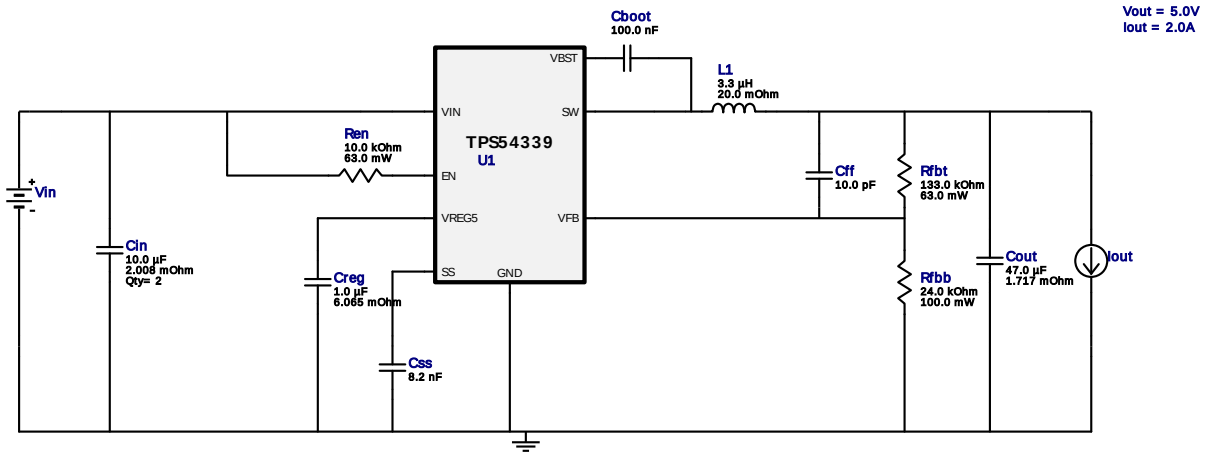
WEBENCH® Design Report

VinMin = 20.0V
VinMax = 22.0V
Vout = 5.0V
Iout = 2.0A

Device = TPS54339DDAR
Topology = Buck
Created = 8/10/16 11:13:36 PM
BOM Cost = $2.12
BOM Count = 12
Total Pd = 1.04W

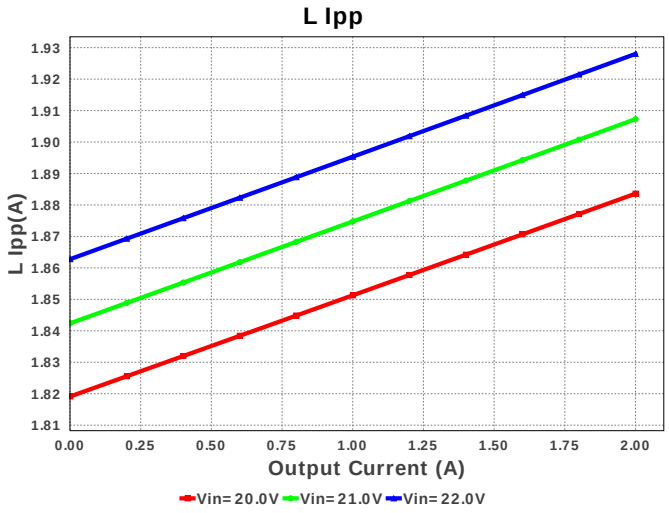
Design : 4765113/1 TPS54339DDAR
TPS54339DDAR 20.0V-22.0V to 5.00V @ 2.0A

