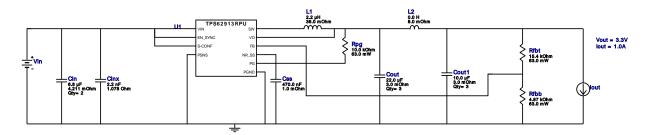
VinMin = 12.0V VinMax = 12.0V Vout = 3.3V Iout = 1.0A Device = TPS62913RPUR Topology = Buck Created = 2021-10-29 03:52:55.362 BOM Cost = \$2.60 BOM Count = 16 Total Pd = 0.21W

# WEBENCH® Design Report

Design: 742 TPS62913RPUR TPS62913RPUR 12V-12V to 3.30V @ 1A



### **Design Alerts**

#### TPS62913 Design

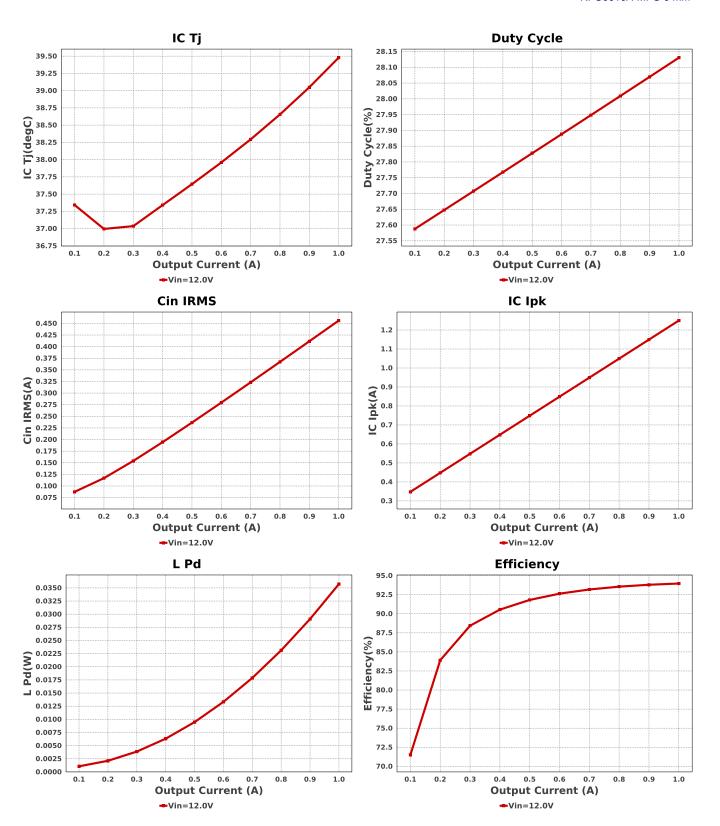
The TPS62913 supports a second LC ferrite bead output filter to achieve lowest output voltage ripple. To enable this filter in the design, use the Second Stage Output Filter dropdown option from Advanced options on the left side. Please refer to the TPS62913 datasheet for more information.

