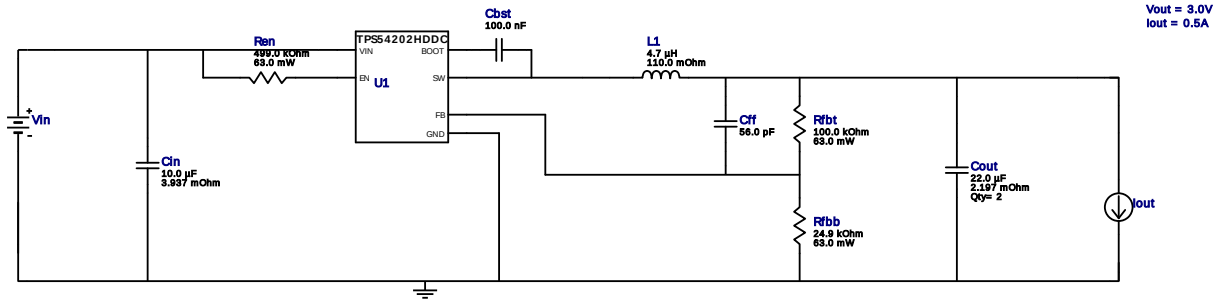
VinMin = 4.5V
VinMax = 5.5V
Vout = 3.0V
Iout = 0.5A

Device = TPS54202HDDCR
Topology = Buck
Created = 7/19/16 5:49:20 AM
BOM Cost = $1.70
BOM Count = 10
Total Pd = 0.12W

WEBENCH® Design Report

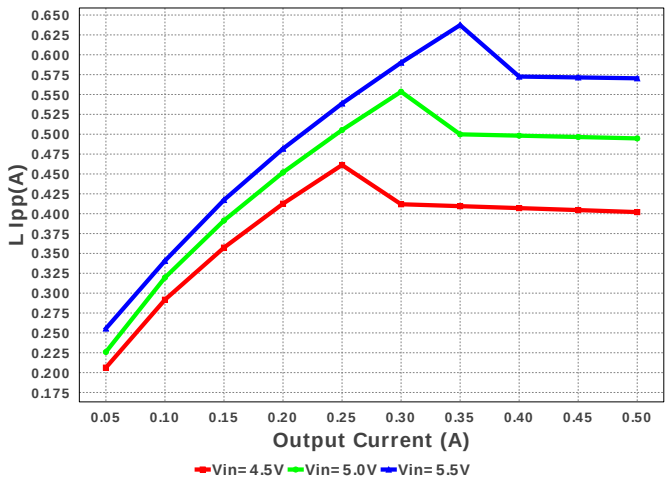
Design : 4742013/156 TPS54202HDDCR
TPS54202HDDCR 4.5V-5.5V to 3.00V @ 0.5A



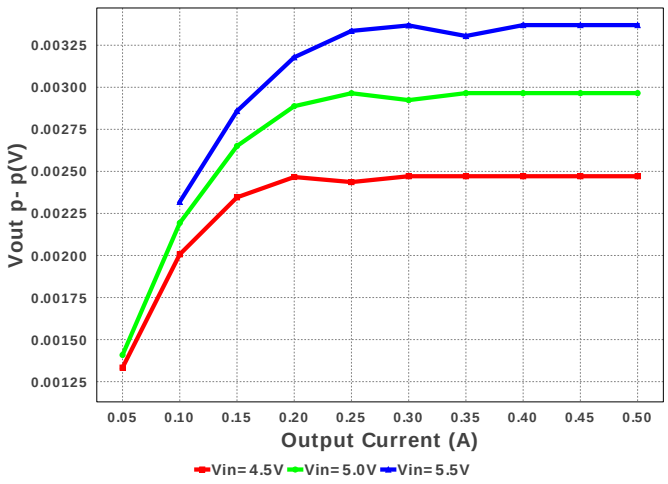
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
2.	Cff	Kemet	C0201C560J3GACTU Series= C0G/NP0	Cap= 56.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm^2
3.	Cin	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 uF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.7713 A	1	$0.03	0805 7 mm^2
4.	Cout	TDK	C4532X5R1E226M Series= X5R	Cap= 22.0 uF ESR= 2.197 mOhm VDC= 25.0 V IRMS= 0.0 A	2	$0.50	1812 23 mm^2
5.	L1	MuRata	LQM2HPN4R7MG0L	L= 4.7 µH DCR= 110.0 mOhm	1	$0.12	1008 10 mm^2
6.	Ren	Vishay-Dale	CRCW0402499KFKED Series= CRCW..e3	Res= 499.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
7.	Rfbb	Vishay-Dale	CRCW040224K9FKED Series= CRCW..e3	Res= 24.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
8.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
9.	U1	Texas Instruments	TPS54202HDDCR	Switcher	1	$0.50	DDC0006A_N 10 mm^2

