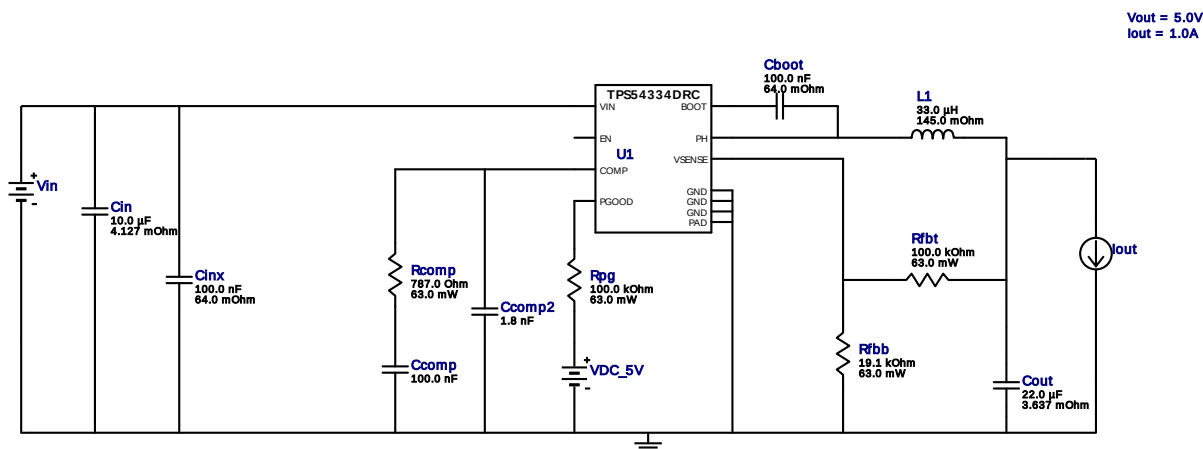


WEBENCH® Design Report

Design : 4742013/55 TPS54334DRCR
TPS54334DRCR 12.0V-13.0V to 5.00V @ 1.0A

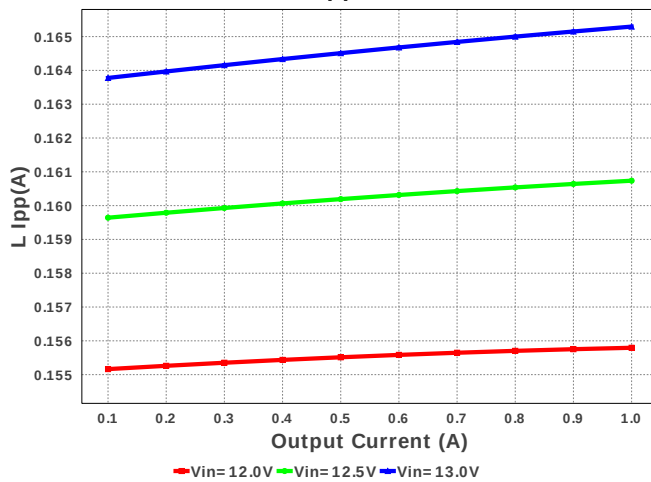


Electrical BOM

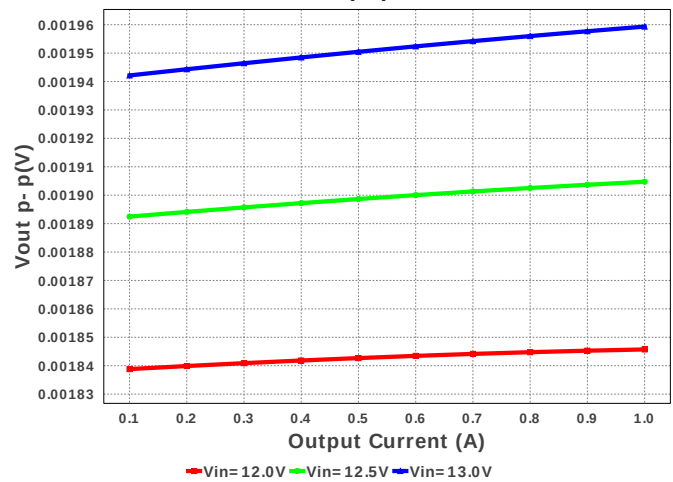
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7 mm ²
2.	Ccomp	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	MuRata	GRM033R71A182KA01D Series= X7R	Cap= 1.8 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
4.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	1	\$0.03	 0805 7 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	GRM31CR61A226KE19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	1	\$0.07	 1206_190 11 mm ²
7.	L1	Bourns	SRN8040-330M	L= 33.0 uH DCR= 145.0 mOhm	1	\$0.22	 SRN8040 100 mm ²
8.	Rcomp	Vishay-Dale	CRCW0402787RFKED Series= CRCW..e3	Res= 787.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rfbb	Vishay-Dale	CRCW040219K1FKED Series= CRCW..e3	Res= 19.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfht	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