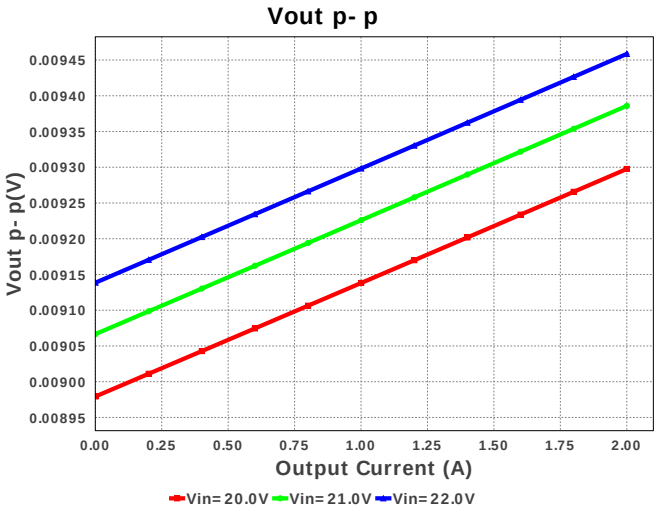


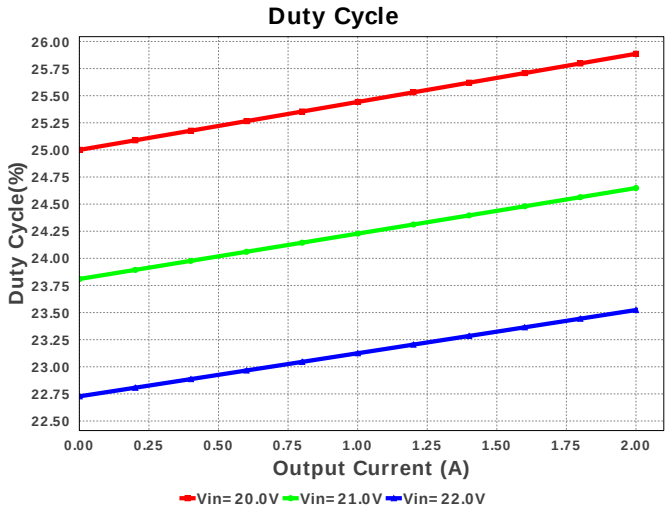
Electrical BOM

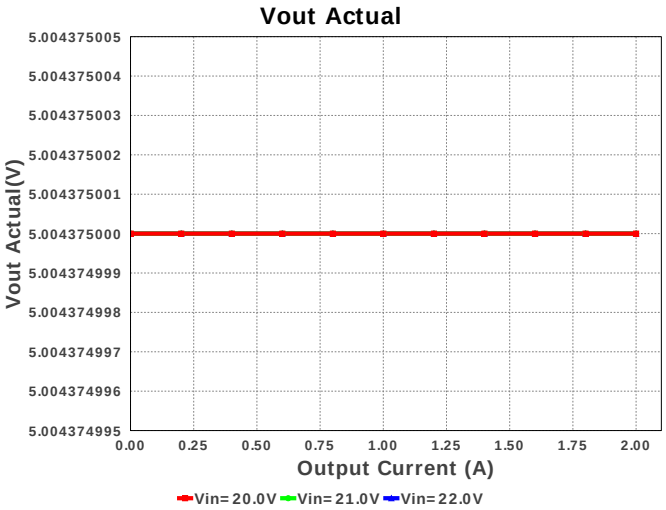
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	2	$0.22	1210_280 15 mm²
4.	Cout	TDK	C3216JB1A476M Series= JB	Cap= 47.0 uF ESR= 1.717 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.34	1206 11 mm²
5.	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
6.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
7.	L1	TDK	CLF7045T-3R3N	L= 3.3 µH DCR= 20.0 mOhm	1	$0.42	CLF7045 86 mm²
8.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Yageo America	RC0603FR-0724KL Series= ?	Res= 24.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
10.	Rfbt	Vishay-Dale	CRCW0402133KFKED Series= CRCW..e3	Res= 133.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54339DDAR	Switcher	1	$0.85	DDA0008E 57 mm^2

