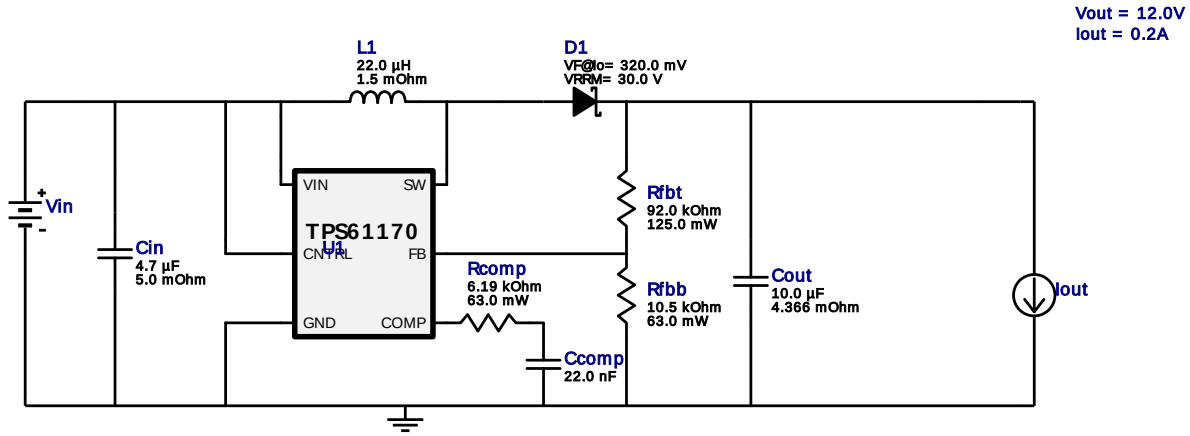
WEBENCH® Design Report

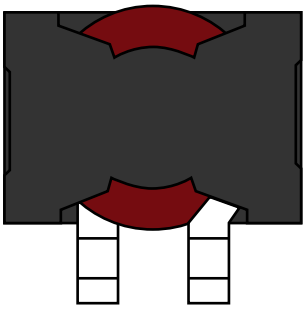
VinMin = 3.3V
VinMax = 3.3V
Vout = 12.0V
Iout = 0.2A

Device = TPS61170DRVR
Topology = Boost
Created = 8/30/16 9:00:28 AM
BOM Cost = $3.21
BOM Count = 9
Total Pd = 0.36W

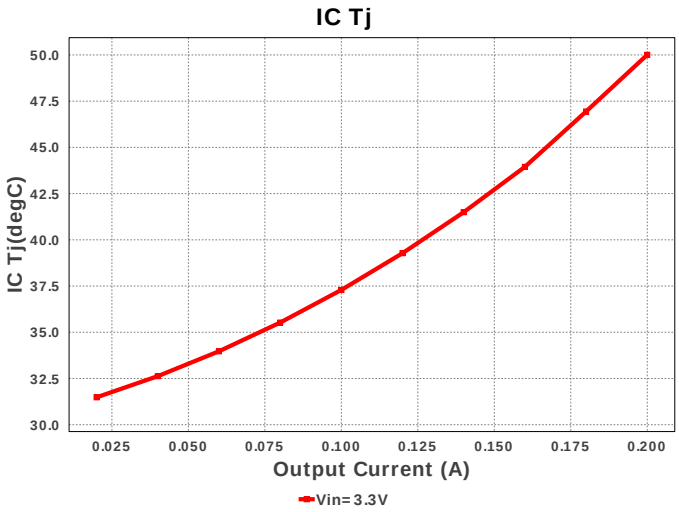
Design : 4009018/139 TPS61170DRVR
TPS61170DRVR 3.3V-3.3V to 12.00V @ 0.2A

