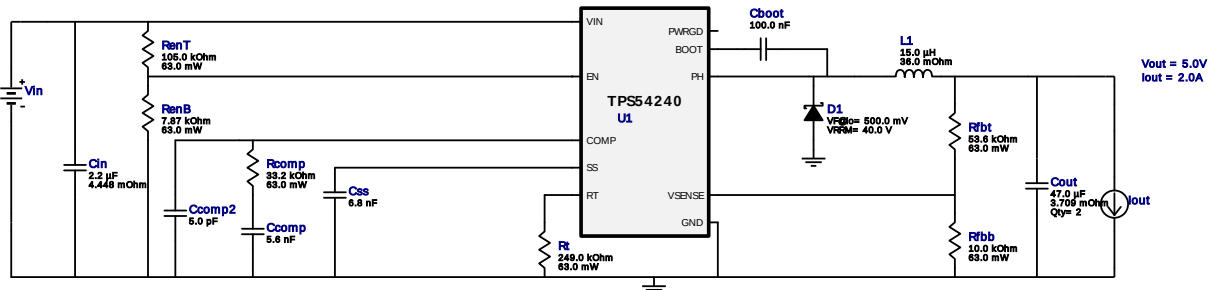


WEBENCH® Design Report

Design : 3893481/7 TPS54240DGQR
TPS54240DGQR 20.0V-30.0V to 5.00V @ 2.0A



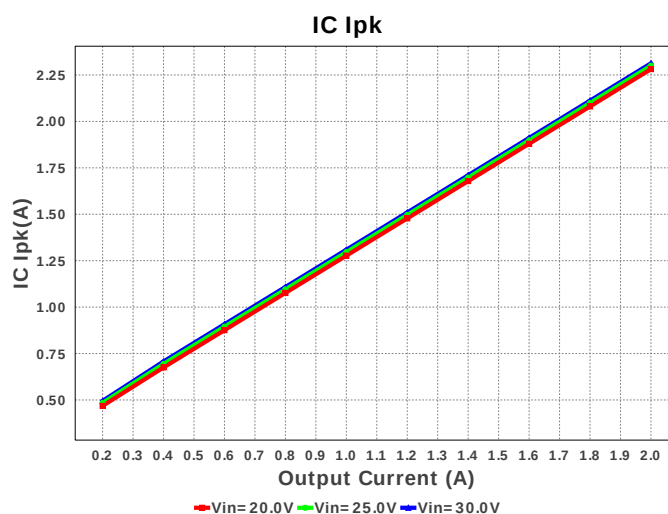
