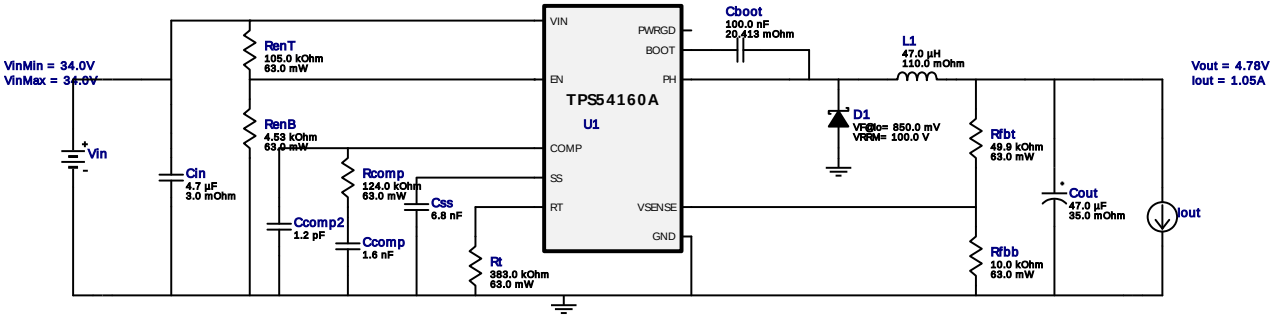
WEBENCH® Design Report

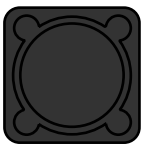
VinMin = 34.0V
VinMax = 34.0V
Vout = 4.78V
Iout = 1.05A

Device = TPS54160ADGQR
Topology = Buck
Created = 11/5/14 12:37:12 AM
BOM Cost = $0.00
Footprint = 343.0 mm²
BOM Count = 15
Total Pd = 1.21W

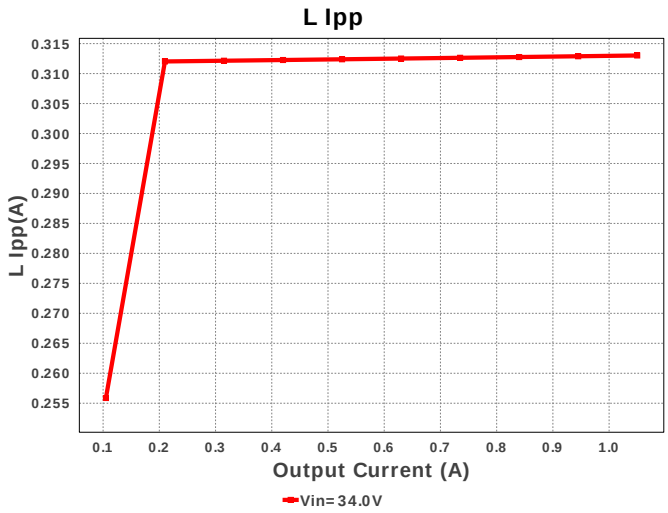
Design : 1240147/280 TPS54160ADGQR
TPS54160ADGQR 34.0V-34.0V to 4.78V @ 1.05A

