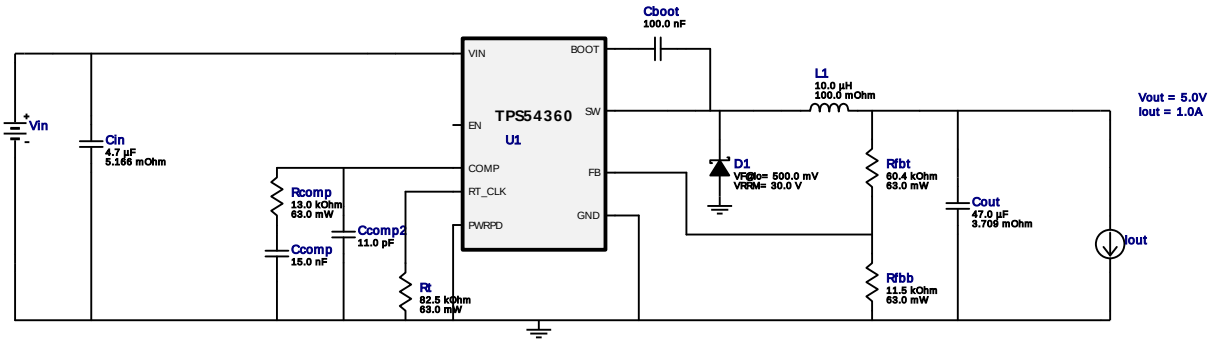
WEBENCH® Design Report

VinMin = 12.0V
VinMax = 13.0V
Vout = 5.0V
Iout = 1.0A

Device = TPS54360DDAR
Topology = Buck
Created = 7/15/16 9:41:33 PM
BOM Cost = $2.61
BOM Count = 12
Total Pd = 0.45W

