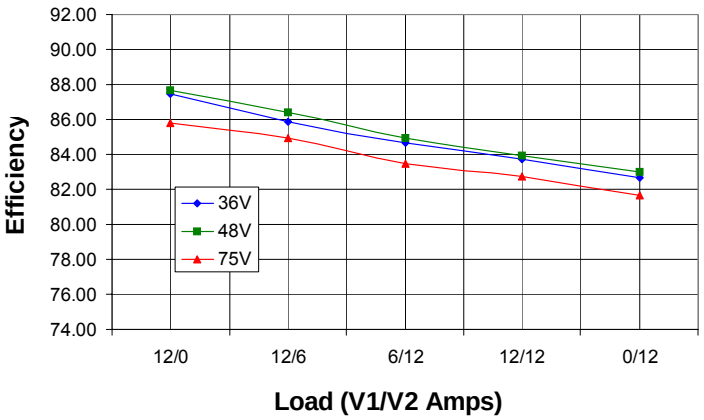
CH2 (1.5Vdc) Transient Response 100% to 50% Load Step



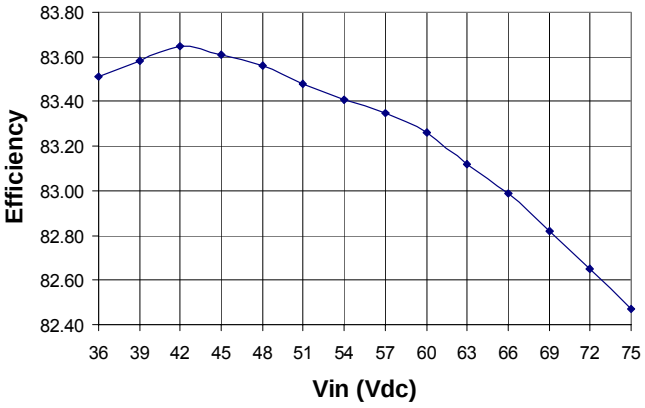
Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

PERFORMANCE CURVES: WPA60R48D1812 and WPA60R48D1812-1

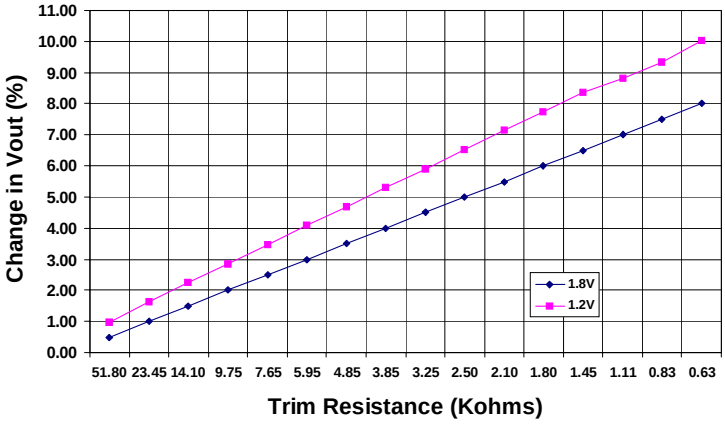
Efficiency vs. Output Current
@ T_A = +25°C



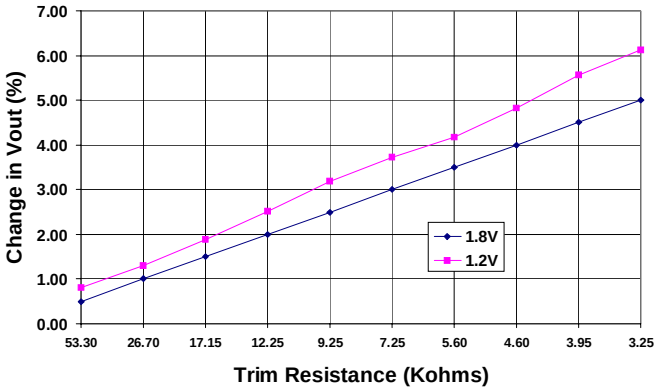
Efficiency vs. Input Voltage
@ T_A = +25°C



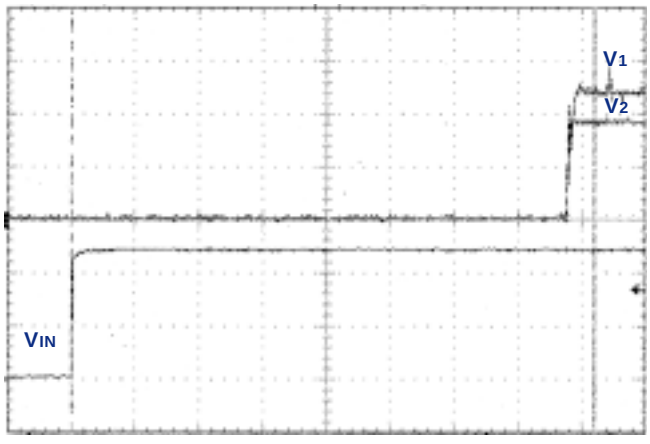
Trim Up Graph



Trim Down Graph

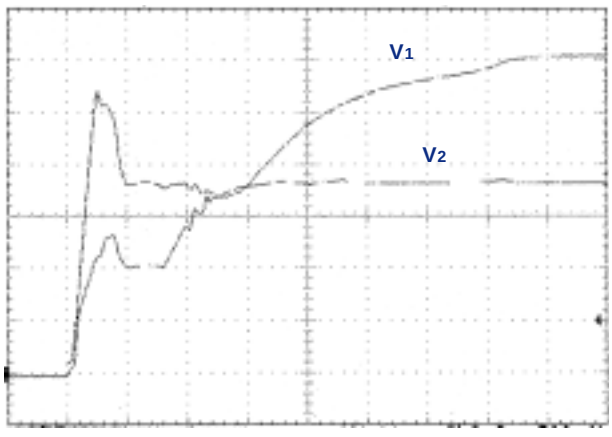


Turn On Time (V_{IN} to V_{OUT})



Time Scale = 50ms/div

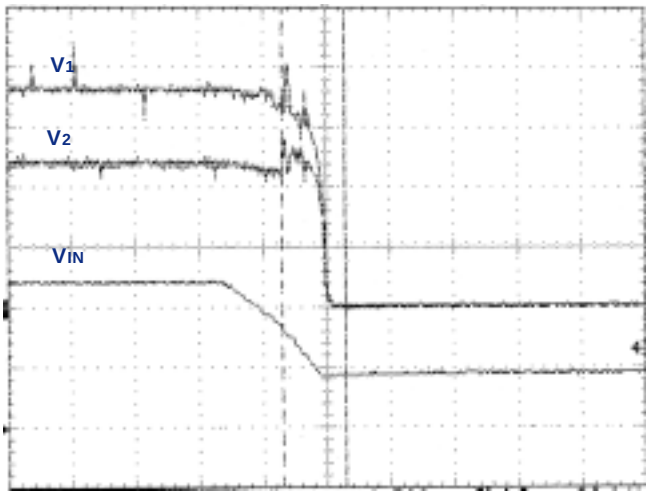
Rise Time (V_1 and V_2)