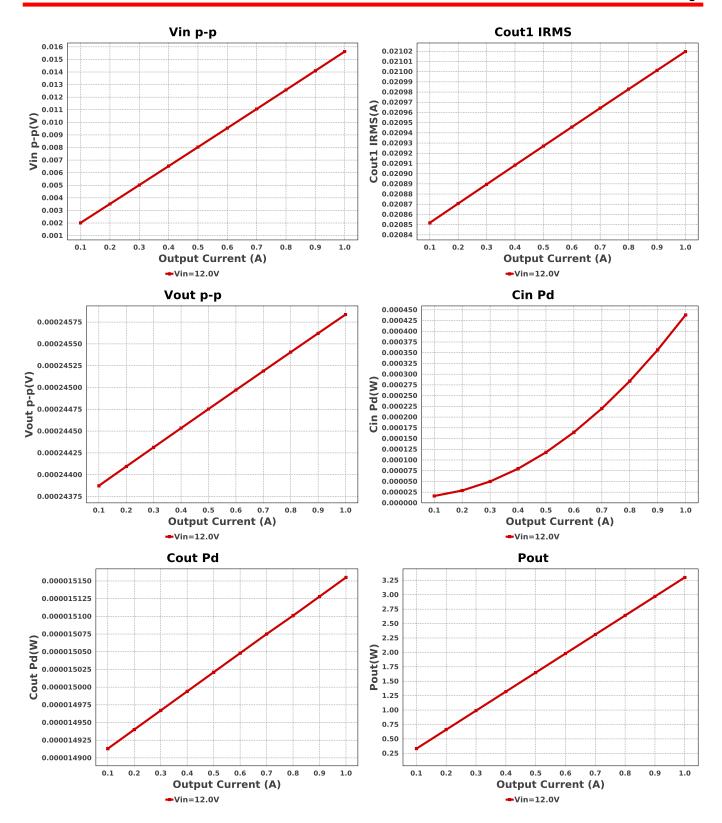
#### **Electrical BOM**

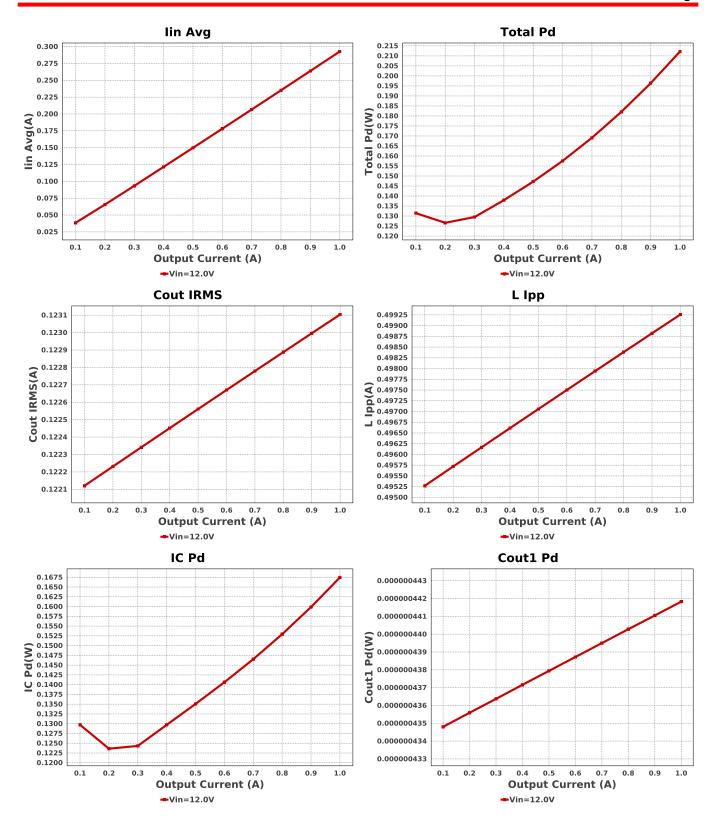
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cin	TDK	C1608X5R1E685K080AC Series= X5R	Cap= 6.8 uF ESR= 4.211 mOhm VDC= 25.0 V IRMS= 2.5341 A	2	\$0.17	0603 5 mm <sup>2</sup>
Cinx	TDK	CGA2B2X7R1H222K050BA Series= X7R	Cap= 2.2 nF ESR= 1.0779 Ohm VDC= 50.0 V IRMS= 264.071 mA	1	\$0.01	0402 3 mm <sup>2</sup>
Cout	MuRata	GRM21BR61A226ME44L Series= X5R	Cap= 22.0 uF ESR= 3.0 mOhm VDC= 10.0 V IRMS= 3.84 A	3	\$0.13	0805 7 mm <sup>2</sup>
Cout1	Kemet	C0805C106K8PACTU Series= X5R	Cap= 10.0 uF ESR= 3.0 mOhm VDC= 10.0 V IRMS= 11.43 A	3	\$0.03	0805 7 mm <sup>2</sup>
Css	MuRata	GRM188R60J474KA01D Series= X5R	Cap= 470.0 nF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.02	0603 5 mm <sup>2</sup>
L1	Abracon Corporation	ASPI-0530HI-2R2M-T2	L= 2.2 μH 35.0 mOhm	1	\$0.41	ASPI-0530HI 55 mm <sup>2</sup>
L2	Wurth Elektronik	782853200	L= 0.0 H 8.0 mOhm	1	\$0.09	0805 7 mm <sup>2</sup>
Rfbb	Vishay-Dale	CRCW04024K87FKED Series= CRCWe3	Res= 4.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
Rfbt	Vishay-Dale	CRCW040215K4FKED Series= CRCWe3	Res= 15.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>
Rpg	Vishay-Dale	CRCW040210K0FKED Series= CRCWe3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm <sup>2</sup>

