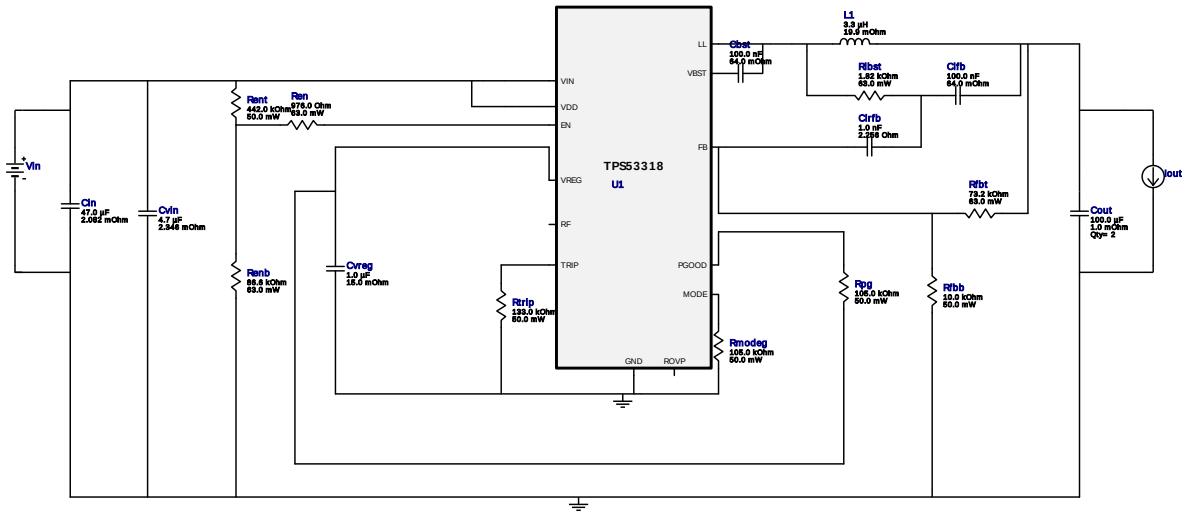
VinMin = 8.0V
VinMax = 22.0V
Vout = 5.2V
Iout = 8.0A

Device = TPS53318DQPR
Topology = Buck
Created = 2018-08-16 07:54:59.615
BOM Cost = $5.51
BOM Count = 19
Total Pd = 3.16W

