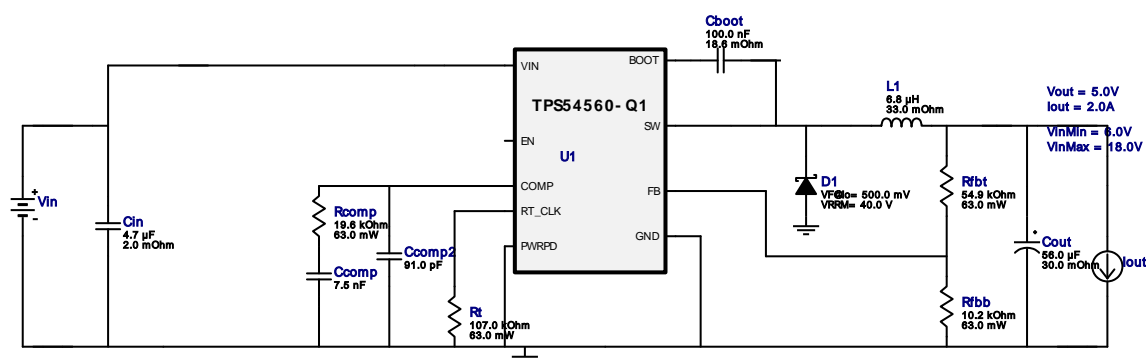


WEBENCH® Design Report

Design : 3550864/15 TPS54560QDDARQ1
TPS54560QDDARQ1 6.0V-18.0V to 5.0V @ 2.0A

VinMin = 6.0V
VinMax = 18.0V
Vout = 5.0V
Iout = 2.0A


Device = TPS54560QDDARQ1
Topology = Buck
Created = 2/3/14 3:59:14 PM
BOM Cost = \$4.12
Total Pd = 1.07W
Footprint = 327.0mm2
BOM Count = 12



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.

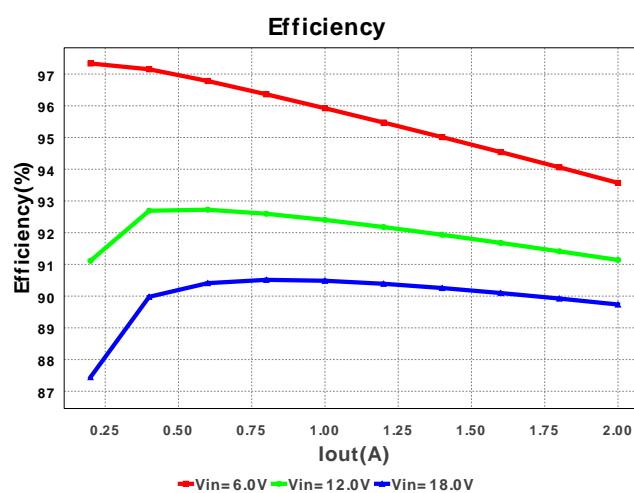
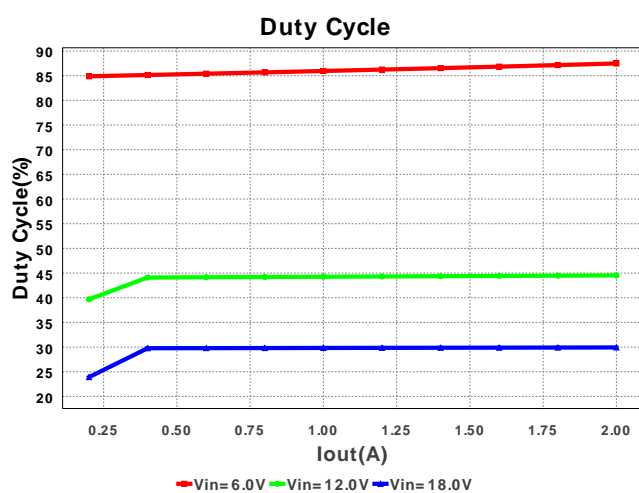
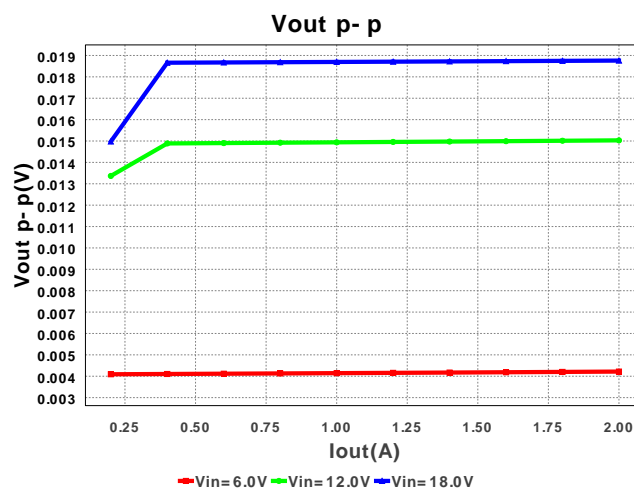
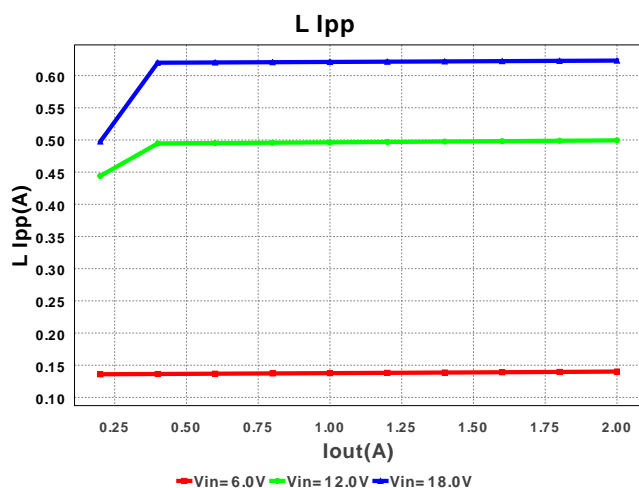
Electrical BOM