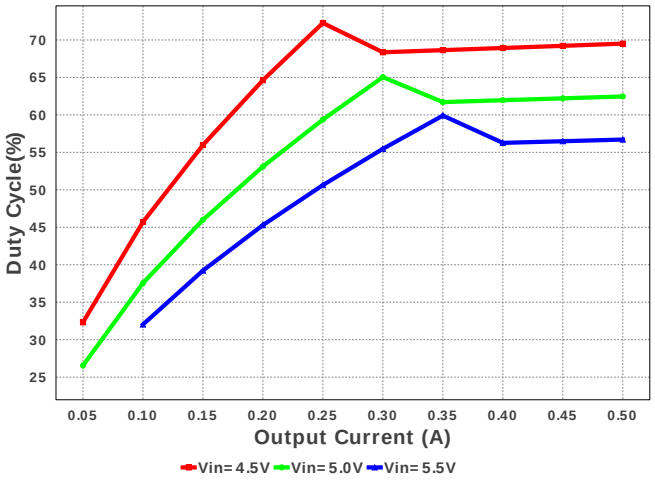
L Ipp



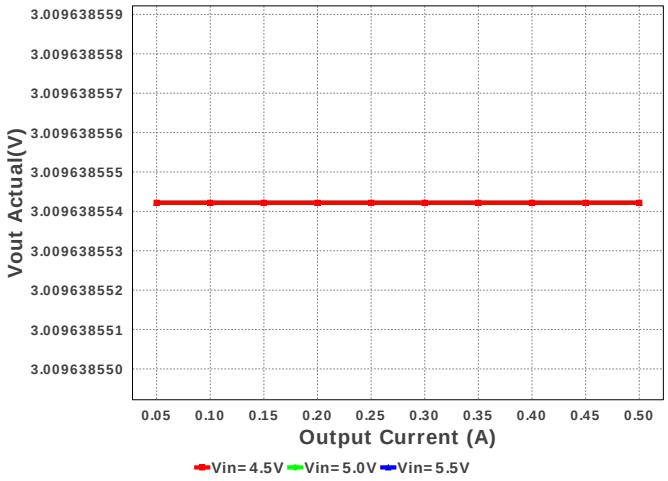
Vout p- p



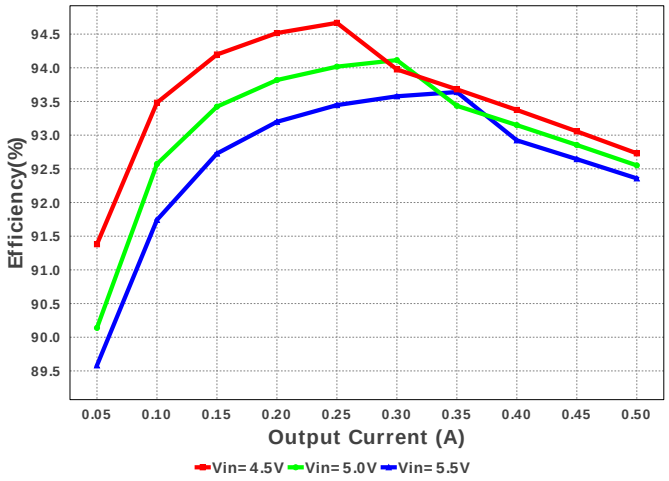
Duty Cycle



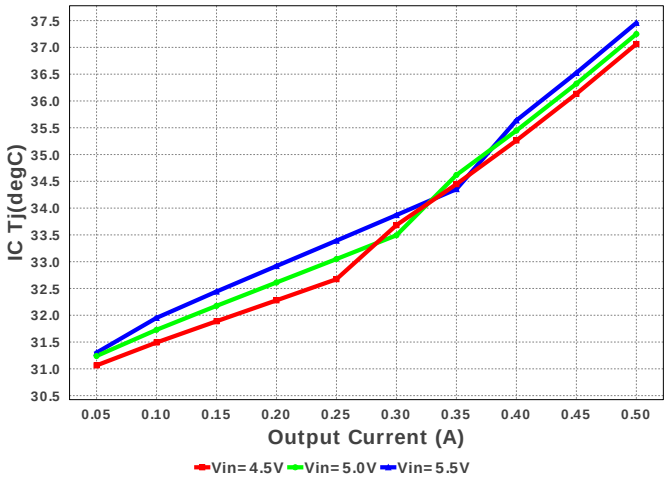
Vout Actual

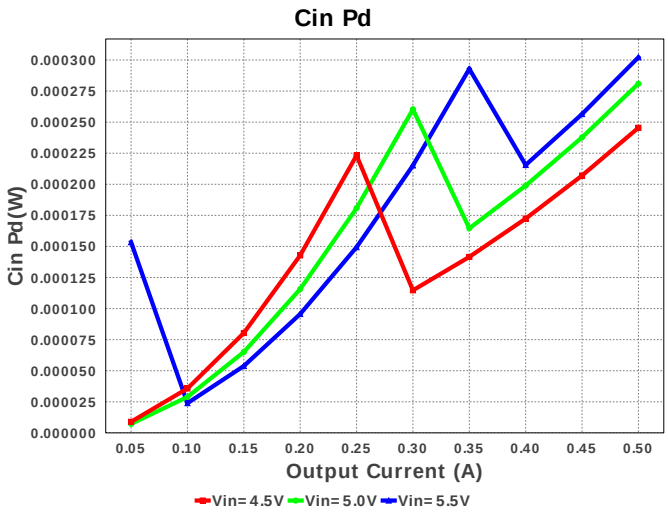


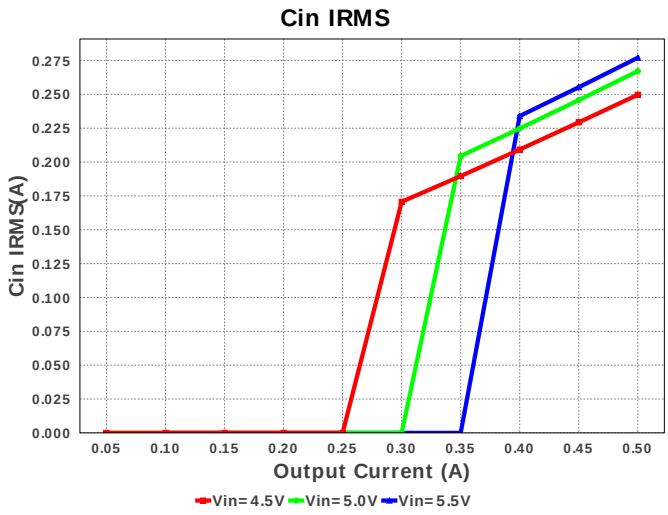
Efficiency

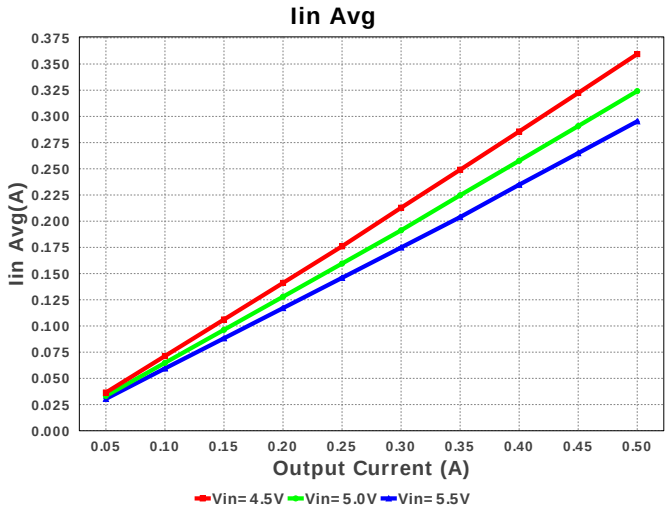


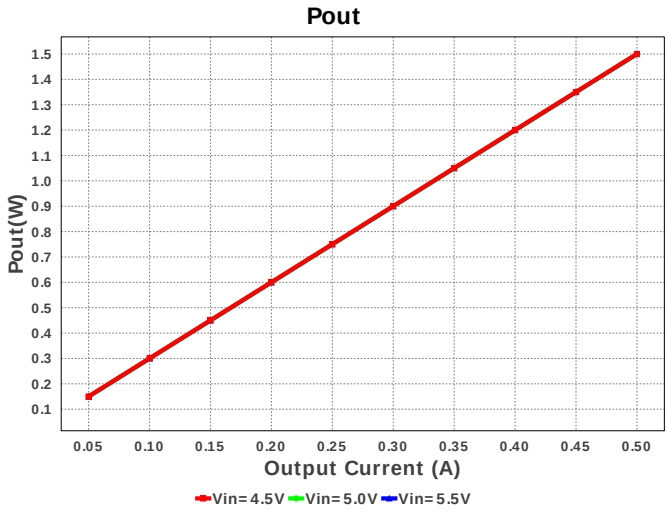
IC Tj

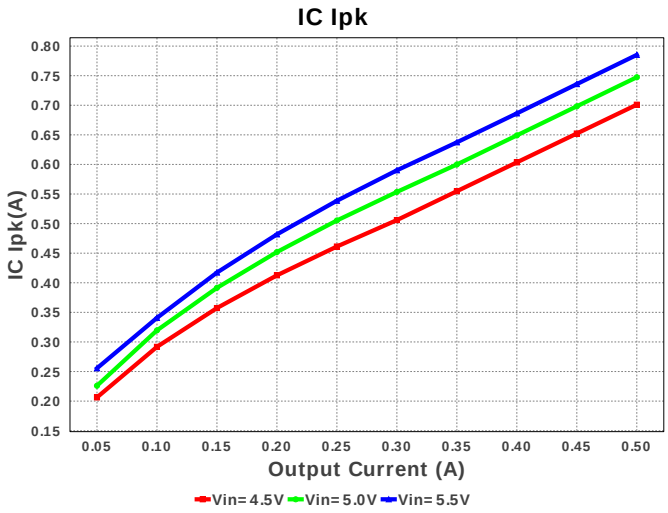


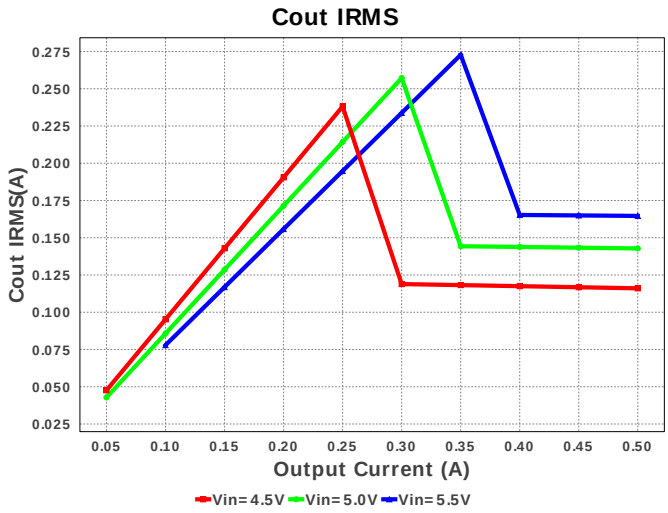


