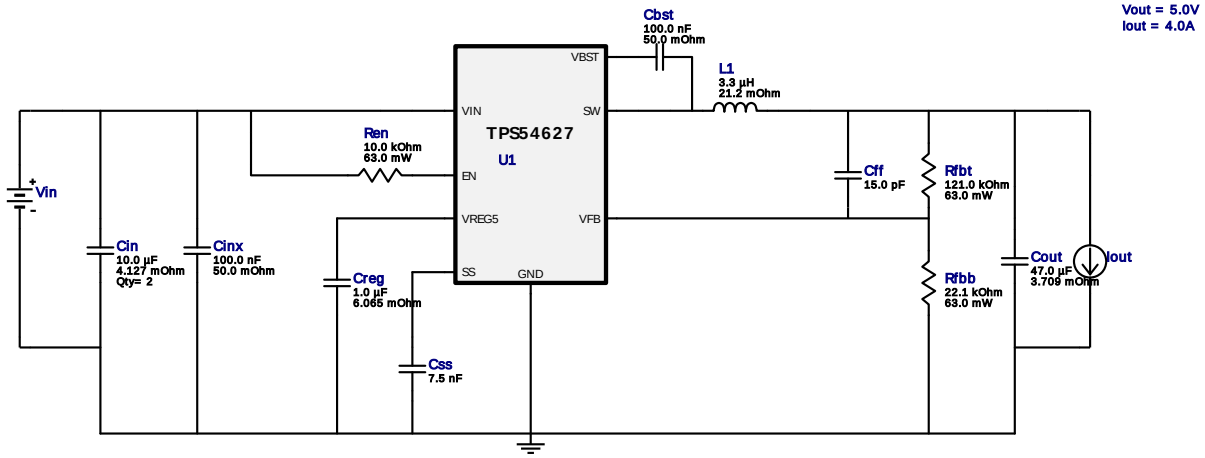
WEBENCH® Design Report

VinMin = 9.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 4.0A

Device = TPS54627DDAR
Topology = Buck
Created = 8/12/16 6:20:46 PM
BOM Cost = $2.45
BOM Count = 13
Total Pd = 1.94W

Design : 4766773/2 TPS54627DDAR
TPS54627DDAR 9.0V-12.0V to 5.00V @ 4.0A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	AVX	06033C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 50.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
2.	Cff	Kemet	C0603C150M8GACTU Series= C0G/NP0	Cap= 15.0 pF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
3.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	2	$0.03	0805 7 mm^2
4.	Cinx	AVX	06033C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 50.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm^2
5.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	$0.15	1206_190 11 mm^2
6.	Creg	MuRata	GRM188R61A105KA61D Series= X5R	Cap= 1.0 uF ESR= 6.065 mOhm VDC= 10.0 V IRMS= 1.30675 A	1	$0.01	0603 5 mm^2
7.	Css	MuRata	GRM2195C1H752JA01D Series= C0G/NP0	Cap= 7.5 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.04	0805 7 mm^2
8.	L1	Coilcraft	XAL5030-332MEB	L= 3.3 µH DCR= 21.2 mOhm	1	$0.63	XAL5030 54 mm^2
9.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
10.	Rfbb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