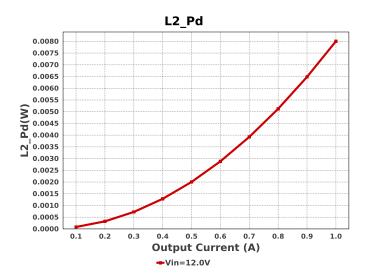
NameManufacturerPart NumberPropertiesQtyPriceFootprintU1Texas InstrumentsTPS62913RPURSwitcher1\$1.22

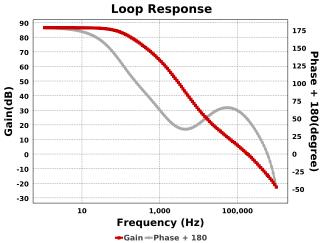
RPU0010A-MFG 9 mm<sup>2</sup>











## **Operating Values**

2. Cin Pd         437,98 µW         Capacitor         Input capacitor power dissipation           3. Cout IRMS         123,104 mA         Capacitor         Output capacitor Power dissipation           4. Cout Pd         15,155 µW         Capacitor         Output capacitor power dissipation           6. Cout1 RMS         21,02 mA         Capacitor         Output capacitor power dissipation           7. IC Ipk         1,25 A         IC         Cuprored dissipation           8. IC Pd         167.46 mW         IC         Cipored dissipation           9. IC Tj         39,478 degC         IC         IC (ipcort dissipation           10. ICThetaJA         56.6 degCW         IC         IC (ipcort dissipation           11. Ilin Avg         292,68 mA         IC         Count percentage         Inductor inductor inductor ripple current percentage (with respect to average inductor current)           13. L Ipp         499,26 mA         Inductor         Inductor ripple current percentage (with respect to average inductor current)           15. L2Pd         8,004 mW         Inductor         Inductor ripple current percentage (with respect to average inductor current)           15. L2Pd         8,004 mW         Inductor         Inductor ripple current percentage (with respect to average inductor current)           16. Cip Pade (accord ripple current)         Adver	#	Name	Value	Category	Description
3. Cout IRMS	1.	Cin IRMS	456.088 mA	Capacitor	Input capacitor RMS ripple current
4. Cout Pd         15.155 µW         Capacitor         Output capacitor power dissipation           6. Cout1 RMS         2.10 mA         Capacitor         Output capacitor power dissipation           6. Cout1 Pd         441.83 nW         Capacitor         Output capacitor power dissipation           7. IC Ipk         1.25 A         IC         IC power dissipation           8. IC Pd         167.46 mW         IC         IC power dissipation           9. IC TJ         39.478 degC         IC         IC junction temperature           10. ICThetaJA         56.6 degCW         IC         IC junction temperature           11. Iin Avg         292.68 mA         IC         Average input current           12. Ipp percentage         499.26 mA         Inductor         Inductor ripple current percentage (with respect to average inductor current)           13. L Ipp         499.26 mA         Inductor         Inductor ripple current percentage (with respect to average inductor current)           14. L Pd         35.727 mW         Inductor         Peak-to-peak inductor ripple current in Ic           15. L2 Pd         8.004 mW         Power         Inductor power dissipation           16. Cin Pd         417.98 µW         Power         Input capacitor power dissipation           16. Cout Pd         414.83 nW <td< td=""><td></td><td></td><td>•</td><td></td><td></td></td<>			•		
5. Cout I RMS         21.02 mA         Capacitor         Output capacitor I power dissipation           7. IC Ipk         1.25 A         IC         Peak switch current in IC           8. IC Pd         167.46 mW         IC         IC power dissipation           9. IC Tj         39.478 degC         IC         IC junction temperature           10. IC ThetaJA         56.6 degC/W         IC         IC junction-to-ambient thermal resistance           11. Iin Ava         29.26 mA         Inductor         Inductor inductor repet power dissipation           12. Ipp percentage         49.926 mA         Inductor         Inductor repet current percentage (with respect to average inductor current)           14. L Pd         35.727 mW         Inductor         Inductor power dissipation           16. Cin Pd         437.98 µW         Power         Inductor power dissipation           17. Cout Pd         15.155 µW         Power         Inductor power dissipation           18. Cout Pd         414.83 nW         Power         Inductor power dissipation           19. L Pd         35.727 mW         Power         Inductor power dissipation           10. L Pd         16. Xaystem         Not AmW         Power         Inductor power dissipation           10. L Pd         35.727 mW         Power	3.	Cout IRMS	123.104 mA	Capacitor	Output capacitor RMS ripple current
