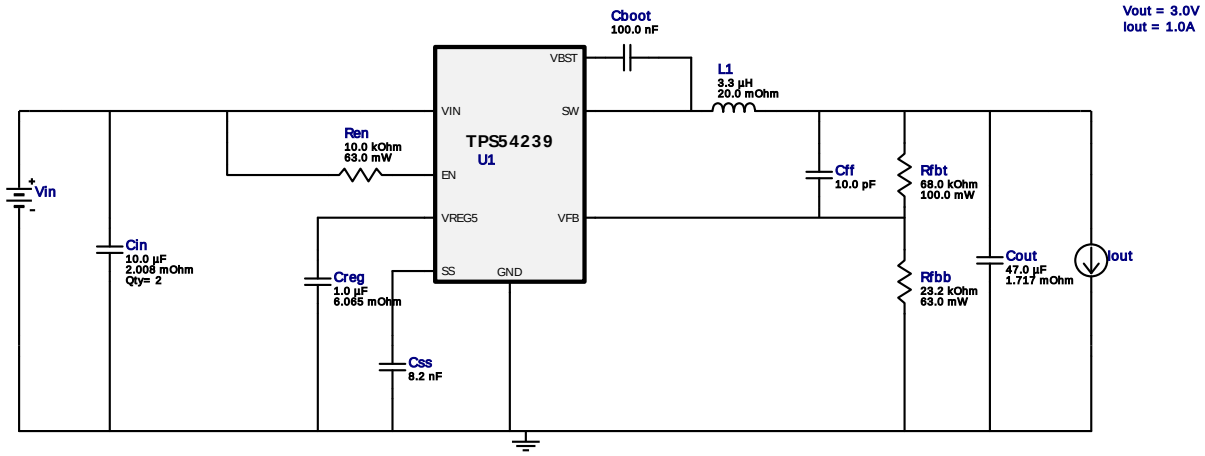
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 19.0V
Vout = 3.0V
Iout = 1.0A

Device = TPS54239DDAR
Topology = Buck
Created = 7/19/16 5:56:19 AM
BOM Cost = $2.00
BOM Count = 12
Total Pd = 0.39W

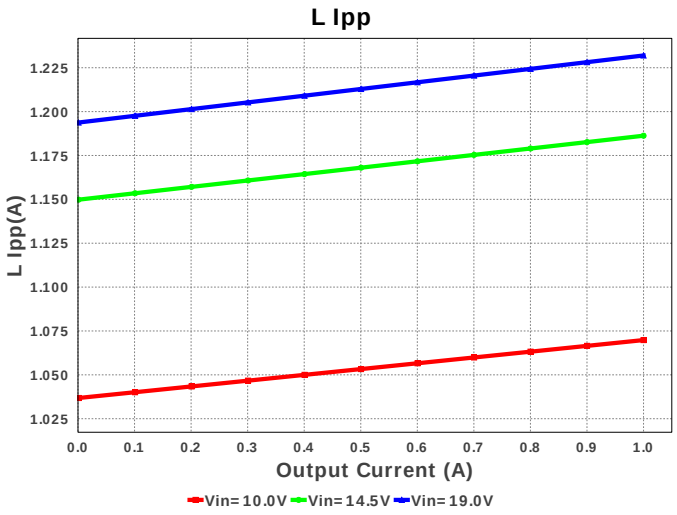
Design : 4728729/18 TPS54239DDAR
TPS54239DDAR 10.0V-19.0V to 3.00V @ 1.0A

