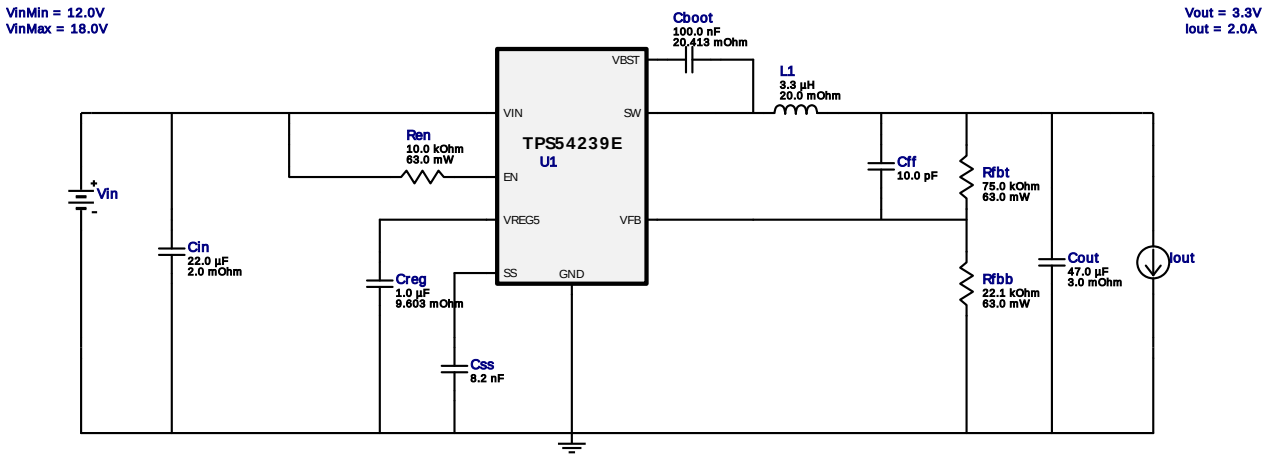
TEXAS INSTRUMENTS

WEBENCH® Design Report

VinMin = 12.0V
VinMax = 18.0V
Vout = 3.3V
Iout = 2.0A

Device = TPS54239EDDAR
Topology = Buck
Created = 6/14/15 7:42:08 PM
BOM Cost = $1.52
Footprint = 195.0 mm²
BOM Count = 11
Total Pd = 0.81W

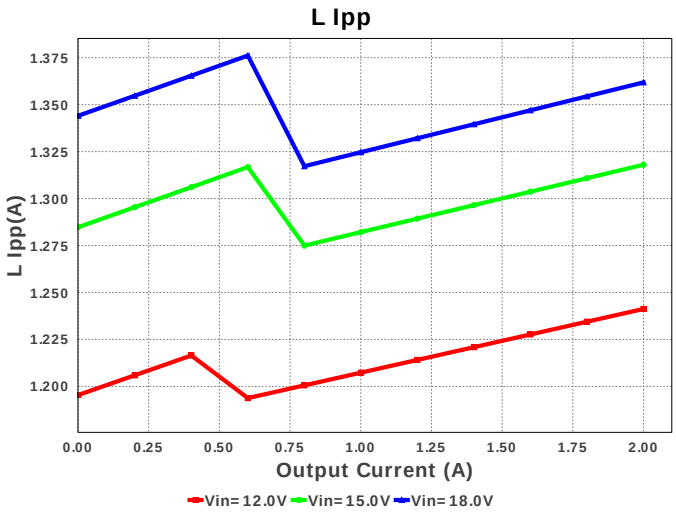
Design : 3997477/174 TPS54239EDDAR
TPS54239EDDAR 12.0V-18.0V to 3.30V @ 2.0A