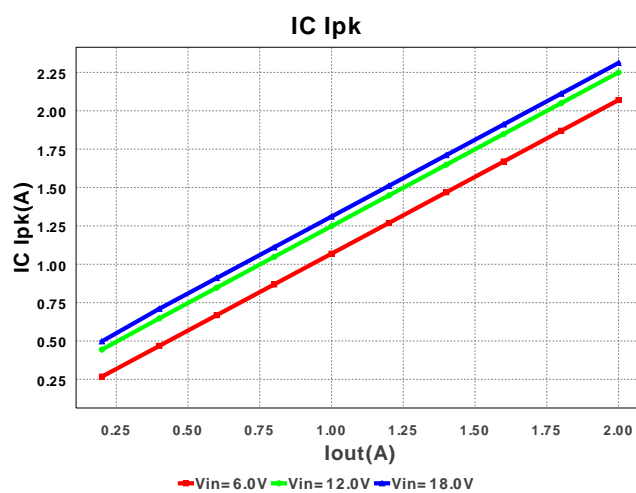
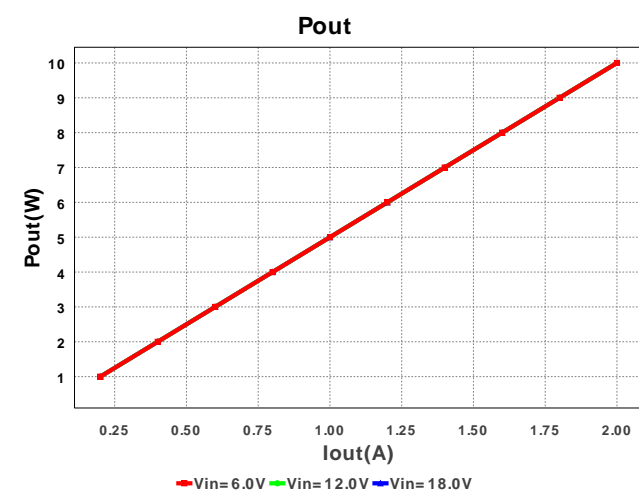
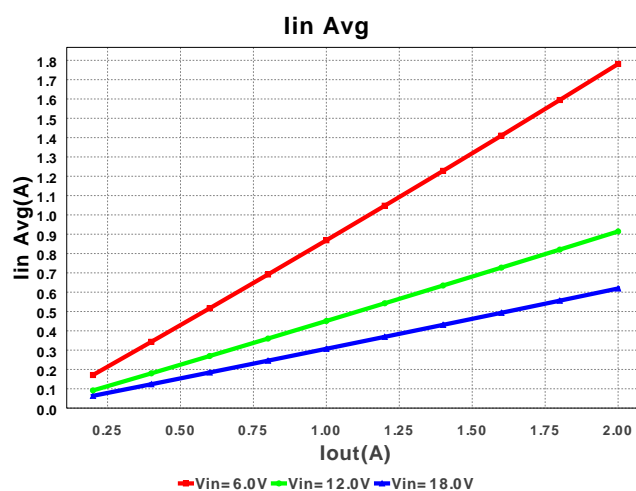
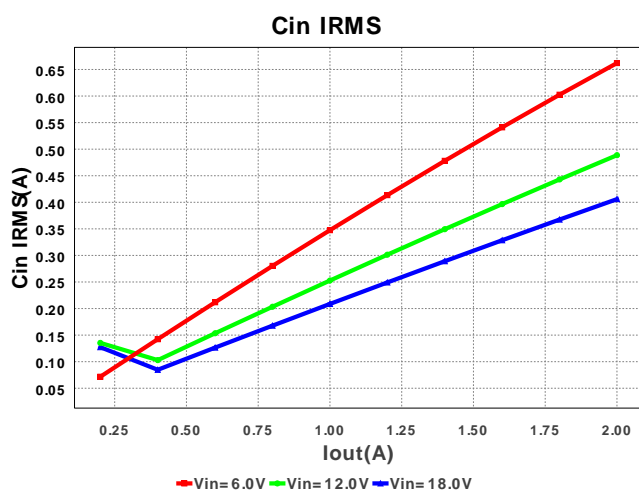
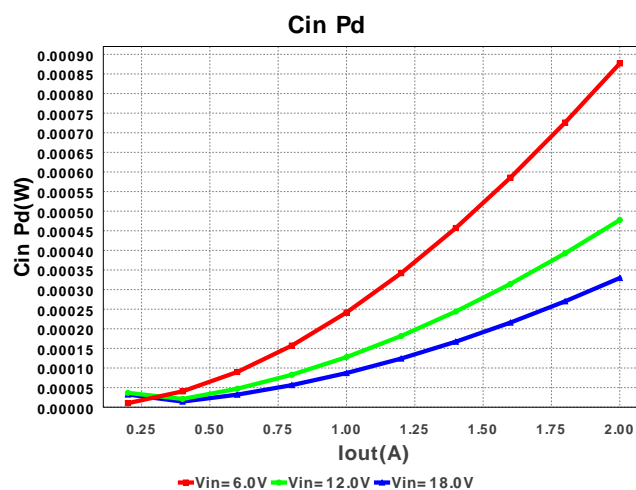
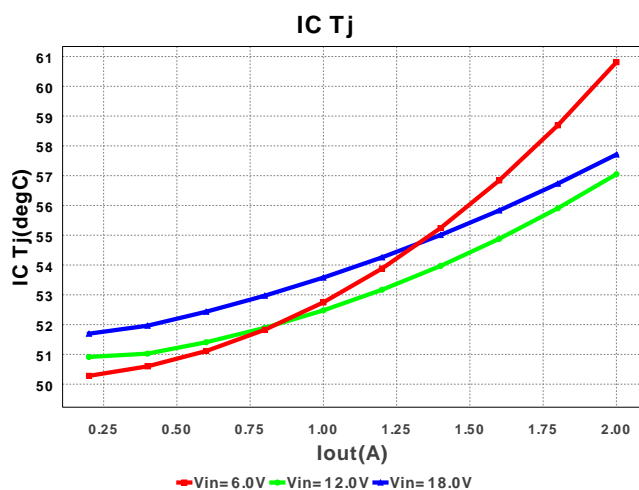
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	TDK	C1005X5R1A104K Series= X5R	Cap= 100.0 nF ESR= 18.6 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3mm2
2.	Ccomp	MuRata	GRM2195C1H752JA01D Series= C0G/NP0	Cap= 7.5 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.06	 0805 7mm2
3.	Ccomp2	MuRata	GRM1885C1H910JA01D Series= C0G/NP0	Cap= 91.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0603 5mm2
4.	Cin	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 µF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	1	\$0.06	 0805 7mm2
5.	Cout	Sanyo	20SPVF56MX Series= 1273	Cap= 56.0 µF ESR= 30.0 mOhm VDC= 20.0 V IRMS= 2.8 A	1	\$0.35	 CAPSMT_62_E61 53mm2
6.	D1	Vishay-Semiconductor	SS34-E3/57T	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.18	 SMC 83mm2
7.	L1	Bourns	SRN8040-6R8Y	L= 6.8 µH DCR= 33.0 mOhm	1	\$0.21	 SRN8040 100mm2
8.	Rcomp	Vishay-Dale	CRCW040219K6FKED Series= CRCW...e3	Res= 19.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
9.	Rfbb	Vishay-Dale	CRCW040210K2FKED Series= CRCW...e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
10.	Rfht	Vishay-Dale	CRCW040254K9FKED Series= CRCW...e3	Res= 54.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2