WEBENCH® Design Report

Design : TPS53318DQPR
TPS53318DQPR 8.0V-22.0V to 5.20V @ 8.0A



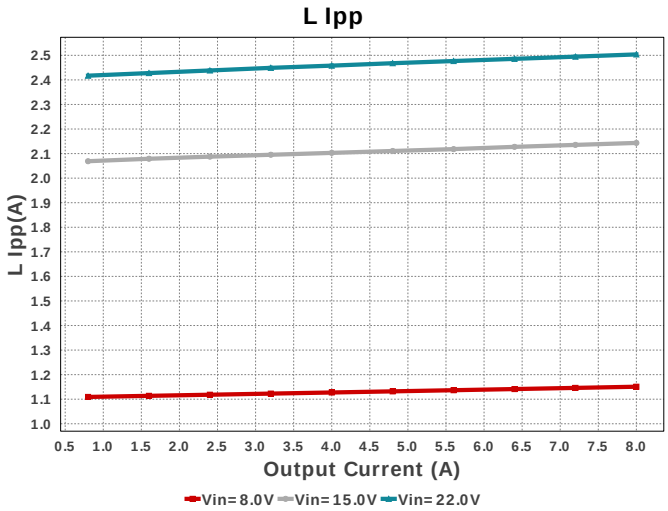
My Comments

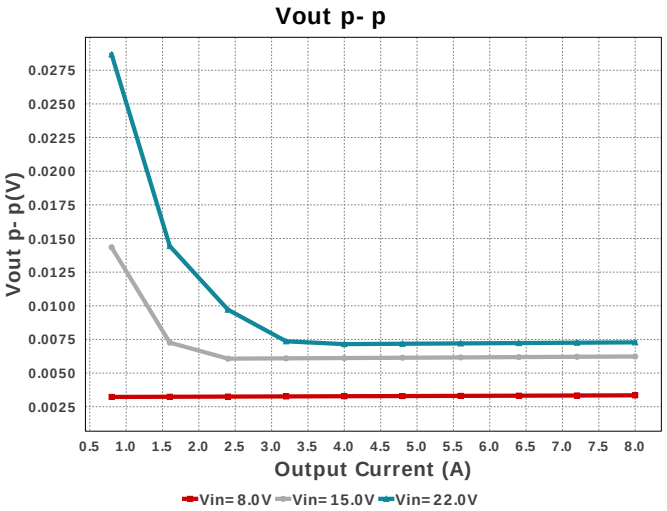
No comments

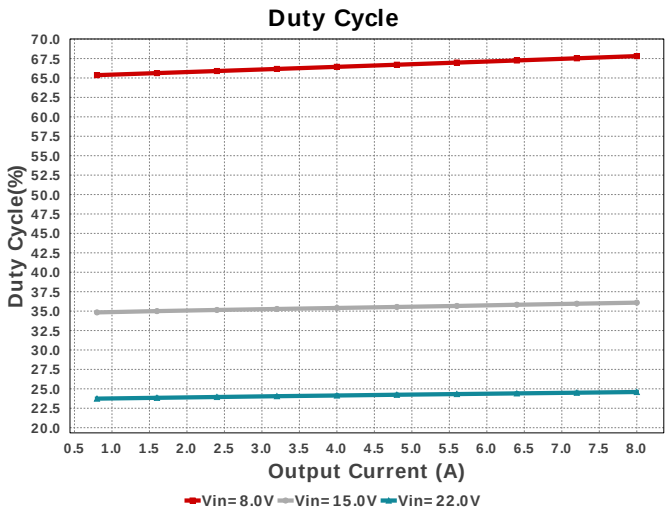
Electrical BOM

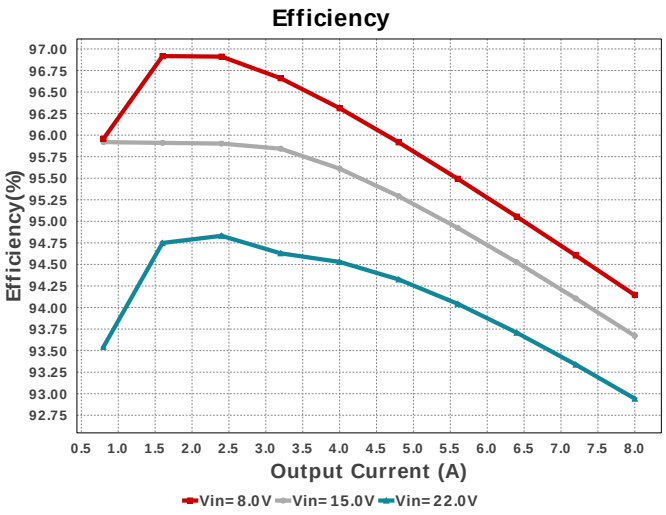
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	1	$0.44	1206 11 mm²
3.	Clfb	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
4.	Clrfb	TDK	CGA2B2X7R1H102K050BA Series= X7R	Cap= 1.0 nF ESR= 2.25564 Ohm VDC= 50.0 V IRMS= 280.466 mA	1	$0.01	0402 3 mm²
5.	Cout	MuRata	GRM32ER60J107ME20L Series= X5R	Cap= 100.0 uF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 6.0 A	2	$0.54	1210_270 15 mm²
6.	Cvin	TDK	C2012X7R1V475K125AC Series= X7R	Cap= 4.7 uF ESR= 2.346 mOhm VDC= 35.0 V IRMS= 4.2602 A	1	$0.20	0805 7 mm²
7.	Cvreg	Kemet	C0805C105K4RACTU Series= X7R	Cap= 1.0 uF ESR= 15.0 mOhm VDC= 16.0 V IRMS= 8.19 A	1	$0.02	0805 7 mm²

