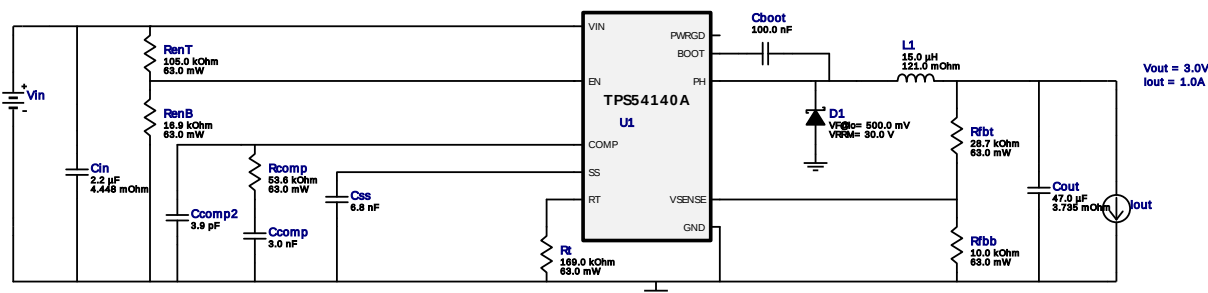


WEBENCH® Design Report

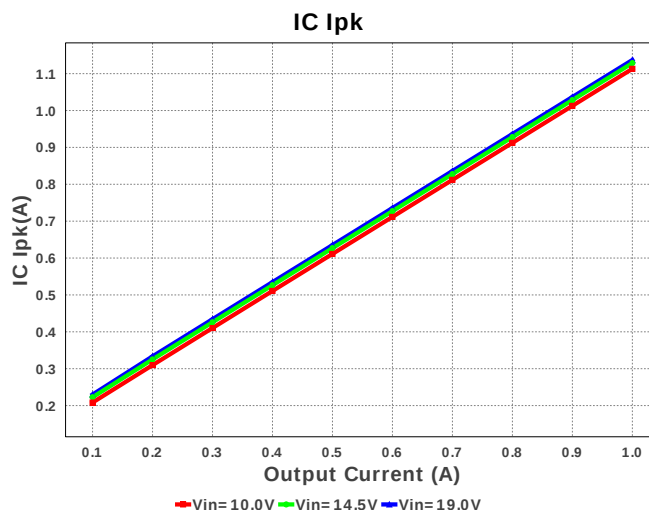
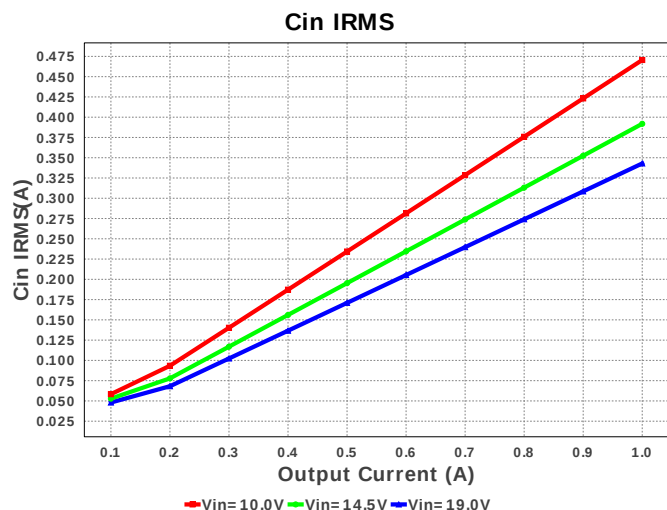
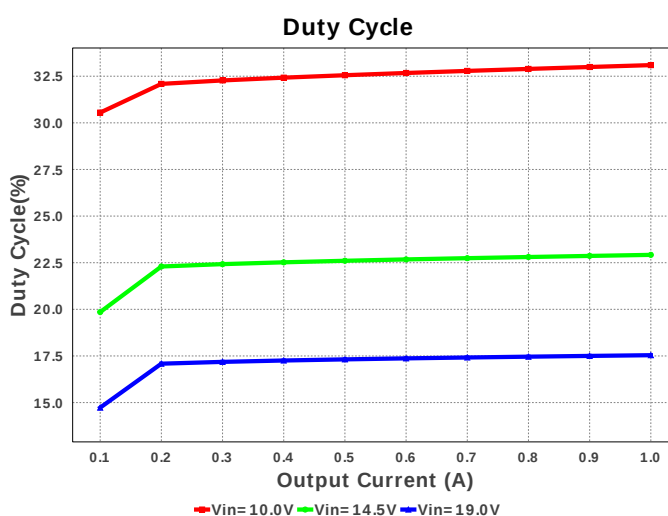
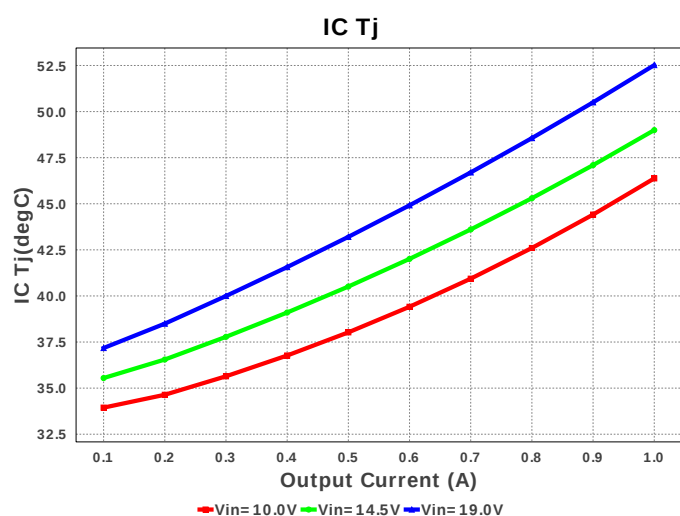
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TPS54140ADGQR 10.0V-19.0V to 3.00V @ 1.0A

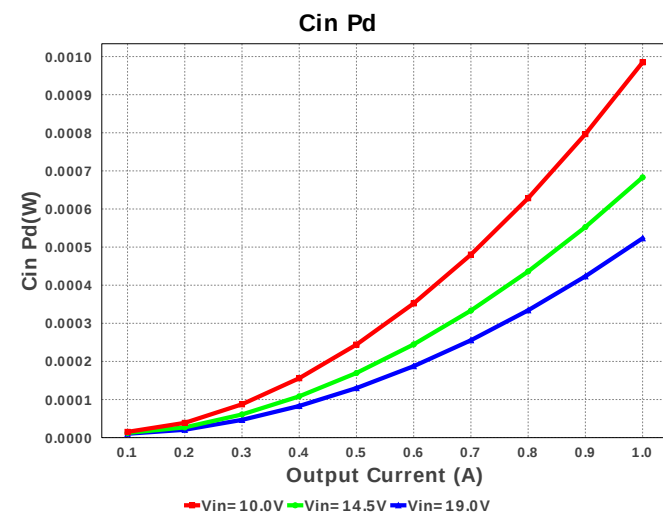
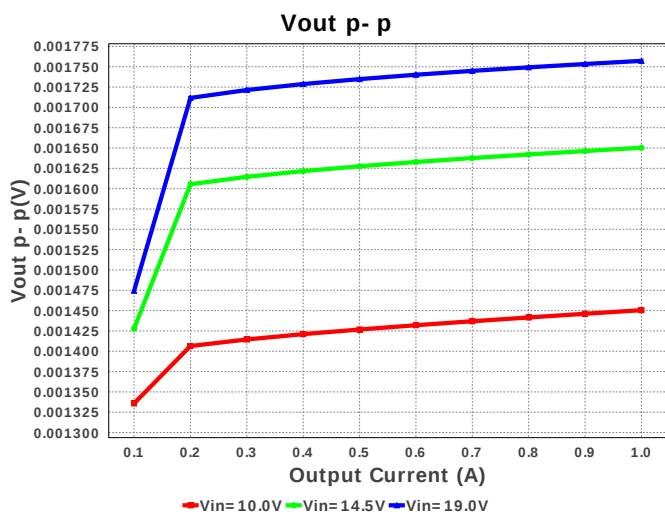
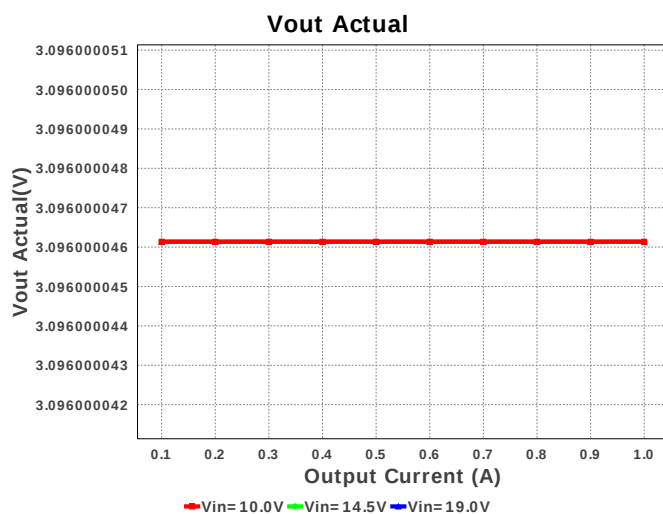
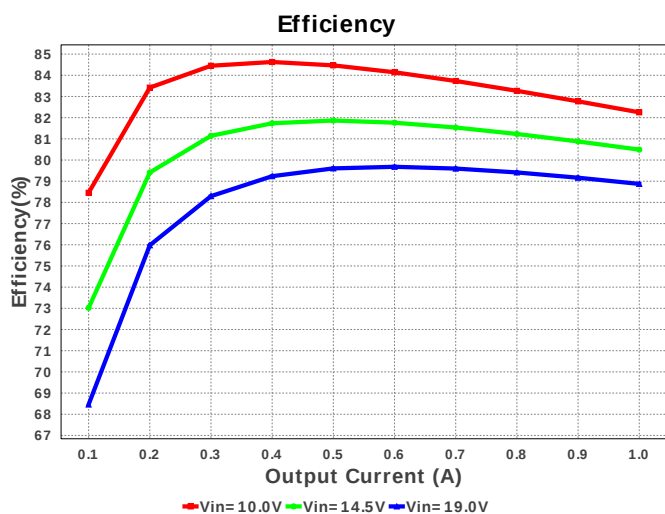
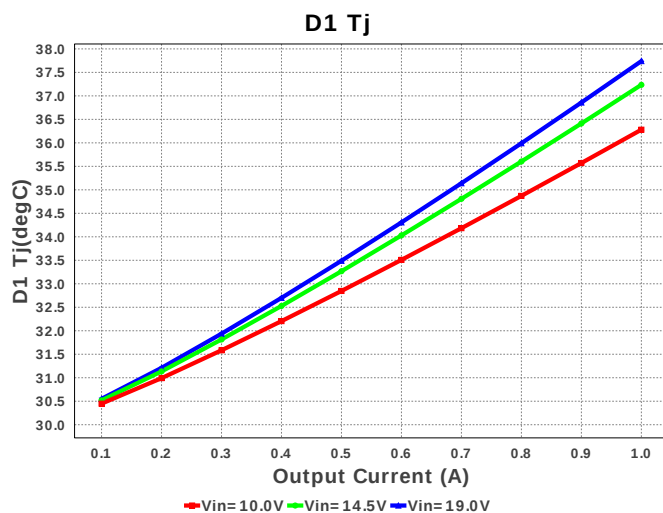
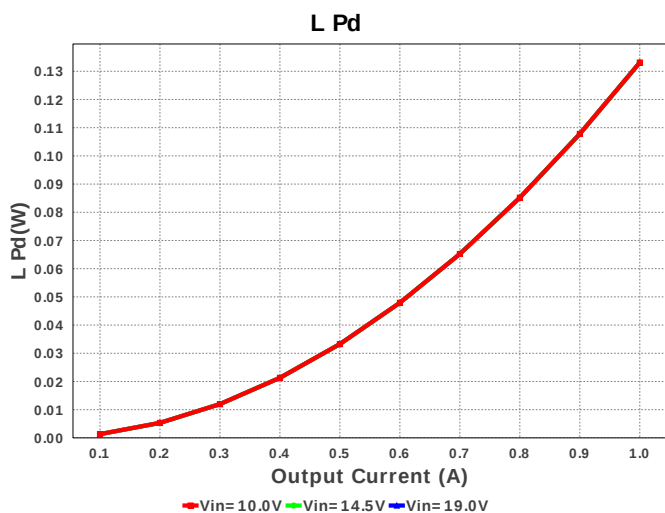


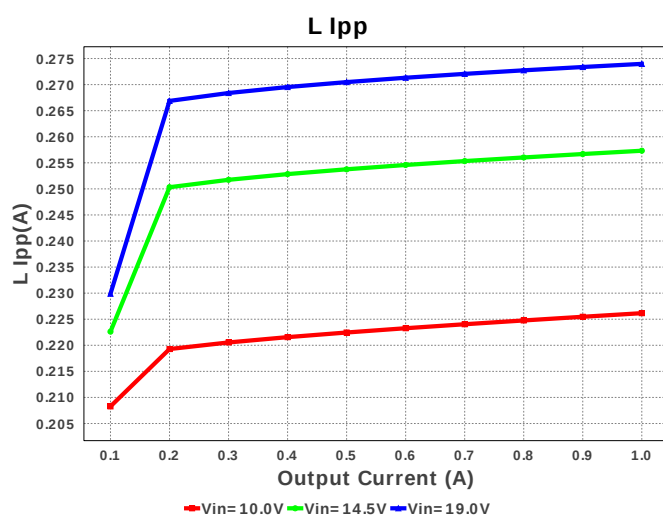
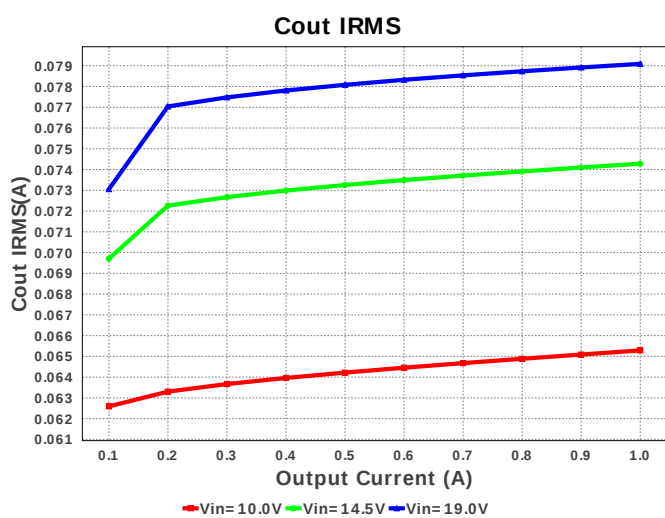
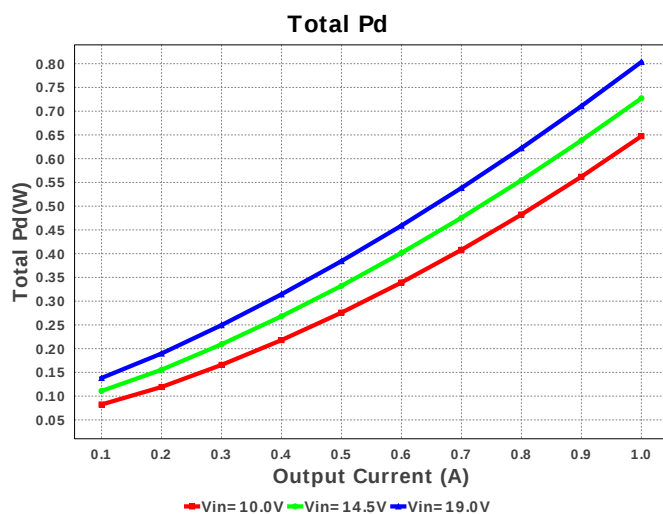
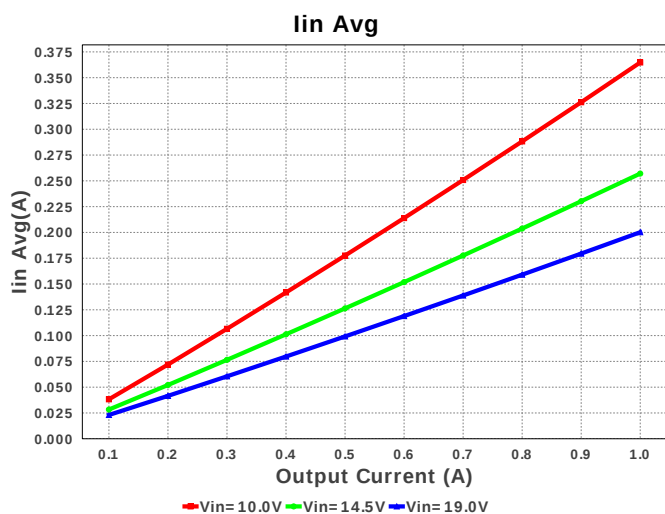
