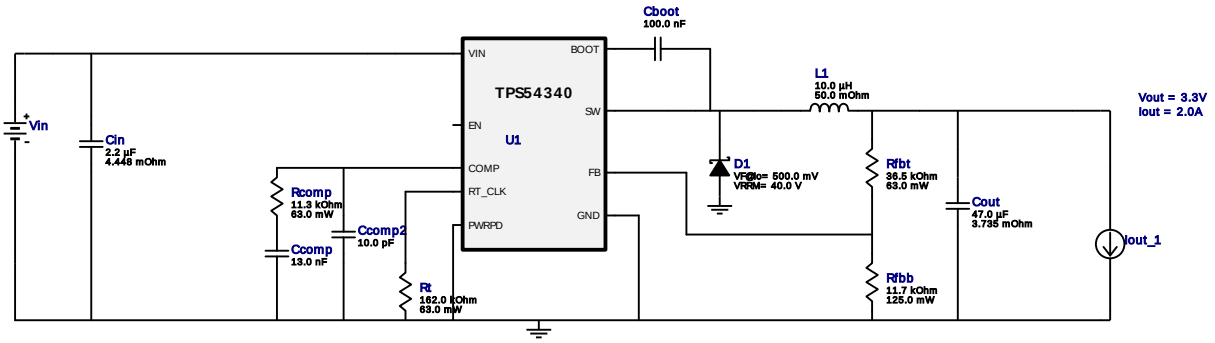
WEBENCH® Design Report

VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 2.0A

Device = TPS54340DDAR
Topology = Buck
Created = 9/22/16 2:19:37 AM
BOM Cost = $2.33
BOM Count = 12
Total Pd = 1.22W

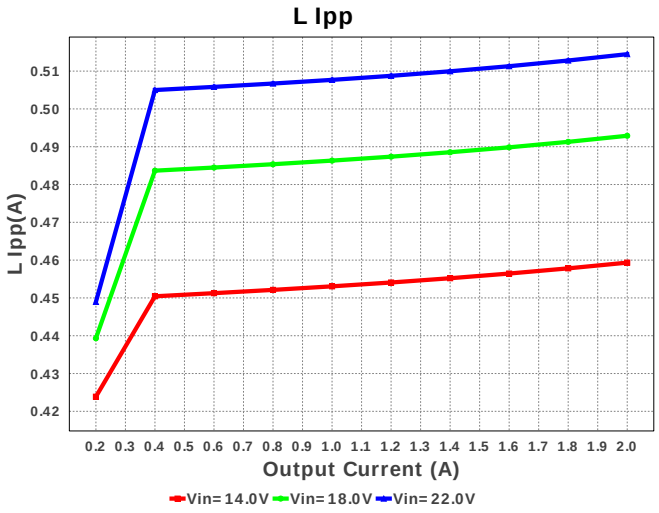
Design : 4800933/7 TPS54340DDAR
TPS54340DDAR 14.0V-22.0V to 3.30V @ 2.0A

