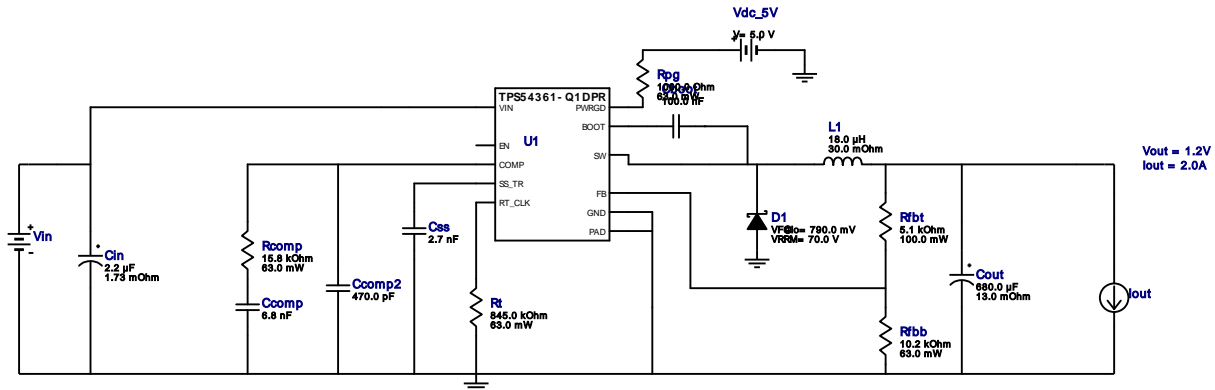


WEBENCH® Design Report

Design : 4466246/53 TPS54361QDPRRQ1
TPS54361QDPRRQ1 48.0V-60.0V to 1.20V @ 2.0A



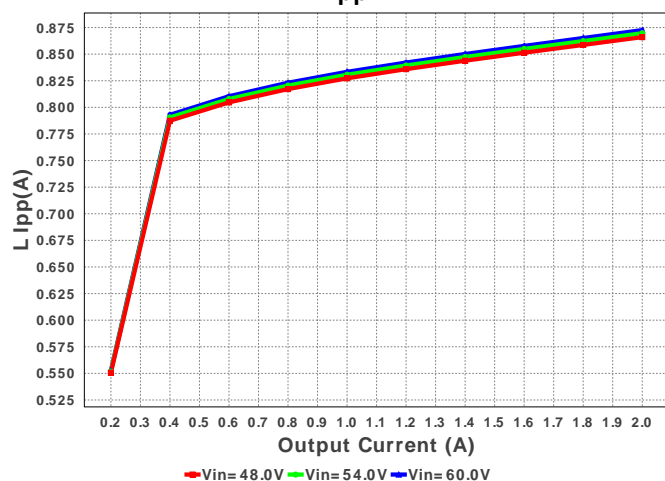
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application. View WEBENCH(R) Disclaimer.

Electrical BOM

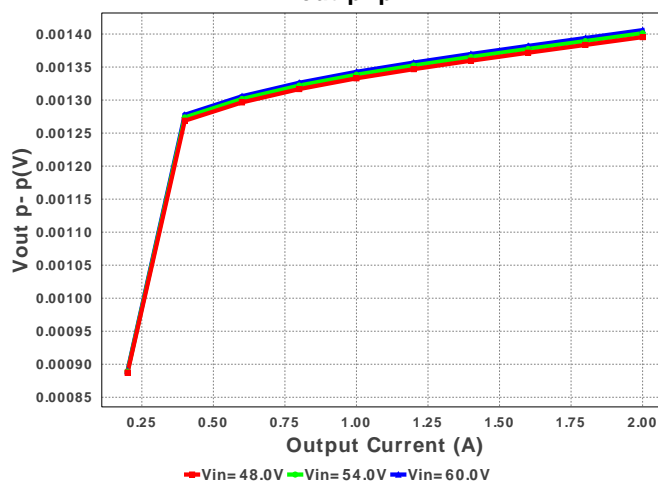
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB471 Series= X7R	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
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 mm ²
5.	Cout	Panasonic	2R5SVP680M Series= SVP	Cap= 680.0 uF ESR= 13.0 mOhm VDC= 2.5 V IRMS= 4.52 A	1	\$0.70	SM_RADIAL_8MM 113 mm ²
6.	Css	Yageo America	CC0805KRX7R9BB272 Series= X7R	Cap= 2.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	D1	Diodes Inc.	B370-13-F	VF@Io= 790.0 mV VRRM= 70.0 V	1	\$0.22	SMC 83 mm ²
8.	L1	Coilcraft	MSS1260-183MLB	L= 18.0 uH DCR= 30.0 mOhm	1	\$0.68	MSS1260 204 mm ²
9.	Rcomp	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rfbb	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	Rfbt	Yageo America	RC0603FR-075K1L Series= ?	Res= 5.1 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	0603 5 mm ²
12.	Rpg	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
13.	Rt	Vishay-Dale	CRCW0402845KFKED Series= CRCW..e3	Res= 845.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
14.	U1	Texas Instruments	TPS54361QDPRRQ1	Switcher	1	\$3.12	DPR0010A 25 mm ²

