

WEBENCH® Design Report

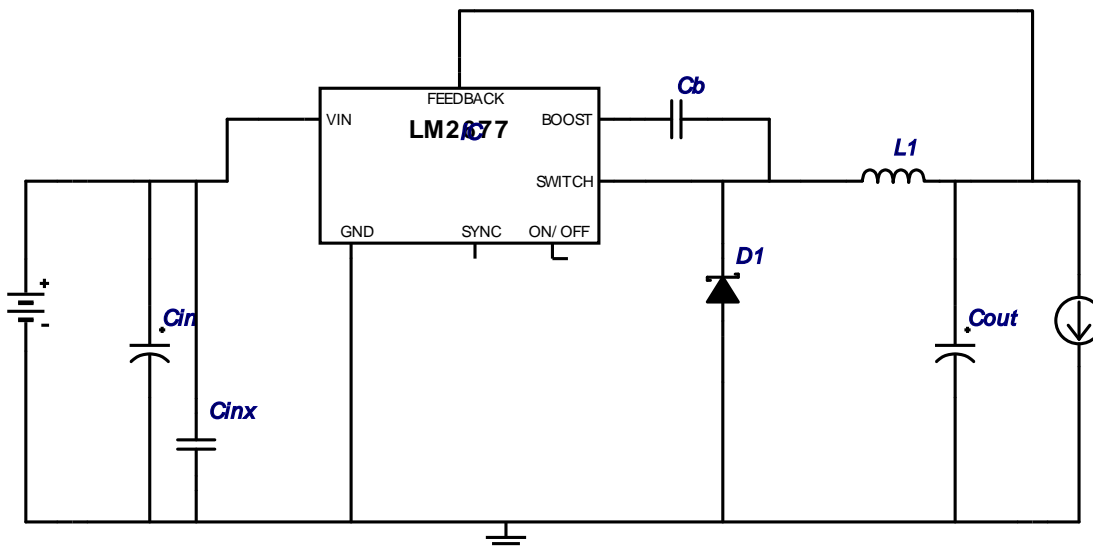
Design : 1195105/8 LM2677S-5.0

Candidate 1- LM2677S-5.0

WEBENCH® Design : LM2677_5.0_Buck_None


VinMin = 8.0V
VinMax = 14.2V
Vout = 5.0V
Iout = 2.5A

Device = LM2677S-5.0
Topology = Buck
Creation date = 4/3/11 3:56:11 AM
Total BOM Cost = \$8.80
Total Pd = 1.21 W
Footprint = 1,138.0 mm2
BOM Count = 10



Electrical BOM

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
1.	Cb	Yageo America	CC0805KRX7R9BB103 Series= X7R	1	\$0.01	Cap= 10.0 nF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
2.	Cin	AVX	TPSD156K035R0100 Series= TPS	2	\$1.49	Cap= 15.0 µF ESR= 100.0 mOhm VDC= 35.0 V IRMS= 1.102 A	 7343-31 59mm2
3.	Cinx	AVX	08053C104KAT2A Series= X7R	1	\$0.01	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	 0805 13mm2
4.	Cout	Nippon Chemi-Con	APXE100ARA121MF61G Series= PXE	1	\$0.53	Cap= 120.0 µF ESR= 25.0 mOhm VDC= 10.0 V IRMS= 2.53 A	 CAPSMT_62_F61 74mm2
5.	Csync	MuRata	GRM2165C1H101JA01D Series= COG/NP0	1	\$0.01	Cap= 100.0 pF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
6.	D1	Diodes Inc.	B340LB-13-F	1	\$0.14	VF@Io= 450.0 mV VRRM= 40.0 V	 SMB 44mm2
7.	IC	National Semiconductor	LM2677S-5.0	1	\$3.38	Switcher	 TS7B 199mm2
8.	L1	Coilcraft	SER2915L-223KL	1	\$1.73	L= 22.0 µH DCR= 1.5 mOhm	SER2915L 652mm2

#	Name	Manufacturer	Part Number	Qty	Price	Properties	Footprint
9.	Rsync	Vishay-Dale	CRCW08051K00FKEA Series= CRCW..e3	1	\$0.01	Res= 1,000 Ohm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2

Op Vals

#	Name	Value	Category	Description
1.	Cin IRMS	893.295 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	175.305 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.804 A	Current	Peak switch current in IC
4.	Iin Avg	965.33 mA	Current	Average input current
5.	L Ipp	607.274 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	1.536 A	Current	Q lavg
7.	BOM Count	10.0	General	Total Design BOM count
8.	FootPrint	1.138 kmm2	General	Total Foot Print Area of BOM components
9.	Frequency	260.0 kHz	General	Switching frequency
10.	IC Tolerance	100.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	215.43 mV	General	
12.	Mode	CCM	General	Conduction Mode
13.	Pout	12.5 W	General	Total output power
14.	Total BOM	\$8.8	General	Total BOM Cost
15.	D1 Tj	93.021 degC	Op_point	D1 junction temperature
16.	Cross Freq	23.921 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	37.757 %	Op_point	Duty cycle
18.	Efficiency	91.19 %	Op_point	Steady state efficiency
19.	IC Tj	41.866 degC	Op_point	IC junction temperature
20.	ICThetaJA	26.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	2.5 A	Op_point	Iout operating point
22.	Phase Marg	58.993 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	14.2 V	Op_point	Vin operating point
24.	Vout p-p	15.376 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	39.899 mW	Power	Input capacitor power dissipation
26.	Cout Pd	768.294 μW	Power	Output capacitor power dissipation
27.	Diode Pd	700.238 mW	Power	Diode power dissipation
28.	IC Pd	456.403 mW	Power	IC power dissipation
29.	L Pd	10.312 mW	Power	Inductor power dissipation
30.	Total Pd	1.208 W	Power	Total Power Dissipation
31.	Vout OP	5.0 V	Unknown	Vin operating point

Design Inputs

#	Name	Value	Description
1.	ErrorFeature	I	Error feature
2.	Iout	2.5 A	Maximum Output Current
3.	Iout1	2.5 Amps	Output Current #1
4.	SoftStart	0.0 ms	Soft Start Time (ms)
5.	SyncFeature	I	External Sync feature
6.	VinMax	14.2 V	Maximum input voltage
7.	VinMin	8.0 V	Minimum input voltage
8.	Vout	5.0 V	Output Voltage
9.	Vout1	5.0 Volt	Output Voltage #1
10.	base_pn	LM2677	National Based Product Number
11.	customfreq	Y	Use Customer Frequency
12.	onOff	I	On/Off feature
13.	optfactor	5.0	Optimization factor to tune up the design
14.	pricefactor	0.0	Price factor to tune up the design cost
15.	ta	30.0 degC	Ambient temperature

Design Assist

1. **LM2677** Product Folder : <http://www.national.com/pf/LM/LM2677.html> : contains the data sheet and other resources.

National's WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using National's published specifications as well as the published specifications of other device manufacturers. While National does update this information periodically, this information may not be current at the time the simulation is built. National does not warrant the accuracy or completeness of the specifications or any information contained therein. National does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. National does not warrant that the designs are production worthy.

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