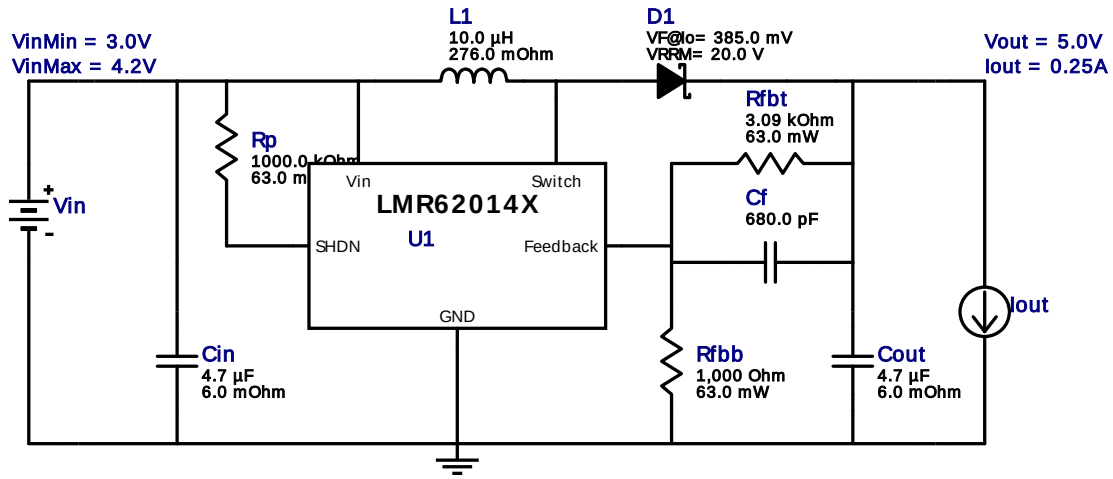
WEBENCH® Design Report

VinMin = 3.0V
VinMax = 4.2V
Vout = 5.0V
Iout = 0.25A

Device = LMR62014XMF/NOPB
Topology = Boost
Created = 4/27/13 4:54:24 PM
BOM Cost = $0.82
Total Pd = 0.36W
Footprint = 126.0mm2
BOM Count = 9

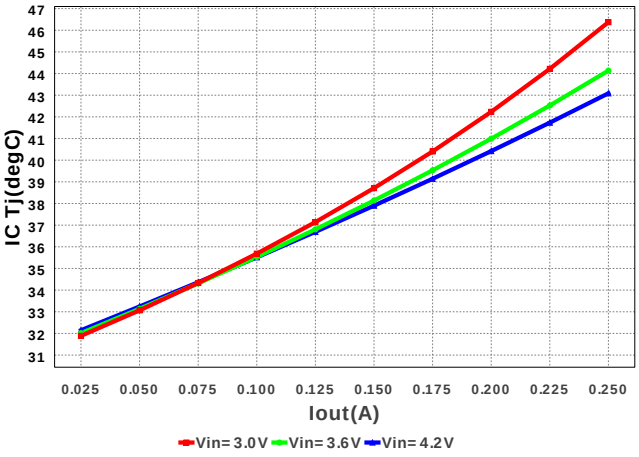
Design : 3670388/4 LMR62014XMF/NOPB
LMR62014XMF/NOPB 3.0V-4.2V to 5.0V @ 0.25A



