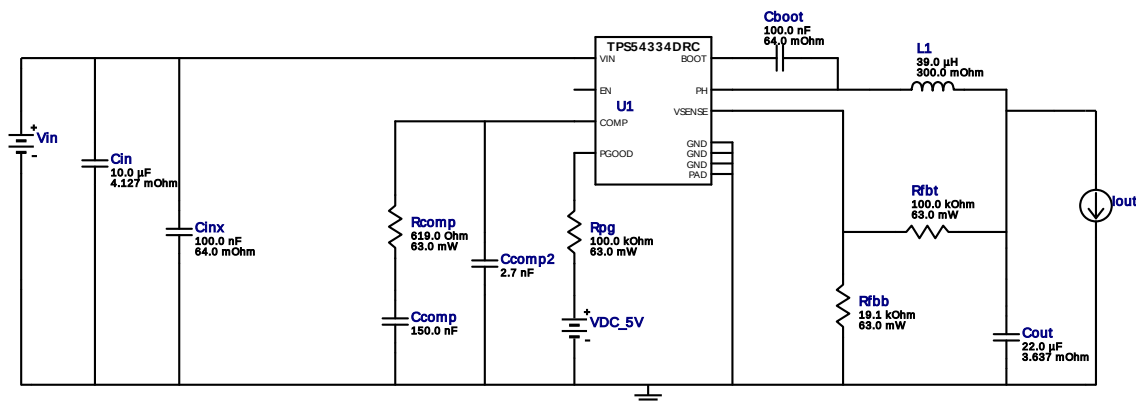


WEBENCH® Design Report

Design : 4742013/216 TPS54334DRCR
TPS54334DRCR 10.0V-12.0V to 5.00V @ 0.5A

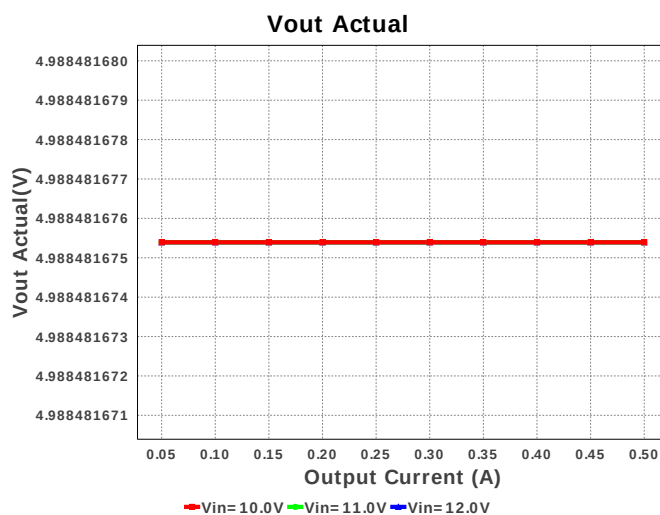
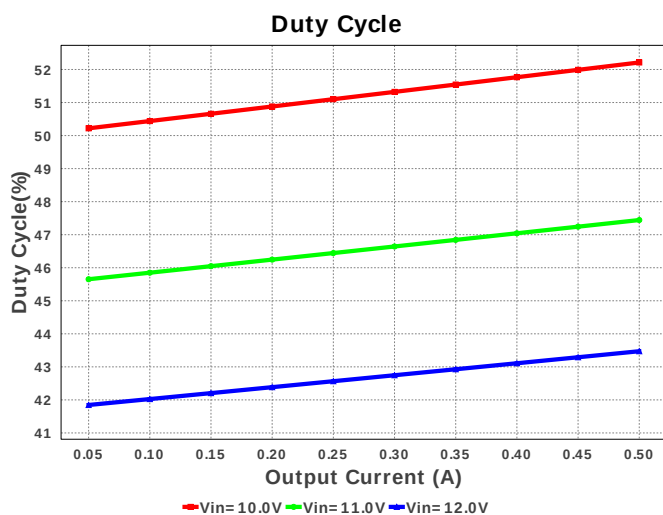
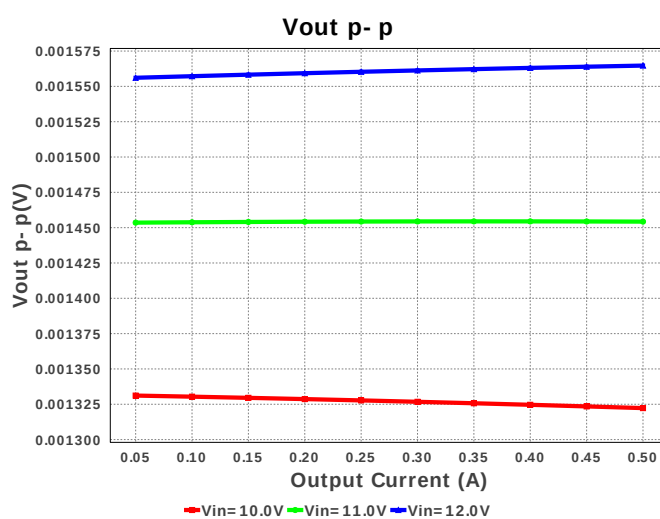
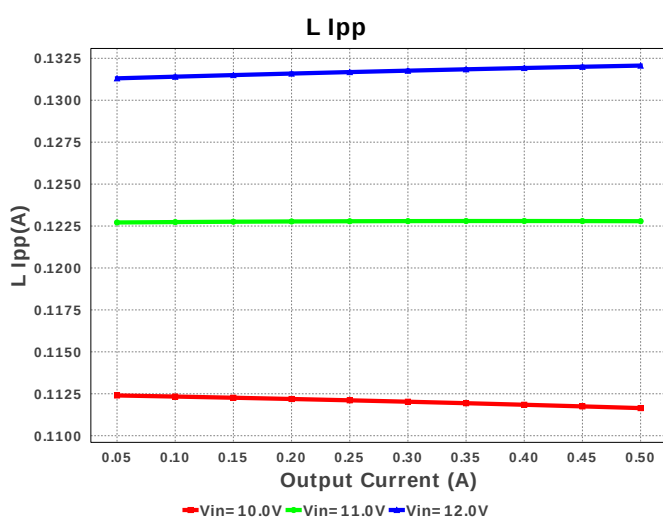
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Iout = 0.5A

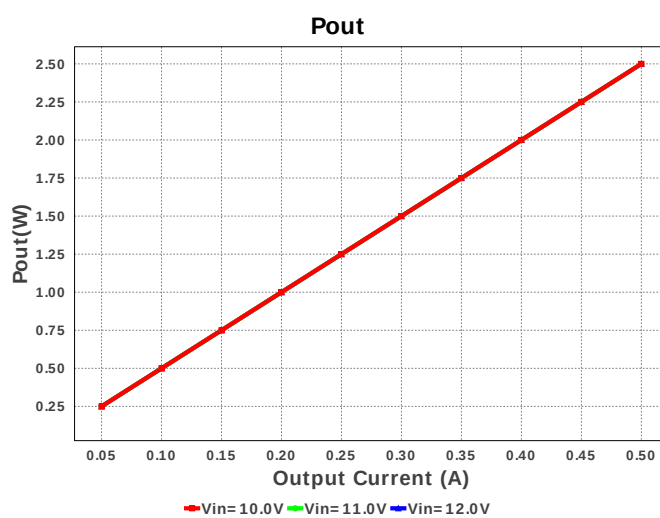
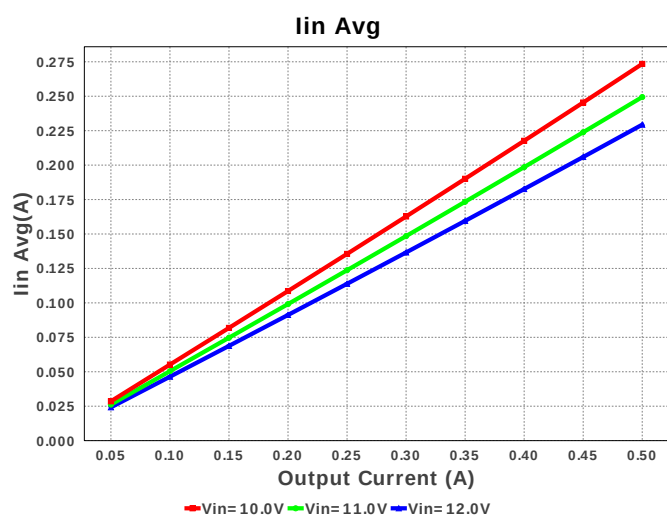
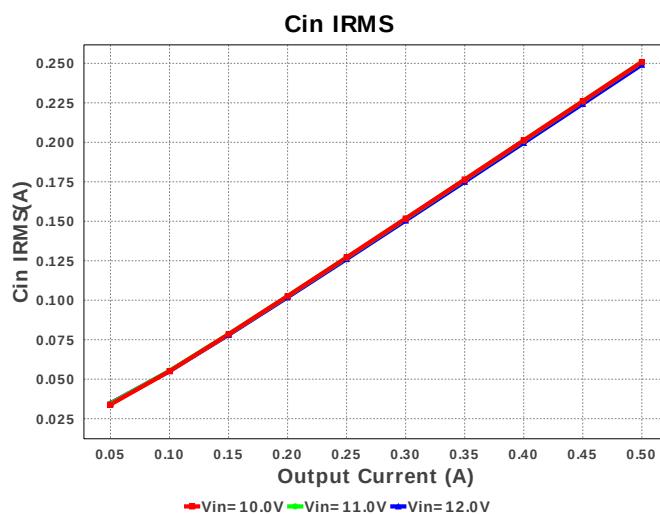
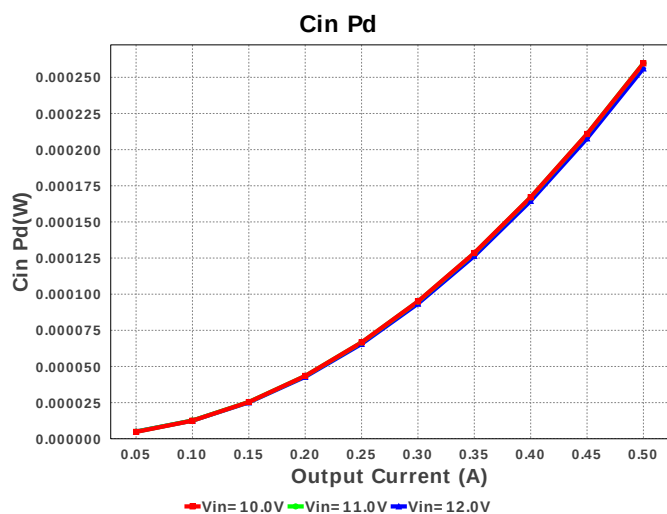
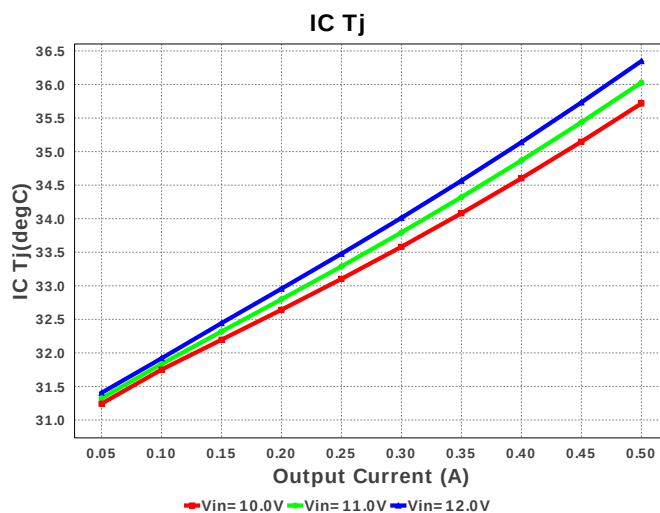
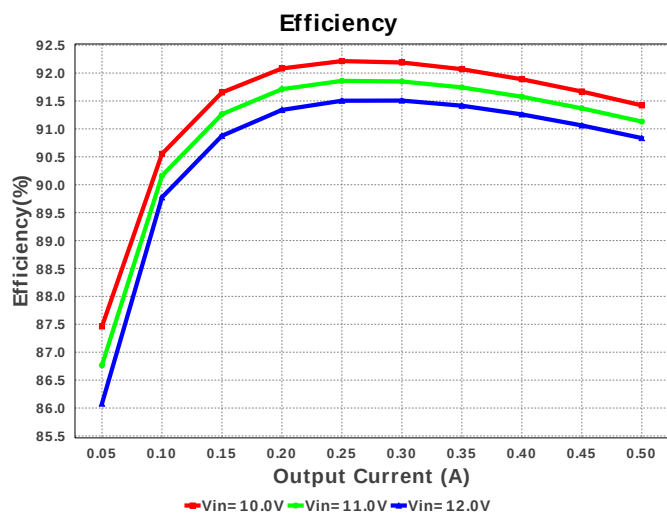


