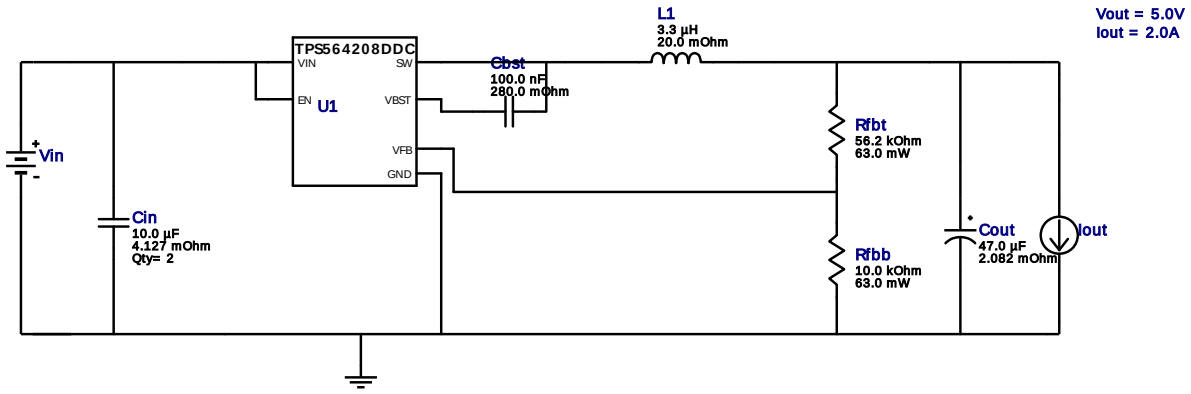
WEBENCH® Design Report

VinMin = 7.0V
VinMax = 11.0V
Vout = 5.0V
Iout = 2.0A

Device = TPS564208DDCR
Topology = Buck
Created = 11/15/16 2:57:29 PM
BOM Cost = $1.35
BOM Count = 8
Total Pd = 0.59W

