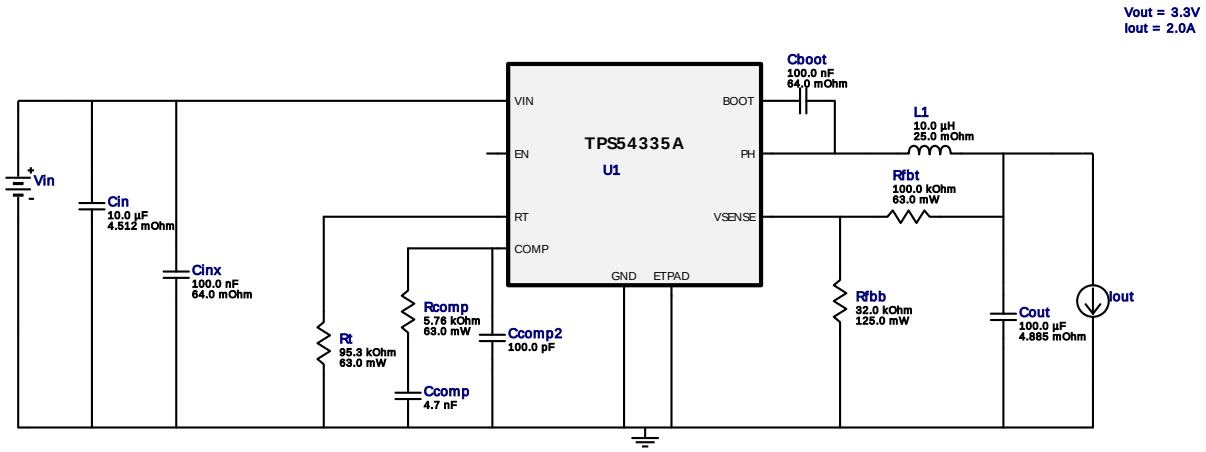
WEBENCH® Design Report

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

Device = TPS54335ADDAR
Topology = Buck
Created = 8/17/16 7:52:10 PM
BOM Cost = $1.54
BOM Count = 12
Total Pd = 1.22W

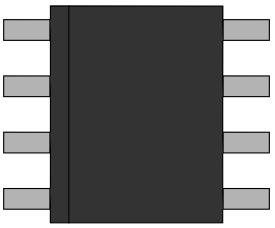
Design : 4770232/1 TPS54335ADDAR
TPS54335ADDAR 14.0V-22.0V to 3.30V @ 2.0A

