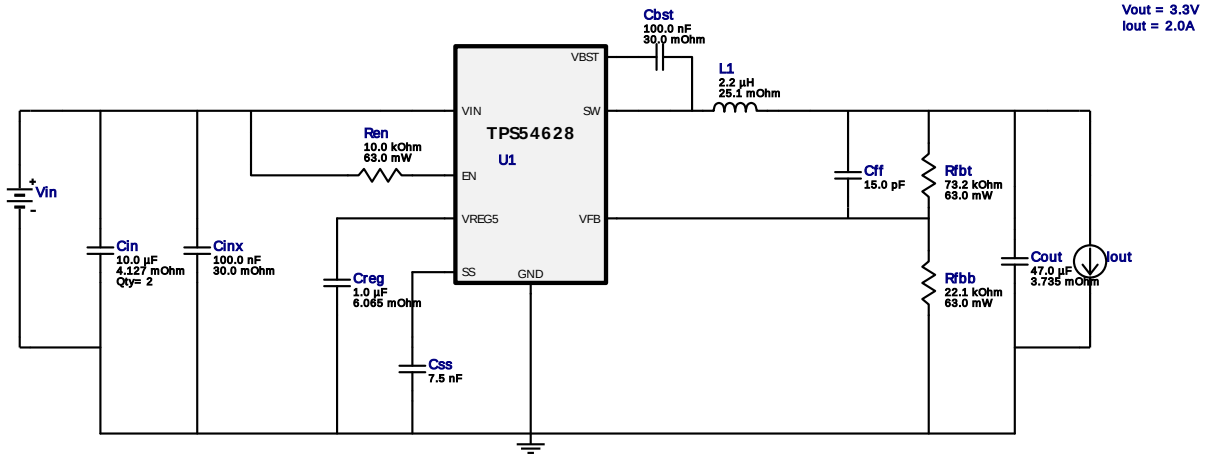
WEBENCH® Design Report

VinMin = 6.0V
VinMax = 10.0V
Vout = 3.3V
Iout = 2.0A

Device = TPS54628DDAR
Topology = Buck
Created = 8/12/16 7:51:23 PM
BOM Cost = $1.98
BOM Count = 13
Total Pd = 0.66W

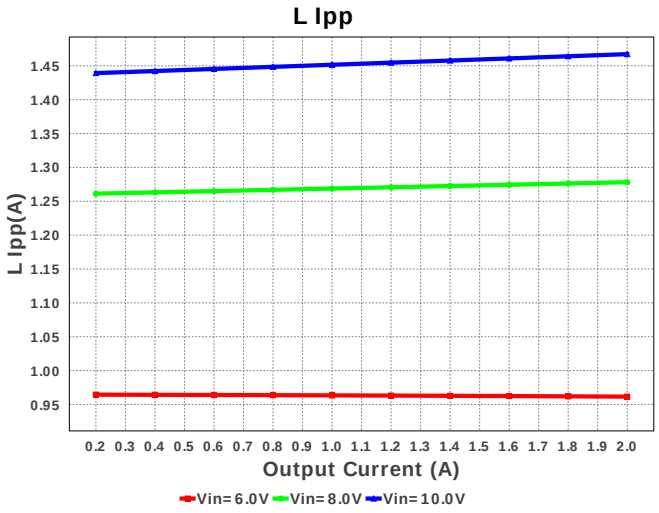
Design : 4766773/11 TPS54628DDAR
TPS54628DDAR 6.0V-10.0V to 3.30V @ 2.0A