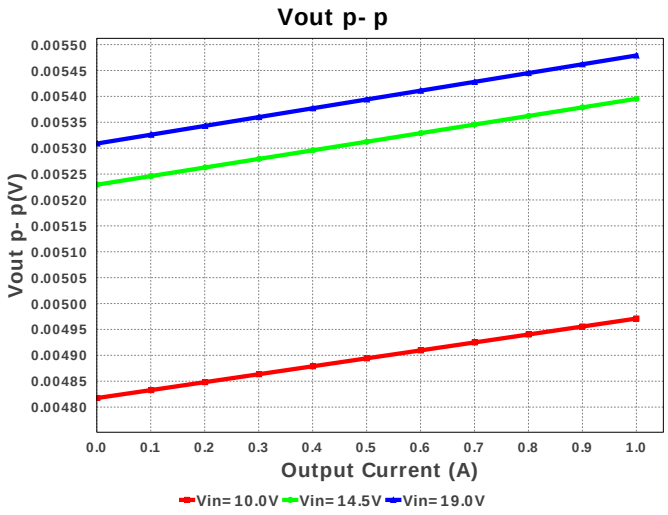


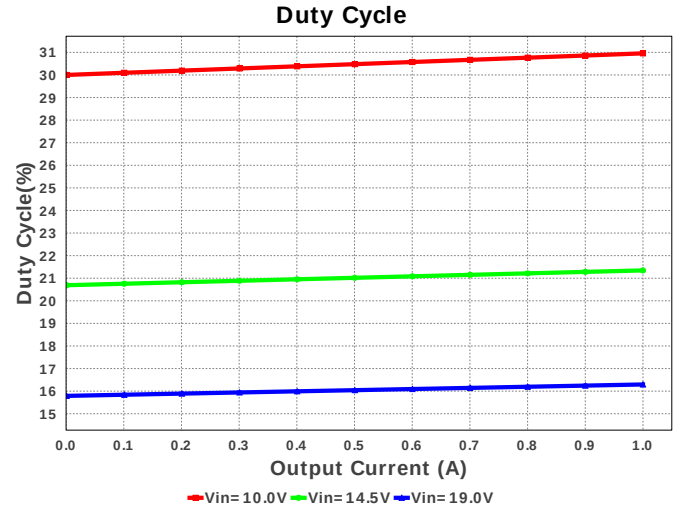
Electrical BOM

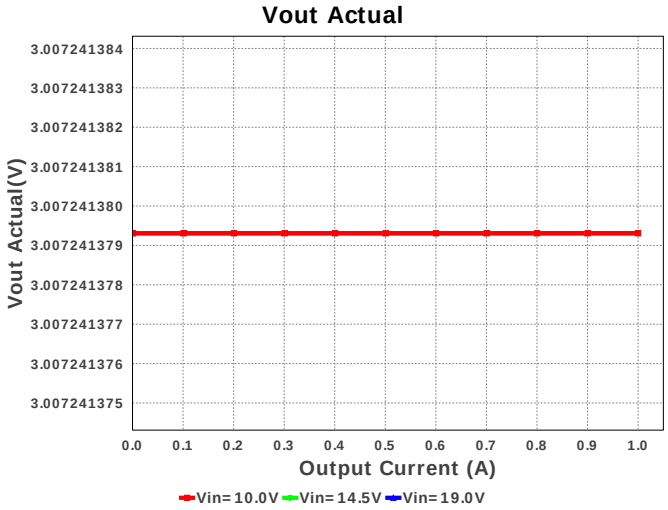
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	2	$0.22	1210_280 15 mm²
4.	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
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	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
7.	L1	TDK	CLF7045T-3R3N	L= 3.3 µH DCR= 20.0 mOhm	1	$0.42	CLF7045 86 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	Vishay-Dale	CRCW040223K2FKED Series= CRCW..e3	Res= 23.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Yageo America	RC0603FR-0768KL Series= ?	Res= 68.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²

