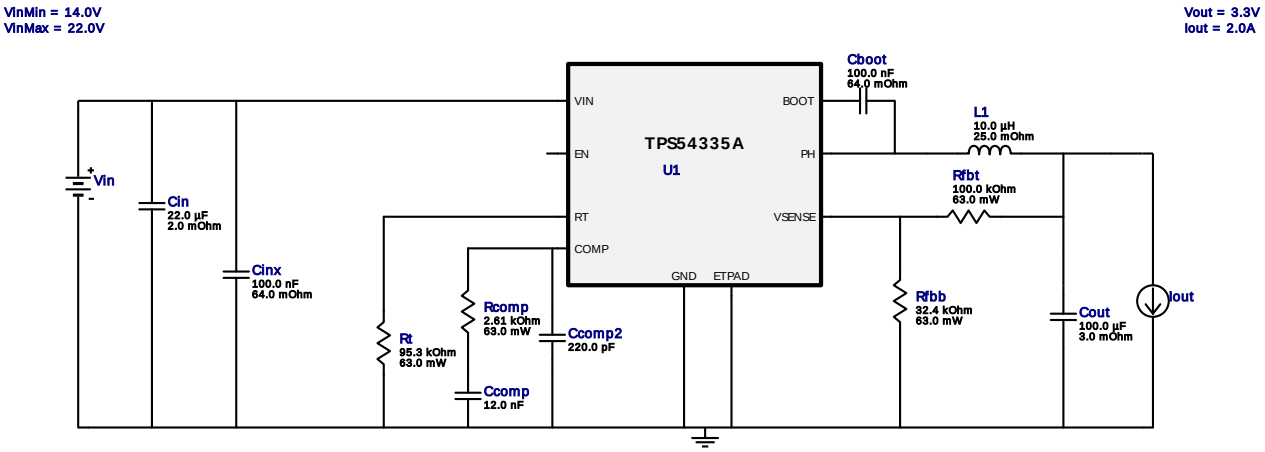
WEBENCH® Design Report

VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 2.0A

Device = TPS54335ADDAR
Topology = Buck
Created = 7/2/15 6:04:07 AM
BOM Cost = $1.67
Footprint = 262.0 mm²
BOM Count = 12
Total Pd = 1.22W