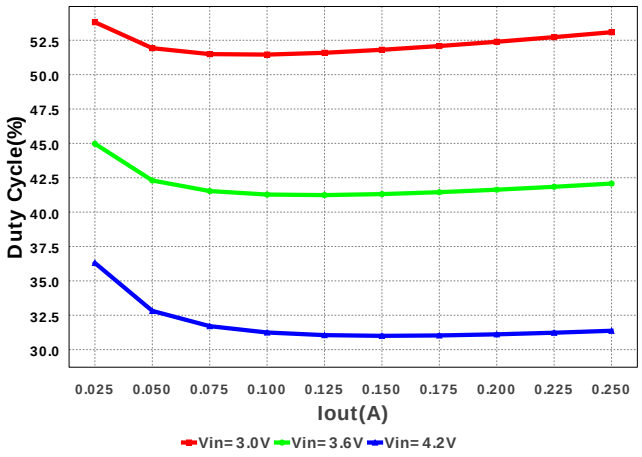
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cf	Yageo America	CC0805KRX7R9BB681 Series= X7R	Cap= 680.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
2.	Cin	Kemet	C0603C475K9PACTU Series= X5R	Cap= 4.7 µF ESR= 6.0 mOhm VDC= 6.3 V IRMS= 7.24 A	1	$0.02	0603 10mm2
3.	Cout	Kemet	C0603C475K9PACTU Series= X5R	Cap= 4.7 µF ESR= 6.0 mOhm VDC= 6.3 V IRMS= 7.24 A	1	$0.02	0603 10mm2
4.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 22mm2
5.	L1	Bourns	SRN3015-100M	L= 10.0 µH DCR= 276.0 mOhm	1	$0.13	SRN3015 25mm2
6.	Rfbb	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
7.	Rfbt	Vishay-Dale	CRCW04023K09FKED Series= CRCW..e3	Res= 3.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
8.	Rp	Vishay-Dale	CRCW04021M00FKED Series= CRCW..e3	Res= 1000.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
9.	U1	Texas Instruments	LMR62014XMF/NOPB	Switcher	1	$0.55	MF05A 24mm2