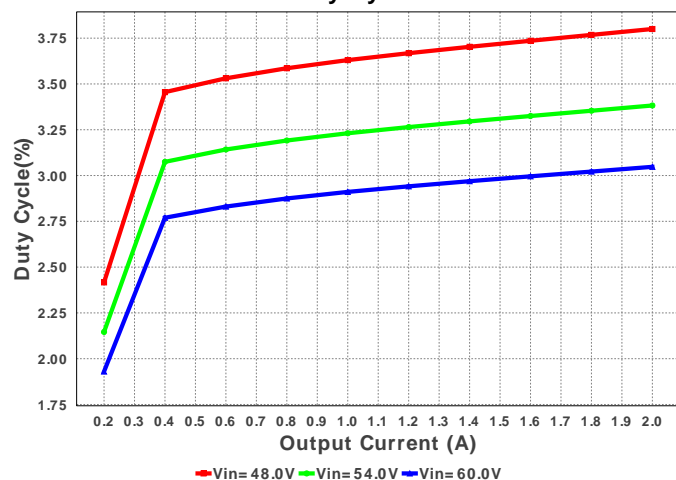
L Ipp



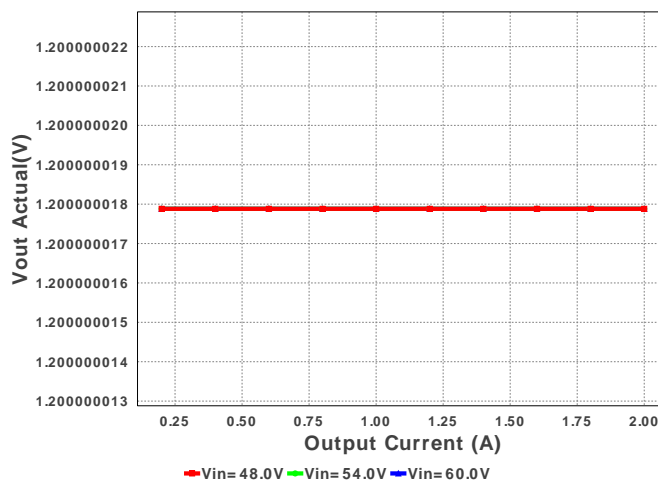
Vout p-p

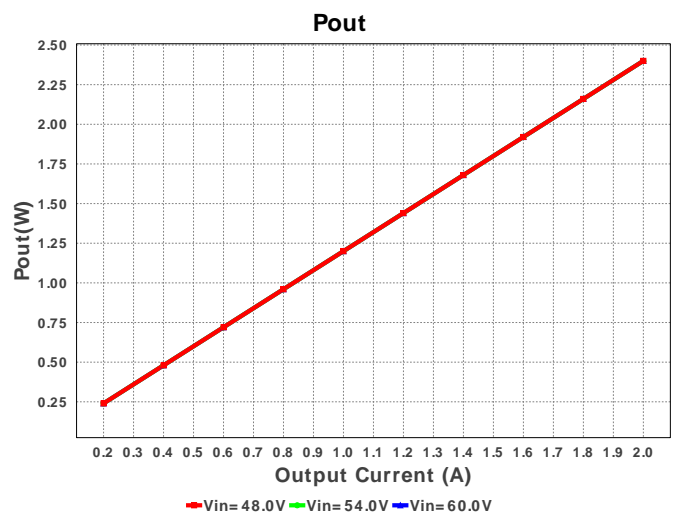
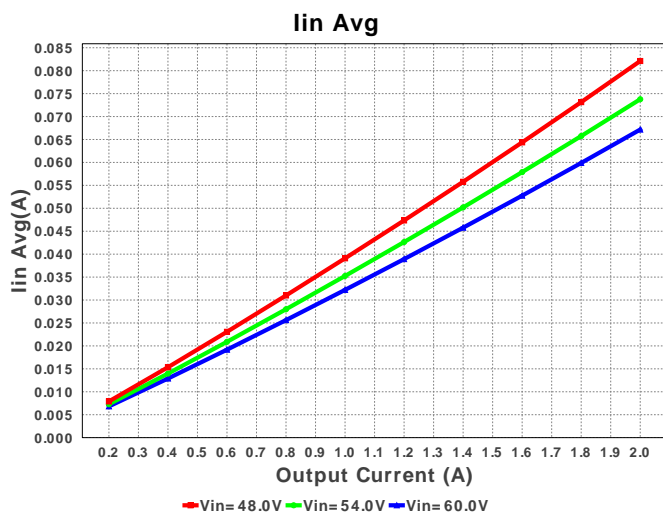