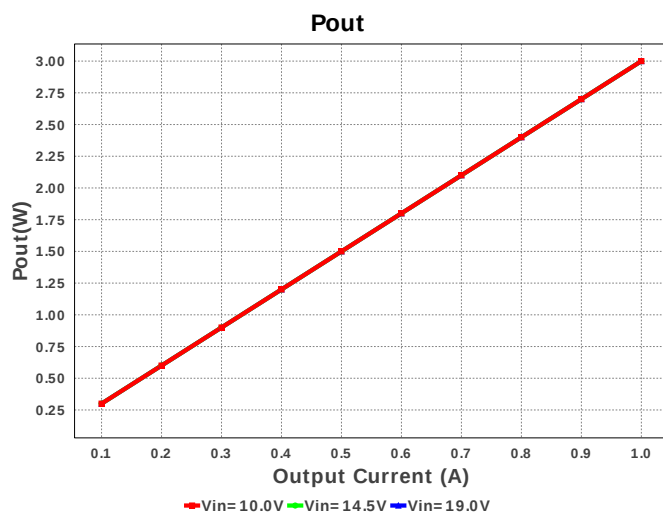
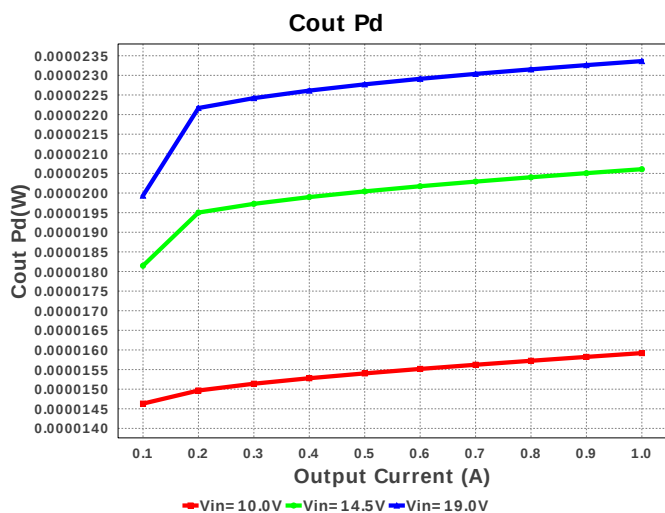
Electrical BOM

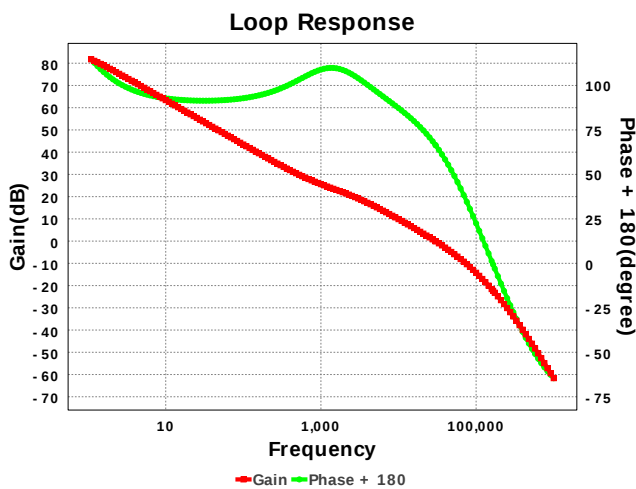
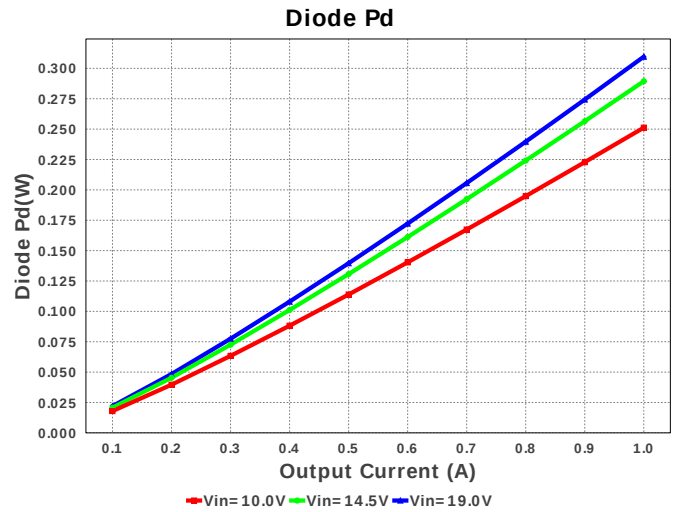
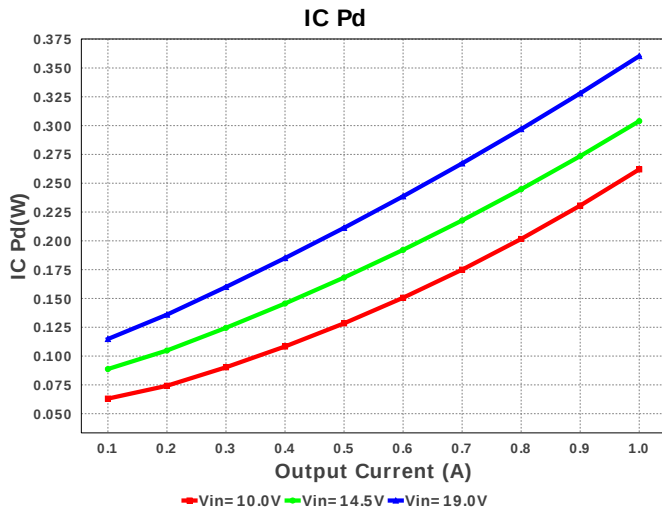
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	MuRata	GRM2165C1H302JA01D Series= C0G/NP0	Cap= 3.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.04	 0805 7 mm ²
3.	Ccomp2	MuRata	GRM1555C1H3R9CA01D Series= C0G/NP0	Cap= 3.9 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
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 mm ²
5.	Cout	MuRata	GRM31CE70G476ME15L Series= X7U	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 4.0 V IRMS= 4.1841 A	1	\$0.10	 1206_190 11 mm ²