6. Court Pd         441.83 nW         Capacitor         Output capacitor1 power dissipation           7. IC Ipk         1.25 A         IC         Peak switch current in IC           8. IC Pd         187.46 mW         IC         IC power dissipation           9. IC TJ         39.478 degC         IC         IC junction temperature           10. ICThetaJA         56.6 degC/W         IC         Ci junction temperature           11. In Avg         292.68 mA         IC         Average input current           12. Ipp percentage         49.926 mA         Inductor         Inductor inductor inductor inductor inductor ripple current percentage (with respect to average inductor current)           13. L Ipp         499.26 mA         Inductor         Inductor peak-to-peak inductor ripple current           14. L Pd         35.727 mW         Inductor         Inductor power dissipation           15. L2.Pd         8.004 mW         Power         Input capacitor power dissipation           16. Cin Pd         415.35 µW         Power         Input capacitor power dissipation           17. Cout Pd         15.155 µW         Power         Output capacitor power dissipation           18. Cout Pd         414.83 nW         Power         Output capacitor power dissipation           19. L2.Pd         8.004 mW         Power </td <td>4.</td> <td>Cout Pd</td> <td>15.155 μW</td> <td>Capacitor</td> <td>Output capacitor power dissipation</td>	4.	Cout Pd	15.155 μW	Capacitor	Output capacitor power dissipation
7. IC lpk         1.25 A         IC         Peak switch current in IC           8. IC Pd         167.46 mW         IC         IC power dissipation           10. IC ThetaJA         56.6 degc/W         IC         IC junction temperature           11. Iin Avg         292.68 mA         IC         Average input current           12. Ipp percentage         49.926 mA         Inductor         Inductor projec current percentage (with respect to average inductor current)           13. L Ipp         499.26 mA         Inductor         Peak-to-peak inductor ripple current percentage (with respect to average inductor current)           14. L Pd         35.727 mW         Inductor         Peak-to-peak inductor ripple current percentage (with respect to average inductor current)           15. L 2.Pd         8.004 mW         Inductor         Peak-to-peak inductor ripple current percentage (with respect to average inductor current)           16. Cin Pd         437.98 µW         Power         Inductor power dissipation           17. Cout Pd         15.155 µW         Power         Inductor power dissipation           18. Cout1 Pd         441.83 nW         Power         Output capacitor power dissipation           19. IC Pd         167.46 mW         Power         Inductor power dissipation           11. L Pd         35.727 mW         Power         Inductor pow	5.	Cout1 IRMS	21.02 mA	Capacitor	Output capacitor1 RMS ripple current
16.   Pd	6.	Cout1 Pd	441.83 nW	Capacitor	Output capacitor1 power dissipation
9. IC Tij 39.478 degC IC IC junction temperature 10. ICThetaJA 56.6 degC/W IC IC IC junction to-ambient thermal resistance 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Inductor power dissipation 11. Inductor power dissipation 12. Ilin Capacitor power dissipatio	7.	IC lpk	1.25 A	IC .	Peak switch current in IC
9. IC Tij 39.478 degC IC IC junction temperature 10. ICThetaJA 56.6 degC/W IC IC IC junction to-ambient thermal resistance 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Ilin Avg 292.68 mA IC Average input current 11. Inductor power dissipation 11. Inductor power dissipation 12. Ilin Capacitor power dissipatio	8.	IC Pd	167.46 mW	IC	IC power dissipation
