PMP4325: AC/DC LED Driver for GU10 _China Power Reference design

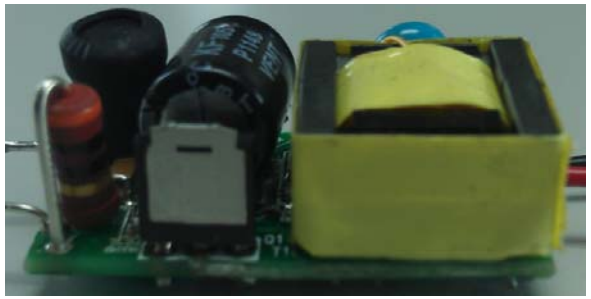
Reference Design	TI Parts	V_{in}	Po	Vo Io	Topology	# of LED	Dimming	Eff.
AC Input GU10 AC/DC LED Lighting Driver	TPS92310	85~ 277 Vac	4.2 W	8V~13V 350mA	Isolated Flyback with Primary Side Regulator	3~4	no	81%

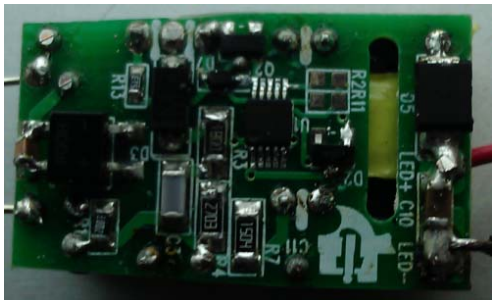
Features

- Isolated Flyback with Primary Side Control
- Low total BOM cost
- Efficiency >79% at 230Vac input
- Output Short Circuit Protection
- Output Over Voltage/Open protection
- Allow no Y CAP application
- Output ripple current: <30% of output current
- Size: 30mmX18mmx10mm (ultra-slim, suitable for GU10 form factor)

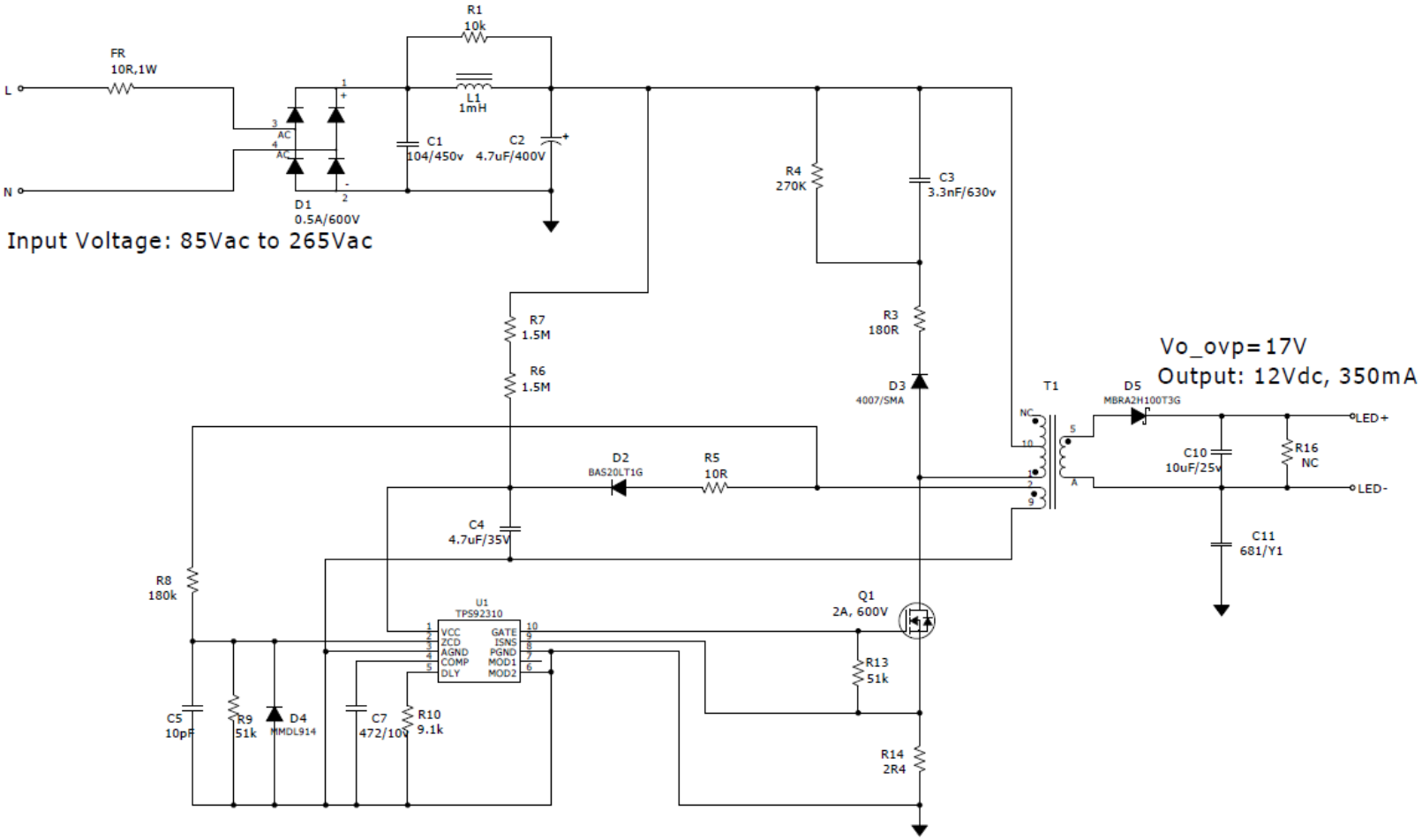
Applications

- GU10 replacement LED lighting
- Wall-wash LED lighting
- Residential/Commercial LED lighting



