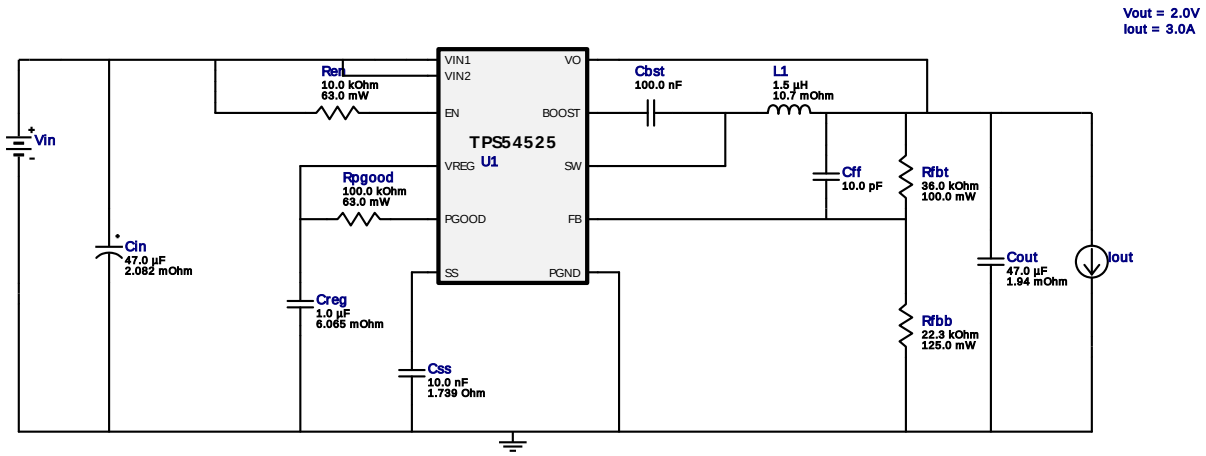
WEBENCH® Design Report

VinMin = 15.0V
VinMax = 18.0V
Vout = 2.0V
Iout = 3.0A

Device = TPS54525PWPR
Topology = Buck
Created = 8/12/16 12:33:31 AM
BOM Cost = $2.36
BOM Count = 12
Total Pd = 1.07W

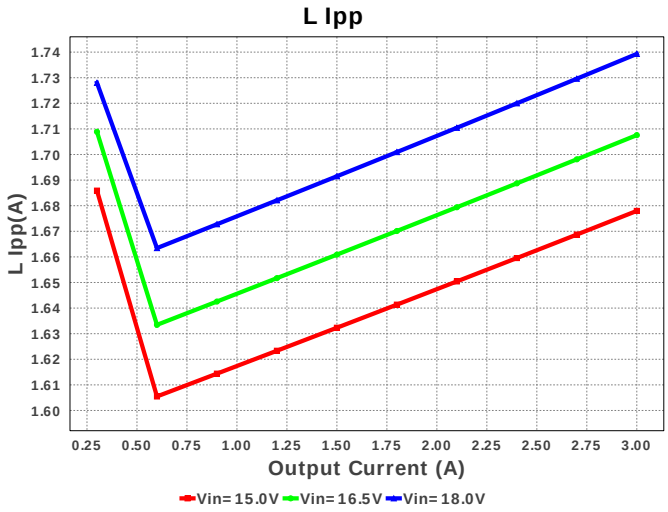
Design : 4766207/1 TPS54525PWPR
TPS54525PWPR 15.0V-18.0V to 2.00V @ 3.0A