Design : 4063042/197 TPS54335ADDAR
TPS54335ADDAR 14.0V-22.0V to 3.30V @ 2.0A

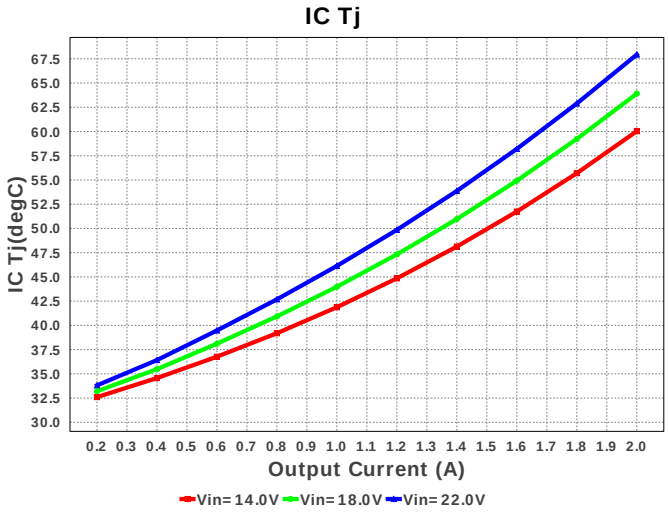


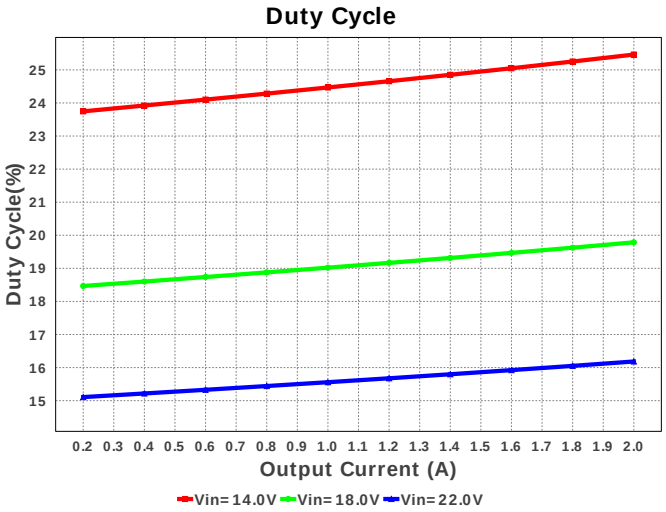
Electrical BOM

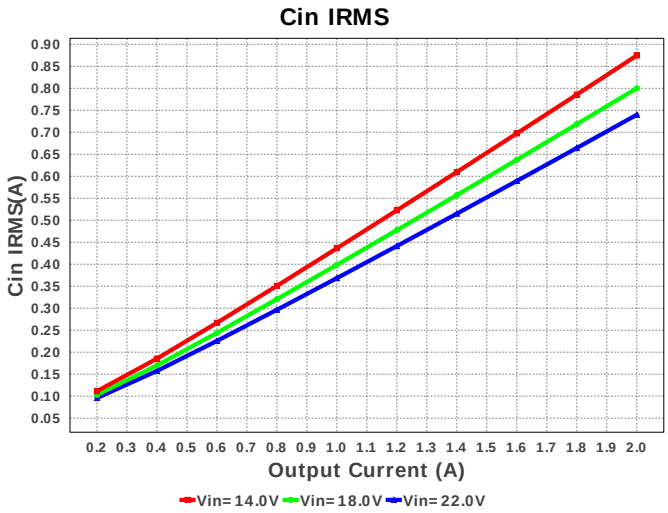
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Ccomp	MuRata	GRM155R71C123KA01D Series= X7R	Cap= 12.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Ccomp2	Yageo America	CC0805JRNPO9BN221 Series= C0G/NP0	Cap= 220.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm²
5.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
6.	Cout	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 3.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.20	1206 11 mm²
7.	L1	Bourns	SRU1038-100Y	L= 10.0 µH DCR= 25.0 mOhm	1	$0.33	SRU1038 144 mm²
8.	Rcomp	Vishay-Dale	CRCW04022K61FKED Series= CRCW..e3	Res= 2.61 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040232K4FKED Series= CRCW..e3	Res= 32.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

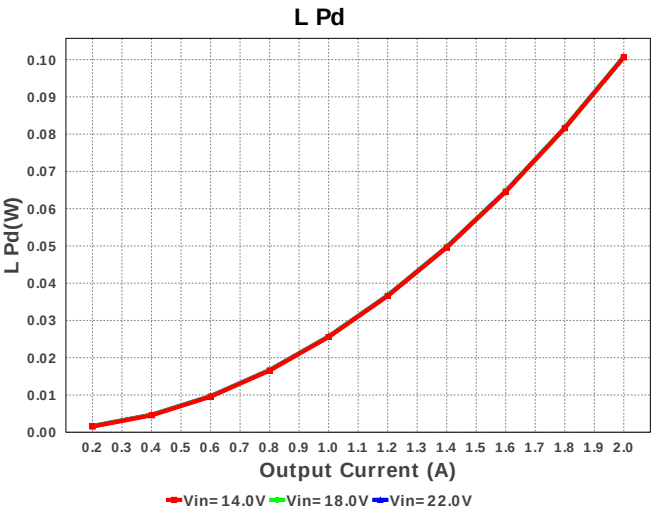
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rt	Vishay-Dale	CRCW040295K3FKED Series= CRCW..e3	Res= 95.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	TPS54335ADDAR	Switcher	1	$0.90	