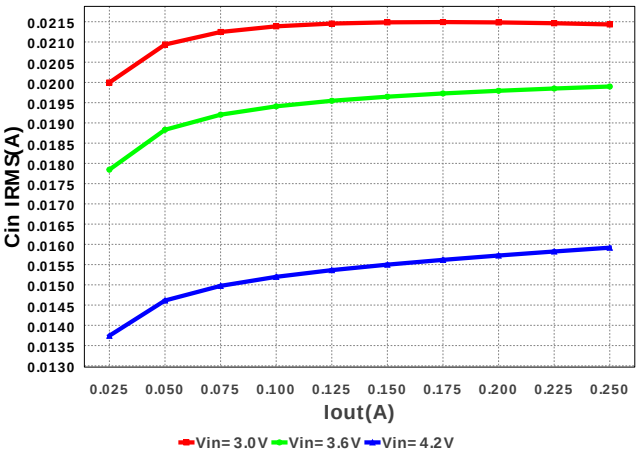
IC Tj



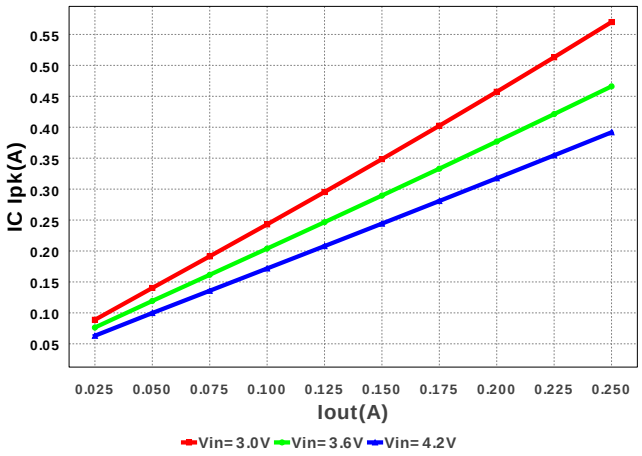
Duty Cycle



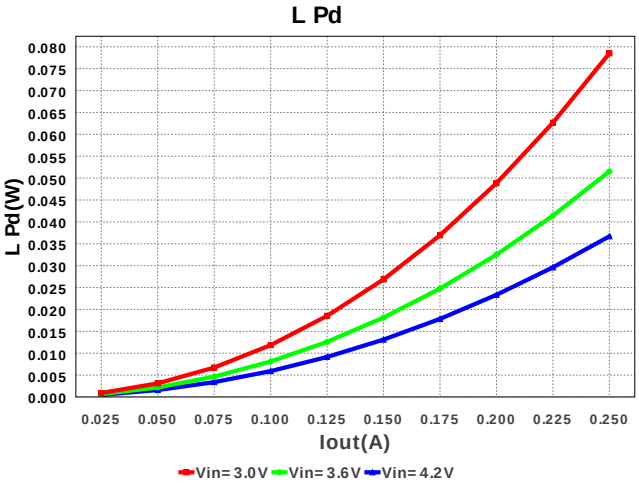
Cin IRMS



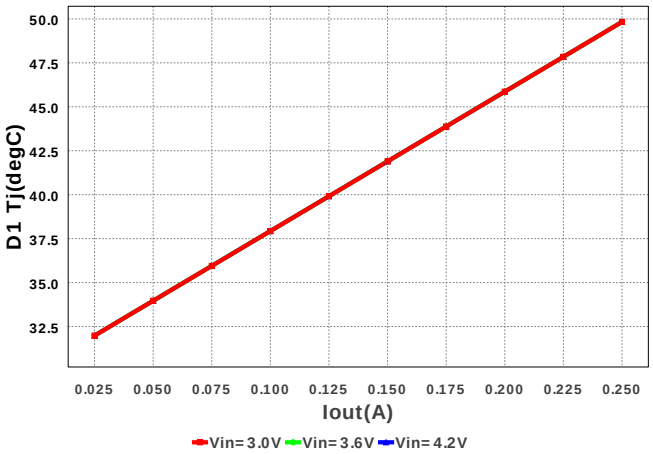
IC Ipk

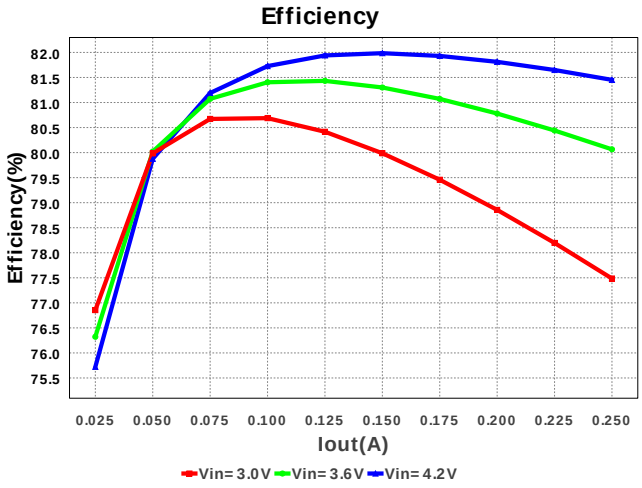


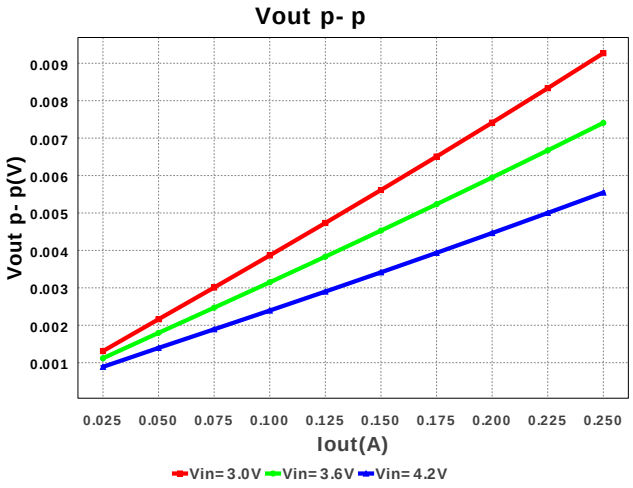
L Pd

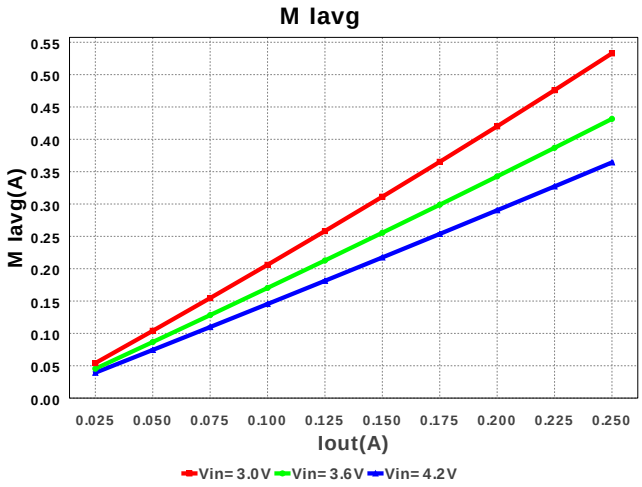


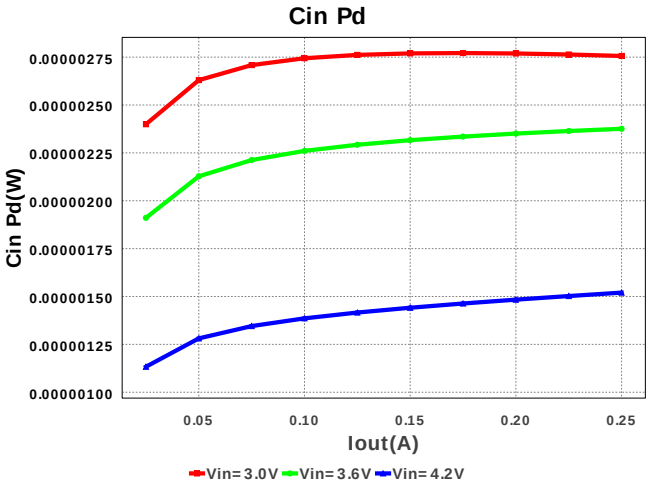
D1 Tj

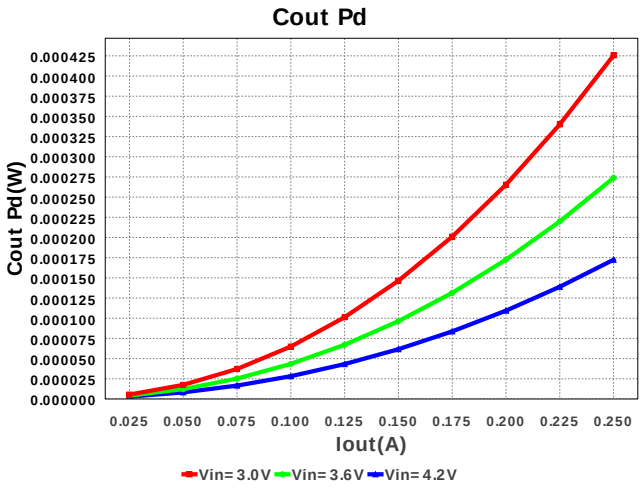


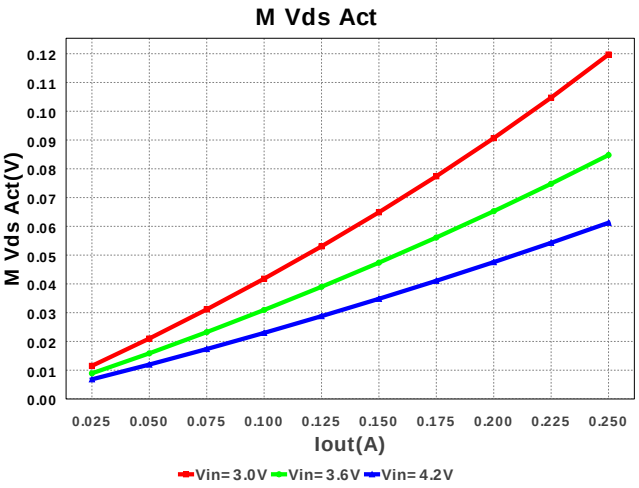


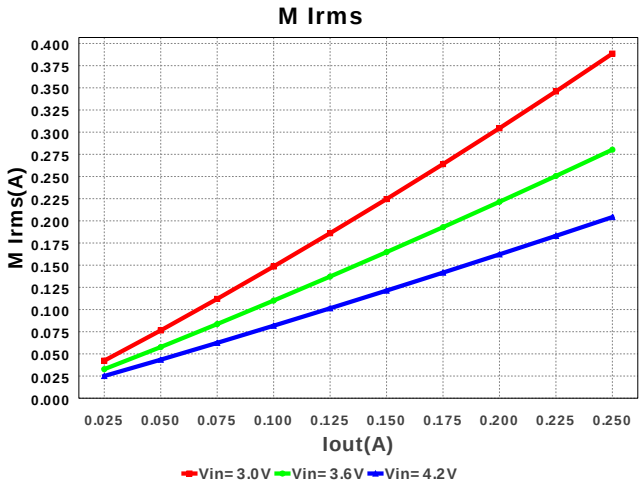


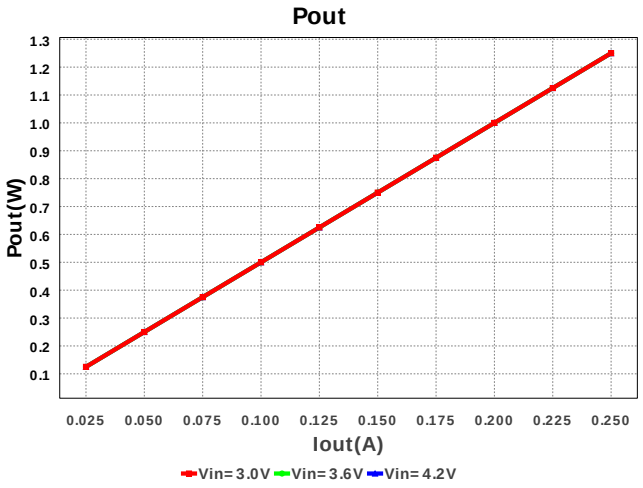


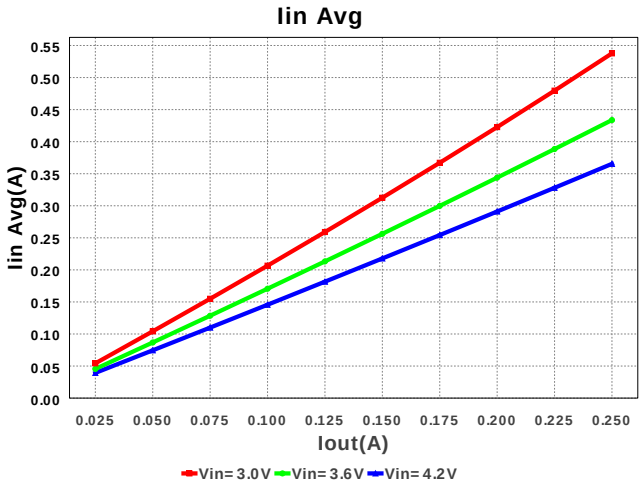


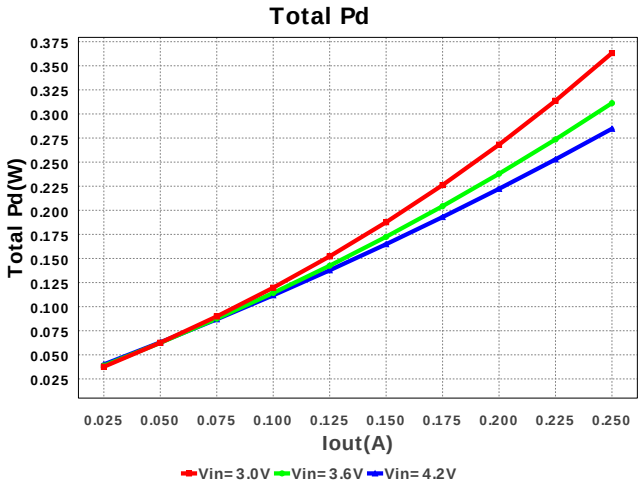


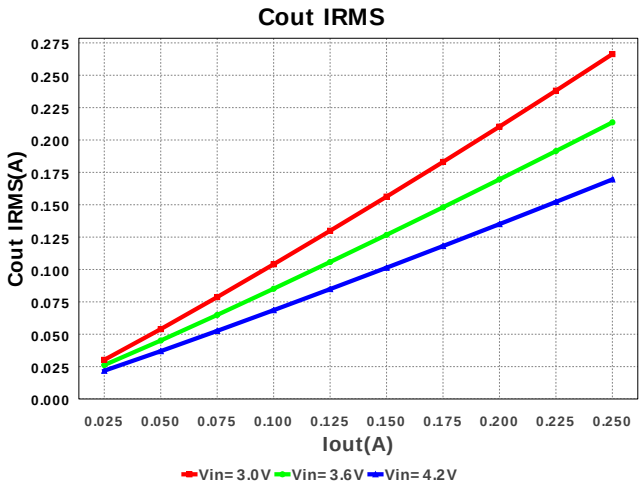