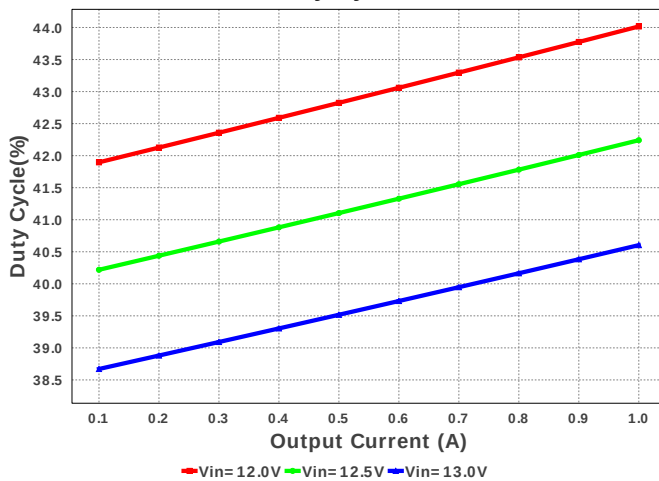
L Ipp



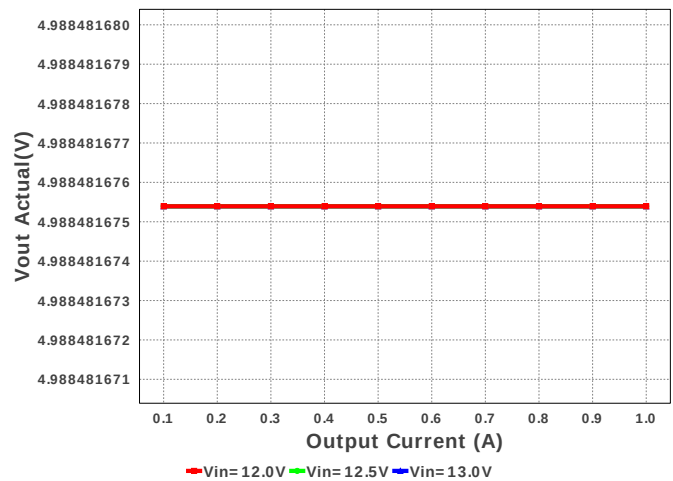
Vout p- p

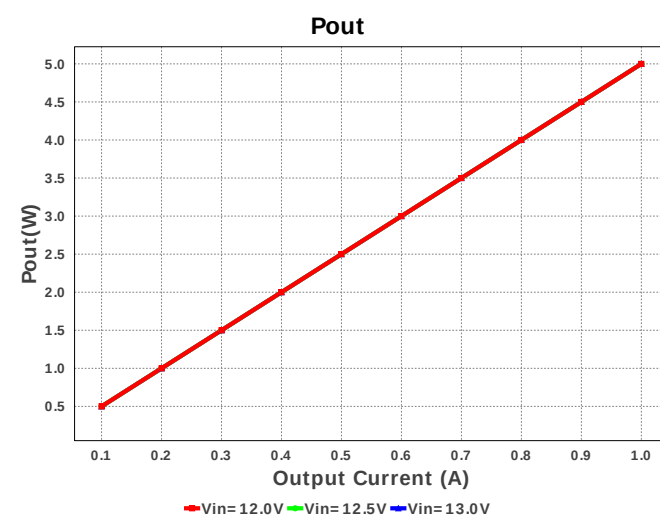
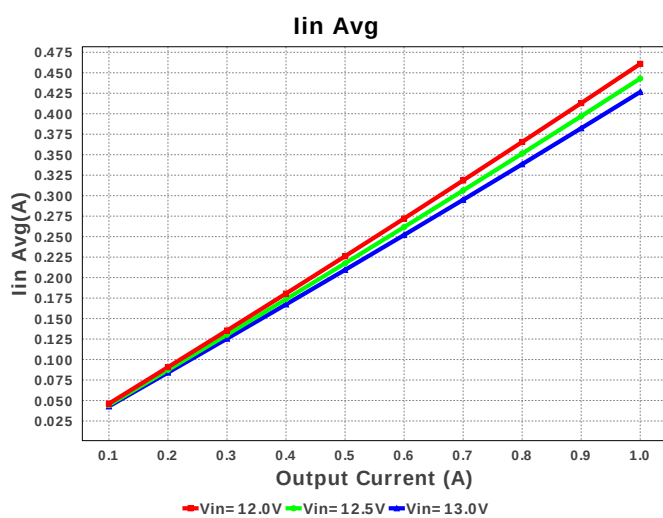