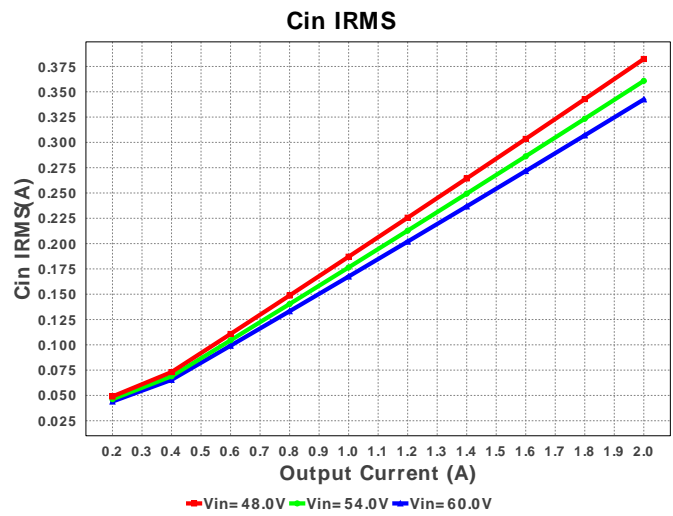
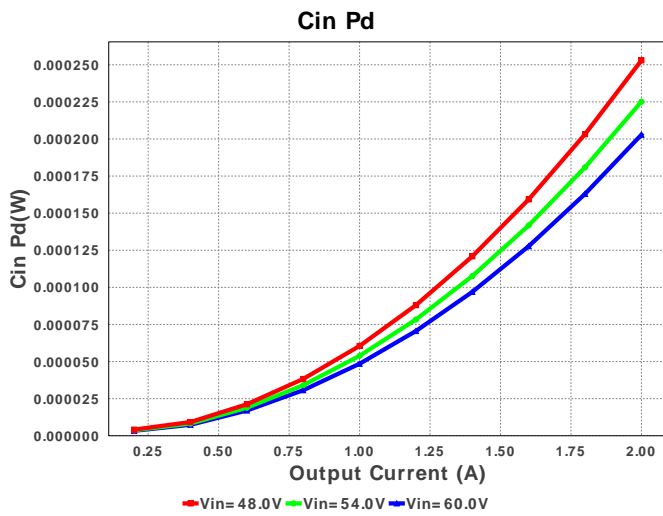
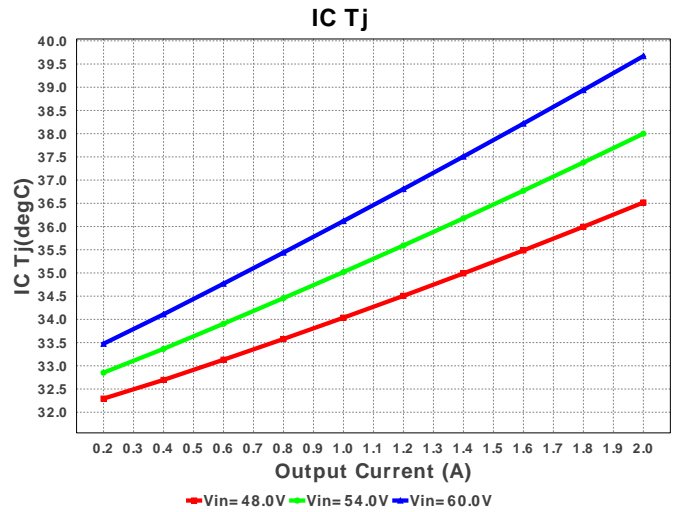
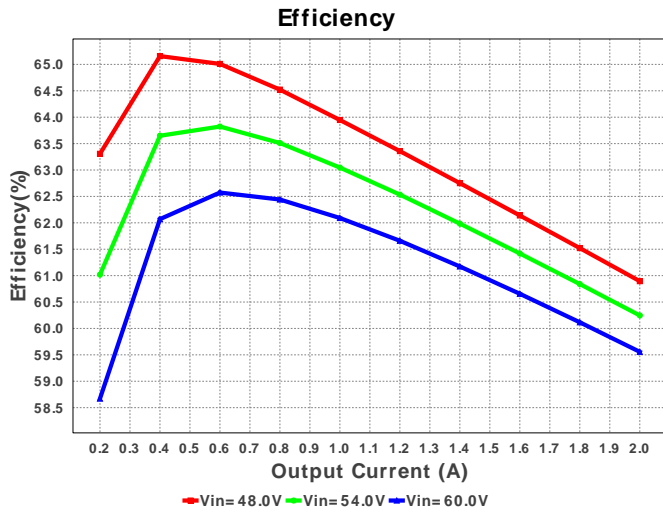