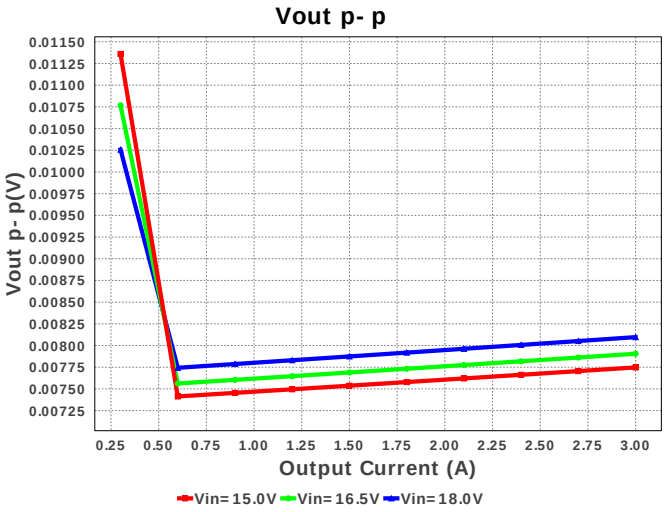


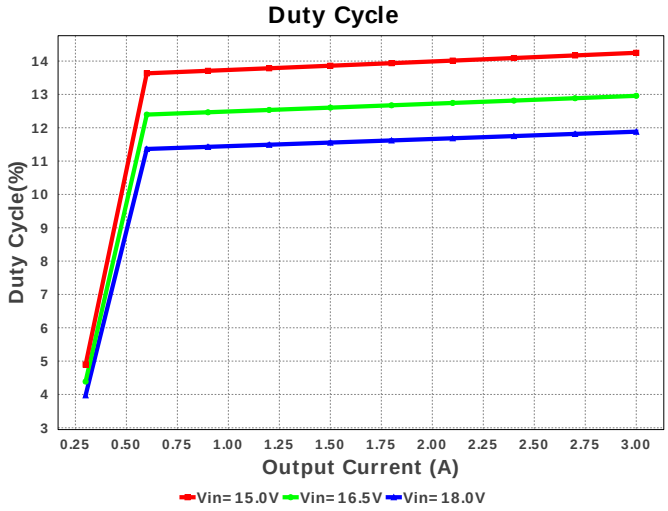
Electrical BOM

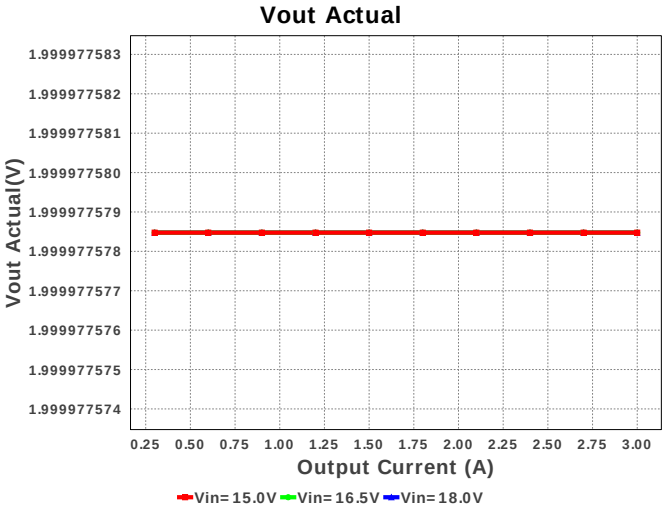
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	1	$0.35	1206 11 mm²
4.	Cout	TDK	C3216X6S0G476M Series= X6S	Cap= 47.0 uF ESR= 1.94 mOhm VDC= 4.0 V IRMS= 0.0 A	1	$0.13	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	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	$0.01	0805 7 mm²
7.	L1	TDK	SPM6530T-1R5M100	L= 1.5 µH DCR= 10.7 mOhm	1	$0.56	SPM6530 77 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	RT0805BRD0722K3L Series= RT0805	Res= 22.3 kOhm Power= 125.0 mW Tolerance= 0.1%	1	$0.05	0805 7 mm²
10.	Rfbt	Yageo America	RC0603FR-0736KL Series= ?	Res= 36.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	TPS54525PWPR	Switcher	1	$1.20	 R-PDSO-G14 61 mm^2

