

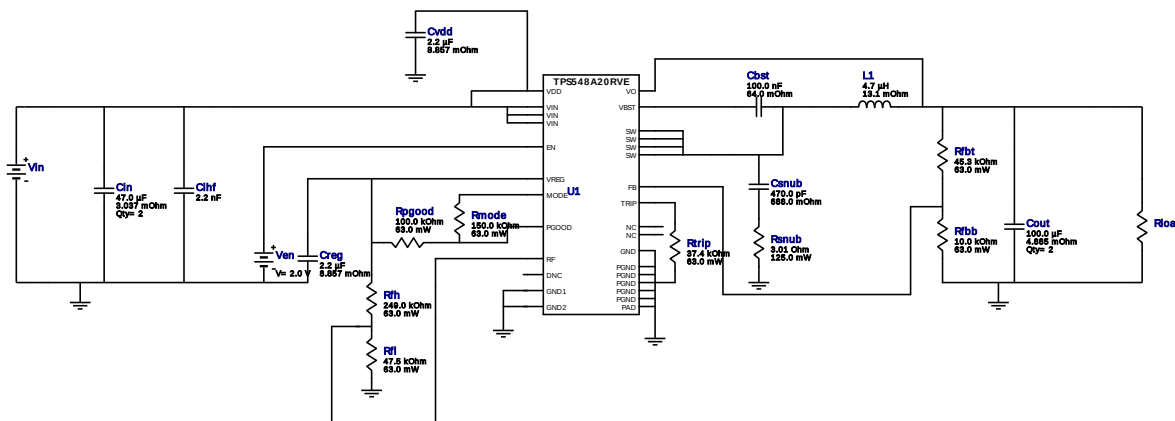
WEBENCH® Design Report

Design : 1076038/116 TPS548A20RVER
TPS548A20RVER 8.0V-14.0V to 3.30V @ 5.0A

VinMin = 8.0V
VinMax = 14.0V
Vout = 3.3V
Vout Sch = 3.3V
Iout = 5.0A

Device = TPS548A20RVER
Topology = Buck
Created = 8/11/16 1:29:59 AM
BOM Cost = \$4.66
BOM Count = 19
Total Pd = 0.8W

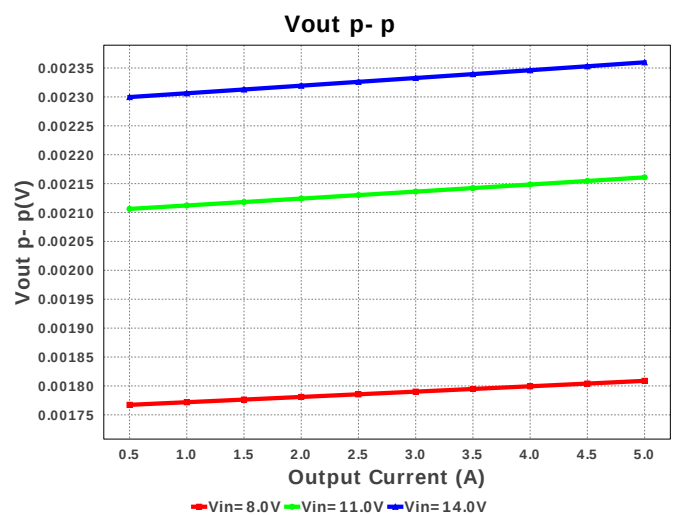
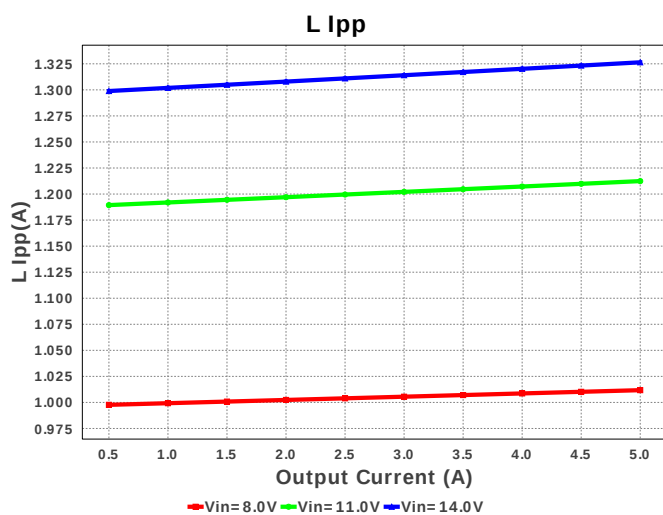
Vout Sch = 3.3V
Iout = 5.0A