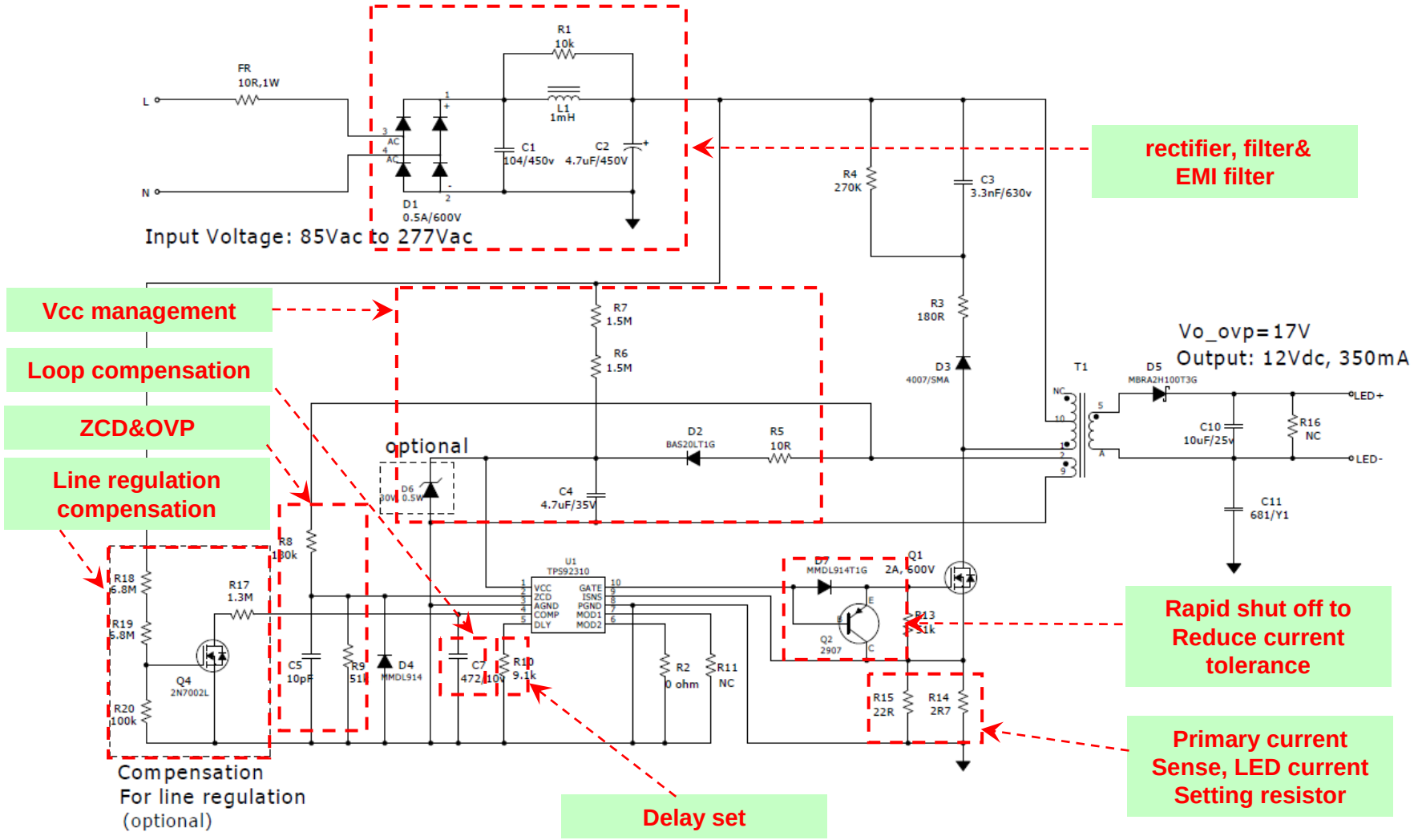


PMP4325: Standard Circuit Of GU10 Design



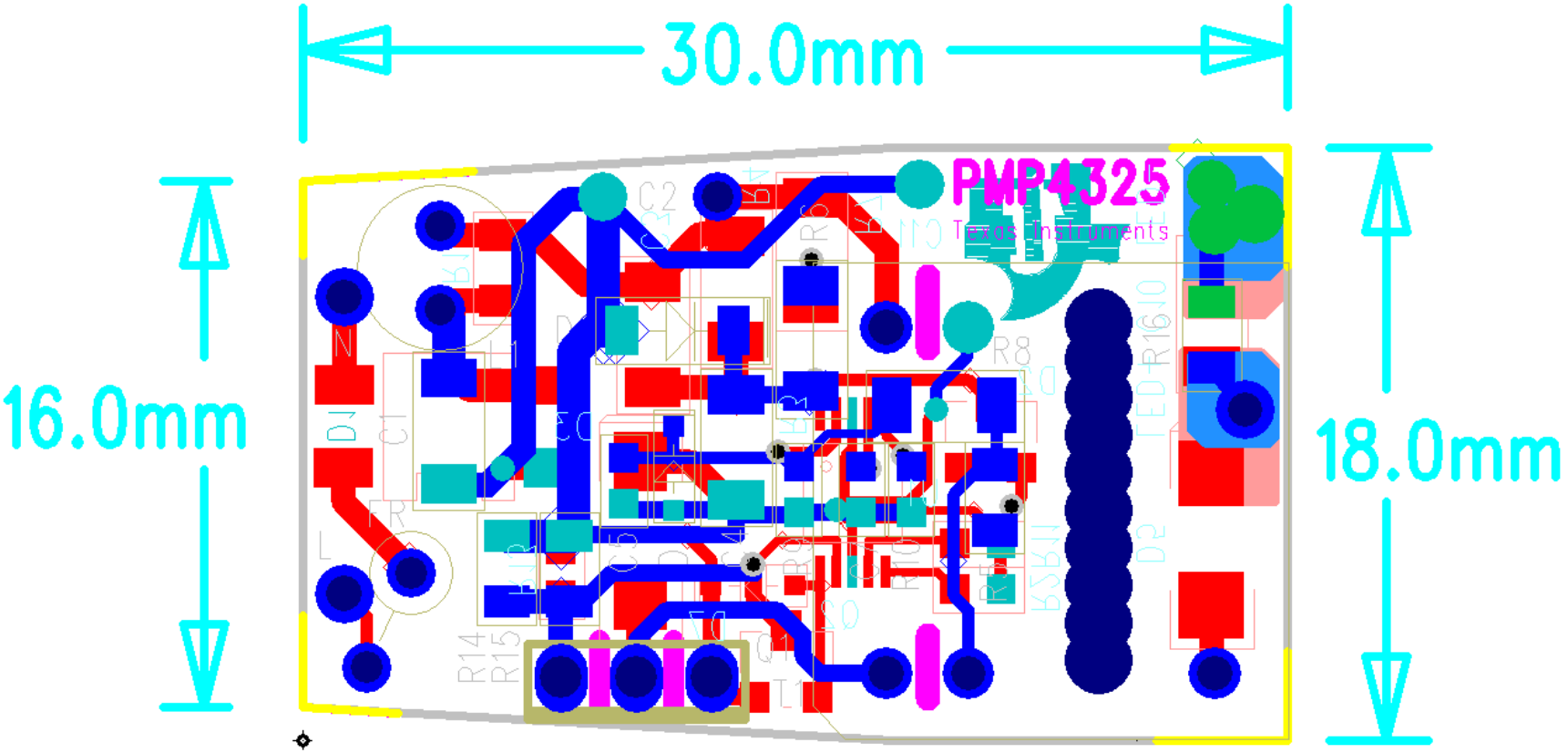
Note: this schematic can be used as application circuit of GU10