Design : 4584502/35 TPS564208DDCR
TPS564208DDCR 7.0V-11.0V to 5.00V @ 2.0A



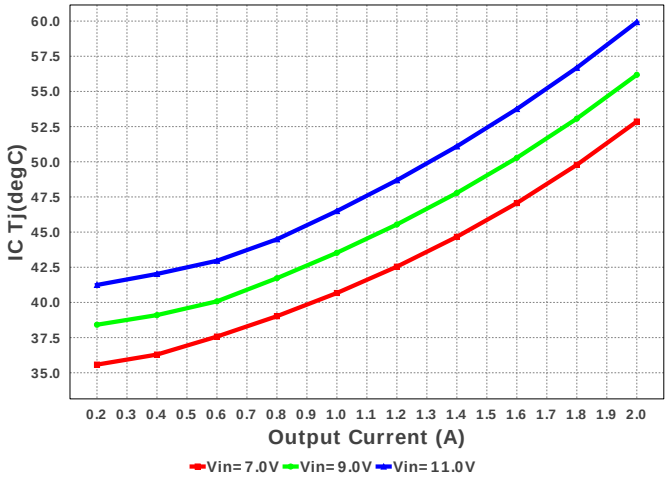
My Comments

No comments

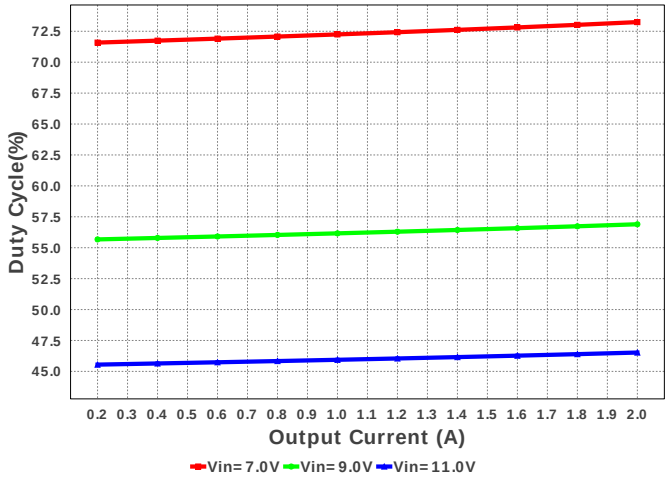
Electrical BOM

#	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	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
3.	Cout	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	1	$0.35	1206 11 mm²
4.	L1	Bourns	SRR6038-3R3Y	L= 3.3 µH DCR= 20.0 mOhm	1	$0.26	SRR6038 77 mm²
5.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	Rfbt	Vishay-Dale	CRCW040256K2FKED Series= CRCW..e3	Res= 56.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	U1	Texas Instruments	TPS564208DDCR	Switcher	1	$0.65	DDC0006A_N 10 mm²