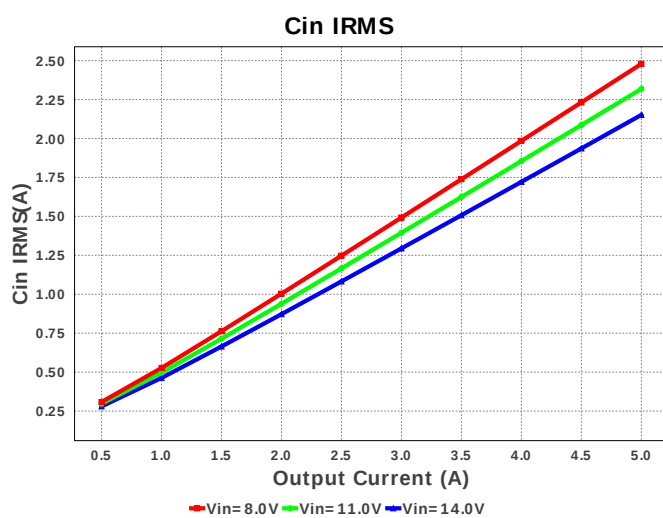
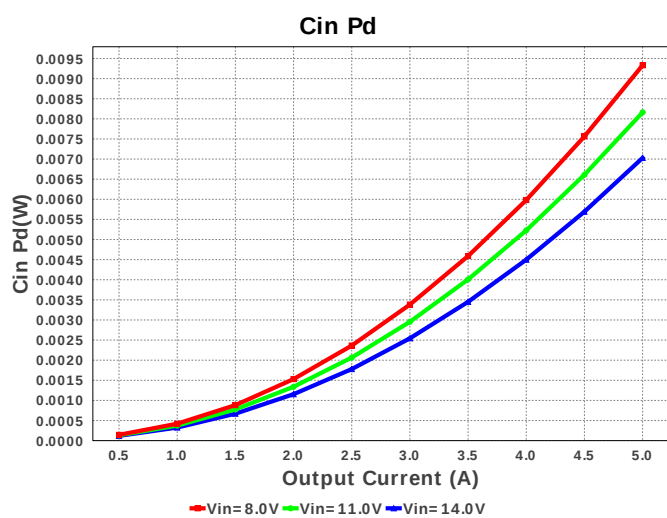
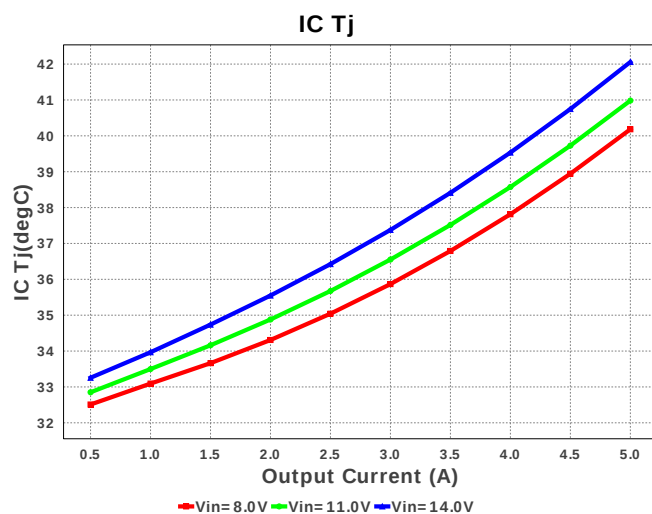