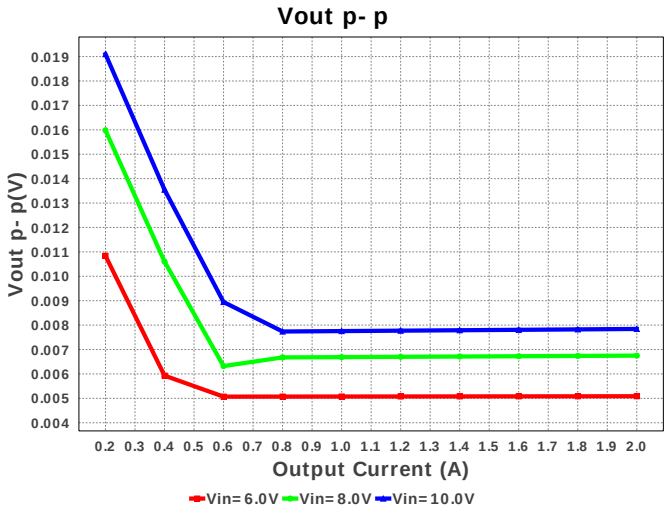


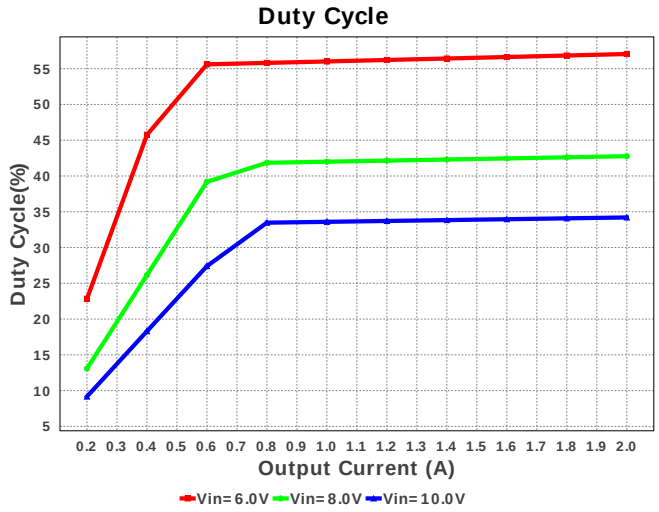
Electrical BOM

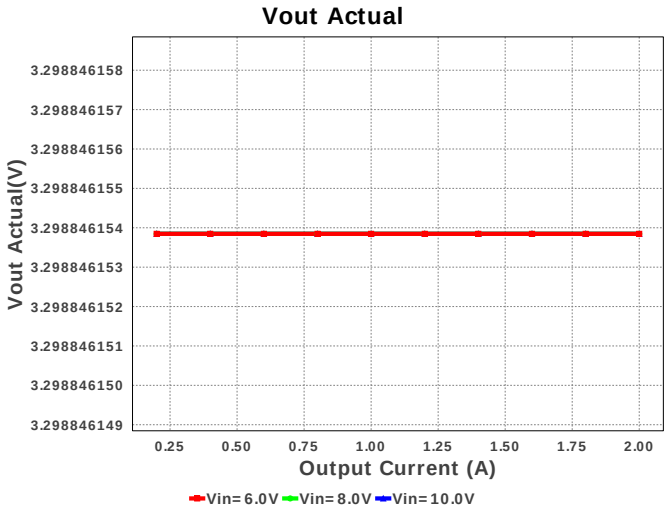
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM188R71C104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 16.0 V IRMS= 1.7 A	1	$0.01	0603 5 mm²
2.	Cff	Kemet	C0603C150M8GACTU Series= C0G/NP0	Cap= 15.0 pF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
3.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	2	$0.03	0805 7 mm²
4.	Cinx	MuRata	GRM188R71C104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 16.0 V IRMS= 1.7 A	1	$0.01	0603 5 mm²
5.	Cout	MuRata	GRM31CC80J476KE18L Series= X6S	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.0522 A	1	$0.10	1206_190 11 mm²
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 mm²
7.	Css	MuRata	GRM2195C1H752JA01D Series= C0G/NP0	Cap= 7.5 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.04	0805 7 mm²
8.	L1	Bourns	SRN6045-2R2Y	L= 2.2 µH DCR= 25.1 mOhm	1	$0.16	SRN6045 64 mm²
9.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rfbt	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
12.	U1	Texas Instruments	TPS54628DDAR	Switcher	1	$1.55	 R-PDSO-G8 55 mm^2