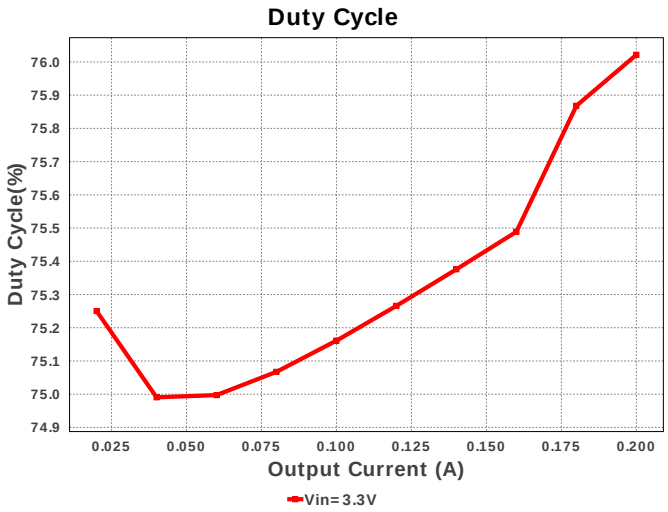


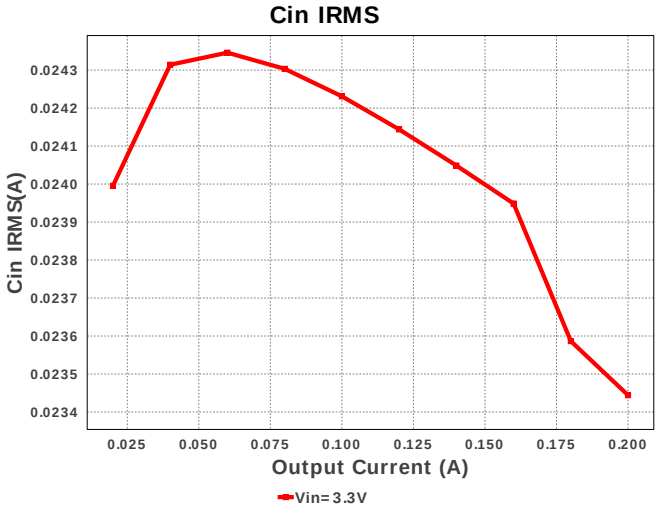
Electrical BOM

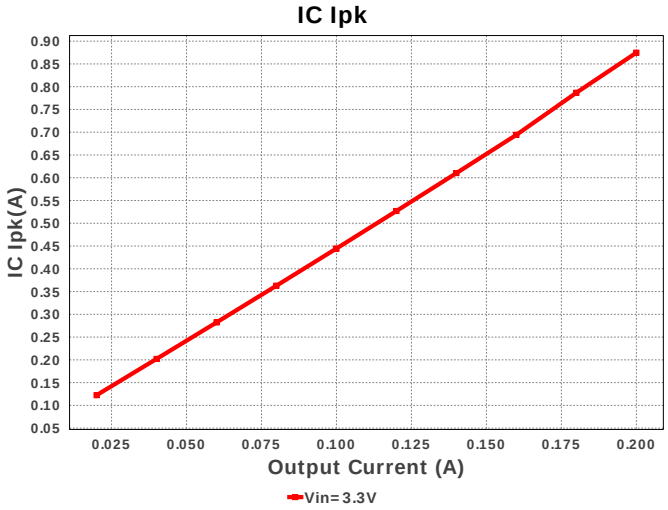
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Yageo America	CC0805KRX7R9BB223 Series= X7R	Cap= 22.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0805 7 mm²
2.	Cin	MuRata	GRM188R60J475KE19D Series= X5R	Cap= 4.7 uF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 2.0 A	1	$0.01	 0603 5 mm²
3.	Cout	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.366 mOhm VDC= 25.0 V IRMS= 2.8022 A	1	$0.05	 1206_190 11 mm²
4.	D1	Toshiba	CMS06	VF@Io= 320.0 mV VRRM= 30.0 V	1	$0.19	 M-FLAT 19 mm²
5.	L1	Coilcraft	SER2915L-223KL	L= 22.0 µH DCR= 1.5 mOhm	1	$1.88	 SER2915L 652 mm²
6.	Rcomp	Vishay-Dale	CRCW04026K19FKED Series= CRCW..e3	Res= 6.19 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
7.	Rfbb	Vishay-Dale	CRCW040210K5FKED Series= CRCW..e3	Res= 10.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
8.	Rfbt	Yageo America	RT0805BRD0792KL Series= RT0805	Res= 92.0 kOhm Power= 125.0 mW Tolerance= 0.1%	1	$0.05	 0805 7 mm²

