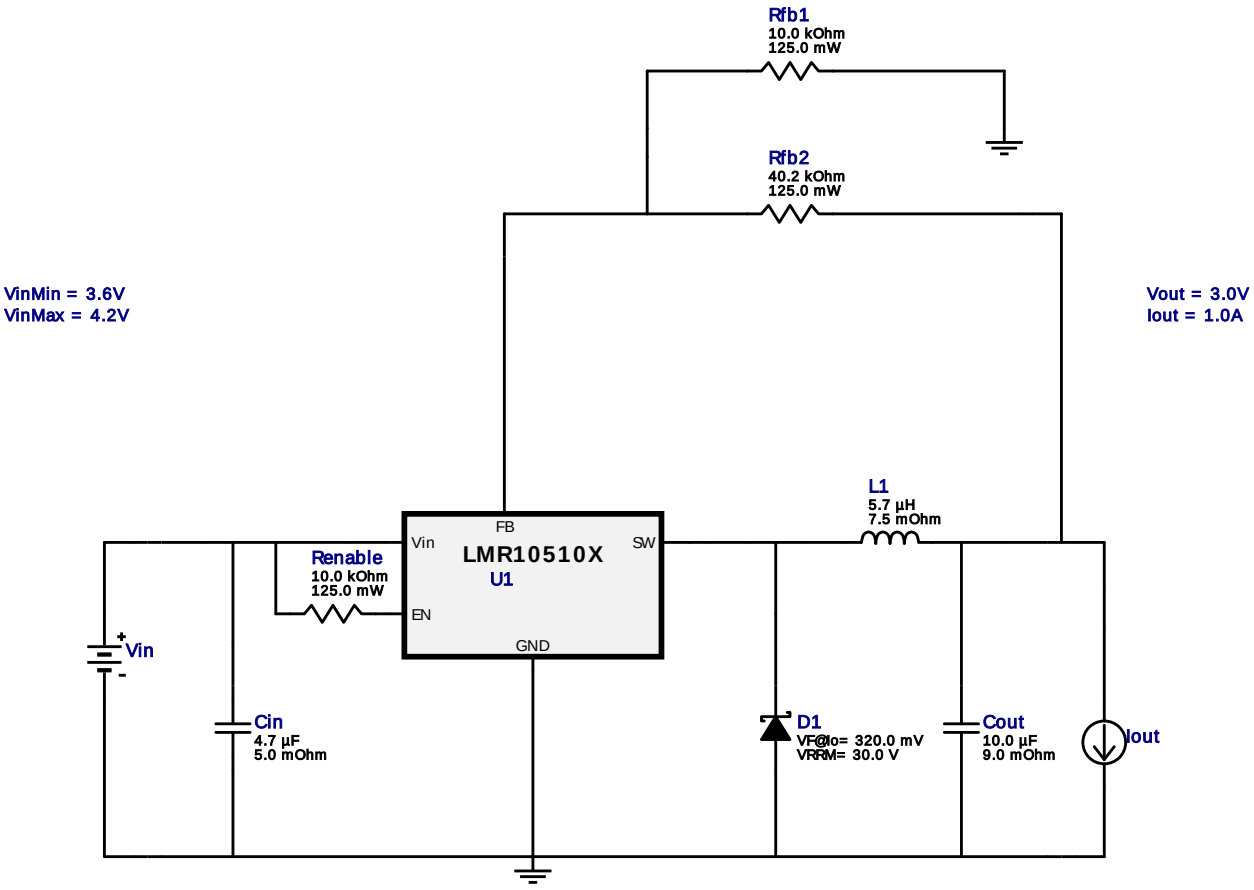
WEBENCH® Design Report

VinMin = 3.6V
VinMax = 4.2V
Vout = 3.0V
Iout = 1.0A

Device = LMR10510XMF/NOPB
Topology = Buck
Created = 5/5/14 5:44:58 AM
BOM Cost = $0.00
Footprint = 421.0mm2
BOM Count = 8
Total Pd = 0.22W