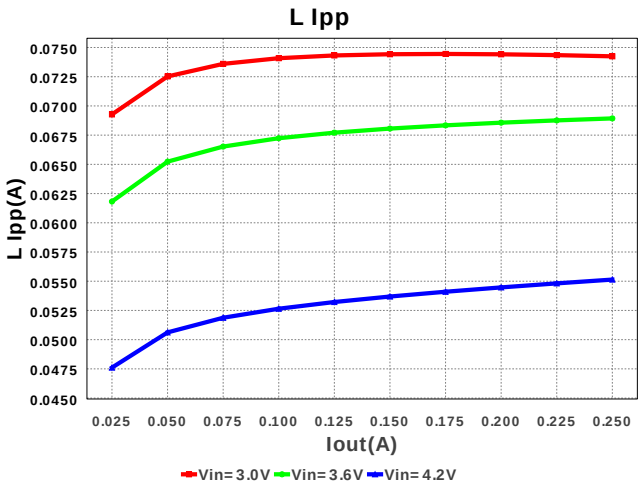


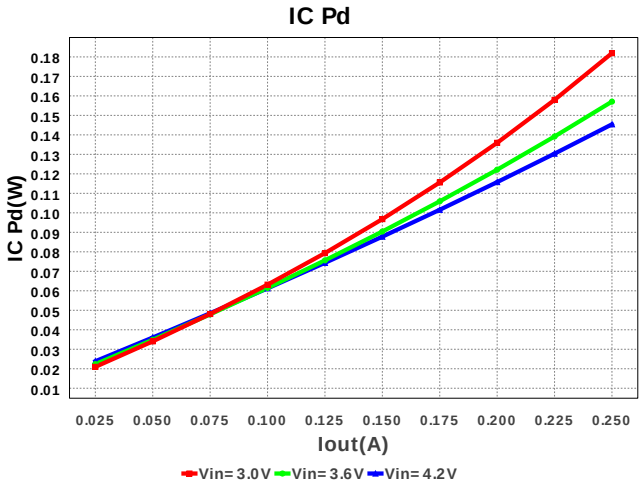


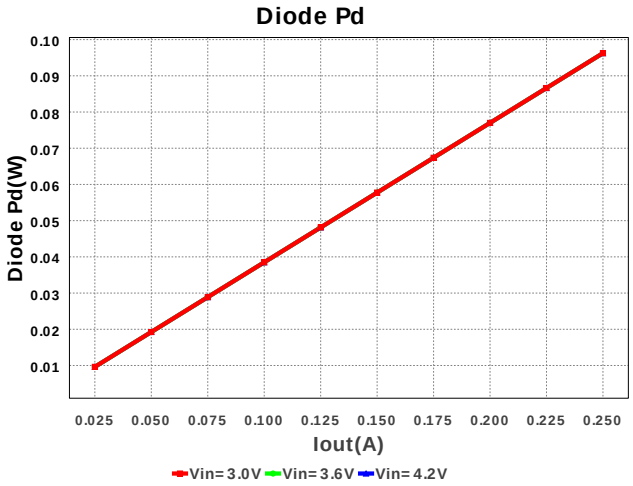












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	21.433 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	266.338 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	570.005 mA	Current	Peak switch current in IC
4.	Iin Avg	537.73 mA	Current	Average input current
5.	L Ipp	74.245 mA	Current	Peak-to-peak inductor ripple current
6.	M Iavg	532.882 mA	Current	MOSFET Average current
7.	M1 Irms	388.57 mA	Current	Q Iavg
8.	BOM Count	9	General	Total Design BOM count
9.	FootPrint	126.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	1.6 MHz	General	Switching frequency