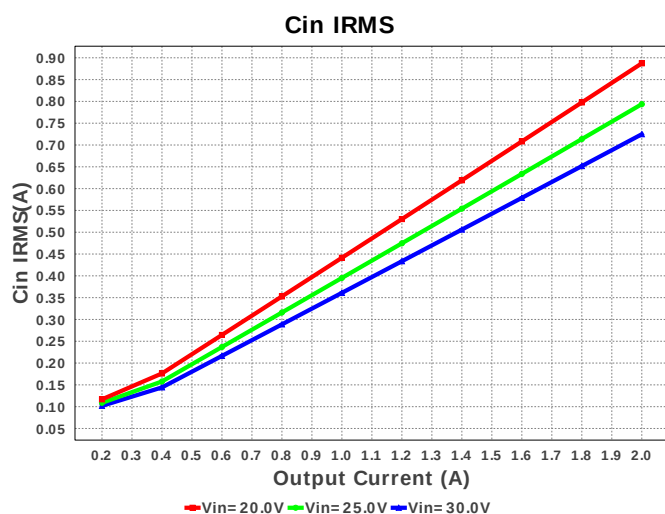
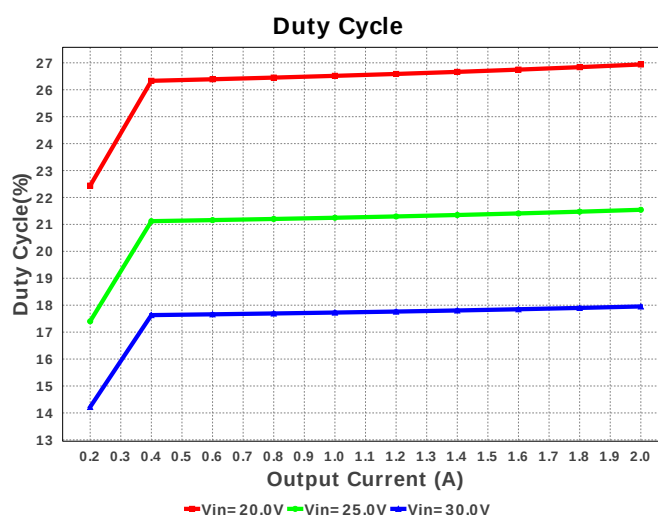
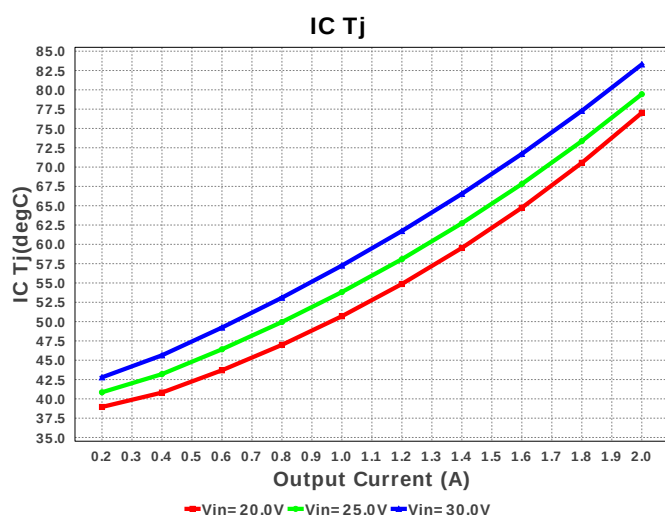
My Comments

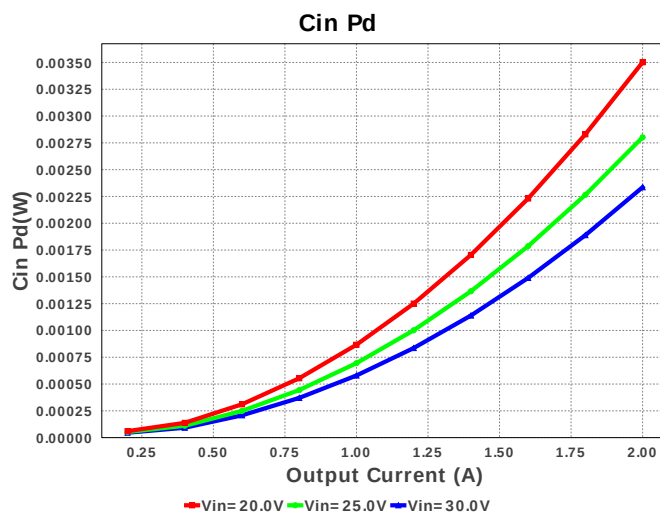
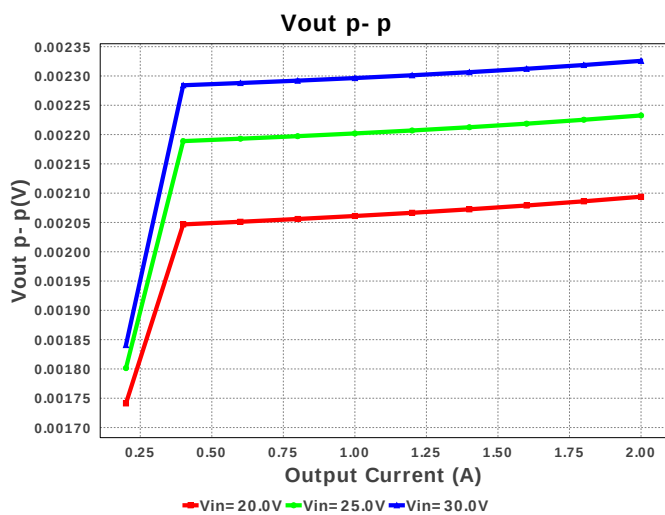