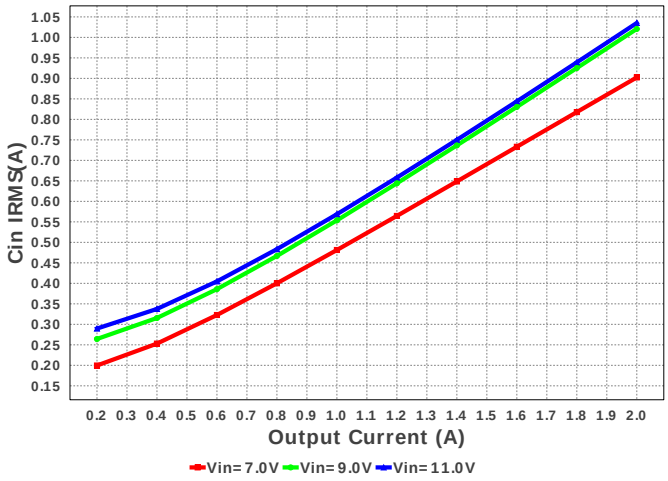
IC Tj



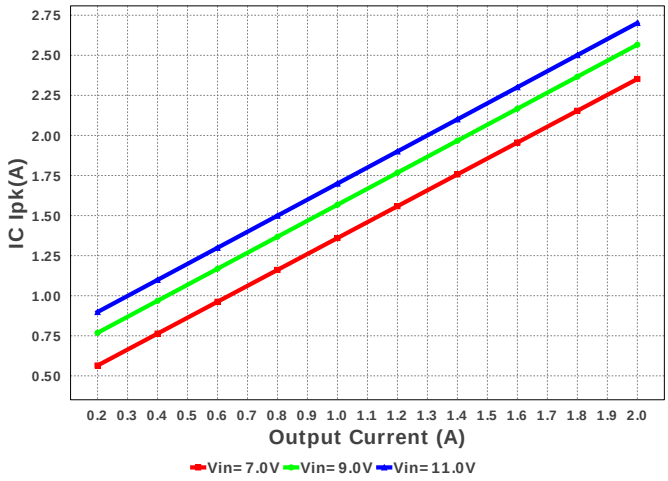
Duty Cycle



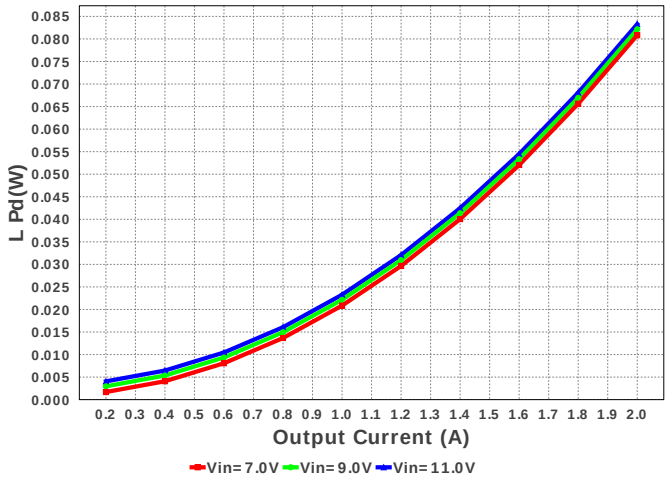
Cin IRMS



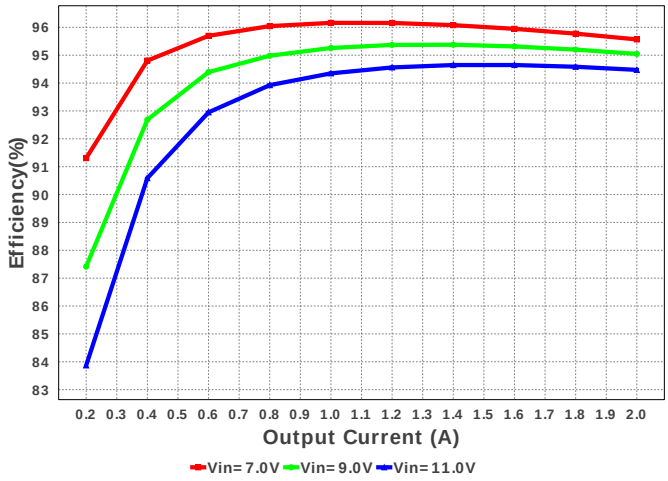
IC Ipk

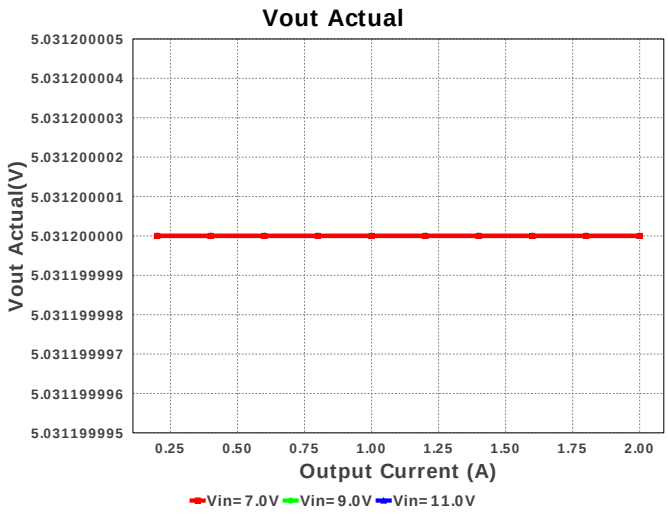


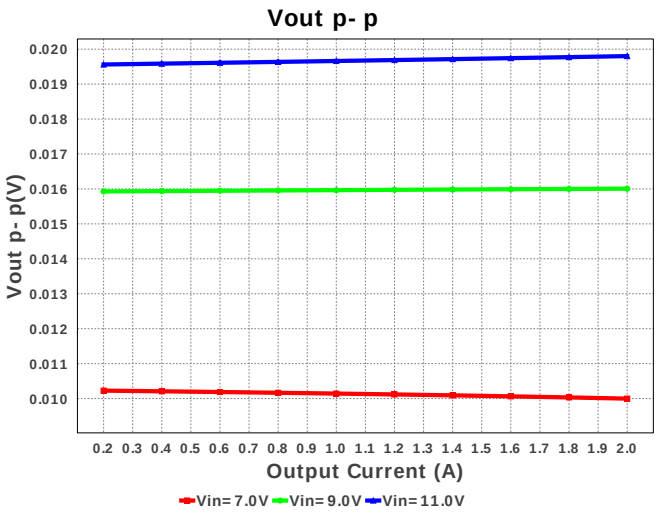
L Pd

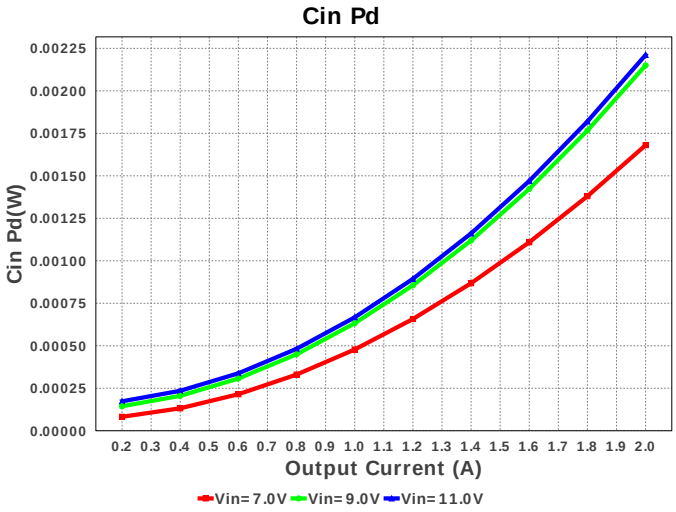


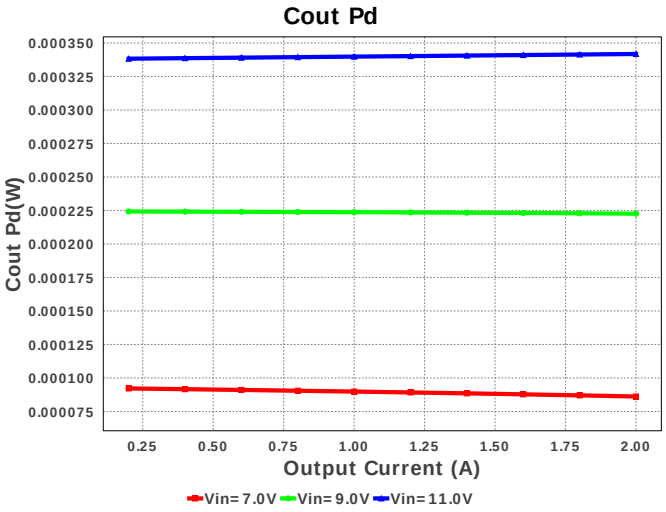
Efficiency

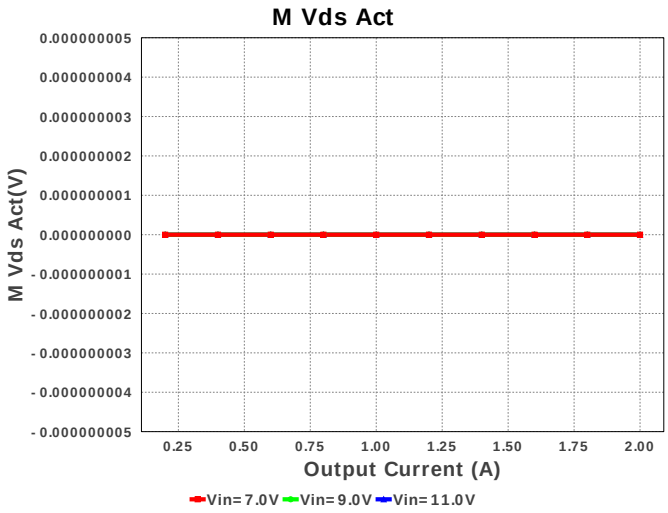


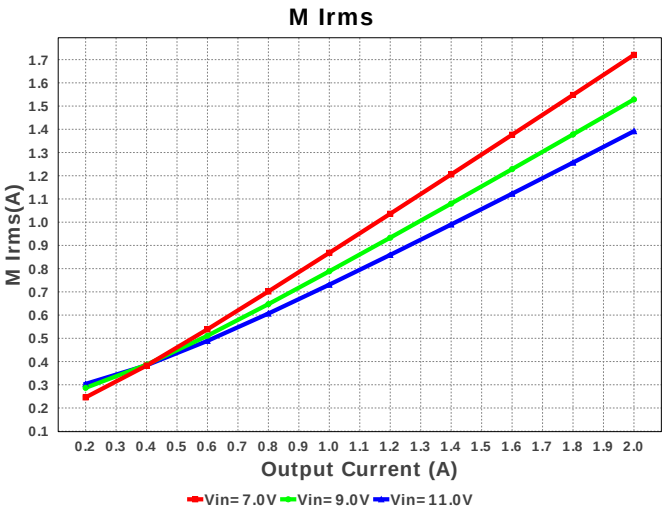


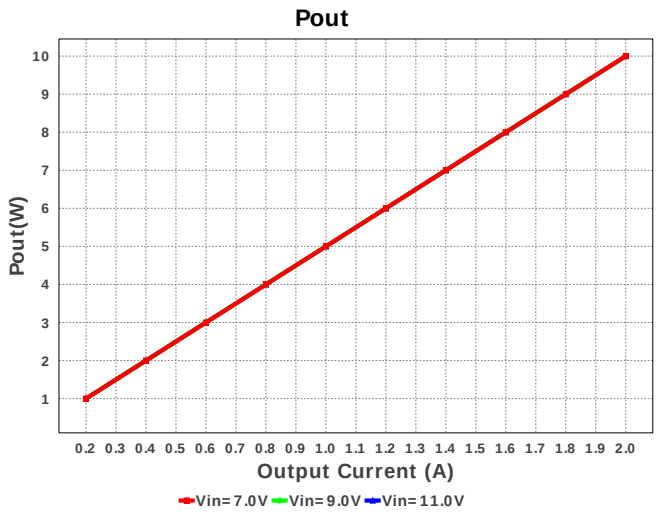


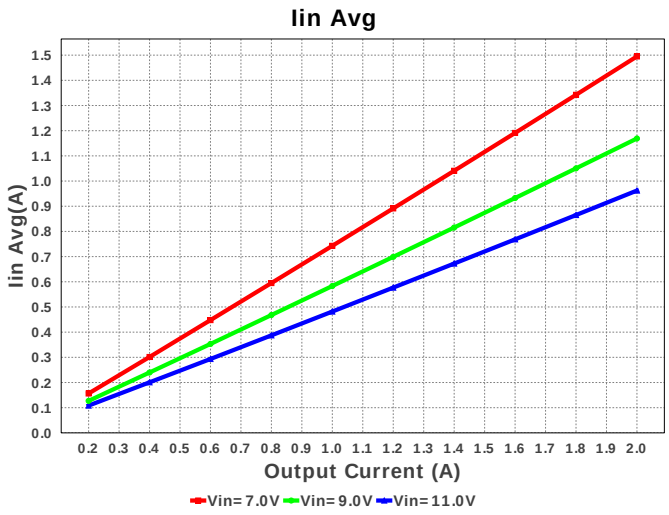


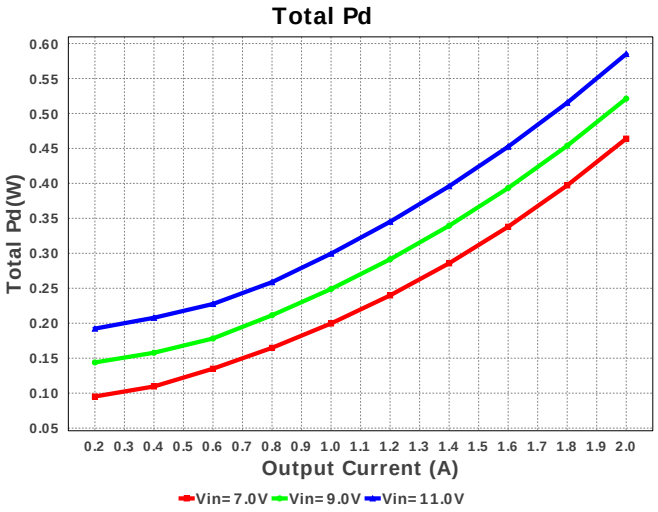