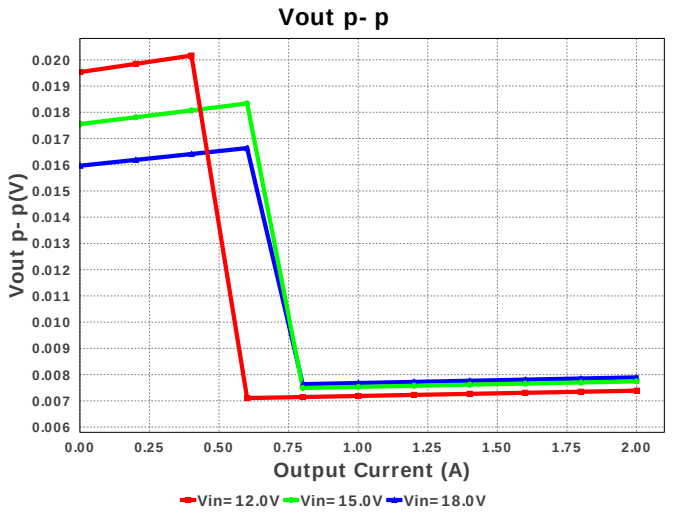


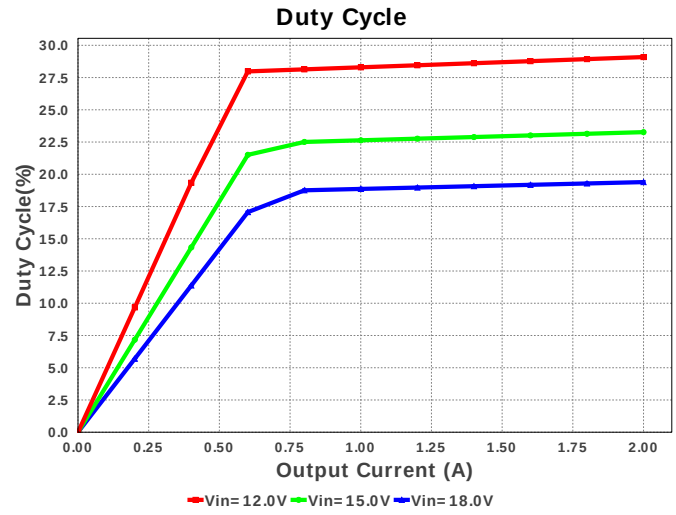
Electrical BOM

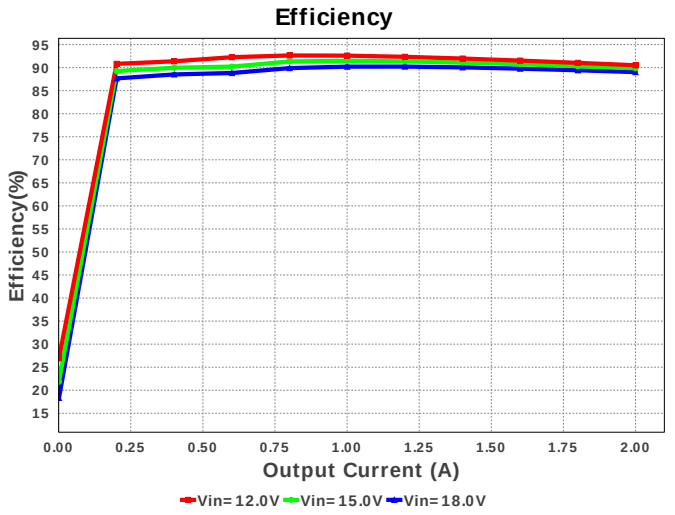
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	C1005X5R1A104K Series= X5R	Cap= 100.0 nF ESR= 20.413 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	Kemet	C0805C100M4GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.16	1210 15 mm²
4.	Cout	MuRata	GRM31CR60J476ME19L Series= X5R	Cap= 47.0 uF ESR= 3.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.12	1206 11 mm²
5.	Creg	TDK	C1608X5R1A105K Series= X5R	Cap= 1.0 uF ESR= 9.603 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
6.	Css	MuRata	GRM155R71E822KA01D Series= X7R	Cap= 8.2 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 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	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW040275K0FKED Series= CRCW..e3	Res= 75.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