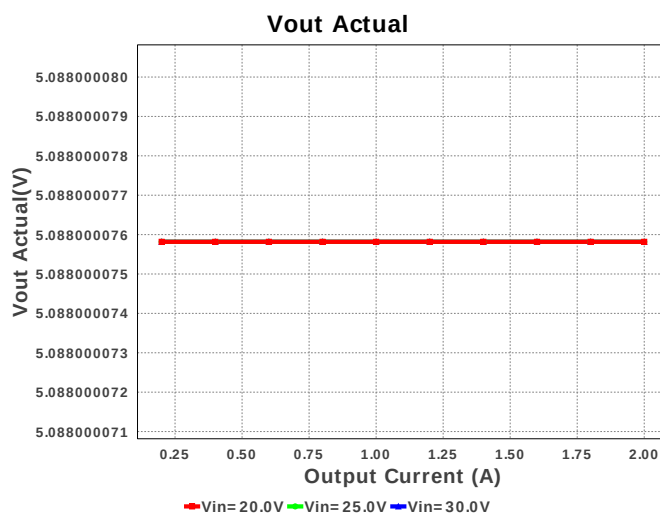
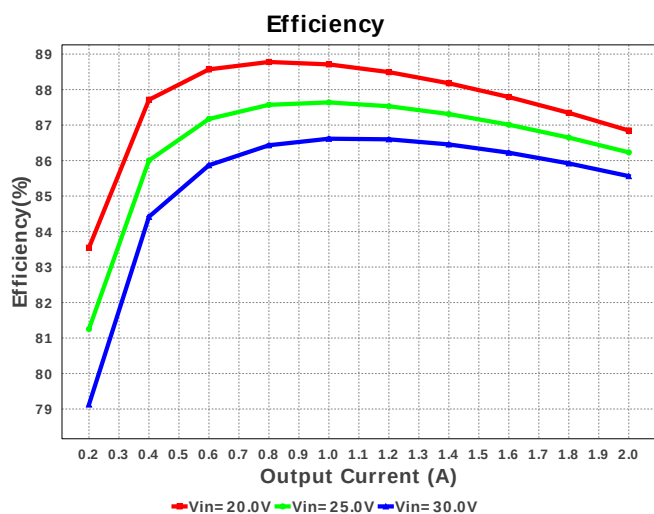
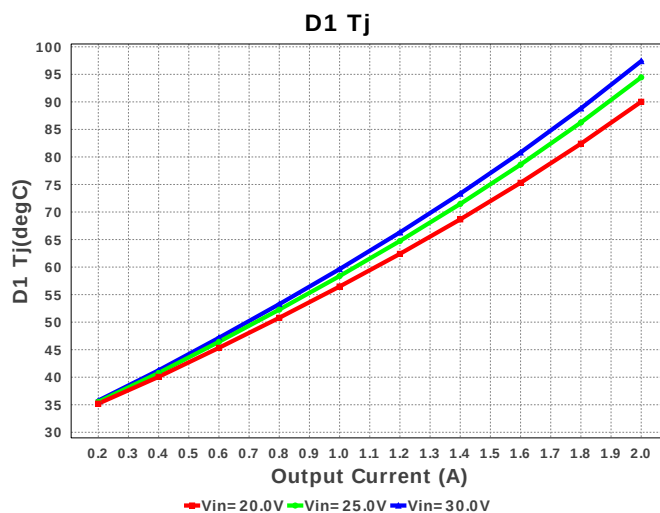
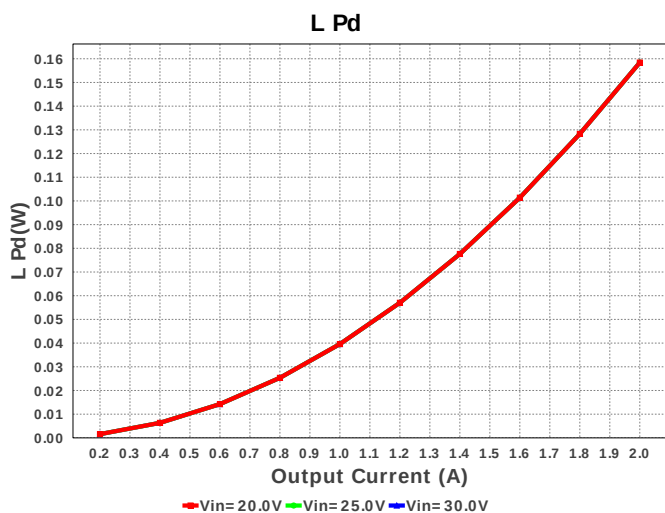