10. ICThetaJA   56.6 degC/W   IC   IC junction-to-ambient thermal resistance   IC   Average input current   Inductor ripple current   Inductor power dissipation   Inductor power dissipation   Inductor power loss   Inductor power dissipation   Inductor power   Inductor power dissipation   Inductor p	9.	IC Ti	39.478 deaC		IC junction temperature
11. III n/avg   292.68 m/s   IC   Average input current   Inductor ripple current   Inductor ripple current   Inductor ripple current   Inductor ripple current   Inductor current)   Peak-to-peak inductor ripple current   Inductor router inductor power dissipation   Output capacitor power dissipation   Output capacitor power dissipation   Output capacitor power diss	10.	•	•		,
Inductor	11.		•		·
13		J		-	
14. L Pd   35.727 mW	12.	ipp percentage	40.020 /0	madotor	,, , , , ,
15.   L2 Pd	13.	L lpp	499.26 mA	Inductor	Peak-to-peak inductor ripple current
16. Cin Pd	14.	L Pd	35.727 mW	Inductor	Inductor power dissipation
17.   Cout Pd	15.	L2_Pd	8.004 mW	Inductor	Inductor2 power loss
17. Cout Pd	16.	Cin Pd		Power	Input capacitor power dissipation
10.   C Pd	17.	Cout Pd	15.155 μW	Power	Output capacitor power dissipation
10.   C Pd	18.	Cout1 Pd	441.83 nW	Power	Output capacitor1 power dissipation
20. L Pd 35.727 mW Power Inductor power dissipation 21. L2_Pd 8.004 mW Power Inductor power dissipation 22. Total Pd 212.17 mW Power Total Power Dissipation 23. BOM Count 16 System Information 24. Cross Freq 182.427 kHz System Information 25. Duty Cycle 28.131 % System Information 26. Efficiency 93.959 % System Information 27. FootPrint 137.0 mm² System Information 28. Frequency 2.2 MHz System Information 29. Gain Marg -14.558 dB System Information 30. lout 1.0 A System Information 31. Low Freq Gain 86.5 dB System Information 32. Mode FCCM System Information 33. Phase Marg 49.615 deg System Information 34. Pout 3.3 W System Information 35. Total BOM \$2.6 System Information 36. Vin 12.0 V System Vin operating point 37. Total BOM Cost 38. Ovin Over Information 39. Vin operating point 39. Vin operating point 39. Vin operating point 39. Vin operating point 39. Vin operating power Inductor2 power loss inductor2 power loss inductor2 power loss inductor3 power loss inductor3 power loss inductor2 power loss inductor3 power loss in	19.	IC Pd	167.46 mW	Power	
21. L2_Pd	20.	L Pd	35.727 mW	Power	·
Power   Total Pd   Power   System   System   Information   Power   System   Information   Power   Po					·
23. BOM Count 16 System Information Information Put Cycle 182.427 kHz System Information System Information Put Cycle 28.131 % System Information Put Cycle 187.0 mm² System Information Put Cycle Inf		_			
Information   System   Bode plot crossover frequency   Information   System   Duty cycle   28.131 %   System   Information   System   Duty cycle   Information   System   Information   System   Information   System   Information   System   Information   System   Steady state efficiency   System   Information   System   System   Steady state efficiency   System   Steady state efficiency   System					
Information   System   Duty cycle   Duty cycle   Information   Duty cycle   Information   System   Duty cycle   Information   System   Steady state efficiency   System   Information   System   Total Foot Print Area of BOM components   Information   System   Switching frequency   Information   System   Bode Plot Gain Margin   Information   System   Information   Information   Information   System   Information   Information   Information   Information   System   Information   Information   Information   Information   System   Information   Information   Information   System   Information   Information   System   Information   Information   Information   System   Information   Information   Information   Information   Information   Information   System   Information   Informa	20.	DOW Count	10	,	Total Design Boly count
