

1 TPS92314 DIM Experimental Results (230VAC)

2 Specifications

- Input Power $\approx 8W$
- Output Power $\approx 7W$
- Line Voltage = 200~240VAC
- Line Frequency = 50Hz
- LED Forward Voltage = 20V
- LED Current $\approx 350mA$
- Efficiency > 80% @230VAC
- Power Factor ≥ 0.9
- Topology: Single-stage buck-boost
- Solution size: 56mm (L) x 22mm (W) x 14mm (H)

3 Test Equipment

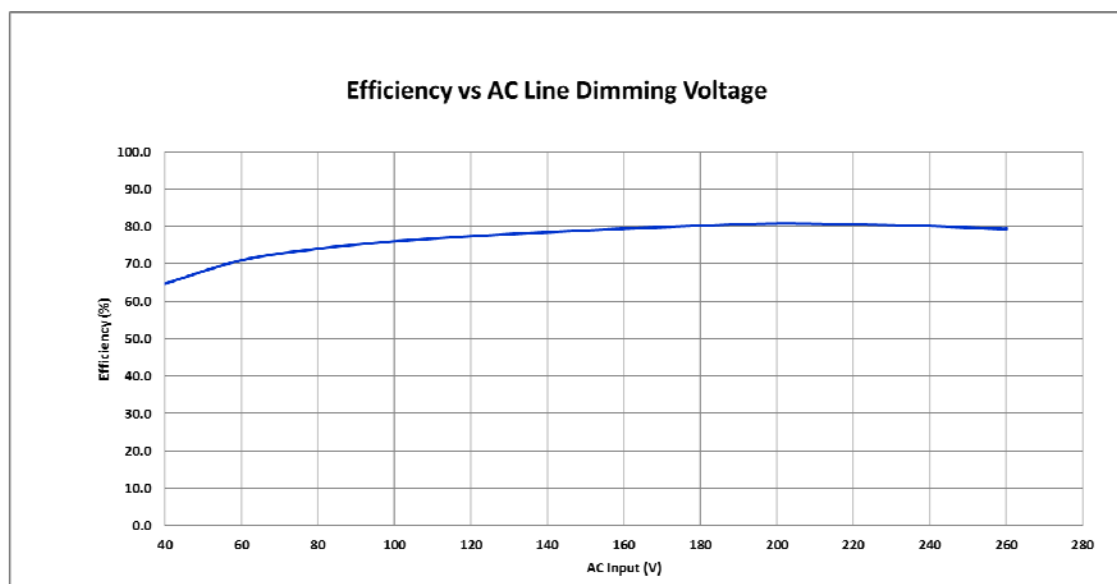
- Voltage Source: 190 V_{RMS} to 265 V_{RMS} isolated AC source PCR500LA (KIKUSUI)
- Multi meters: Agilent 34401A
- Power Meter: YOKOGAWA WT210
- Output Load: 7 LEDs in series (VF = 3 V at 350mA per LED)
- Oscilloscope: TDS3045C (TEKTRONIX)
- Operating Temperature: 25°C
- Recommended Wire Gauge: 18 AWG not more than two feet long

4 Performance Data and Typical Characteristic Curves.

Preset Voltage (V)	40	60	80	100	120	140	160	160	180	200	220	240	260
Frequency (Hz)	50	50	50	50	50	50	50	50	50	50	50	50	50
Input Voltage (V)	40.0	60.0	80.0	100.0	120.0	140.0	160.1	160.1	180.0	200.1	220.1	240.1	260.2
Input Current (A)	0.021	0.029	0.034	0.037	0.040	0.041	0.043	0.043	0.045	0.046	0.043	0.040	0.038
Input Power (W)	0.82	1.72	2.68	3.66	4.66	5.68	6.70	6.72	7.75	8.79	8.91	9.02	9.13
Power Factor	0.961	0.983	0.986	0.986	0.983	0.979	0.973	0.974	0.967	0.960	0.947	0.932	0.915
Output Voltage (V)	18.38	18.74	19.02	19.25	19.46	19.64	19.81	19.84	20.00	20.15	20.15	20.18	20.11
Output Current (A)	0.029	0.065	0.104	0.145	0.185	0.227	0.269	0.269	0.311	0.353	0.356	0.358	0.360
Output Power (W)	0.53	1.22	1.99	2.78	3.61	4.46	5.32	5.34	6.22	7.11	7.18	7.23	7.24
Efficiency (%)	64.7	71.0	74.1	76.1	77.4	78.5	79.4	79.4	80.2	80.8	80.6	80.1	79.3