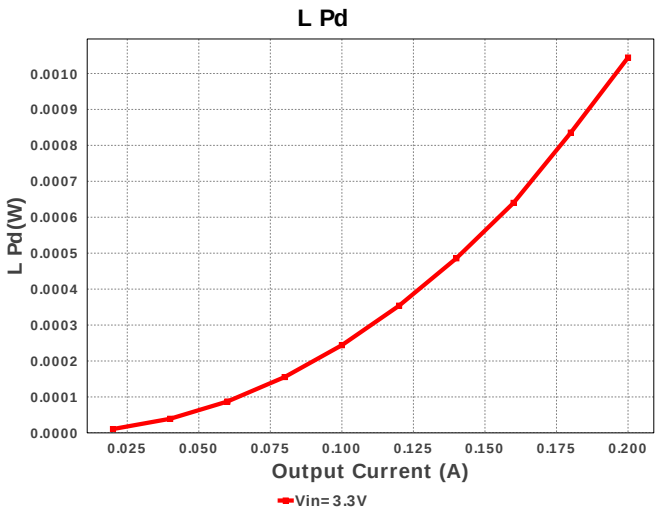
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	TPS61170DRVR	Switcher	1	$1.00	S-PWSON-N6 9 mm^2

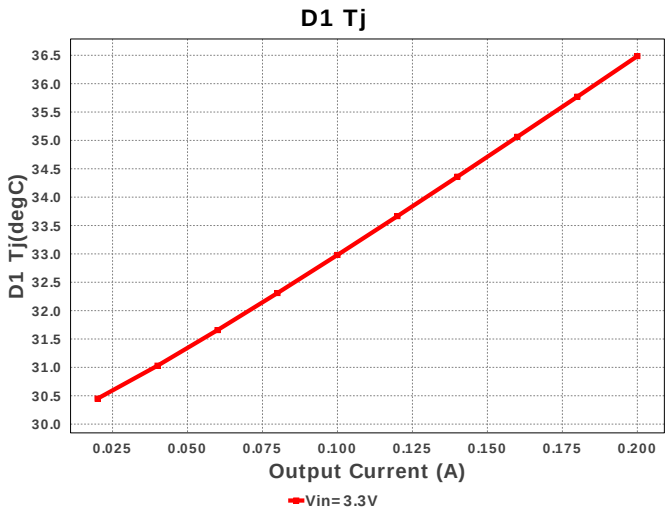


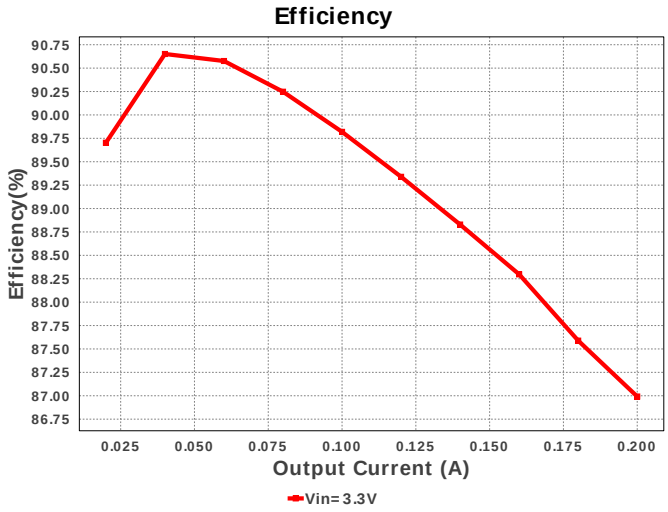


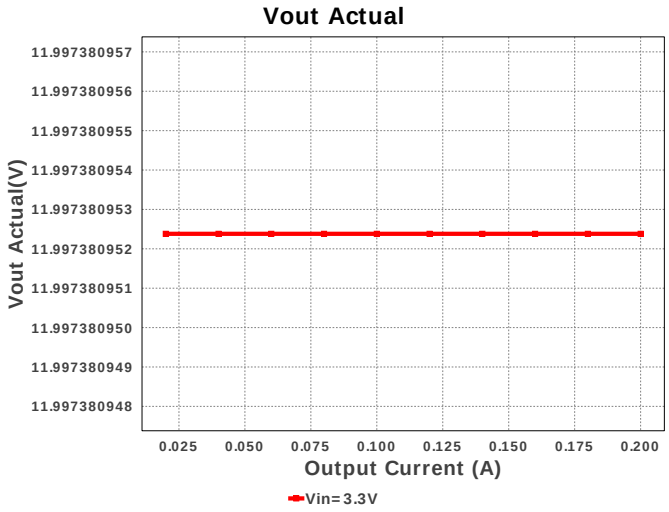


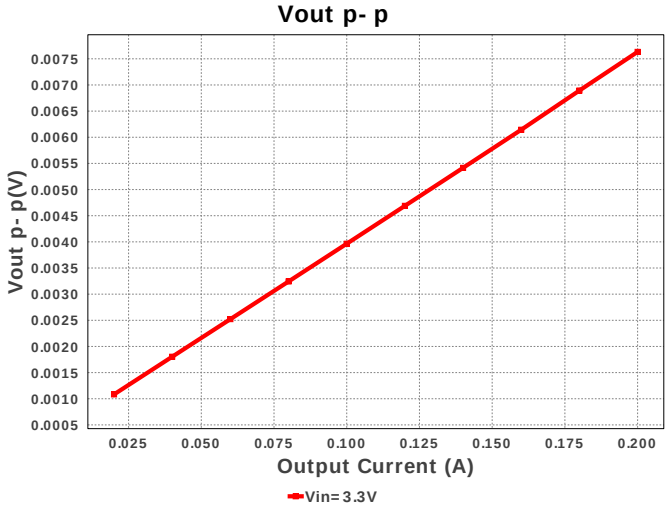


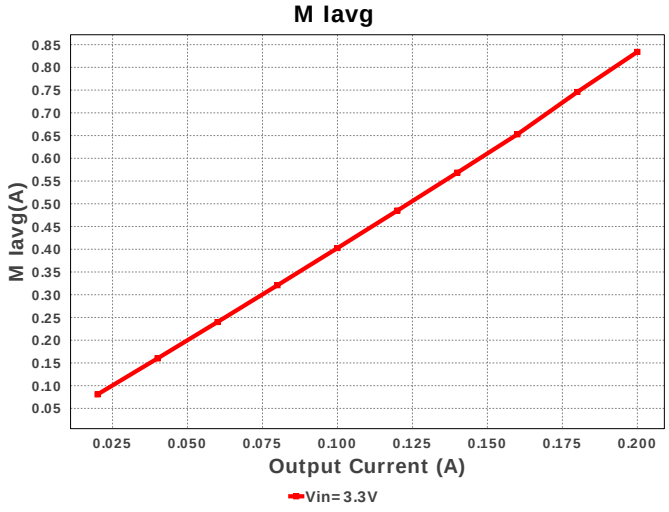


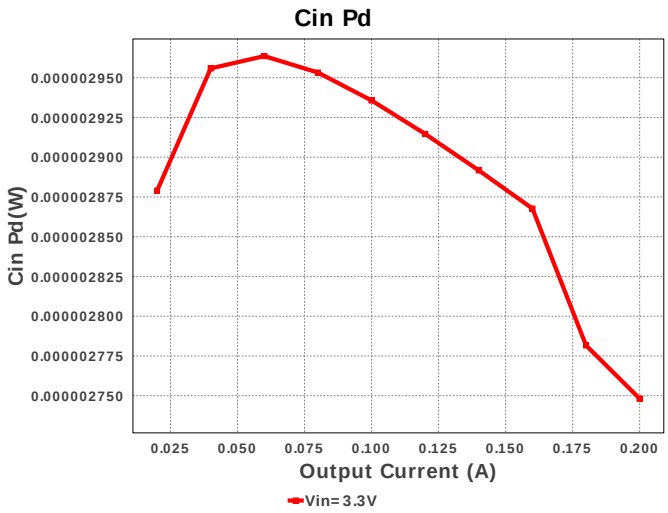


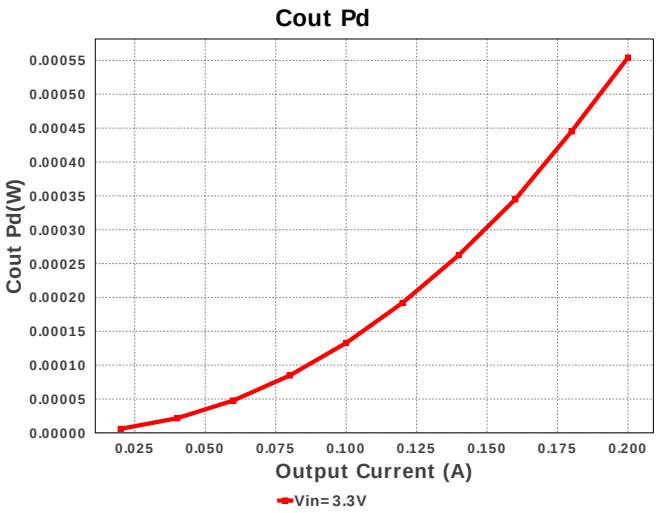


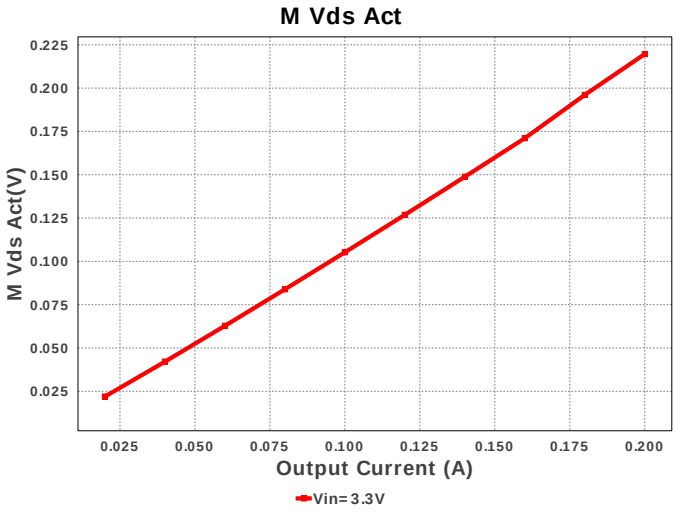


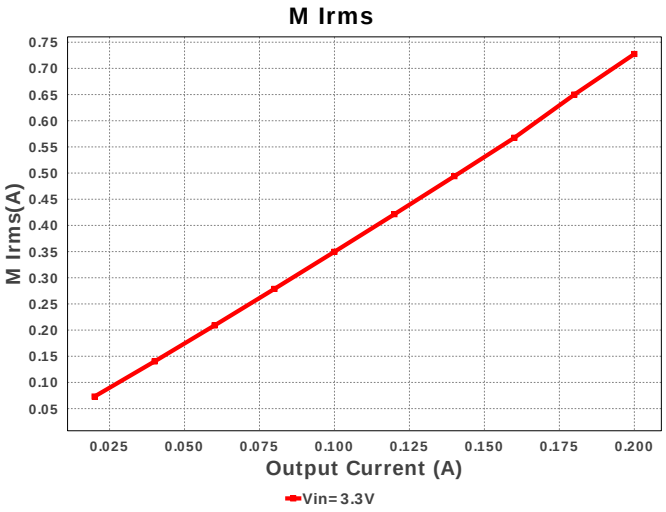