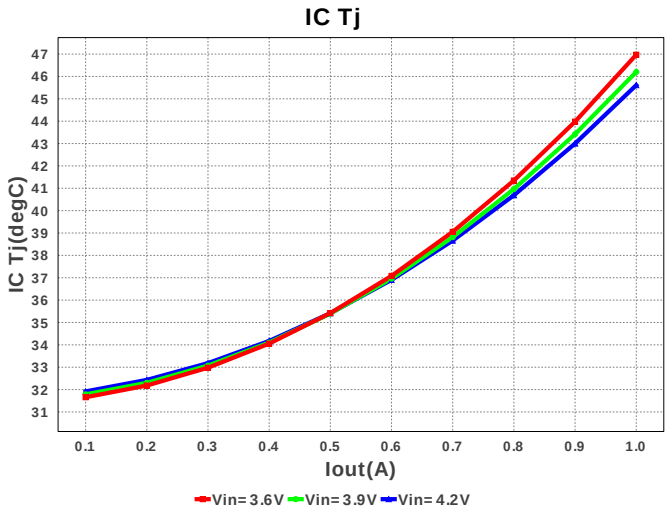
Design : 906020/293 LMR10510XMF/NOPB
LMR10510XMF/NOPB 3.6V-4.2V to 3.0V @ 1.0A