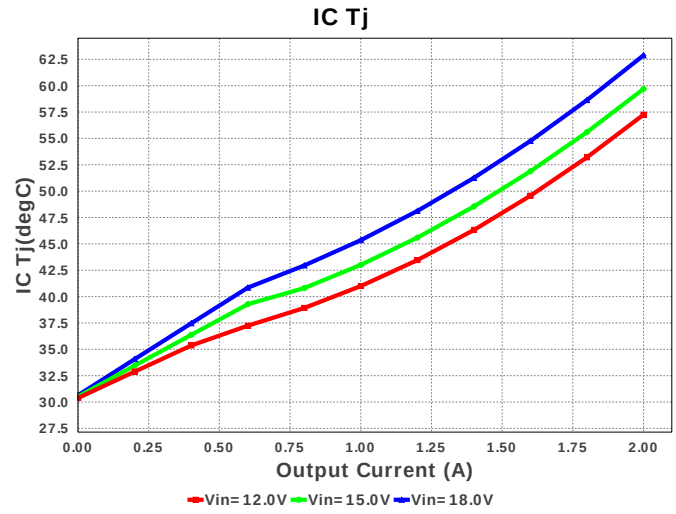
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	TPS54239EDDAR	Switcher	1	$0.75	DDA0008E 57 mm^2