PMP4325: Schematics Of GU10 Reference Design

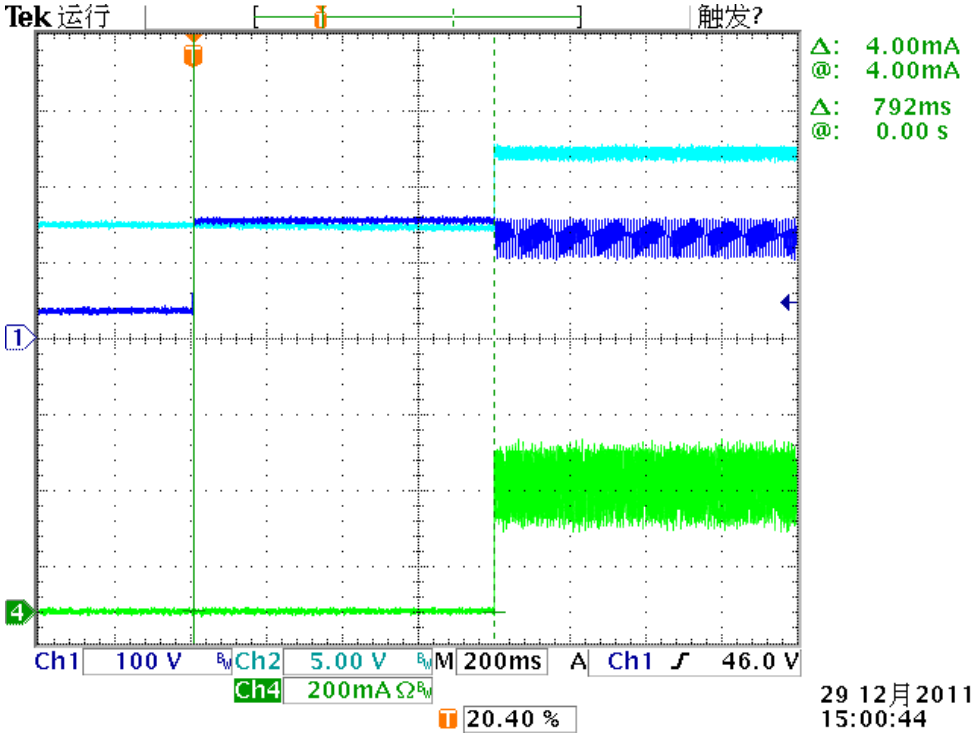


Note: Demo board based on this schematic without external compensation

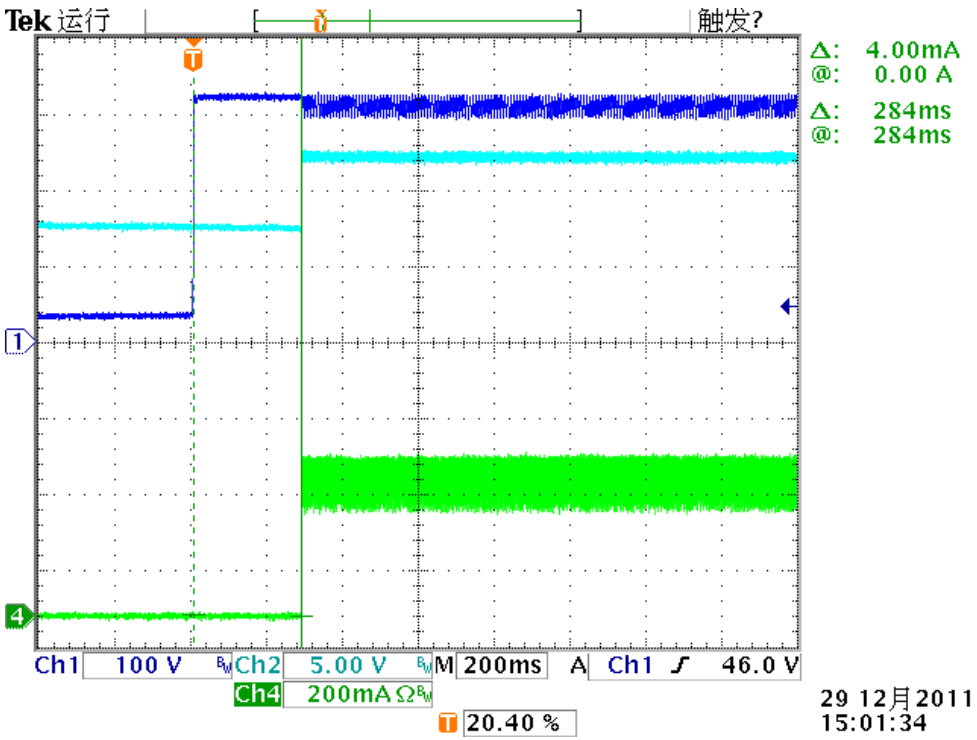
PMP4325: PCB Layout



PMP4325: Start up waveform

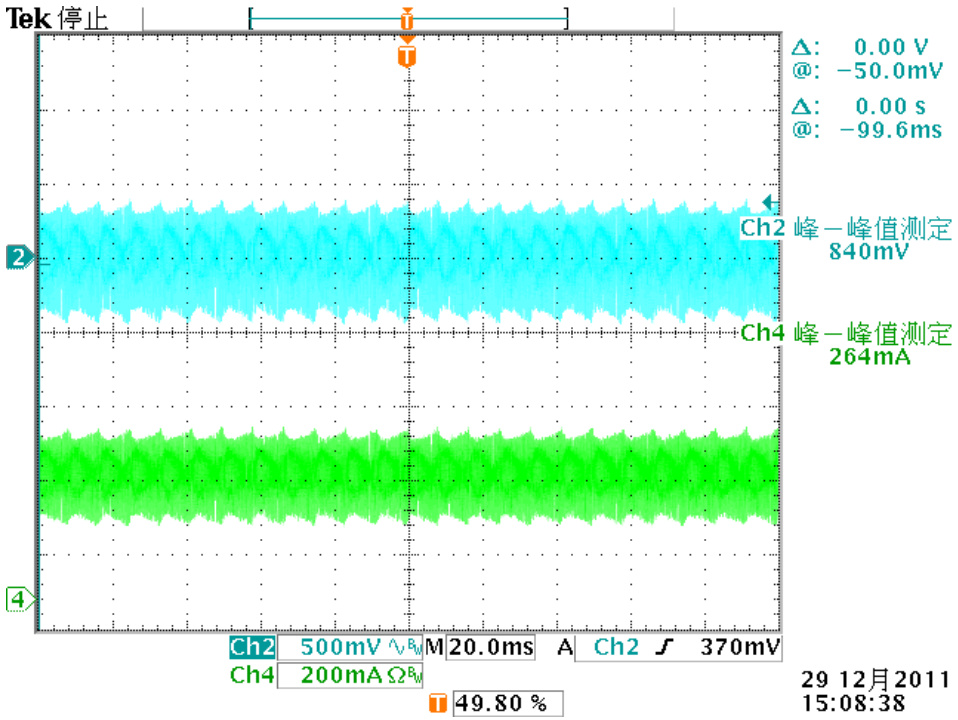


Vin:110Vac Io: full load (LED Lamp Load)
Ch1: Input bulk CAP voltage 100V/div
Ch2: LED voltage, 5V/div
Ch4: LED current 200mA/div

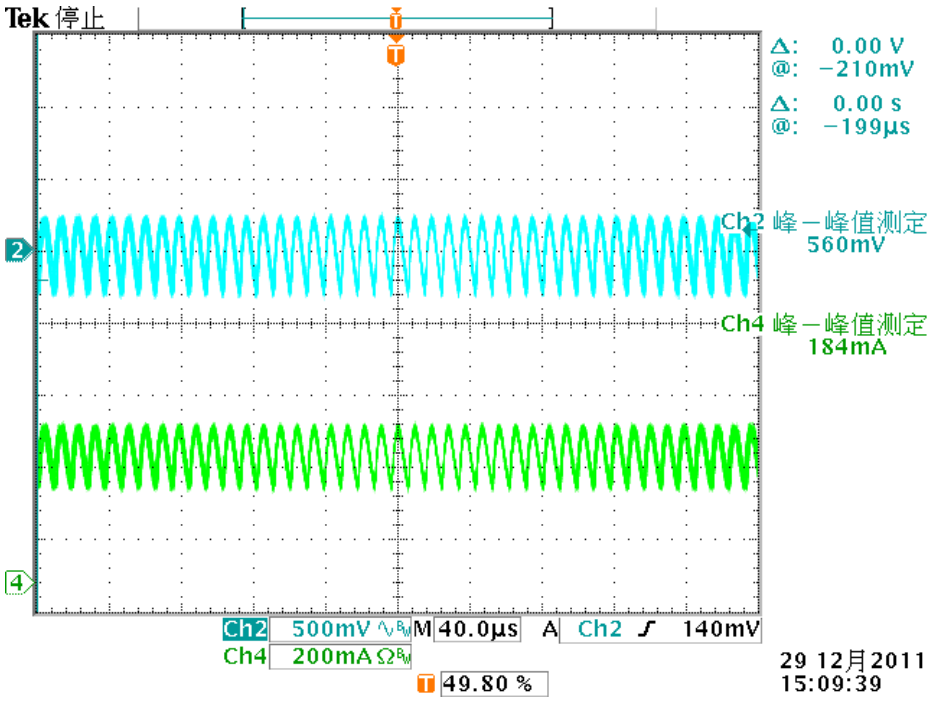


Vin:230Vac Io: full load (LED Lamp Load)
Ch1: Input bulk CAP voltage 100V/div
Ch2: LED voltage, 5V/div
Ch4: LED current 200mA/div

