

Bill of Materials for LM2623 National Semiconductor

Part	Manufacturer	Part#	Attributes	Farnell#	Xref_Type	Mfr Part#	Comments	Farnell#	Xref_Type	Mfr Part#	Comments
A1	National Semiconductor	LM321MF		9779116	Exact	LM321MF		1468874	Exact	LM321MF/NOPB	
C1	TDK	C3216X5R0J106M	10u F	1301815	Suggested	12066D106KAT2A	Mapped to 10% Tolerance	1288286	Suggested	C1206C106K9PAC	Mapped to 10% Tolerance
C2	TDK	C3216X5R0J106M	10u F	1301815	Suggested	12066D106KAT2A	Mapped to 10% Tolerance	1288286	Suggested	C1206C106K9PAC	Mapped to 10% Tolerance
C3	Vitramon	VJ0603A220KXAAB	22p F	498543	Suggested	06035A220JAT2A	Mapped to 5% Tolerance	9406107	Suggested	U0603C220JCT	Mapped to 5% Tolerance
C4	TDK	C3216X5R0J106M	10u F	1301815	Suggested	12066D106KAT2A	Mapped to 10% Tolerance	1288286	Suggested	C1206C106K9PAC	Mapped to 10% Tolerance
C5	Vitramon	VJ0603A330KXAAB	33p F	498555	Suggested	06035A330JAT2A	Mapped to 5% Tolerance	1414633	Suggested	C0603C330J5GAC	Mapped to 5% Tolerance
C6	Vitramon	VJ0603Y103KXAAT	0.01u F	1327675	Exact	06035C103KAT2A		8819980	Exact	GRM188R71H103KA01D	
D1	ONSEMI	MBR0520LT1	0.385 V	9556915	Exact	MBR0520LT1G		9556915RL	Exact	MBR0520LT1G	
D3	ONSEMI	MMSD4148T1	1 V	9556079	Exact	MMSD4148T1G		9556079RL	Exact	MMSD4148T1G	
L1	Coilcraft	DO1608C-472	4.7u H, 0.09 Ohms	7429819	Suggested	B82462A4472M	Mapped to 6x6 mm Package				
R1	Dale	CRCW08059092F	90.9k Ohms	9333649	Suggested	MC 0.1W 0805 1% 91K	Mapped to 91K	1400374	Suggested	SG73S2ATTD9102F	Mapped to 91K
R2	Dale	CRCW08053922F	39.2k Ohms	9237828	Suggested	232273463903	Mapped to 39K-Phycomp	1400092	Suggested	SG73P2ATTD3902F	Mapped to 39K
R3	Dale	CRCW06032103F	210k Ohms	1171016	Exact	MC 0.063W 0603 1%					
R4	Dale	CRCW06031002F	10k Ohms	1469748	Exact	CRCW060310K0FKEA					
R5	Dale	CRCW06036812F	68.1k Ohms	1170970	Exact	MC 0.063W 0603 1%					
R6	Dale	CRCW06031002F	10k Ohms	1469748	Exact	CRCW060310K0FKEA					
R7	Dale	CRCW05081R0J(USE TWO 1 ohm IN PARALLEL)	0.5 Ohms	1399702	Suggested	SR732ATTDR510F	Mapped to 1% Tolerance				
U1	National Semiconductor	LM2623AMM		8207445	Exact	LM2623AMM		8207453	Exact	LM2623MM	

LM2623 Design Document

National Semiconductor
LM2623
May 2006



1.0 Design Specifications

Inputs	Outputs #1
VinMin=1.5	Vout1=2
VinMax=3.3	Iout1=0.5

2.0 Design Description

This design is a basic boost that is capable of providing constant current of 350mA and an open circuit maximum voltage of 5V at high efficiency. It is designed to power LUMILEDS 1W LED from single or two cells.

With an LED present, as the output voltage ramps to approximately 3.4V, the LED will turn on causing current to flow through R7. The voltage across R7 is amplified by a factor of 7X by the SOT-5 LM321MF and the gain resistors R5 and R6. This produces a voltage of 1.24 volts at the junction of R4 and R5 when 350mA flows through the LED. The 1.24 volts causes the LM2623 to stop switching which regulates the LED current at a constant value. This current loop controlled boost circuit requires 1 or 2 cells and will operate with full brightness down to 1.0V. It uses the LM2623MM, a mini-SO8 package

boost switcher with an internal 1.2amp switch, to boost the input voltage from 2-3V to the required LED voltage of 3.4V.

The LM2623A should be used for single cell operation since it guarantees a peak switch current greater than 2A.

The open circuit voltage with no LED present is set to 5V by the resistor ladder of R3-R6. If the LED is permanent, R3 can be omitted.