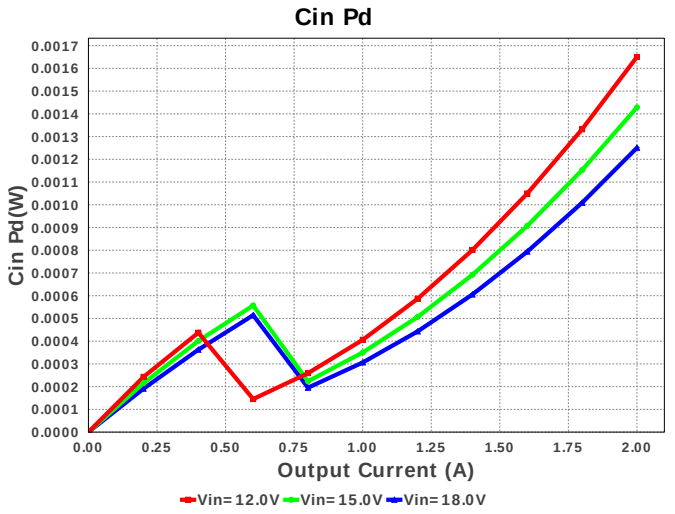


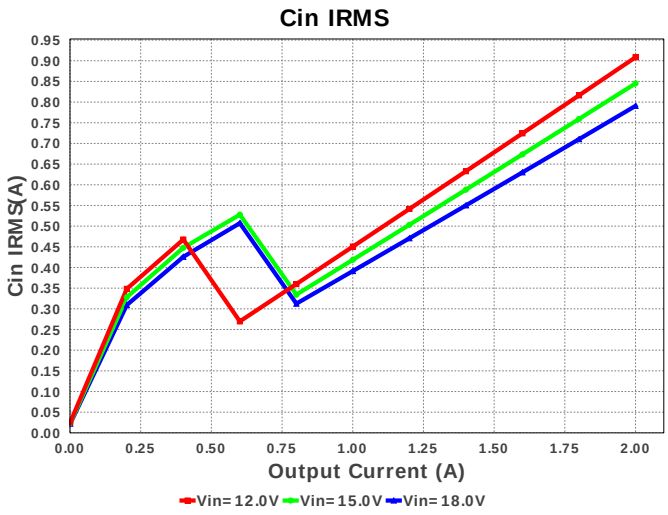


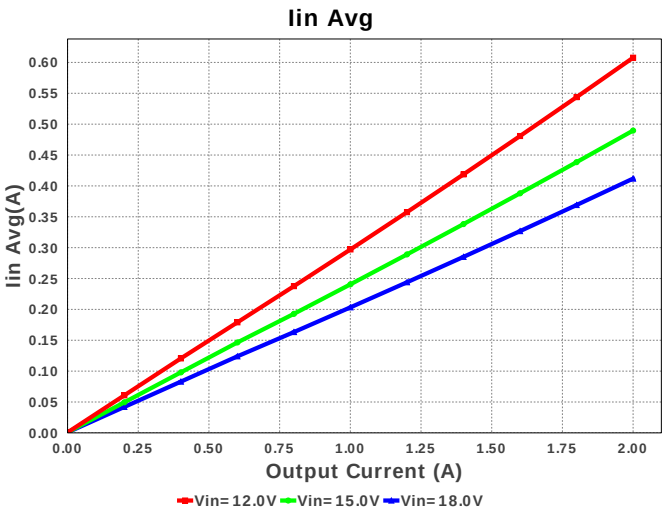


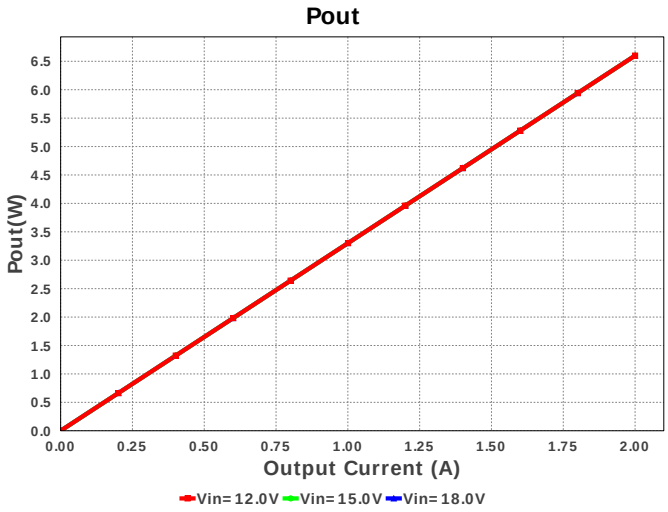


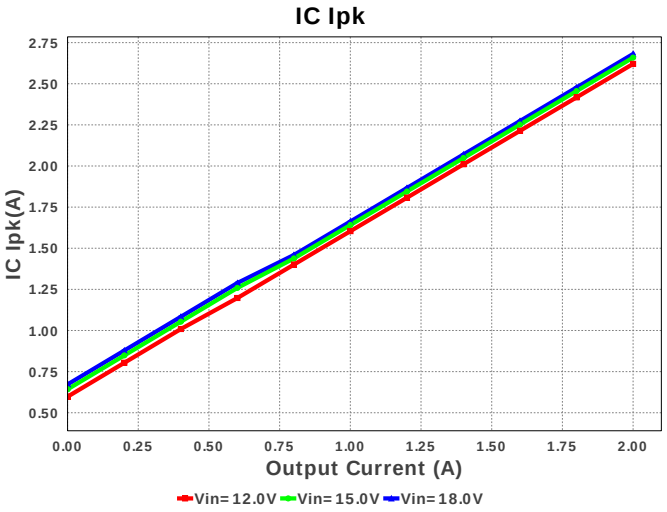


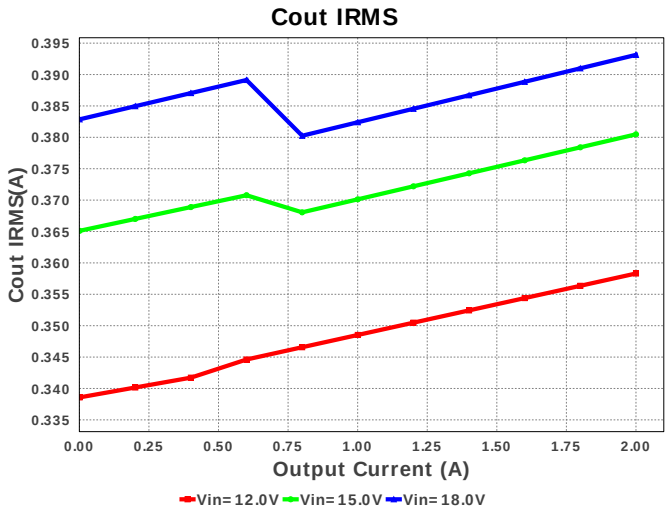


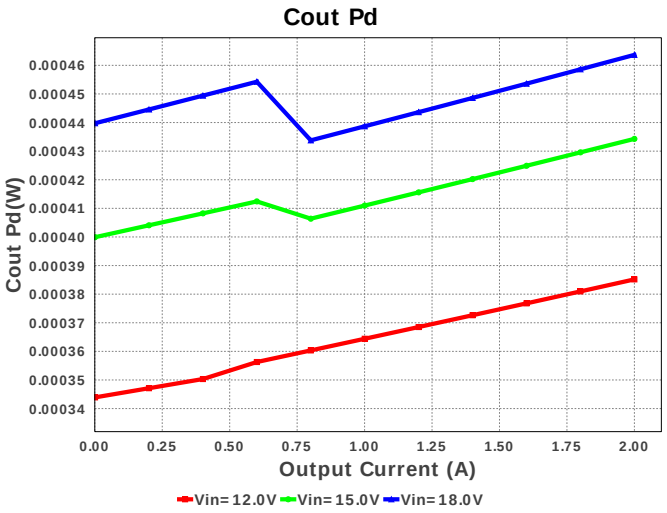


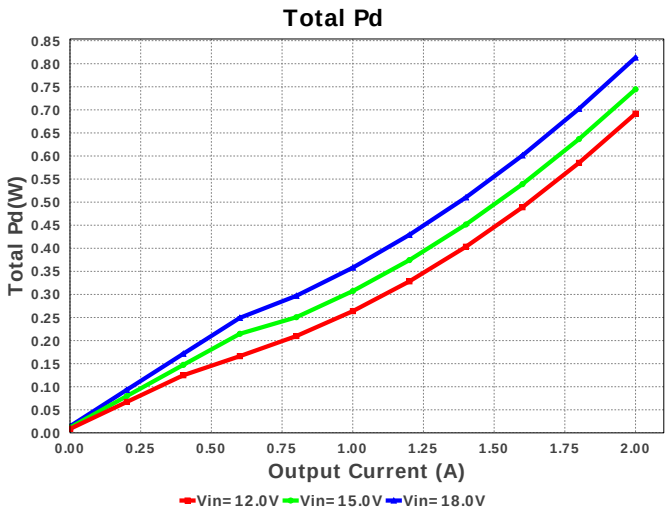


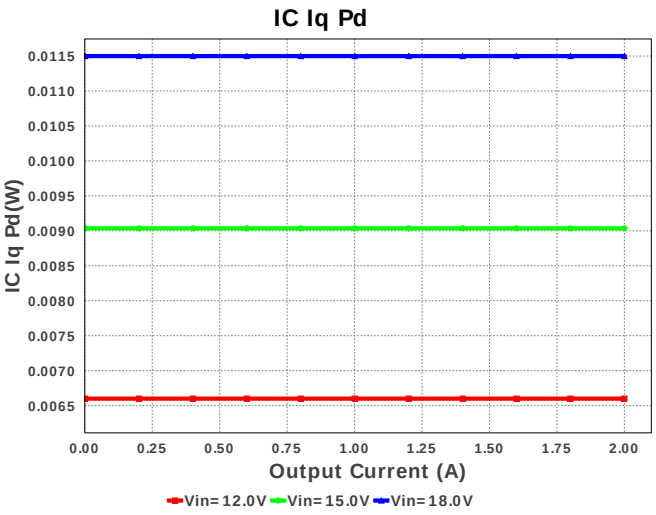


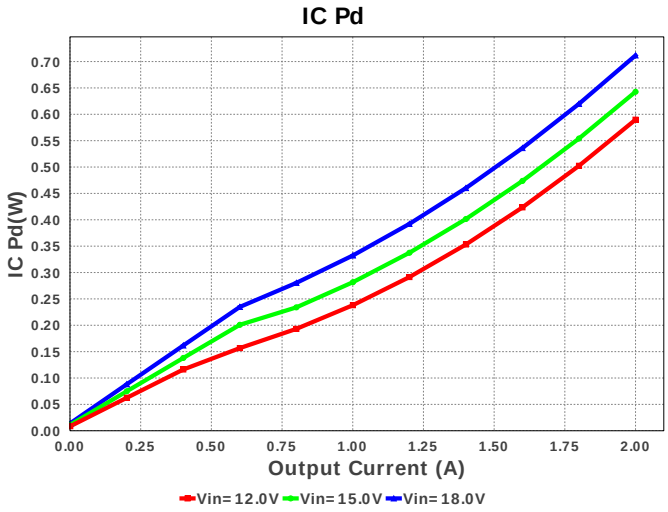


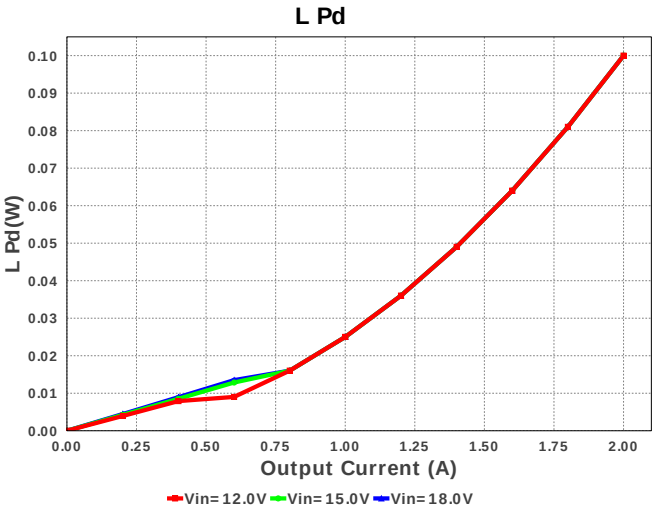


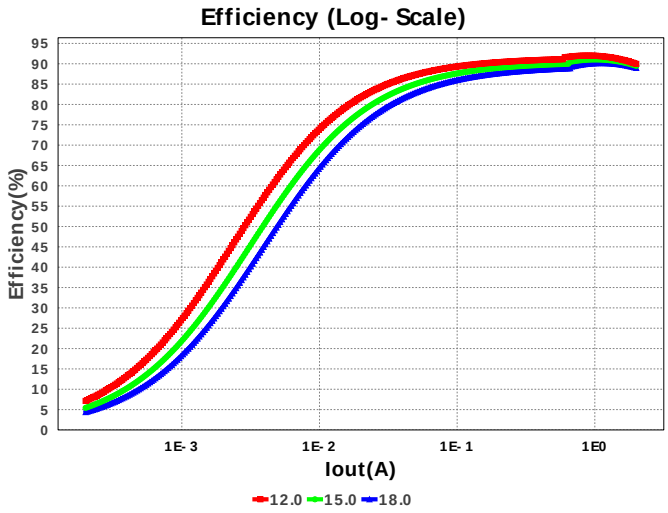












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	790.762 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	393.133 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.681 A	Current	Peak switch current in IC
