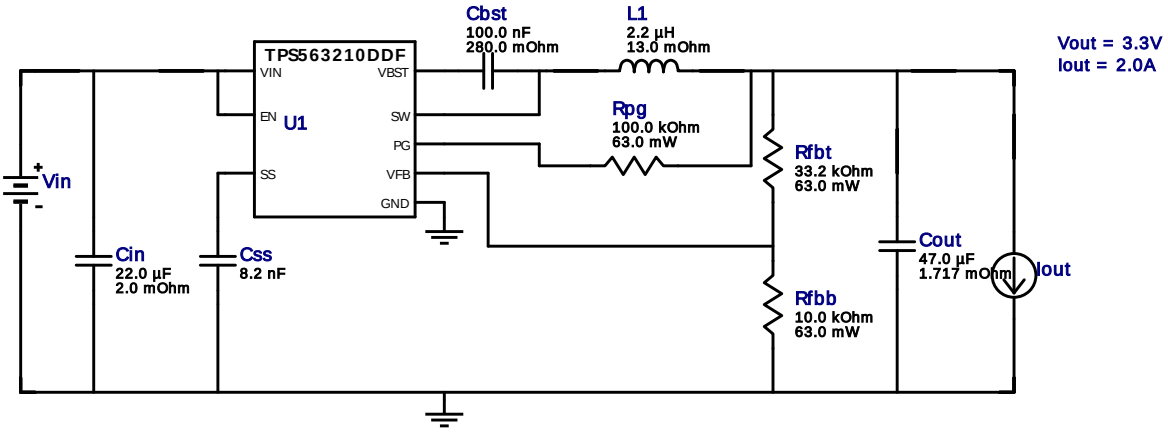
WEBENCH® Design Report

VinMin = 5.0V
VinMax = 16.0V
Vout = 3.3V
Iout = 2.0A

Device = TPS563210DDFR
Topology = Buck
Created = 8/11/16 5:09:51 AM
BOM Cost = $1.67
BOM Count = 9
Total Pd = 0.59W

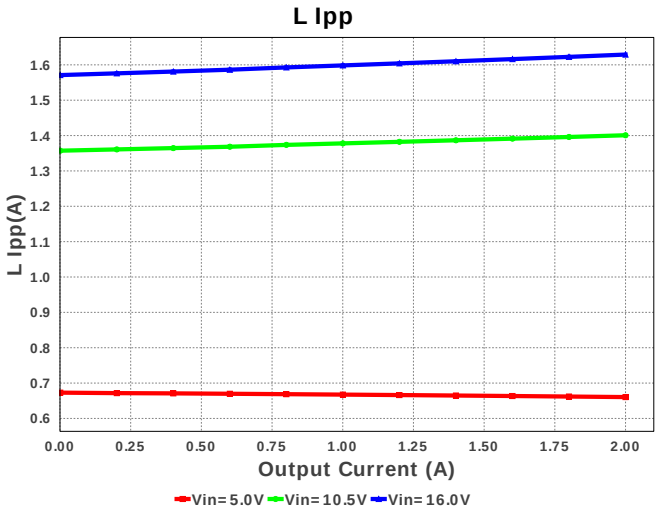
Design : 4085315/3 TPS563210DDFR
Design 2 from 790403042@qq.com