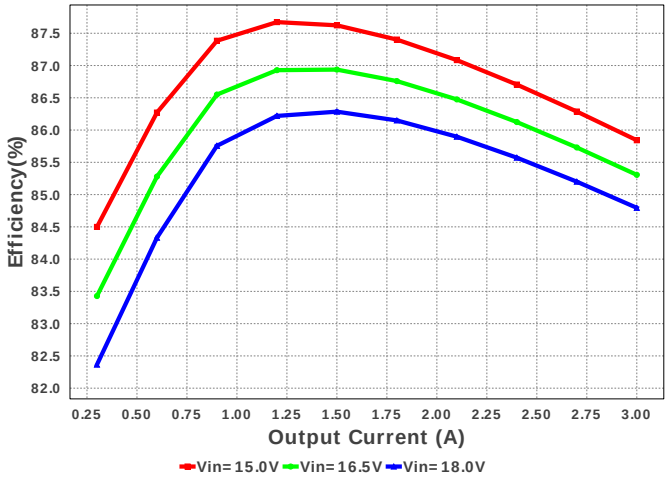




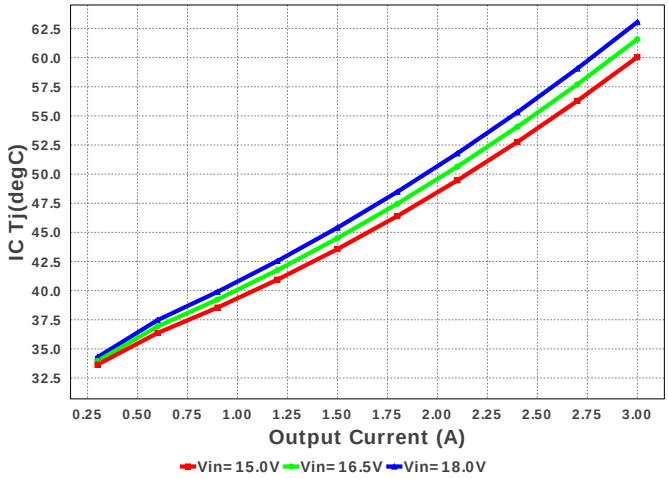




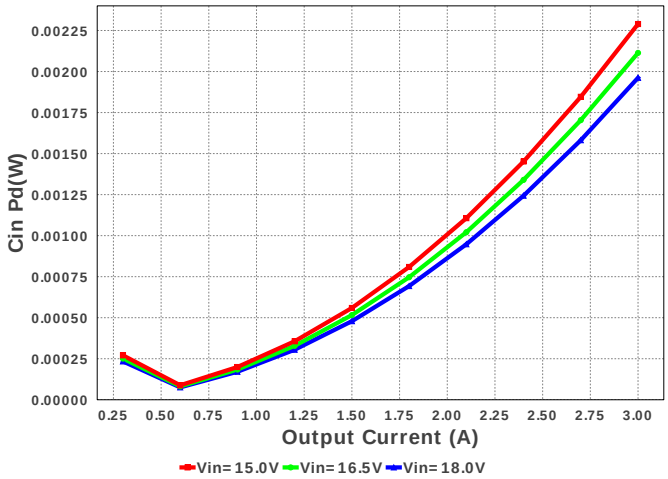
Efficiency



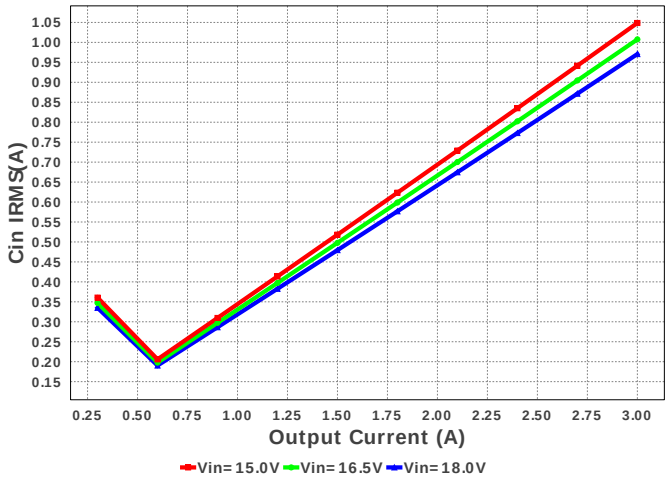
IC Tj



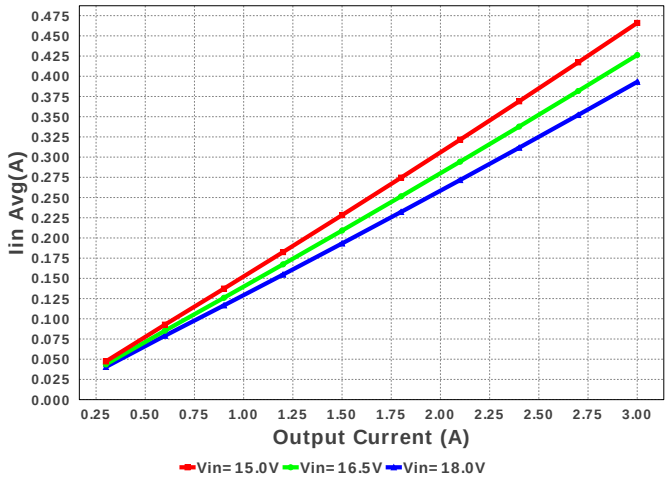
Cin Pd



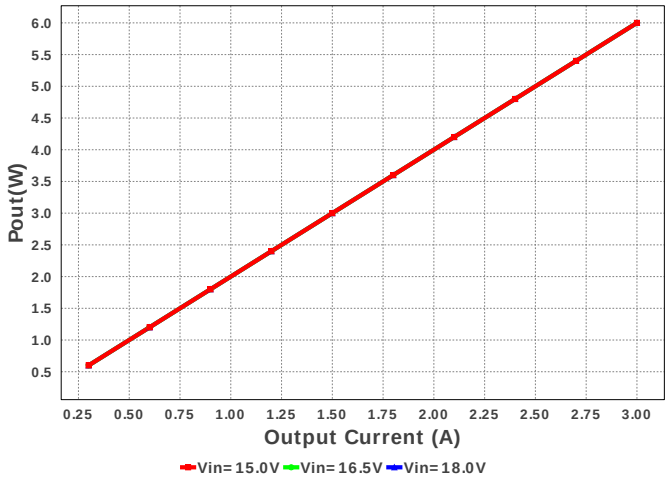
Cin IRMS

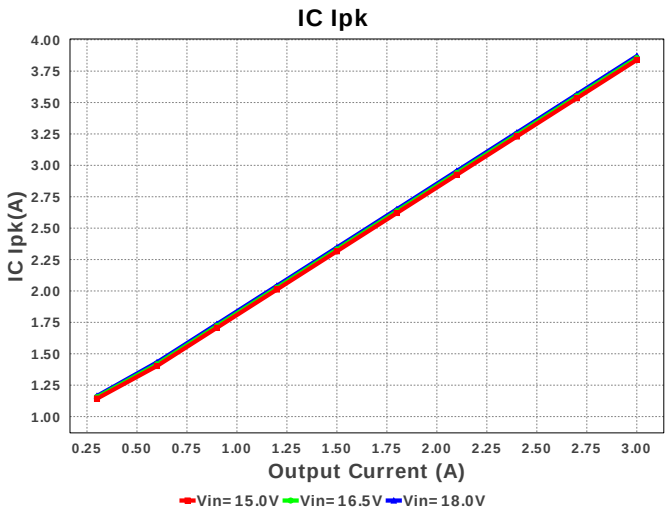


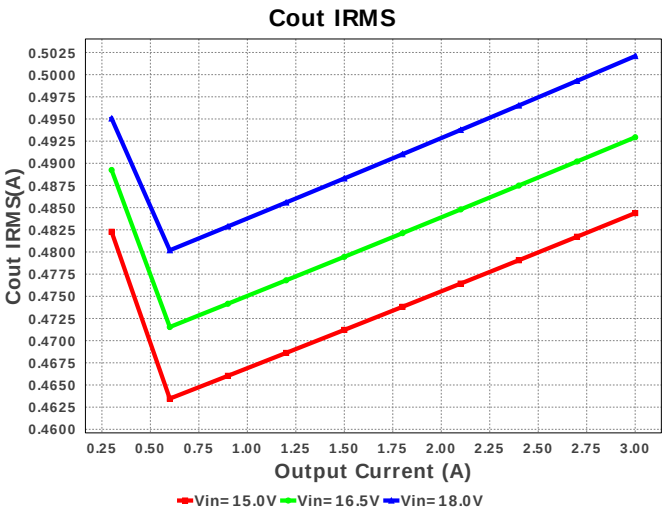
Iin Avg

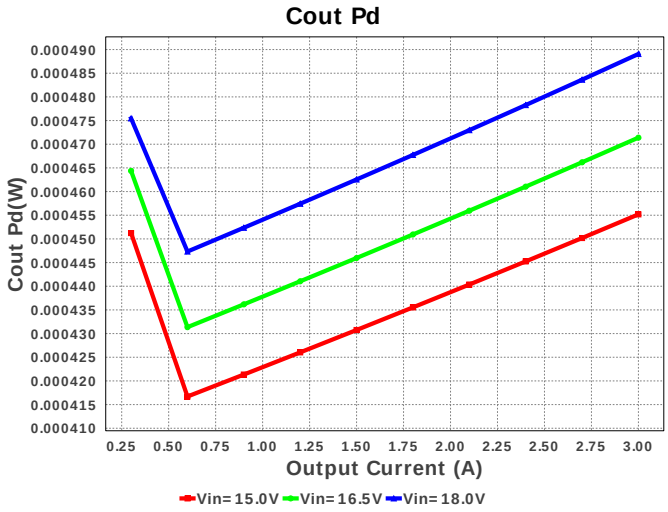


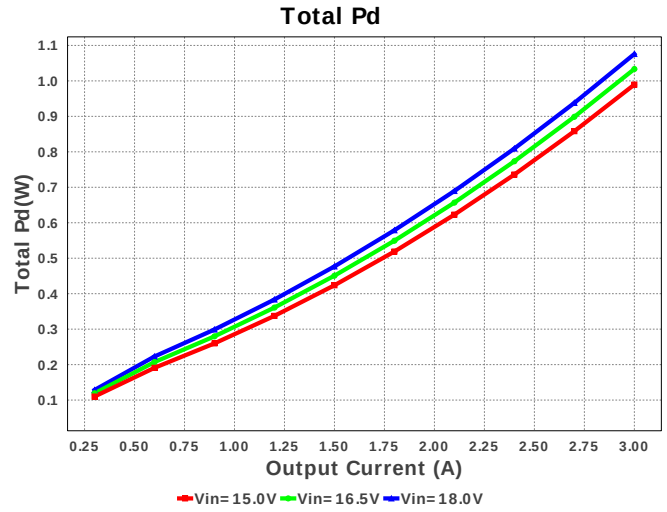
Pout

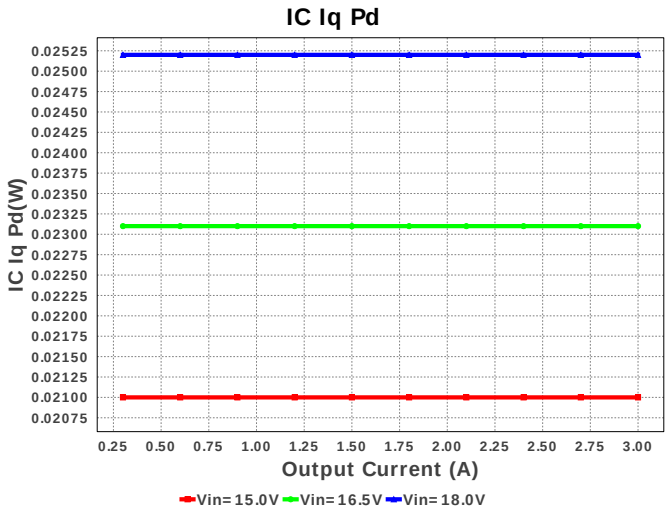


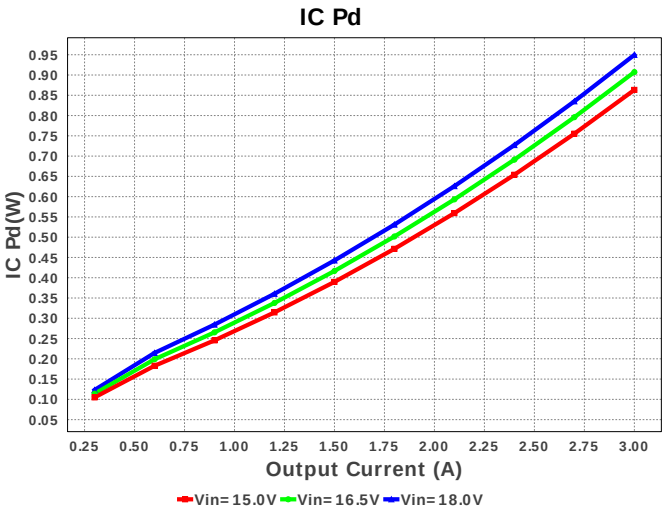