4.	Iin Avg	411.85 mA	Current	Average input current
5.	L Ipp	1.362 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	11	General	Total Design BOM count
7.	FootPrint	195.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	634.361 kHz	General	Switching frequency
9.	Pout	6.6 W	General	Total output power
10.	Total BOM	$1.52	General	Total BOM Cost
11.	Vout OP	3.3 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
12.	Duty Cycle	19.394 %	Op_point	Duty cycle
13.	Efficiency	89.028 %	Op_point	Steady state efficiency
14.	IC Tj	62.879 degC	Op_point	IC junction temperature
15.	ICThetaJA	46.2 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	2.0 A	Op_point	Iout operating point
17.	VIN_OP	18.0 V	Op_point	Vin operating point
18.	Vout p-p	7.894 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	1.251 mW	Power	Input capacitor power dissipation
20.	Cout Pd	463.66 µW	Power	Output capacitor power dissipation
21.	IC Iq Pd	11.499 mW	Power	IC Iq Pd
22.	IC Pd	711.671 mW	Power	IC power dissipation
23.	L Pd	100.0 mW	Power	Inductor power dissipation
24.	Total Pd	813.387 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	Iout1	2.0	Output Current #1
3.	VinMax	18.0	Maximum input voltage
4.	VinMin	12.0	Minimum input voltage
5.	Vout	3.3	Output Voltage
6.	Vout1	3.3	Output Voltage #1
7.	base_pn	TPS54239E	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0	Ambient temperature

Design Assistance

1. TPS54239E Product Folder : http://www.ti.com/product/TPS54239E : contains the data sheet and other resources.