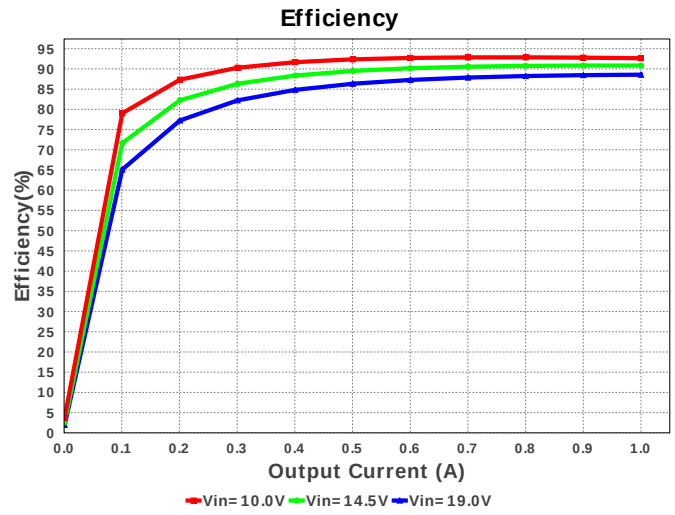
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54239DDAR	Switcher	1	$0.73	DDA0008E 57 mm^2