11.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	119.722 mV	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	1.25 W	General	Total output power
15.	Total BOM	$0.82	General	Total BOM Cost
16.	D1 Tj	49.828 degC	Op_Point	D1 junction temperature
17.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
18.	Duty Cycle	53.085 %	Op_point	Duty cycle
19.	Efficiency	77.486 %	Op_point	Steady state efficiency
20.	IC Tj	46.372 degC	Op_point	IC junction temperature
21.	ICThetaJA	90.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	250.0 mA	Op_point	Iout operating point
23.	VIN_OP	3.0 V	Op_point	Vin operating point
24.	Vout p-p	9.269 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	2.756 µW	Power	Input capacitor power dissipation
26.	Cout Pd	425.617 µW	Power	Output capacitor power dissipation
27.	Diode Pd	96.25 mW	Power	Diode power dissipation
28.	IC Pd	181.912 mW	Power	IC power dissipation
29.	L Pd	78.501 mW	Power	Inductor power dissipation
30.	Total Pd	363.194 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	250.0 mA	Maximum Output Current
2.	Iout1	250.0 mAmps	Output Current #1
3.	VinMax	4.2 V	Maximum input voltage
4.	VinMin	3.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	LMR62014X	National Based Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LMR62014X** Product Folder : http://www.ti.com/product/lmr62014 : contains the data sheet and other resources.