4.1.1 Table 1 Test Data from 60VAC to 260VAC/50Hz

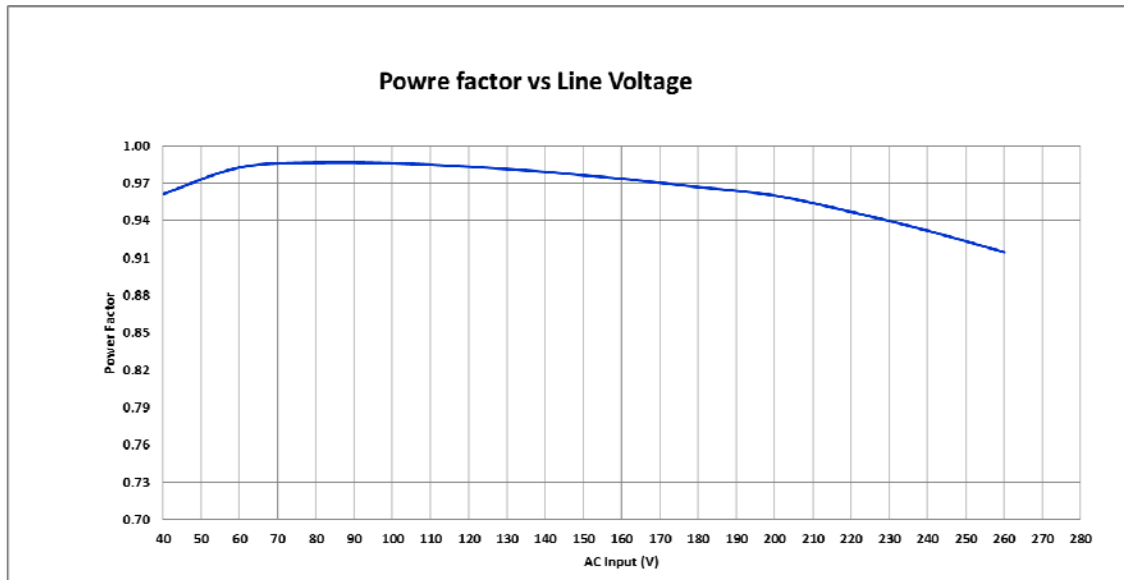
1. Efficiency



4.2

4.2.1 Figure 2 Efficiency vs. Line Voltage from 40VAC to 260VAC/50Hz

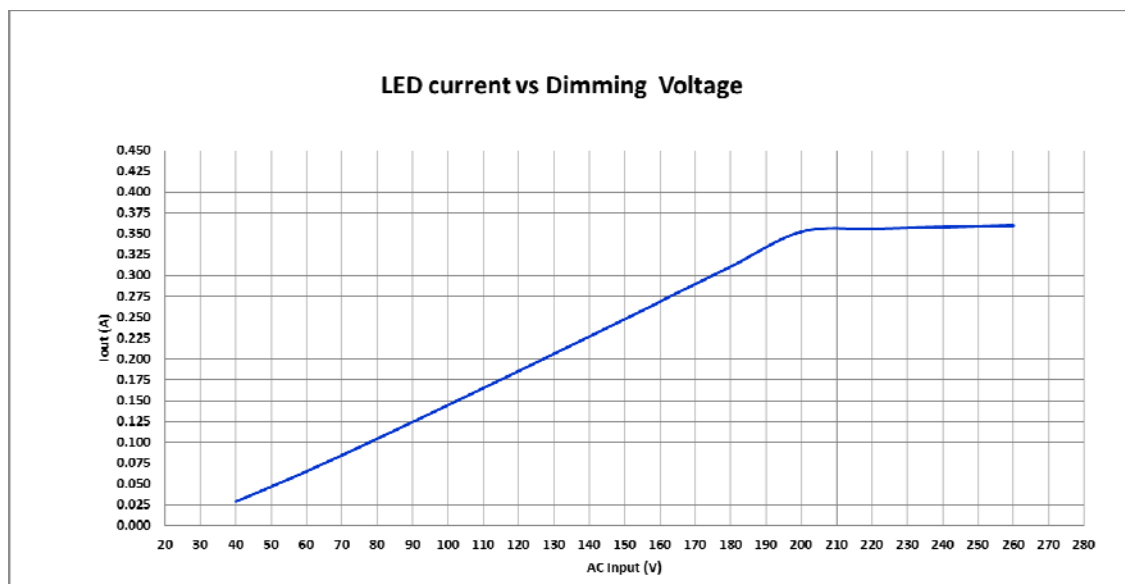
2. Power Factor



4.3