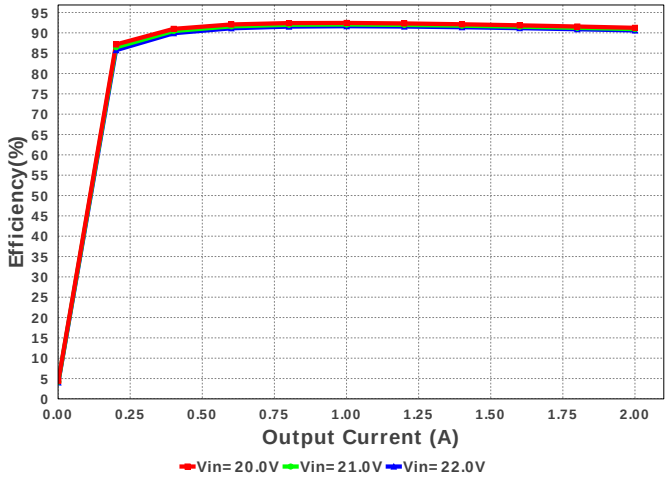




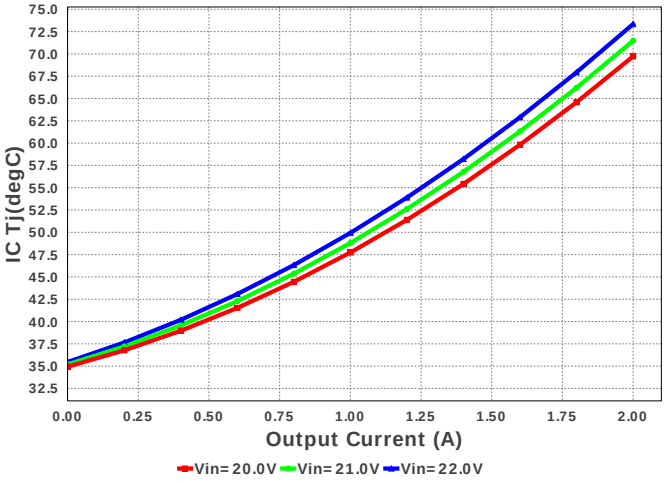




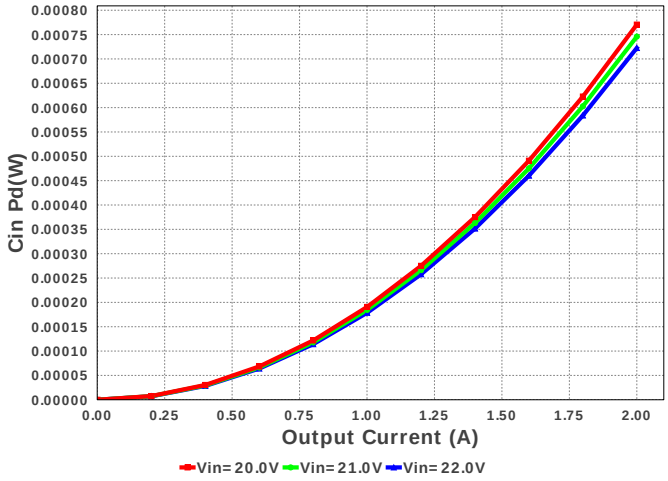
Efficiency



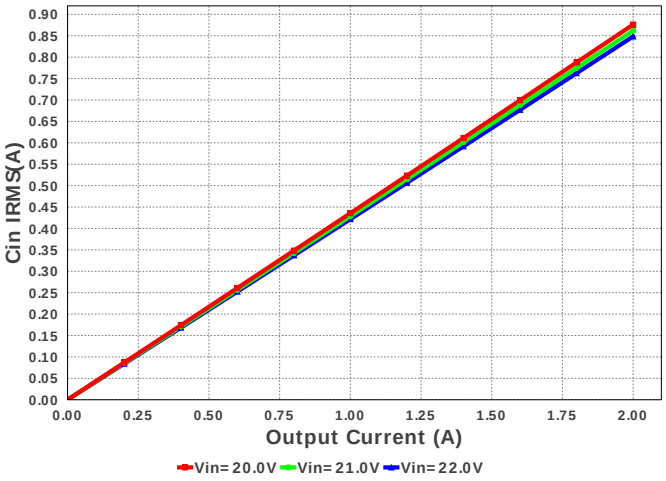
IC Tj



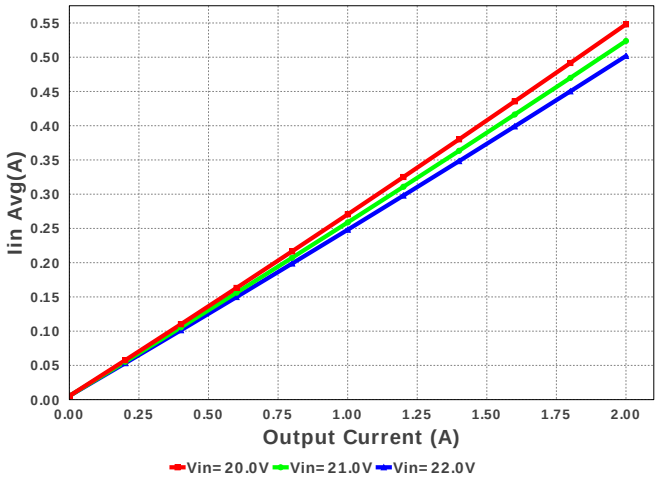
Cin Pd



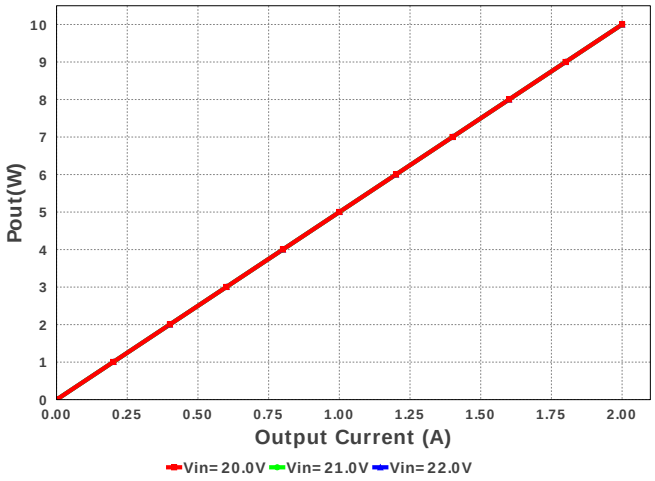
Cin IRMS

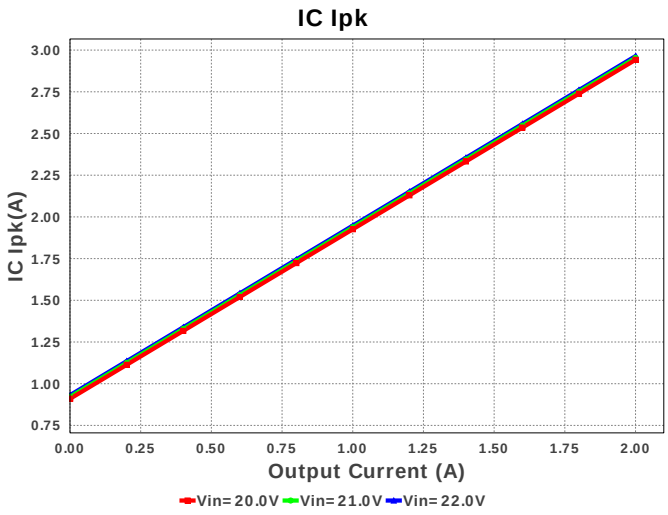


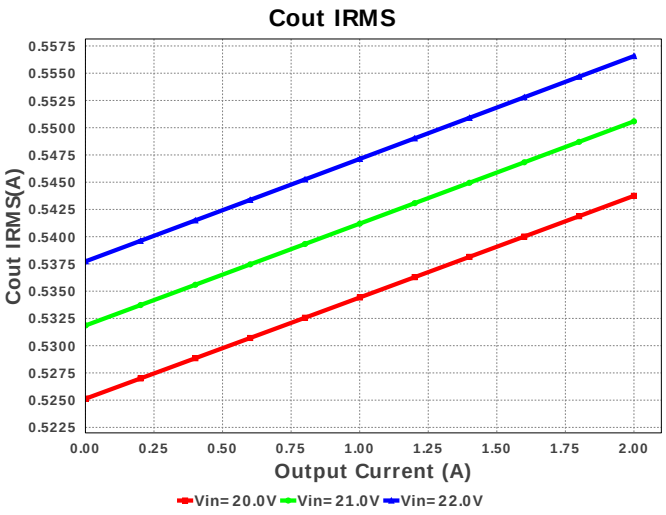
Iin Avg

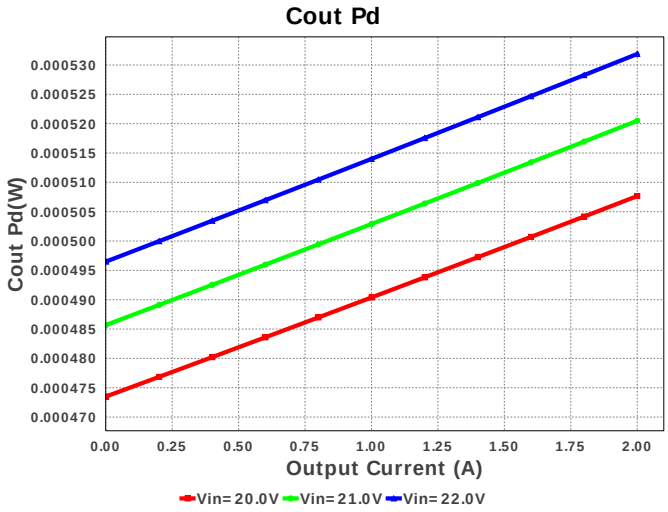


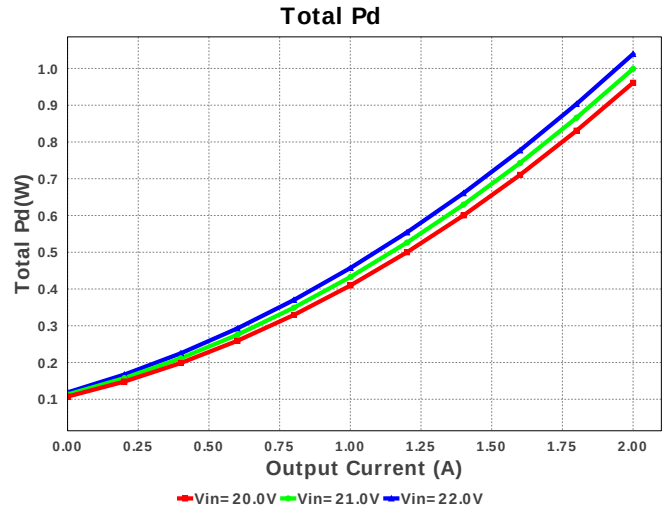
Pout

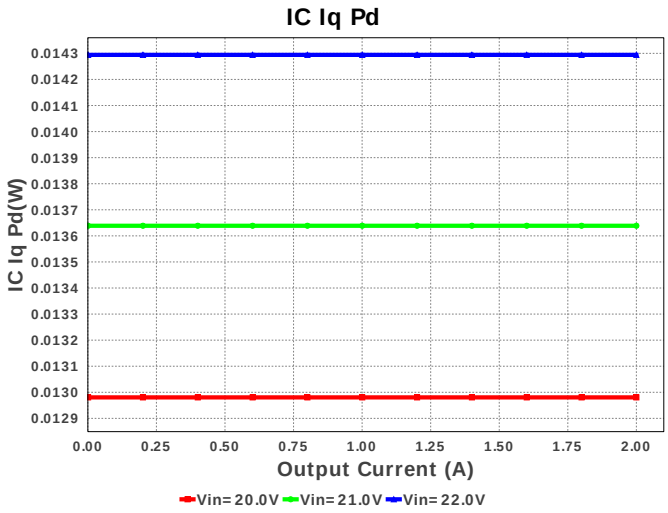


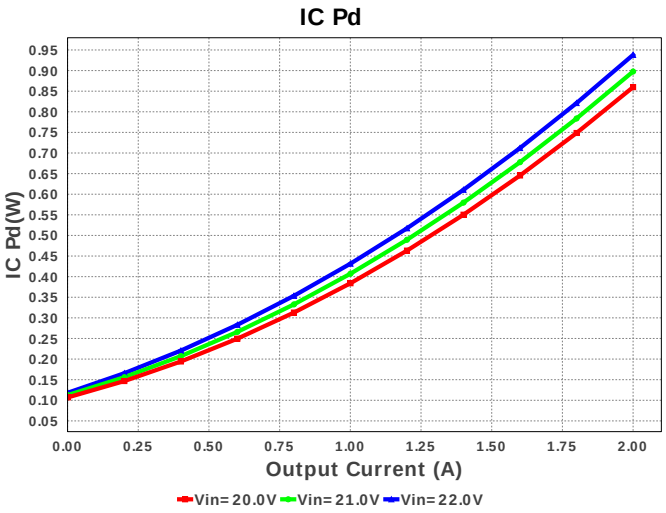