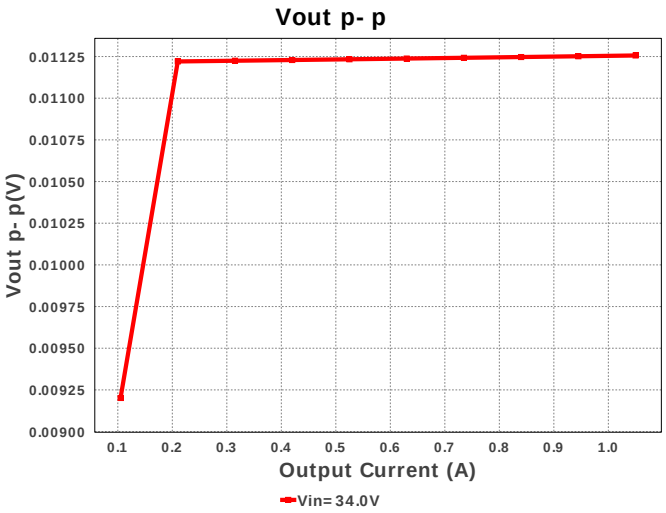


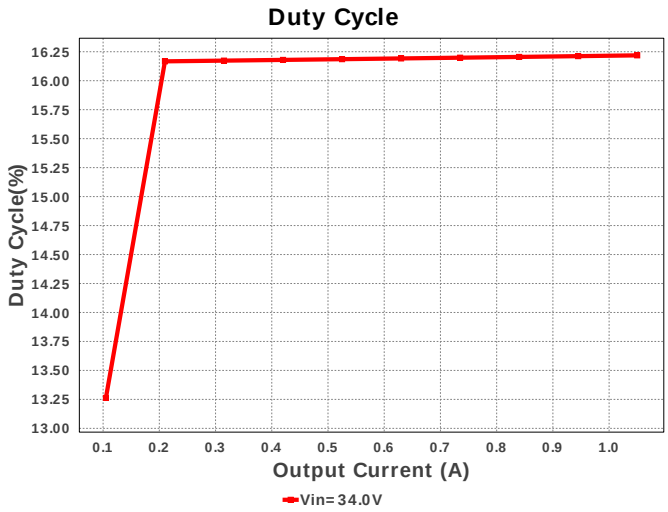
Electrical BOM

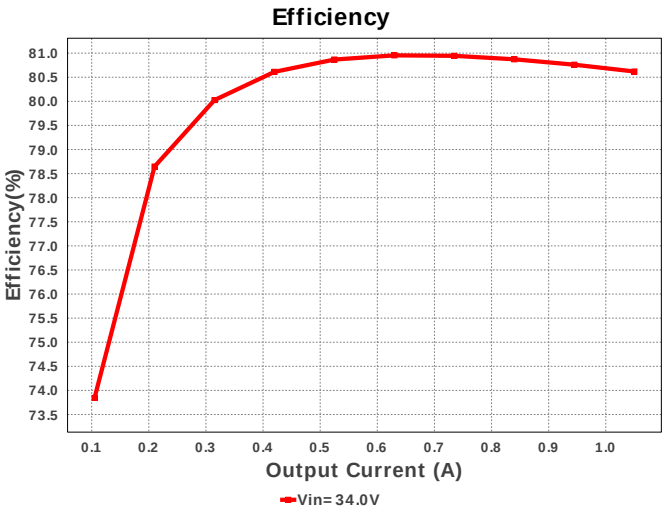
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	C1005X5R1A104K Series= 285	Cap= 100.0 nF ESR= 20.413 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Ccomp	MuRata	GRM2165C1H162JA01D Series= C0G/NP0	Cap= 1.6 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
3.	Ccomp2	MuRata	GRM1555C1H1R2CA01D Series= C0G/NP0	Cap= 1.2 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
4.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	$0.10	1206 11 mm²
5.	Cout	Panasonic	10TPE47MAZB Series= ?	Cap= 47.0 uF ESR= 35.0 mOhm VDC= 10.0 V IRMS= 1.4 A	1	NA	3528-21 17 mm²
6.	Css	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
7.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	$0.10	SMA 37 mm²
8.	L1	Bourns	SRR1208-470YL	L= 47.0 µH DCR= 110.0 mOhm	1	$0.37	 SRR1208 216 mm²
9.	Rcomp	Vishay-Dale	CRCW0402124KFKED Series= CRCW..e3	Res= 124.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	RenB	Vishay-Dale	CRCW04024K53FKED Series= CRCW..e3	Res= 4.53 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	RenT	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

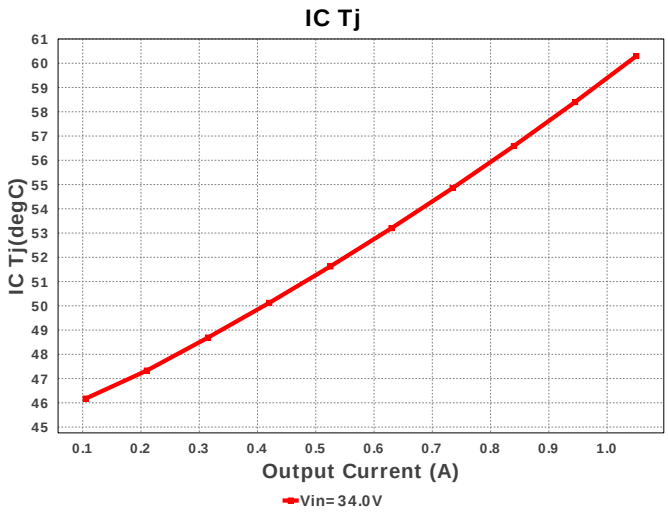
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
13.	Rfbt	Vishay-Dale	CRCW040249K9FKED Series= CRCW..e3	Res= 49.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
14.	Rt	Vishay-Dale	CRCW0402383KFKED Series= CRCW..e3	Res= 383.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
15.	U1	Texas Instruments	TPS54160ADGQR	Switcher	1	$1.58	S-PDSO-G10 24 mm²