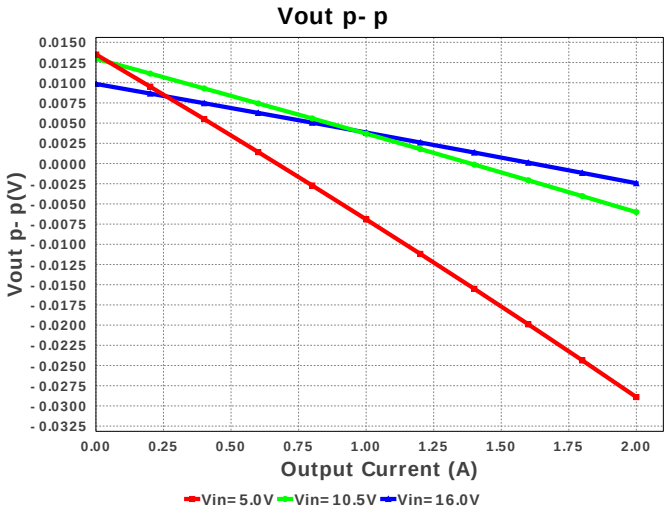


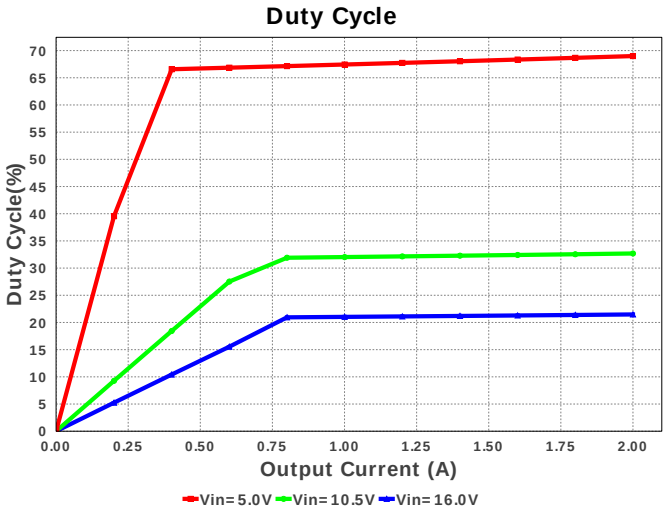
Electrical BOM

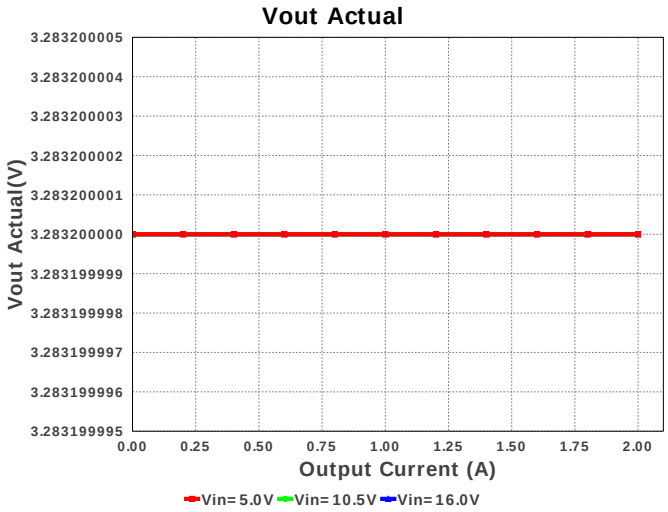
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm²
3.	Cout	TDK	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
4.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
5.	L1	Bourns	SRN8040-2R2Y	L= 2.2 µH DCR= 13.0 mOhm	1	$0.22	SRN8040 100 mm²
6.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW040233K2FKED Series= CRCW..e3	Res= 33.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	TPS563210DDFR	Switcher	1	$0.90	DDF0008A 10 mm²

