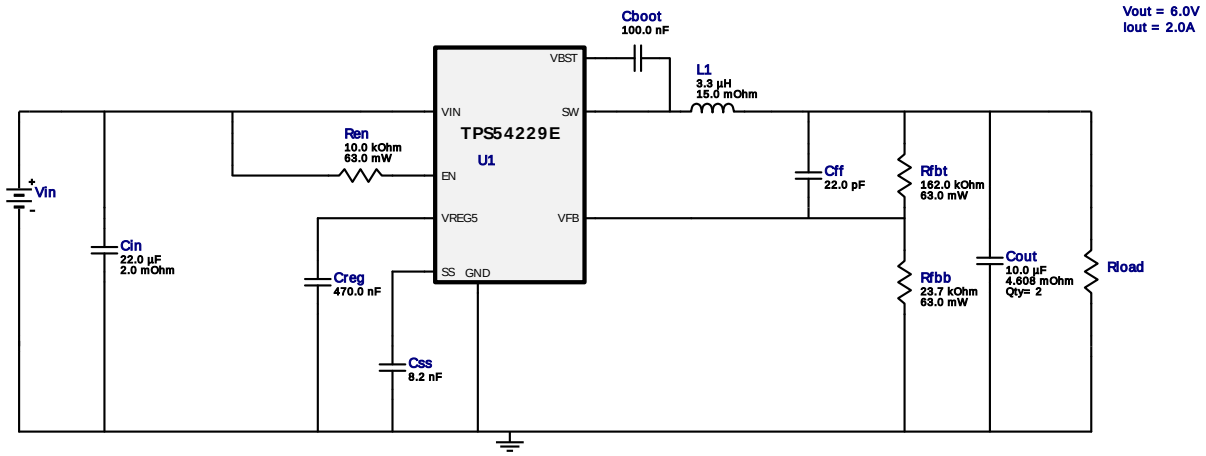
WEBENCH® Design Report

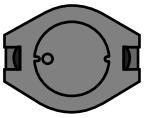
VinMin = 16.0V
VinMax = 18.0V
Vout = 6.0V
Iout = 2.0A

Device = TPS54229EDDAR
Topology = Buck
Created = 9/22/16 2:04:12 AM
BOM Cost = $1.20
BOM Count = 12
Total Pd = 0.89W

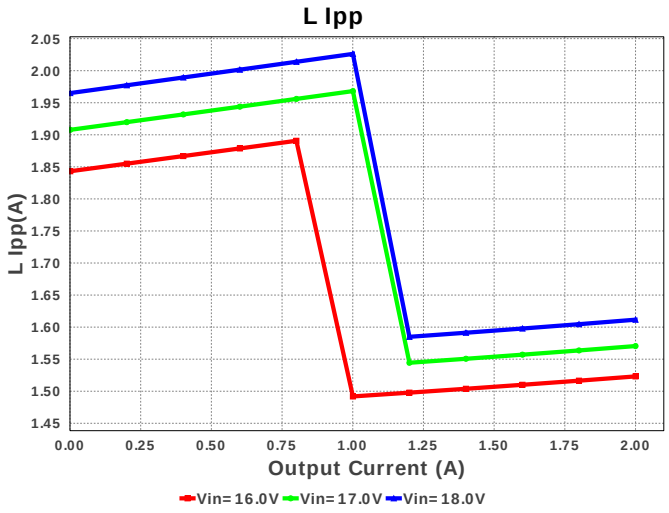
Design : 4800933/2 TPS54229EDDAR
TPS54229EDDAR 16.0V-18.0V to 6.00V @ 2.0A

