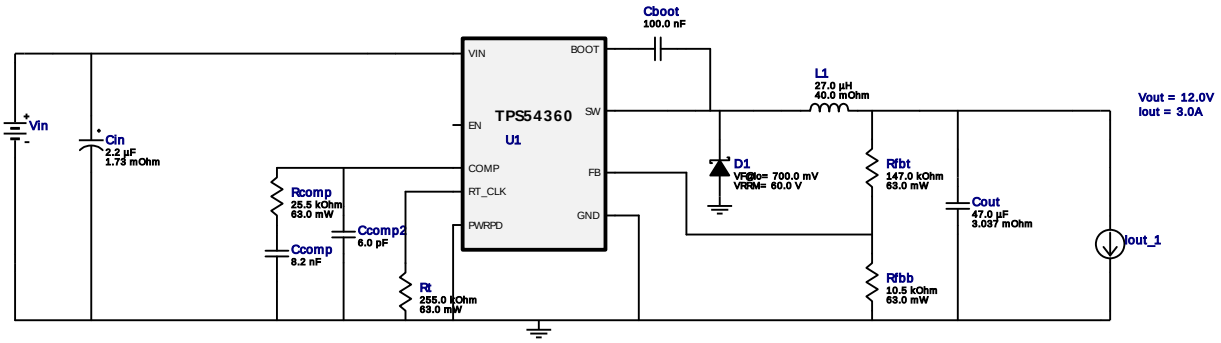
WEBENCH® Design Report

VinMin = 40.0V
VinMax = 50.0V
Vout = 12.0V
Iout = 3.0A

Device = TPS54360DDAR
Topology = Buck
Created = 8/5/16 4:24:32 AM
BOM Cost = $3.23
BOM Count = 12
Total Pd = 2.44W

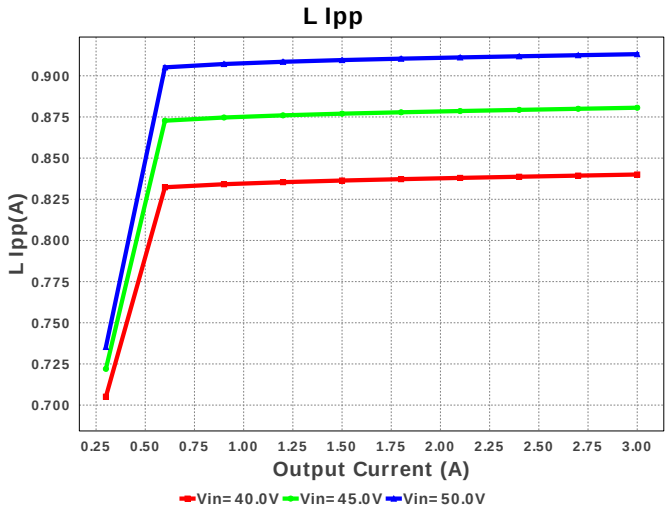
Design : 4761085/2 TPS54360DDAR
TPS54360DDAR 40.0V-50.0V to 12.00V @ 3.0A