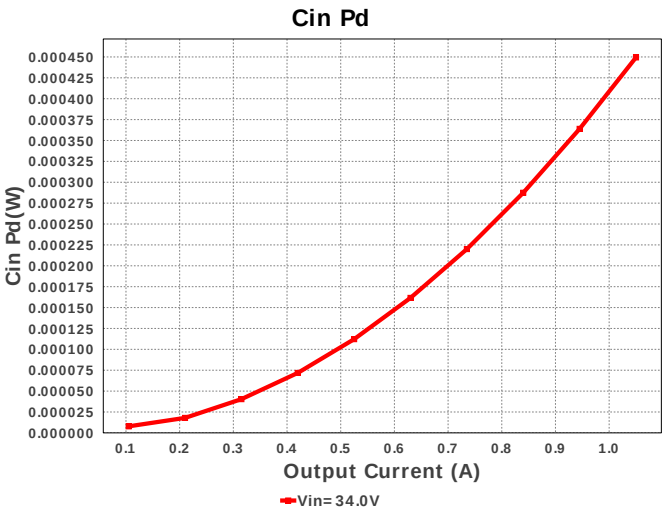


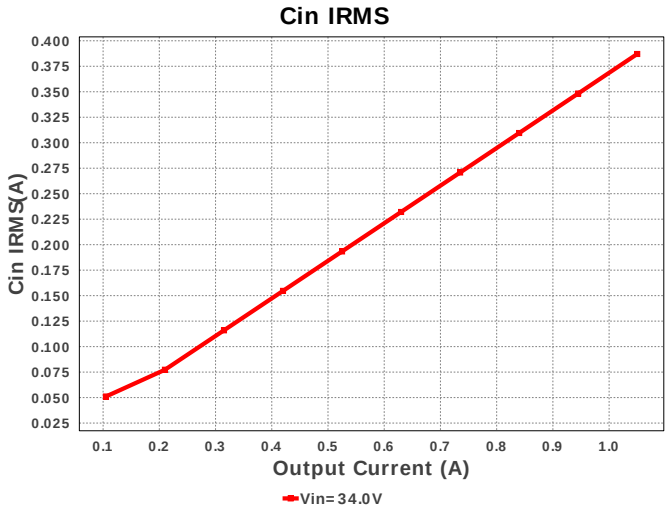


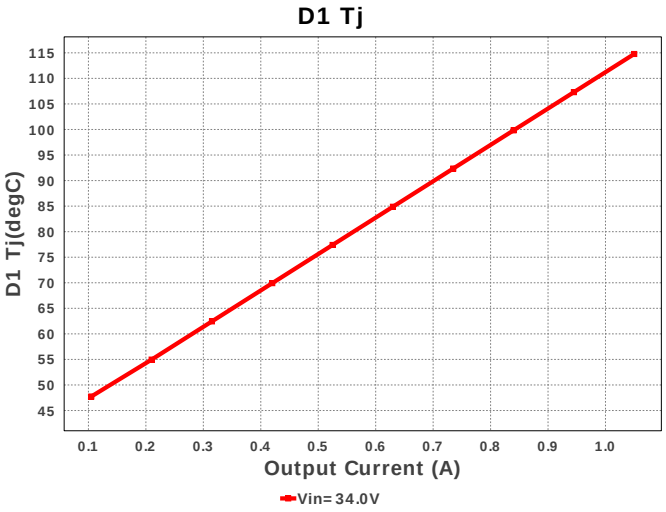


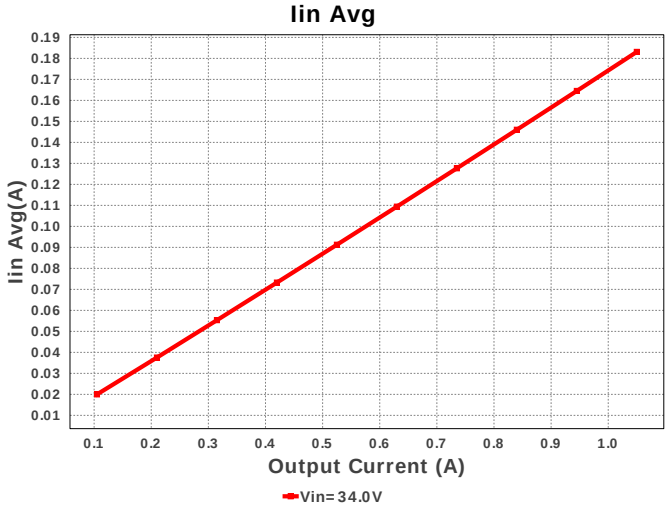


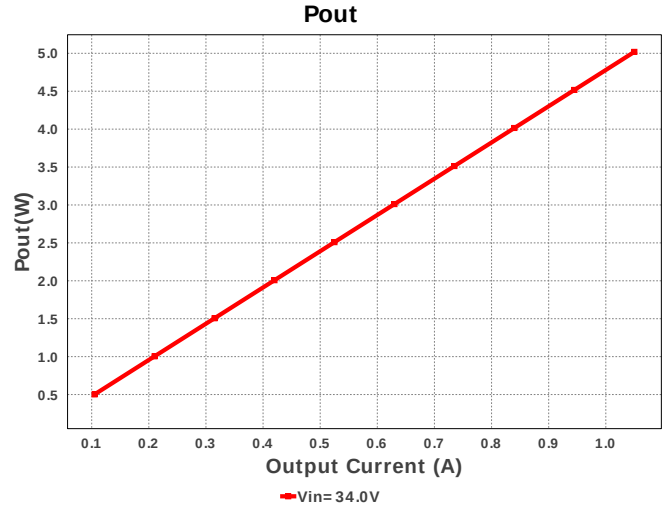


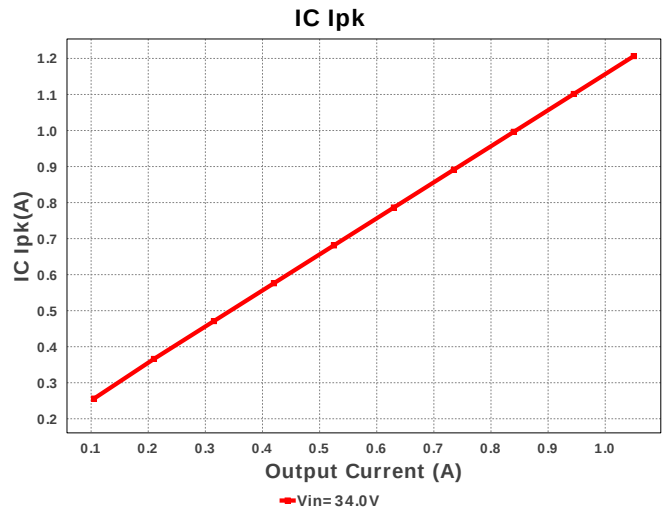


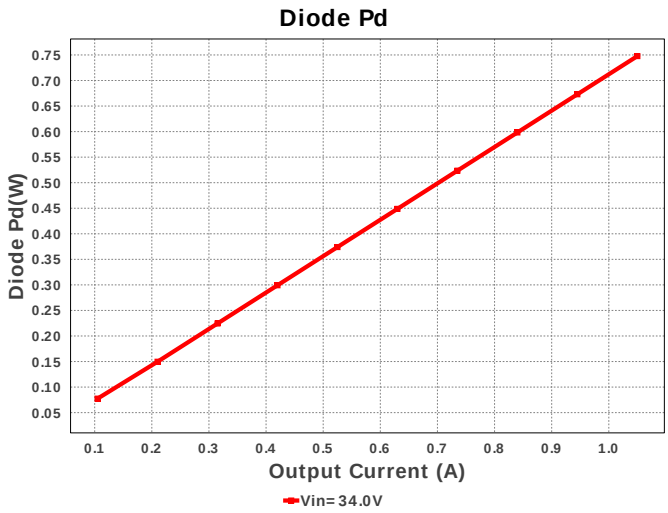


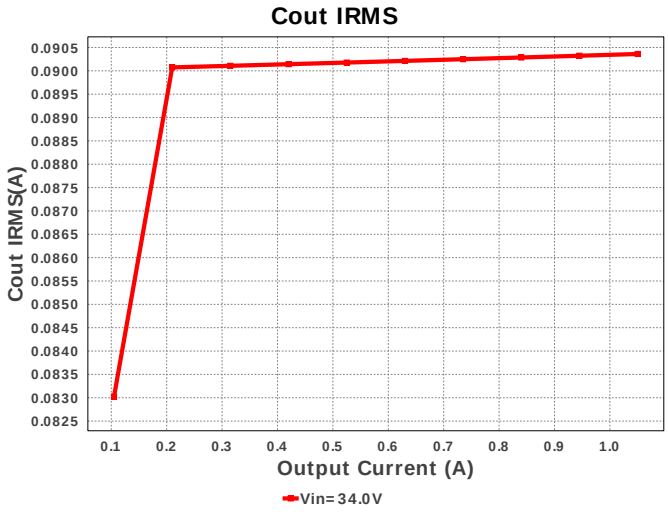


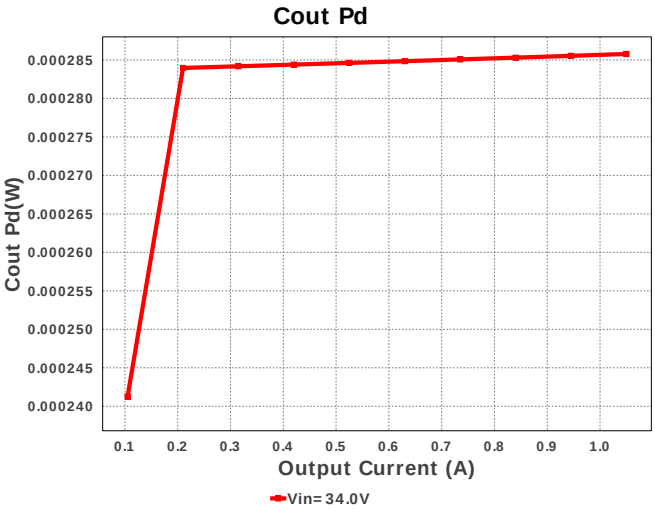


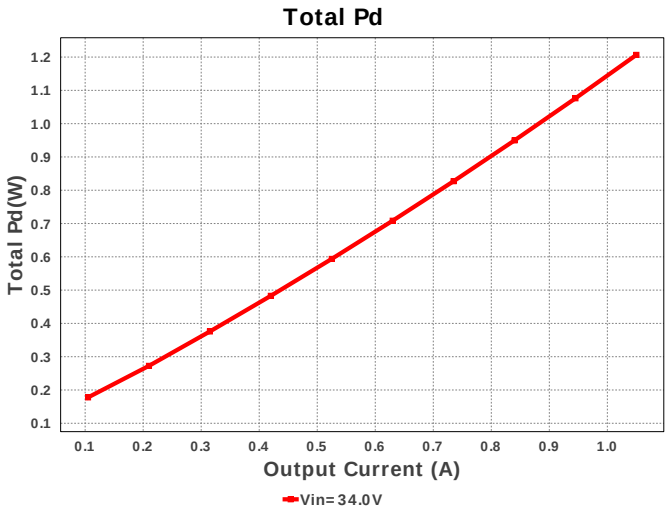


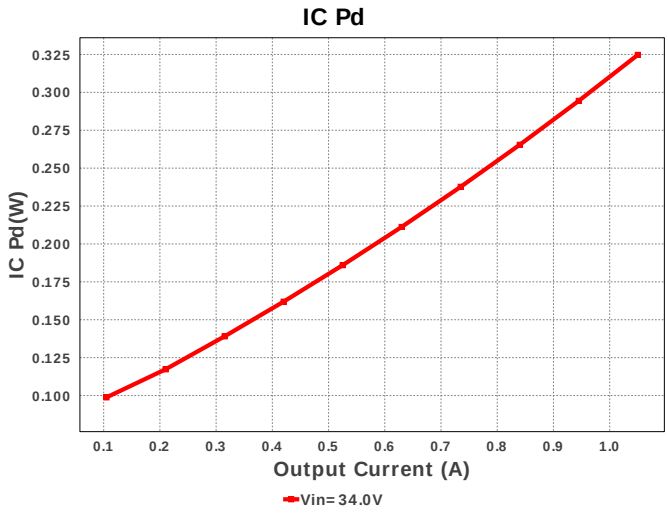


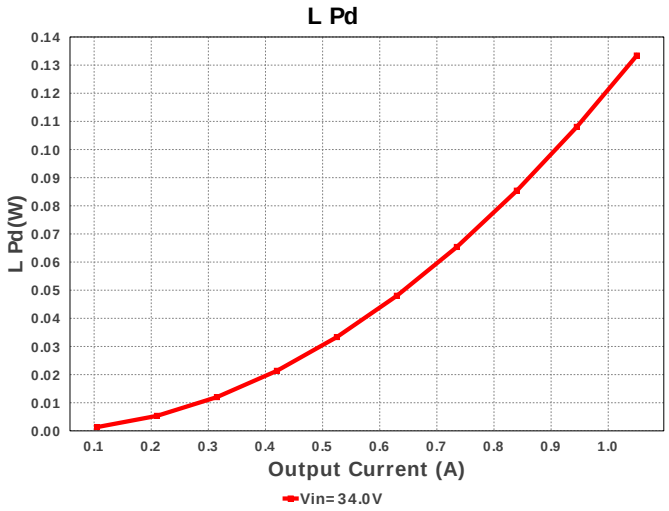


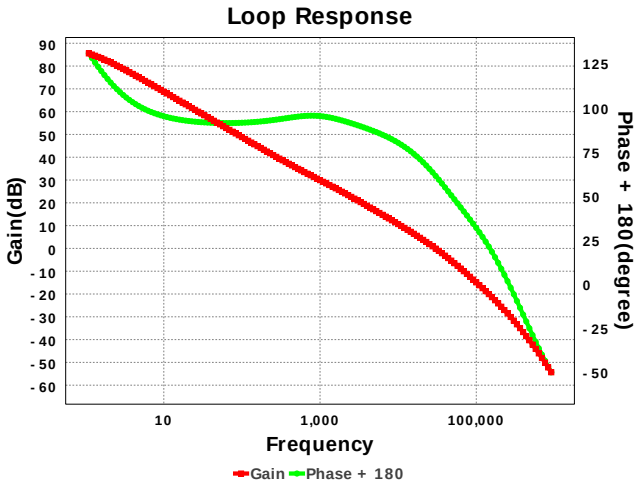