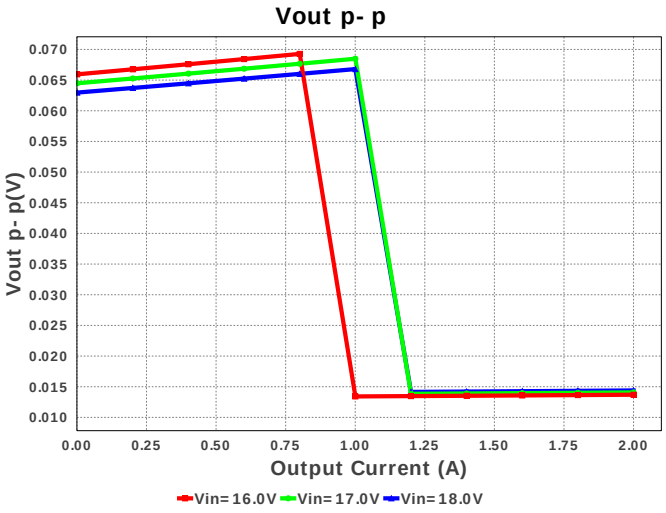


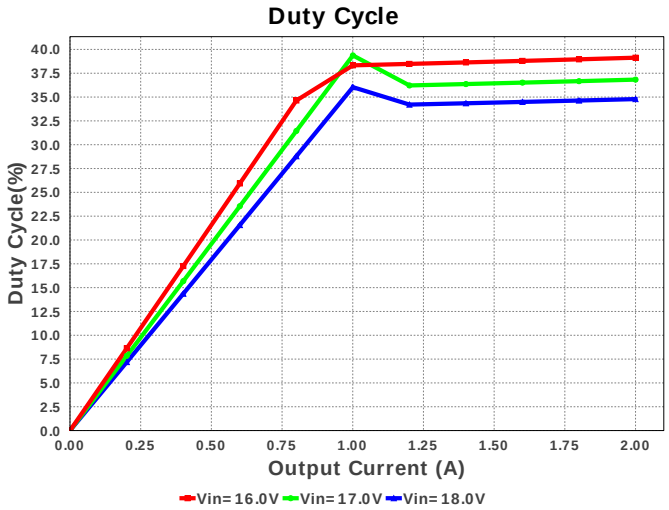
Electrical BOM

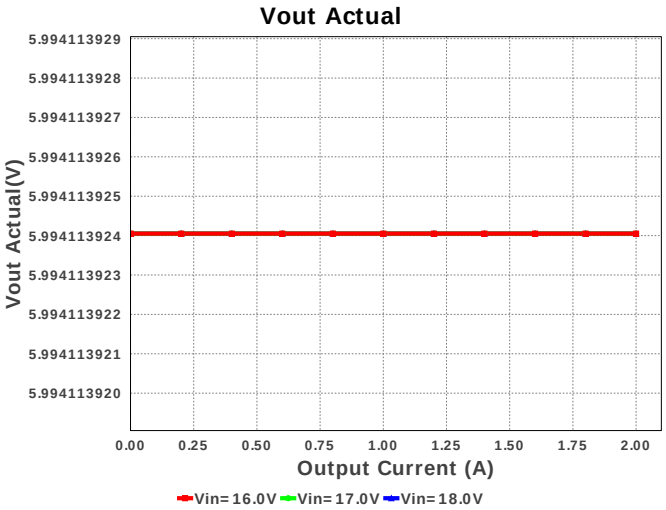
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cff	MuRata	GRM0225C1C220JD05L Series= C0G/NP0	Cap= 22.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	01005 2 mm²
3.	Cin	MuRata	GRM32ER61E226KE15L 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	GRM319R61C106KE15D Series= X5R	Cap= 10.0 uF ESR= 4.608 mOhm VDC= 16.0 V IRMS= 2.54841 A	2	$0.04	1206 11 mm²
5.	Creg	MuRata	GRM155R61A474KE15D Series= X5R	Cap= 470.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 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	Bourns	SDR1005-3R3ML	L= 3.3 µH DCR= 15.0 mOhm	1	$0.26	 SDR1005 176 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	CRCW040223K7FKED Series= CRCW..e3	Res= 23.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW0402162KFKED Series= CRCW..e3	Res= 162.0 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	TPS54229EDDAR	Switcher	1	$0.63	DDA0008E 57 mm^2