R-PDSO-G8 57 mm^2

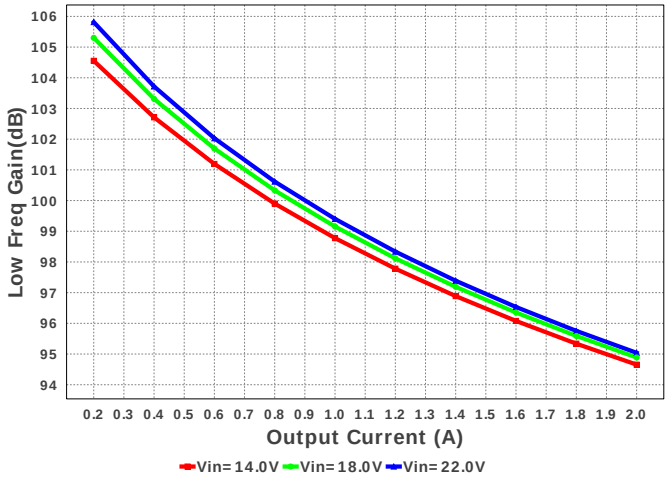




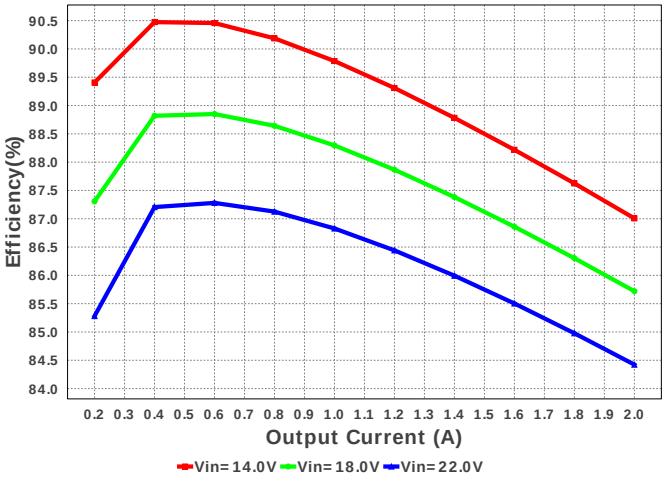




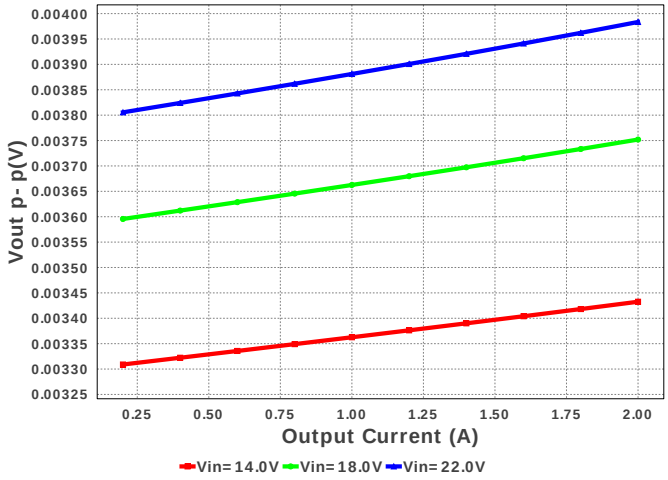
Low Freq Gain



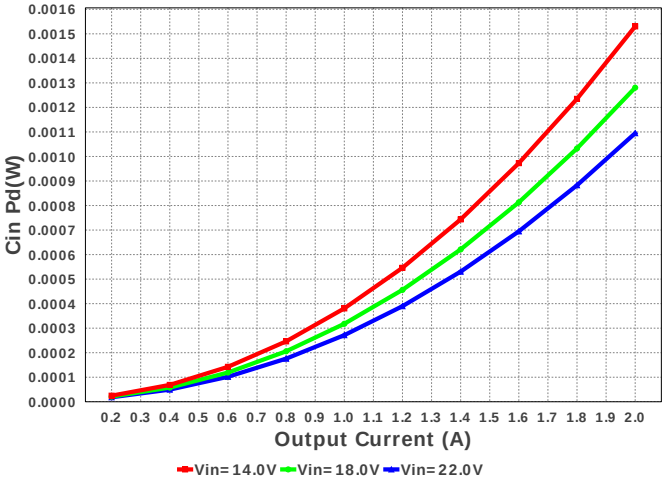
Efficiency



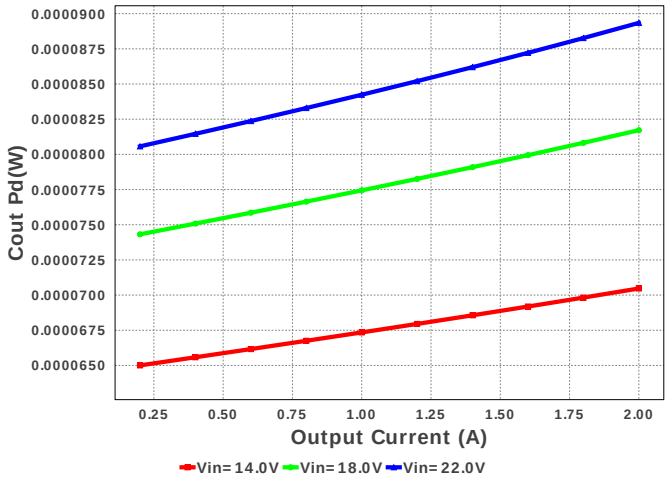
Vout p- p



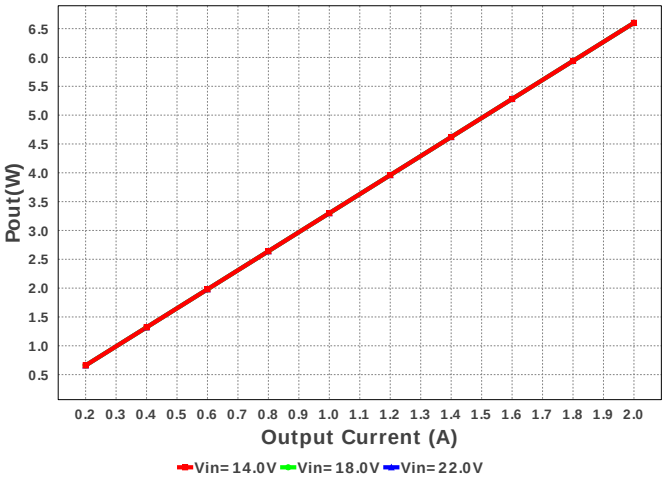
Cin Pd

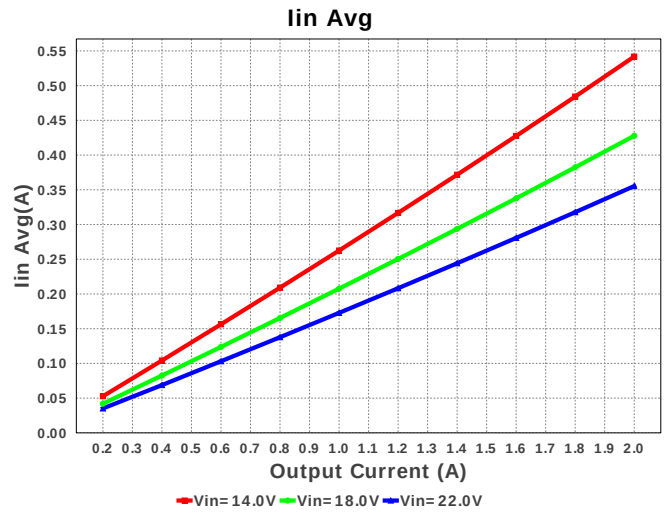


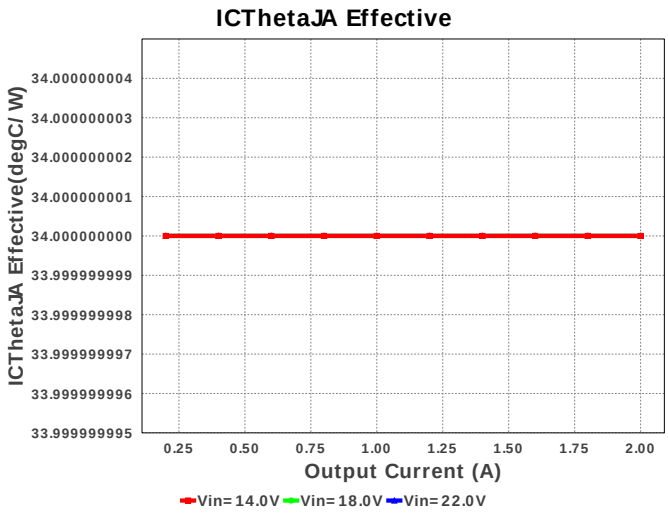
Cout Pd

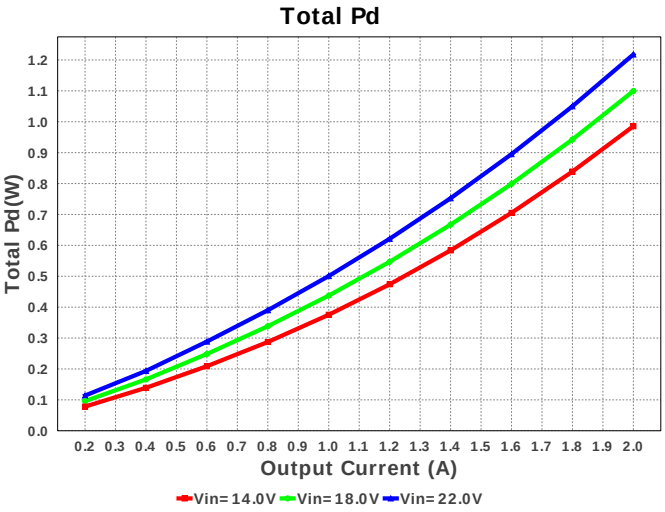


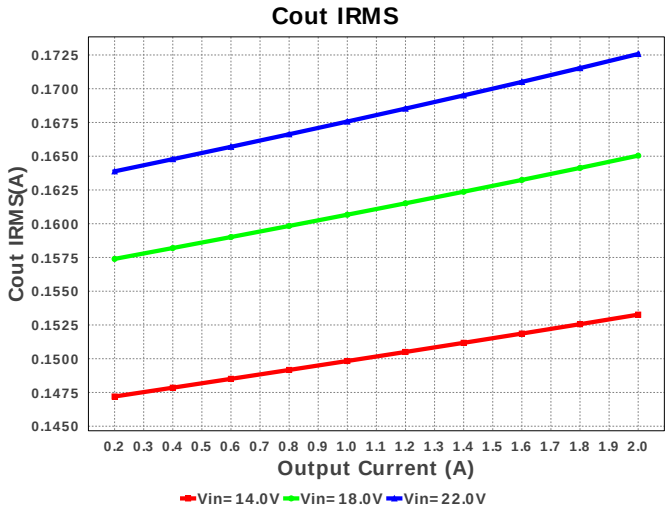
Pout

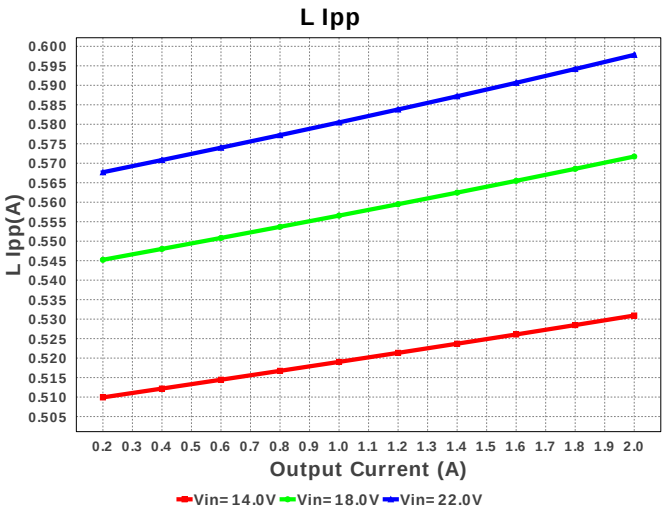


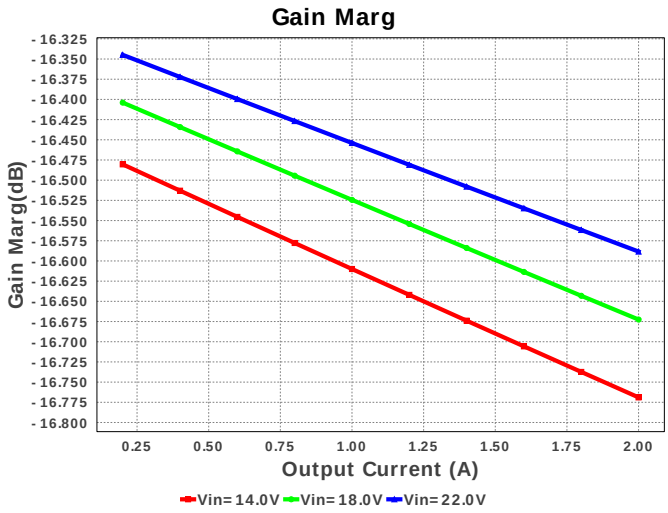


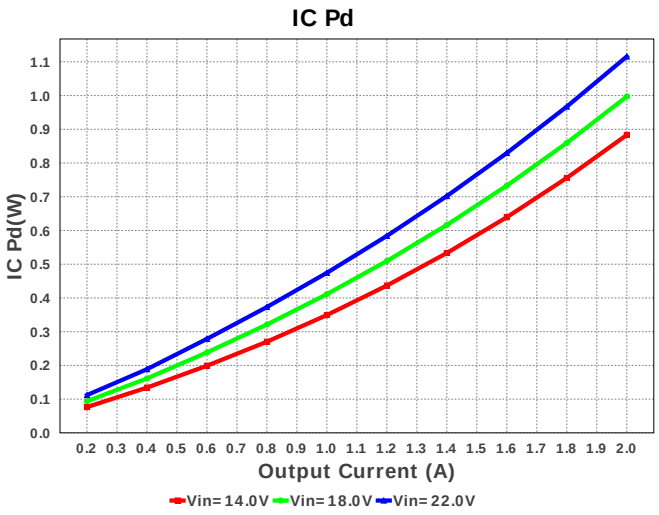


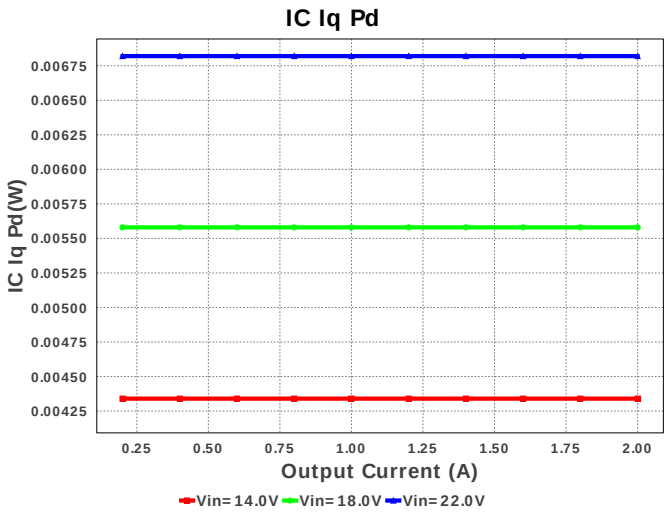