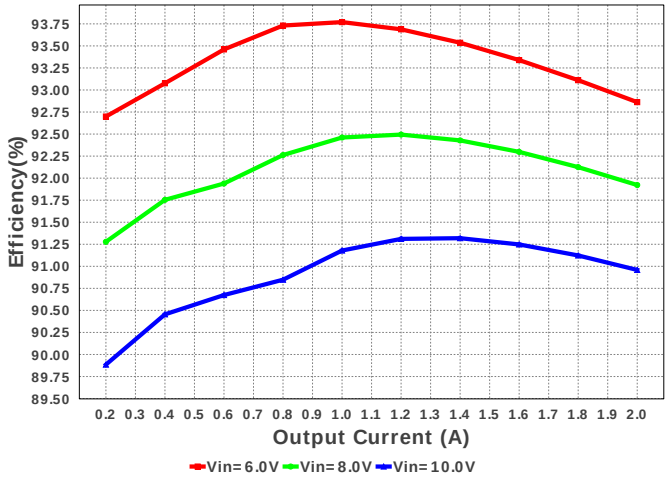




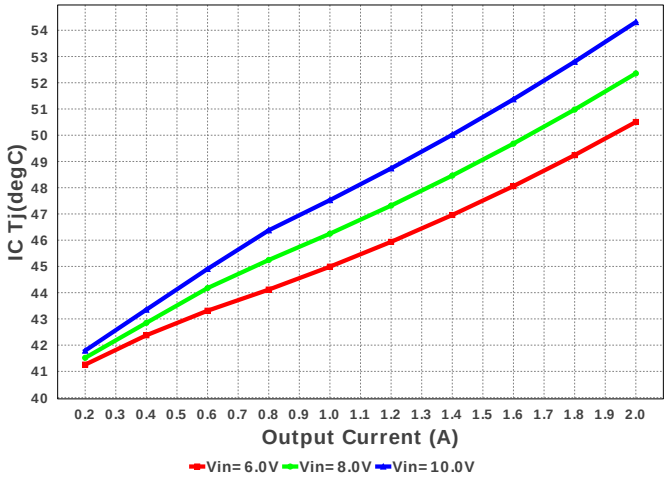




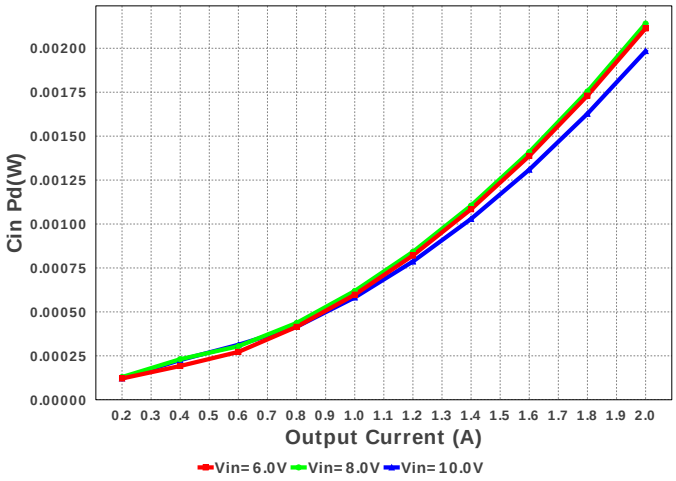
Efficiency



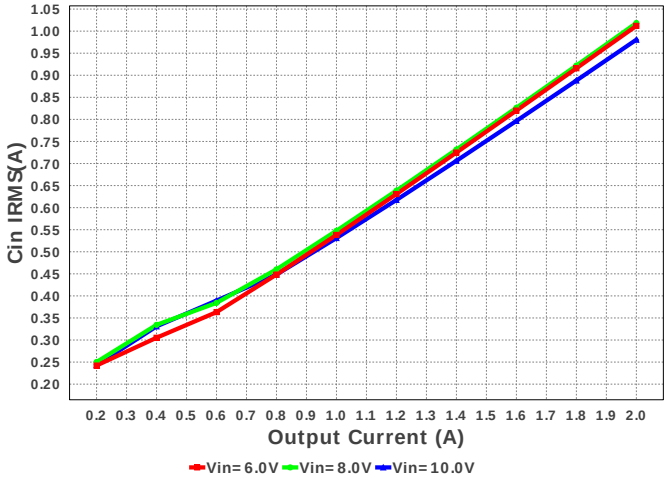
IC Tj



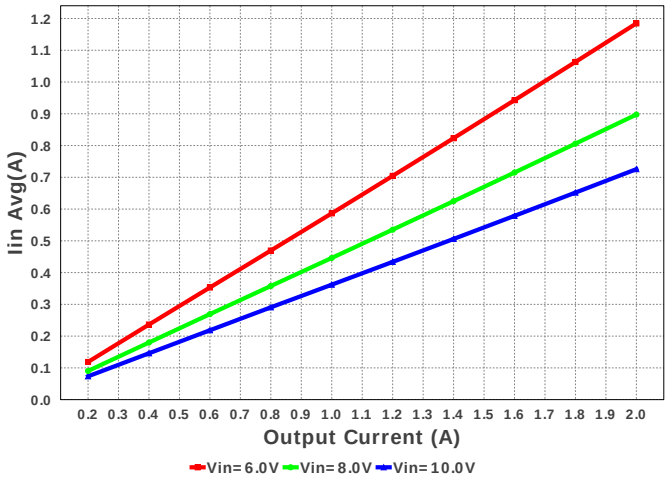
Cin Pd



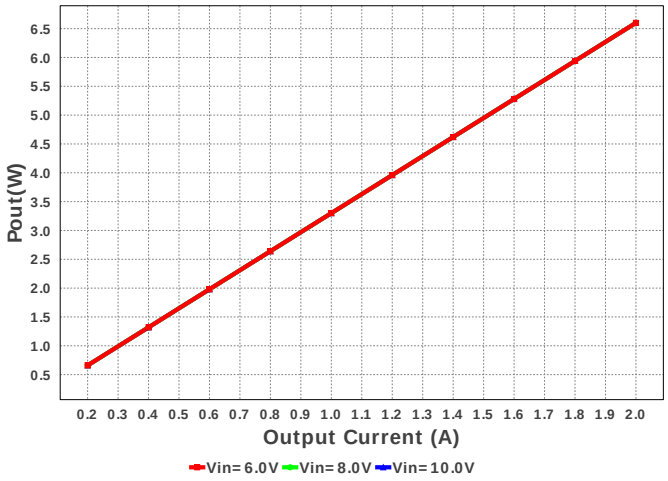
Cin IRMS

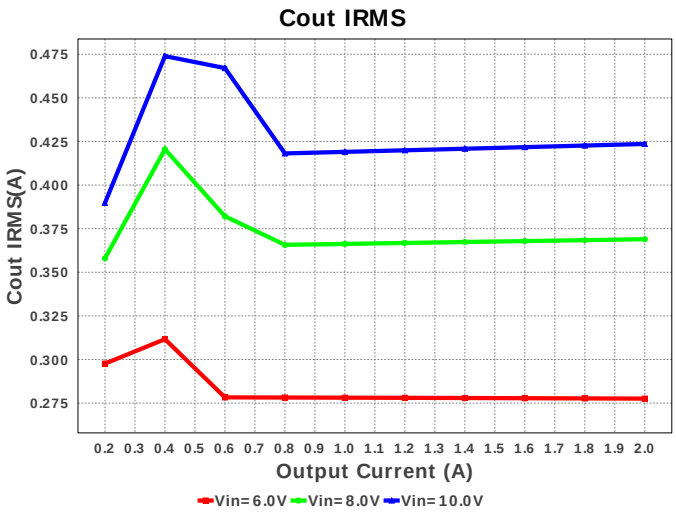


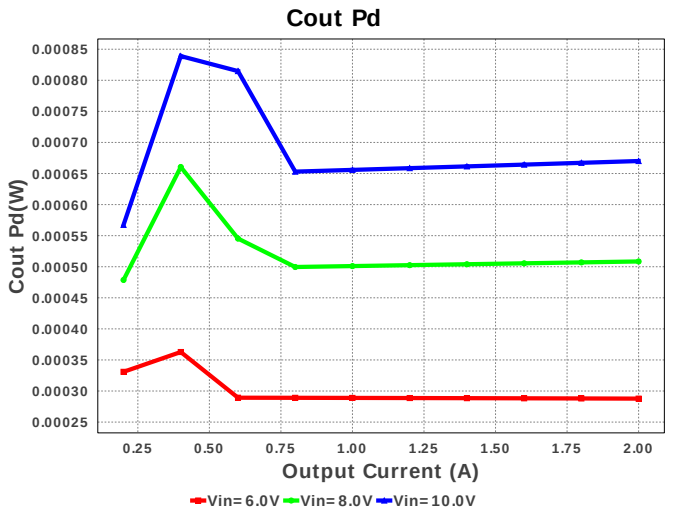
Iin Avg

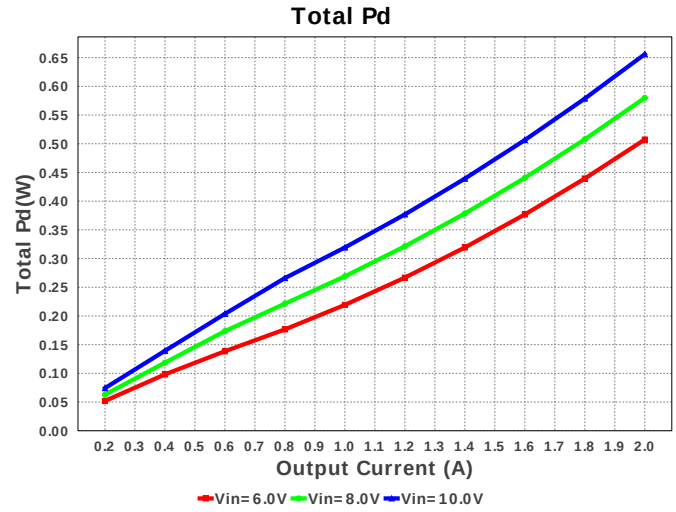


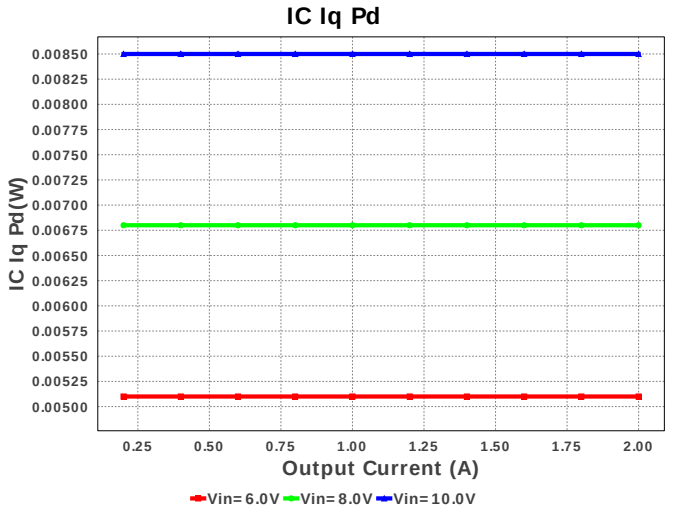
Pout

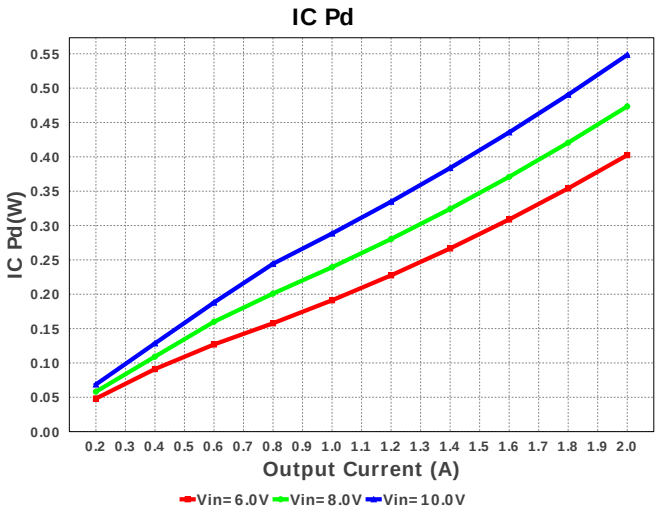


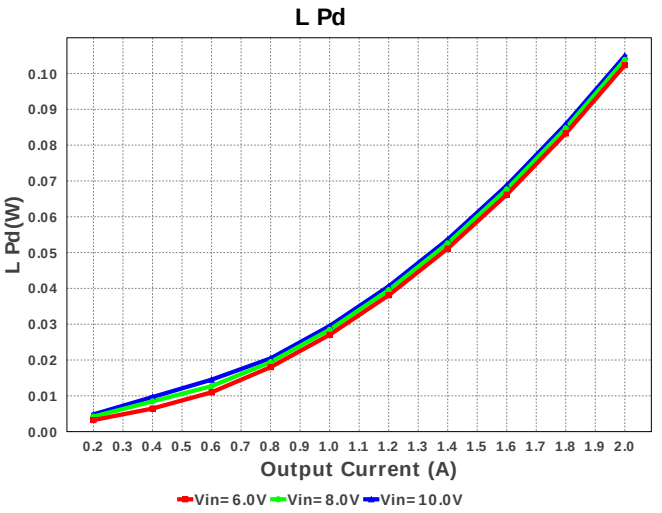