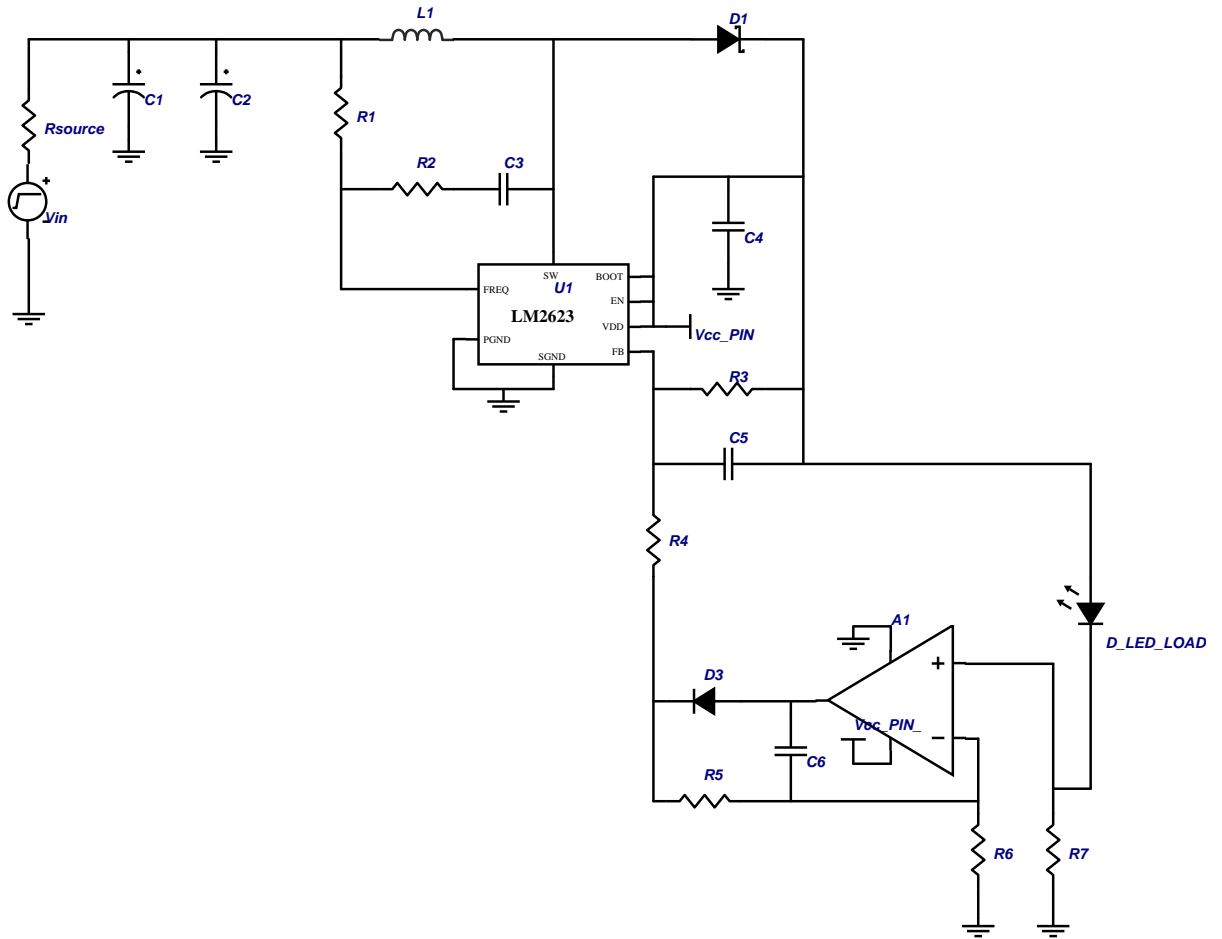
$$V_{outmax} = V_{fb} * (1 + R3 / (R4 + R5 + R6))$$

$$LED \text{ current} = V_{fb} / R7 * R6 / (R6 + R5)$$

The inductor is a Coilcraft DS1608 size, the capacitors are small ceramic, and the diode is a 0.5A rated Schottky in the SOD package.

Notes: Please note that A1 in the schematic is represented as U in the board layout.

3.0 Schematic



689758_578_0

FIGURE 1. Example Schematic Showing Connection for all Components.