Time Scale = 1ms/div

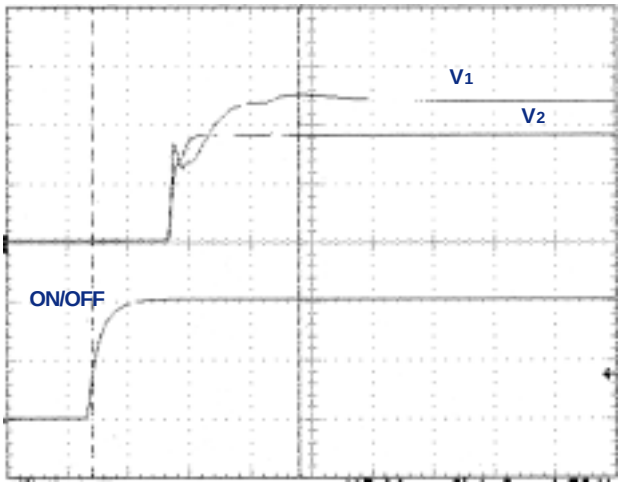
PERFORMANCE CURVES: WPA60R48D1812 and WPA60R48D1812-1

Turn Off Time (V_{IN} to V_{OUT})



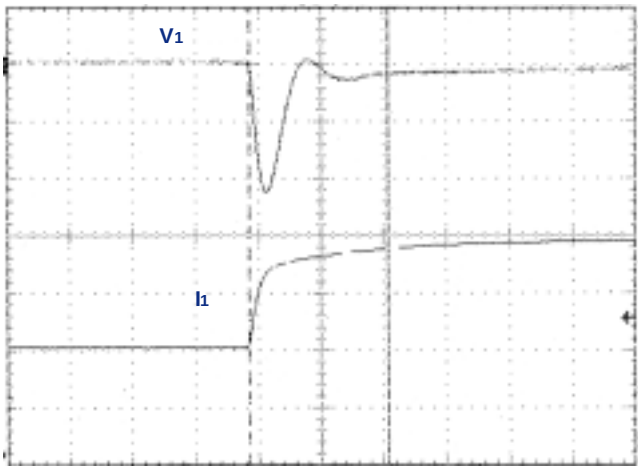
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



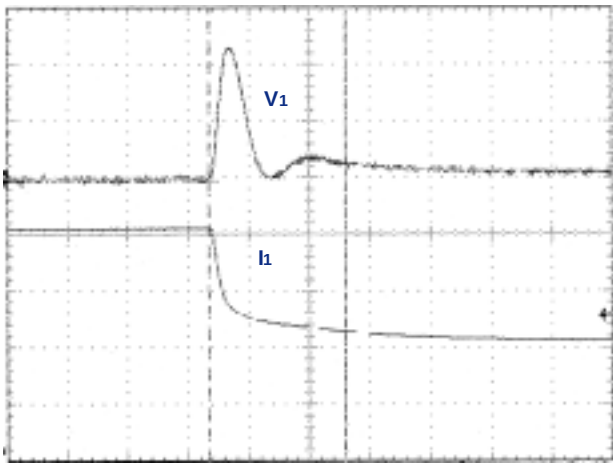
Time Scale = 5ms/div

CH1 (1.8Vdc) Transient Response 50% to 100% Load Step



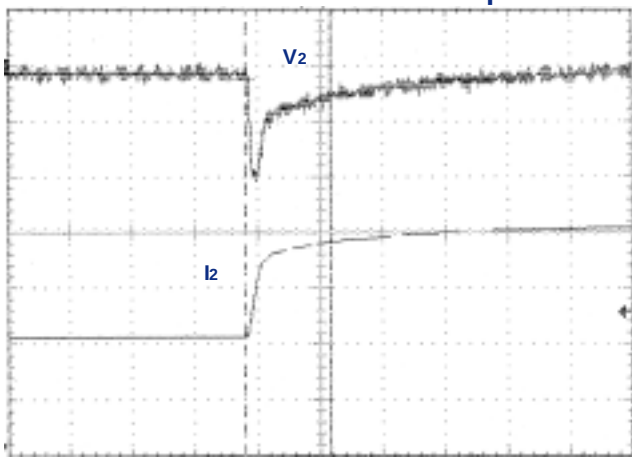
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (1.8Vdc) Transient Response 100% to 50% Load Step



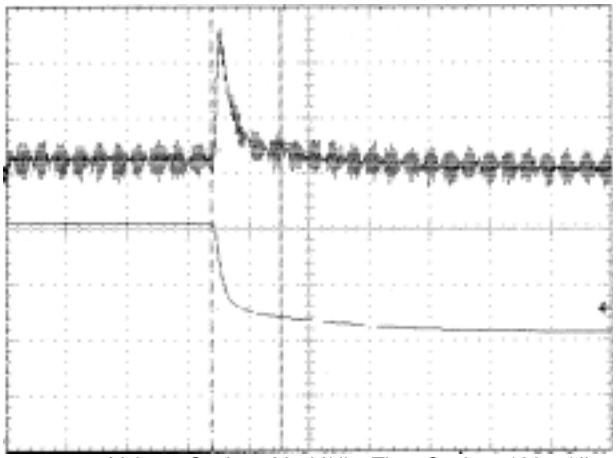
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.2Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 20mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

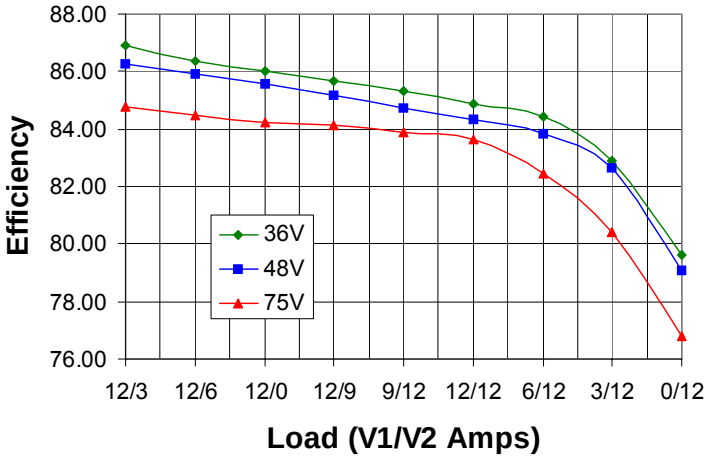
CH2 (1.2Vdc) Transient Response 100% to 50% Load Step



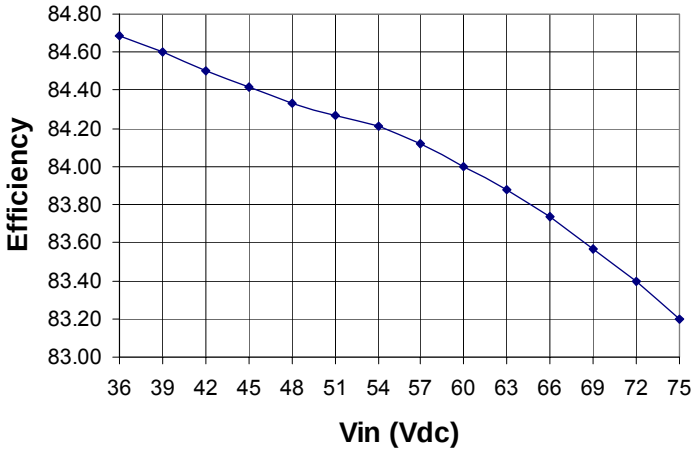
Voltage Scale = 20mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