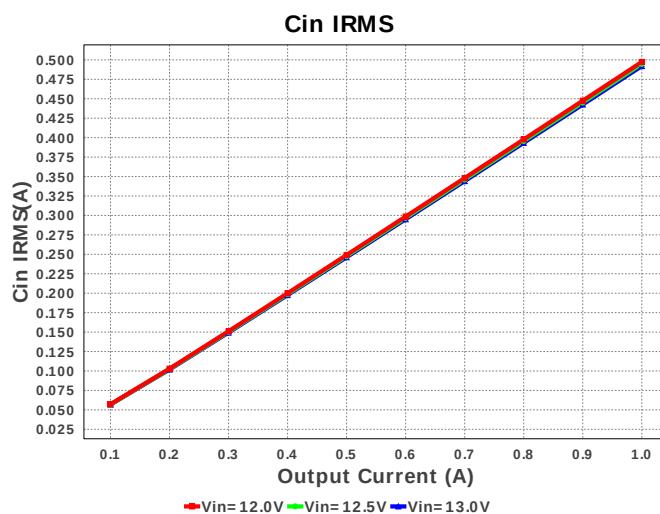
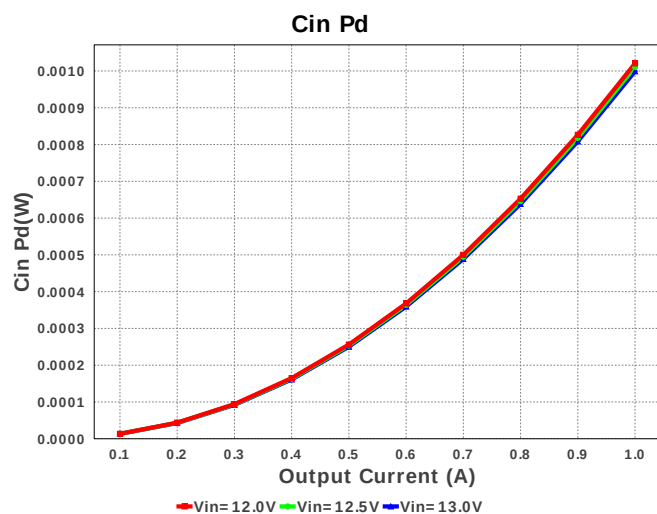
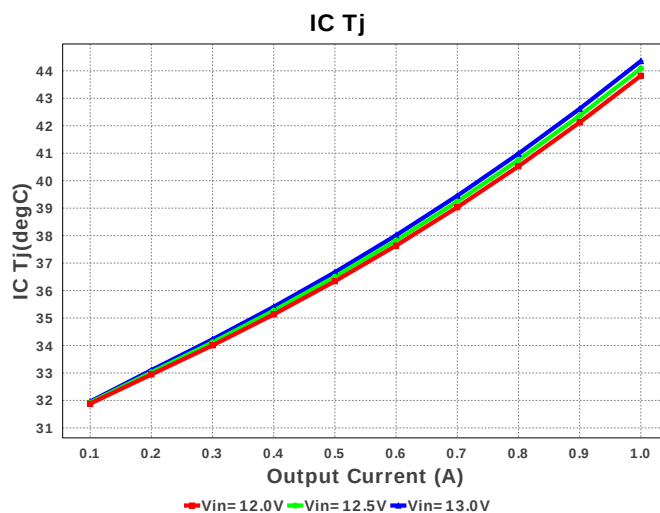
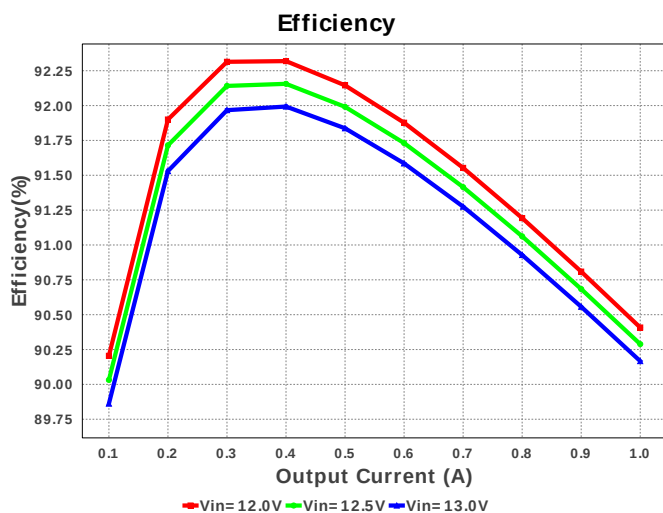