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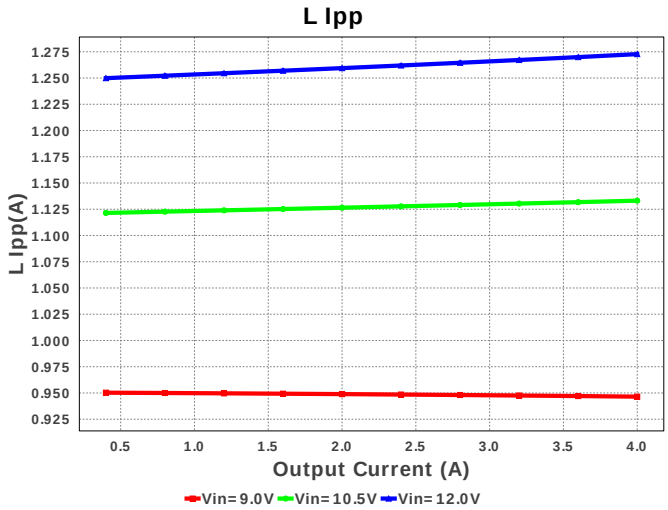
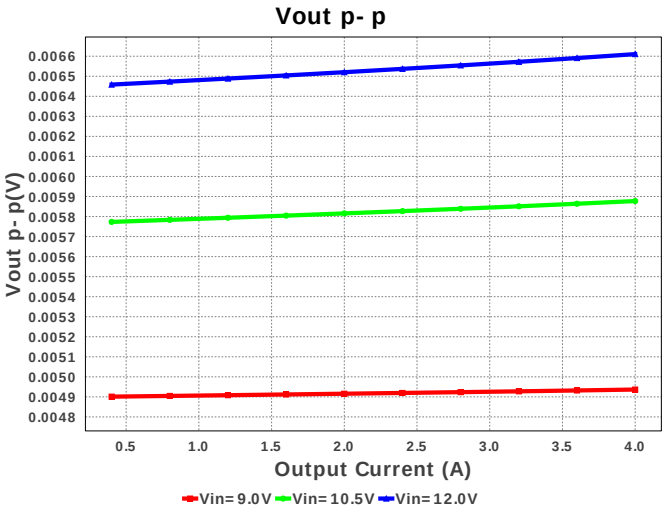
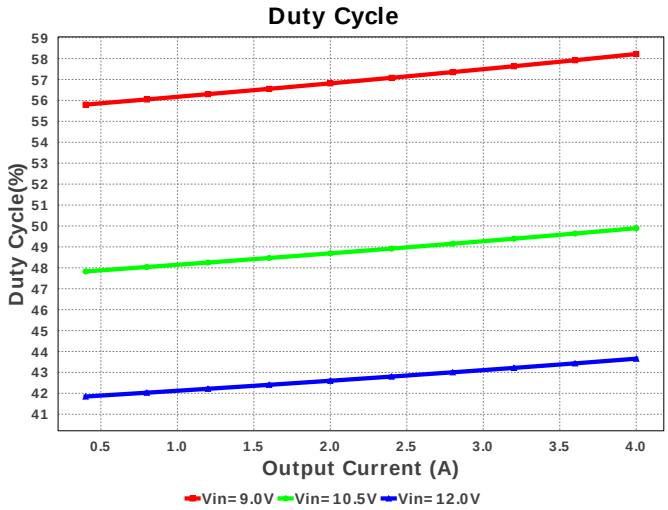
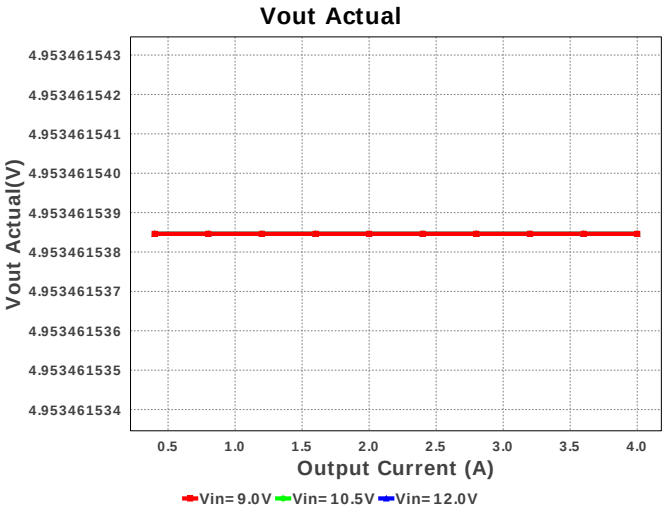
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rfbt	Vishay-Dale	CRCW0402121KFKED Series= CRCW..e3	Res= 121.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
12.	U1	Texas Instruments	TPS54627DDAR	Switcher	1	$1.50	 R-PDSO-G8 55 mm^2