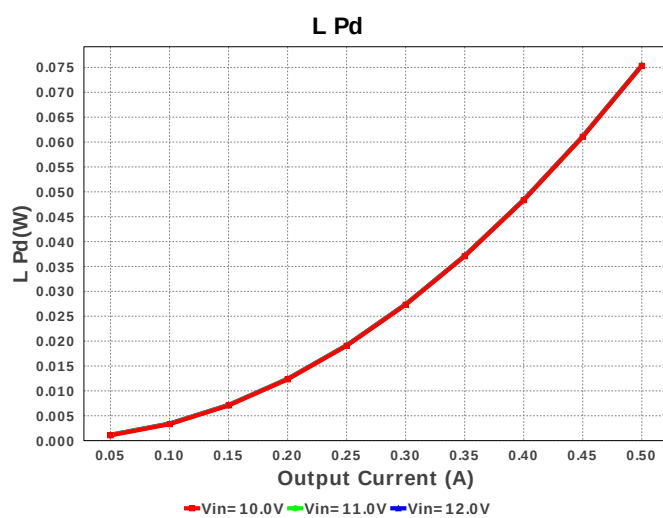
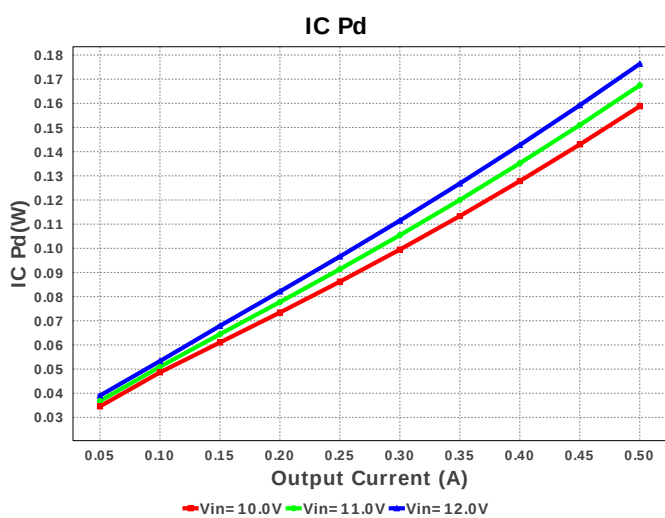
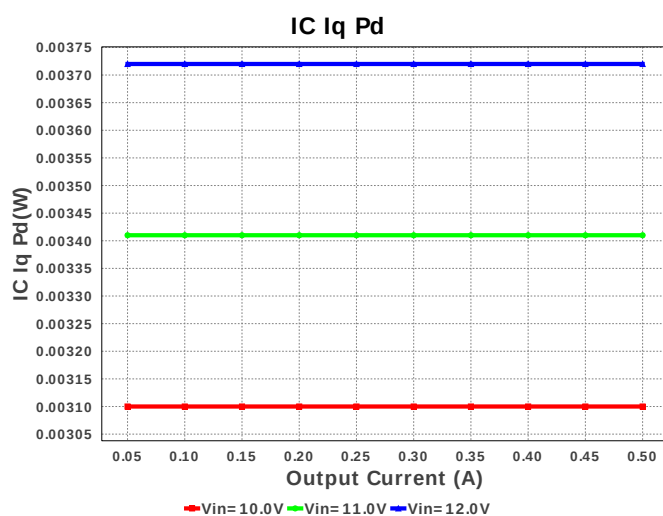
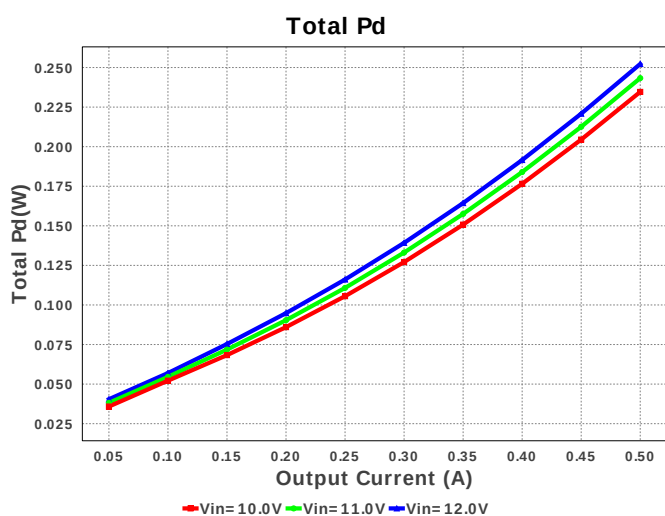
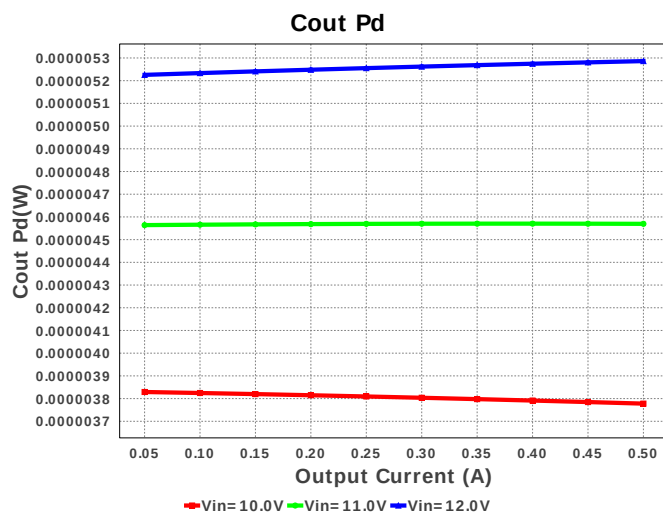
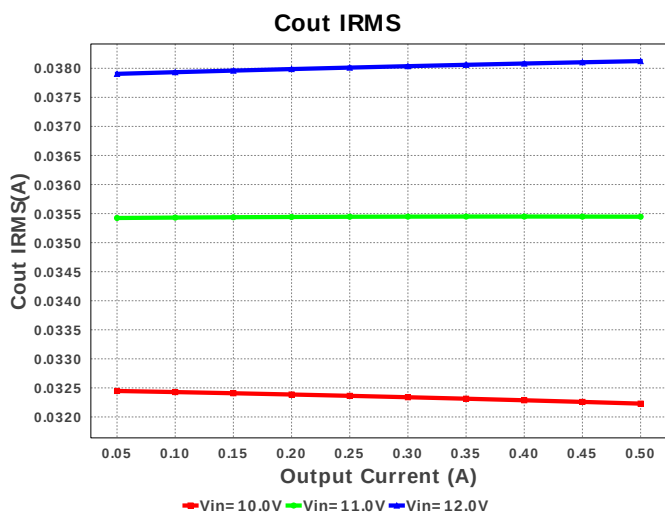
Electrical BOM

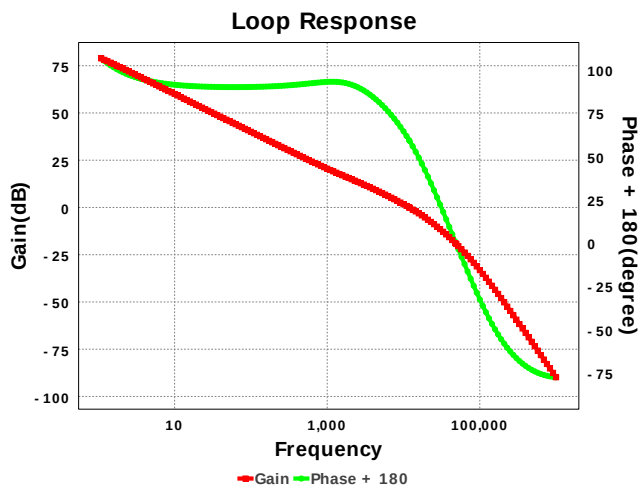
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7 mm²
2.	Ccomp	MuRata	GRM155R60J154KE01D Series= X5R	Cap= 150.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm²
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 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	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 mm²