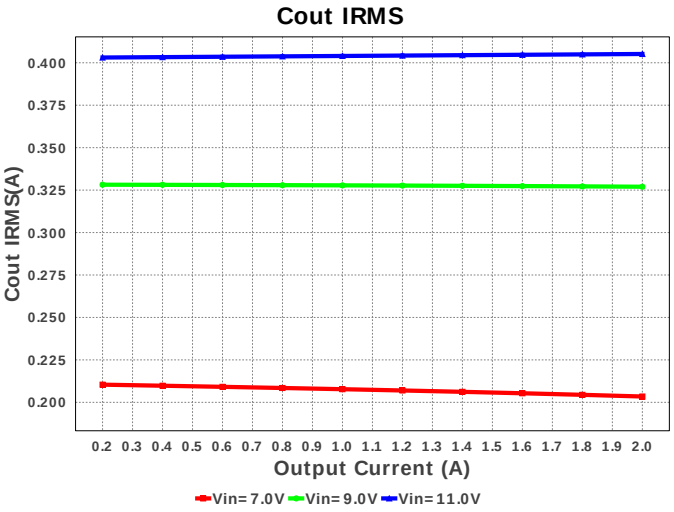


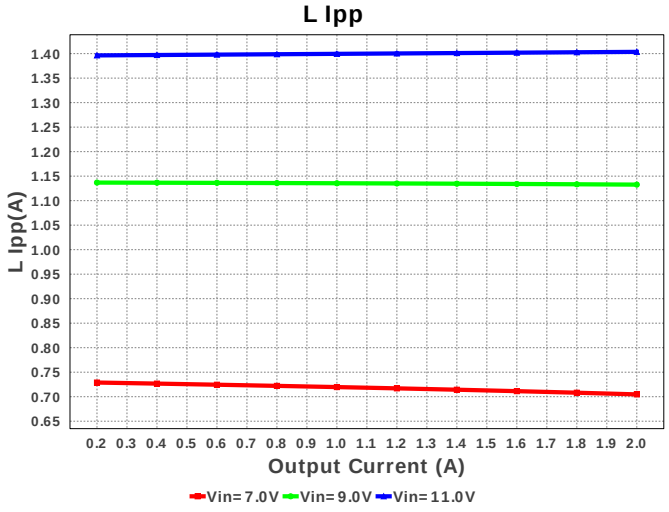


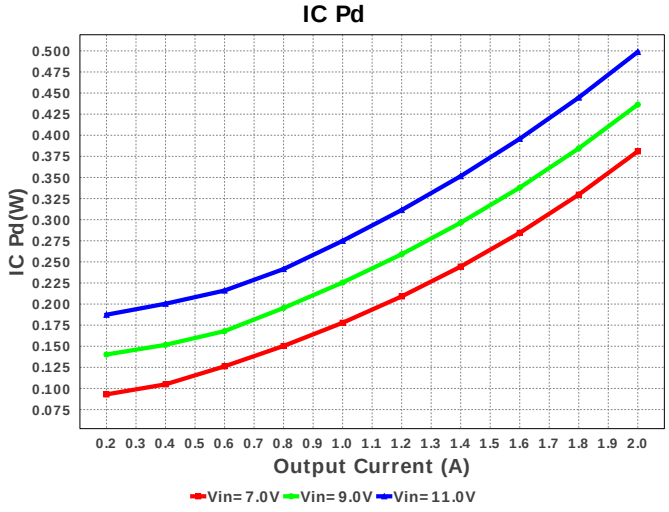












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.035 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	405.171 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.702 A	Current	Peak switch current in IC
4.	Iin Avg	962.28 mA	Current	Average input current
5.	L Ipp	1.404 A	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.392 A	Current	Q Iavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	125.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	587.577 kHz	General	Switching frequency
10.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	0.0 V	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	10.0 W	General	Total output power
14.	Total BOM	$1.35	General	Total BOM Cost
15.	Vout Actual	5.031 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
17.	Duty Cycle	46.523 %	Op_point	Duty cycle
18.	Efficiency	94.473 %	Op_point	Steady state efficiency
19.	IC Tj	59.929 degC	Op_point	IC junction temperature
20.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	2.0 A	Op_point	Iout operating point
22.	VIN_OP	11.0 V	Op_point	Vin operating point
23.	Vout p-p	19.802 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	2.211 mW	Power	Input capacitor power dissipation
25.	Cout Pd	341.789 µW	Power	Output capacitor power dissipation
26.	IC Pd	498.812 mW	Power	IC power dissipation
27.	L Pd	83.283 mW	Power	Inductor power dissipation
28.	Total Pd	585.037 mW	Power	Total Power Dissipation
29.	Vout Tolerance	3.053 %		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	11.0	Maximum input voltage
3.	VinMin	7.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS564208	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS564208** Product Folder : http://www.ti.com/product/TPS564208 : contains the data sheet and other resources.