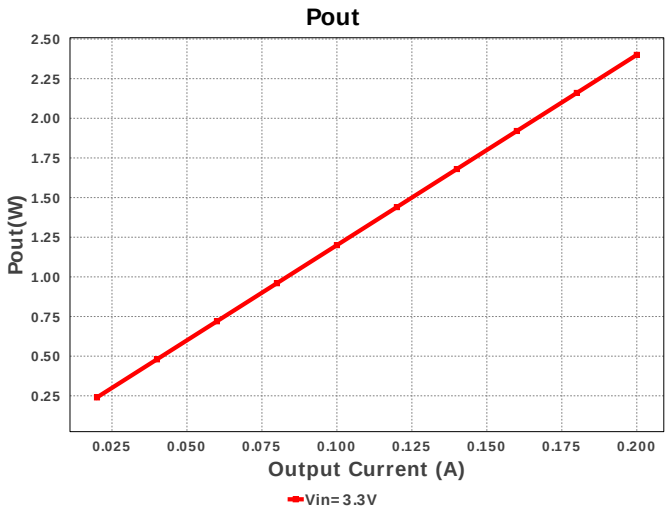


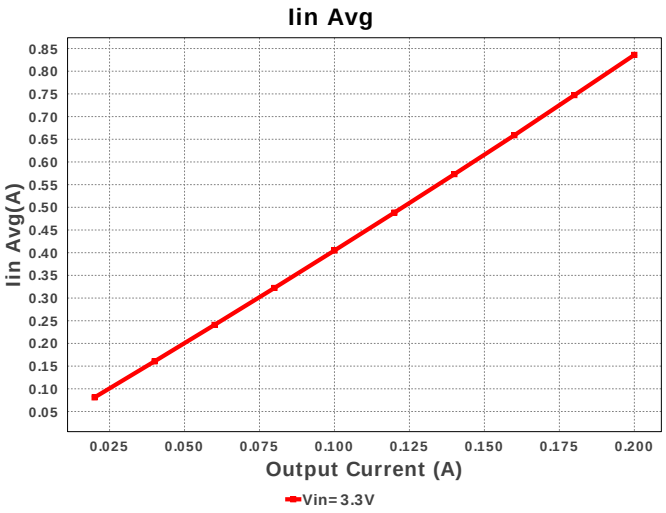


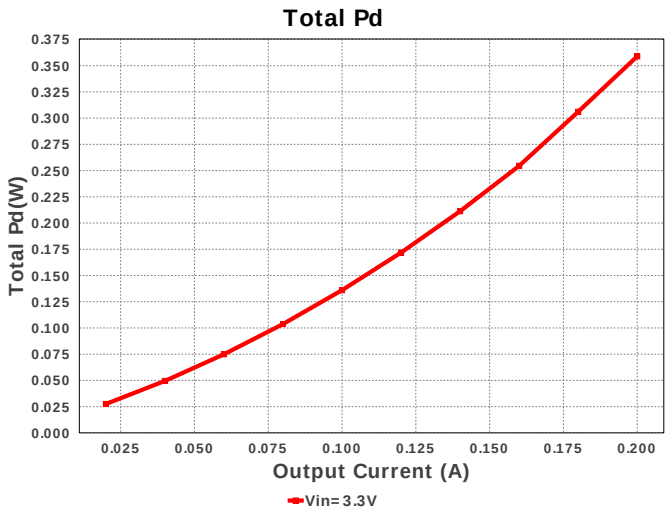


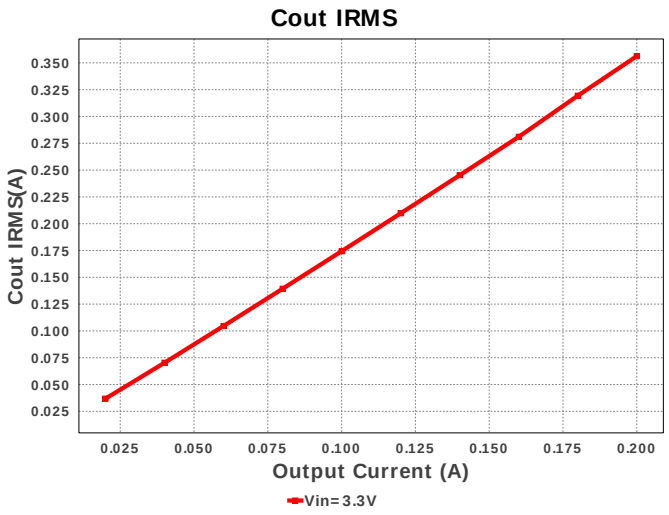


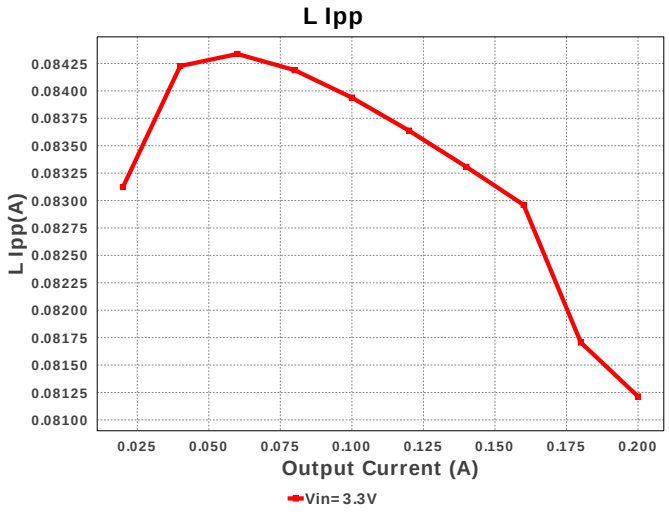


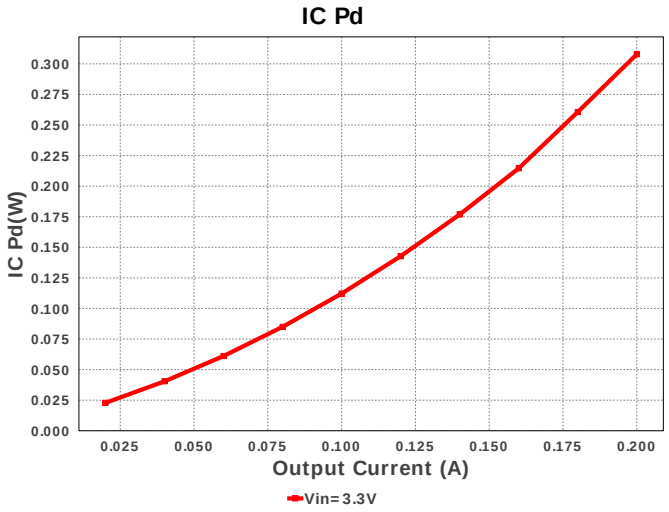


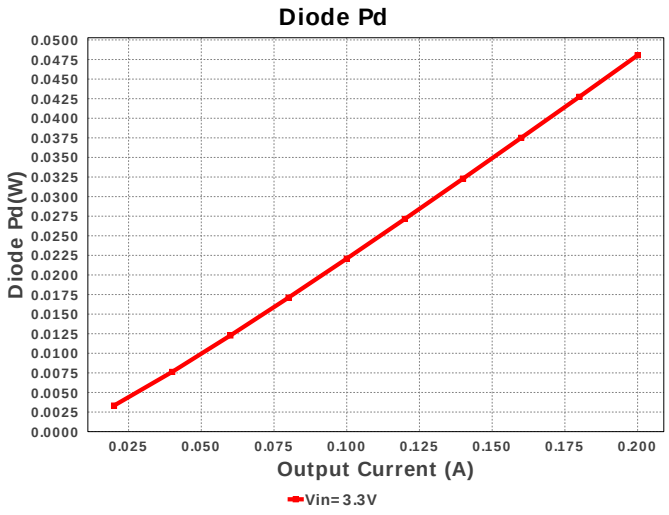


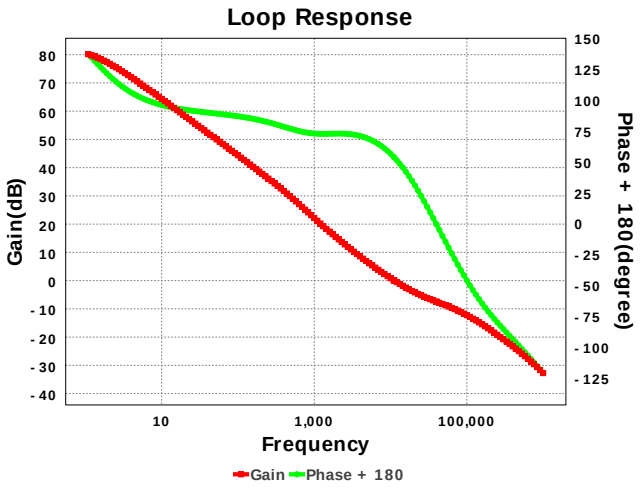












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	23.444 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	356.298 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	874.688 mA	Current	Peak switch current in IC