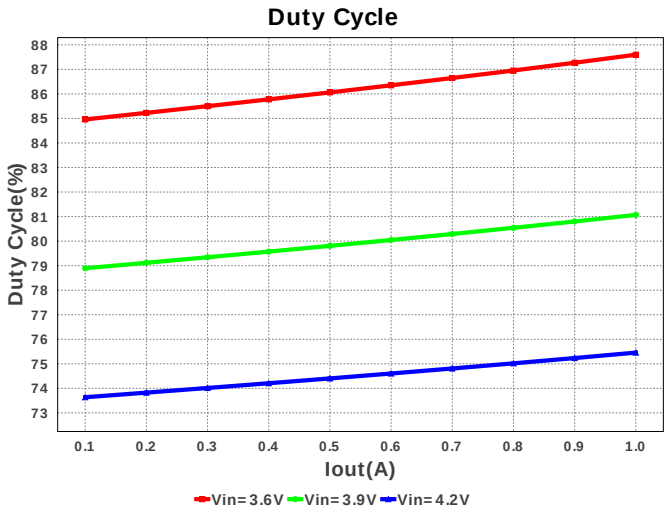


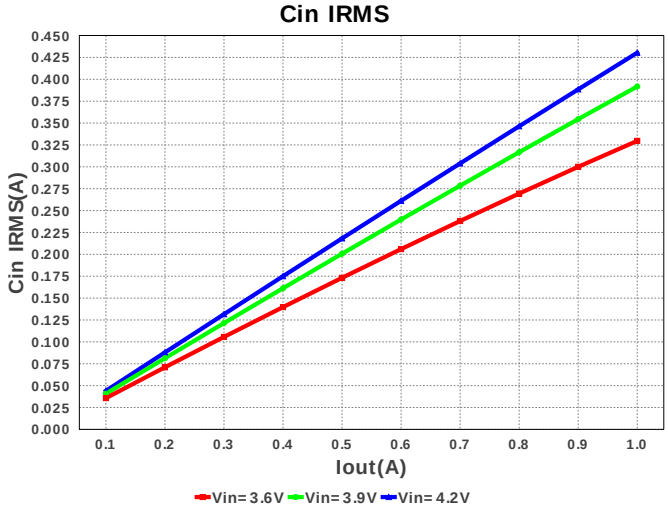
Electrical BOM

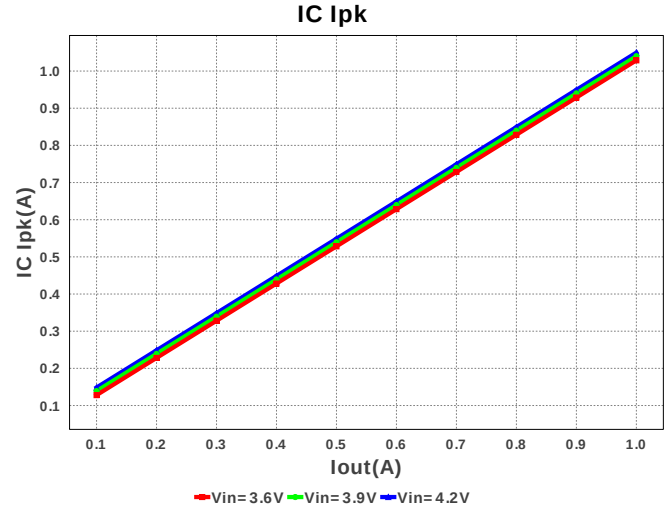
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM188R60J475KE19D Series= X5R	Cap= 4.7 µF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 2.0 A	1	$0.02	0603 5mm2
2.	Cout	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 µF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	$0.03	0603 5mm2
3.	D1	Toshiba	CMS06	VF@Io= 320.0 mV VRRM= 30.0 V	1	$0.19	M-FLAT 19mm2
4.	L1	GOWANDA	HC44-5701SMLF	L= 5.7 µH DCR= 7.5 mOhm	1	NA	HCSM44 357mm2
5.	Renable	Panasonic	ERJ-6ENF1002V Series= 225	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7mm2

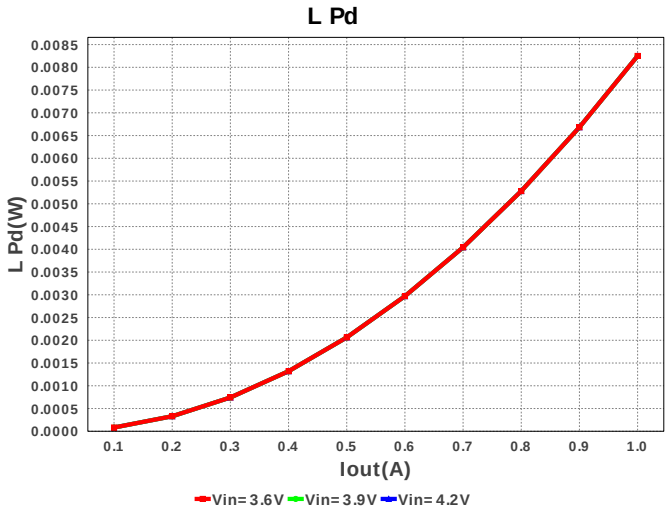
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	Rfb1	Panasonic	ERJ-6ENF1002V Series= 225	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7mm2
7.	Rfb2	Panasonic	ERJ-6ENF4022V Series= 225	Res= 40.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7mm2
8.	U1	Texas Instruments	LMR10510XMF/NOPB	Switcher	1	$0.30	MF05A 15mm2