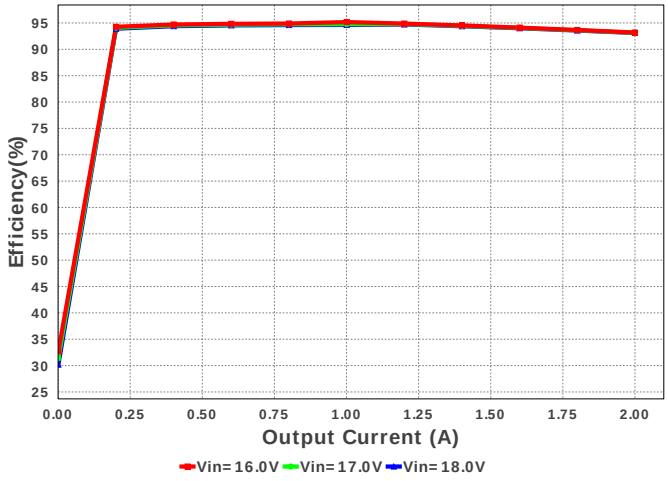




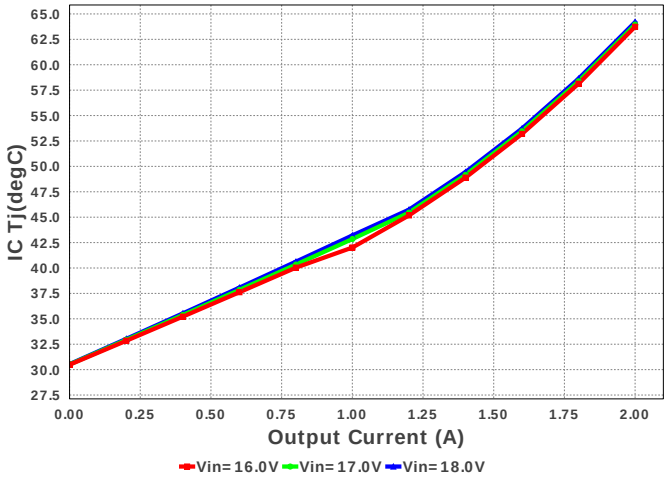




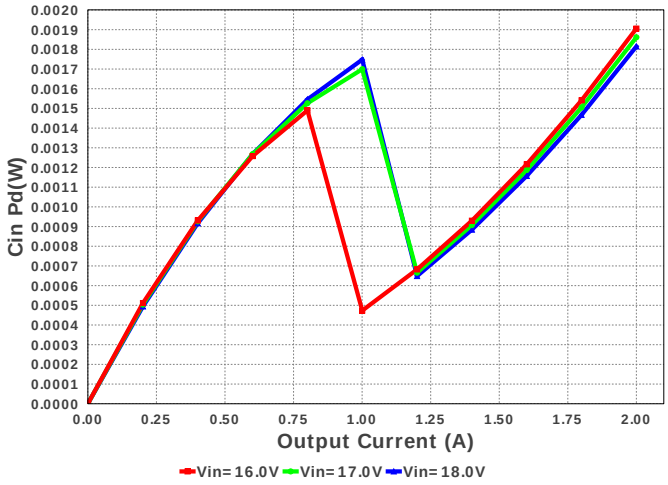
Efficiency



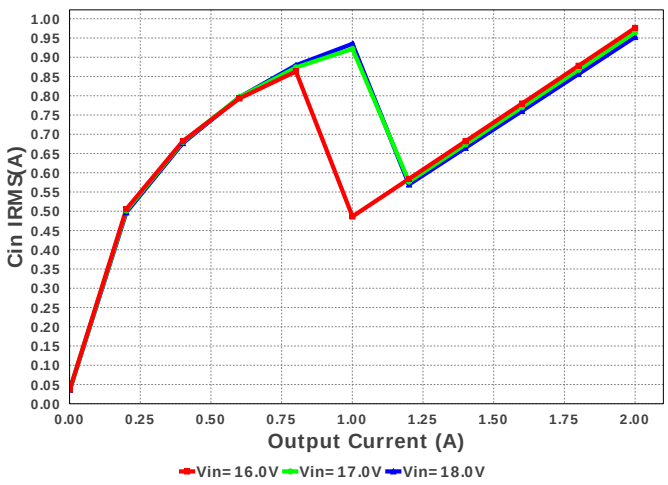
IC Tj



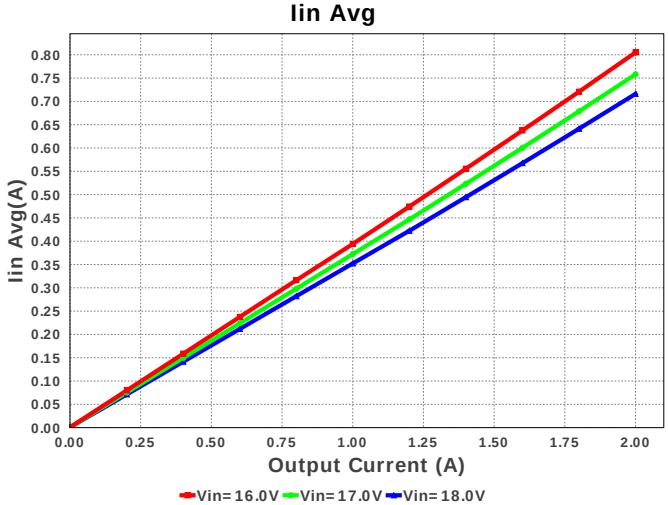
Cin Pd



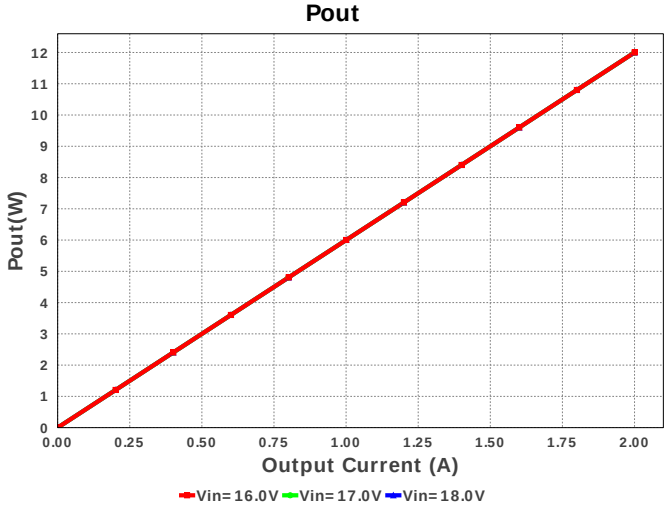
Cin IRMS

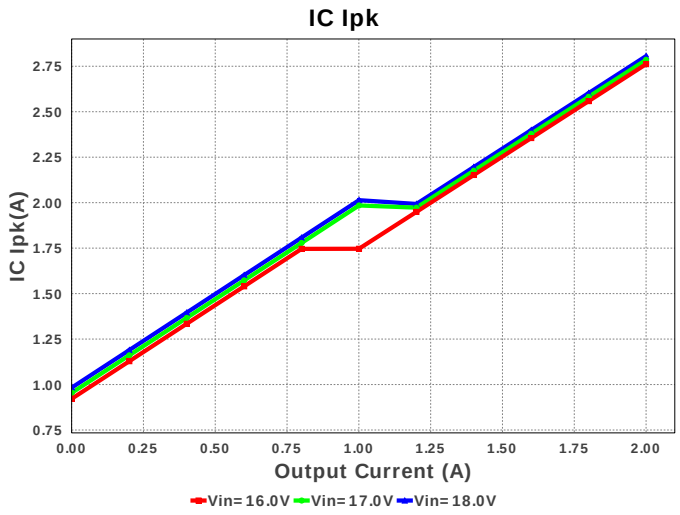


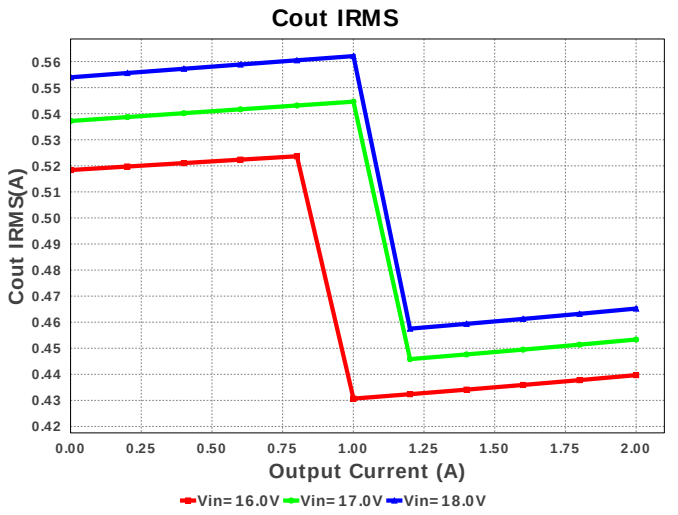
Iin Avg

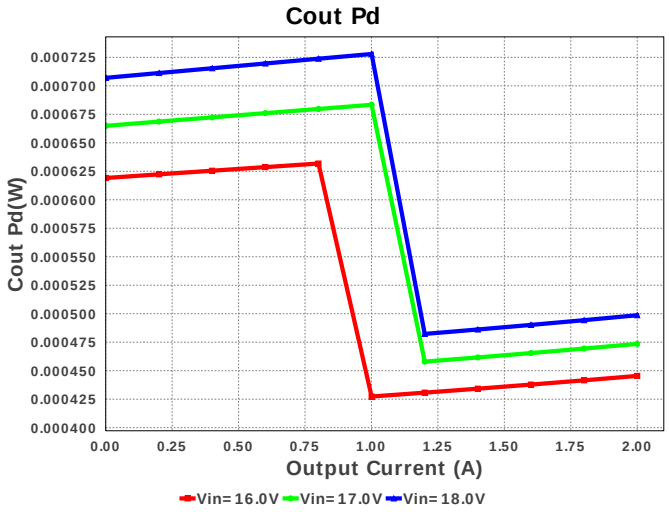


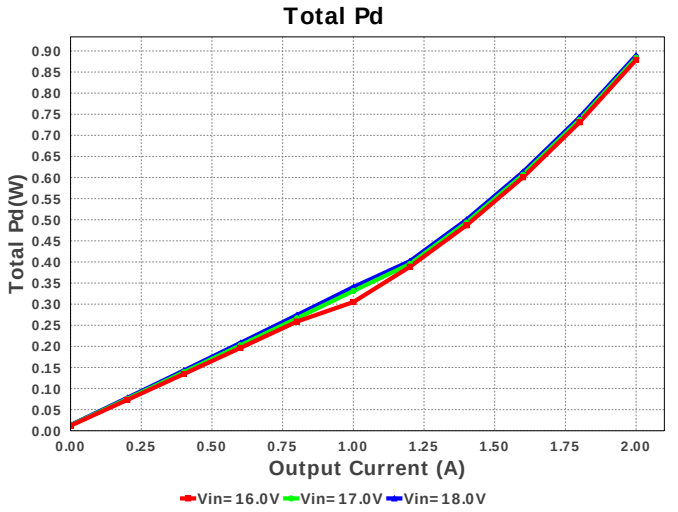
Pout

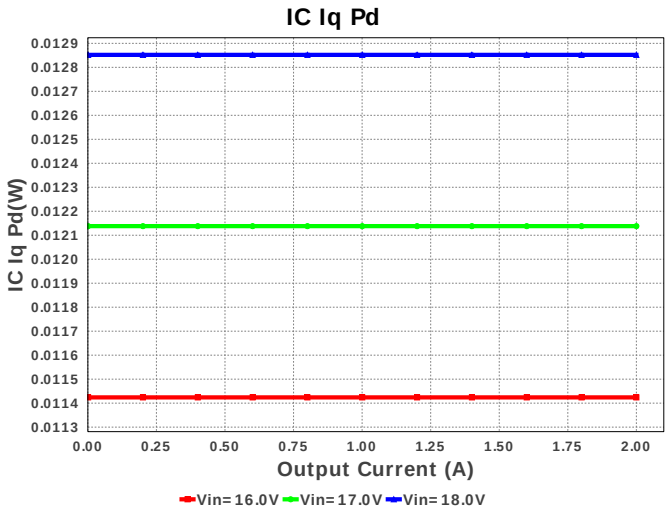


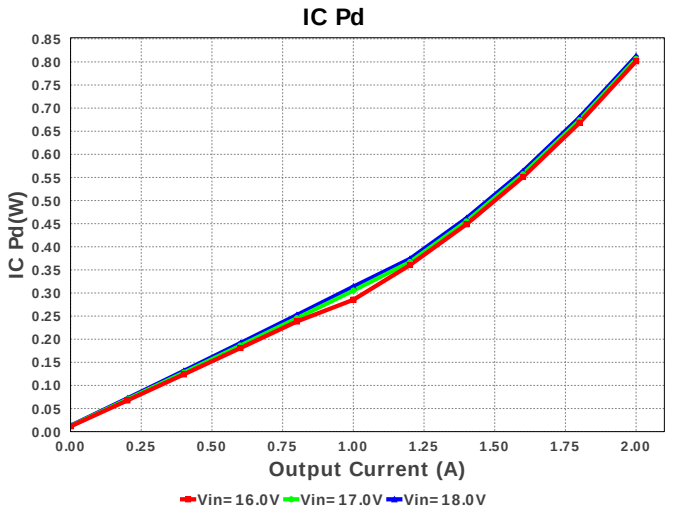


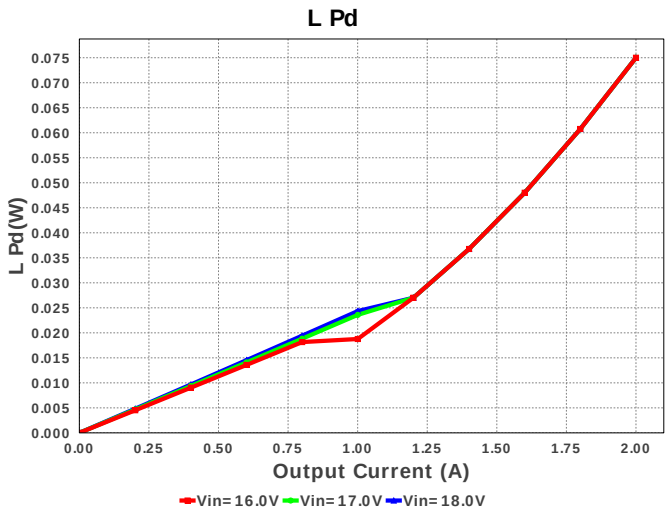