4.3.1 Figure 3 Power Factor vs. Line Voltage from 40VAC to 260VAC/50Hz

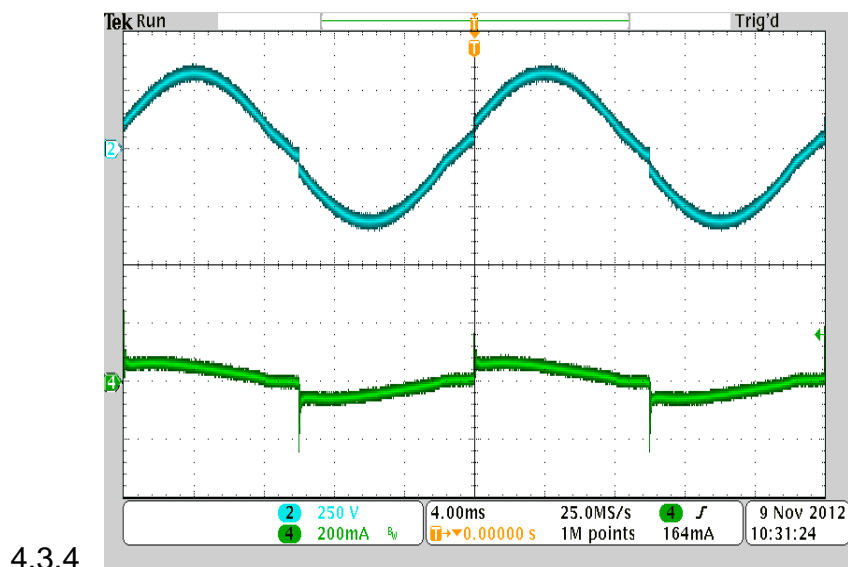
3. LED Current vs Line Voltage



4.3.2

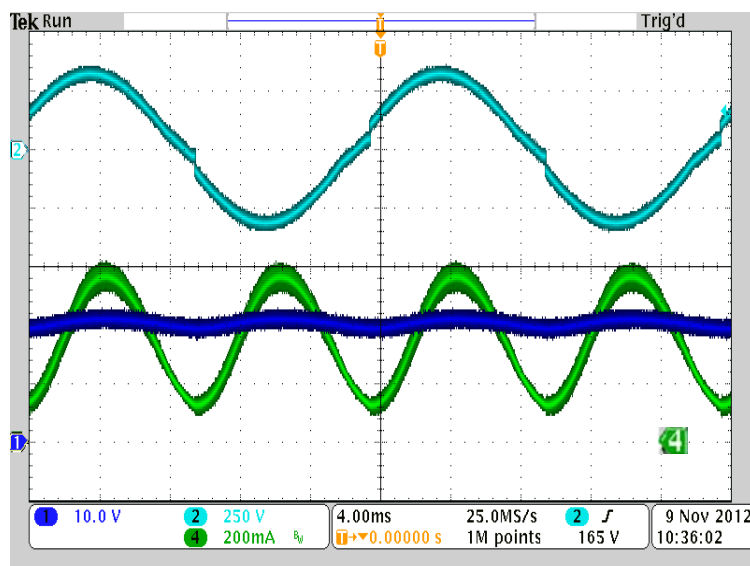
4.3.3 Figure 4 ILED vs. AC Line Dimming Voltage from 40 to 260VAC/50Hz.