PMP4325: Output Ripple Voltage And Current

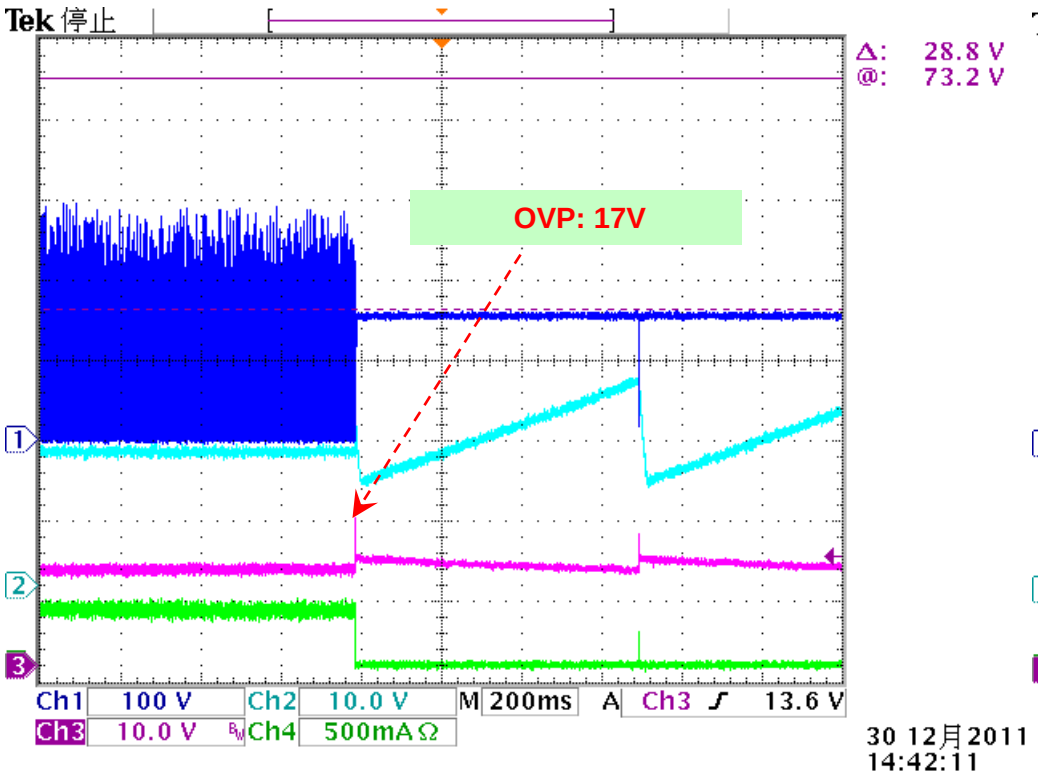


Vin:110Vac Io: LED load (LED Lamp Load)
Ch2: LED ripple voltage 500mV/div
Ch4: LED current 200mA/div

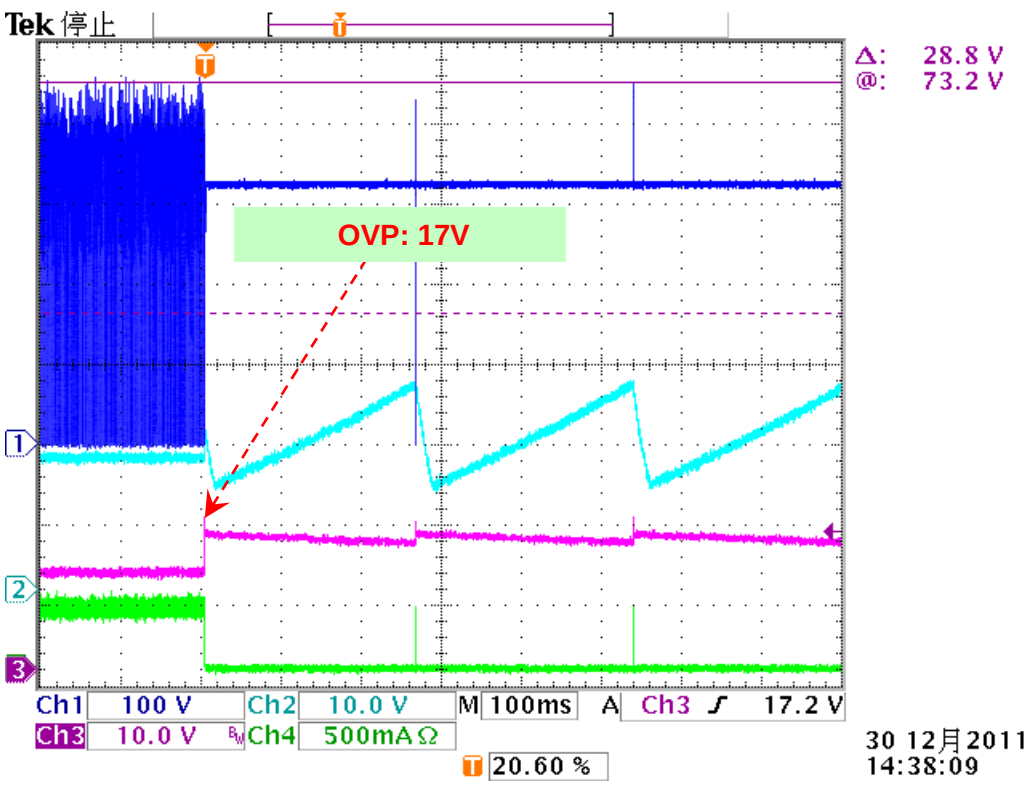


Vin:230Vac Io: LED load (LED Lamp Load)
Ch2: LED ripple voltage 500mV/div
Ch4: LED current 200mA/div