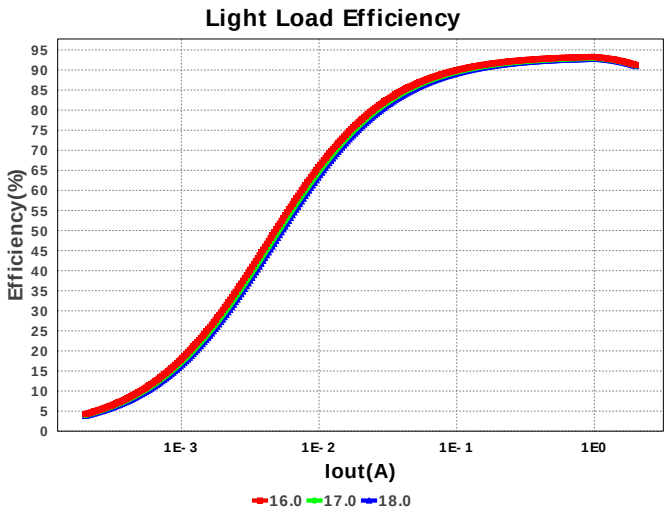












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	952.585 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	465.227 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.806 A	Current	Peak switch current in IC
4.	Iin Avg	716.09 mA	Current	Average input current
5.	L Ipp	1.612 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	289.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	784.911 kHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	12.0 W	General	Total output power
11.	Total BOM	$1.2	General	Total BOM Cost
12.	Vout Actual	5.994 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	6.0 V	Op_Point	Operational Output Voltage
14.	Duty Cycle	34.786 %	Op_point	Duty cycle
15.	Efficiency	93.099 %	Op_point	Steady state efficiency
16.	IC Tj	64.196 degC	Op_point	IC junction temperature
17.	ICThetaJA	42.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
18.	IOUT_OP	2.0 A	Op_point	Iout operating point
19.	VIN_OP	18.0 V	Op_point	Vin operating point
20.	Vout p-p	13.129 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	1.815 mW	Power	Input capacitor power dissipation
22.	Cout Pd	498.67 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	12.852 mW	Power	IC Iq Pd
24.	IC Pd	812.258 mW	Power	IC power dissipation
25.	L Pd	75.0 mW	Power	Inductor power dissipation
26.	Total Pd	889.513 mW	Power	Total Power Dissipation
27.	Vout Tolerance	3.625 %		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	18.0	Maximum input voltage
3.	VinMin	16.0	Minimum input voltage
4.	Vout	6.0	Output Voltage
5.	base_pn	TPS54229E	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54229E** Product Folder : http://www.ti.com/product/TPS54229E : contains the data sheet and other resources.