1. Input and Line Voltage Waveforms vs. Dimmer Setting



4.3.5 Figure 5 Dimmer Full ON

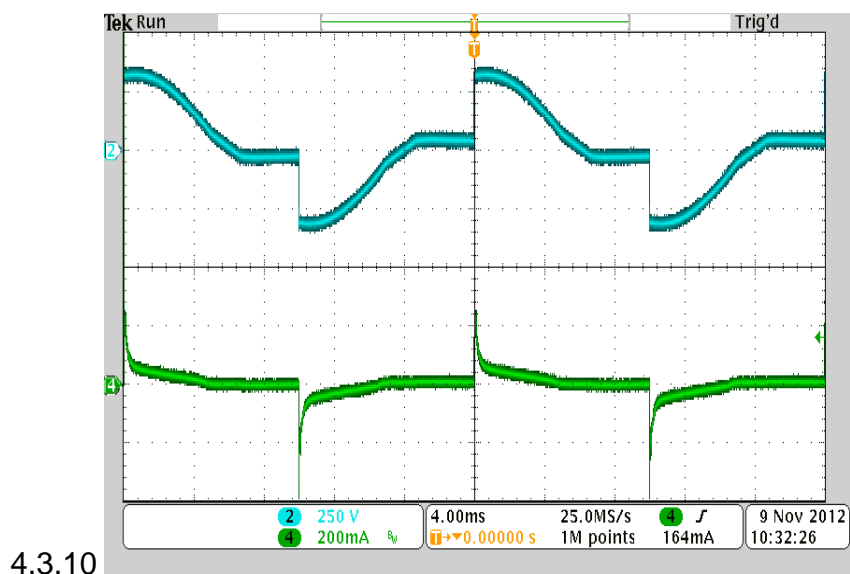
4.3.6 CH2– Input Voltage; CH4– Input current



4.3.7 Figure 6 Dimmer FULL ON

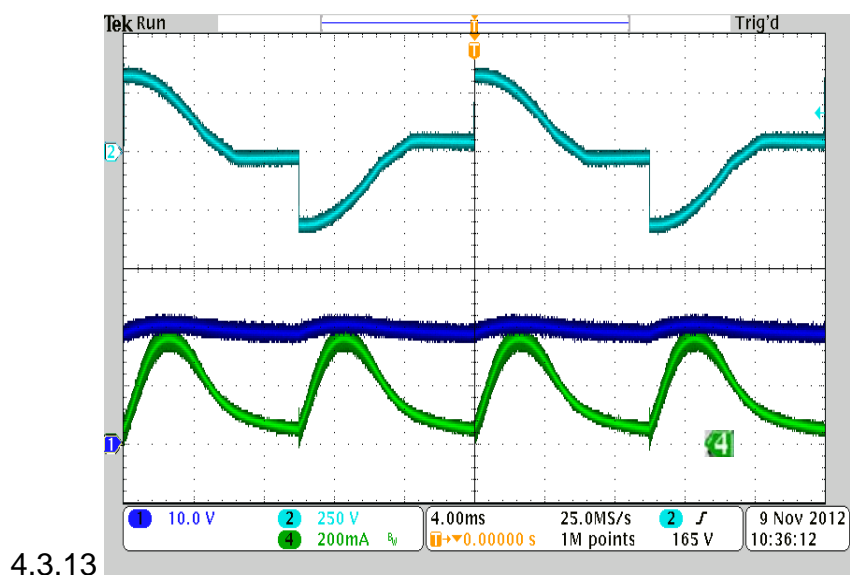
4.3.8 CH1– Output Voltage; CH2– Input Voltage; CH4– Output current