PMP4325: Output Open LED and OVP

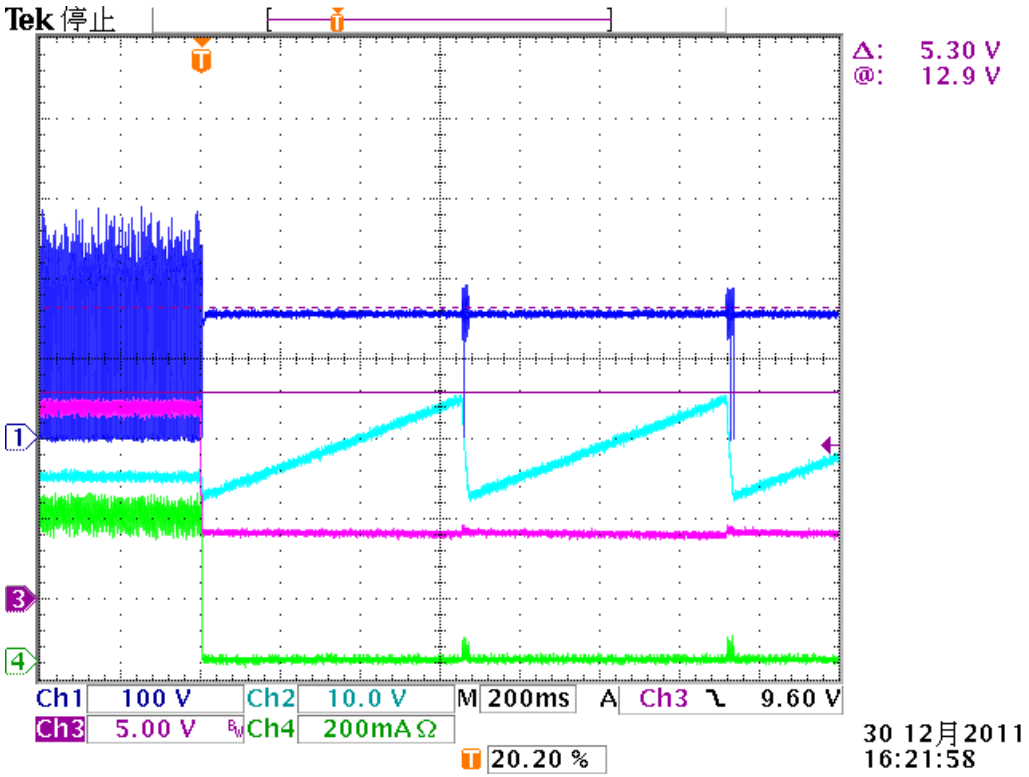


Vin:110Vac OVP and open LED protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: LED current, 500mA/div

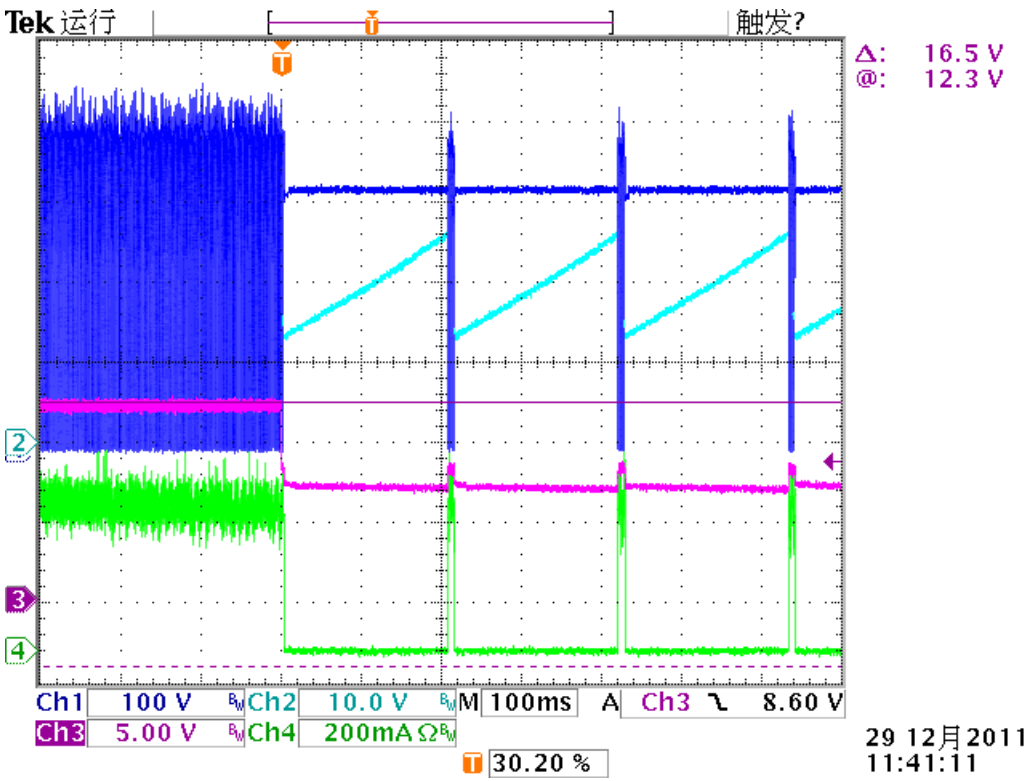


Vin:230Vac OVP and open LED protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: LED current, 500mA/div

PMP4325: Shorting 2 LEDs

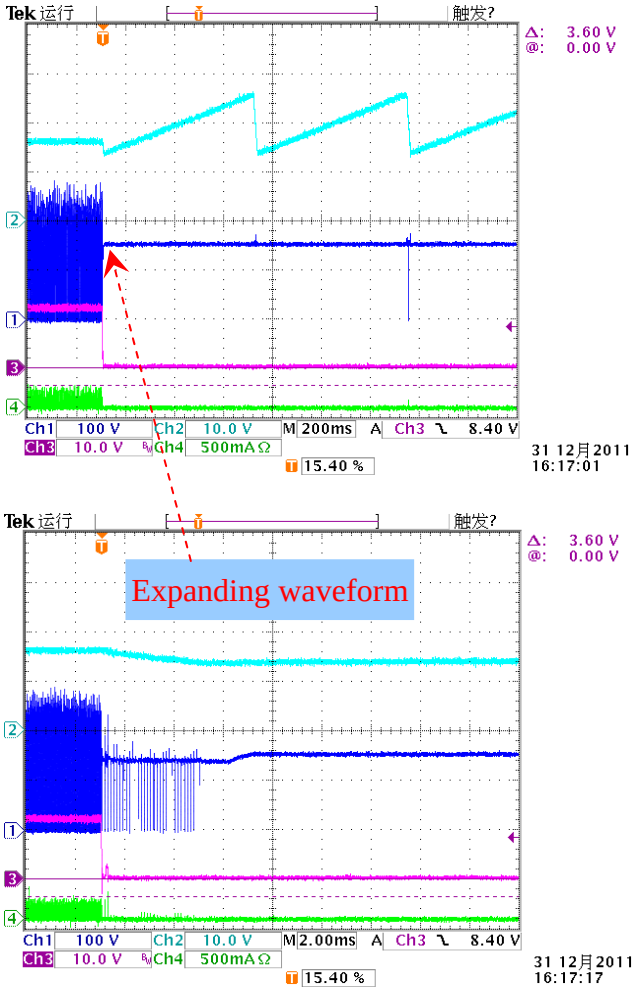


Vin:110Vac two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 5V/div
Ch4: LED current, 200mA/div