4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
A1	National Semiconductor	LM321	
C1	TDK	C3216X5R0J106M	10u F
C2	TDK	C3216X5R0J106M	10u F
C3	Vitramon	VJ0603A220KXAAB	22p F
C4	TDK	C3216X5R0J106M	10u F
C5	Vitramon	VJ0603A330KXAAB	33p F
C6	Vitramon	VJ0603Y103KXAAT	0.01u F
D1	ONSEMI	MBR0520LT1	0.385 V
D3	ONSEMI	MMSD4148T1	1 V
L1	Coilcraft	DO1608C-472	4.7u H, 0.09 Ohms
R1	Dale	CRCW08059092F	90.9k Ohms
R2	Dale	CRCW08053922F	39.2k Ohms
R3	Dale	CRCW06032103F	210k Ohms
R4	Dale	CRCW06031002F	10k Ohms
R5	Dale	CRCW06036812F	68.1k Ohms

Part	Manufacturer	Part#	Attributes
R6	Dale	CRCW06031002F	10k Ohms
R7	Dale	CRCW05081R0J(USE TWO 1 ohm IN PARALLEL)	0.5 Ohms
U1	National Semiconductor	LM2623	

5.0 Layout

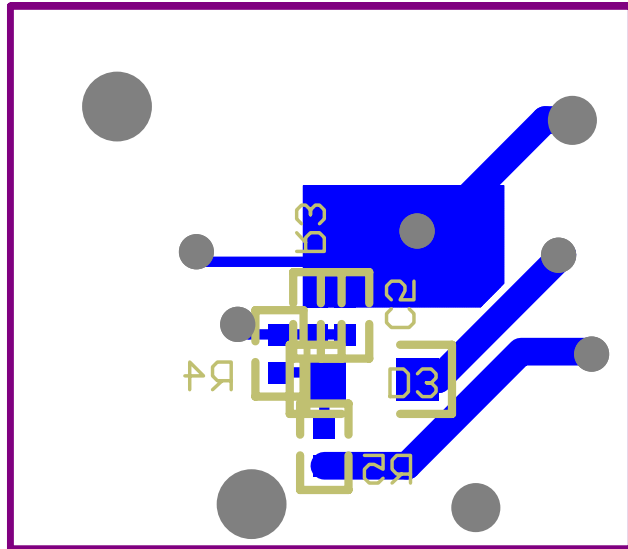
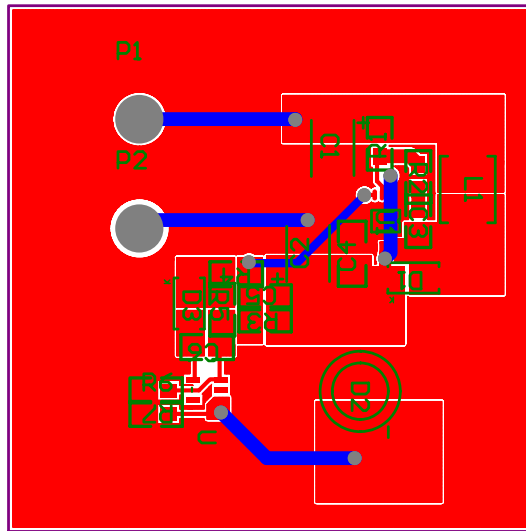