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	387.053 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	90.361 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.05 A	Current	Peak switch current in IC
4.	Iin Avg	183.11 mA	Current	Average input current
5.	L Ipp	313.019 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	15	General	Total Design BOM count
7.	FootPrint	343.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	322.126 kHz	General	Switching frequency
9.	Pout	5.019 W	General	Total output power
10.	Total BOM	$0.0	General	Total BOM Cost
11.	D1 Tj	114.775 degC	Op_Point	D1 junction temperature
12.	Vout OP	4.78 V	Op_Point	Operational Output Voltage
13.	Cross Freq	30.035 kHz	Op_point	Bode plot crossover frequency
14.	Duty Cycle	16.219 %	Op_point	Duty cycle
15.	Efficiency	80.619 %	Op_point	Steady state efficiency
16.	IC Tj	60.296 degC	Op_point	IC junction temperature
17.	ICThetaJA	62.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
18.	IOUT_OP	1.05 A	Op_point	Iout operating point
19.	Phase Marg	61.917 deg	Op_point	Bode Plot Phase Margin
20.	VIN_OP	34.0 V	Op_point	Vin operating point
21.	Vout p-p	11.256 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	449.429 µW	Power	Input capacitor power dissipation
23.	Cout Pd	285.778 µW	Power	Output capacitor power dissipation
24.	Diode Pd	747.749 mW	Power	Diode power dissipation
25.	IC Pd	324.729 mW	Power	IC power dissipation
26.	L Pd	133.402 mW	Power	Inductor power dissipation
27.	Total Pd	1.207 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.05 A	Maximum Output Current
2.	Iout1	1.05 Amps	Output Current #1
3.	SoftStart	2.176 ms	Soft Start Time (ms)
4.	VinMax	34.0 V	Maximum input voltage
5.	VinMin	34.0 V	Minimum input voltage
6.	Vout	4.78 V	Output Voltage
7.	Vout1	4.78 Volt	Output Voltage #1
8.	base_pn	TPS54160A	Texas Instruments Base Part Number
9.	source	DC	Input Source Type
10.	ta	40.0 degC	Ambient temperature
11.	userfsw	329.0 kHz	Customer Selected Frequency

Design Assistance

1. TPS54160A Product Folder : http://www.ti.com/product/tps54160a : contains the data sheet and other resources.