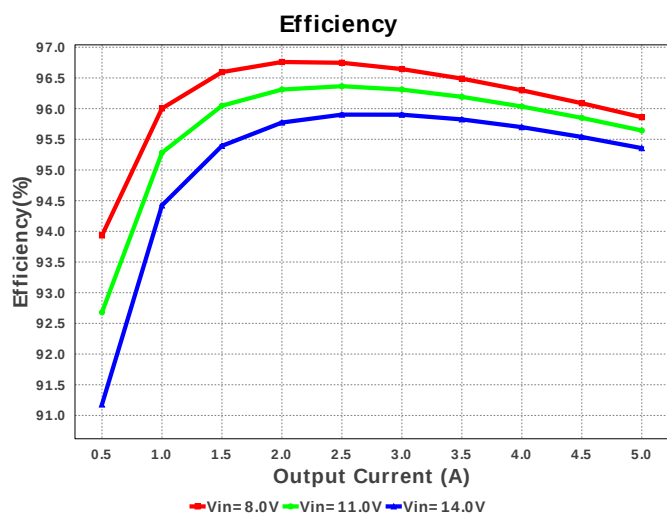
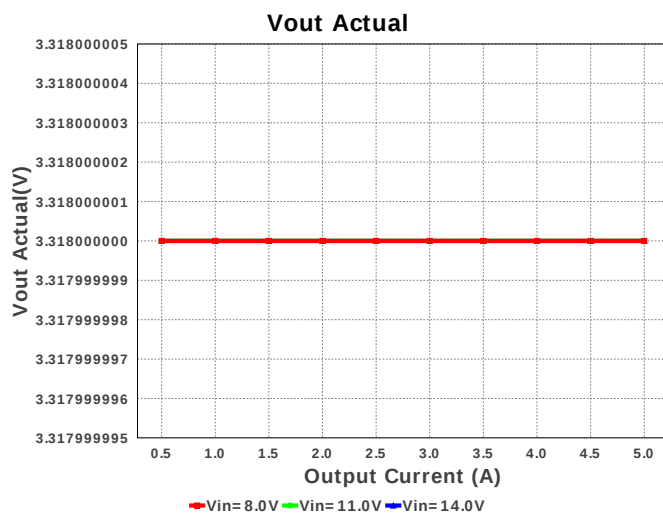
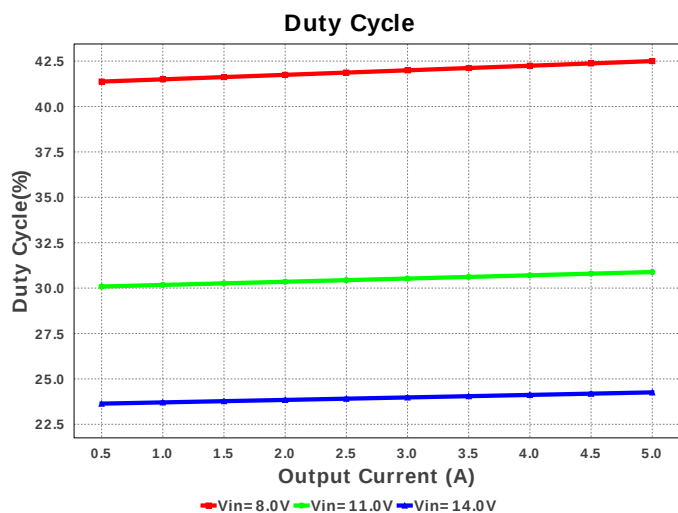