PERFORMANCE CURVES: WPA60R48D1510 and WPA60R48D1510-1

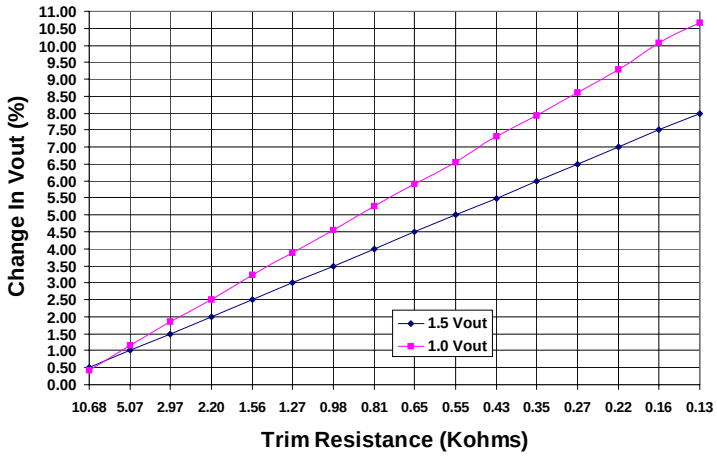
Efficiency vs. Output Current
@ T_A = +25°C



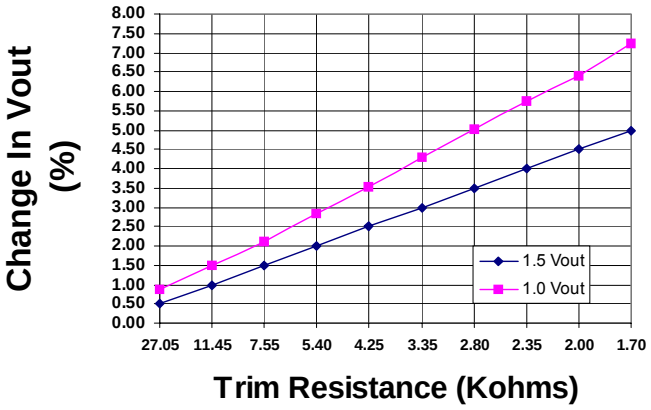
Efficiency vs. Input Voltage
@ T_A = +25°C



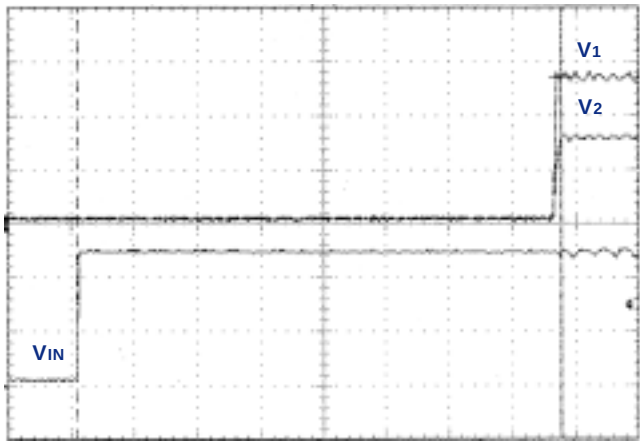
Trim Up Graph



Trim Down Graph

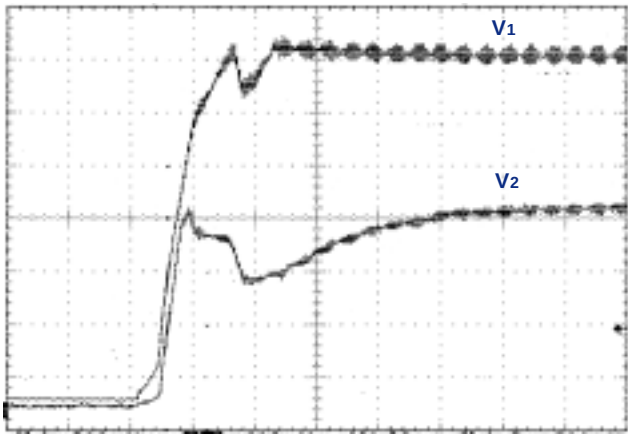


Turn On Time (V_{IN} to V_{OUT})



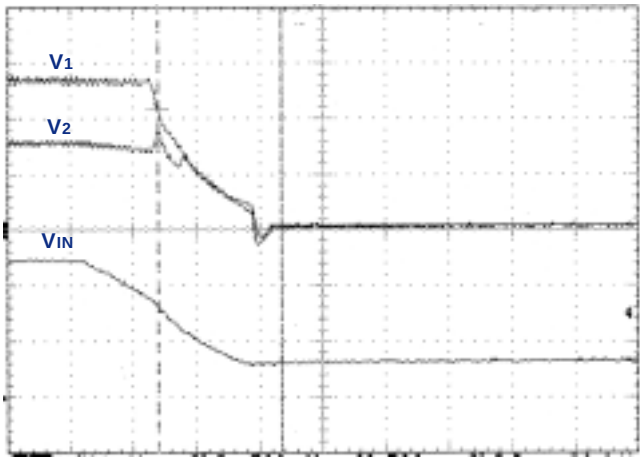
Time Scale = 50ms/div

Rise Time (V_1 and V_2)



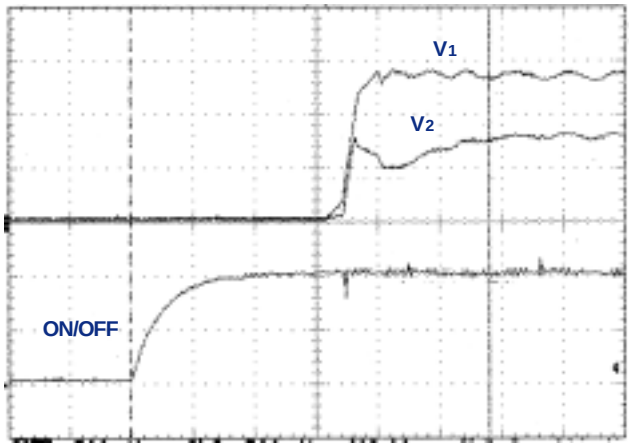
Time Scale = 1ms/div

Turn Off Time (V_{IN} to V_{OUT})



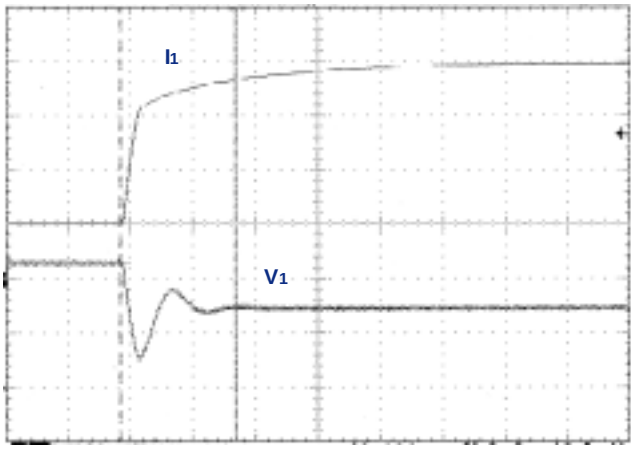
Time Scale = 500µs/div

Primary On Time (Primary Remote to V_{OUT})