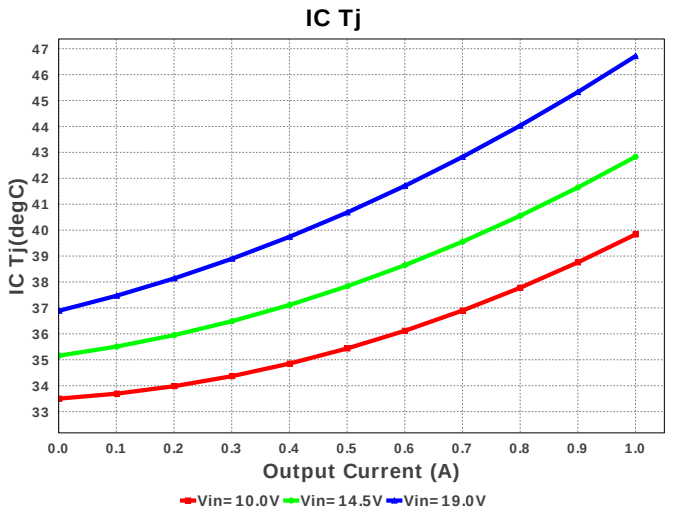


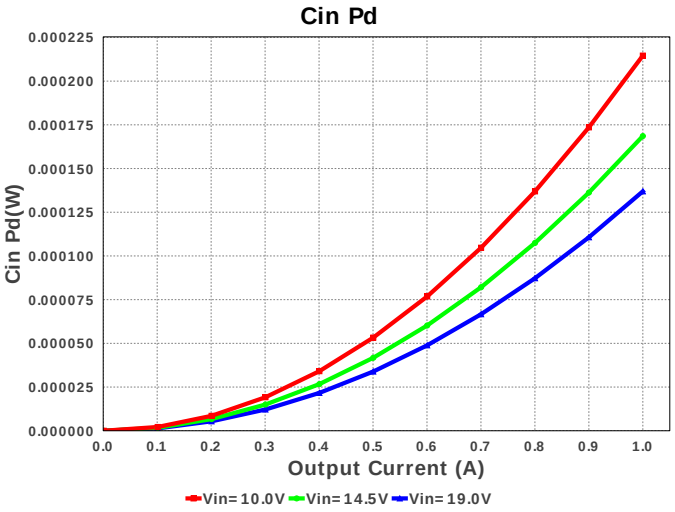


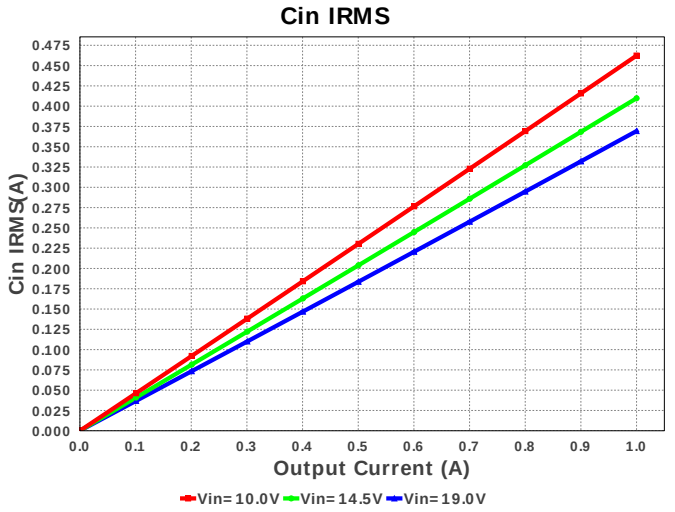


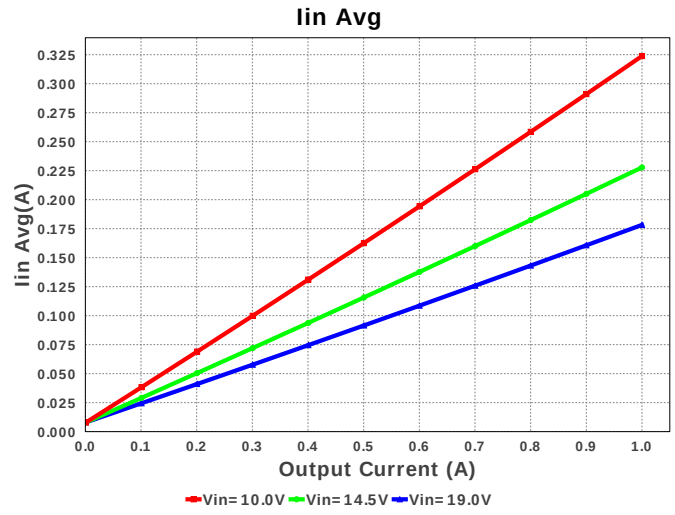


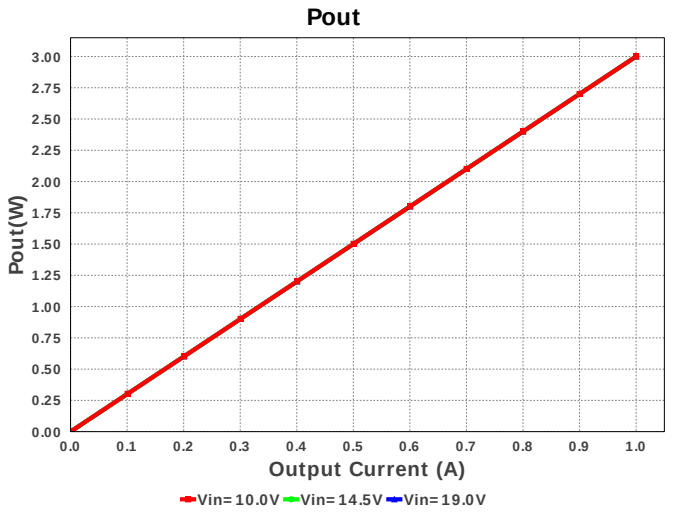


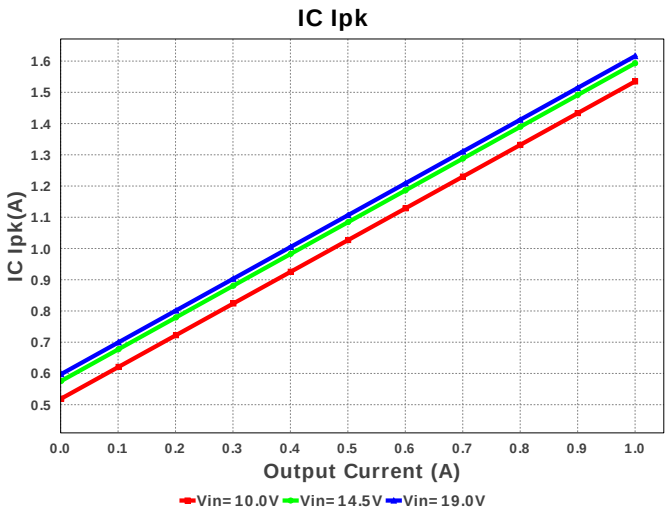


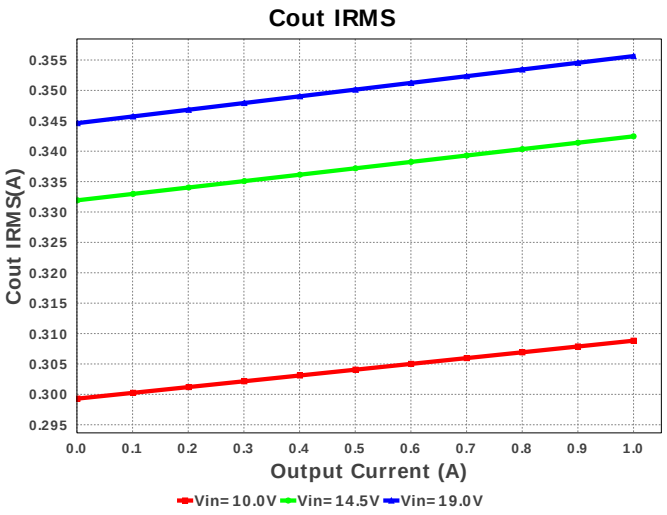


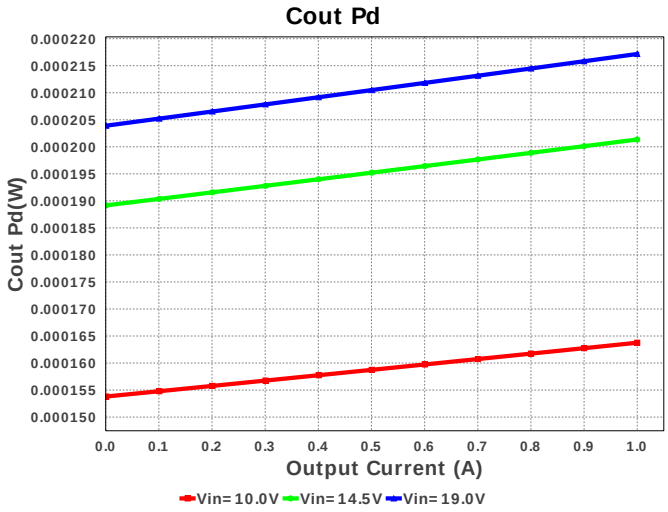


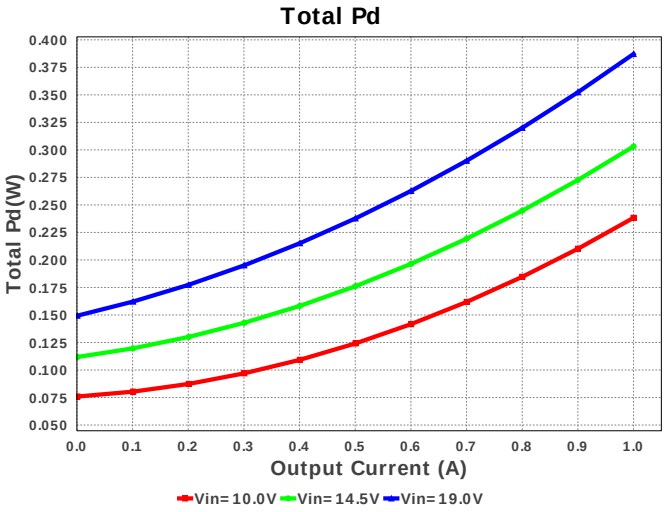


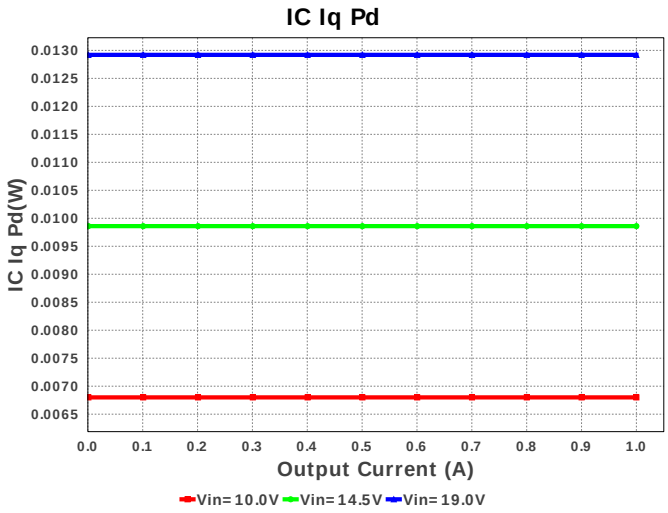


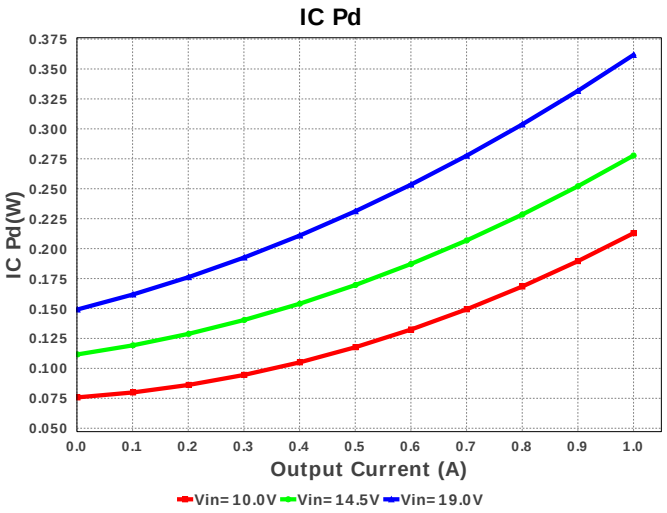


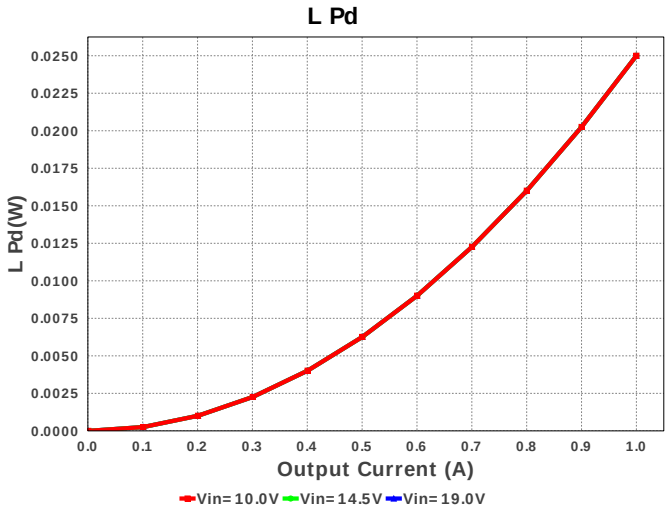












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	369.323 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	355.643 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.616 A	Current	Peak switch current in IC
4.	Iin Avg	178.27 mA	Current	Average input current
5.	L Ipp	1.232 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	210.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	641.305 kHz	General	Switching frequency
9.	Pout	3.0 W	General	Total output power
10.	Total BOM	$2.0	General	Total BOM Cost
11.	Vout Actual	3.007 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
12.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	16.295 %	Op_point	Duty cycle
14.	Efficiency	88.57 %	Op_point	Steady state efficiency
15.	IC Tj	46.714 degC	Op_point	IC junction temperature
16.	ICThetaJA	46.2 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	1.0 A	Op_point	Iout operating point
18.	VIN_OP	19.0 V	Op_point	Vin operating point
19.	Vout p-p	5.479 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	136.945 µW	Power	Input capacitor power dissipation
21.	Cout Pd	217.169 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	12.92 mW	Power	IC Iq Pd
23.	IC Pd	361.781 mW	Power	IC power dissipation
24.	L Pd	25.0 mW	Power	Inductor power dissipation
25.	Total Pd	387.149 mW	Power	Total Power Dissipation
26.	Vout Tolerance	3.364 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	19.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	TPS54239	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. TPS54239 Product Folder : http://www.ti.com/product/TPS54239 : contains the data sheet and other resources.