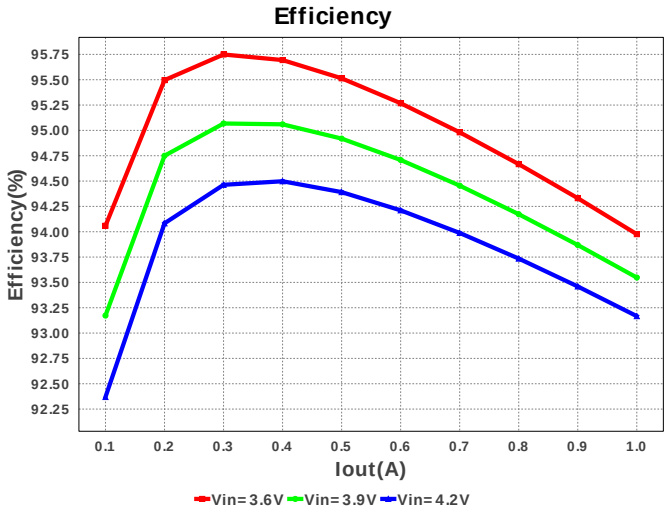


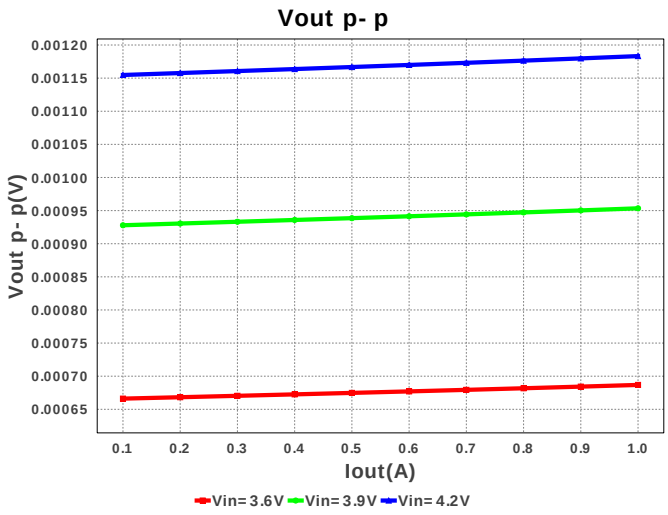


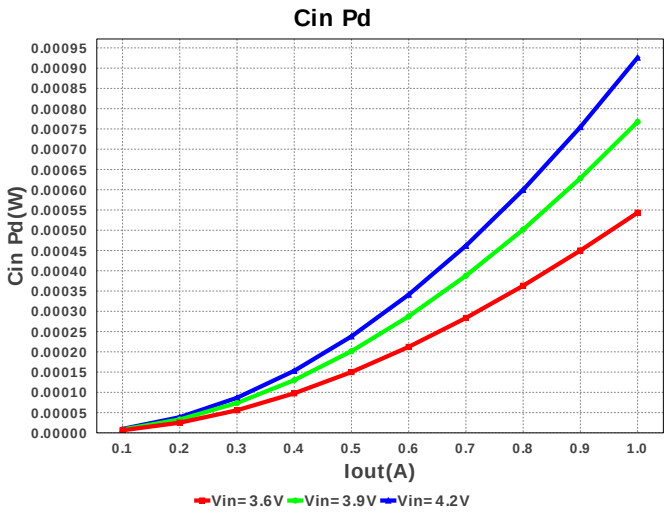


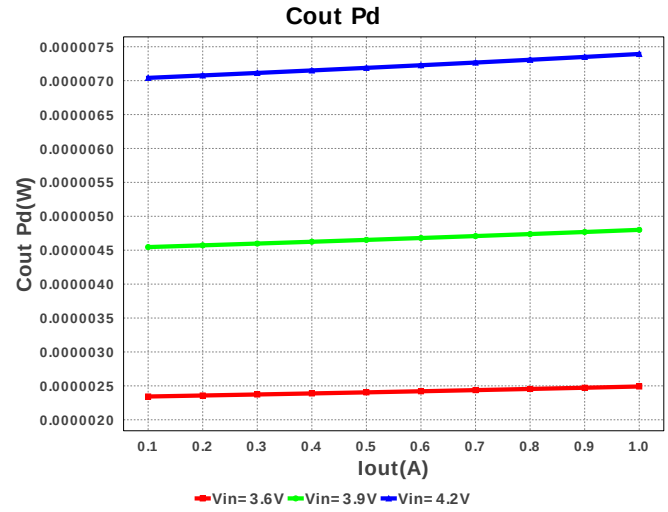


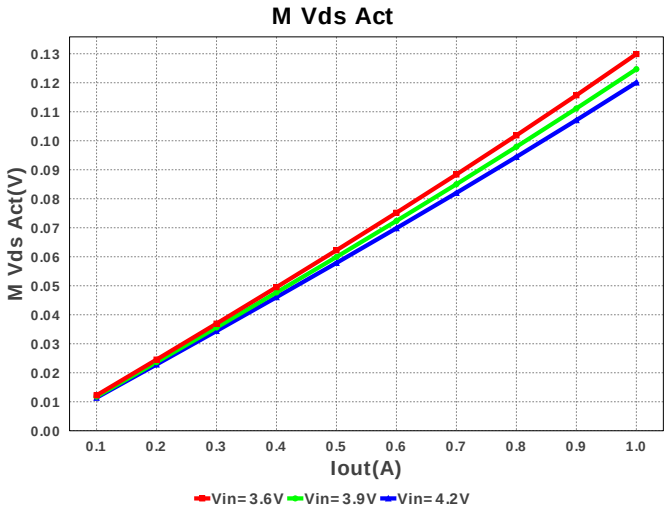


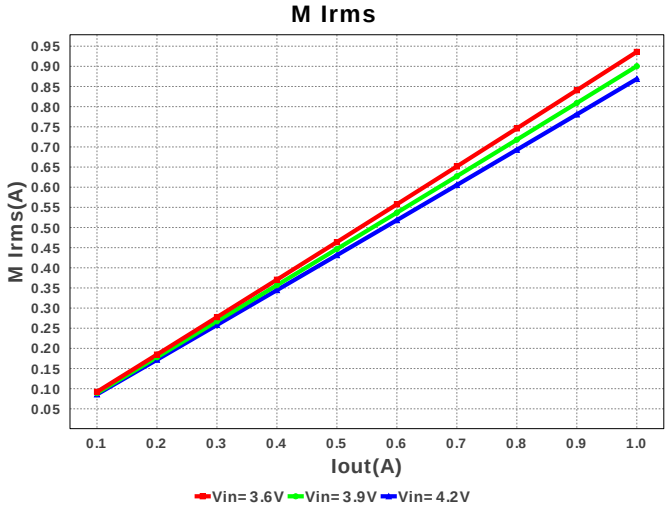


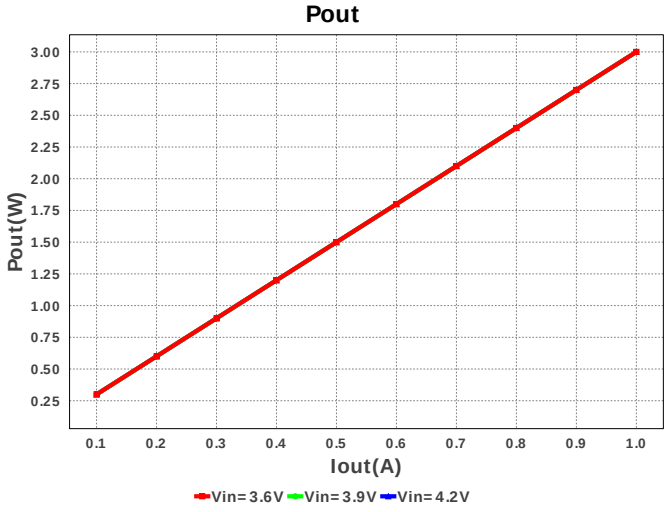


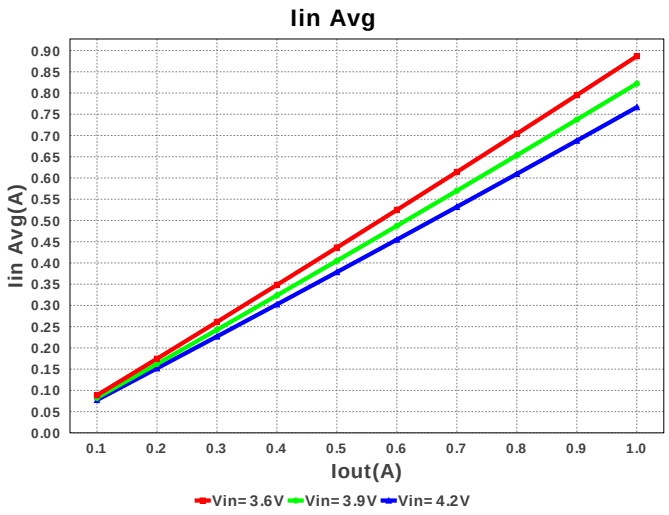


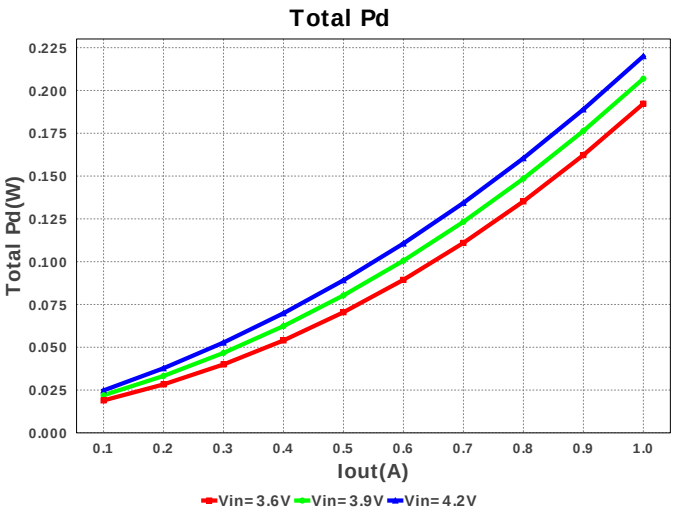


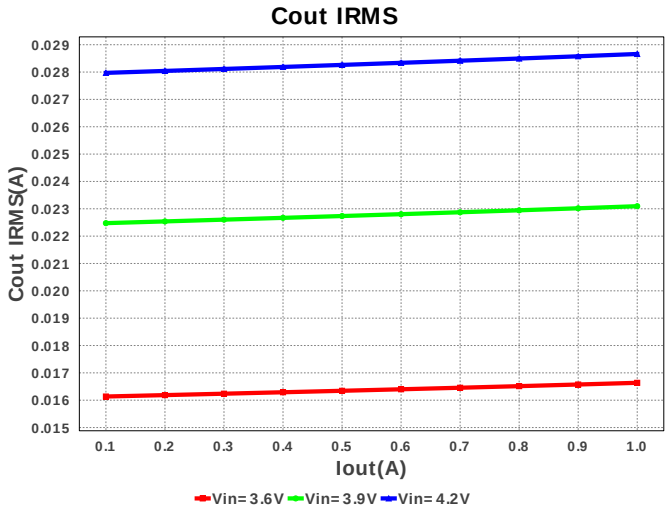


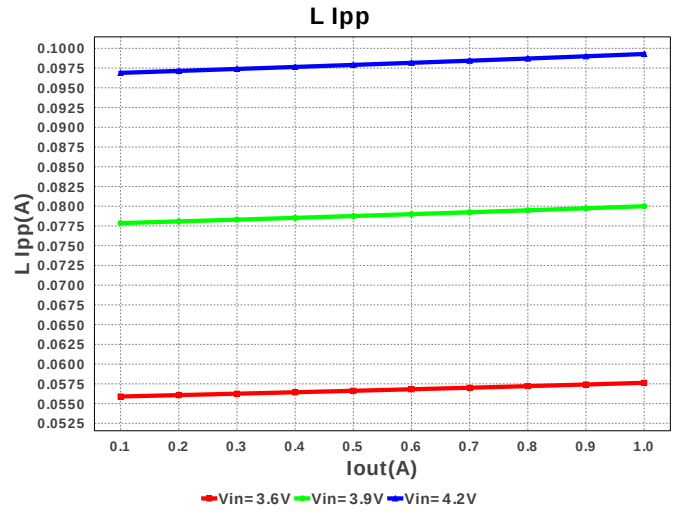


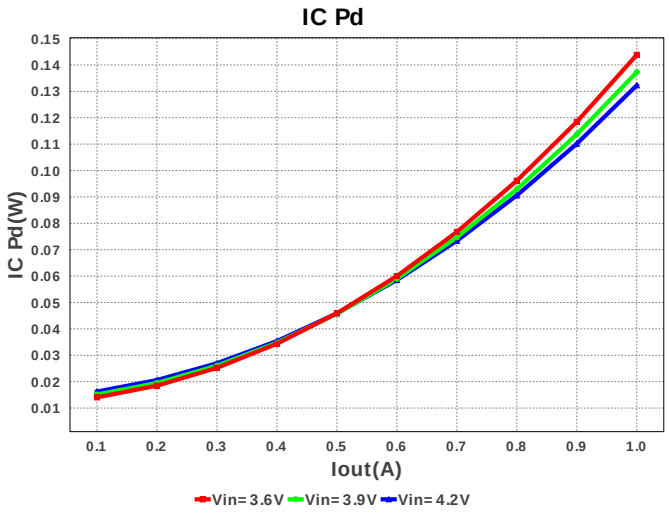


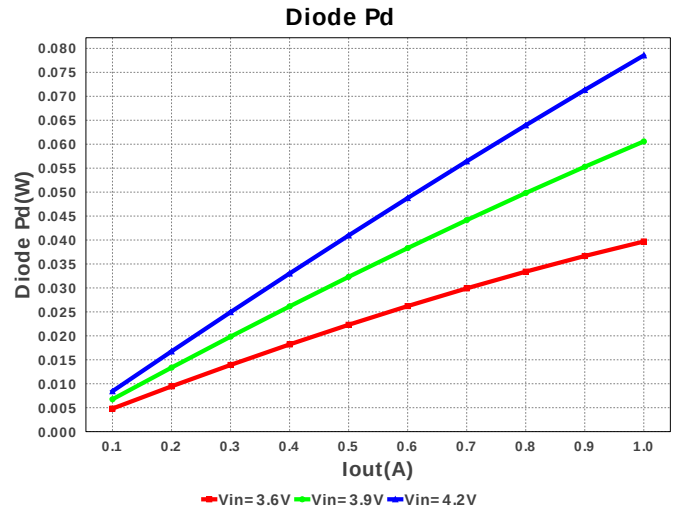