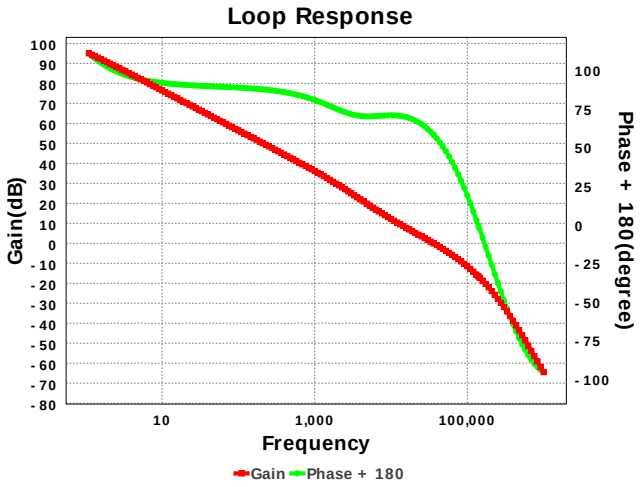












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	739.877 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	172.573 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	355.35 mA	Current	Average input current
4.	L Ipp	597.81 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	262.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	496.814 kHz	General	Switching frequency
8.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
9.	Pout	6.6 W	General	Total output power
10.	Total BOM	$1.67	General	Total BOM Cost
11.	ICThetaJA Effective	34.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	95.039 dB	Op_Point	Gain at 10Hz
13.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
14.	Cross Freq	36.073 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	16.184 %	Op_point	Duty cycle
16.	Efficiency	84.423 %	Op_point	Steady state efficiency
17.	Gain Marg	-16.588 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	67.937 degC	Op_point	IC junction temperature
19.	IOUT_OP	2.0 A	Op_point	Iout operating point
20.	Phase Marg	58.843 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	22.0 V	Op_point	Vin operating point
22.	Vout p-p	3.983 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.095 mW	Power	Input capacitor power dissipation
24.	Cout Pd	89.344 µW	Power	Output capacitor power dissipation
25.	IC Iq Pd	6.82 mW	Power	IC Iq Pd
26.	IC Pd	1.116 W	Power	IC power dissipation
27.	L Pd	100.745 mW	Power	Inductor power dissipation
28.	Total Pd	1.218 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	Iout1	2.0	Output Current #1
3.	VinMax	22.0	Maximum input voltage
4.	VinMin	14.0	Minimum input voltage
5.	Vout	3.3	Output Voltage
6.	Vout1	3.3	Output Voltage #1
7.	base_pn	TPS54335A	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0	Ambient temperature

Design Assistance

1. TPS54335A Product Folder : http://www.ti.com/product/TPS54335A : contains the data sheet and other resources.