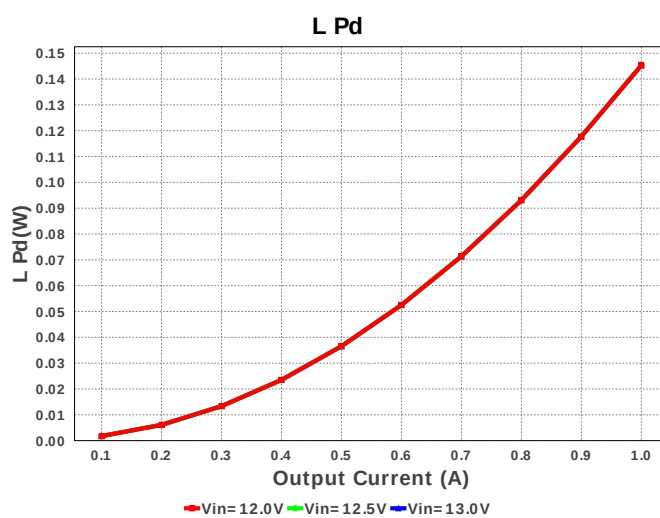
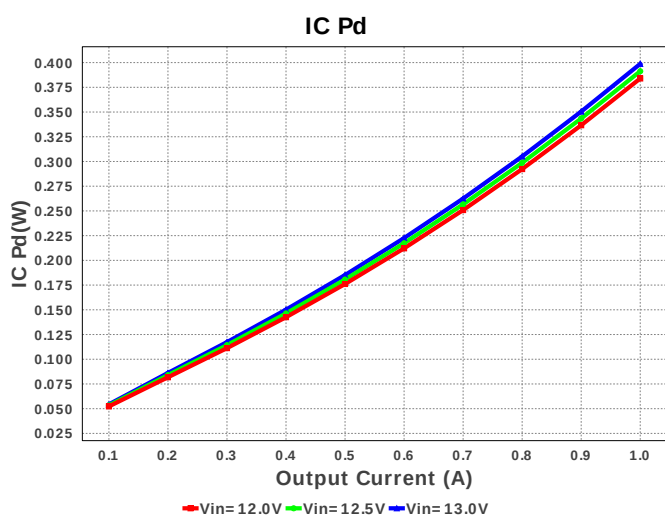
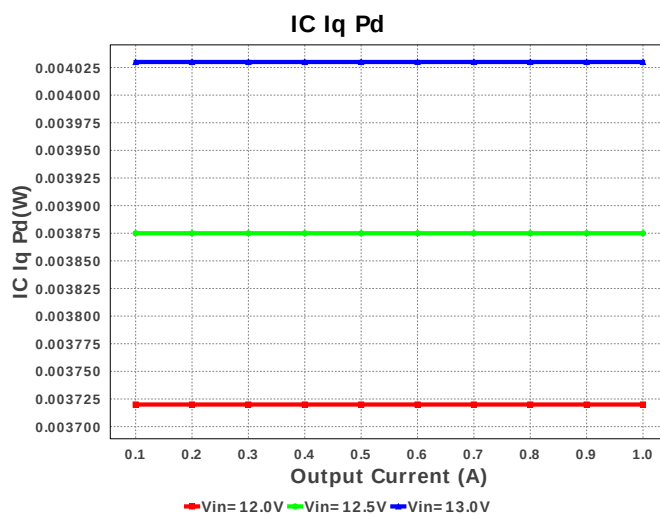