4.3.9 Input and Line Voltage Waveforms vs. Dimmer Setting



4.3.11 Figure 7 Dimmer 50% ON

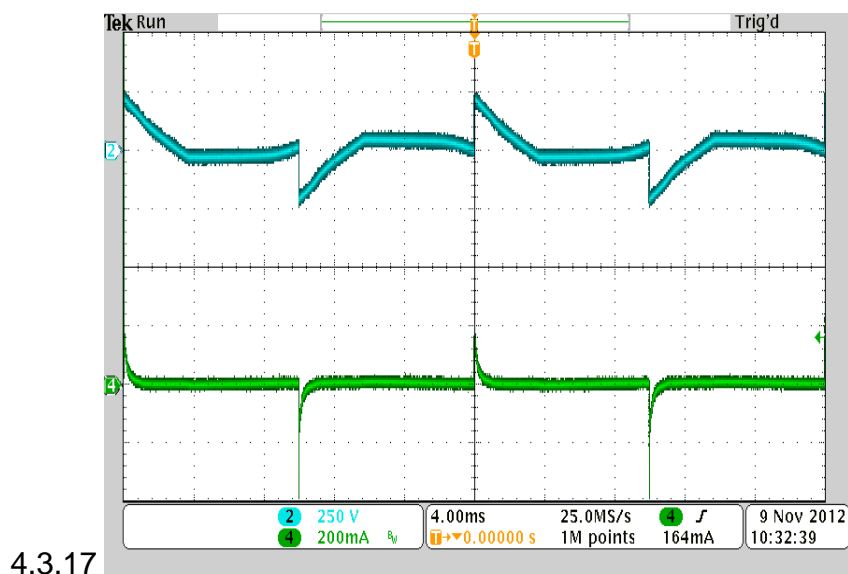
4.3.12 CH2– Input Voltage; CH4– Input Current



4.3.14 Figure 8 Dimmer 50% ON

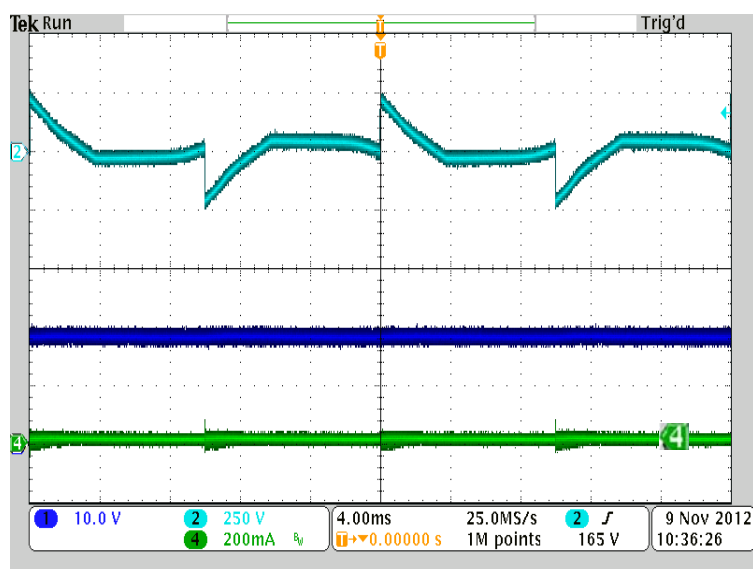
4.3.15 CH1– Output Voltage; CH2– Input Voltage; CH4– Output Current