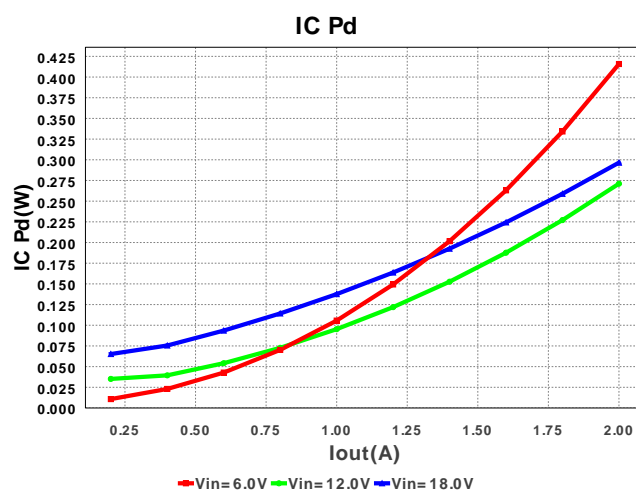
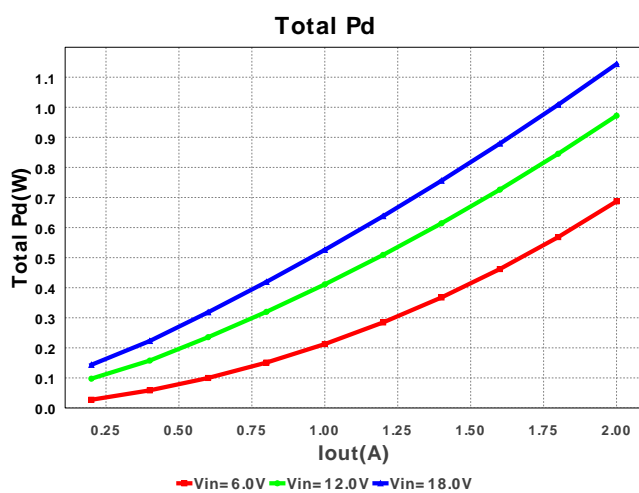
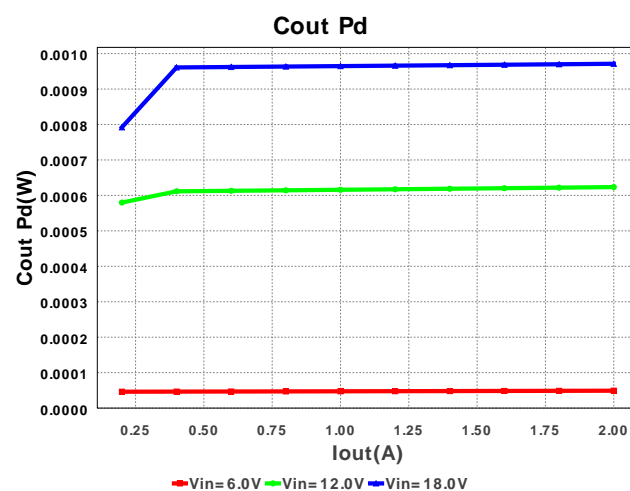
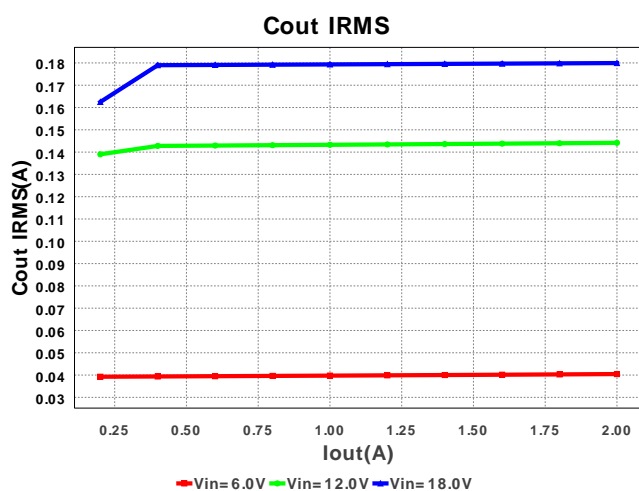
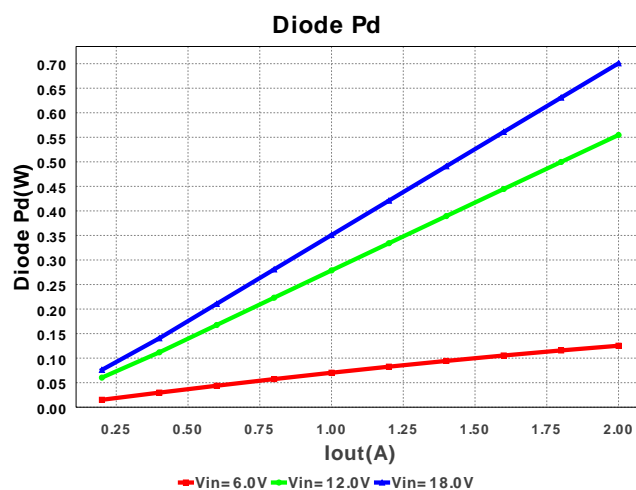
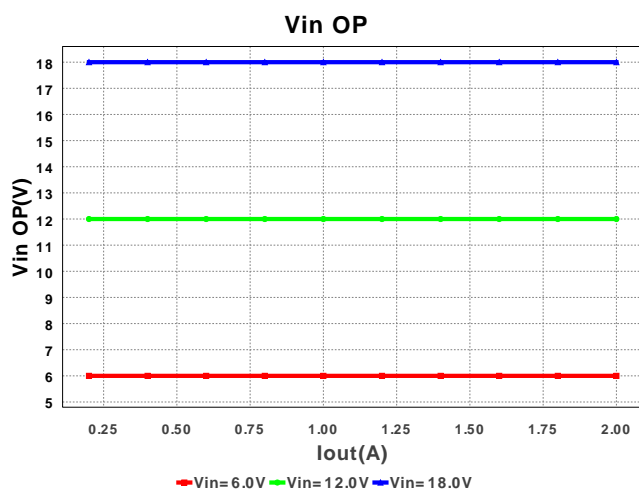
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rt	Vishay-Dale	CRCW0402107KFKED Series= CRCW..e3	Res= 107.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
12.	U1	Texas Instruments	TPS54560QDDARQ1	Switcher	1	\$3.20	