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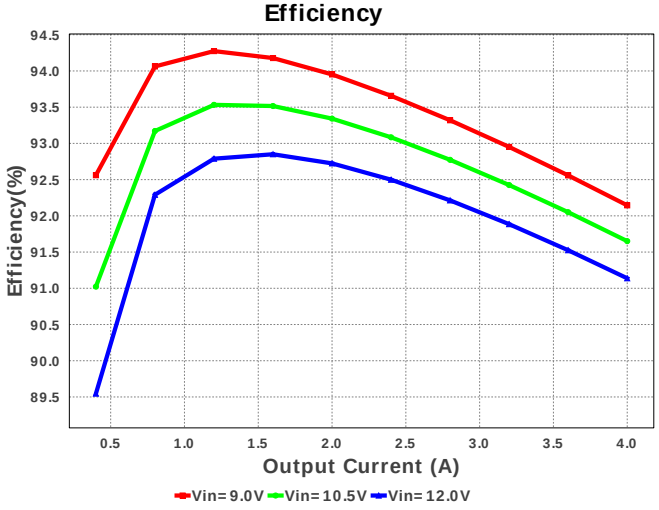
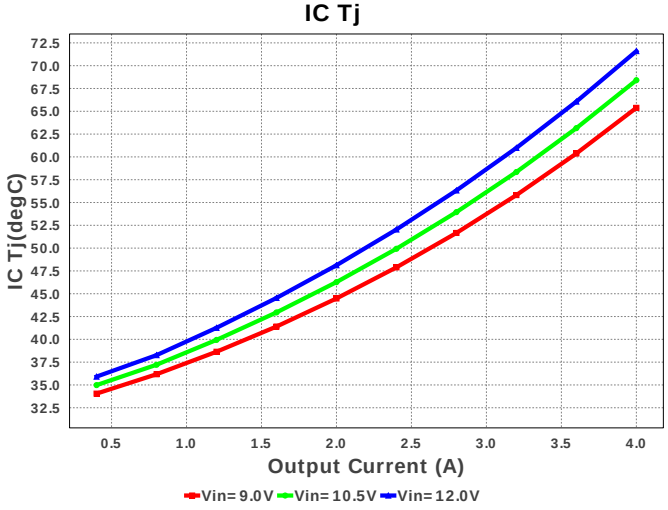
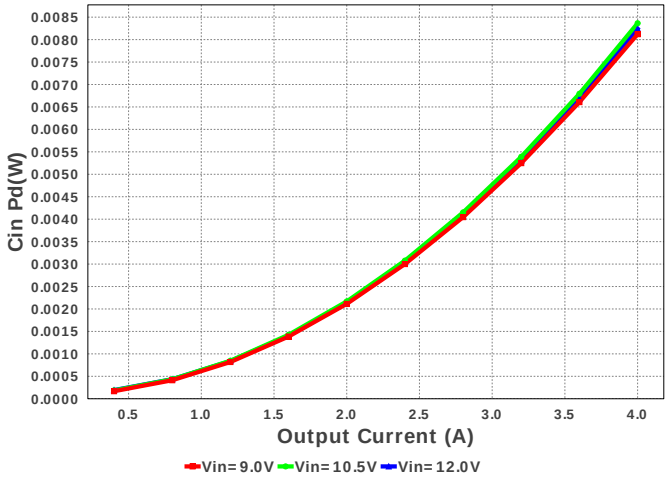
Efficiency