25. Duty Cycle 28. 131 % System Information 26. Efficiency 27. FootPrint 28. Frequency 29. Gain Marg 29. Gain Marg 20. Low Freq Gain 30. Low Freq Gain 31. Low Freq Gain 32. Mode 33. Phase Marg 34. Pout 37. Out 38. System Information 39. Duty Cycle 39. System System Information 39. Duty Cycle 39. System Information 39. Duty Cycle 39. System Information 39. Company System Information 39. Duty Cycle 39. System Information 39. Phase Marg 39. System Information 39. Phase Marg 49.615 deg 59. System Information 39. System Total output power 39. Total BOM System Total BOM Cost 39. System Information 39. Vin 12.0 V System Vin operating point	24.	Cross Freq	182.427 kHz	•	Bode plot crossover frequency
Information System Steady state efficiency PootPrint 137.0 mm² System Information Prepared Information PootPrint 137.0 mm² System Information PootPrint 137.0 mm² System Information PootPrint 137.0 mm² System Information PootPrint Area of BOM components PootPrint A	~=	D . O .	00.404.0/		D
26. Efficiency 93.959 % System Information System Steady state efficiency Information System Information System Switching frequency Information System Bode Plot Gain Margin Information Information System Information System Information System Information System Information Information System Vin operating point Vin operating point	25.	Duty Cycle	28.131 %	•	Duty cycle
Information 27. FootPrint  137.0 mm²  System Total Foot Print Area of BOM components Information 28. Frequency 2.2 MHz  System Switching frequency Information 29. Gain Marg  -14.558 dB  System Bode Plot Gain Margin Information 30. lout  1.0 A  System lout operating point Information 31. Low Freq Gain  86.5 dB  System Gain at 1Hz Information 32. Mode  FCCM  System Conduction Mode Information 33. Phase Marg  49.615 deg  System Bode Plot Phase Margin Information 34. Pout  3.3 W  System Bode Plot Phase Margin Information 35. Total BOM  \$2.6  System Total output power Information  System Total BOM Cost Information  System Total BOM Cost Information  System Vin operating point					
27. FootPrint 137.0 mm² System Information 28. Frequency 2.2 MHz System Switching frequency 29. Gain Marg -14.558 dB System Information 29. Iout 1.0 A System Information 29. Iout Print Area of BOM components 29. Iout 1.0 A System Information 29. Iout 1.0 A System Information 29. Iout Preq Gain 86.5 dB System Gain at 1Hz Information 29. Mode FCCM System Conduction Mode Information 29. Iout Preq Gain 29. When Information 29. Iout Preq Gain 29. Iout Phase Margin Information 29. Iout 29.	26.	Efficiency	93.959 %	•	Steady state efficiency
Information  28. Frequency  2.2 MHz  System Information System Information  30. lout  30. lout  31. Low Freq Gain  32. Mode  FCCM  System Information Total output power Information  Total BOM Cost Information System Information System Information System Information System Information Total BOM Cost Information Total BOM Cost Information System Information Total BOM Cost Informat					
28. Frequency 29. Gain Marg 30. lout 31. Low Freq Gain 32. Mode 33. Phase Marg 34. Pout 35. Total BOM 36. Vin 37. Total BOM 38. Frequency 29. Gain Marg 3914.558 dB 39. System Information Total output power Total BOM Cost Information Total BOM Cost Information System Information Total BOM Cost Information Total point	27.	FootPrint	137.0 mm <sup>2</sup>	System	Total Foot Print Area of BOM components
Information 29. Gain Marg  -14.558 dB  System Information 30. lout  1.0 A  System Information 31. Low Freq Gain 32. Mode  FCCM  System Information 33. Phase Marg  49.615 deg  System Information 34. Pout  3.3 W  System Information 35. Total BOM  \$2.6  System Information  System Information  System Information  Total output power Information  Total BOM Cost Information  System Vin operating point				Information	
