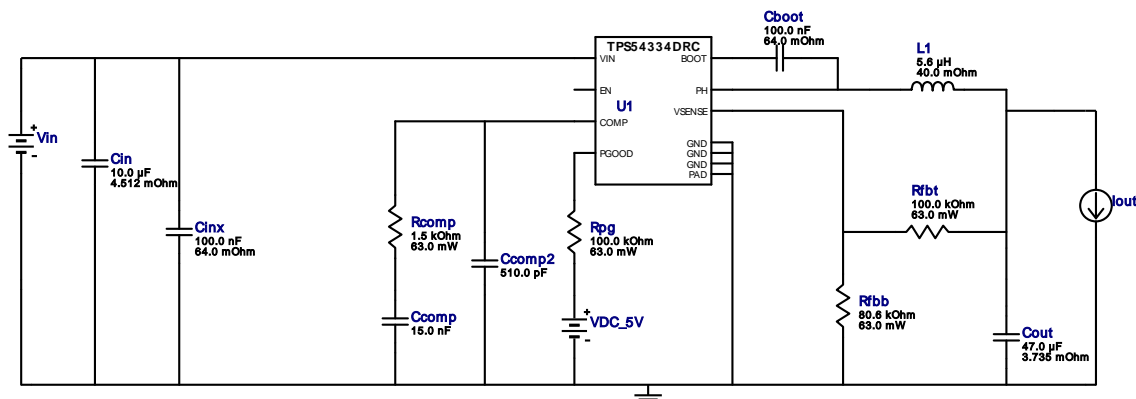


WEBENCH® Design Report



Design : 4466246/33 TPS54334DRCR
TPS54334DRCR 5.0V-22.0V to 1.80V @ 2.0A

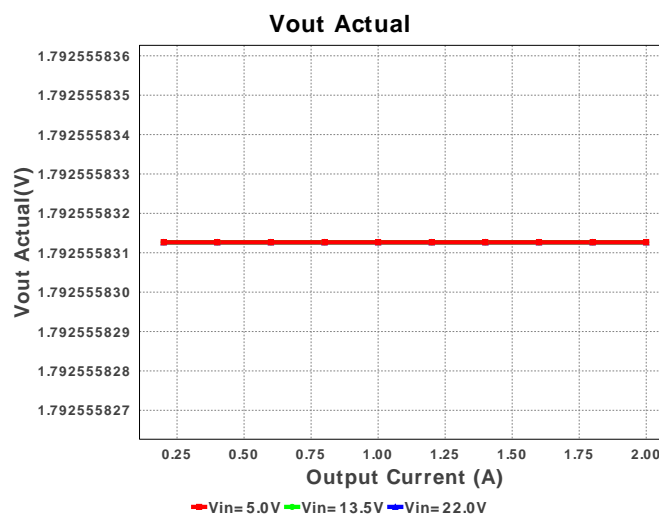
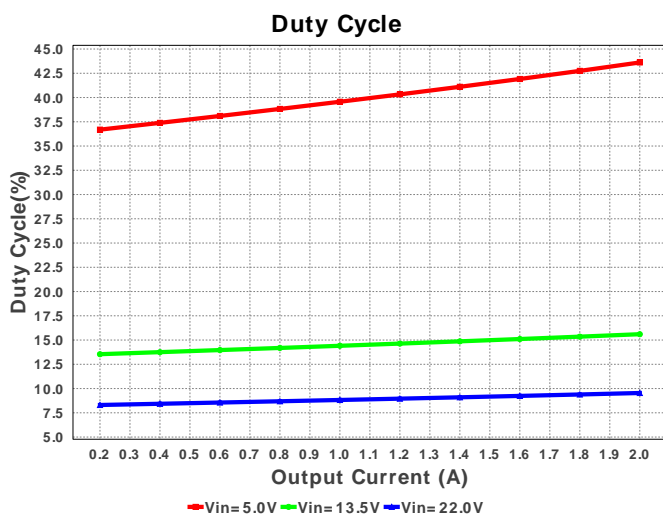
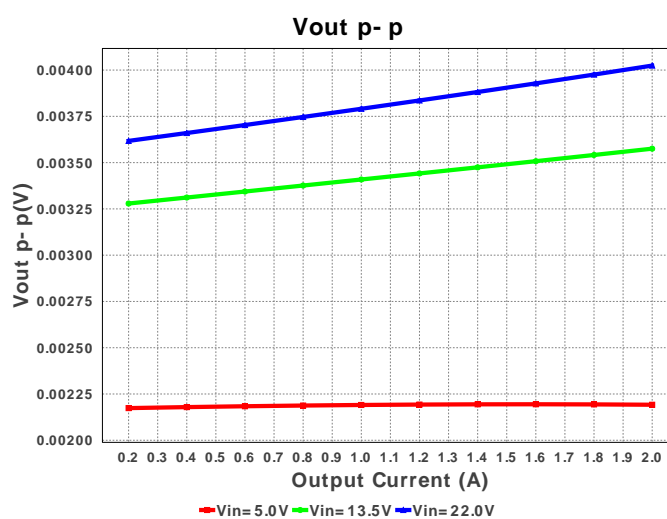
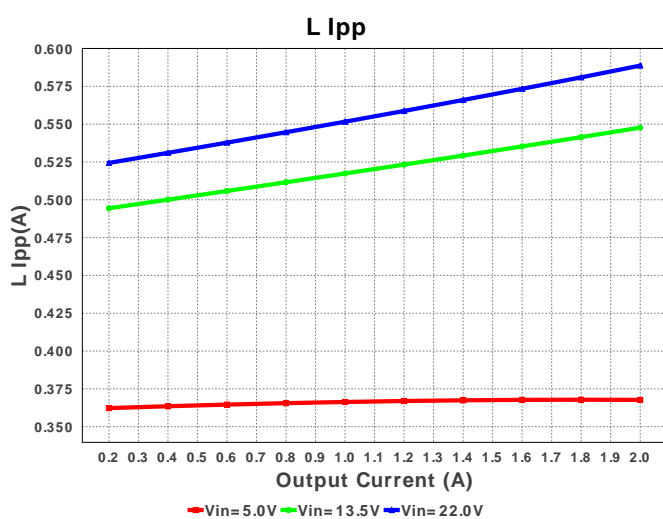
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Iout = 2.0A

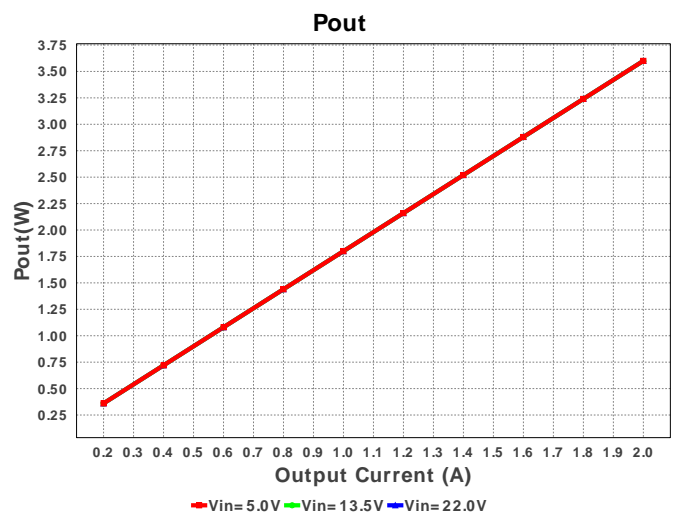
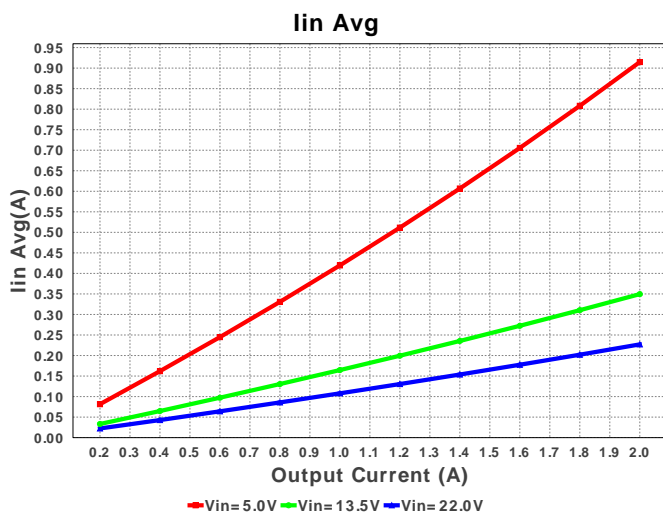
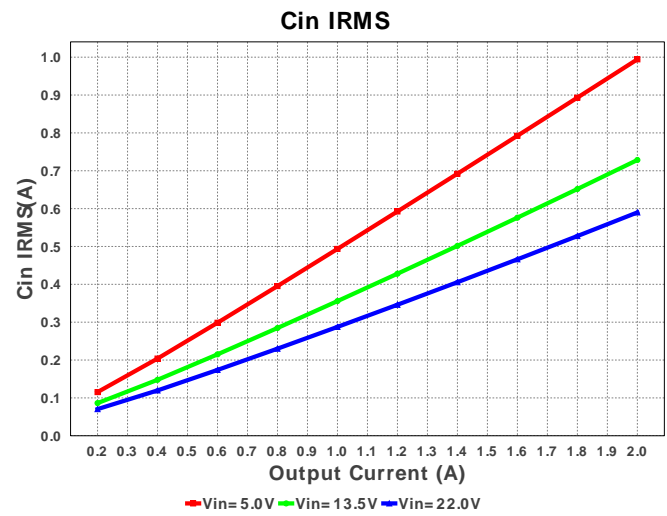
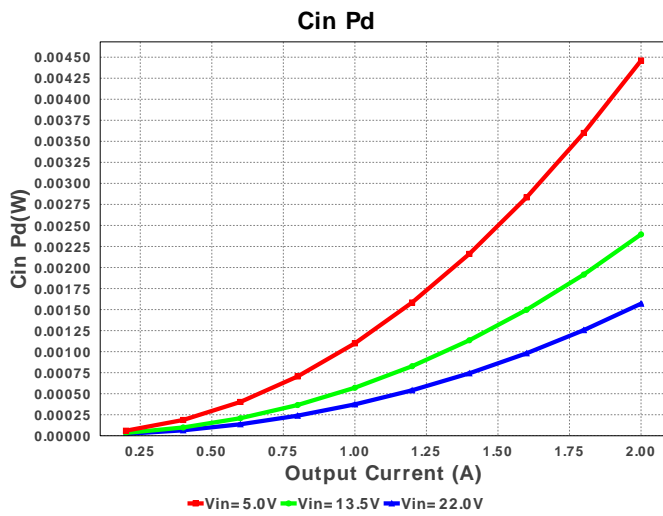
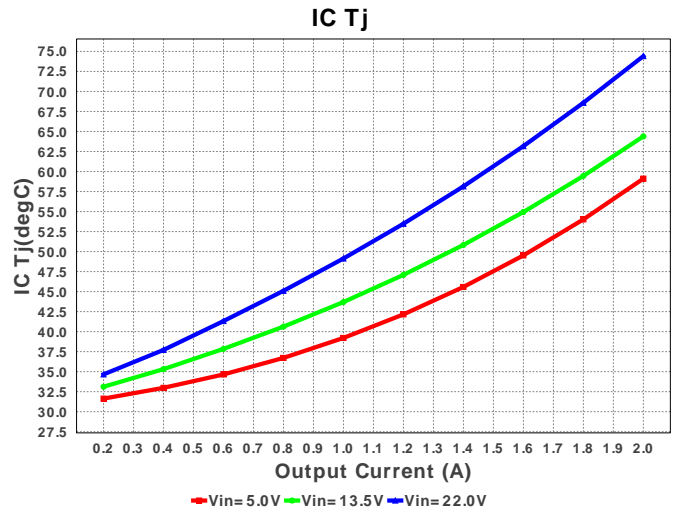
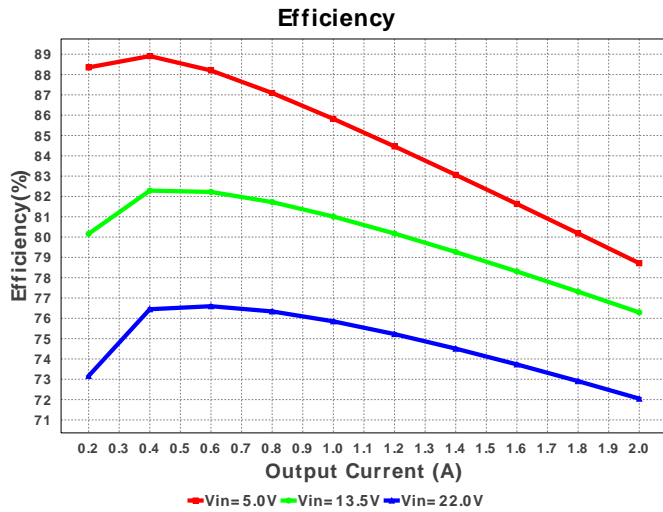