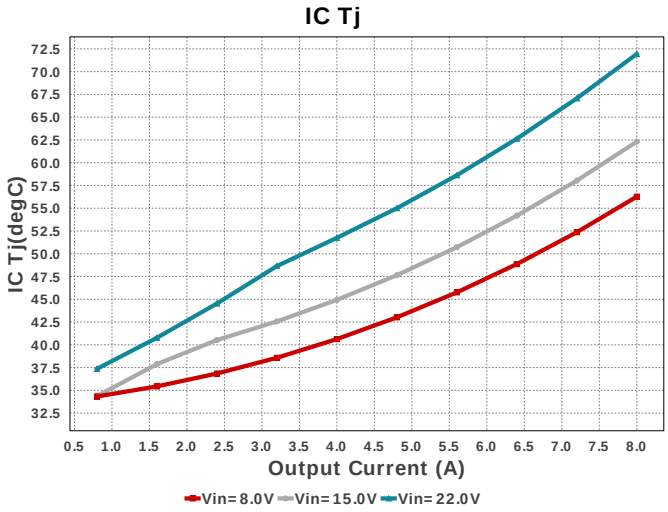
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	L1	Coilcraft	XAL6030-332MEB	L= 3.3 µH DCR= 19.9 mOhm	1	$0.65	XAL6030 72 mm²
9.	Ren	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Renb	Yageo	AC0402FR-0786K6L Series= ?	Res= 86.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rent	Yageo	RC0201FR-07442KL Series= ?	Res= 442.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
12.	Rfbb	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
13.	Rfbt	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
14.	Rlbst	Vishay-Dale	CRCW04021K82FKED Series= CRCW..e3	Res= 1.82 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
15.	Rmodeg	Yageo	RC0201FR-07105KL Series= ?	Res= 105.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
16.	Rpg	Yageo	RC0201FR-07105KL Series= ?	Res= 105.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
17.	Rtrip	Yageo	RC0201FR-07133KL Series= ?	Res= 133.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
18.	U1	Texas Instruments	TPS53318DQPR	Switcher	1	$3.00	DQP0022A 56 mm²