7.	L1	NIC Components	NPI54C390KTRF	L= 39.0 uH DCR= 300.0 mOhm	1	\$0.09	 IND_NPI54C 61 mm²
8.	Rcomp	Vishay-Dale	CRCW0402619RFKED Series= CRCW..e3	Res= 619.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040219K1FKED Series= CRCW..e3	Res= 19.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
10.	Rfbb	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.	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	249.132 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	38.124 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	229.35 mA	Current	Average input current
4.	L Ipp	132.07 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	130.0 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	2.5 W	General	Total output power
10.	Total BOM	\$1.22	General	Total BOM Cost
11.	ICThetaJA Effective	36.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	78.848 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	11.863 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	43.473 %	Op_point	Duty cycle
17.	Efficiency	90.835 %	Op_point	Steady state efficiency
18.	Gain Marg	-19.352 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	36.349 degC	Op_point	IC junction temperature
20.	IOUT_OP	500.0 mA	Op_point	Iout operating point
21.	Phase Marg	59.961 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	12.0 V	Op_point	Vin operating point
23.	Vout p-p	1.565 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	256.149 μ W	Power	Input capacitor power dissipation
25.	Cout Pd	5.286 μ W	Power	Output capacitor power dissipation
26.	IC Iq Pd	3.72 mW	Power	IC Iq Pd
27.	IC Pd	176.347 mW	Power	IC power dissipation
28.	L Pd	75.436 mW	Power	Inductor power dissipation
29.	Total Pd	252.239 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	500.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	10.0	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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