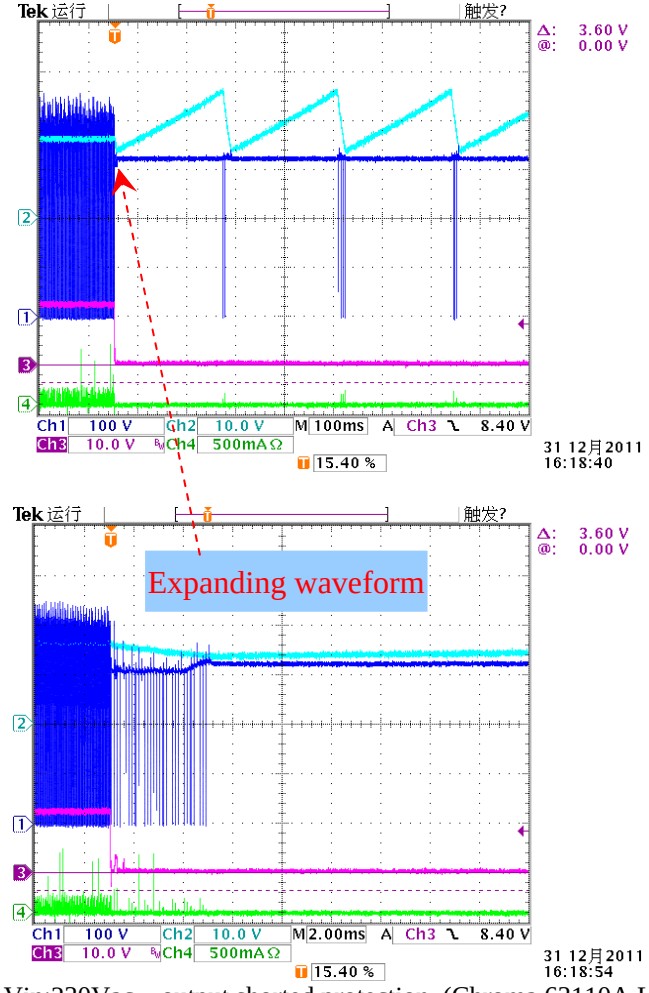


Vin:230Vac two LEDs shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 5V/div
Ch4: LED current, 200mA/div

PMP4325: Output Short-Circuit Protection

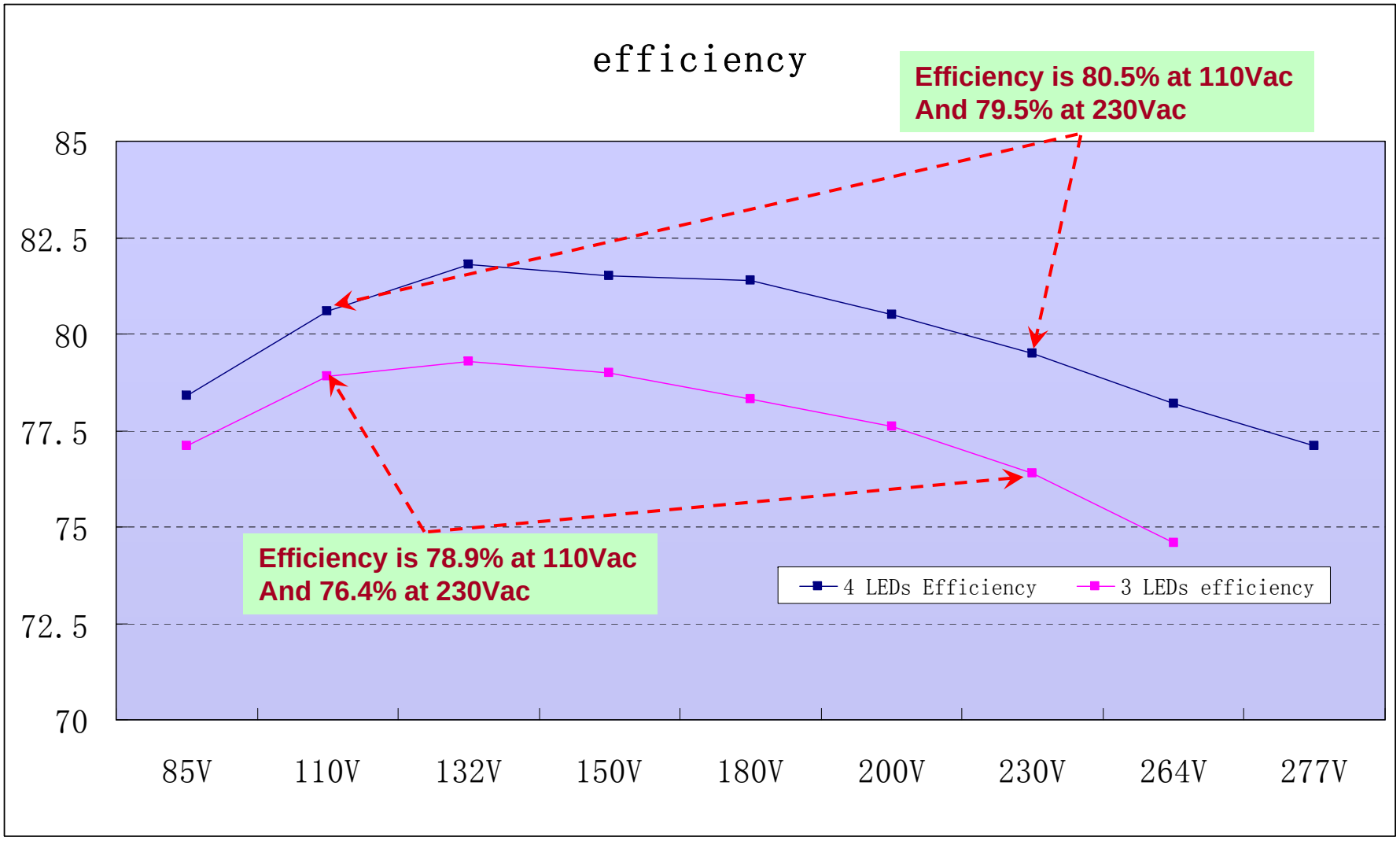


Vin:110Vac output shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: Primary current, 500mA/div