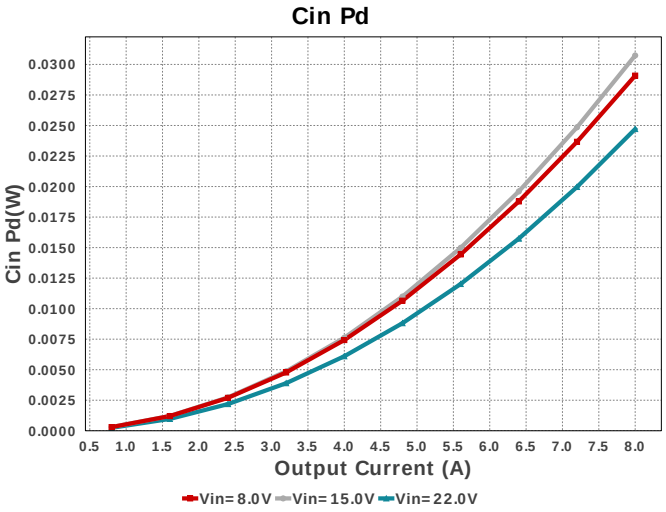


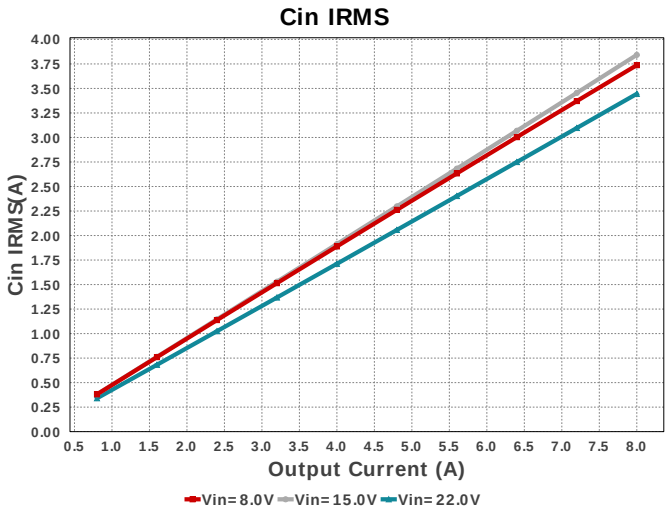


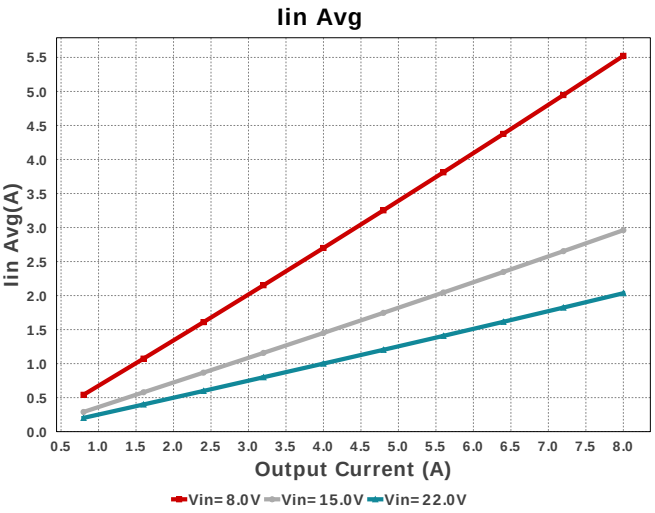




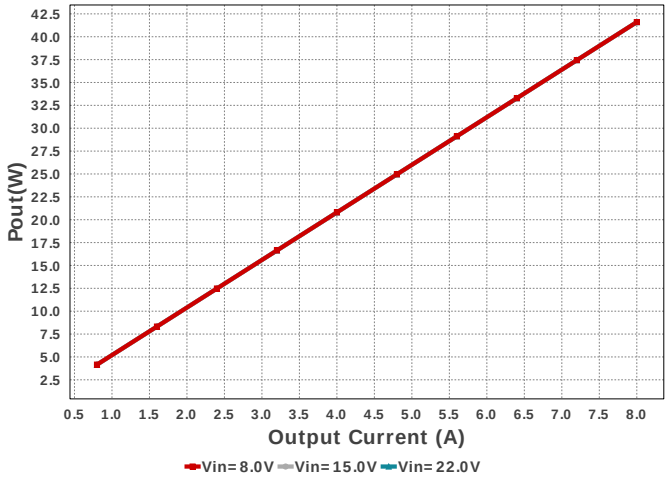




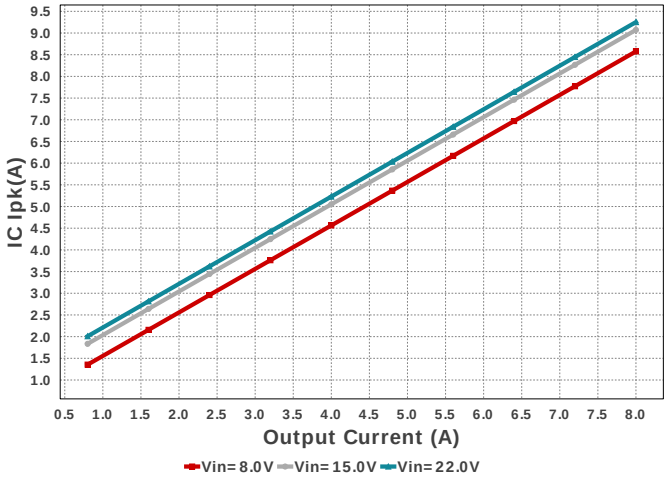




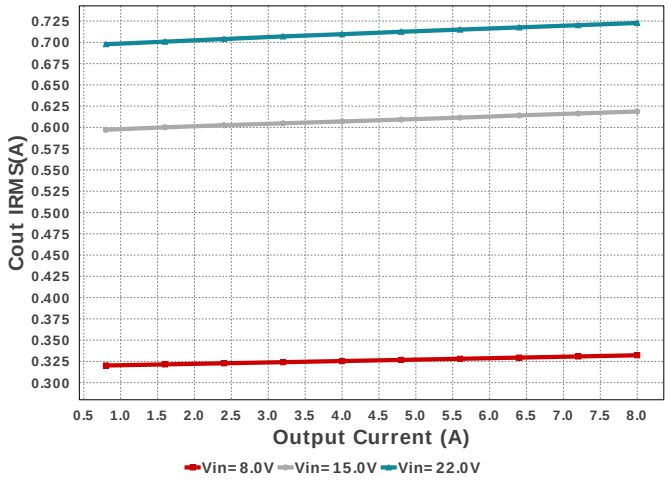
Pout



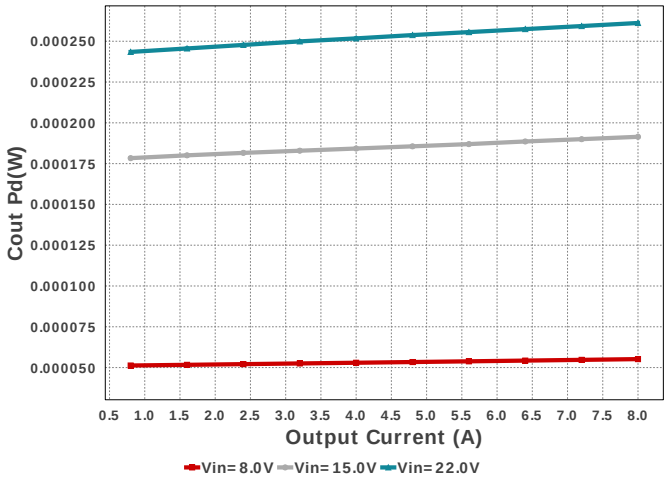
IC Ipk



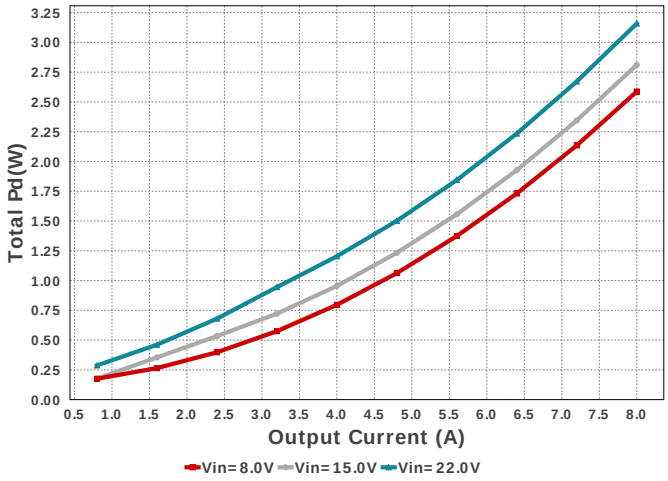
Cout IRMS



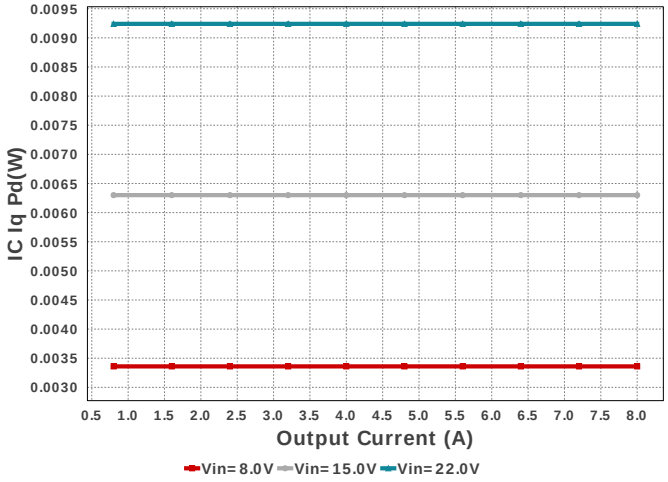
Cout Pd

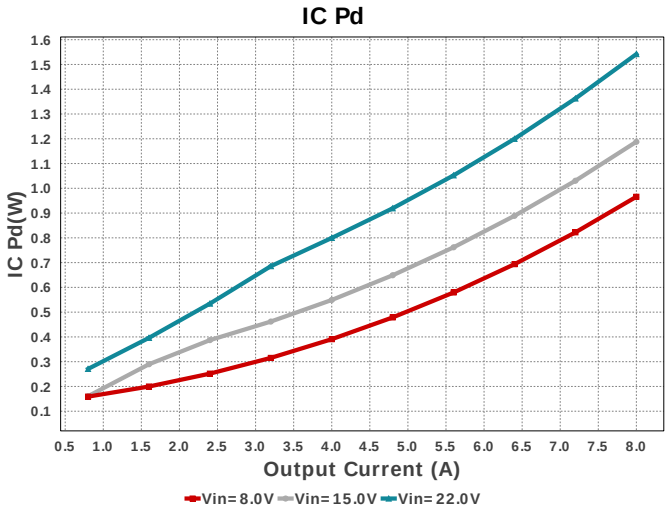


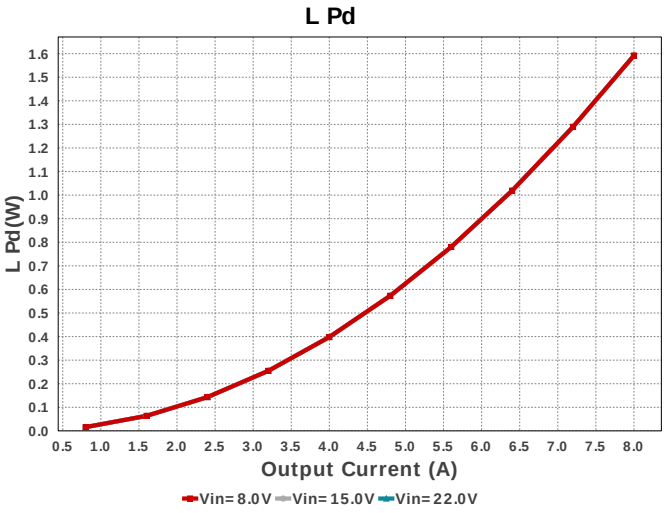
Total Pd



IC Iq Pd







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	3.445 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	722.765 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	9.252 A	Current	Peak switch current in IC
4.	Iin Avg	2.034 A	Current	Average input current