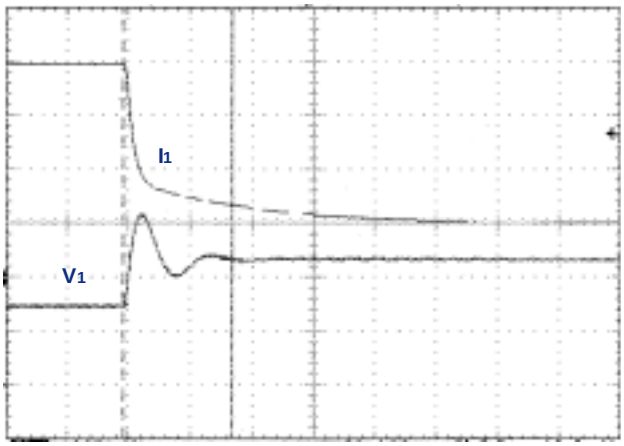
Time Scale = 2ms/div

CH1 (1.5Vdc) Transient Response 50% to 100% Load Step



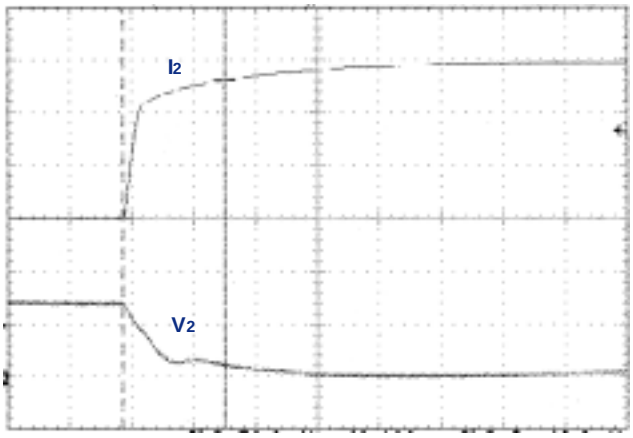
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH1 (1.5Vdc) Transient Response 100% to 50% Load Step



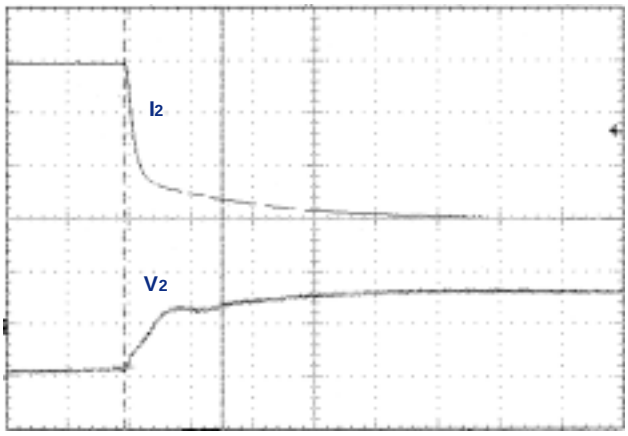
Voltage Scale = 100mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.0Vdc) Transient Response 50% to 100% Load Step



Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

CH2 (1.0Vdc) Transient Response 100% to 50% Load Step

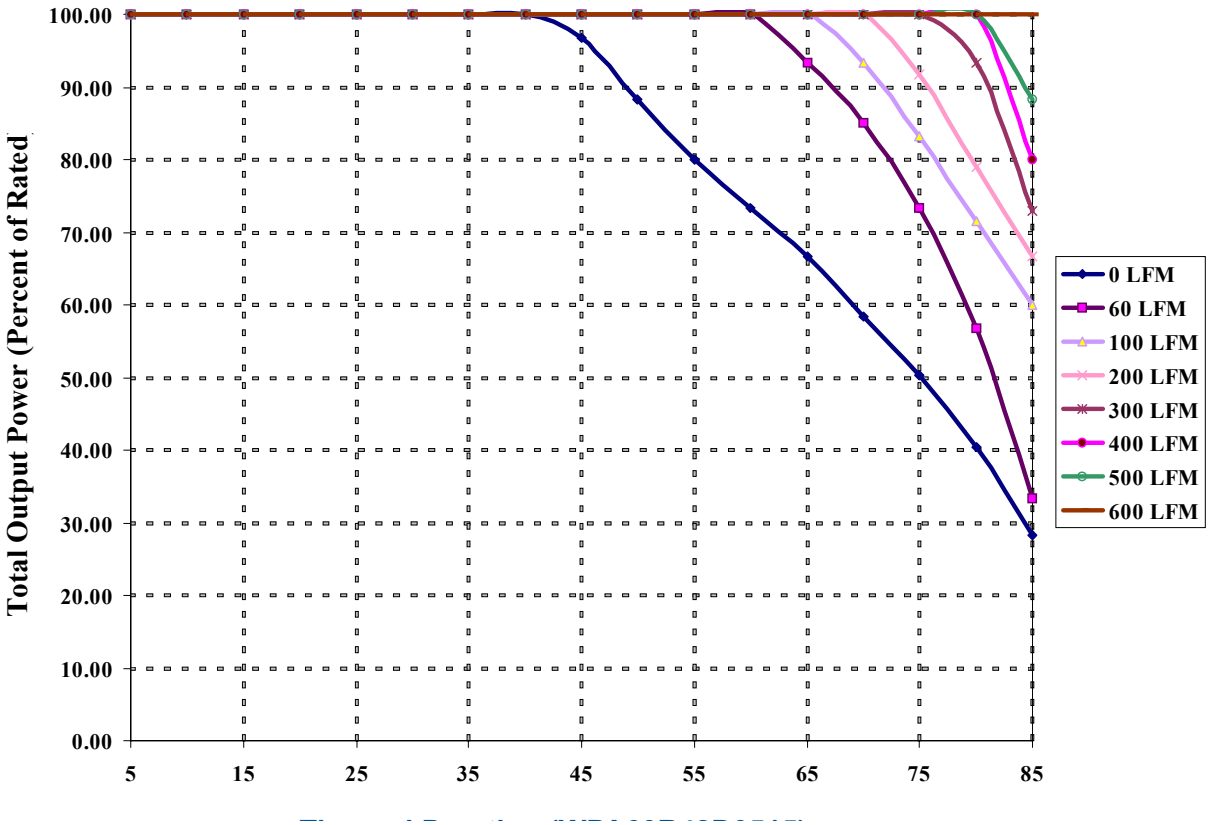


Voltage Scale = 50mV/div; Time Scale = 100µs/div
di/dt = 0.2A/µs

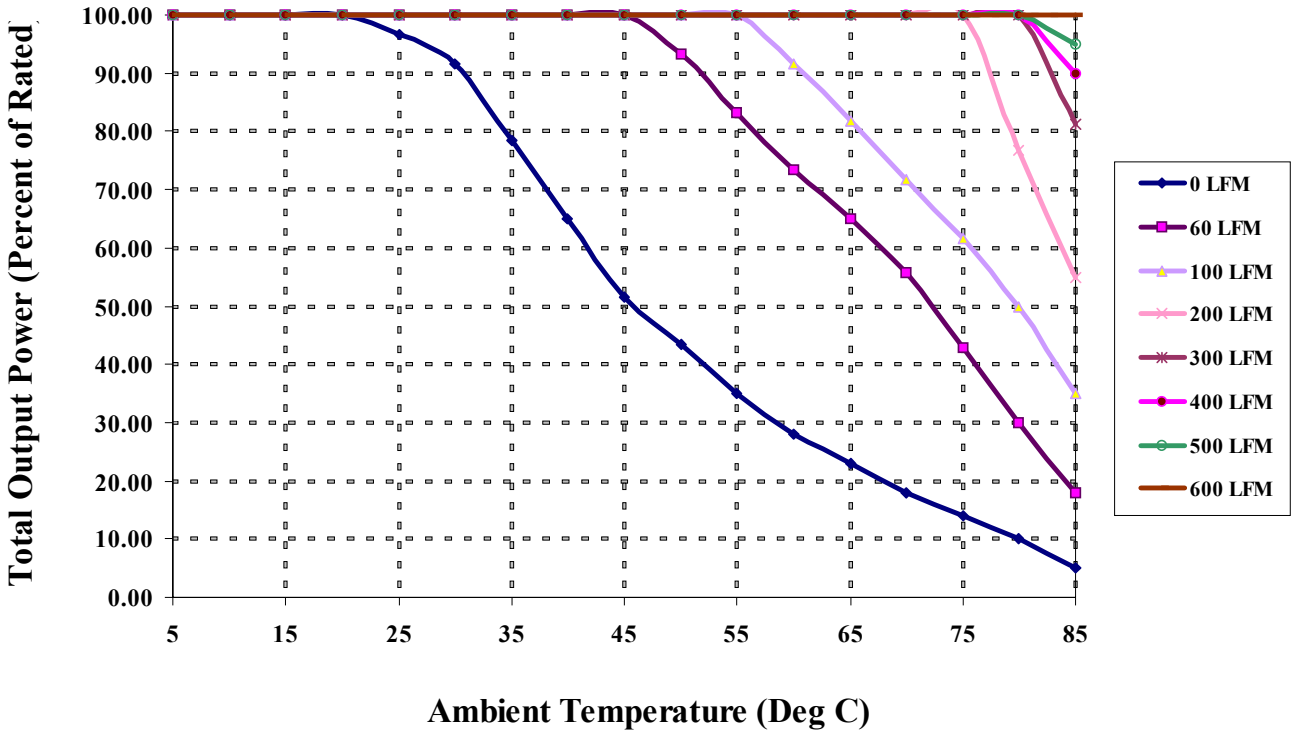
THERMAL DERATING CURVES

Thermal Derating (WPA60R48D0533)