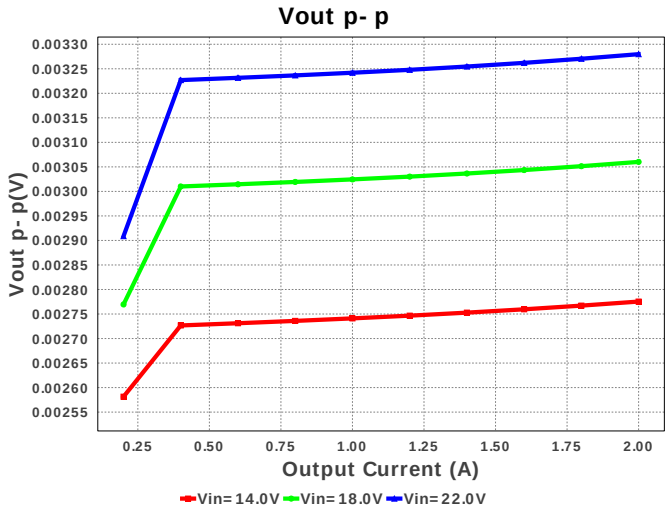


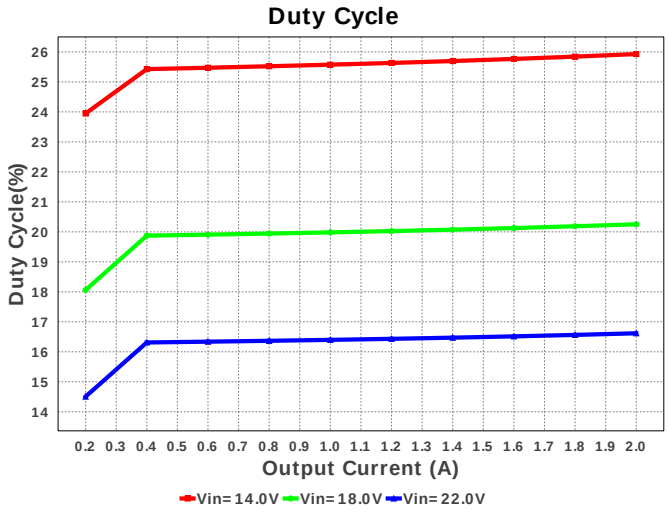
Electrical BOM

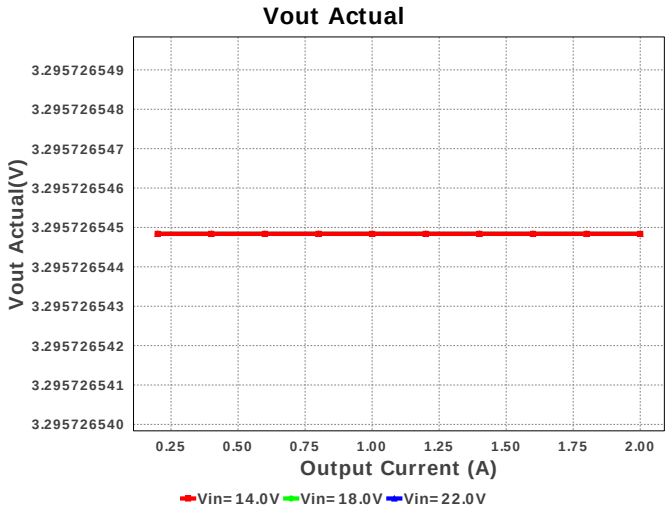
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Ccomp	MuRata	GRM3195C1H133JA01D Series= C0G/NP0	Cap= 13.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.07	1206 11 mm²
3.	Ccomp2	Kemet	C0805C100K5GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	$0.05	1206_190 11 mm²
5.	Cout	MuRata	GRM31CC80J476KE18L Series= X6S	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.0522 A	1	$0.10	1206_190 11 mm²
6.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.11	SMA 37 mm²
7.	L1	Bourns	SRN8040-100M	L= 10.0 µH DCR= 50.0 mOhm	1	$0.22	SRN8040 100 mm²
8.	Rcomp	Vishay-Dale	CRCW040211K3FKED Series= CRCW..e3	Res= 11.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Yageo America	RT0805BRD0711K7L Series= RT0805	Res= 11.7 kOhm Power= 125.0 mW Tolerance= 0.1%	1	$0.05	0805 7 mm²
10.	Rfbt	Vishay-Dale	CRCW040236K5FKED Series= CRCW..e3	Res= 36.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rt	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
12.	U1	Texas Instruments	TPS54340DDAR	Switcher	1	$1.68	 R-PDSO-G8 55 mm^2