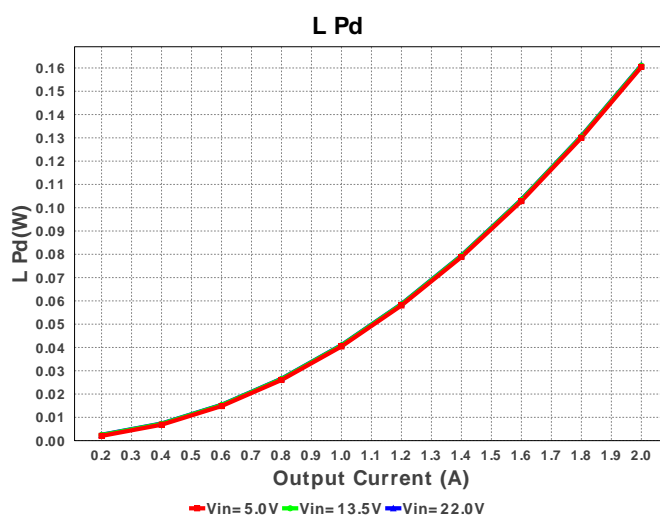
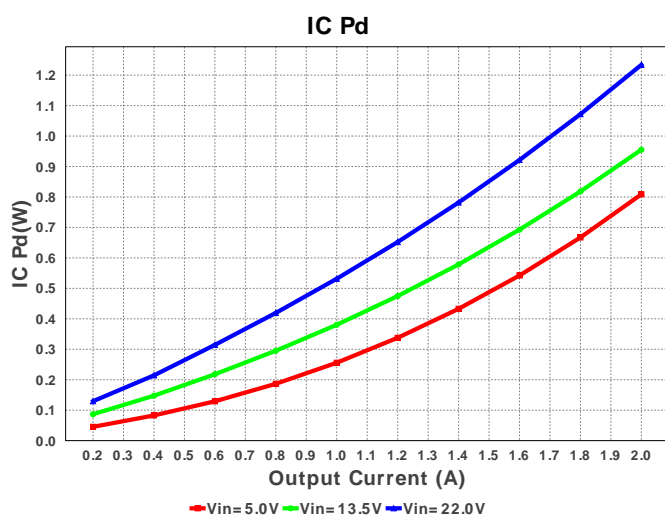
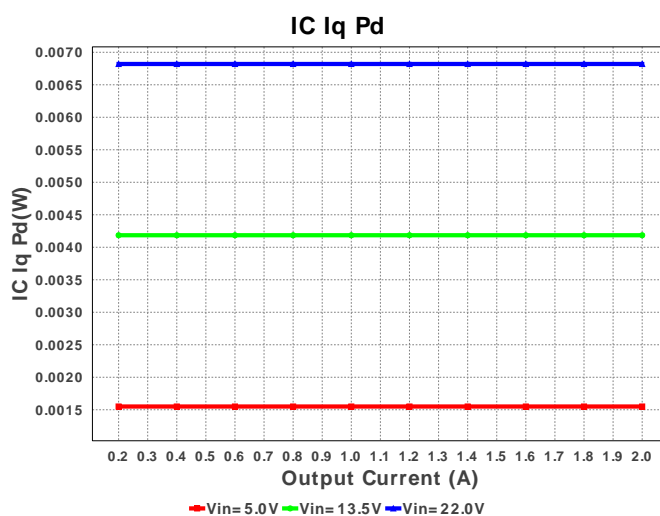
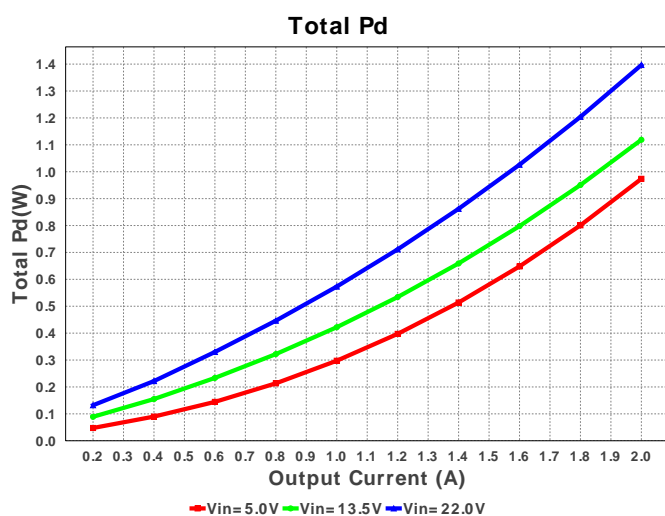
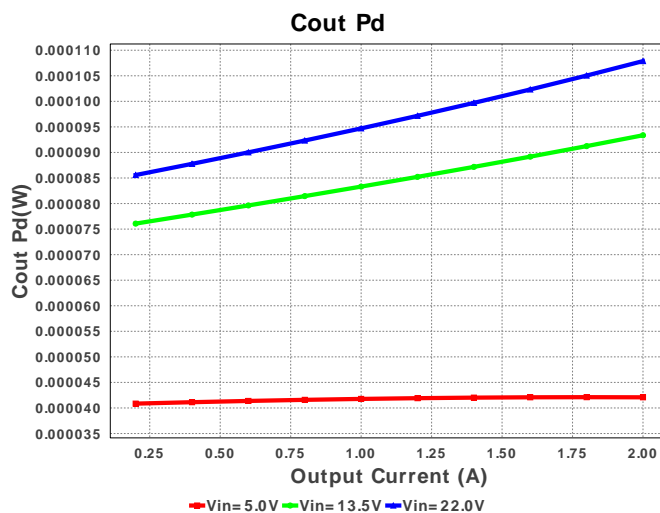
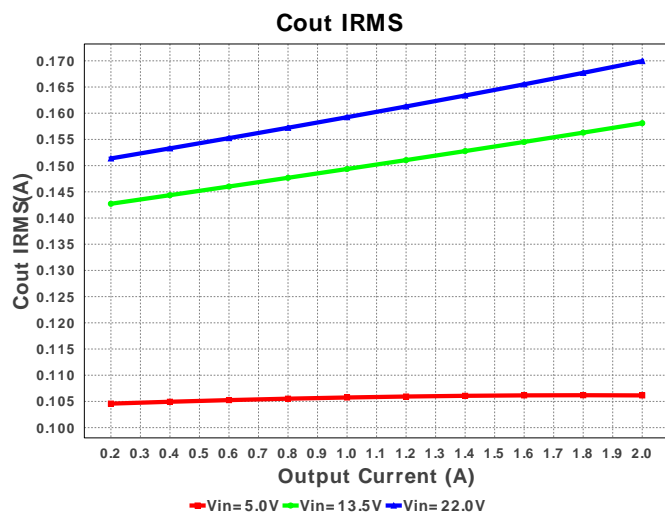
Electrical BOM

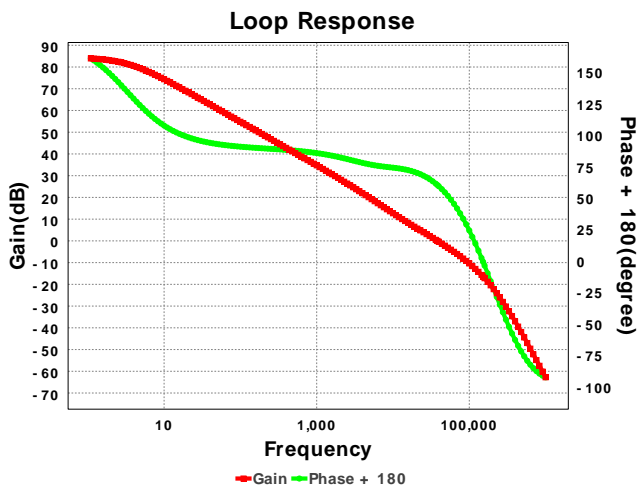
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp2	MuRata	GRM1555C1H511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
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 mm ²
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 mm ²
