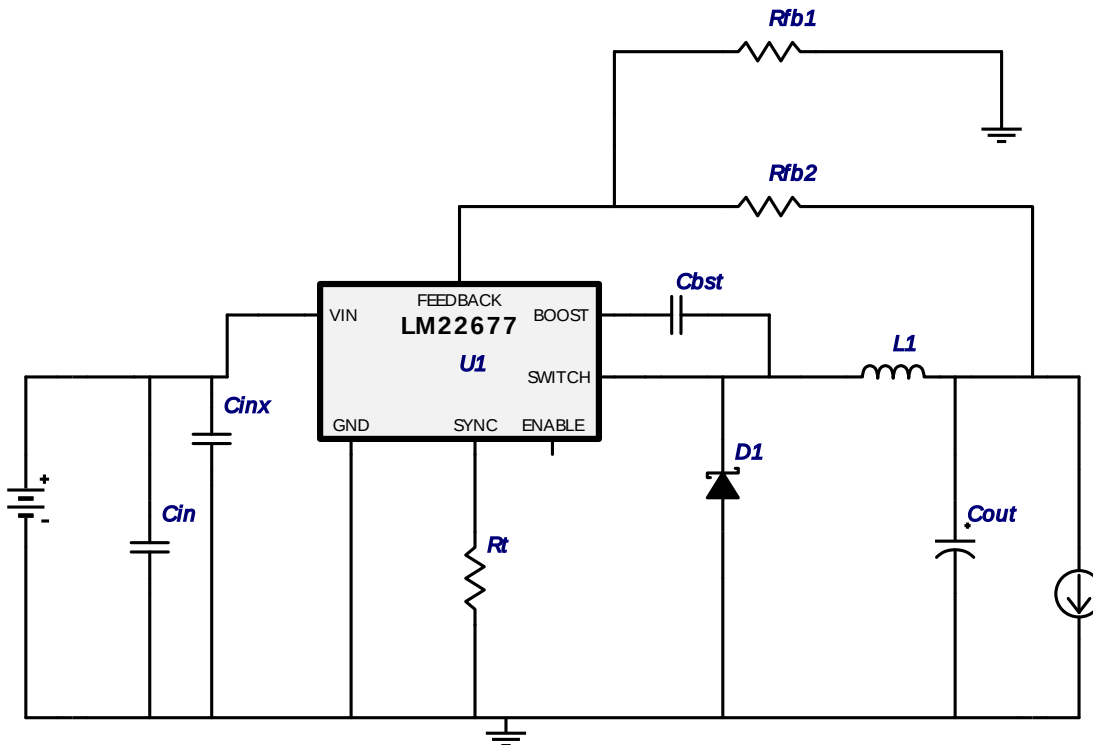
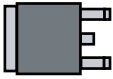


WEBENCH® Design Report

Design : 3488861/28 LM22677TJ-5.0
LM22677TJ-5.0 21.0V-32.0V to 12.0V @ 5.0A



Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	1	\$0.01	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	 0805 13mm2
2.	Cin	TDK	C5750X7R1H106M Series= X7R	1	\$0.68	Cap= 10.0 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 5.5 A	 2220 60mm2
3.	Cinx	MuRata	GRM21BR71H105KA12L Series= X7R	1	\$0.10	Cap= 1.0 µF VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
4.	Cout	Nippon Chemi-Con	APXA160ARA390MF60G Series= PXA	1	\$0.31	Cap= 39.0 µF ESR= 37.0 mOhm VDC= 16.0 V IRMS= 2.05 A	 CAPSMT_62_F60 77mm2
5.	D1	Vishay-Semiconductor	50WQ10FNPBF	1	\$0.41	VF@Io= 770.0 mV VRRM= 100.0 V	 DPAK 102mm2

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
6.	L1	Würth Elektronik eiSos	74435571500	1	\$6.34	L= 15.0 µH DCR= 9.0 mOhm	 WE-HCB-18X8.9 410mm2
7.	Rfb1	Vishay-Dale	CRCW0805787RFKEA Series= CRCW..e3	1	\$0.01	Res= 787.0 Ohm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
8.	Rfb2	Vishay-Dale	CRCW08051K00FKEA Series= CRCW..e3	1	\$0.01	Res= 1,000 Ohm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
9.	Rt	Vishay-Dale	CRCW0805124KFKEA Series= CRCW..e3	1	\$0.01	Res= 124.0 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
10.	U1	Texas Instruments	LM22677TJ-5.0	1	\$2.50	Switcher	 TJ7A 199mm2

Operating Values

#	Name	Value	Category	Description
1.	BOM Count	10.0		Total Design BOM count
2.	Total BOM	\$10.382		Total BOM Cost
3.	Cin IRMS	1.992 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	494.128 m A	Current	Output capacitor RMS ripple current
5.	IC Ipk	5.856 A	Current	Peak switch current in IC
6.	Iin Avg	2.03 A	Current	Average input current
7.	L Ipp	1.712 A	Current	Peak-to-peak inductor ripple current
8.	M1 Irms	3.141 A	Current	Q lavg
9.	FootPrint	913.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	307.383 k Hz	General	Switching frequency
11.	IC Tolerance	19.0 m V	General	IC Feedback Tolerance
12.	M Vds Act	409.229 m V	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	60.0 W	General	Total output power
15.	D1 Tj	109.922 degC	Op_Point	D1 junction temperature
16.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	34.081 k Hz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	39.461 %	Op_point	Duty cycle
19.	Efficiency	92.34 %	Op_point	Steady state efficiency
20.	IC Tj	92.311 degC	Op_point	IC junction temperature
21.	ICThetaJA	22.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	5.0 A	Op_point	Iout operating point
23.	Phase Marg	65.184 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	32.0 V	Op_point	Vin operating point
25.	Vout p-p	65.8 m V	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	11.903 m W	Power	Input capacitor power dissipation
27.	Cout Pd	9.034 m W	Power	Output capacitor power dissipation
28.	Diode Pd	2.331 W	Power	Diode power dissipation
29.	IC Pd	2.378 W	Power	IC power dissipation
30.	L Pd	247.5 m W	Power	Inductor power dissipation
31.	Total Pd	4.977 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	5.0 A	Maximum Output Current
2.	Iout1	5.0 Amps	Output Current #1
3.	VinMax	32.0 V	Maximum input voltage
4.	VinMin	21.0 V	Minimum input voltage
5.	Vout	12.0 V	Output Voltage
6.	Vout1	12.0 Volt	Output Voltage #1
7.	base_pn	LM22677	National Based Product Number
8.	Ta	40.0 degC	Ambient temperature

Design Assistance

1. Why WEBENCH recommends the 5.0 option for your 12.0V output: The internal compensation for the ADJ version of the LM22677 is optimized for output voltages below 5V. Therefore it is recommended that for outputs greater than 5V, the 5.0 option be used with an additional external resistive feedback divider. Part Description The LM22677 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 5.0A loads with excellent line and load regulation characteristics. High efficiency (>90%) is obtained through the use of a low ON-resistance N-channel MOSFET.

2. **LM22677** Product Folder : <http://www.ti.com/product/lm22677> : contains the data sheet and other resources.

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You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

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