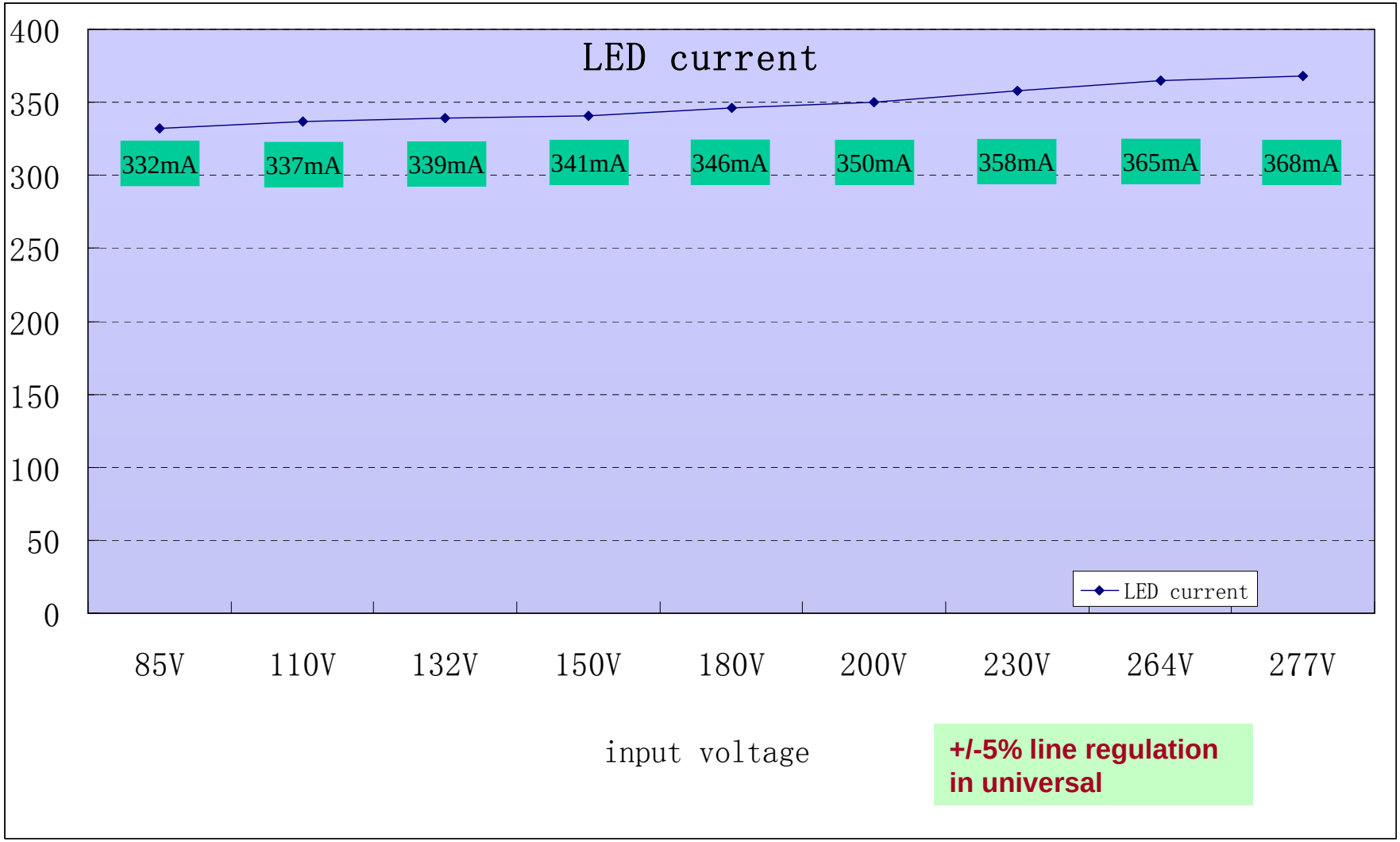


Vin:230Vac output shorted protection (Chroma 63110A LED load)
Ch1: Mosfet Vds, 100V/div
Ch2: Vcc, 10V/div
Ch3: LED voltage, 10V/div
Ch4: Primary current, 500mA/div

PMP4325: Efficiency Vs Input Voltage

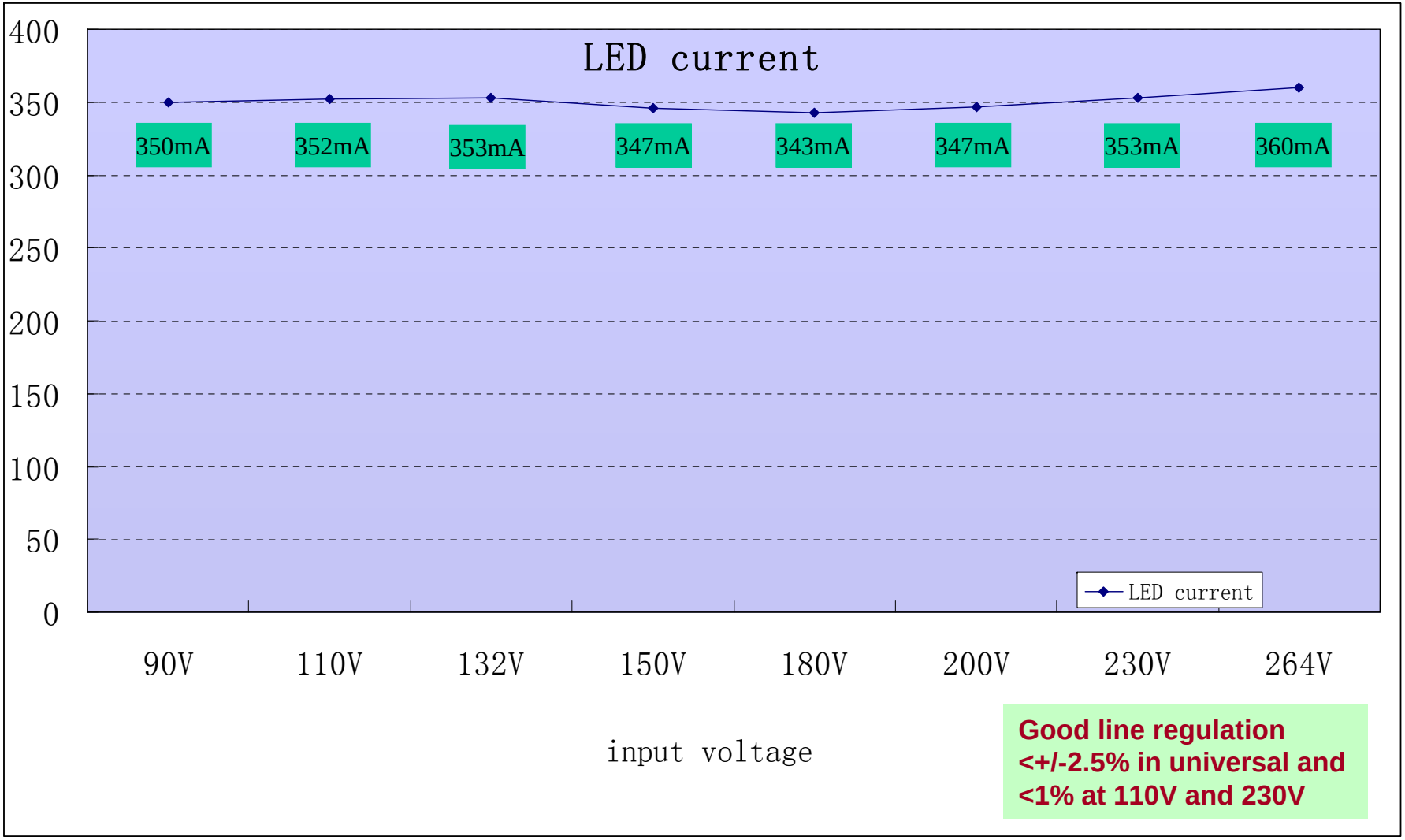


PMP4325: Line Regulation



+/-5% line regulation in universal

PMP4325: Line Regulation With Compensation Circuit



Good line regulation <+/-2.5% in universal and <1% at 110V and 230V

PMP4325: EMI Test report
4 LEDs GU10 Load

Vin: 230Vac Line Io: full load

EMI TEST REPORT

parameter

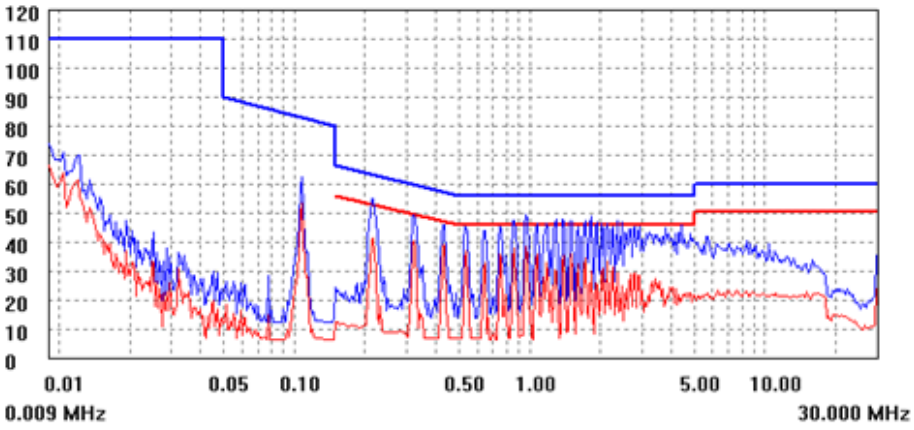
Organization: Ti		Operator:	david dou	EUT:	GU10
Place:		Time:	2011/12/28/18:43		
Detector:	PK+AV	Test-time[ms]:	30		
Limit:	EN55015	Transductor[PK/AV]:	PK1 / AV1		
Remark:					

freq, step

Start[MHz]	End[MHz]	Step[MHz]
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV