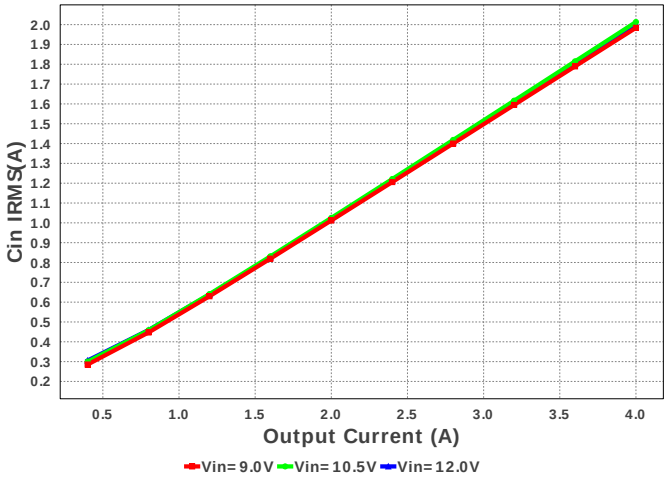
IC Tj



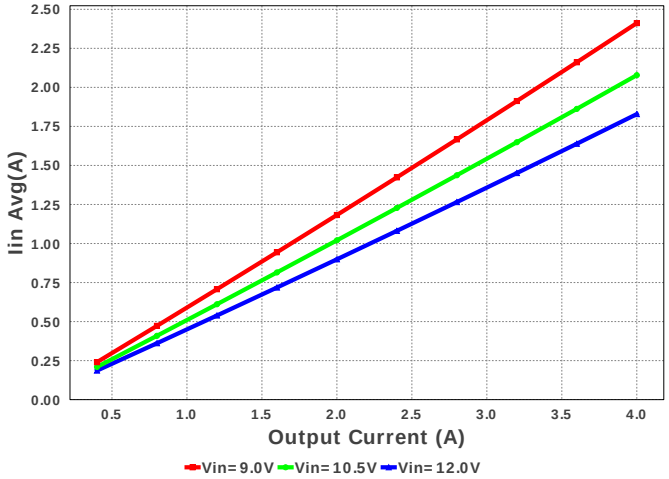
Cin Pd



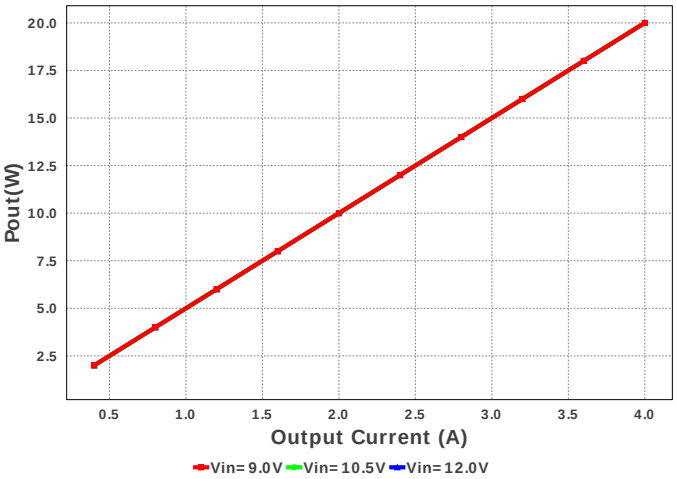
Cin IRMS



Iin Avg



Pout



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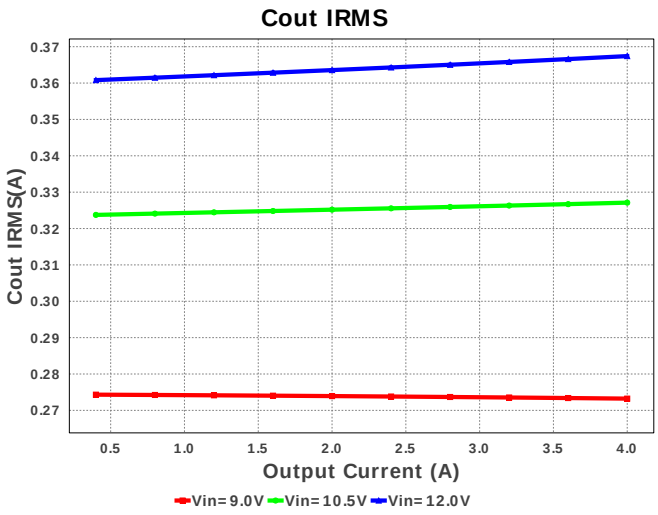