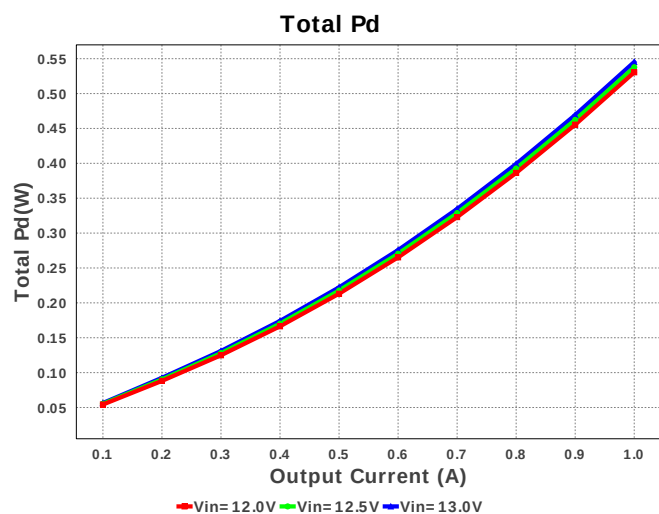
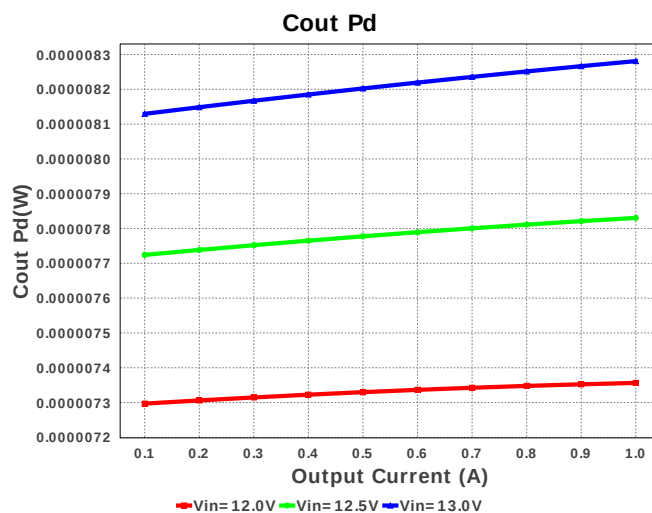
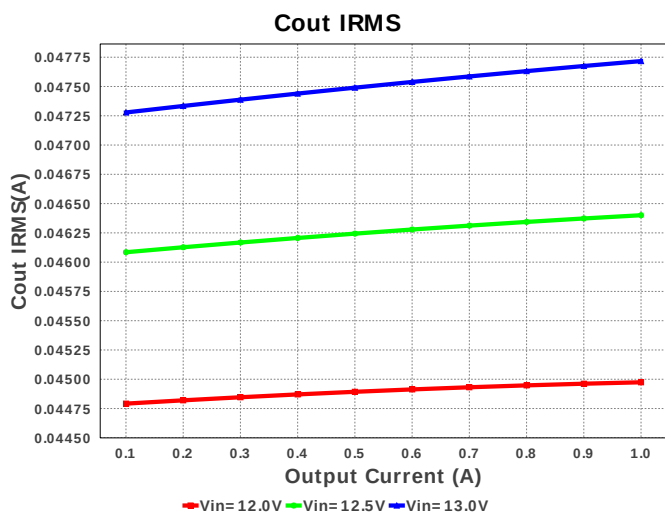
Duty Cycle