FIGURE 2. Board's Bottom View

PADC_NSC0119_1o_1



PADC_NSC0119_1o_2

FIGURE 3. Board's Top View

6.0 Waveforms

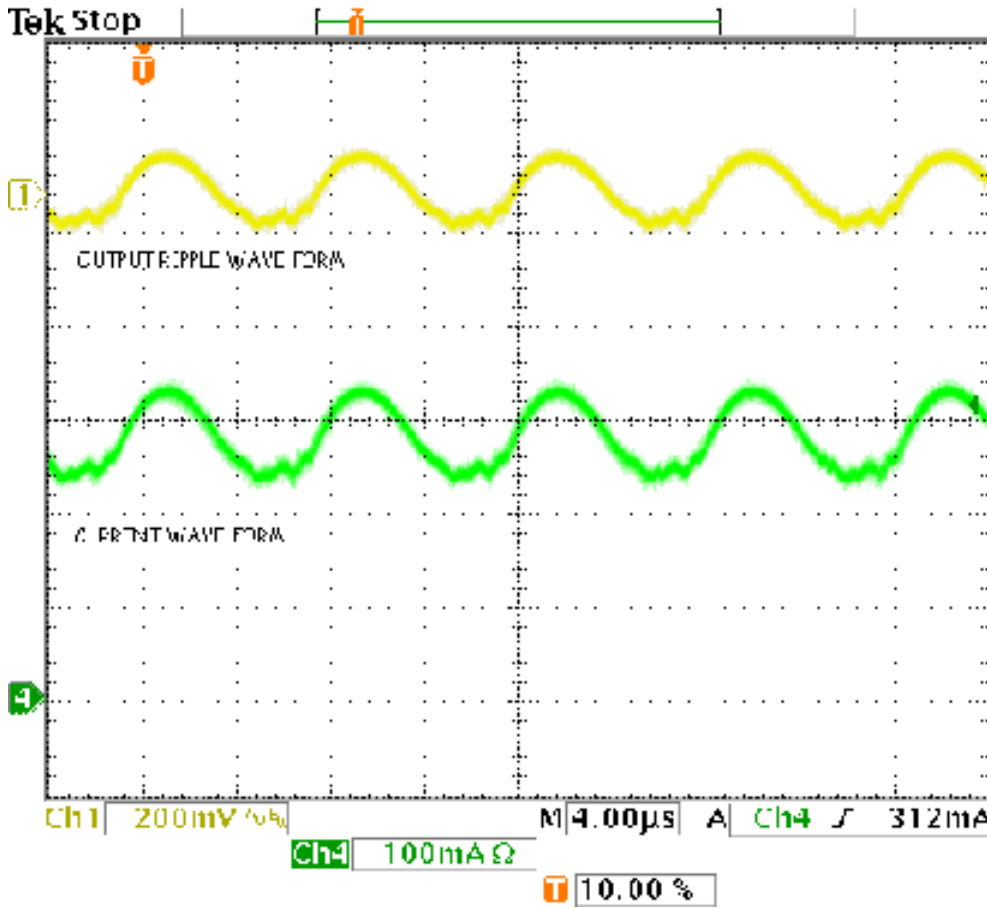


FIGURE 4. CURRENT AND RIPPLE

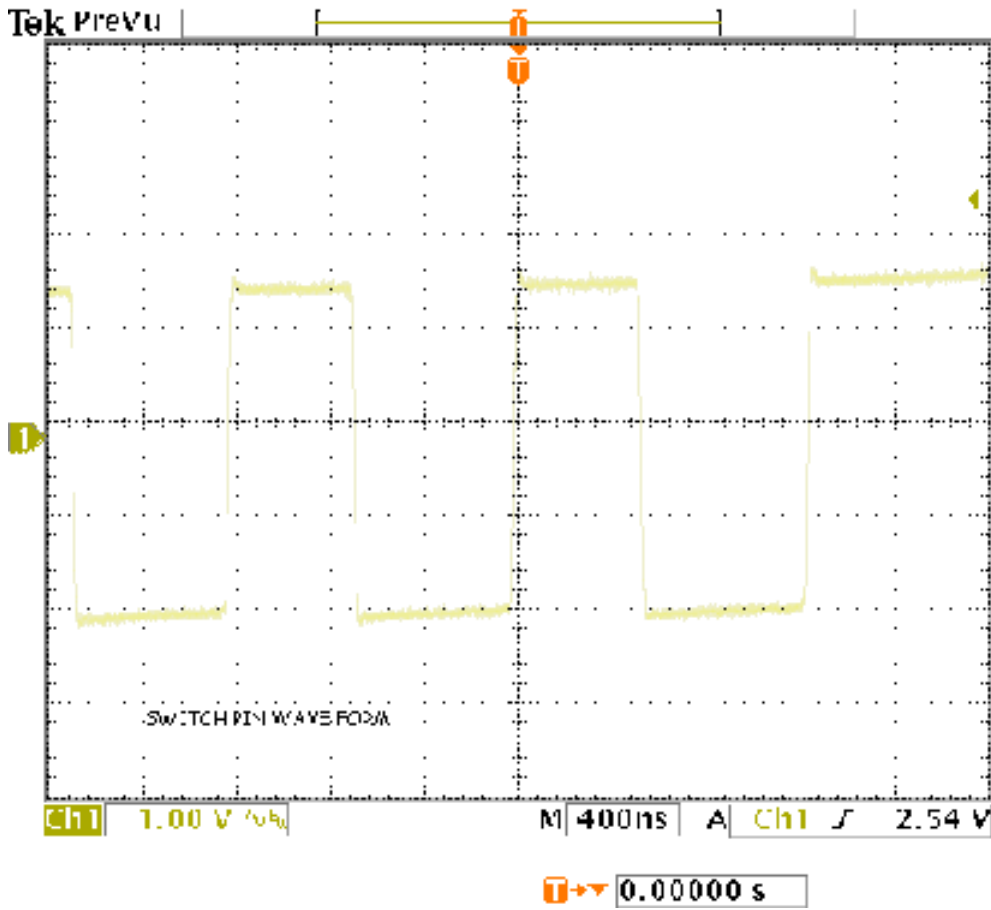


FIGURE 5. SWITCH PIN WAVE FORMS

Notes

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