4.3.16 Input and Line Voltage Waveforms vs. Dimmer Setting



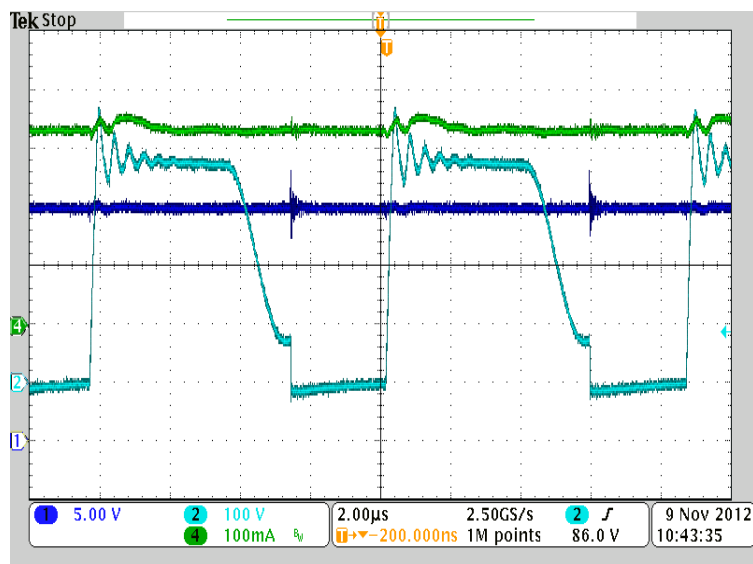
4.3.18 Figure 9 Dimmer minimum ON

4.3.19 CH2– Input Voltage; CH4– Input Current



4.3.21 CH1– Output Voltage; CH2 – Input Voltage; CH4 – Output Current

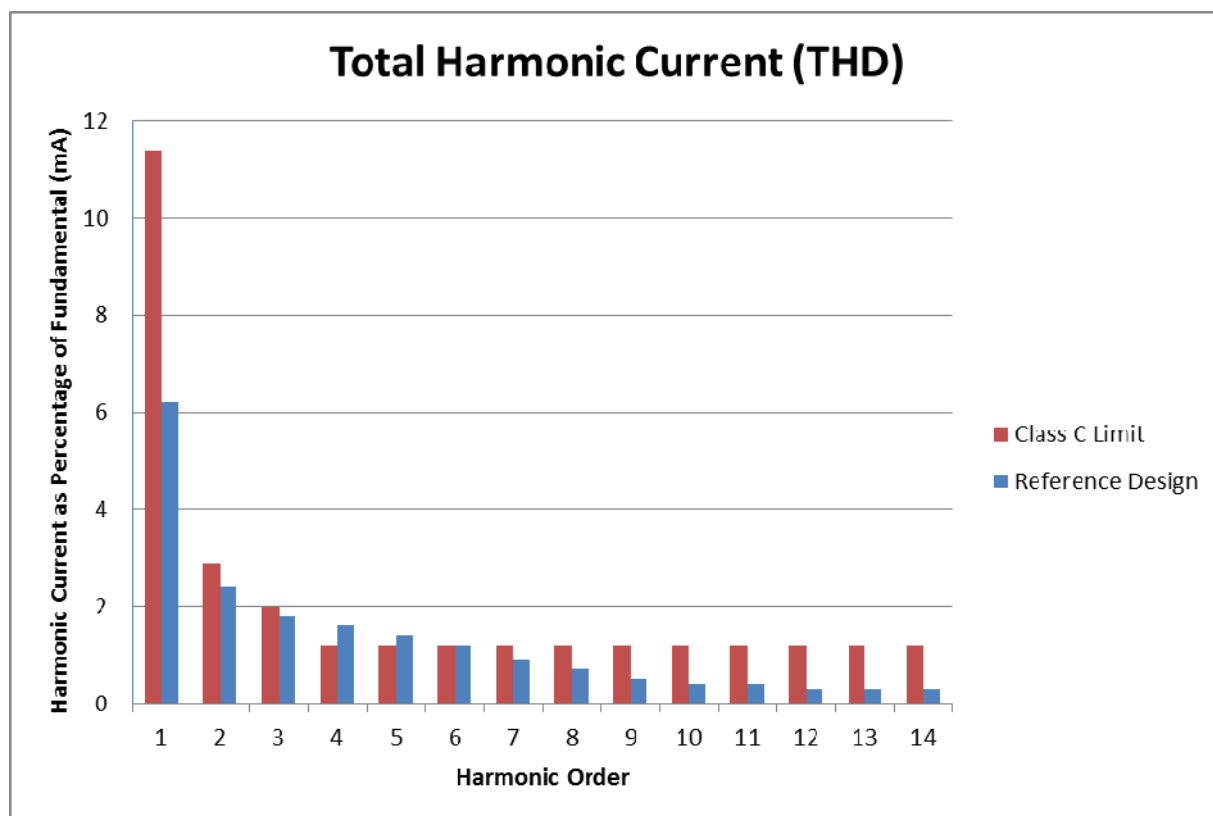
2. Switch Node Voltage Valley Switching



4.3.22 Figure 11 Switch Node and Output Current Waveform

4.3.23 CH1 – Output Voltage; CH2 – Switch Node LX; CH4 – Output Current

4.3.24 Total Harmonic Distortion



4.3.25 Figure 12 Current Harmonic Performance vs. EN/IEC61000-3-2 Class C Limits at 230VAC/50Hz

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