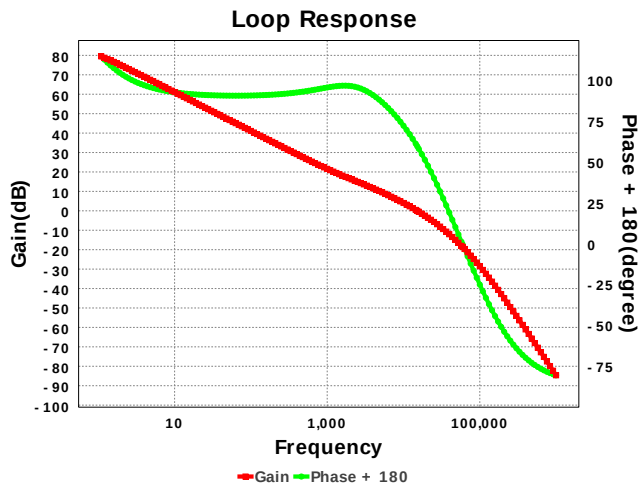


Vout Actual









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	492.031 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	47.717 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	426.56 mA	Current	Average input current
4.	L Ipp	165.3 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	168.0 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	5.0 W	General	Total output power
10.	Total BOM	\$1.35	General	Total BOM Cost
11.	ICThetaJA Effective	36.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	79.448 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	4.988 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
15.	Cross Freq	15.154 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	40.603 %	Op_point	Duty cycle
17.	Efficiency	90.167 %	Op_point	Steady state efficiency
18.	Gain Marg	-18.637 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	44.354 degC	Op_point	IC junction temperature
20.	IOUT_OP	1.0 A	Op_point	Iout operating point
21.	Phase Marg	59.989 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	13.0 V	Op_point	Vin operating point
23.	Vout p-p	1.959 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	999.125 μ W	Power	Input capacitor power dissipation
25.	Cout Pd	8.281 μ W	Power	Output capacitor power dissipation
26.	IC Iq Pd	4.03 mW	Power	IC Iq Pd
27.	IC Pd	398.71 mW	Power	IC power dissipation
28.	L Pd	145.33 mW	Power	Inductor power dissipation
29.	Total Pd	545.267 mW	Power	Total Power Dissipation
30.	Vout Tolerance	2.967 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	13.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	5.0	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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