6.	Cout	MuRata	GRM31CE70G476ME15L Series= X7U	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 4.0 V IRMS= 4.1841 A	1	\$0.10	1206_190 11 mm ²
7.	L1	Bourns	SDR0805-5R6ML	L= 5.6 uH DCR= 40.0 mOhm	1	\$0.22	SDR0805 96 mm ²
8.	Rcomp	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
9.	Rfbb	Vishay-Dale	CRCW040280K6FKED Series= CRCW..e3	Res= 80.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
12.	U1	Texas Instruments	TPS54334DRCR	Switcher	1	\$0.95	 DRC0010J 16 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	589.911 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	169.947 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	227.12 mA	Current	Average input current
4.	L Ipp	588.71 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	169.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	570.0 kHz	General	Switching frequency
8.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
9.	Pout	3.6 W	General	Total output power
10.	Total BOM	\$1.4	General	Total BOM Cost
11.	ICThetaJA Effective	36.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	83.944 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	1.793 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	1.8 V	Op_Point	Operational Output Voltage
15.	Cross Freq	38.282 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	9.541 %	Op_point	Duty cycle
17.	Efficiency	72.048 %	Op_point	Steady state efficiency
18.	Gain Marg	-16.435 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	74.417 degC	Op_point	IC junction temperature
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	Phase Marg	60.964 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	22.0 V	Op_point	Vin operating point
23.	Vout p-p	4.024 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	1.57 mW	Power	Input capacitor power dissipation
25.	Cout Pd	107.874 μ W	Power	Output capacitor power dissipation
26.	IC Iq Pd	6.82 mW	Power	IC Iq Pd
27.	IC Pd	1.234 W	Power	IC power dissipation
28.	L Pd	161.155 mW	Power	Inductor power dissipation
29.	Total Pd	1.397 W	Power	Total Power Dissipation
30.	Vout Tolerance	2.383 %		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	5.0	Minimum input voltage
4.	Vout	1.8	Output Voltage
5.	base_pn	TPS54334	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54334** Product Folder : <http://www.ti.com/product/TPS54334> : contains the data sheet and other resources.

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