Output Current v/s Temperature Vin = 48Vdc

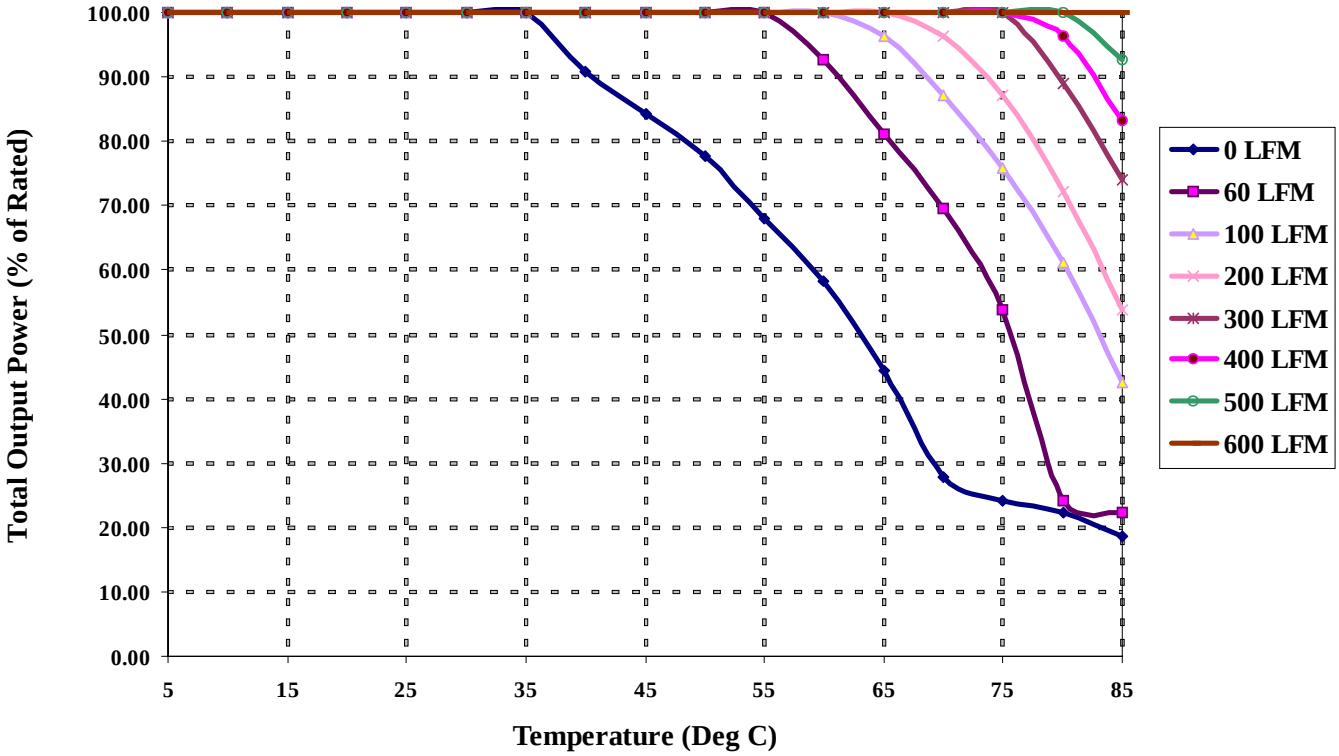


Output Current v/s Temperature Vin = 48Vdc



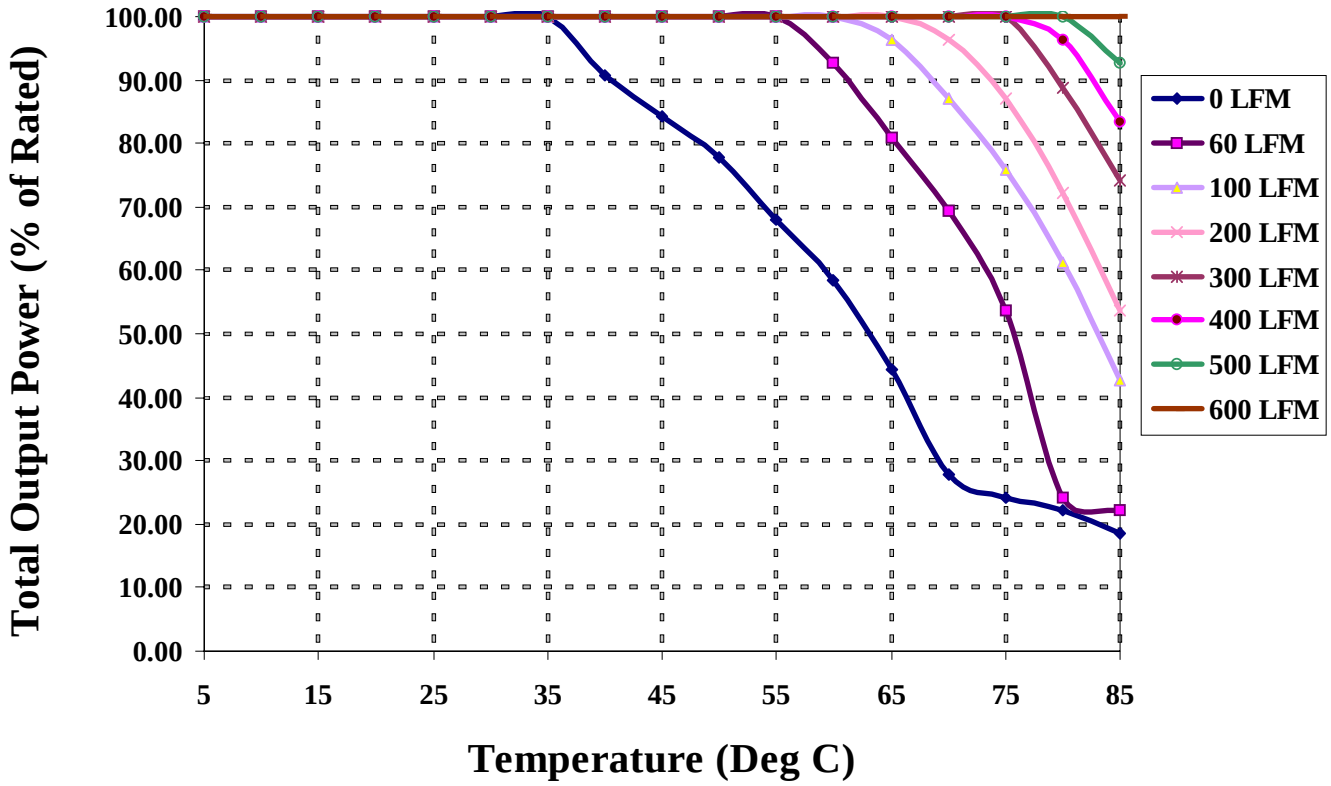
Thermal Derating (WPA60R48D3325)

Output Current v/s Temperature Vin = 48Vdc



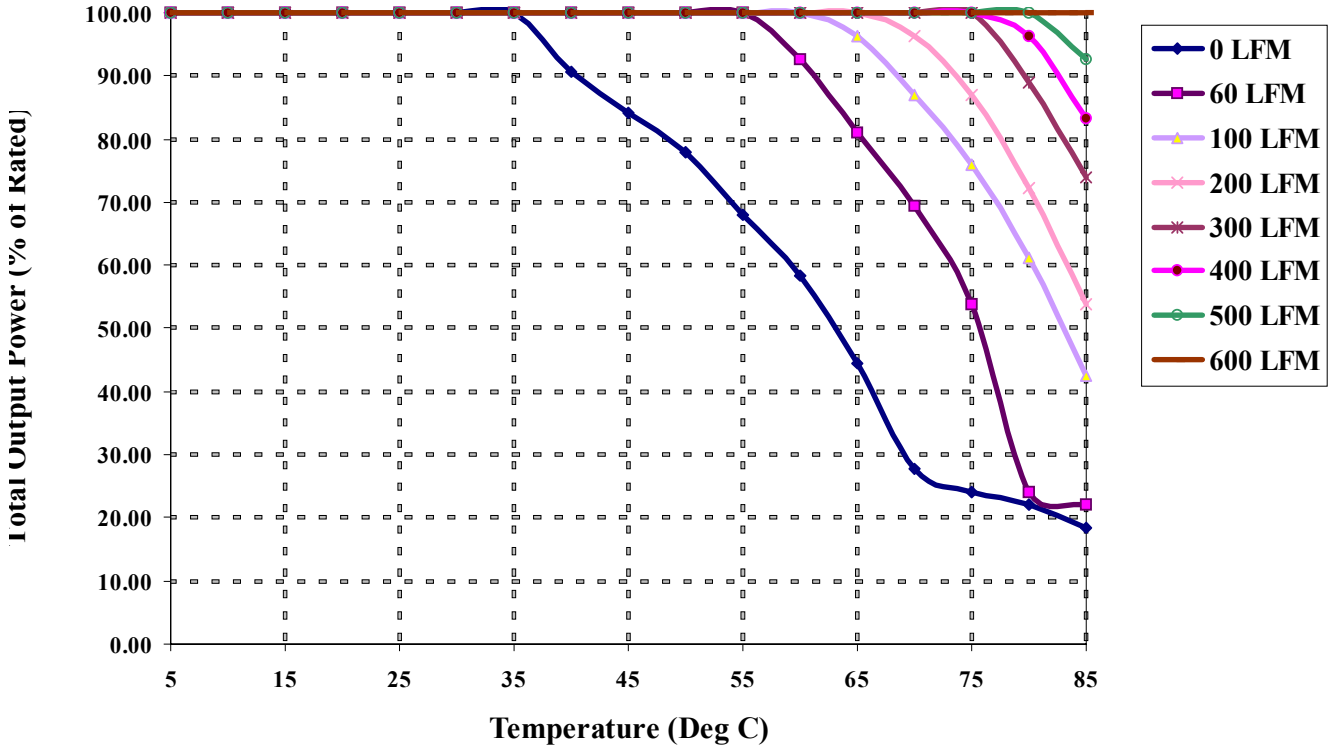
Thermal Derating (WPA60R48D3318)