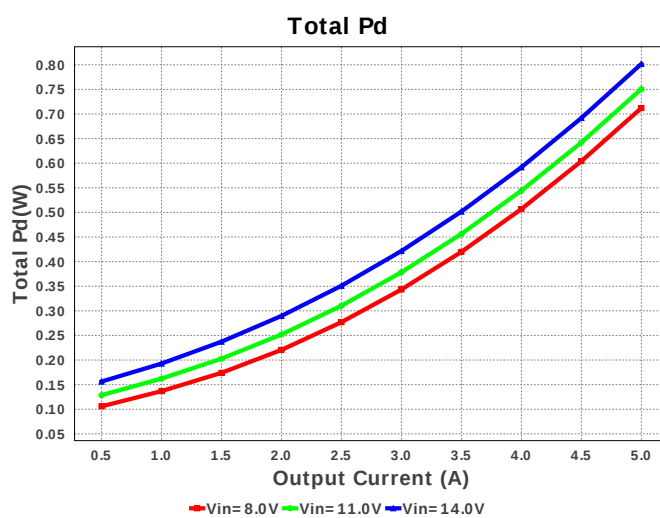
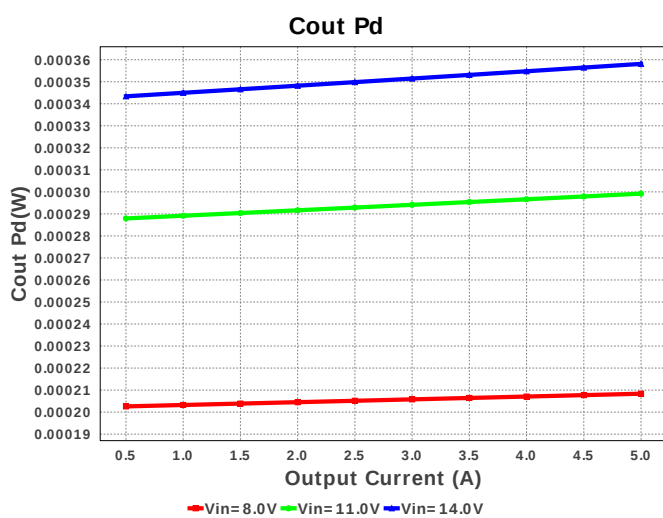
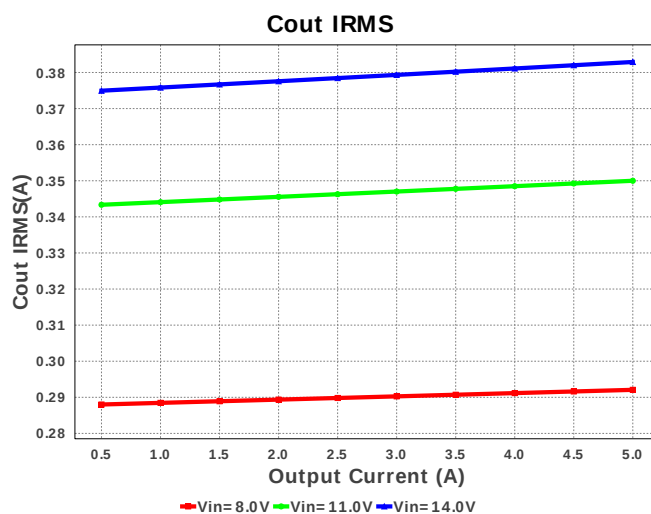