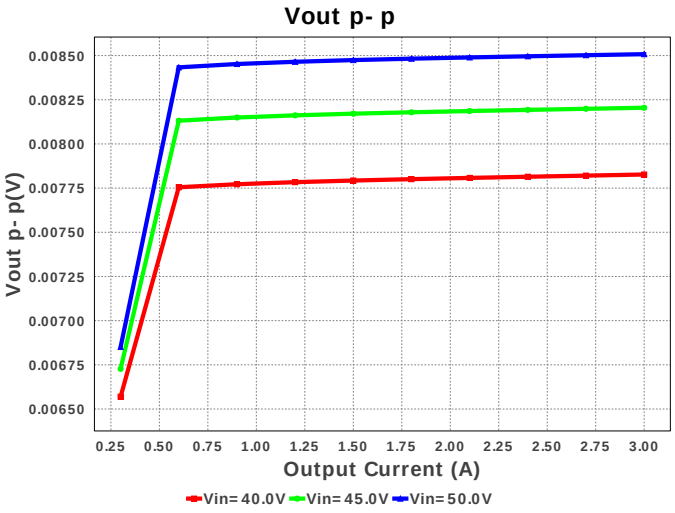


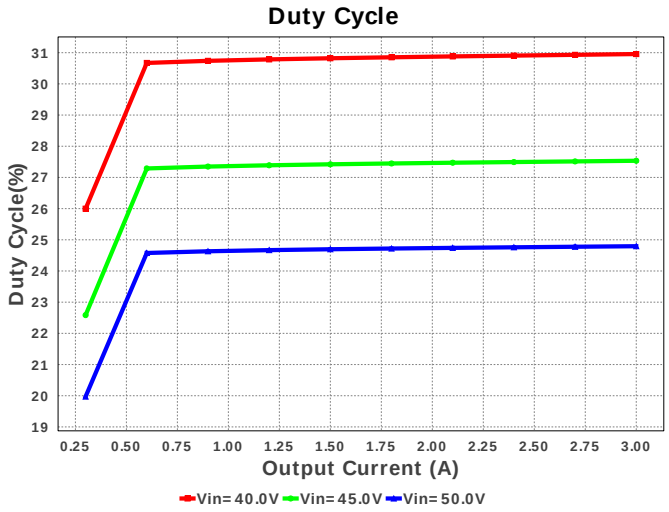
Electrical BOM

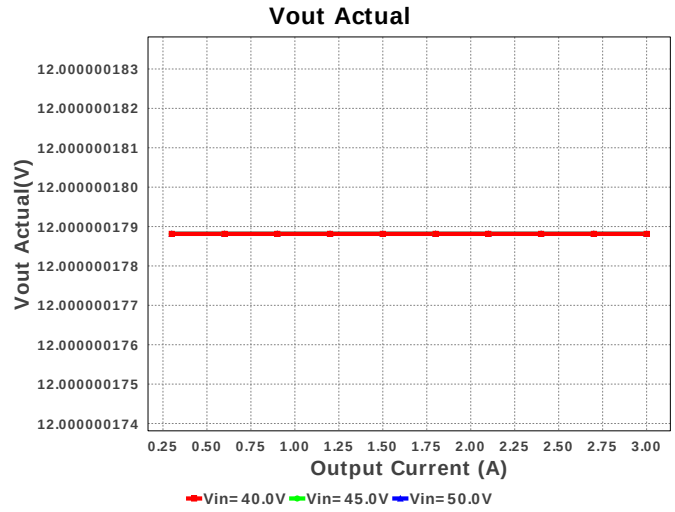
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Ccomp	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
3.	Ccomp2	Yageo America	CC0805DRNP09BN6R0 Series= C0G/NP0	Cap= 6.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
4.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 1.73 mOhm VDC= 100.0 V IRMS= 5.5932 A	1	$0.19	1210_250 15 mm²
5.	Cout	MuRata	GRM32ER61C476ME15L Series= X5R	Cap= 47.0 uF ESR= 3.037 mOhm VDC= 16.0 V IRMS= 4.59346 A	1	$0.24	1210_280 15 mm²
6.	D1	Diodes Inc.	B560C-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.17	 SMC 83 mm²
7.	L1	Bourns	SRR1210-270M	L= 27.0 µH DCR= 40.0 mOhm	1	$0.44	 SRR1210 196 mm²
8.	Rcomp	Vishay-Dale	CRCW040225K5FKED Series= CRCW..e3	Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040210K5FKED Series= CRCW..e3	Res= 10.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW0402147KFKED Series= CRCW..e3	Res= 147.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rt	Vishay-Dale	CRCW0402255KFKED Series= CRCW..e3	Res= 255.0 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	TPS54360DDAR	Switcher	1	$2.10	 R-PDSO-G8 55 mm^2