29. Gain Marg -14.558 dB System Information 30. lout 1.0 A System Information 31. Low Freq Gain 32. Mode FCCM System Information 33. Phase Marg 49.615 deg Information 34. Pout 3.3 W System Bode Plot Gain Margin Intormation System Gain at 1Hz Conduction Mode Information System Bode Plot Phase Margin Information System Total output power Information Total BOM Cost Information System Total BOM Cost Information System Total BOM Cost Information System Vin operating point	28.	Frequency	2.2 MHz	System	Switching frequency
Information 30. lout  1.0 A  System lout operating point Information 31. Low Freq Gain  86.5 dB  System Gain at 1Hz Information 32. Mode  FCCM  System Conduction Mode Information 33. Phase Marg  49.615 deg  System Bode Plot Phase Margin Information 34. Pout  3.3 W  System Total output power Information 35. Total BOM  \$2.6  System Total BOM Cost Information  Total BOM Cost Information  Win operating point		•		Information	
Information 30. lout  1.0 A  System lout operating point Information 31. Low Freq Gain  86.5 dB  System Gain at 1Hz Information 32. Mode  FCCM  System Conduction Mode Information 33. Phase Marg  49.615 deg  System Bode Plot Phase Margin Information 34. Pout  3.3 W  System Total output power Information 35. Total BOM  \$2.6  System Total BOM Cost Information  Total BOM Cost Information  Win operating point	29.	Gain Marg	-14.558 dB	System	Bode Plot Gain Margin
System   Information   System   Gain at 1Hz		-		Information	-
Information 31. Low Freq Gain 32. Mode FCCM System Information System Information System Information Conduction Mode Information System Information Solve Plot Phase Margin Information System Information System Information Total output power Information System Information Total BOM Cost Information System Information System Information System Information Total BOM Cost Information System Vin operating point	30.	lout	1.0 A		lout operating point
31. Low Freq Gain 86.5 dB System Gain at 1Hz Information 32. Mode FCCM System Conduction Mode Information 33. Phase Marg 49.615 deg System Bode Plot Phase Margin Information 34. Pout 3.3 W System Total output power Information 35. Total BOM \$2.6 System Total BOM Cost Information 36. Vin 12.0 V System Vin operating point	-		-	•	
Information  32. Mode FCCM System Conduction Mode Information  33. Phase Marg 49.615 deg System Bode Plot Phase Margin Information  34. Pout 3.3 W System Total output power Information  35. Total BOM \$2.6 System Total BOM Cost Information  36. Vin 12.0 V System Vin operating point	31.	Low Freg Gain	86.5 dB		Gain at 1Hz
32. Mode FCCM System Conduction Mode Information 33. Phase Marg 49.615 deg System Bode Plot Phase Margin Information 34. Pout 3.3 W System Total output power Information 35. Total BOM \$2.6 System Total BOM Cost Information 36. Vin 12.0 V System Vin operating point	٠		55.0 GB	,	
Information  System Bode Plot Phase Margin Information  34. Pout 3.3 W System Total output power Information  55. Total BOM \$2.6 System Total BOM Cost Information  36. Vin 12.0 V System Vin operating point	32	Mode	FCCM		Conduction Mode
33. Phase Marg 49.615 deg System Bode Plot Phase Margin Information 34. Pout 3.3 W System Total output power Information 35. Total BOM \$2.6 System Total BOM Cost Information 36. Vin 12.0 V System Vin operating point	JZ.	IVIOUC	1 JOIVI	•	Conduction Mode
Information 34. Pout 3.3 W System Total output power Information 35. Total BOM \$2.6 System Total BOM Cost Information 36. Vin 12.0 V System Vin operating point	22	Phase Mara	40.615 dog		Rodo Plot Phase Margin
34. Pout 3.3 W System Total output power Information 35. Total BOM \$2.6 System Total BOM Cost Information 36. Vin 12.0 V System Vin operating point	SS.	Fliase Mary	49.010 ueg	•	Boue Flot Fliase Marylli
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35. Total BOM \$2.6 System Total BOM Cost Information 36. Vin 12.0 V System Vin operating point	34.	Pout	3.3 W	•	rotal output power
Information  36. Vin 12.0 V System Vin operating point	0=	T	00.0		T I DOM 0
36. Vin 12.0 V System Vin operating point	35.	rotal BOM	\$2.6	•	Total BOM Cost
, , , ,					
Information	36.	Vin	12.0 V	•	Vin operating point
				Information	