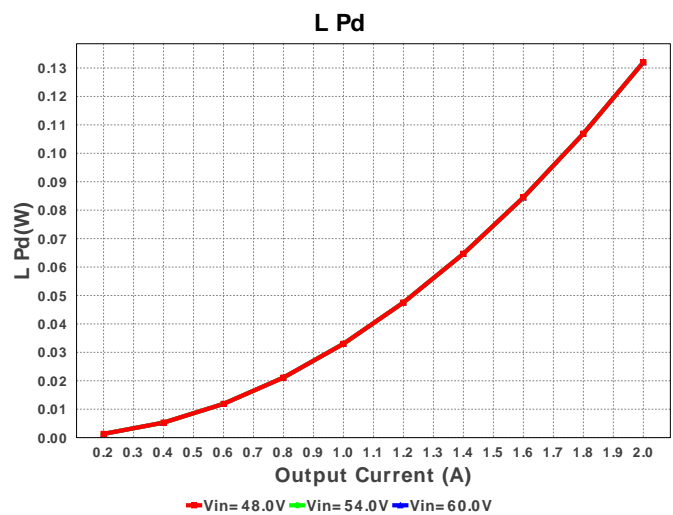
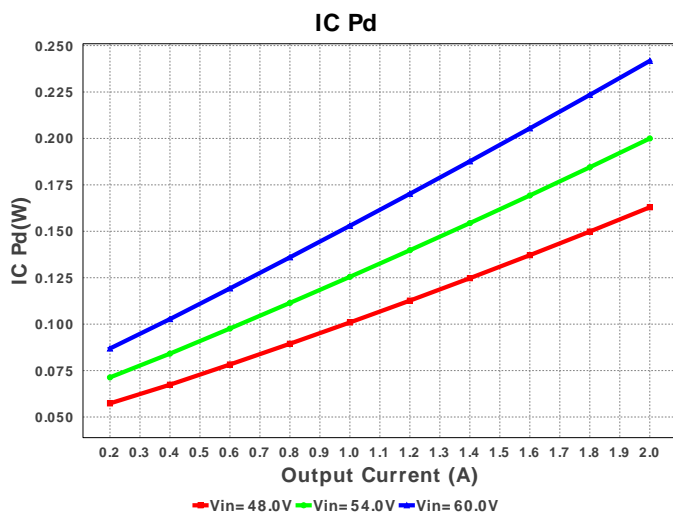
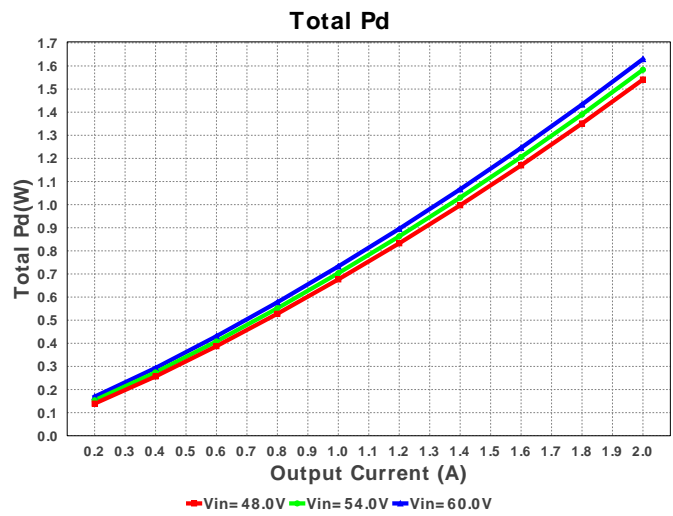