Design : 4742013/87 TPS54360DDAR
TPS54360DDAR 12.0V-13.0V to 5.00V @ 1.0A

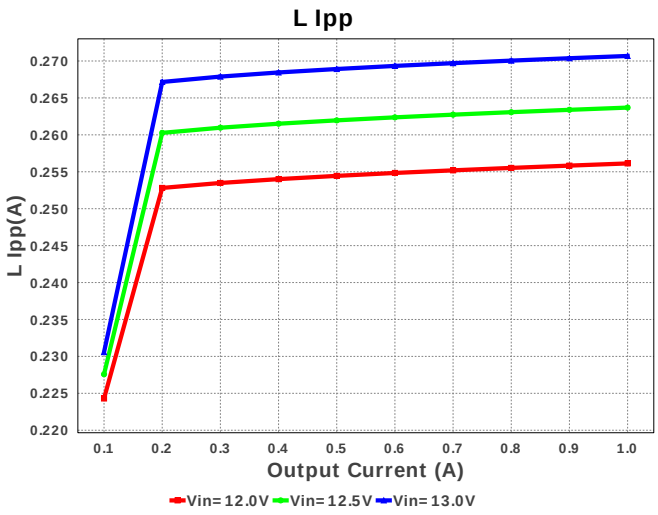


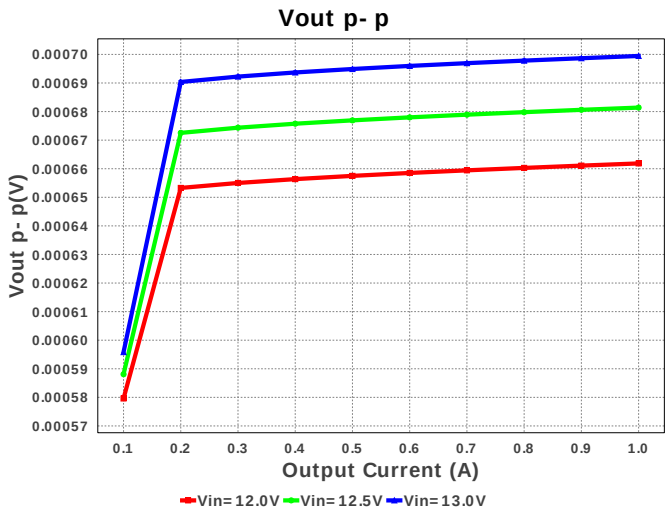
Electrical BOM

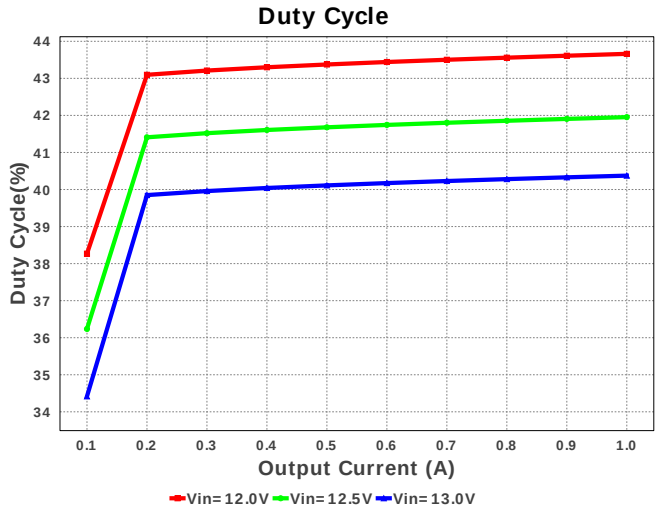
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Ccomp	Yageo America	CC0805KRX7R9BB153 Series= X7R	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Ccomp2	TDK	C0603C0G1E110G Series= C0G/NP0	Cap= 11.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
4.	Cin	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
5.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	$0.15	1206_190 11 mm²
6.	D1	Diodes Inc.	B230A-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	$0.09	SMA 37 mm²
7.	L1	Bourns	SDR0604-100ML	L= 10.0 µH DCR= 100.0 mOhm	1	$0.18	SDR0604 61 mm²
8.	Rcomp	Vishay-Dale	CRCW040213K0FKED Series= CRCW..e3	Res= 13.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040211K5FKED Series= CRCW..e3	Res= 11.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW040260K4FKED Series= CRCW..e3	Res= 60.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rt	Vishay-Dale	CRCW040282K5FKED Series= CRCW..e3	Res= 82.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

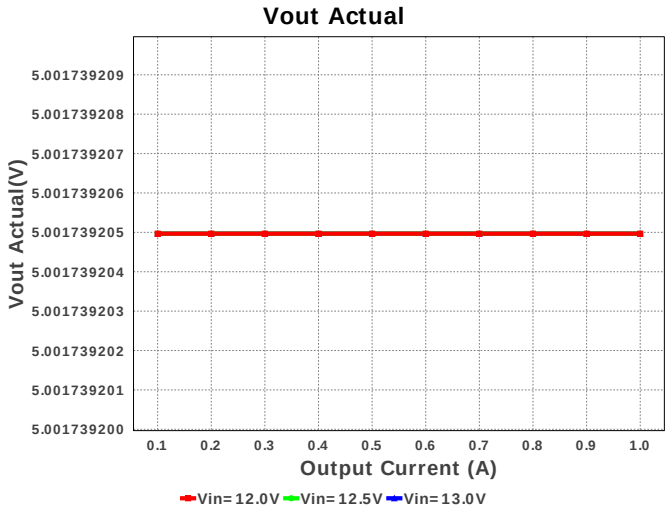
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	U1	Texas Instruments	TPS54360DDAR	Switcher	1	$2.10	