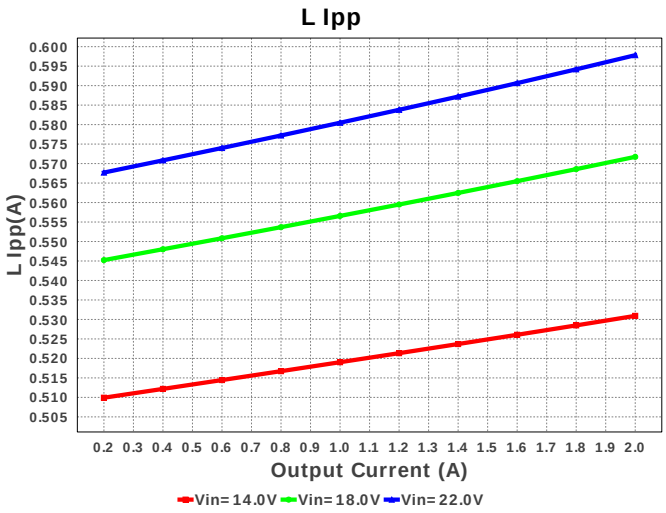


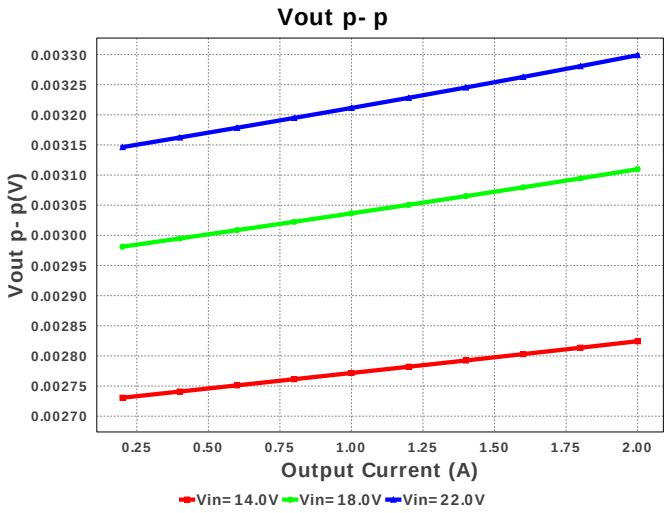
Electrical BOM

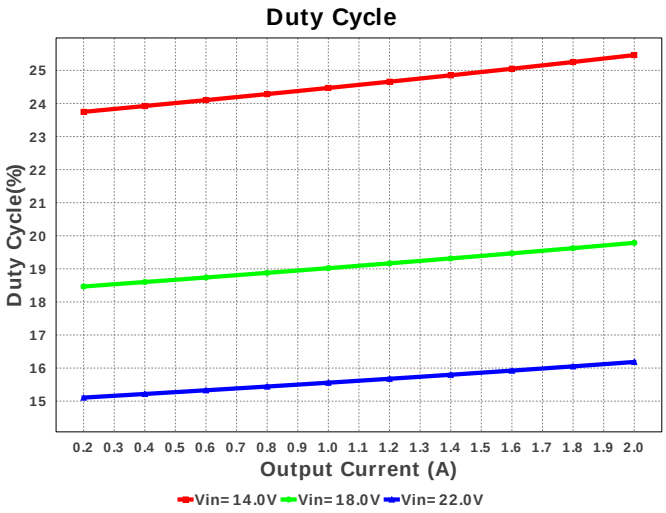
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Ccomp	Yageo America	CC0805KRX7R9BB472 Series= X7R	Cap= 4.7 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Ccomp2	Yageo America	CC0805JRNPO9BN101 Series= C0G/NP0	Cap= 100.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM31CR61E106KA12L Series= X5R	Cap= 10.0 uF ESR= 4.512 mOhm VDC= 25.0 V IRMS= 2.447 A	1	$0.05	1206_190 11 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= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	1	$0.14	1206_190 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	CRCW04025K76FKED Series= CRCW..e3	Res= 5.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Yageo America	RT0805BRD0732KL Series= ?	Res= 32.0 kOhm Power= 125.0 mW Tolerance= 0.1%	1	$0.05	0805 7 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

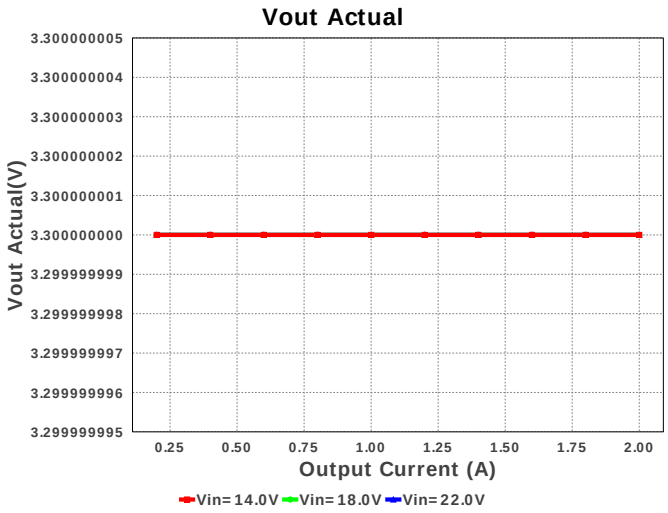
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rt	Vishay-Dale	CRCW040295K3FKED Series= CRCW..e3	Res= 95.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	TPS54335ADDAR	Switcher	1	$0.90	R-PDSO-G8 55 mm^2