#	Name	Value	Category	Description
37.	Vin p-p	15.626 mV	System Information	Peak-to-peak input voltage
38.	Vout	3.3 V	System Information	Operational Output Voltage
39.	Vout Actual	3.33 V	System Information	Vout Actual calculated based on selected voltage divider resistors
40.	Vout Tolerance	2.042 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors at 25 degC
41.	Vout p-p	245.837 μV	System Information	Peak-to-peak output ripple voltage

# **Design Inputs**

Name	Value	Description	
lout	1.0	Maximum Output Current	
SoftStart	5.0 ms	Soft Start Time (ms)	
VinMax	12.0	Maximum input voltage	
VinMin	12.0	Minimum input voltage	
Vout	3.3	Output Voltage	
base_pn	TPS62913	Base Product Number	
source	DC	Input Source Type	
Та	30.0	Ambient temperature	

## WEBENCH® Assembly

### Component Testing

Some published data on components in datasheets such as Capacitor ESR and Inductor DC resistance is based on conservative values that will guarantee that the components always exceed the specification. For design purposes it is usually better to work with typical values. Since this data is not always available it is a good practice to measure the Capacitance and ESR values of Cin and Cout, and the inductance and DC resistance of L1 before assembly of the board. Any large discrepancies in values should be electrically simulated in WEBENCH to check for instabilities and thermally simulated in WebTHERM to make sure critical temperatures are not exceeded.

### Soldering Component to Board

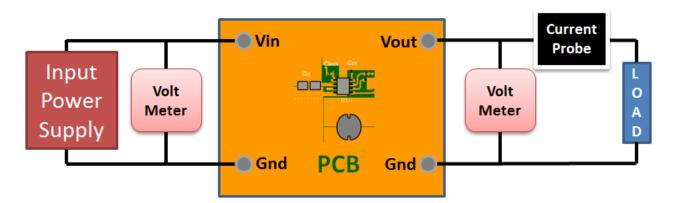
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. To solder the tab town to the board place the iron down on the board while resting against the tab, heating both surfaces simultaneously. Apply light pressure to the top of the plastic case until the solder flows around the part and the part is flush with the PCB. If the solder is not flowing around the board you may need a higher wattage iron (generally 25W to 30W is enough).

### Initial Startup of Circuit

It is best to initially power up the board by setting the input supply voltage to the lowest operating input voltage 12.0V and set the input supply's current limit to zero. With the input supply off connect up the input supply to Vin and GND. Connect a digital volt meter and a load if needed to set the minimum lout of the design from Vout and GND. Turn on the input supply and slowly turn up the current limit on the input supply. If the voltage starts to rise on the input supply continue increasing the input supply current limit while watching the output voltage. If the current increases on the input supply, but the voltage remains near zero, then there may be a short or a component misplaced on the board. Power down the board and visually inspect for solder bridges and recheck the diode and capacitor polarities. Once the power supply circuit is operational then more extensive testing may include full load testing, transient load and line tests to compare with simulation results.

### **Load Testing**

The setup is the same as the initial startup, except that an additional digital voltmeter is connected between Vin and GND, a load is connected between Vout and GND and a current meter is connected in series between Vout and the load. The load must be able to handle at least rated output power + 50% (7.5 watts for this design). Ideally the load is supplied in the form of a variable load test unit. It can also be done in the form of suitably large power resistors. When using an oscilloscope to measure waveforms on the prototype board, the ground leads of the oscilloscope probes should be as short as possible and the area of the loop formed by the ground lead should be kept to a minimum. This will help reduce ground lead inductance and eliminate EMI noise that is not actually present in the circuit.



#### **Design Assistance**

- 1. Master key: E2EC2B81AD3E5F56[v1]
- 2. TPS62913 Product Folder: http://www.ti.com/product/TPS62913: contains the data sheet and other resources.

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