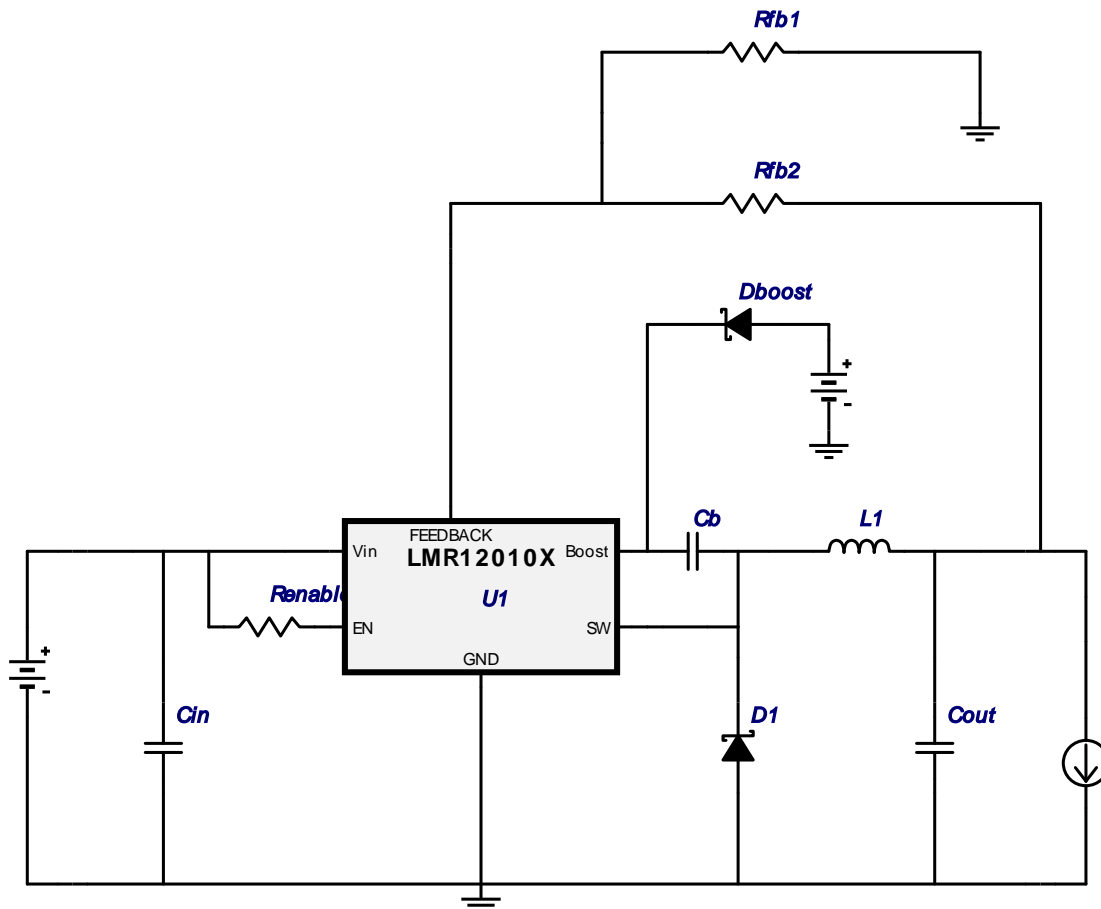


WEBENCH® Design Report







Design : 3458594/11 LMR12010XMK/NOPB
LMR12010XMK/NOPB 6.0V-20.0V to 5.0V @ 1.0A

VinMin = 6.0V
VinMax = 20.0V
Vout = 5.0V
Iout = 1.0A

Device = LMR12010XMK/NOPB
Topology = Buck
Created = 11/19/12 1:48:30 PM
BOM Cost = \$1.33
Total Pd = 1.31 W
Footprint = 251.0 mm2
BOM Count = 10



Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	1	\$0.01	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
2.	Cin	TDK	C3225X5R1E106K Series= X5R	1	\$0.15	Cap= 10.0 µF ESR= 15.0 mOhm VDC= 25.0 V IRMS= 3.0 A	 1210 23mm2
3.	Cout	TDK	C3216X5R0J106K Series= X5R	1	\$0.04	Cap= 10.0 µF ESR= 3.1 mOhm VDC= 6.3 V IRMS= 4.1 A	 1206 19mm2
4.	D1	Diodes Inc.	B140-13-F	1	\$0.06	VF@Io= 500.0 mV VRRM= 40.0 V	 SMA 37mm2
5.	Dboost	Diodes Inc.	B140-13-F	1	\$0.06	VF@Io= 500.0 mV VRRM= 40.0 V	 SMA 37mm2
6.	L1	Bourns	SRN6045-220M	1	\$0.18	L= 22.0 µH DCR= 142.0 mOhm	 SRN6045 64mm2

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
7.	Renable	Vishay-Dale	CRCW080510K0FKEA Series= CRCW..e3	1	\$0.01	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
8.	Rfb1	Vishay-Dale	CRCW080510K0FKEA Series= CRCW..e3	1	\$0.01	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
9.	Rfb2	Vishay-Dale	CRCW080552K3FKEA Series= CRCW..e3	1	\$0.01	Res= 52.3 kOhm Power= 125.0 mW Tolerance= 1.0%	 0805 13mm2
10.	U1	Texas Instruments	LMR12010XMK/NOPB	1	\$0.80	Switcher	 MK06A 18mm2

Operating Values

#	Name	Value	Category	Description
1.	BOM Count	10.0		Total Design BOM count
2.	Total BOM	\$1.33		Total BOM Cost
3.	Cin IRMS	444.634 m A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	33.375 m A	Current	Output capacitor RMS ripple current
5.	IC Ipk	1.058 A	Current	Peak switch current in IC
6.	Iin Avg	315.61 m A	Current	Average input current
7.	L Ipp	115.614 m A	Current	Peak-to-peak inductor ripple current
8.	M1 Irms	520.872 m A	Current	Q lavg
9.	FootPrint	251.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	1.6 M Hz	General	Switching frequency
11.	IC Tolerance	16.0 m V	General	IC Feedback Tolerance
12.	M Vds Act	227.775 m V	General	
13.	Mode	CCM	General	Conduction Mode
14.	Pout	5.0 W	General	Total output power
15.	Duty Cycle	27.131 %	Op_point	Duty cycle
16.	Efficiency	79.212 %	Op_point	Steady state efficiency
17.	IC Tj	123.059 degC	Op_point	IC junction temperature
18.	ICThetaJA	118.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	1.0 A	Op_point	Iout operating point
20.	VIN_OP	20.0 V	Op_point	Vin operating point
21.	Vout p-p	971.742 μ V	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	2.965 m W	Power	Input capacitor power dissipation
23.	Cout Pd	3.453 μ W	Power	Output capacitor power dissipation
24.	Diode Pd	364.346 m W	Power	Diode power dissipation
25.	IC Pd	788.638 m W	Power	IC power dissipation
26.	L Pd	156.2 m W	Power	Inductor power dissipation
27.	Total Pd	1.312 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.0 A	Maximum Output Current
2.	Iout1	1.0 Amps	Output Current #1
3.	VinMax	20.0 V	Maximum input voltage
4.	VinMin	6.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	LMR12010X	National Based Product Number
8.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LMR12010X** Product Folder : <http://www.ti.com/product/lmr12010> : contains the data sheet and other resources.

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