Output Current v/s Temperature Vin = 48Vdc



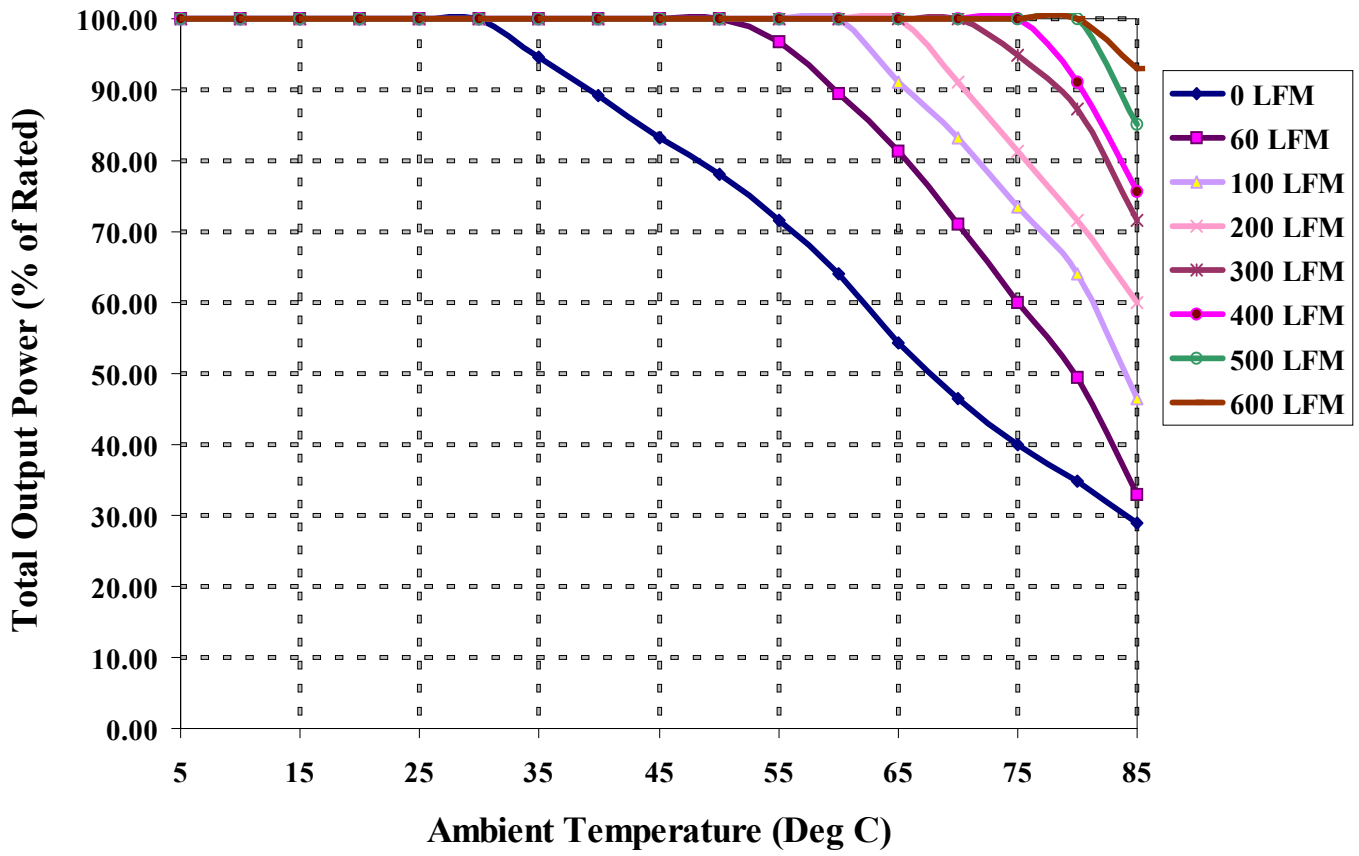
Thermal Derating (WPA60R48D3312)

Output Current v/s Temperature Vin = 48Vdc

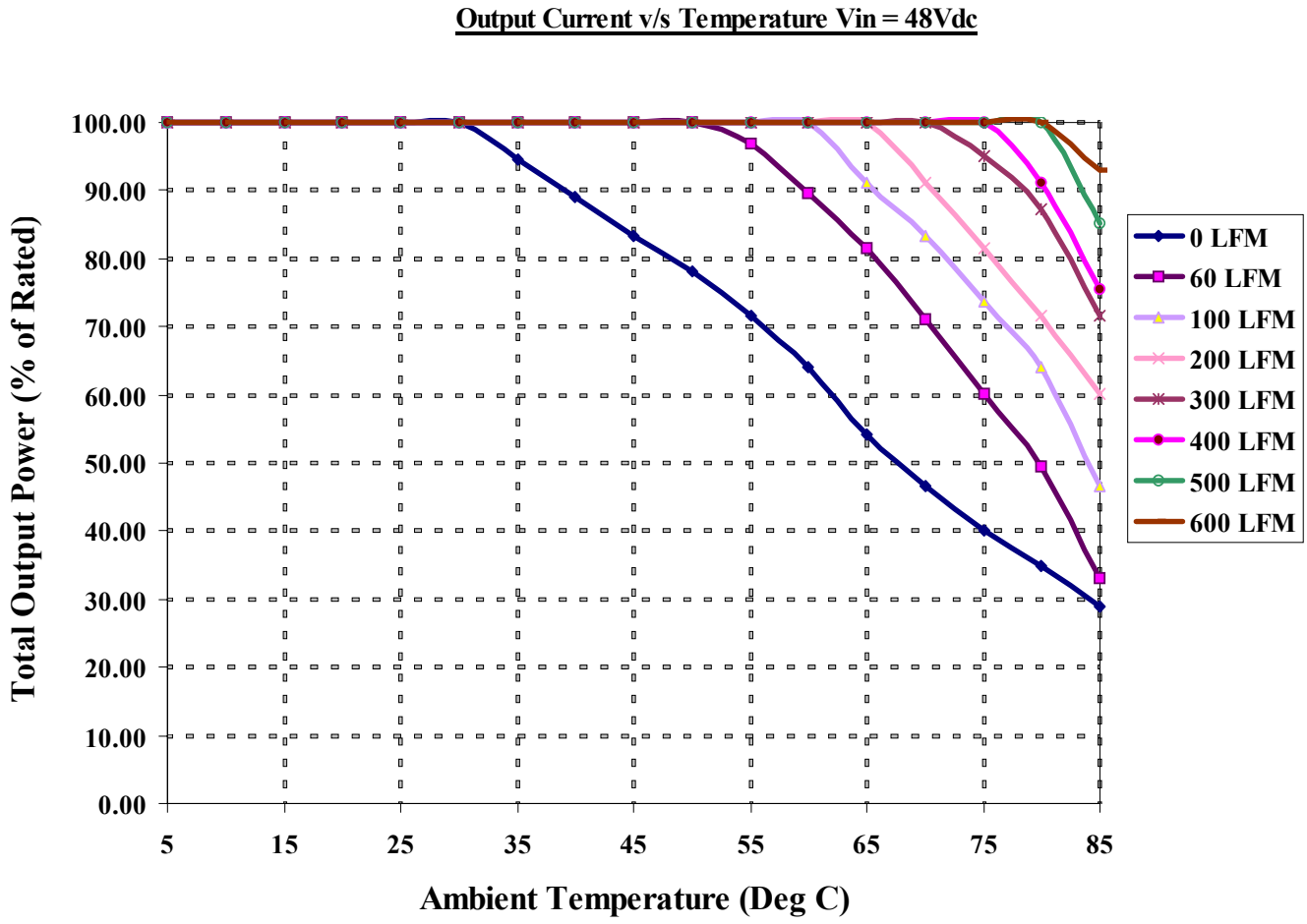


Thermal Derating (WPA60R48D2518)