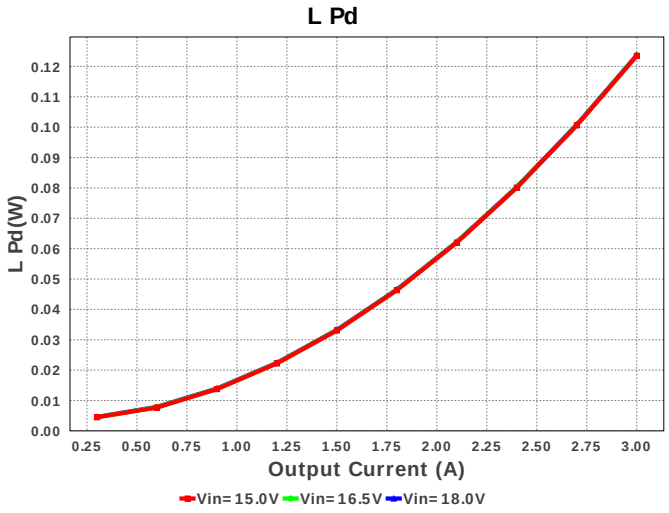












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	970.72 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	502.091 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	3.87 A	Current	Peak switch current in IC
4.	Iin Avg	392.92 mA	Current	Average input current
5.	L Ipp	1.739 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	199.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	728.678 kHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	6.0 W	General	Total output power
11.	Total BOM	$2.36	General	Total BOM Cost
12.	Vout Actual	2.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	2.0 V	Op_Point	Operational Output Voltage
14.	Duty Cycle	11.882 %	Op_point	Duty cycle
15.	Efficiency	84.836 %	Op_point	Steady state efficiency
16.	IC Tj	63.049 degC	Op_point	IC junction temperature
17.	ICThetaJA	34.8 degC/W	Op_point	IC junction-to-ambient thermal resistance
18.	IOUT_OP	3.0 A	Op_point	Iout operating point
19.	VIN_OP	18.0 V	Op_point	Vin operating point
20.	Vout p-p	7.36 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	1.962 mW	Power	Input capacitor power dissipation
22.	Cout Pd	489.064 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	25.2 mW	Power	IC Iq Pd
24.	IC Pd	949.68 mW	Power	IC power dissipation
25.	L Pd	120.375 mW	Power	Inductor power dissipation
26.	Total Pd	1.072 W	Power	Total Power Dissipation
27.	Vout Tolerance	2.522 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	VinMax	18.0	Maximum input voltage
3.	VinMin	15.0	Minimum input voltage
4.	Vout	2.0	Output Voltage
5.	base_pn	TPS54525	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54525** Product Folder : http://www.ti.com/product/TPS54525 : contains the data sheet and other resources.