National Semiconductor
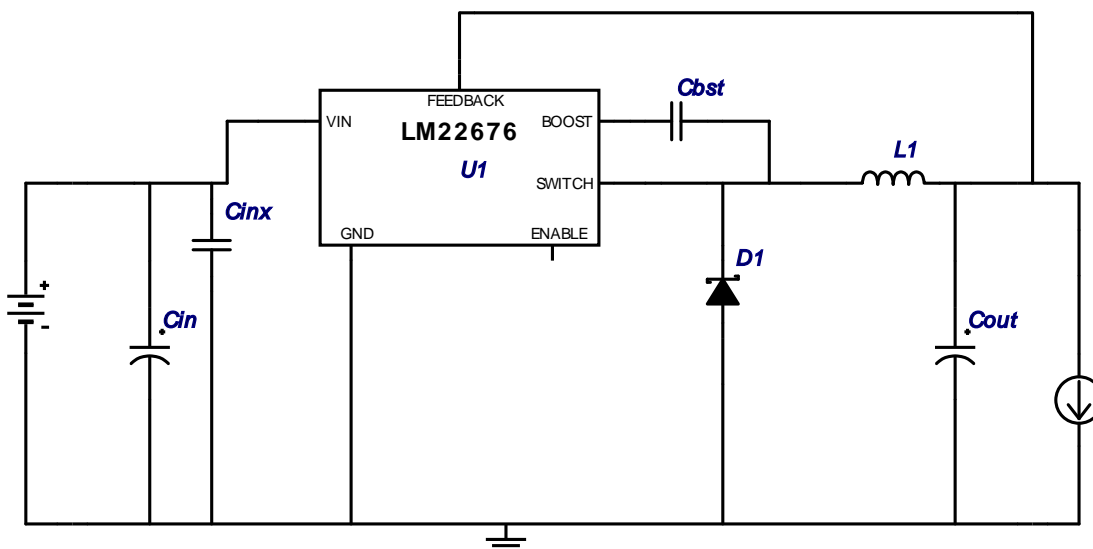
VinMin = 9.0V
VinMax = 18.0V
Vout = 5.0V
Iout = 3.0A

Device = LM22676MR-5.0
Topology = Buck
Creation date = 5/11/11 7:05:35 PM
Total BOM Cost = $3.53
Total Pd = 2.24 W
Footprint = 616.0 mm2
BOM Count = 7

WEBENCH® Design Report

Design : 1185292/14 LM22676MR-5.0
IGVC/USB: (9-18)->5

WEBENCH® Design : LM22676_5.0_Buck_None

Electrical BOM

#	Name	Manufacturer	Part Number	Qty	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	C3225X7R1E106M Series= X7R	1	$0.18	Cap= 10.0 µF ESR= 2.7 mOhm VDC= 25.0 V IRMS= 3.0 A	1210 23mm2
3.	Cinx	TDK	C2012Y5V1E105Z/0.85 Series= Y5V	1	$0.01	Cap= 1.0 µF ESR= 9.0 mOhm VDC= 25.0 V IRMS= 0.0 A	0805 13mm2
4.	Cout	Panasonic	EEF-UD0K680R Series= UD	1	$0.76	Cap= 68.0 µF ESR= 15.0 mOhm VDC= 8.0 V IRMS= 3.0 A	CAPSMT_6_UD 59mm2
5.	D1	Diodes Inc.	B340LB-13-F	1	$0.14	VF@Io= 450.0 mV VRRM= 40.0 V	SMB 44mm2
6.	L1	Bourns	SDR2207-150YL	1	$0.51	L= 15.0 µH DCR= 28.8 mOhm	SDR2207 408mm2
7.	U1	National Semiconductor	LM22676MR-5.0	1	$1.92	Switcher	MRA08B 56mm2

Op Vals

#	Name	Value	Category	Description
1.	BOM Count	7.0		Total Design BOM count
2.	Total BOM	$3.53		Total BOM Cost
3.	Cin IRMS	1.048 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	149.796 mA	Current	Output capacitor RMS ripple current
5.	IC Ipk	3.259 A	Current	Peak switch current in IC
6.	Iin Avg	957.66 mA	Current	Average input current
7.	L Ipp	518.909 mA	Current	Peak-to-peak inductor ripple current
8.	M Irms	1.641 A	Current	Q Iavg
9.	FootPrint	616.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	500.0 kHz	General	Switching frequency
11.	IC Tolerance	19.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	245.144 mV	General	
13.	Mode	CCM	General	Conduction Mode
14.	Pout	15.0 W	General	Total output power
15.	D1 Tj	115.126 degC	Op_Point	D1 junction temperature
16.	Cross Freq	42.623 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	29.937 %	Op_point	Duty cycle
18.	Efficiency	87.018 %	Op_point	Steady state efficiency
19.	IC Tj	90.215 degC	Op_point	IC junction temperature
20.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	3.0 A	Op_point	Iout operating point
22.	Phase Marg	61.689 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	18.0 V	Op_point	Vin operating point
24.	Vout p-p	8.014 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	2.968 mW	Power	Input capacitor power dissipation
26.	Cout Pd	336.583 µW	Power	Output capacitor power dissipation
27.	Diode Pd	945.85 mW	Power	Diode power dissipation
28.	IC Pd	1.004 W	Power	IC power dissipation
29.	L Pd	285.12 mW	Power	Inductor power dissipation
30.	Total Pd	2.238 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	3.0 A	Maximum Output Current
3.	Iout1	3.0 Amps	Output Current #1
4.	SoftStart	0.0 ms	Soft Start Time (ms)
5.	SyncFeature	I	External Sync feature
6.	VinMax	18.0 V	Maximum input voltage
7.	VinMin	9.0 V	Minimum input voltage
8.	Vout	5.0 V	Output Voltage
9.	Vout1	5.0 Volt	Output Voltage #1
10.	base_pn	LM22676	National Based Product Number
11.	customfreq	Y	Use Customer Frequency
12.	onOff	I	On/Off feature
13.	optfactor	3.0	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. **LM22676** Product Folder : http://www.national.com/pf/LM/LM22676.html : contains the data sheet and other resources.