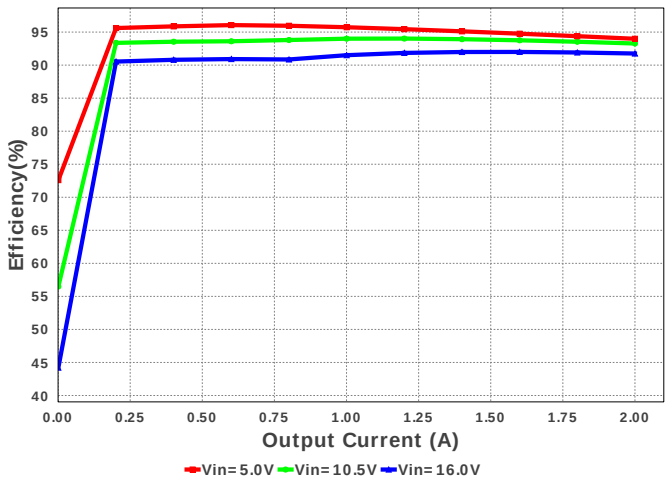




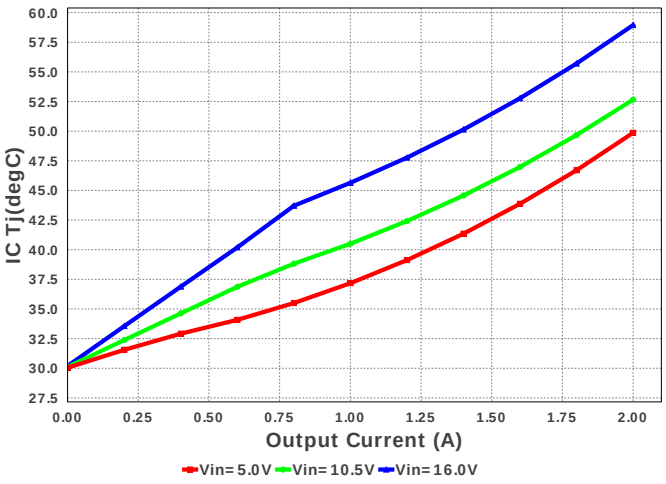




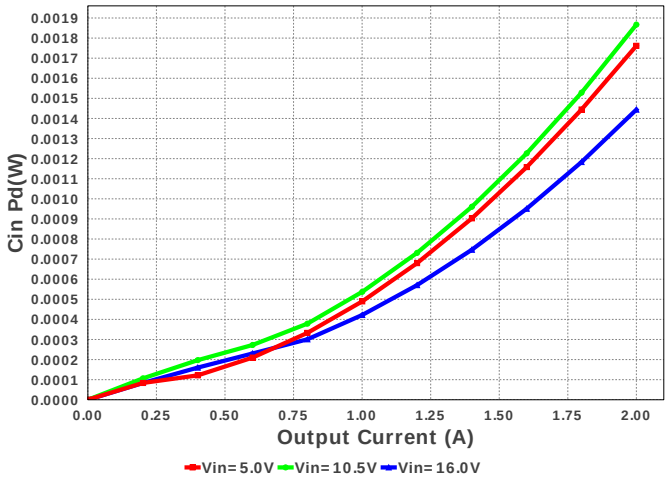
Efficiency



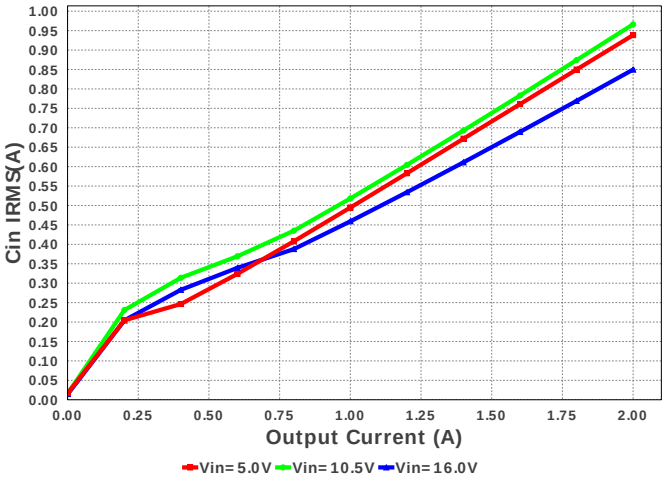
IC Tj



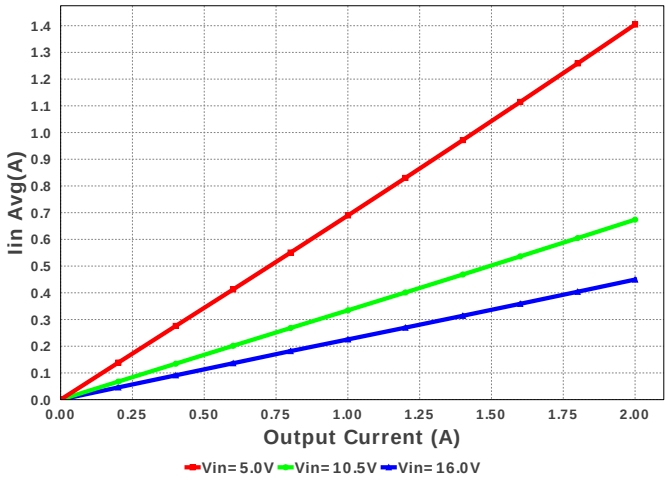
Cin Pd



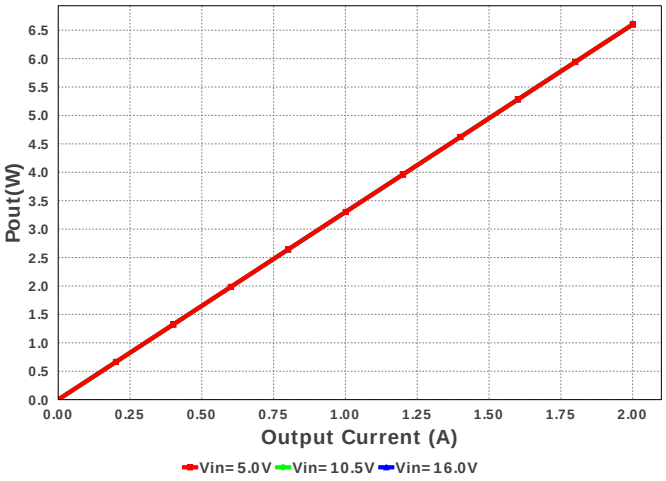
Cin IRMS

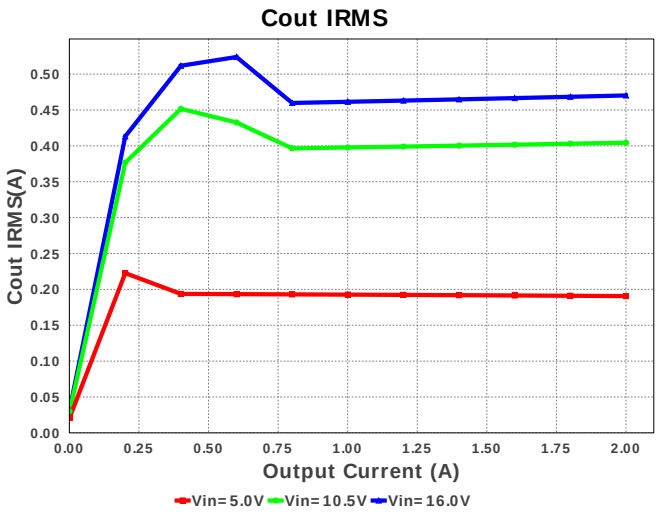


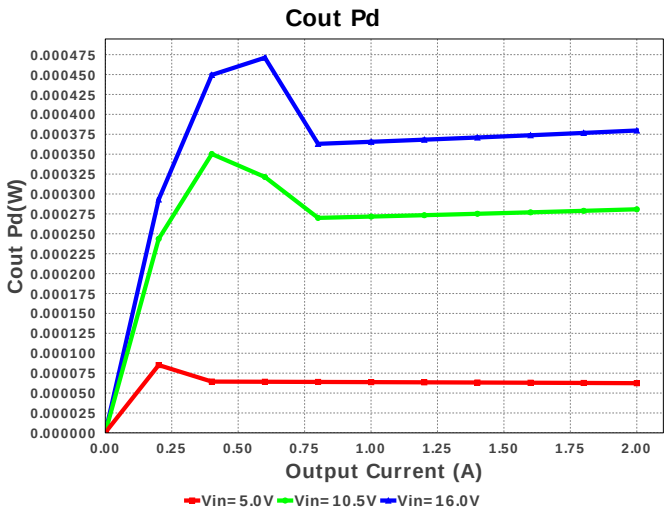
Iin Avg

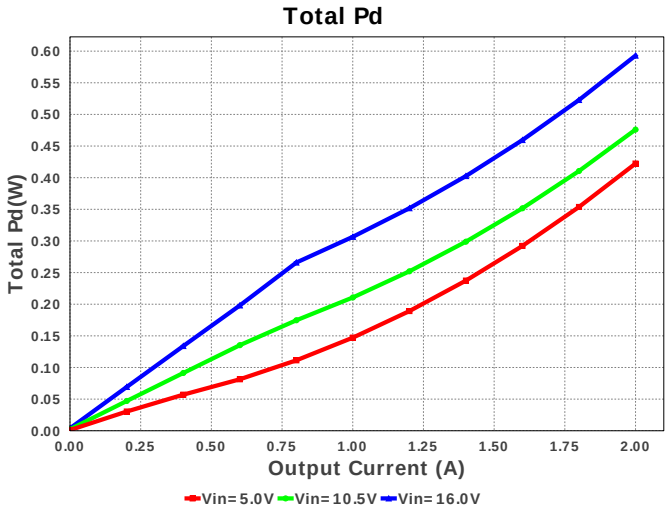


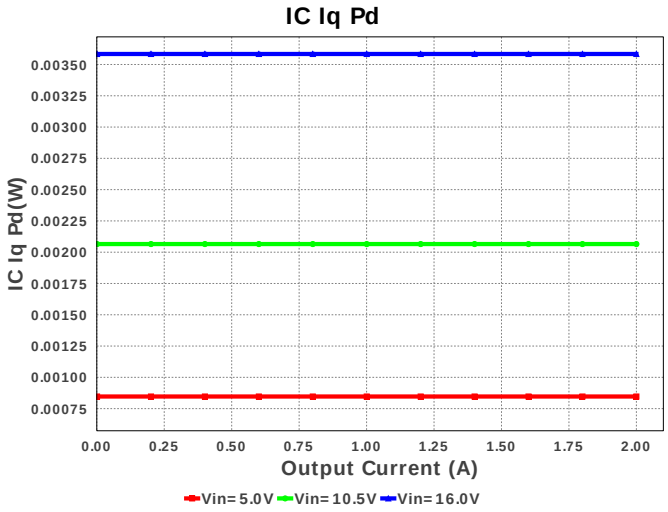
Pout

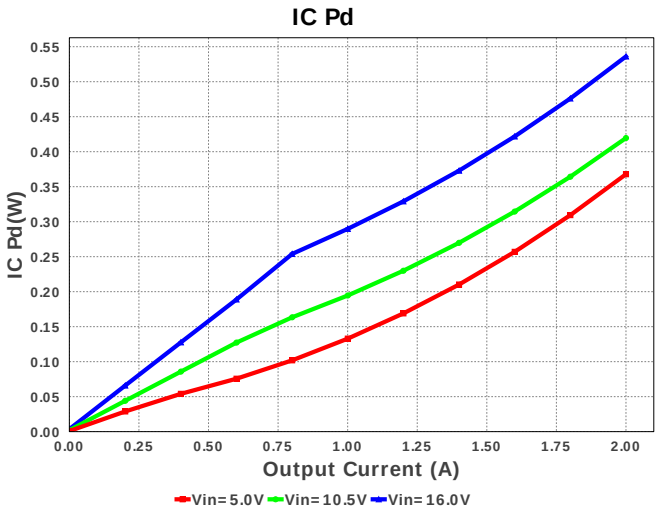


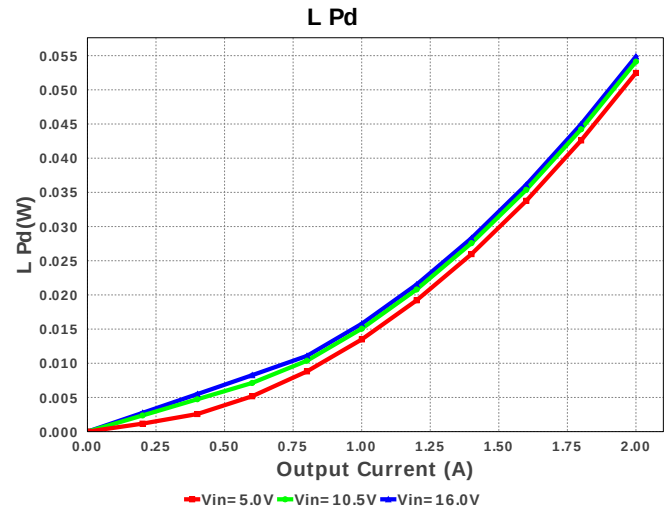


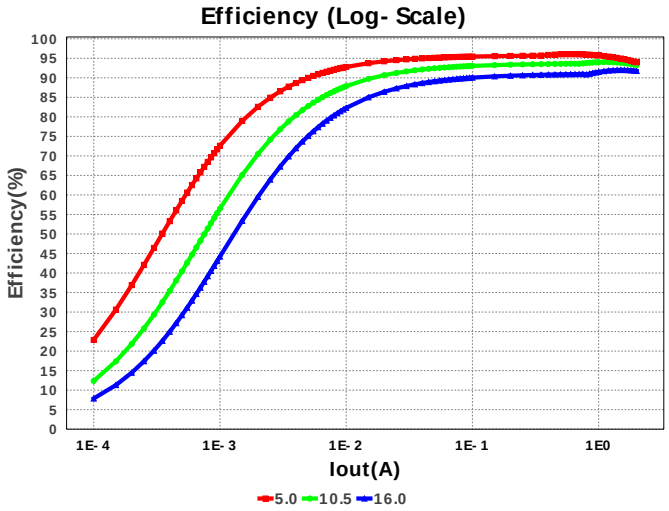












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	849.719 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	470.276 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	449.56 mA	Current	Average input current
4.	L Ipp	1.629 A	Current	Peak-to-peak inductor ripple current
5.	BOM Count	9	General	Total Design BOM count
6.	FootPrint	154.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	753.085 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	6.6 W	General	Total output power
10.	Total BOM	$1.67	General	Total BOM Cost
11.	Vout Actual	3.283 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	21.475 %	Op_point	Duty cycle
14.	Efficiency	91.756 %	Op_point	Steady state efficiency
15.	IC Tj	58.947 degC	Op_point	IC junction temperature
16.	ICThetaJA	54.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	VIN_OP	16.0 V	Op_point	Vin operating point
19.	Vout p-p	6.697 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	1.444 mW	Power	Input capacitor power dissipation
21.	Cout Pd	379.73 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	3.584 mW	Power	IC Iq Pd
23.	IC Pd	536.047 mW	Power	IC power dissipation
24.	L Pd	54.875 mW	Power	Inductor power dissipation
25.	Total Pd	592.988 mW	Power	Total Power Dissipation
26.	Vout Tolerance	2.889 %		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	16.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS563210	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS563210** Product Folder : http://www.ti.com/product/TPS563210 : contains the data sheet and other resources.