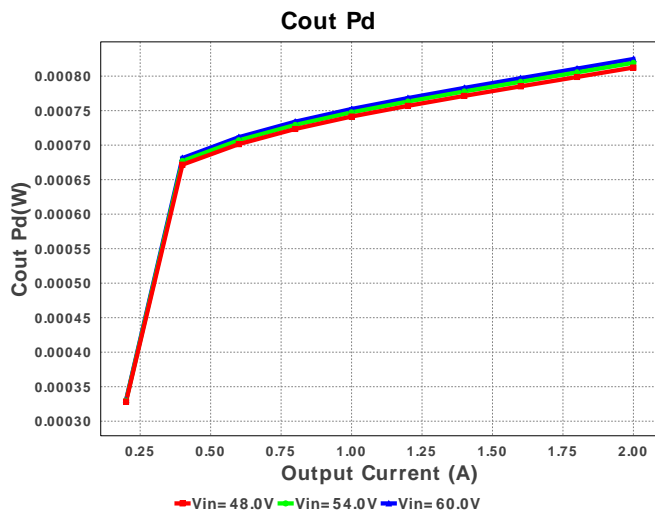
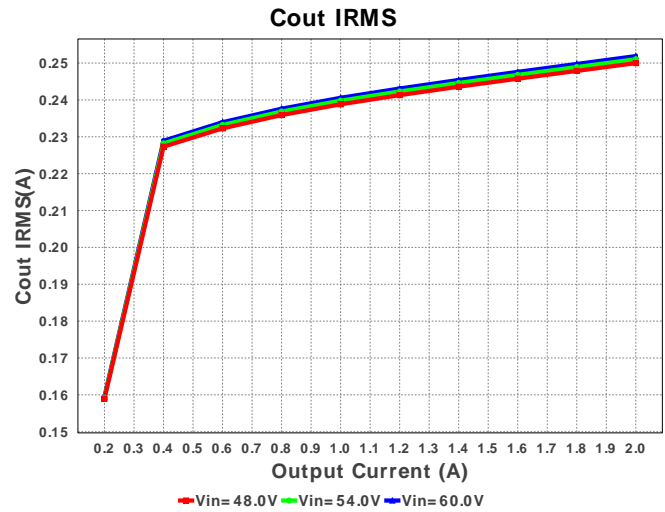
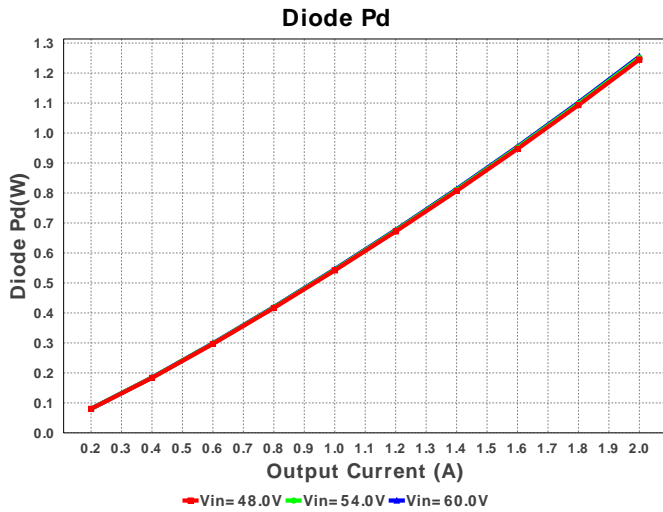
Duty Cycle