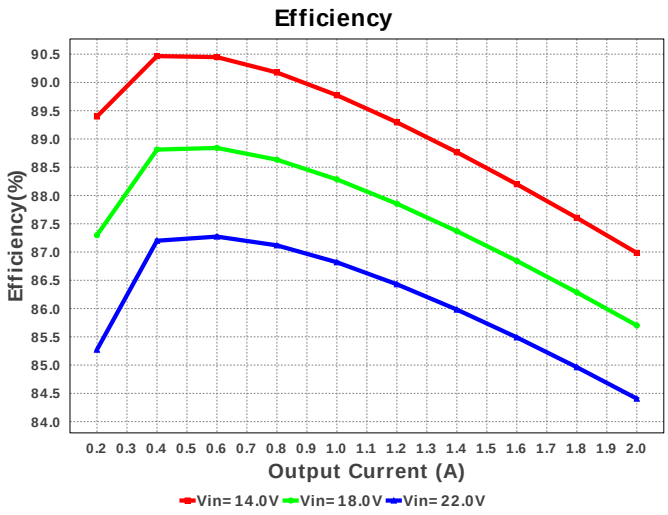


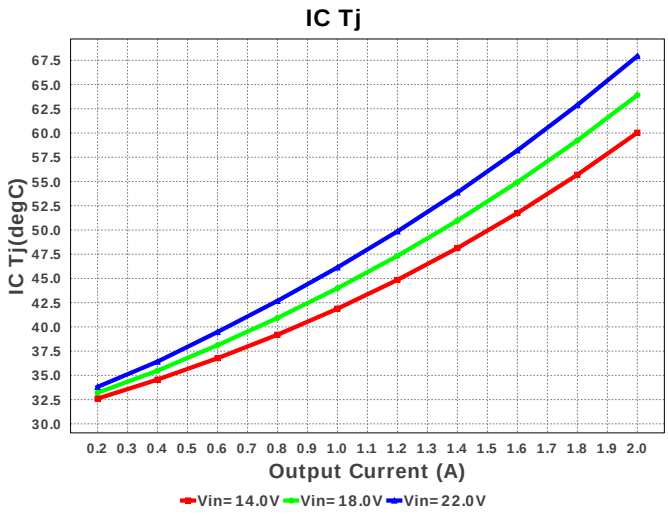


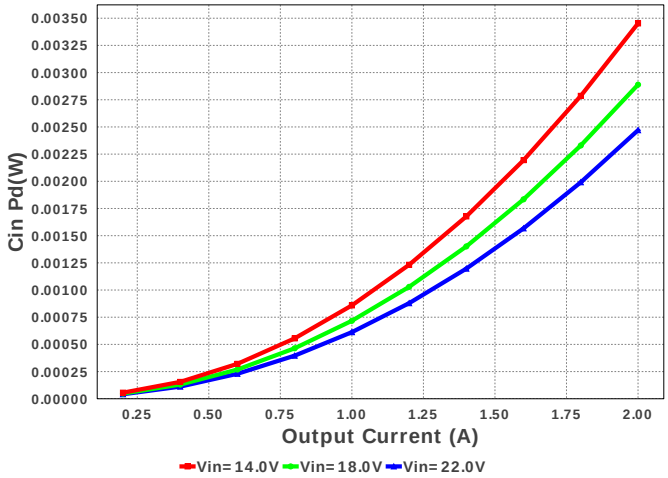


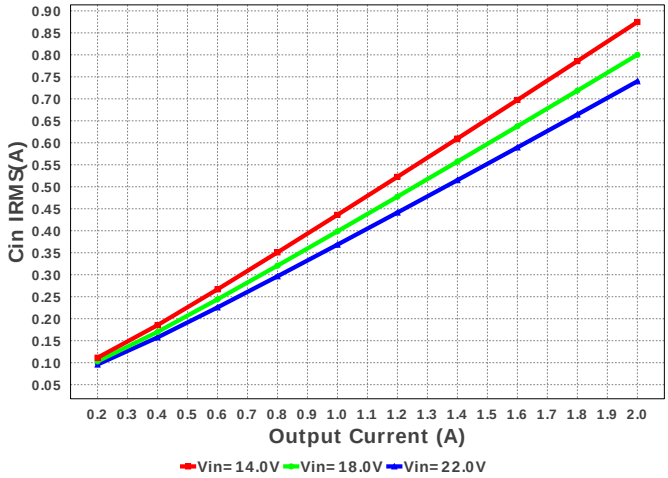


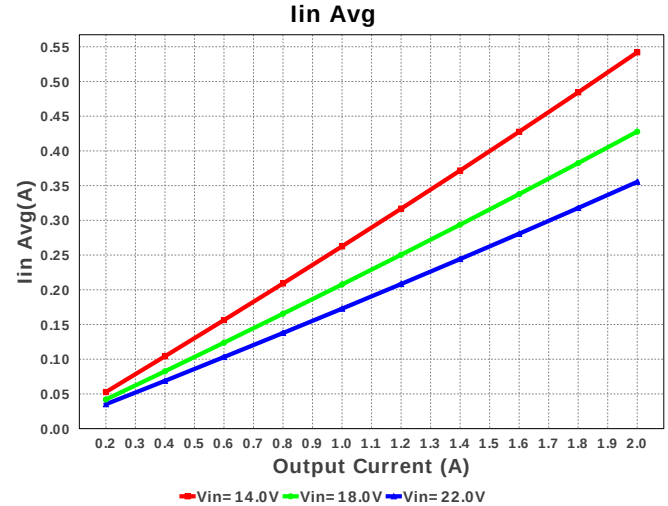


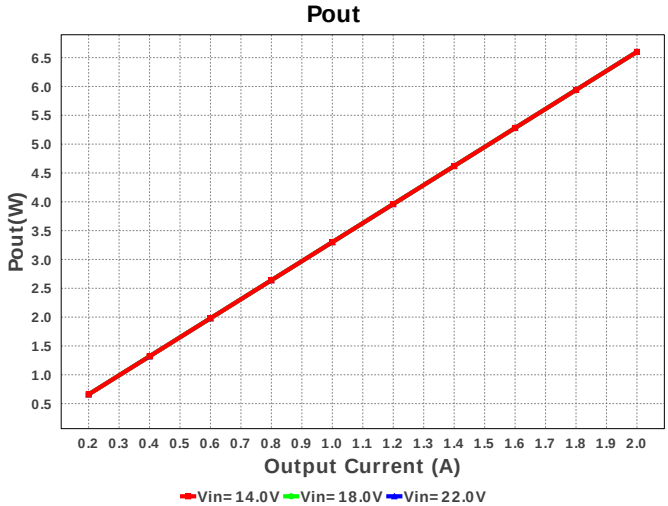


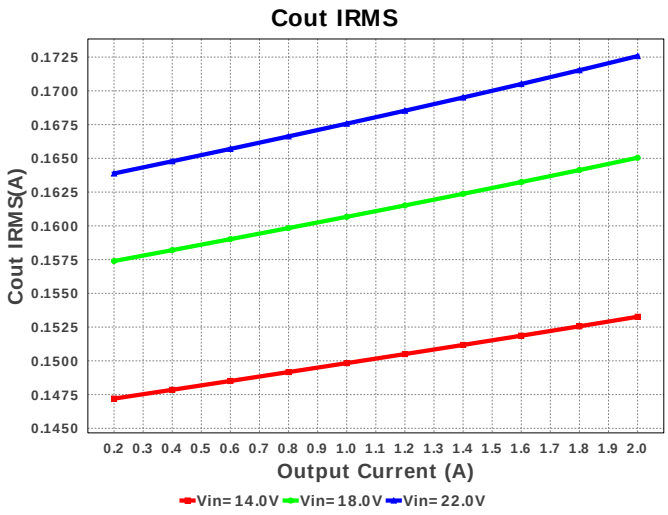


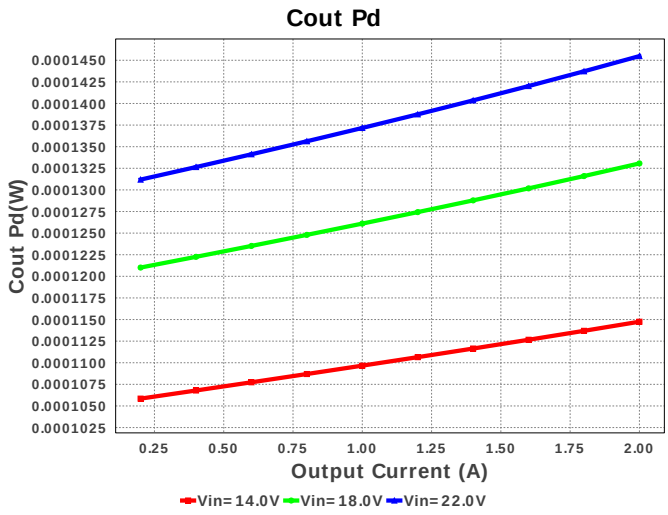


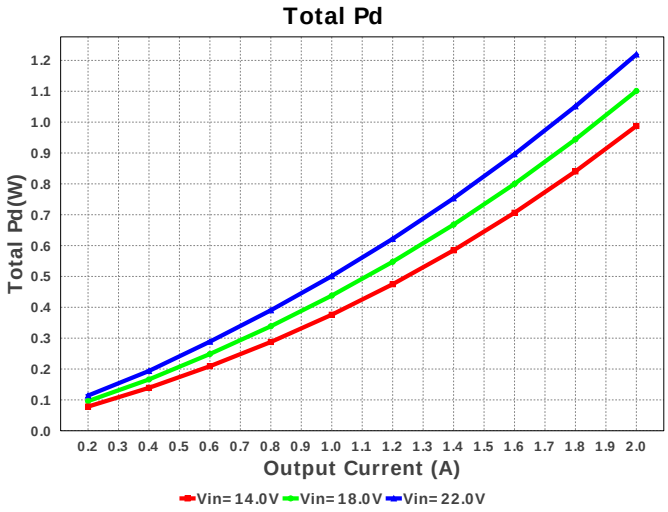


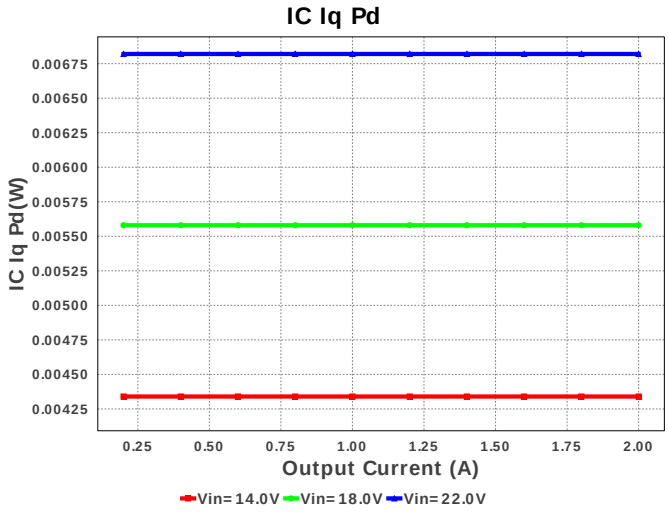


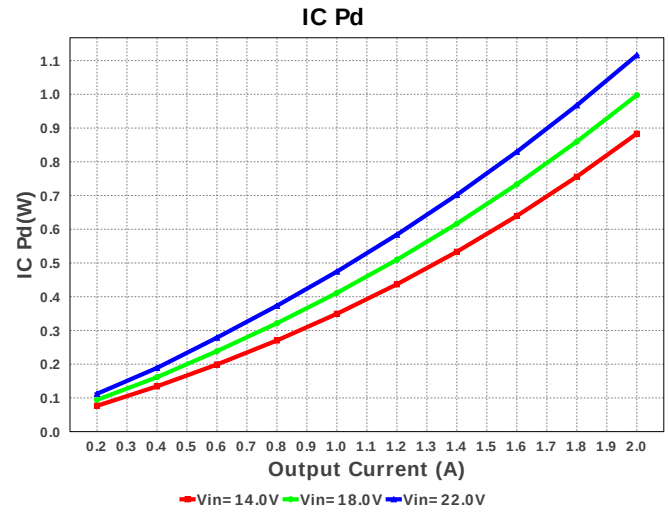


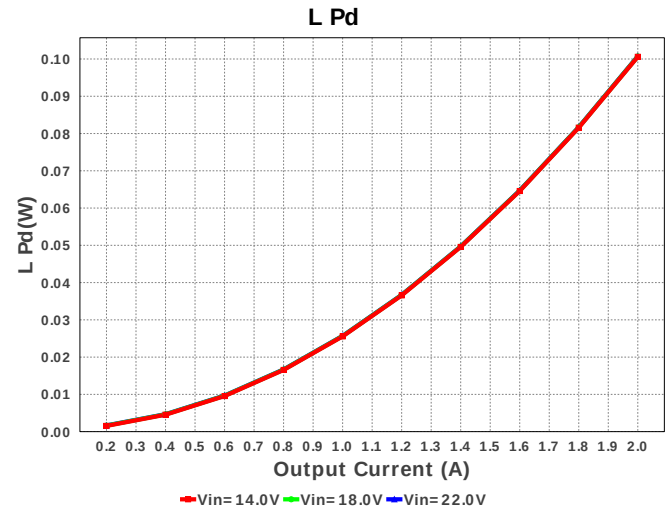