R-PDSO-G8 57 mm^2

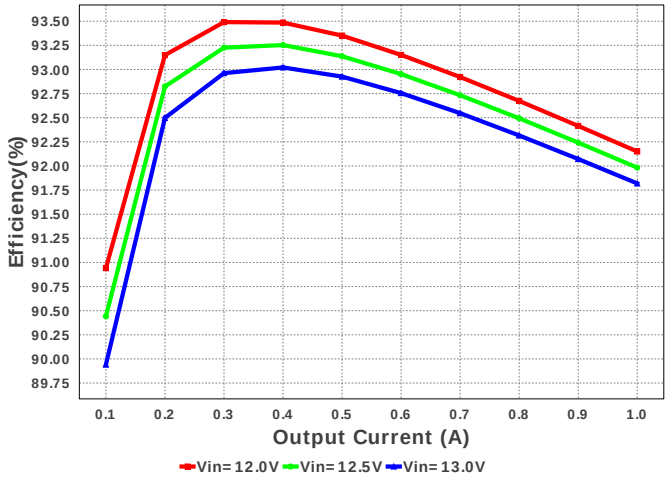




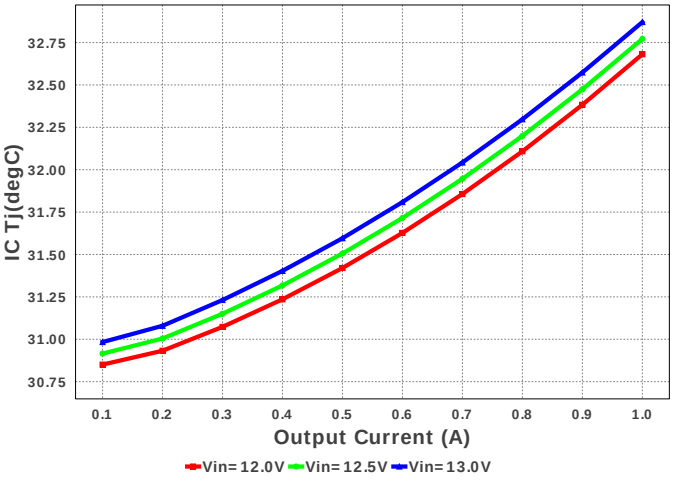




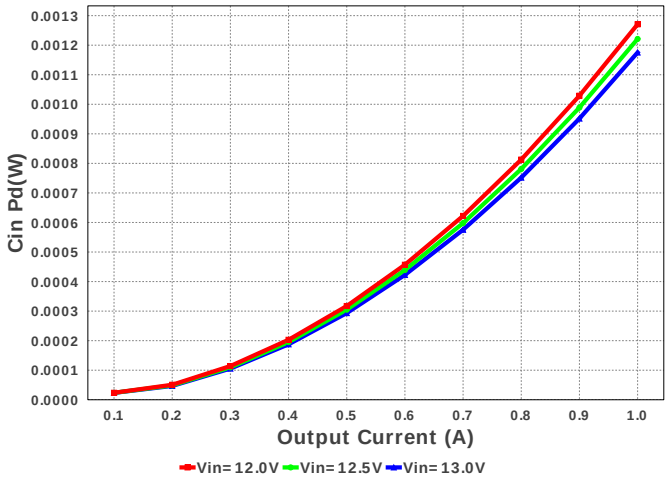
Efficiency



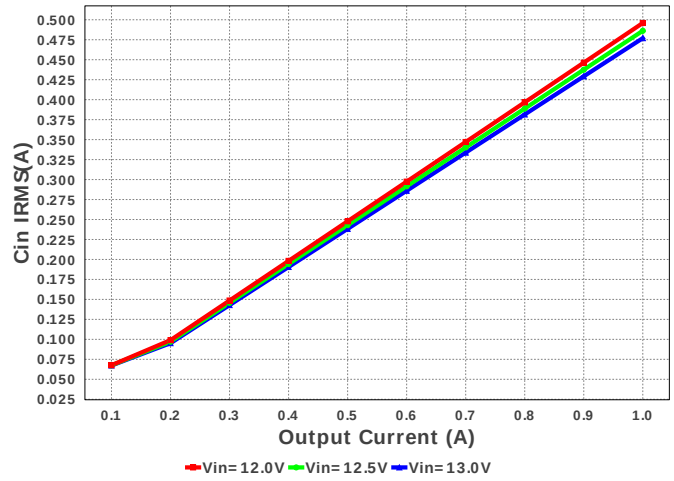
IC Tj



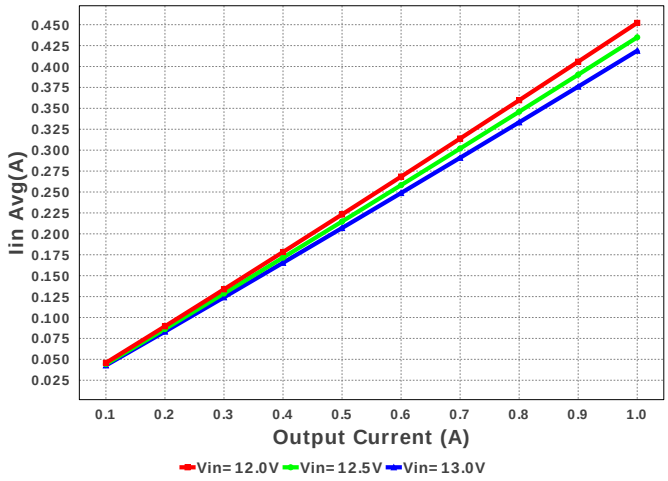
Cin Pd



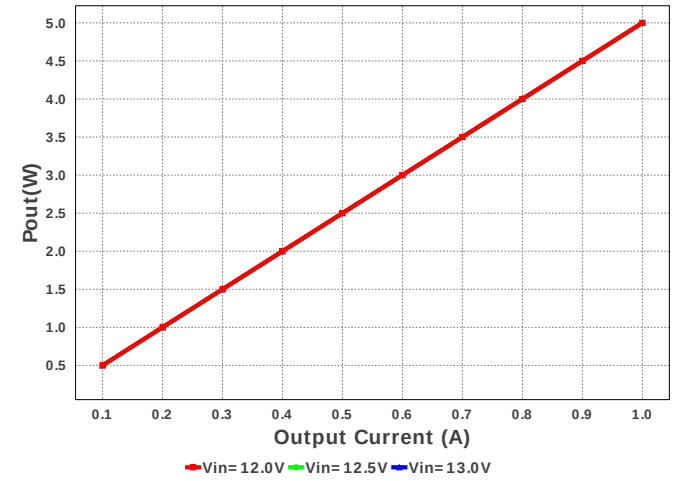
Cin IRMS

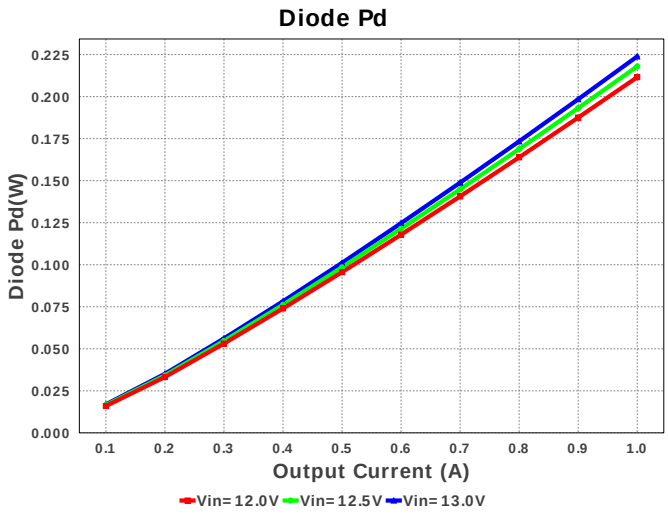


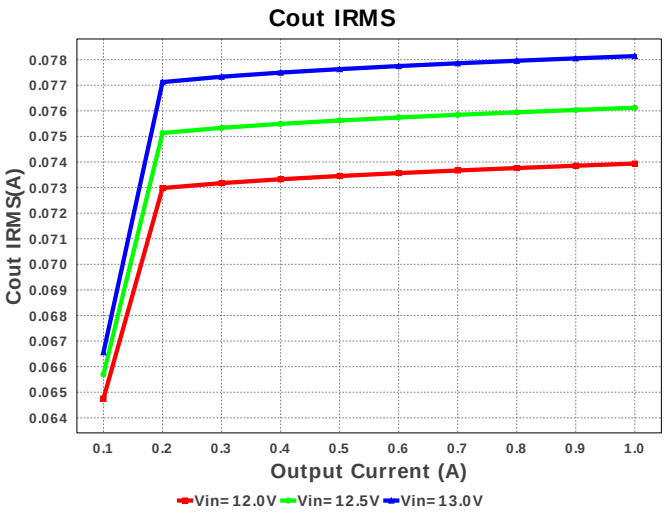
Iin Avg

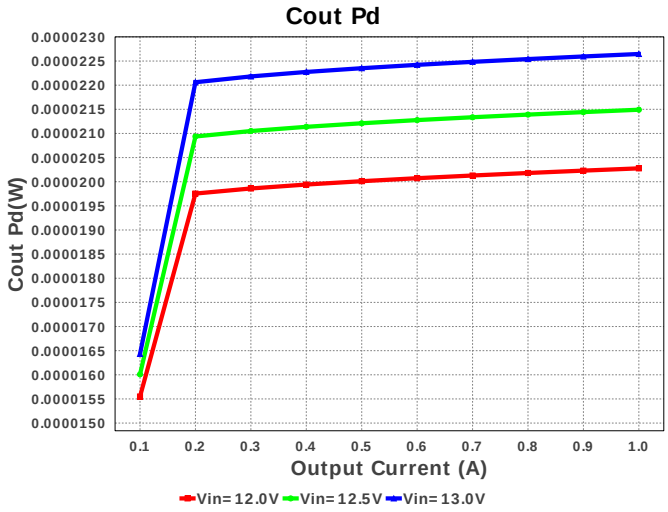


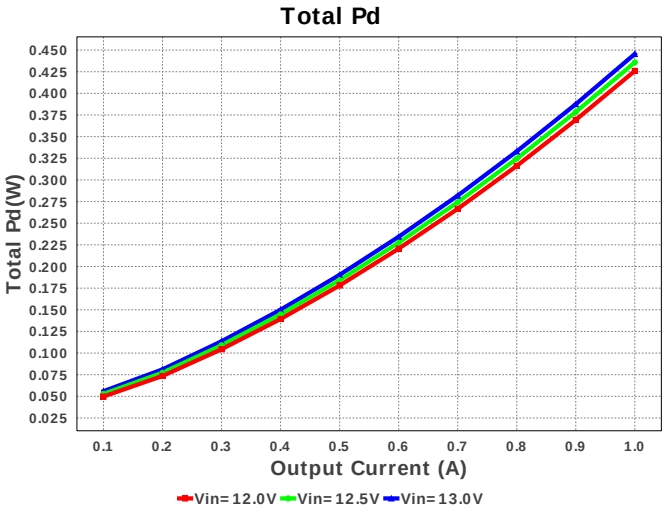
Pout

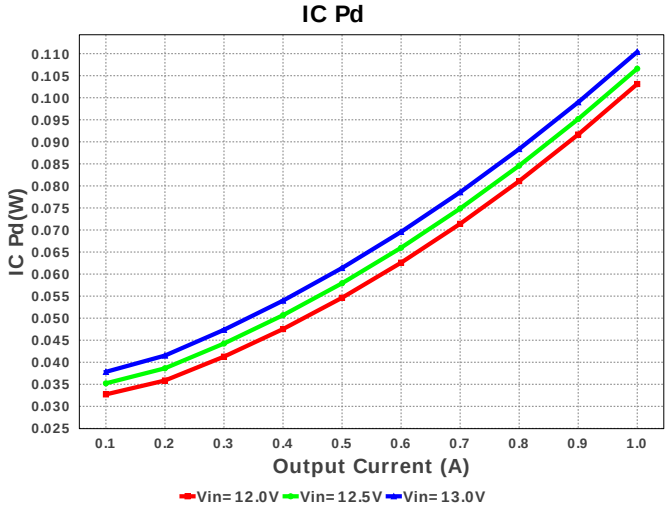


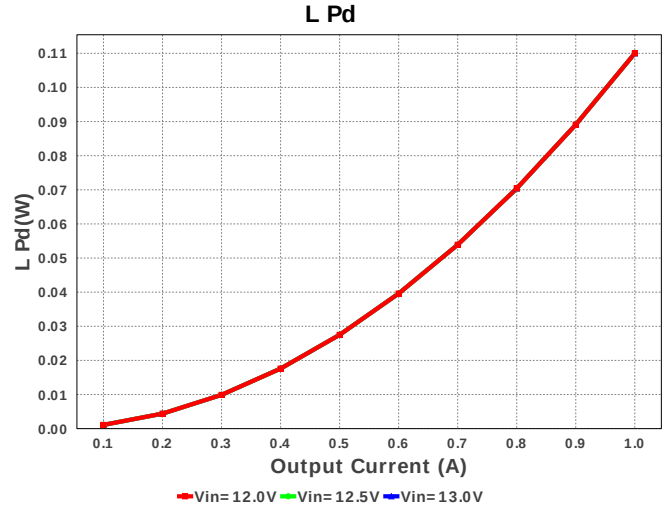