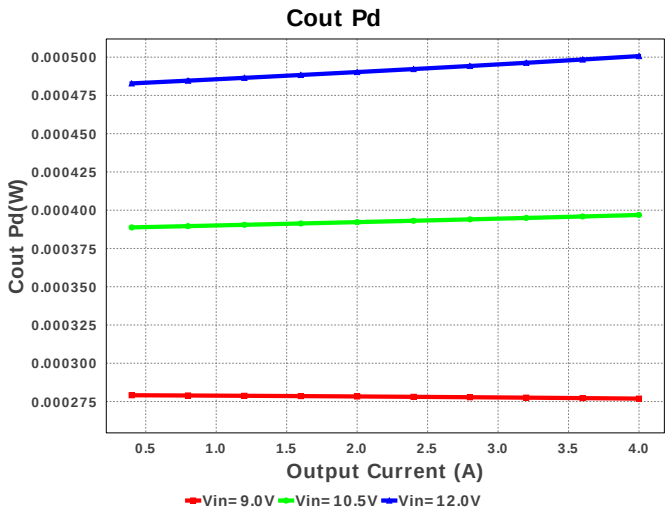

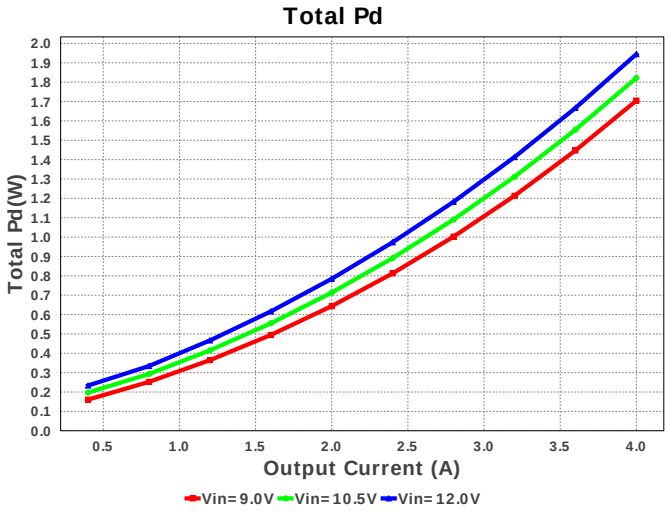

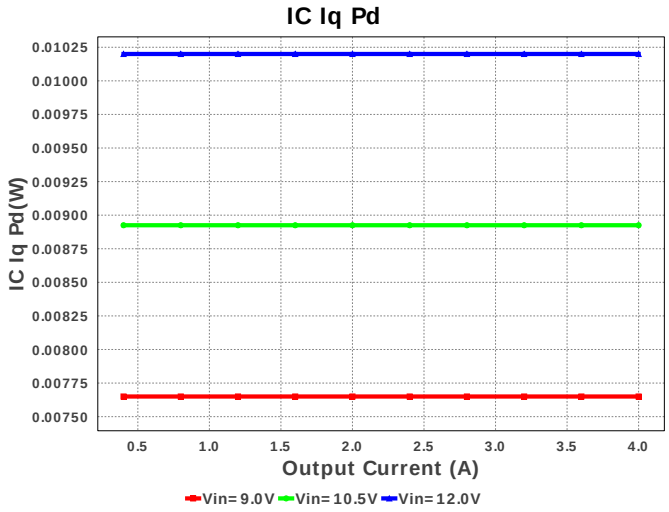

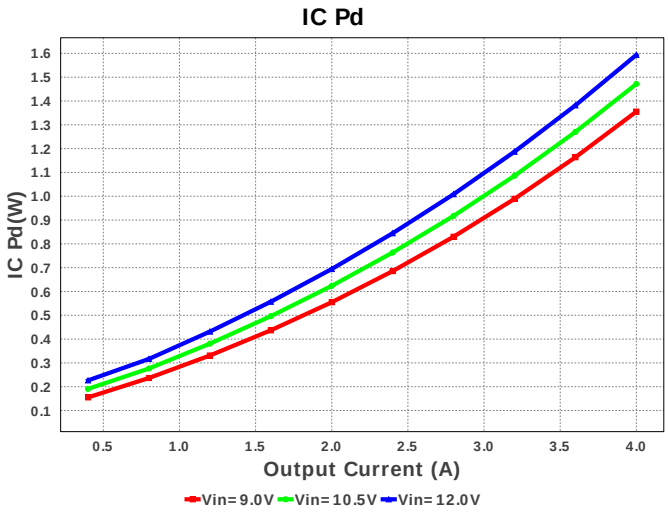

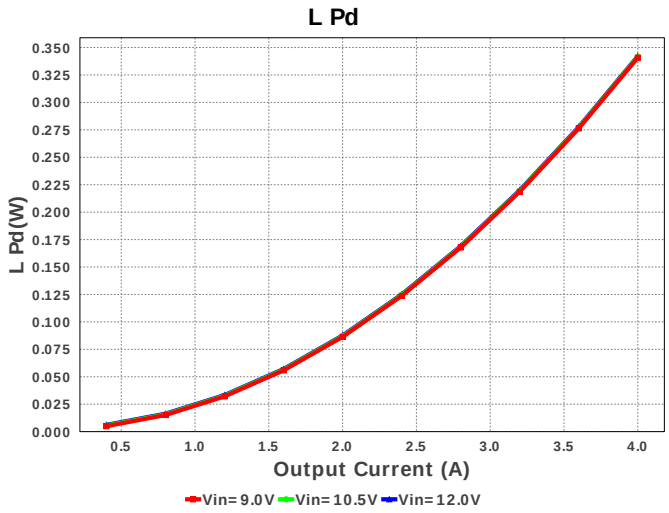

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.999 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	367.413 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.829 A	Current	Average input current
4.	L Ipp	1.273 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	13	General	Total Design BOM count
6.	FootPrint	169.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	700.897 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	20.0 W	General	Total output power
10.	Total BOM	$2.45	General	Total BOM Cost
11.	Vout Actual	4.953 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors

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#	Name	Value	Category	Description
12.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	43.656 %	Op_point	Duty cycle
14.	Efficiency	91.138 %	Op_point	Steady state efficiency
15.	IC Tj	71.598 degC	Op_point	IC junction temperature
16.	ICThetaJA	26.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	4.0 A	Op_point	Iout operating point
18.	VIN_OP	12.0 V	Op_point	Vin operating point
19.	Vout p-p	6.611 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	8.243 mW	Power	Input capacitor power dissipation
21.	Cout Pd	500.686 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	10.2 mW	Power	IC Iq Pd
23.	IC Pd	1.594 W	Power	IC power dissipation
24.	L Pd	342.062 mW	Power	Inductor power dissipation
25.	Total Pd	1.945 W	Power	Total Power Dissipation
26.	Vout Tolerance	3.57 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	4.0	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	9.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54627	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54627** Product Folder : http://www.ti.com/product/TPS54627 : contains the data sheet and other resources.

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