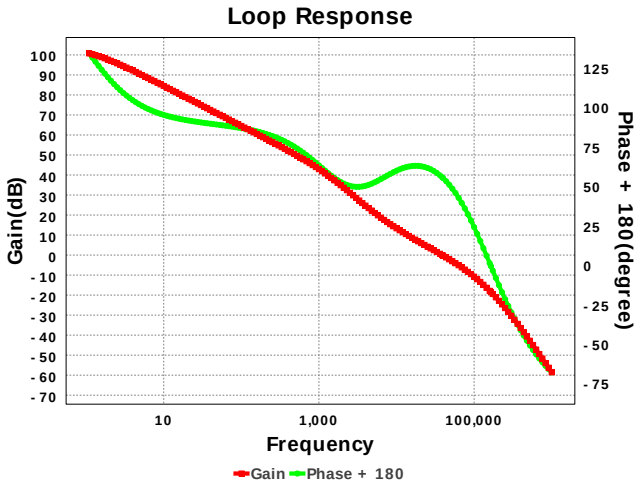












Operating Values

#	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	355.42 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	264.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	496.814 kHz	General	Switching frequency
8.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
9.	Mode	CCM	General	Conduction Mode
10.	Pout	6.6 W	General	Total output power
11.	Total BOM	$1.54	General	Total BOM Cost
12.	ICThetaJA Effective	34.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Low Freq Gain	100.743 dB	Op_Point	Gain at 10Hz
14.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Cross Freq	38.81 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	16.184 %	Op_point	Duty cycle
18.	Efficiency	84.407 %	Op_point	Steady state efficiency
19.	Gain Marg	-18.499 dB	Op_point	Bode Plot Gain Margin
20.	IC Tj	67.937 degC	Op_point	IC junction temperature
21.	IOUT_OP	2.0 A	Op_point	Iout operating point
22.	Phase Marg	56.318 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	22.0 V	Op_point	Vin operating point
24.	Vout p-p	3.299 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	2.47 mW	Power	Input capacitor power dissipation
26.	Cout Pd	145.482 µW	Power	Output capacitor power dissipation
27.	IC Iq Pd	6.82 mW	Power	IC Iq Pd
28.	IC Pd	1.116 W	Power	IC power dissipation
29.	L Pd	100.745 mW	Power	Inductor power dissipation
30.	Total Pd	1.219 W	Power	Total Power Dissipation
31.	Vout Tolerance	2.347 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

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

Design Assistance

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