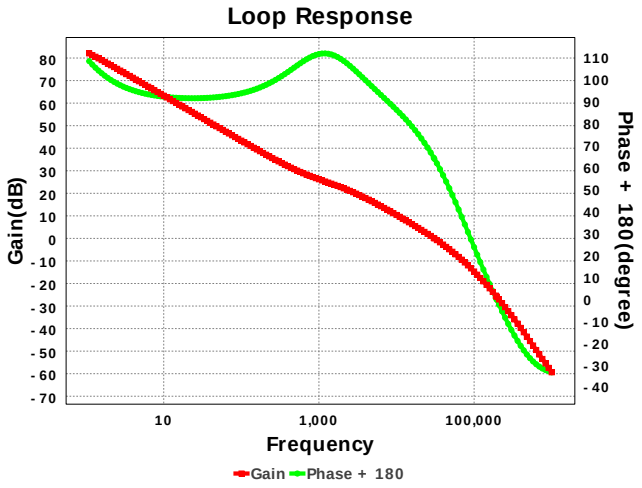












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	477.076 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	78.274 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	419.58 mA	Current	Average input current
4.	L Ipp	271.15 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	12	General	Total Design BOM count
6.	FootPrint	197.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	1.193 MHz	General	Switching frequency
8.	Pout	5.0 W	General	Total output power
9.	Total BOM	$2.61	General	Total BOM Cost
10.	ICThetaJA Effective	26.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Low Freq Gain	82.036 dB	Op_Point	Gain at 10Hz
12.	Vout Actual	5.002 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
14.	Cross Freq	30.749 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	40.444 %	Op_point	Duty cycle
16.	Efficiency	91.666 %	Op_point	Steady state efficiency
17.	Gain Marg	-25.8 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	32.872 degC	Op_point	IC junction temperature
19.	IOUT_OP	1.0 A	Op_point	Iout operating point
20.	Phase Marg	64.2 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	13.0 V	Op_point	Vin operating point
22.	Vout p-p	700.667 µV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.176 mW	Power	Input capacitor power dissipation
24.	Cout Pd	22.724 µW	Power	Output capacitor power dissipation
25.	Diode Pd	232.879 mW	Power	Diode power dissipation
26.	IC Pd	110.479 mW	Power	IC power dissipation
27.	L Pd	110.0 mW	Power	Inductor power dissipation
28.	Total Pd	454.581 mW	Power	Total Power Dissipation
29.	Vout Tolerance	2.714 %		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	13.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	5.0	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.