5.	L Ipp	2.504 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	19	General	Total Design BOM count
7.	FootPrint	206.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	500.0 kHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	41.6 W	General	Total output power
11.	Total BOM	$5.51	General	Total BOM Cost
12.	Duty Cycle	24.59 %	Op Point	Duty cycle
13.	Efficiency	92.942 %	Op Point	Steady state efficiency
14.	IC Tj	71.938 degC	Op Point	IC junction temperature
15.	ICThetaJA	27.2 degC/W	Op Point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	8.0 A	Op Point	Iout operating point
17.	VIN_OP	22.0 V	Op Point	Vin operating point
18.	Vout Actual	4.992 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
19.	Vout OP	5.2 V	Op Point	Operational Output Voltage
20.	Vout Tolerance	2.795 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
21.	Vout p-p	14.566 mV	Op Point	Peak-to-peak output ripple voltage
22.	Cin Pd	24.709 mW	Power	Input capacitor power dissipation
23.	Cout Pd	522.39 µW	Power	Output capacitor power dissipation
24.	IC Iq Pd	9.24 mW	Power	IC Iq Pd
25.	IC Pd	1.542 W	Power	IC power dissipation
26.	L Pd	1.592 W	Power	Inductor power dissipation
27.	Total Pd	3.159 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	8.0	Maximum Output Current
2.	VinMax	22.0	Maximum input voltage
3.	VinMin	8.0	Minimum input voltage
4.	Vout	5.2	Output Voltage
5.	base_pn	TPS53318	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS53318** Product Folder : http://www.ti.com/product/TPS53318 : contains the data sheet and other resources.