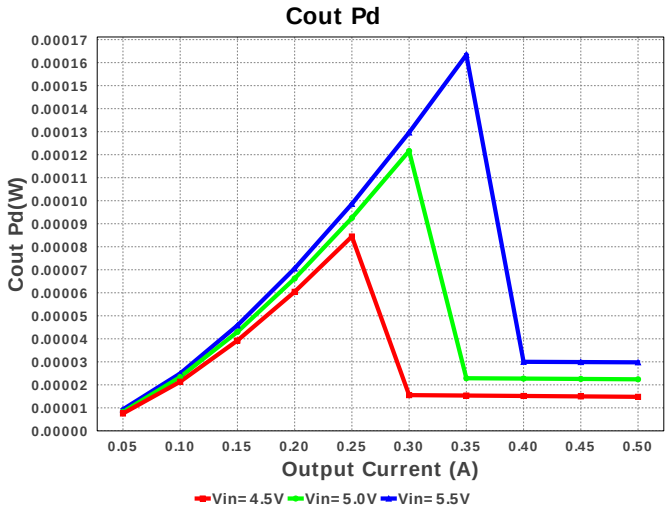


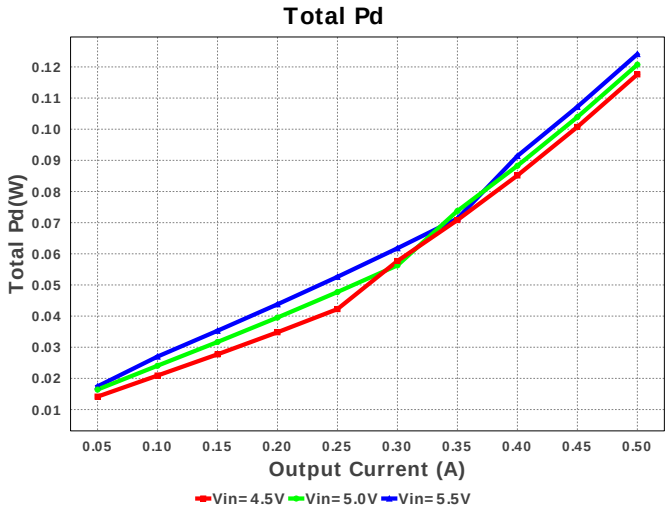


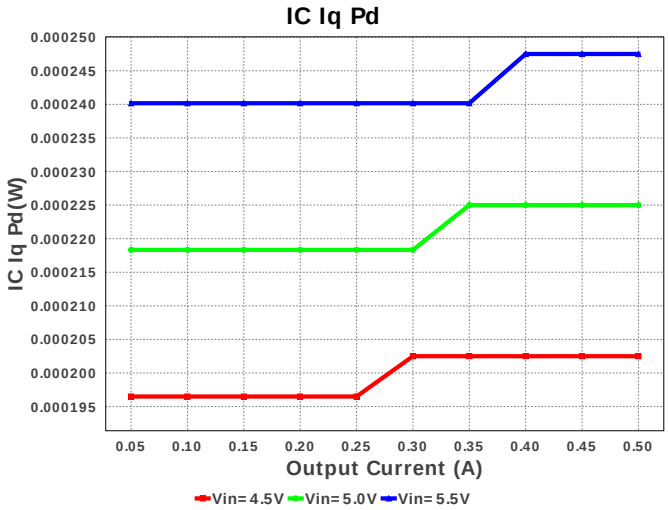


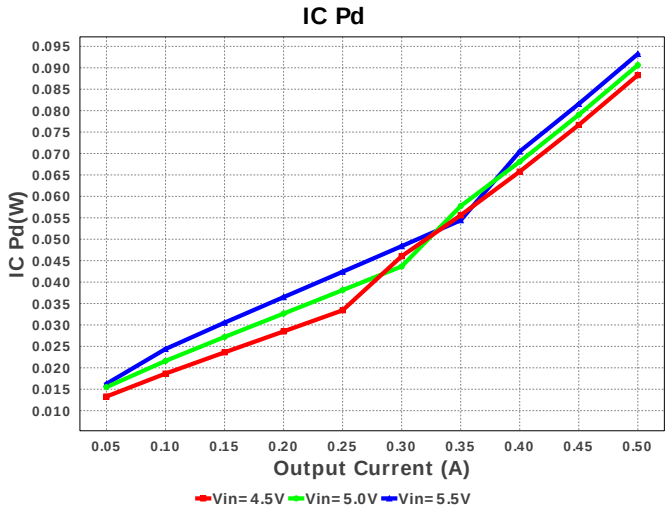


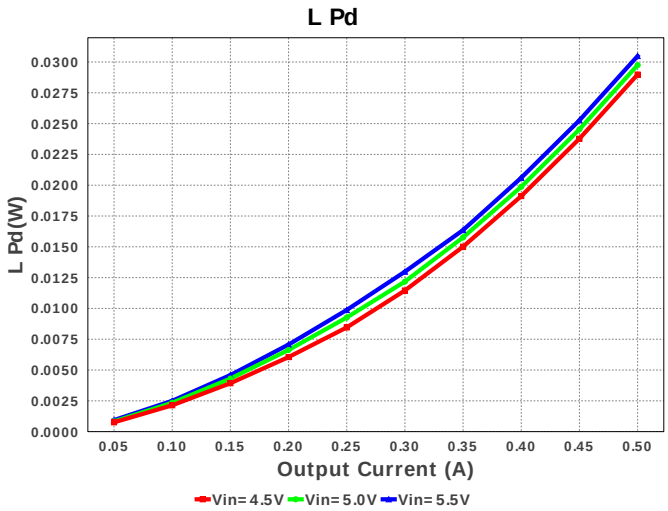


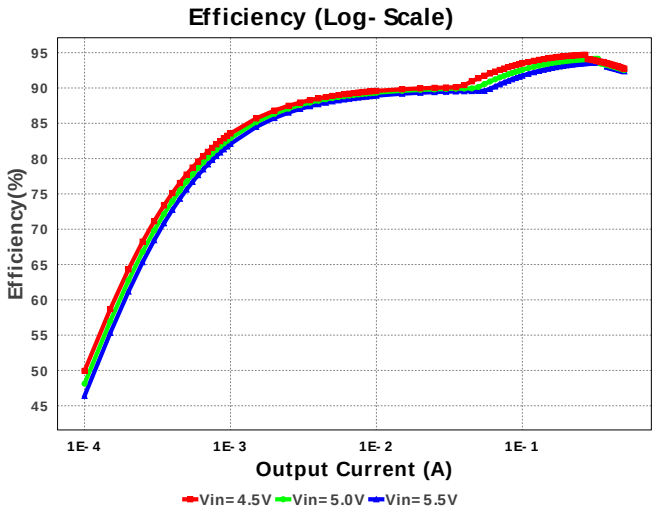












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	277.035 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	164.65 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	785.183 mA	Current	Peak switch current in IC