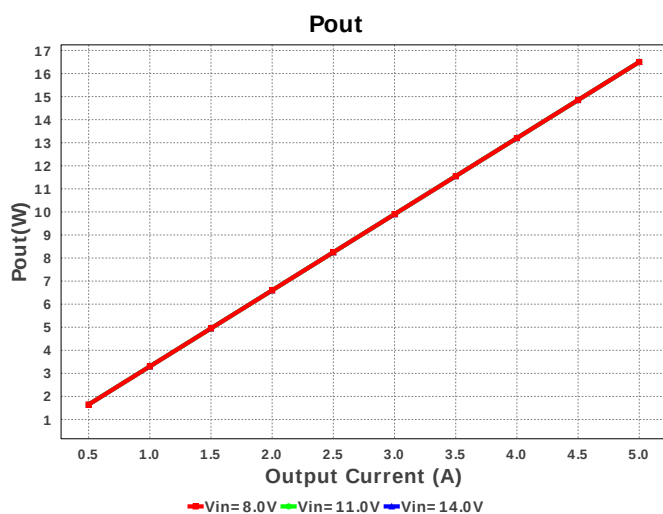
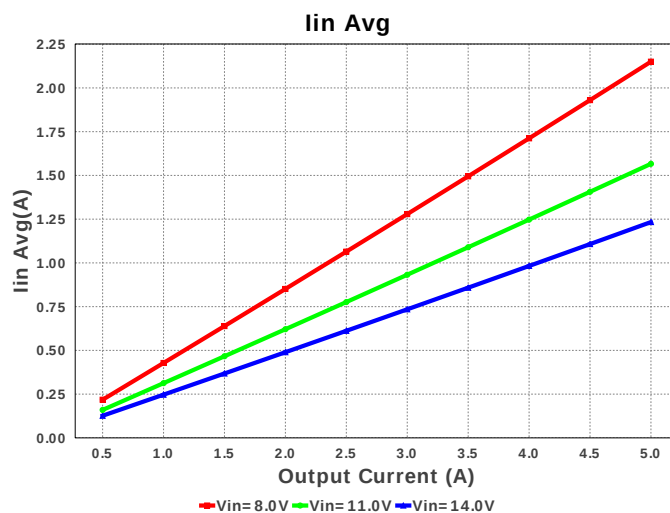
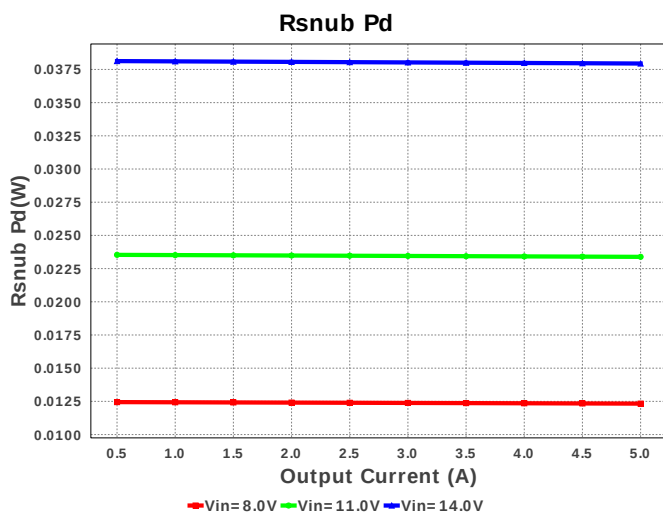
Electrical BOM