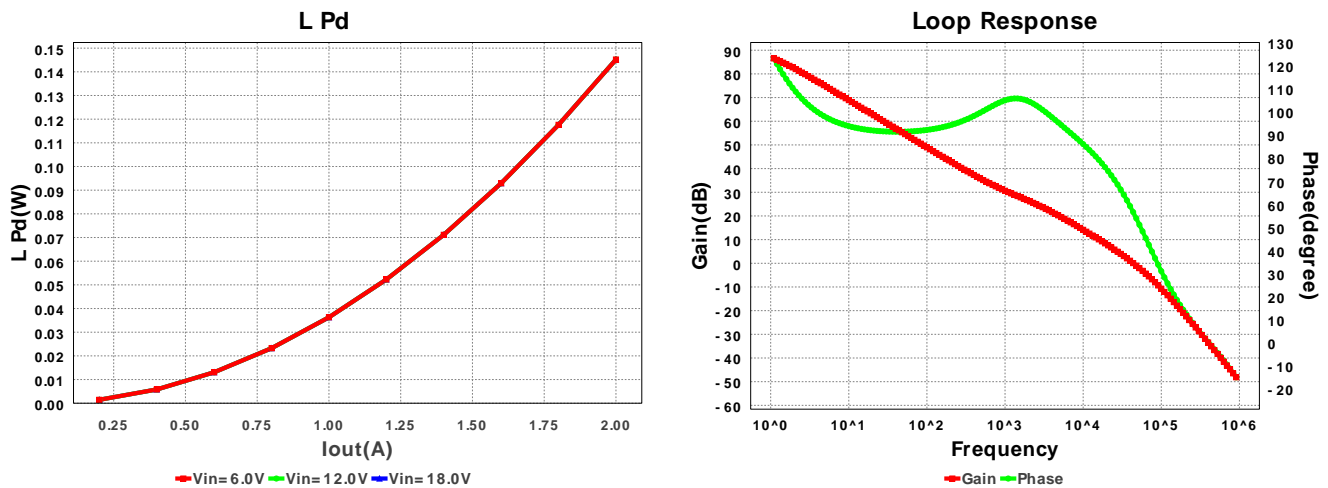


R-PDSO-G8 57mm2









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	406.314 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	178.69 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.309 A	Current	Peak switch current in IC
4.	Iin Avg	615.05 mA	Current	Average input current
5.	L Ipp	618.999 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	12	General	Total Design BOM count
7.	FootPrint	327.0 mm2	General	Total Foot Print Area of BOM components
8.	Frequency	918.056 kHz	General	Switching frequency
9.	Pout	10.0 W	General	Total output power
10.	Total BOM	\$4.12	General	Total BOM Cost
11.	Vout OP	5.0 V	Op_point	Operational Output Voltage
12.	Cross Freq	43.917 kHz	Op_point	Bode plot crossover frequency
13.	Duty Cycle	29.725 %	Op_point	Duty cycle
14.	Efficiency	90.328 %	Op_point	Steady state efficiency
15.	IC Tj	57.686 degC	Op_point	IC junction temperature
16.	ICThetaJA	26.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	Phase Marg	56.912 deg	Op_point	Bode Plot Phase Margin
19.	VIN_OP	18.0 V	Op_point	Vin operating point
20.	Vout p-p	18.631 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	330.181 μW	Power	Input capacitor power dissipation
22.	Cout Pd	957.899 μW	Power	Output capacitor power dissipation
23.	Diode Pd	628.707 mW	Power	Diode power dissipation
24.	IC Pd	295.628 mW	Power	IC power dissipation
25.	L Pd	145.2 mW	Power	Inductor power dissipation
26.	Total Pd	1.071 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0 A	Maximum Output Current
2.	Iout1	2.0 Amps	Output Current #1
3.	VinMax	18.0 V	Maximum input voltage
4.	VinMin	6.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	TPS54560-Q1	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	50.0 degC	Ambient temperature

Design Assistance

1. The TPS54560-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. **TPS54560-Q1 Product Folder** : <http://www.ti.com/product/TPS54560-Q1> : contains the data sheet and other resources.

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