NXP UBA3070 demo board (version 1.11)

Description

The NXP UBA3070 demo board is intended to demonstrate the switch-mode current driving capabilities of the UBA3070 device. Emphasis is on driving LED strings of variable length and color. The LED intensity can be controlled by connecting a TTL compatible PWM signal to the PWM dim input of the demo board. High voltage (+5V w.r.t. Ground) on the PWM dim input causes the UBA3070 to enter "cycle skipping" mode, which effectively switches-off the current through the LED string. Leaving the PWM dim input unconnected results in maximum brightness of the LED string.



Figure 1 Front side and back side of the UBA3070 demo board

Flexible configuration

The default configuration of the UBA3070 demo board implements a 350mA switch-mode current source which is capable of driving LED strings that have a total voltage drop up to some 150V (some 50 Red Luxeon Lumileds or 40 Green/Blue Luxeon Lumileds in series). The maximum supply voltage is 190V. However the board can be re-configured to meet specific application needs. Components that should be changed in order to meet specific requirements include MOSFET Q1, Bipolar Transistor Q3, Inductor L1, Capacitors C1 and C6, Resistors R4, R6, R8 and R9. Please refer to the application guidelines and the UBA3070 datasheet for directions.

Main characteristics of the default configuration

Property	Value	Remark
Output current	350 mA	Selectable – see application guidelines
Supply voltage	12 – 190 V	Depends on maximum LED string length
Aux. supply voltage	12 V	
Switching frequency	30 – 145 kHz	Selectable – see application guidelines

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Circuit diagram



Figure 2 UBA3070 demo board circuit diagram

PCB Layout



Figure 3 UBA3070 demo board PCB top silk (top view) and bottom copper (bottom view)

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Bill of material

Component ID	Value	Remark
IC1	NXP UBA3070	
Q1	NXP PHD9NQ20T	replace to meet specific requirements
Q2	NXP BCX53	
Q3	NXP PXTA92	replace to meet specific requirements
D1	NXP BAS316	
D2	NXP BAS316	
D3	Vishay BYG20J	
C1	22 μF, 200V	replace to meet specific requirements
C2	100 μF, 25V	
C3	180 pF	
C4	22 pF	
C5		not mounted in this PCB configuration
C6	100 nF, 250V	replace to meet specific requirements
C7		not mounted in this PCB configuration
C8	100 nF, 50V	
C9		not mounted in this PCB configuration
C10	10 nF, 500V	
L1	680 μH, 700mA	replace to meet specific requirements
R1	1 kΩ, 0.125W	
R2	10 kΩ, 0.125W	
R3	22 kΩ, 0.125W	
R4	1.5 Ω, 0.25W	replace to meet specific requirements
R5	10 kΩ, 0.125W	
R6	1.5 Ω, 0.25W	replace to meet specific requirements
R7	1 kΩ, 0.125W	
R8	300 Ω, 0.125W	replace to meet specific requirements
R9	300 Ω, 0.125W	replace to meet specific requirements
R10		not mounted in this PCB configuration
J1	4-pole screw terminal	
J2	2-pole screw terminal	
J3		not mounted in this PCB configuration



Figure 4 Locations of the components that can be replaced to meet specific requirements



Wiring diagram

Component locations



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