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	430.348 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	28.661 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.05 A	Current	Peak switch current in IC
4.	Iin Avg	766.67 mA	Current	Average input current
5.	L Ipp	99.284 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	868.654 mA	Current	Q Iavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	421.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	1.6 MHz	General	Switching frequency
10.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	120.086 mV	General	

#	Name	Value	Category	Description
12.	Pout	3.0 W	General	Total output power
13.	Total BOM	$0.0	General	Total BOM Cost
14.	Duty Cycle	75.456 %	Op_point	Duty cycle
15.	Efficiency	93.167 %	Op_point	Steady state efficiency
16.	IC Tj	45.61 degC	Op_point	IC junction temperature
17.	ICThetaJA	118.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
18.	IOUT_OP	1.0 A	Op_point	Iout operating point
19.	VIN_OP	4.2 V	Op_point	Vin operating point
20.	Vout p-p	1.183 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	925.995 µW	Power	Input capacitor power dissipation
22.	Cout Pd	7.393 µW	Power	Output capacitor power dissipation
23.	Diode Pd	78.541 mW	Power	Diode power dissipation
24.	IC Pd	132.285 mW	Power	IC power dissipation
25.	L Pd	8.25 mW	Power	Inductor power dissipation
26.	Total Pd	220.024 mW	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	4.2 V	Maximum input voltage
4.	VinMin	3.6 V	Minimum input voltage
5.	Vout	3.0 V	Output Voltage
6.	Vout1	3.0 Volt	Output Voltage #1
7.	base_pn	LMR10510X	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LMR10510X** Product Folder : http://www.ti.com/product/lmr10510 : contains the data sheet and other resources.