Output Current v/s Temperature Vin = 48Vdc

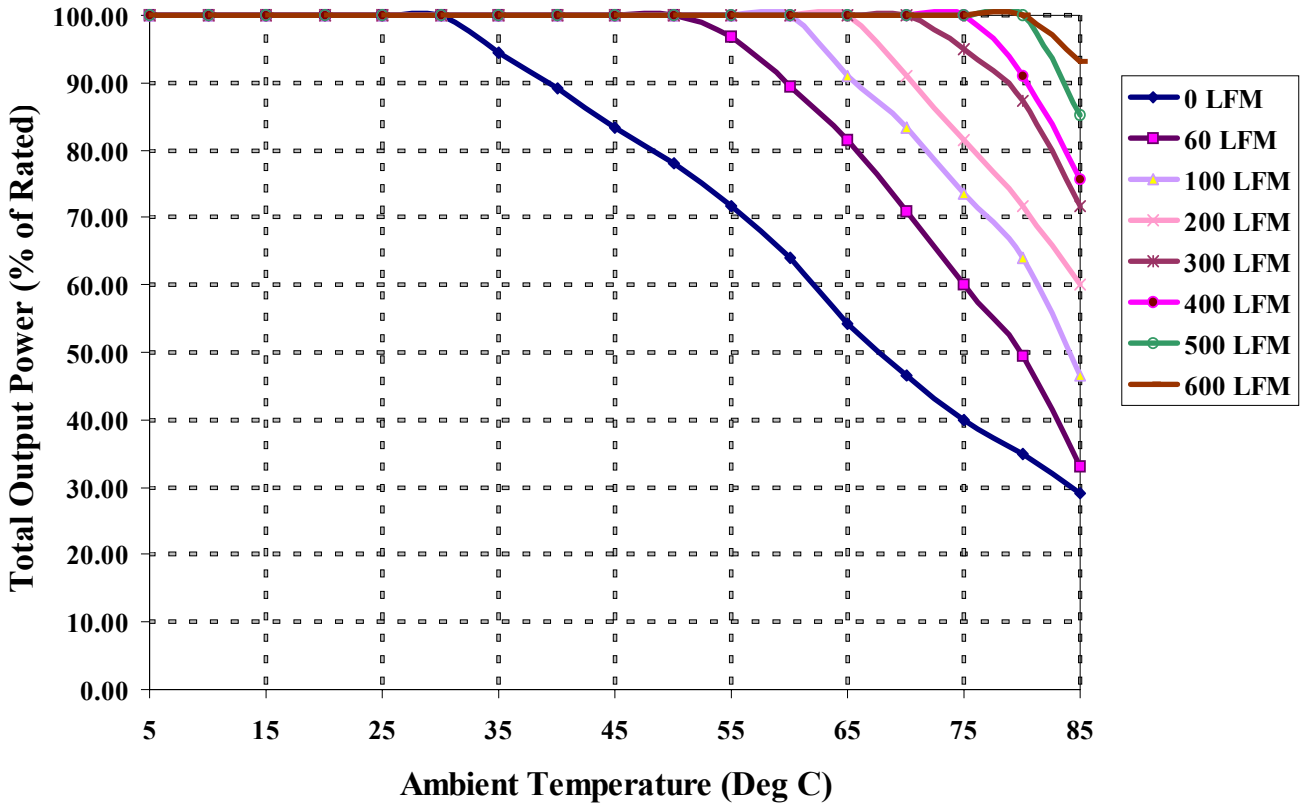


Thermal Derating (WPA60R48D2215)



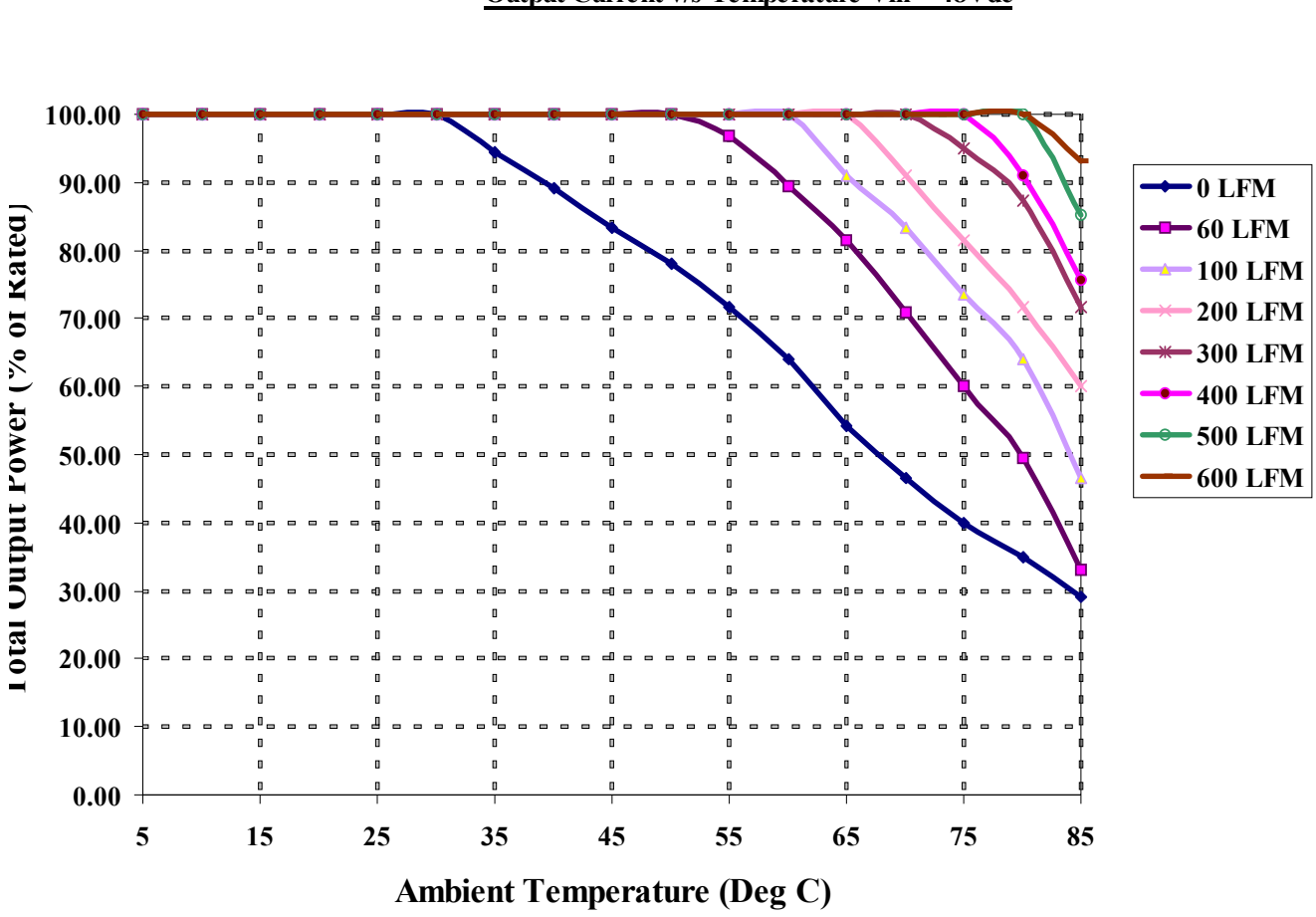
Thermal Derating (WPA60R48D1812)

Output Current v/s Temperature Vin = 48Vdc



THERMAL DERATING CURVES

Thermal Derating (WPA60R48D1510)



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