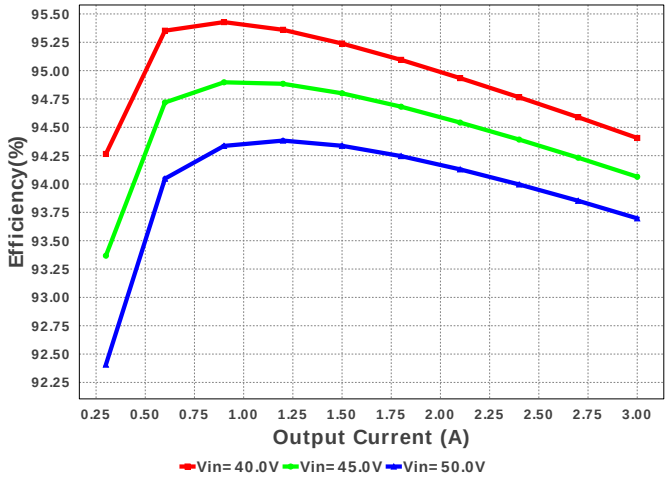




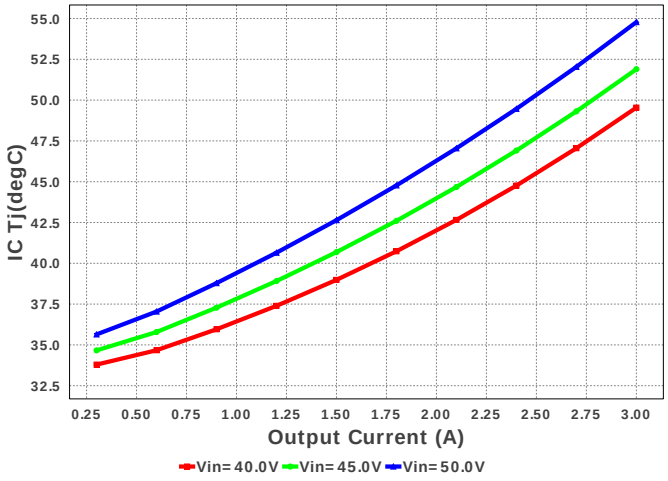




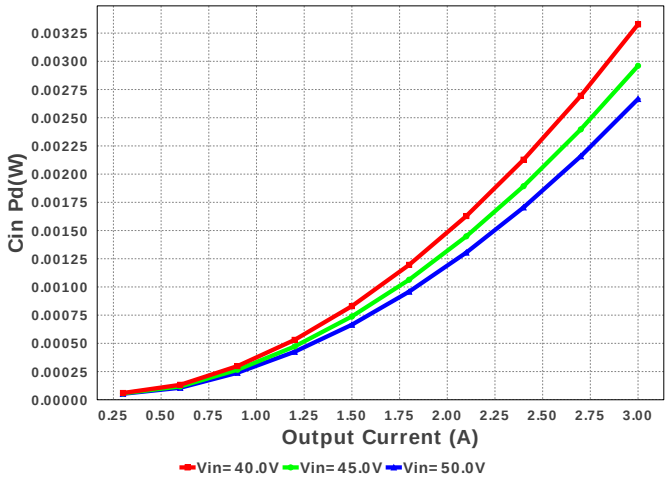
Efficiency



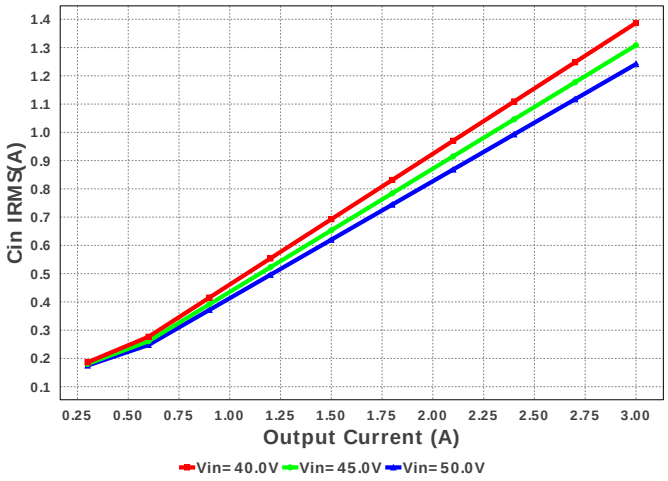
IC Tj



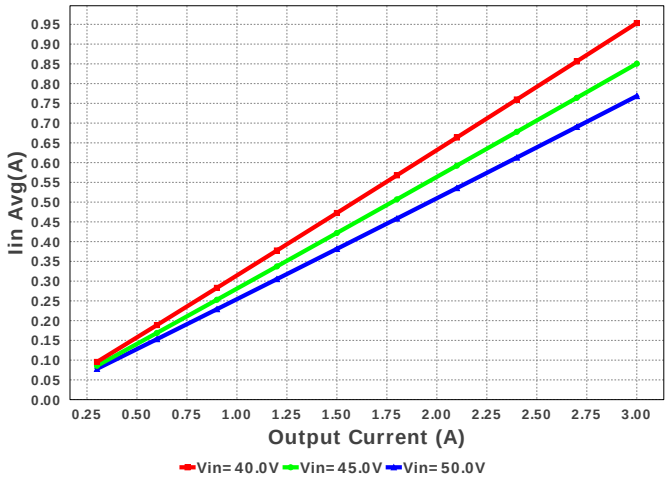
Cin Pd



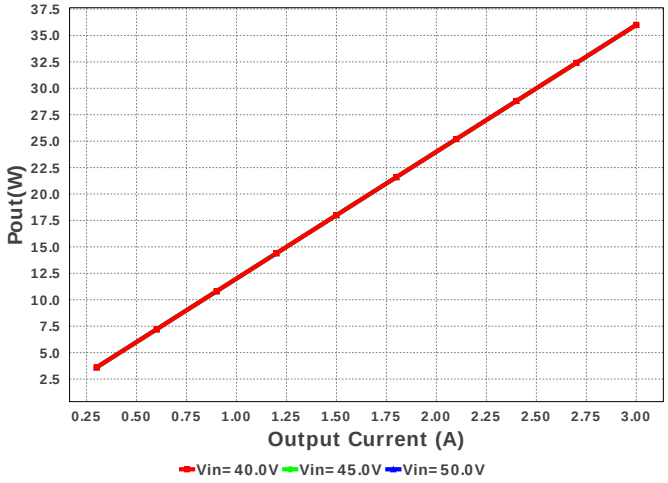
Cin IRMS

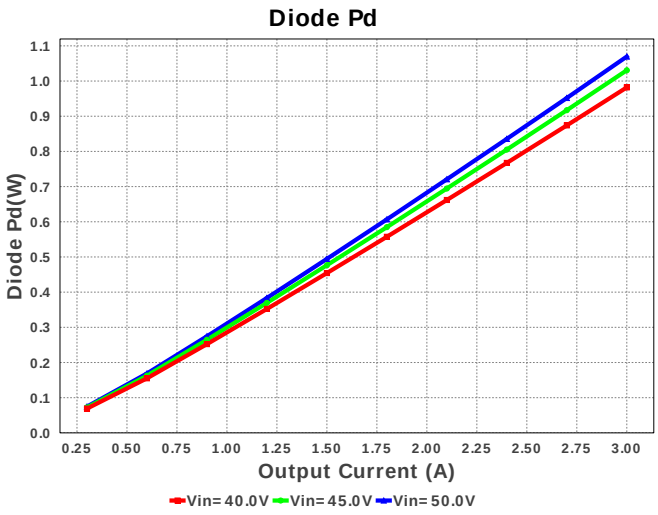


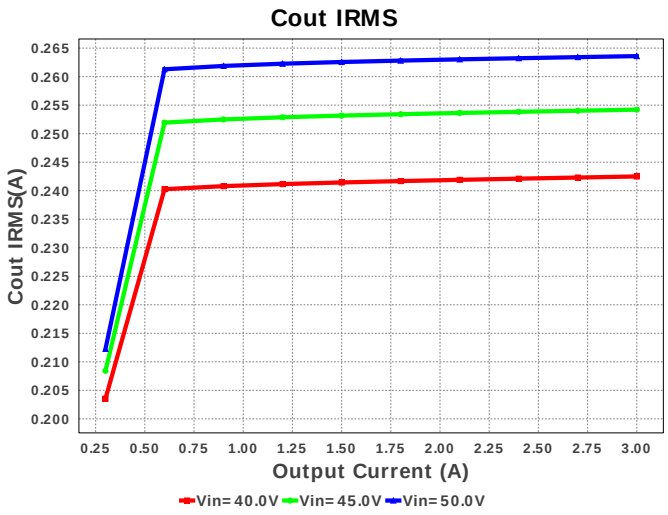
Iin Avg

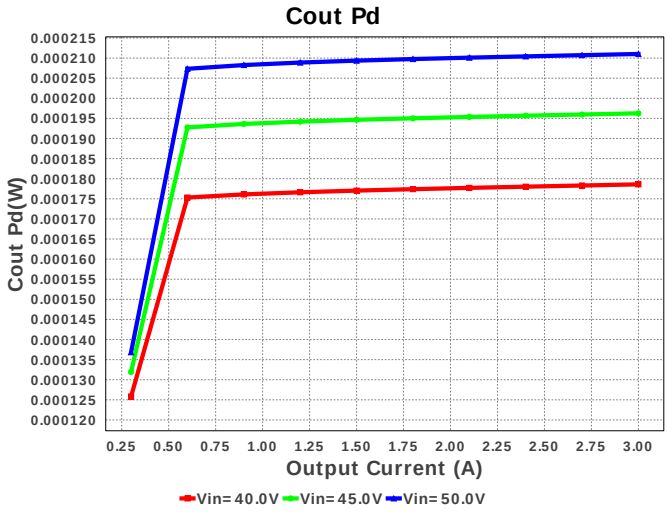


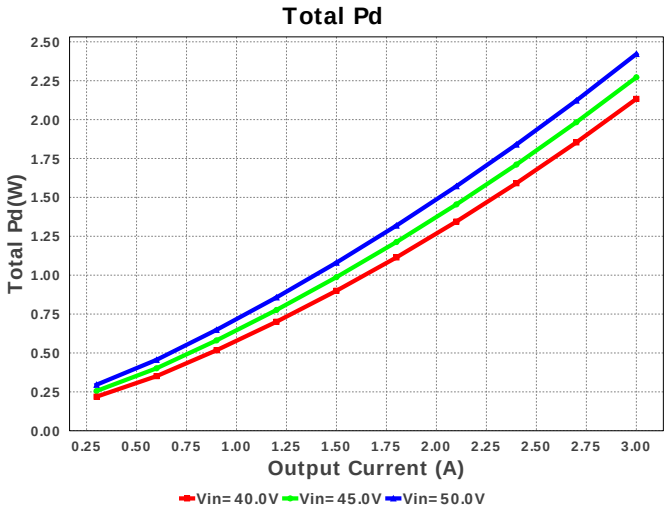
Pout

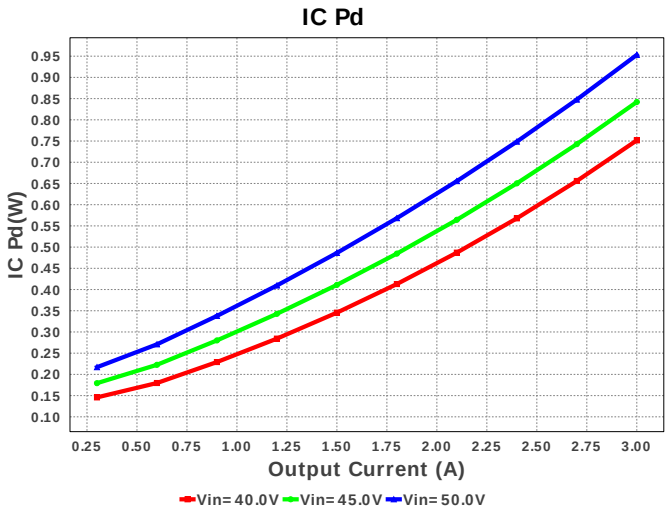


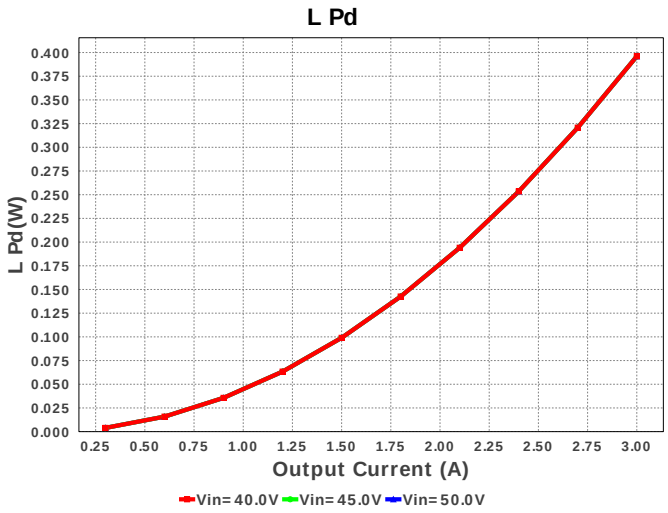


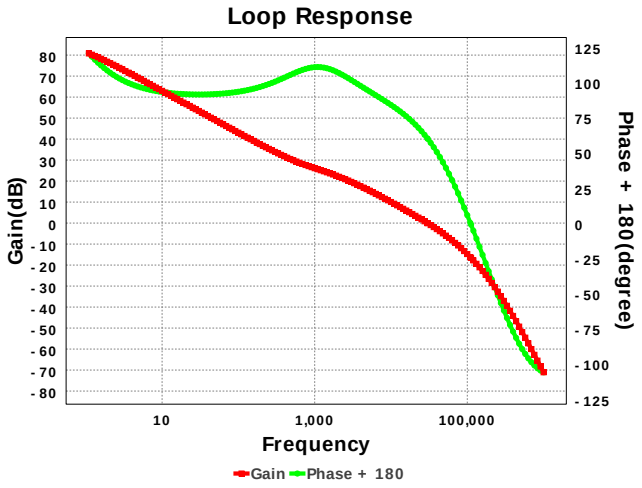