Vin: 230Vac Neutral Io: full load

EMI TEST REPORT

parameter

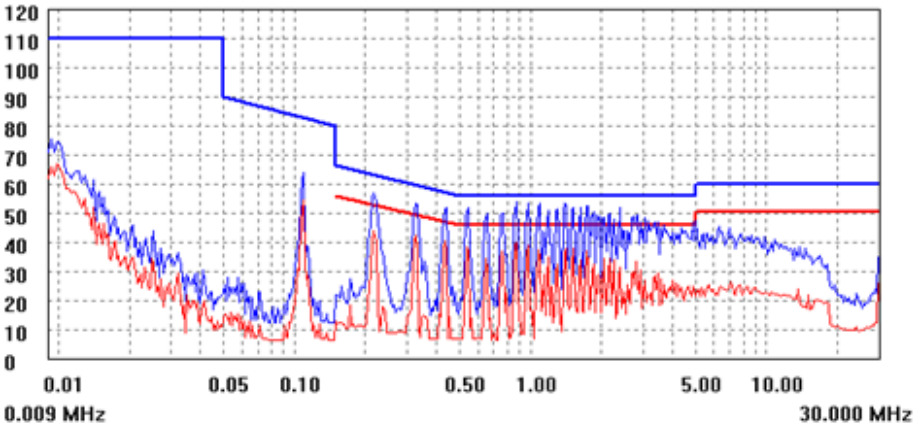
Organization: Ti		Operator:	david dou	EUT:	GU10
Place:		Time:	2011/12/28/18:40		
Detector:	PK+AV	Test-time[ms]:	30		
Limit:	EN55015	Transductor[PK/AV]:	PK1 / AV1		
Remark:					

freq, step

Start[MHz]	End[MHz]	Step[MHz]
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV



PMP4325: EMI Test report
3 LEDs GU10 Load

Vin: 230Vac Line Io: full load

EMI TEST REPORT

parameter

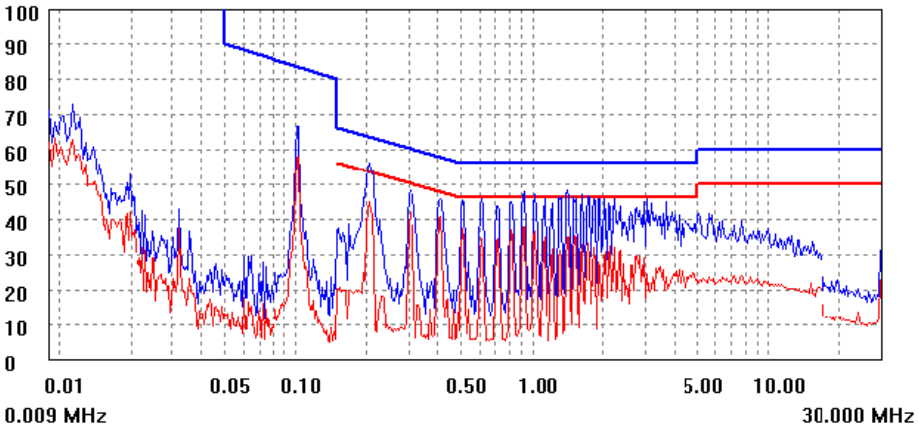
Organization:	Operator:	EUT:
Place:	Time: 2012/2/2/16:45	
Detector: PK+AV	Test-time(ms): 30	
Limit: EN55015	Transductor(PK/AV): PK1 / AV1	
Remark:		

freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV



Vin: 230Vac Neutral Io: full load

EMI TEST REPORT

parameter

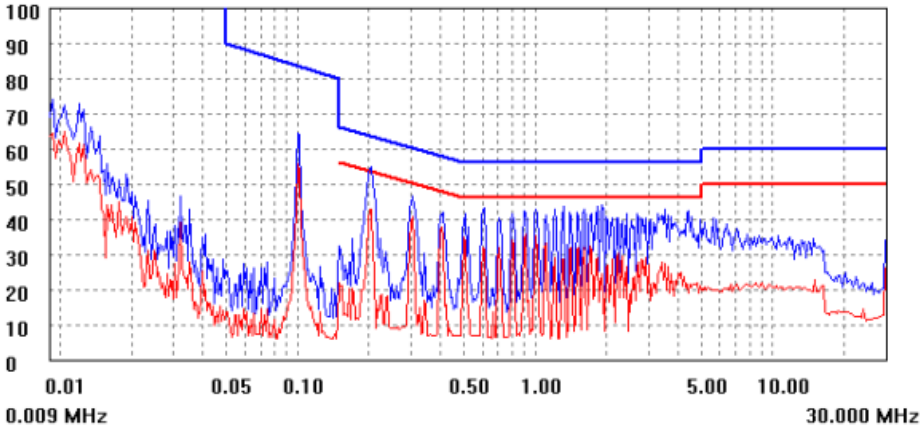
Organization:	Operator:	EUT:
Place:	Time: 2012/2/2/16:47	
Detector: PK+AV	Test-time(ms): 30	
Limit: EN55015	Transductor(PK/AV): PK1 / AV1	
Remark:		

freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV



PMP4325: EMI Test report
3 LEDs GU10 Load, No Y-CAP

Vin: 230Vac Line Io: full load

EMI TEST REPORT

parameter

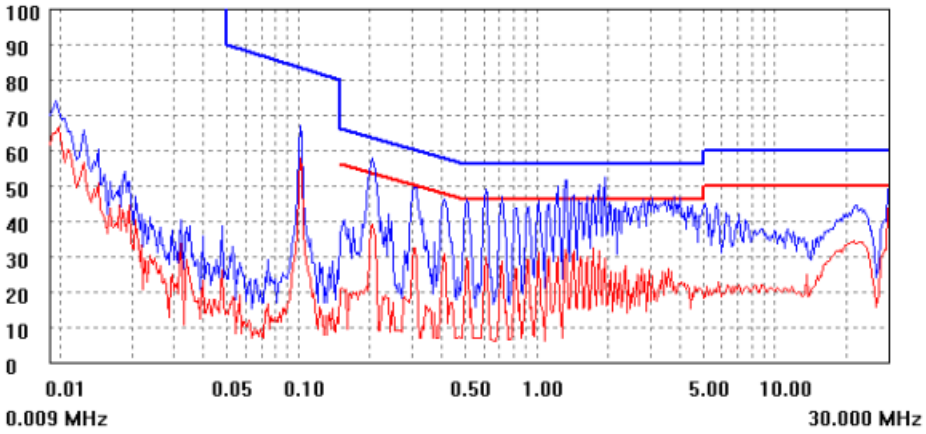
Organization:	Operator:	EUT:
Place:	Time: 2012/2/2/16:58	
Detector: PK+AV	Test-time(ms): 30	
Limit: EN55015	Transductor(PK/AV): PK1 / AV1	
Remark:		

freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV



Vin: 230Vac Neutral Io: full load

EMI TEST REPORT

parameter

Organization:	Operator:	EUT:
Place:	Time: 2012/2/2/17:2	
Detector: PK+AV	Test-time(ms): 30	
Limit: EN55015	Transductor(PK/AV): PK1 / AV1	
Remark:		

freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.000
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

scan result

dBuV