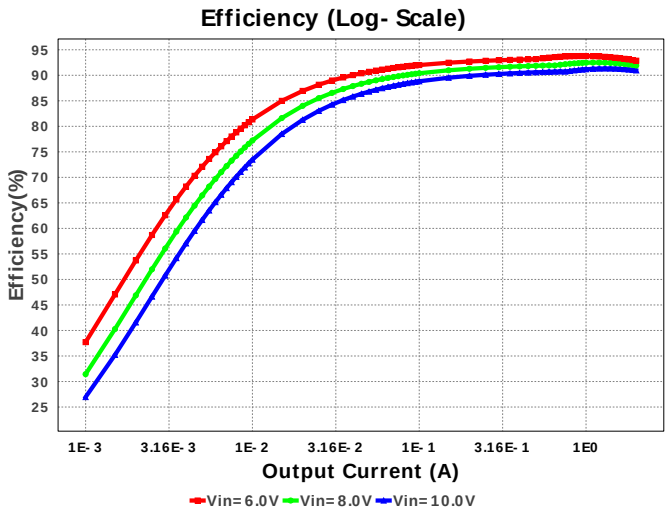












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	980.596 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	423.567 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	725.6 mA	Current	Average input current
4.	L Ipp	1.467 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	13	General	Total Design BOM count
6.	FootPrint	178.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	696.065 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	6.6 W	General	Total output power
10.	Total BOM	$1.98	General	Total BOM Cost
11.	Vout Actual	3.299 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
12.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	34.205 %	Op_point	Duty cycle
14.	Efficiency	90.959 %	Op_point	Steady state efficiency
15.	IC Tj	54.312 degC	Op_point	IC junction temperature
16.	ICThetaJA	26.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	VIN_OP	10.0 V	Op_point	Vin operating point
19.	Vout p-p	7.842 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	1.984 mW	Power	Input capacitor power dissipation
21.	Cout Pd	670.092 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	8.5 mW	Power	IC Iq Pd
23.	IC Pd	548.334 mW	Power	IC power dissipation
24.	L Pd	104.903 mW	Power	Inductor power dissipation
25.	Total Pd	656.015 mW	Power	Total Power Dissipation
26.	Vout Tolerance	3.41 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	10.0	Maximum input voltage
3.	VinMin	6.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54628	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	40.0	Ambient temperature

Design Assistance

1. **TPS54628** Product Folder : http://www.ti.com/product/TPS54628 : contains the data sheet and other resources.