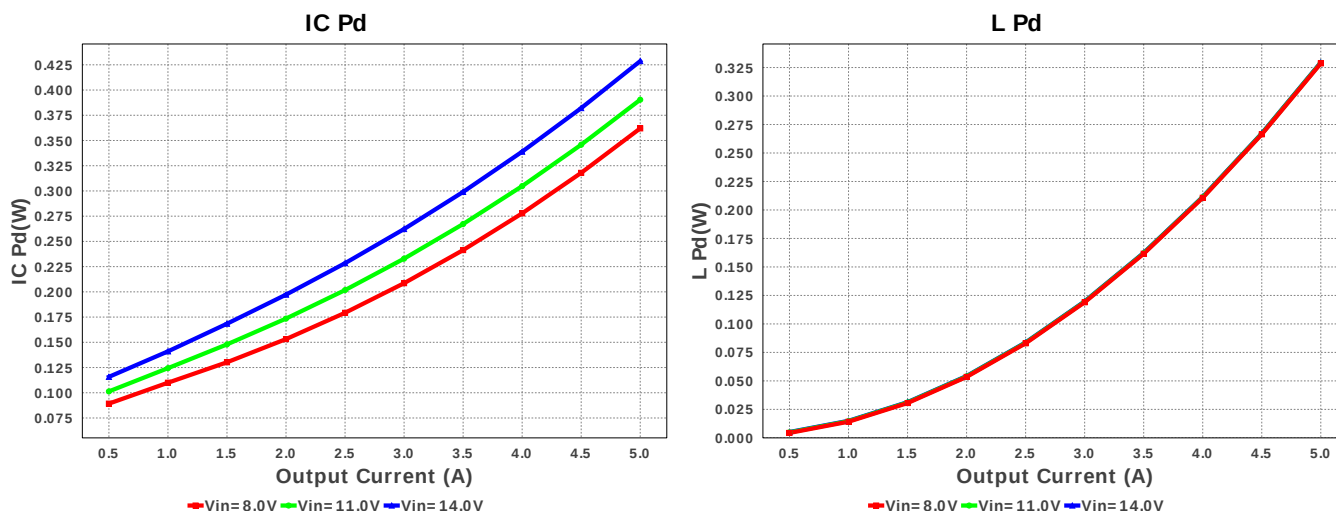
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²
2.	Cihf	MuRata	GRM155R61E222KA01D Series= X5R	Cap= 2.2 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
3.	Cin	MuRata	GRM32ER61C476ME15L Series= X5R	Cap= 47.0 uF ESR= 3.037 mOhm VDC= 16.0 V IRMS= 4.59346 A	2	\$0.24	1210_280 15 mm ²
4.	Cout	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	2	\$0.14	1206_190 11 mm ²
5.	Creg	MuRata	GRM21BR61E225KA12L Series= X5R	Cap= 2.2 uF ESR= 8.857 mOhm VDC= 25.0 V IRMS= 1.3111 A	1	\$0.04	0805 7 mm ²
6.	Csub	Kemet	C0805C471K5RACTU Series= X7R	Cap= 470.0 pF ESR= 688.0 mOhm VDC= 50.0 V IRMS= 213.0 mA	1	\$0.01	0805 7 mm ²
7.	Cvdd	MuRata	GRM21BR61E225KA12L Series= X5R	Cap= 2.2 uF ESR= 8.857 mOhm VDC= 25.0 V IRMS= 1.3111 A	1	\$0.04	0805 7 mm ²
8.	L1	Coilcraft	XAL6060-472MEB	L= 4.7 uH DCR= 13.1 mOhm	1	\$0.82	XAL6060 72 mm ²
9.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW...e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfbt	Vishay-Dale	CRCW040245K3FKED Series= CRCW..e3	Res= 45.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
11.	Rfh	Vishay-Dale	CRCW0402249KFKED Series= CRCW..e3	Res= 249.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
12.	Rfl	Vishay-Dale	CRCW040247K5FKED Series= CRCW..e3	Res= 47.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
13.	Rmode	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
14.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
15.	Rsnub	Vishay-Dale	CRCW08053R01FKEA Series= CRCW..e3	Res= 3.01 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
16.	Rtrip	Vishay-Dale	CRCW040237K4FKED Series= CRCW..e3	Res= 37.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
17.	U1	Texas Instruments	TPS548A20RVER	Switcher	1	\$2.89	 RVE0028A 25 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	2.151 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	382.909 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.233 A	Current	Average input current
4.	L Ipp	1.326 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	19	General	Total Design BOM count
6.	FootPrint	205.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	411.913 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	16.5 W	General	Total output power
10.	Total BOM	\$4.66	General	Total BOM Cost
11.	ICThetaJA Effective	28.13 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Vout Actual	3.318 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
14.	Duty Cycle	24.258 %	Op_point	Duty cycle
15.	Efficiency	95.356 %	Op_point	Steady state efficiency
16.	IC Tj	42.059 degC	Op_point	IC junction temperature
17.	IOUT_OP	5.0 A	Op_point	Iout operating point
18.	VIN_OP	14.0 V	Op_point	Vin operating point
19.	Vout p-p	2.36 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	7.029 mW	Power	Input capacitor power dissipation
21.	Cout Pd	358.118 μ W	Power	Output capacitor power dissipation
22.	IC Pd	428.678 mW	Power	IC power dissipation
23.	L Pd	329.421 mW	Power	Inductor power dissipation
24.	Rsnub Pd	37.945 mW	Power	Rsnub power dissipation
25.	Total Pd	801.842 mW	Power	Total Power Dissipation
26.	Vout Tolerance	2.671 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	5.0	Maximum Output Current
2.	VinMax	14.0	Maximum input voltage
3.	VinMin	8.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS548A20	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature
1.	Vout Sch	3.3	Output voltage selected

Design Assistance

1. **TPS548A20** Product Folder : <http://www.ti.com/product/TPS548A20> : contains the data sheet and other resources.

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