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.242 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	263.735 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	768.82 mA	Current	Average input current
4.	L Ipp	913.61 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	388.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	382.156 kHz	General	Switching frequency
8.	Pout	36.0 W	General	Total output power
9.	Total BOM	$3.23	General	Total BOM Cost
10.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Low Freq Gain	80.791 dB	Op_Point	Gain at 10Hz
12.	Vout Actual	12.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
14.	Cross Freq	30.067 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	24.807 %	Op_point	Duty cycle
16.	Efficiency	93.65 %	Op_point	Steady state efficiency
17.	Gain Marg	-16.593 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	54.784 degC	Op_point	IC junction temperature
19.	IOUT_OP	3.0 A	Op_point	Iout operating point
20.	Phase Marg	61.248 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	50.0 V	Op_point	Vin operating point
22.	Vout p-p	8.512 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	2.667 mW	Power	Input capacitor power dissipation
24.	Cout Pd	211.243 µW	Power	Output capacitor power dissipation
25.	Diode Pd	1.089 W	Power	Diode power dissipation
26.	IC Pd	953.223 mW	Power	IC power dissipation
27.	L Pd	396.0 mW	Power	Inductor power dissipation
28.	Total Pd	2.441 W	Power	Total Power Dissipation
29.	Vout Tolerance	2.904 %		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	50.0	Maximum input voltage
3.	VinMin	40.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	TPS54360	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54360** Product Folder : http://www.ti.com/product/TPS54360 : contains the data sheet and other resources.