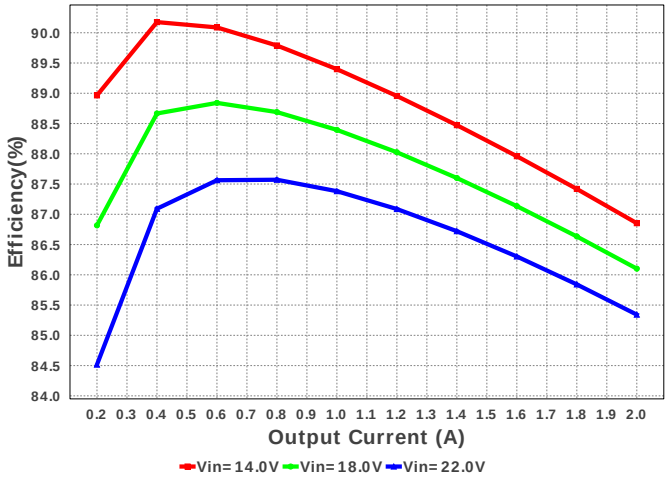




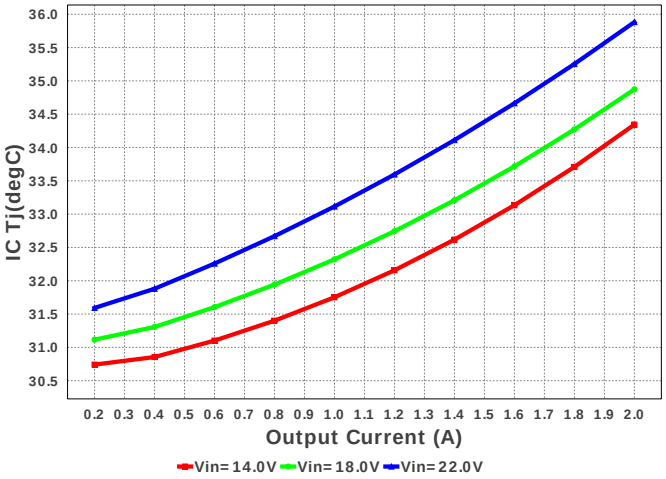




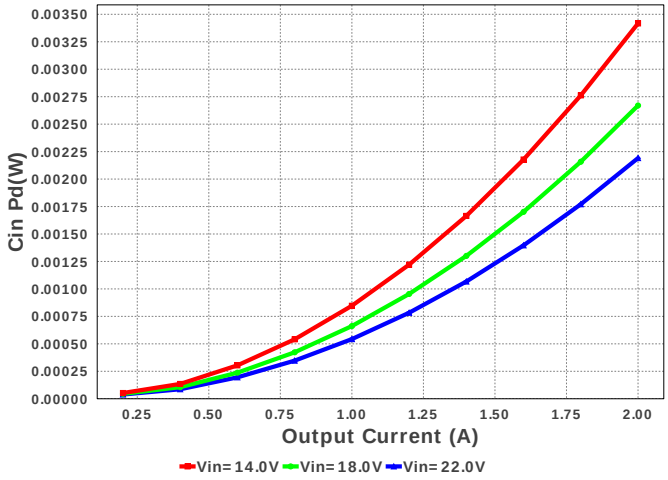
Efficiency



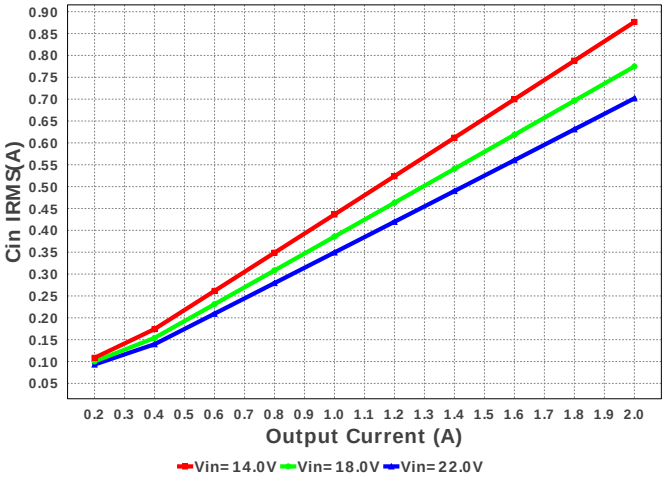
IC Tj



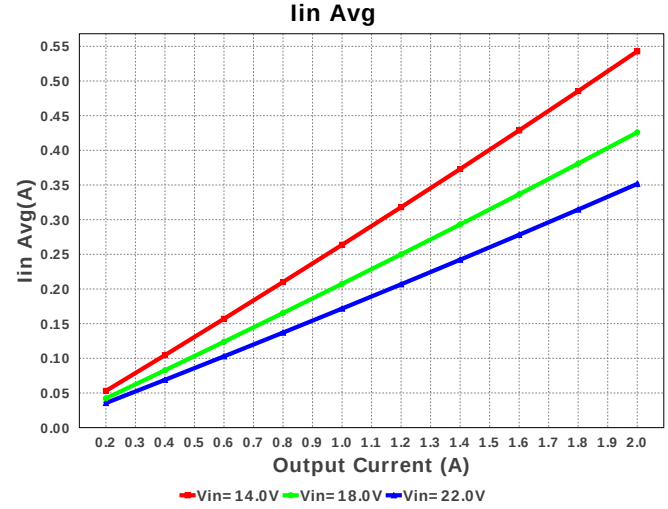
Cin Pd



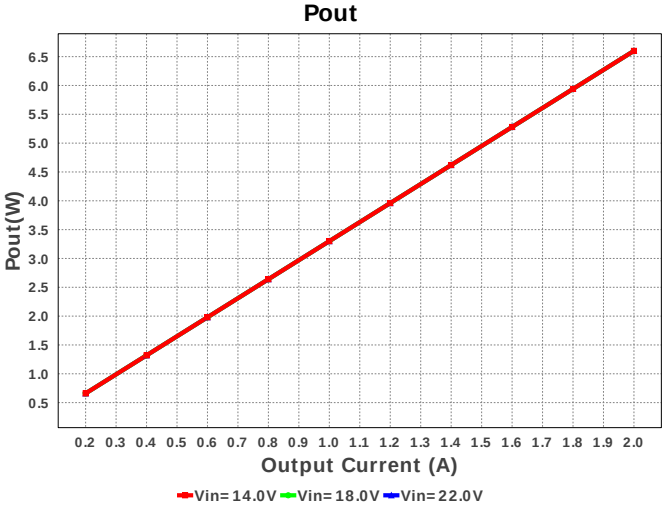
Cin IRMS

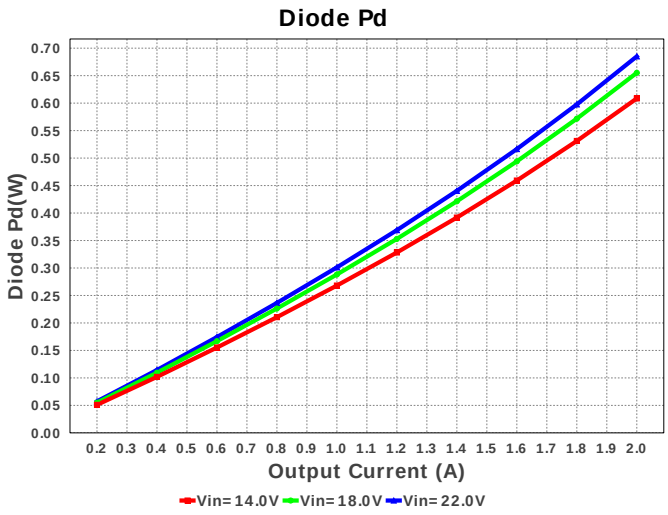


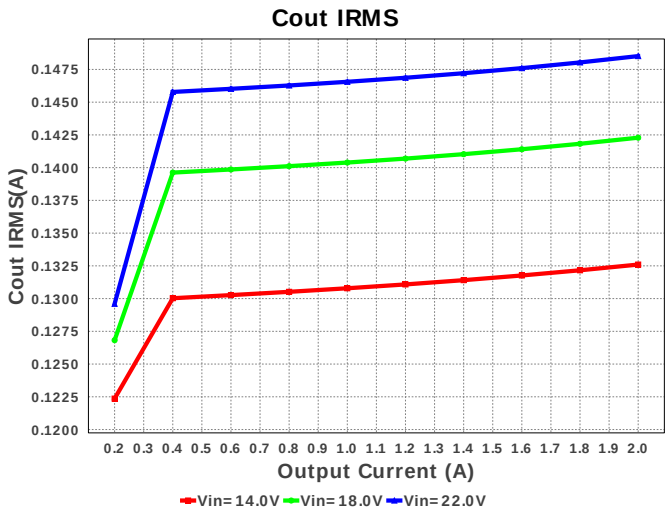
Iin Avg

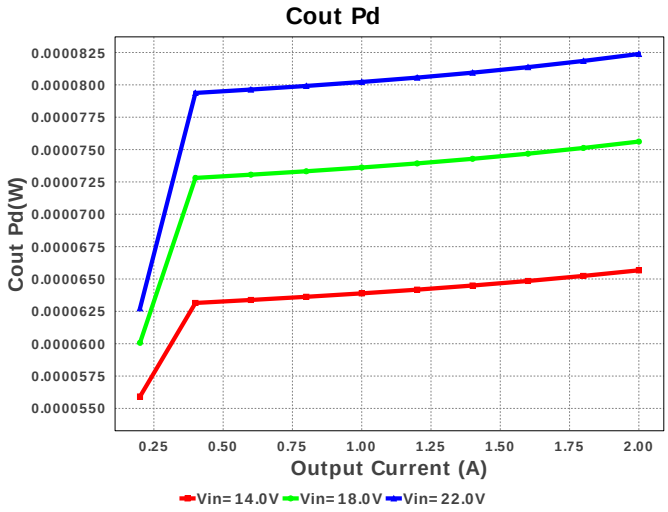


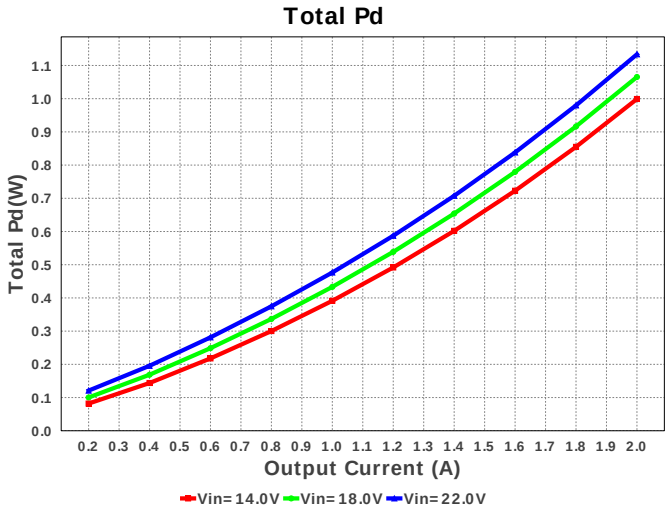
Pout

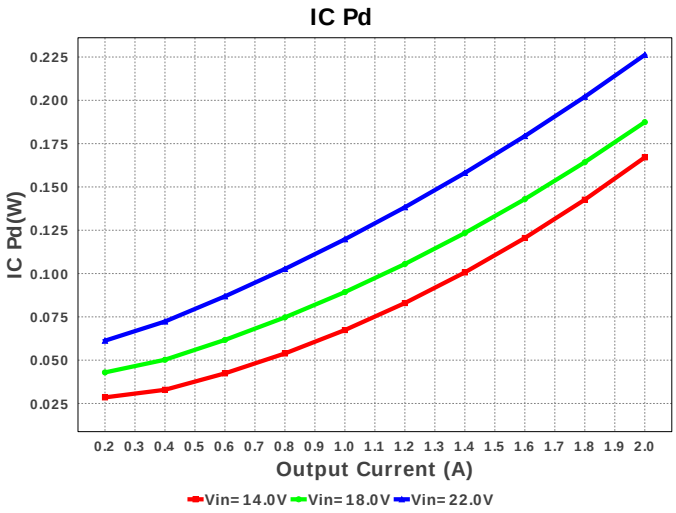


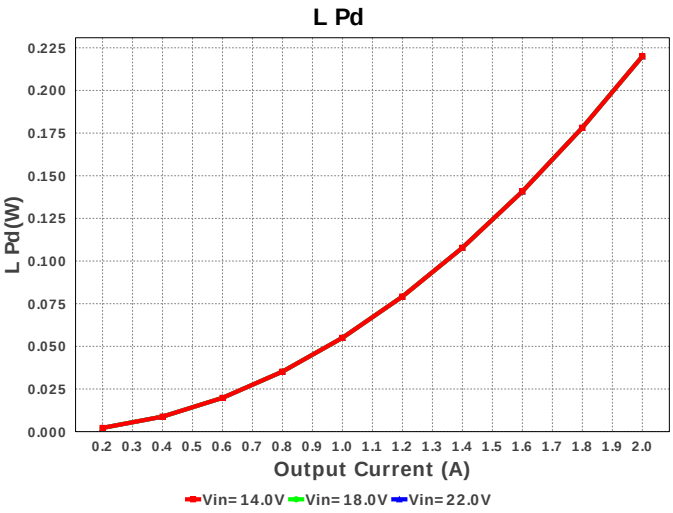


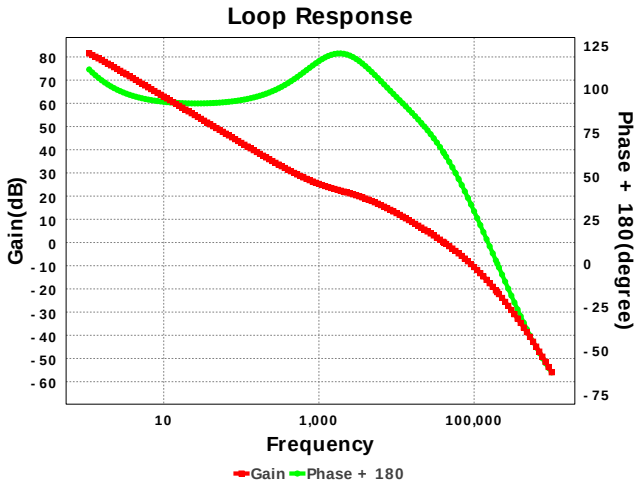