4.	Iin Avg	836.02 mA	Current	Average input current
5.	L Ipp	81.213 mA	Current	Peak-to-peak inductor ripple current
6.	M Iavg	834.081 mA	Current	MOSFET Average current
7.	M1 Irms	727.526 mA	Current	Q Iavg
8.	BOM Count	9	General	Total Design BOM count
9.	FootPrint	715.0 mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	1.2 MHz	General	Switching frequency
11.	IC Tolerance	20.0 mV	General	IC Feedback Tolerance

#	Name	Value	Category	Description
12.	M Vds Act	219.713 mV	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	2.4 W	General	Total output power
15.	Total BOM	$3.21	General	Total BOM Cost
16.	D1 Tj	36.486 degC	Op_Point	D1 junction temperature
17.	Low Freq Gain	80.17 dB	Op_Point	Gain at 10Hz
18.	Vout Actual	11.997 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
19.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
20.	Cross Freq	9.56 kHz	Op_point	Bode plot crossover frequency
21.	Duty Cycle	76.022 %	Op_point	Duty cycle
22.	Efficiency	86.992 %	Op_point	Steady state efficiency
23.	Gain Marg	-8.693 dB	Op_point	Bode Plot Gain Margin
24.	IC Tj	50.008 degC	Op_point	IC junction temperature
25.	ICThetaJA	65.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
26.	IOUT_OP	200.0 mA	Op_point	Iout operating point
27.	Phase Marg	57.741 deg	Op_point	Bode Plot Phase Margin
28.	VIN_OP	3.3 V	Op_point	Vin operating point
29.	Vout p-p	6.69 mV	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	2.748 µW	Power	Input capacitor power dissipation
31.	Cout Pd	554.255 µW	Power	Output capacitor power dissipation
32.	Diode Pd	48.043 mW	Power	Diode power dissipation
33.	IC Pd	307.813 mW	Power	IC power dissipation
34.	L Pd	1.044 mW	Power	Inductor power dissipation
35.	Total Pd	358.873 mW	Power	Total Power Dissipation
36.	Vout Tolerance	2.641 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	3.3	Maximum input voltage
3.	VinMin	3.3	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	TPS61170	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS61170** Product Folder : http://www.ti.com/product/TPS61170 : contains the data sheet and other resources.