6.	Css	Yageo America	CC0805KRX7R9BB682 Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
7.	D1	Diodes Inc.	B230A-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	\$0.09	 SMA 37 mm ²
8.	L1	Bourns	SRP6540-150M	L= 15.0 uH DCR= 121.0 mOhm	1	\$0.60	 SRP6540 83 mm ²
9.	Rcomp	Vishay-Dale	CRCW040253K6FKED Series= CRCW..e3	Res= 53.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	RenB	Vishay-Dale	CRCW040216K9FKED Series= CRCW..e3	Res= 16.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
11.	RenT	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
12.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
13.	Rfbt	Vishay-Dale	CRCW040228K7FKED Series= CRCW..e3	Res= 28.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rt	Vishay-Dale	CRCW0402169KFKED Series= CRCW..e3	Res= 169.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	U1	Texas Instruments	TPS54140ADGQR	Switcher	1	\$1.26	 S-PDSO-G10 24 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	343.329 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	79.392 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.0 A	Current	Peak switch current in IC
4.	Iin Avg	200.86 mA	Current	Average input current
5.	L Ipp	275.02 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	15	General	Total Design BOM count
7.	FootPrint	203.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	682.903 kHz	General	Switching frequency
9.	Pout	3.0 W	General	Total output power
10.	Total BOM	\$2.23	General	Total BOM Cost
11.	D1 Tj	38.054 degC	Op_Point	D1 junction temperature
12.	Low Freq Gain	81.681 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	3.096 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
15.	Cross Freq	29.778 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	17.607 %	Op_point	Duty cycle
17.	Efficiency	78.609 %	Op_point	Steady state efficiency
18.	Gain Marg	-22.376 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	52.534 degC	Op_point	IC junction temperature
20.	ICThetaJA	62.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	1.0 A	Op_point	Iout operating point
22.	Phase Marg	66.647 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	19.0 V	Op_point	Vin operating point
24.	Vout p-p	1.764 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	524.307 μ W	Power	Input capacitor power dissipation
26.	Cout Pd	23.542 μ W	Power	Output capacitor power dissipation
27.	Diode Pd	322.177 mW	Power	Diode power dissipation
28.	IC Pd	360.537 mW	Power	IC power dissipation
29.	L Pd	133.1 mW	Power	Inductor power dissipation
30.	Total Pd	816.353 mW	Power	Total Power Dissipation

#	Name	Value	Category	Description
31.	Vout Tolerance	2.513 %		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	19.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	TPS54140A	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. TPS54140A Product Folder : <http://www.ti.com/product/TPS54140A> : contains the data sheet and other resources.

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