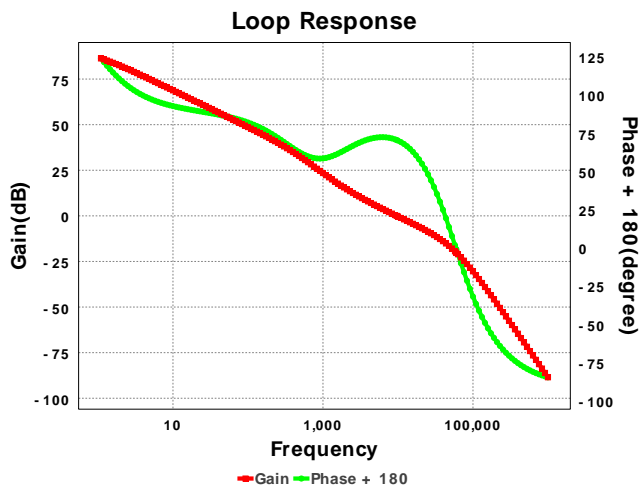


Vout Actual









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	346.803 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	258.617 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	68.794 mA	Current	Average input current
4.	L Ipp	895.88 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	14	General	Total Design BOM count
6.	FootPrint	481.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	114.088 kHz	General	Switching frequency
8.	Pout	2.4 W	General	Total output power
9.	Total BOM	\$5.0	General	Total BOM Cost
10.	ICThetaJA Effective	40.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Low Freq Gain	86.308 dB	Op_Point	Gain at 10Hz
12.	Vout Actual	1.2 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	1.2 V	Op_Point	Operational Output Voltage
14.	Cross Freq	9.605 kHz	Op_point	Bode plot crossover frequency
15.	Duty Cycle	3.129 %	Op_point	Duty cycle
16.	Efficiency	58.144 %	Op_point	Steady state efficiency
17.	Gain Marg	-20.138 dB	Op_point	Bode Plot Gain Margin
18.	IC Tj	39.683 degC	Op_point	IC junction temperature
19.	IOUT_OP	2.0 A	Op_point	Iout operating point
20.	Phase Marg	71.395 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	60.0 V	Op_point	Vin operating point
22.	Vout p-p	1.443 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	208.071 μ W	Power	Input capacitor power dissipation
24.	Cout Pd	869.477 μ W	Power	Output capacitor power dissipation
25.	Diode Pd	1.352 W	Power	Diode power dissipation
26.	IC Pd	242.082 mW	Power	IC power dissipation
27.	L Pd	132.0 mW	Power	Inductor power dissipation
28.	Total Pd	1.728 W	Power	Total Power Dissipation
29.	Vout Tolerance	1.68 %		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	60.0	Maximum input voltage
3.	VinMin	48.0	Minimum input voltage
4.	Vout	1.2	Output Voltage
5.	base_pn	TPS54361-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. The TPS54361-Q1 is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application

2. **TPS54361-Q1** Product Folder : <http://www.ti.com/product/TPS54361%2DQ1> : contains the data sheet and other resources.

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