



ON Semiconductor

ENERGY STAR® Compliant - Low Cost LED Dimming

Device	Application	Input Voltage	Output Power	Topology	I/O Isolation
NSIC2050 NSI5010	AC LED Dimmable	100 – 127 Vac	6 W	Bridge + CCR and PWM Sensing	No

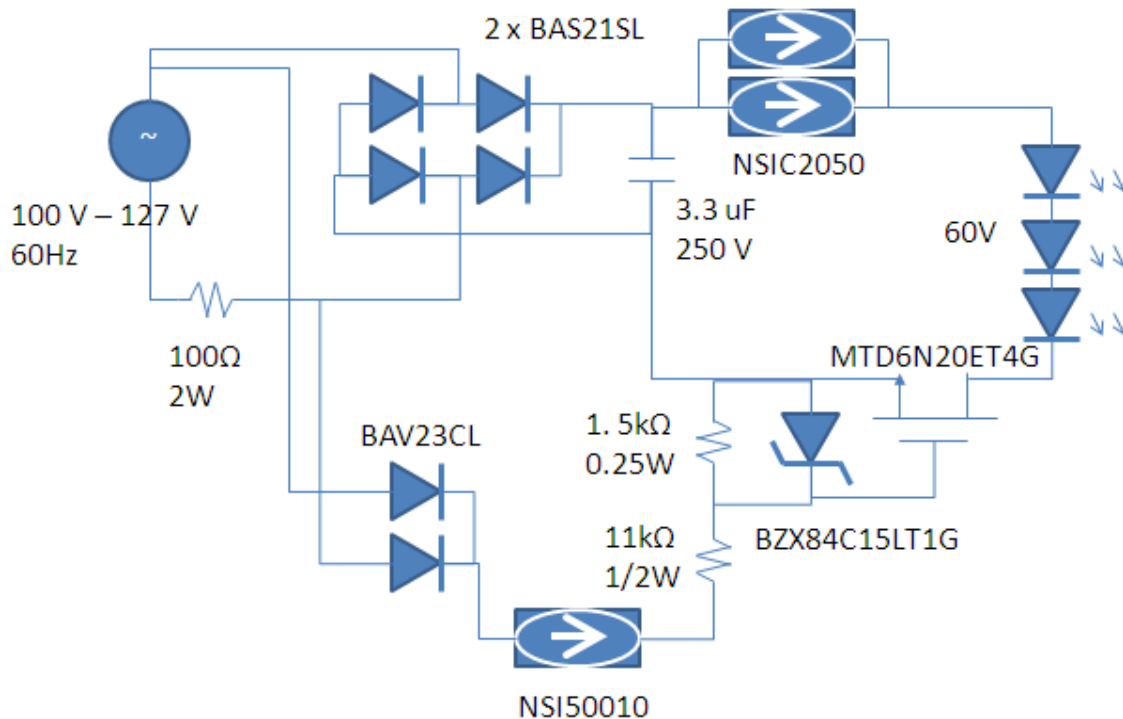


Figure 1 – CCR with dimmable interface

Circuit Description

This circuit can be thought of as having two separate portions. There is a LED management portion and there is a dimmer management and PWM Signal portion.

The LED management portion charges the output capacitor to a “DC” state. The dimmer management portion provides loading current for an SCR in a dimmer and provides a gate voltage to the series pass MOSFET. The gate drive of the series MOSFET PWMs the LEDs at their peak current rating. The NSIC2050 Constant Current Regulators provides over current and over voltage protection to the LEDs. The NSI5010 limits the power consumption of the dimmer management circuit.

For optimal performance the gate voltage of the MOSFET (driven by the voltage divider of the 11kΩ and

1.5kΩ) needs to be that of the threshold voltage when the input voltage to the circuit is at the minimum conduction angle.

Also some dimmers require 20mA of loading current so the NSI50010 can be replaced with an NSI45020AT1G, but expect extra power losses.

Key Features

- PF = 0.95
- THD = 17.5%
- Dimming a function of the Dimmer's Range
- Extremely Low BOM cost
- Works with a wide variety of Dimmers:

DN05022/D

	Output
Output Voltage	60 V
Ripple	100 %
Nominal Current	86 mA rms
Max Current	106 mA
Min Current	0 mA

PFC (Yes/No)	0.95 PF
Minimum Efficiency	60 %
Inrush Limiting / Fuse	N/A (100 Ω , 2W)

	100 V_{RMS}	127 V_{RMS}
I_{RMS(IN)}	94 mA	89 mA
PF	0.98	0.98
THD	18.6 %	17.5 %
I_{RMS(out)}	96 mA	91 mA
P_(in)	8.8 W	10.7 W

Manufacturer	Serial Number	Notes
Lutron	500-15591A	Smooth Dim Below 30%
Lutron	TGCL-153PH	Smooth Dim Below 5%
Lutron	CTCL-153PDH	Smooth Dim Below 5%
Pass & Seymour	450 W – CFL/LED	Smooth Dim Below 5%
Leviton	1B4105	Small Dead Travel

* - This list is compiled from a limited selection of Dimmers

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Design note created by Eric Tuffyas, e-mail: Eric.Tuffyas@onsemi.com