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	704.557 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	150.197 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	355.3 mA	Current	Average input current
4.	L Ipp	520.3 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	251.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	604.003 kHz	General	Switching frequency
8.	Mode	CCM	General	Conduction Mode
9.	Pout	6.6 W	General	Total output power
10.	Total BOM	$2.33	General	Total BOM Cost
11.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Low Freq Gain	81.507 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	3.296 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
15.	Cross Freq	41.11 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	16.805 %	Op_point	Duty cycle
17.	Efficiency	84.437 %	Op_point	Steady state efficiency
18.	Gain Marg	-21.411 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	35.902 degC	Op_point	IC junction temperature
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	Phase Marg	63.21 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	22.0 V	Op_point	Vin operating point
23.	Vout p-p	3.312 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	2.208 mW	Power	Input capacitor power dissipation
25.	Cout Pd	84.258 µW	Power	Output capacitor power dissipation
26.	Diode Pd	767.219 mW	Power	Diode power dissipation
27.	IC Pd	226.99 mW	Power	IC power dissipation
28.	L Pd	220.0 mW	Power	Inductor power dissipation
29.	Total Pd	1.216 W	Power	Total Power Dissipation
30.	Vout Tolerance	1.842 %		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	22.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54340	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54340** Product Folder : http://www.ti.com/product/TPS54340 : contains the data sheet and other resources.