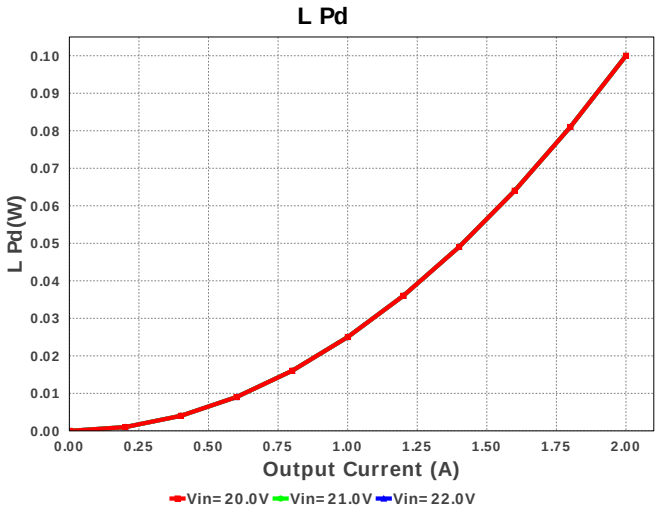












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	848.291 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	556.57 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.964 A	Current	Peak switch current in IC
4.	Iin Avg	501.79 mA	Current	Average input current
5.	L Ipp	1.928 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	210.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	628.53 kHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	10.0 W	General	Total output power
11.	Total BOM	$2.12	General	Total BOM Cost
12.	Vout Actual	5.004 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
14.	Duty Cycle	23.523 %	Op_point	Duty cycle
15.	Efficiency	90.585 %	Op_point	Steady state efficiency
16.	IC Tj	73.34 degC	Op_point	IC junction temperature
17.	ICThetaJA	46.2 degC/W	Op_point	IC junction-to-ambient thermal resistance
18.	IOUT_OP	2.0 A	Op_point	Iout operating point
19.	VIN_OP	22.0 V	Op_point	Vin operating point
20.	Vout p-p	9.459 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	722.475 µW	Power	Input capacitor power dissipation
22.	Cout Pd	531.875 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	14.294 mW	Power	IC Iq Pd
24.	IC Pd	938.106 mW	Power	IC power dissipation
25.	L Pd	100.0 mW	Power	Inductor power dissipation
26.	Total Pd	1.039 W	Power	Total Power Dissipation
27.	Vout Tolerance	3.573 %		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	22.0	Maximum input voltage
3.	VinMin	20.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54339	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54339** Product Folder : http://www.ti.com/product/TPS54339 : contains the data sheet and other resources.