4.	Iin Avg	295.29 mA	Current	Average input current
5.	L Ipp	570.37 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	10	General	Total Design BOM count
7.	FootPrint	88.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	500.0 kHz	General	Switching frequency
9.	Pout	1.5 W	General	Total output power
10.	Total BOM	$1.7	General	Total BOM Cost
11.	ICThetaJA Effective	80.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance

#	Name	Value	Category	Description
12.	Vout Actual	3.01 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Duty Cycle	56.706 %	Op_point	Duty cycle
14.	Efficiency	92.358 %	Op_point	Steady state efficiency
15.	IC Tj	37.458 degC	Op_point	IC junction temperature
16.	IOUT_OP	500.0 mA	Op_point	Iout operating point
17.	VIN_OP	5.5 V	Op_point	Vin operating point
18.	Vout p-p	3.37 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	302.159 µW	Power	Input capacitor power dissipation
20.	Cout Pd	29.78 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	247.5 µW	Power	IC Iq Pd
22.	IC Pd	93.221 mW	Power	IC power dissipation
23.	L Pd	30.482 mW	Power	Inductor power dissipation
24.	Total Pd	124.113 mW	Power	Total Power Dissipation
25.	Vout Tolerance	1.617 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	5.5	Maximum input voltage
3.	VinMin	4.5	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	TPS54202H	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54202H** Product Folder : http://www.ti.com/product/TPS54202H : contains the data sheet and other resources.