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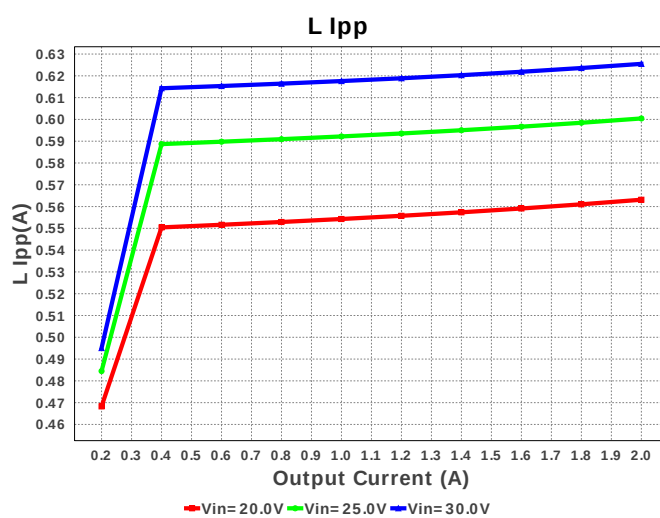
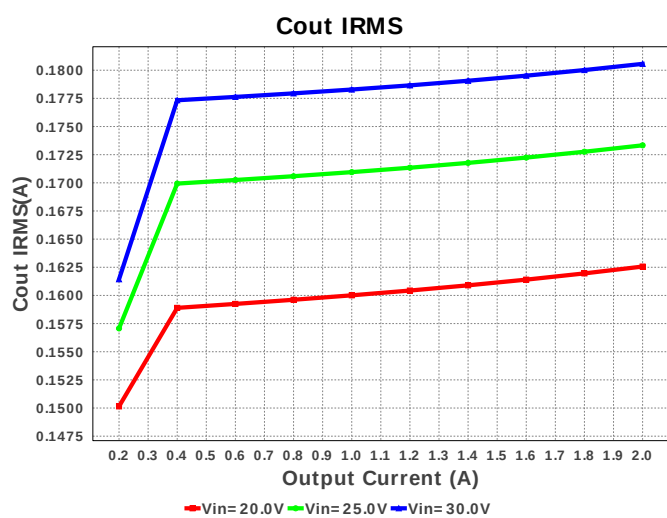
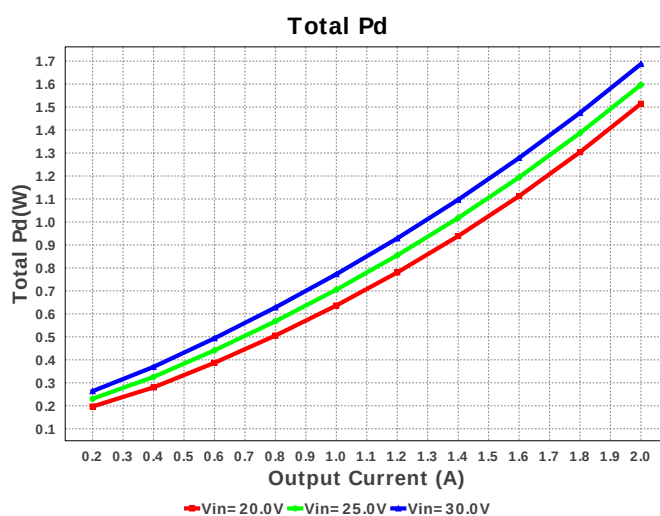
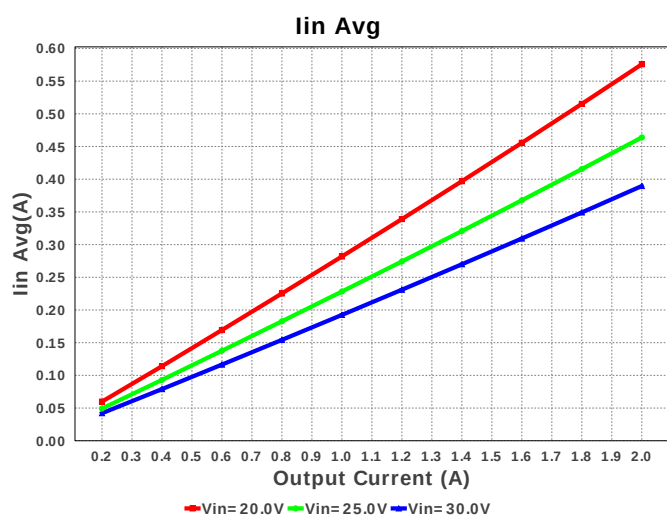
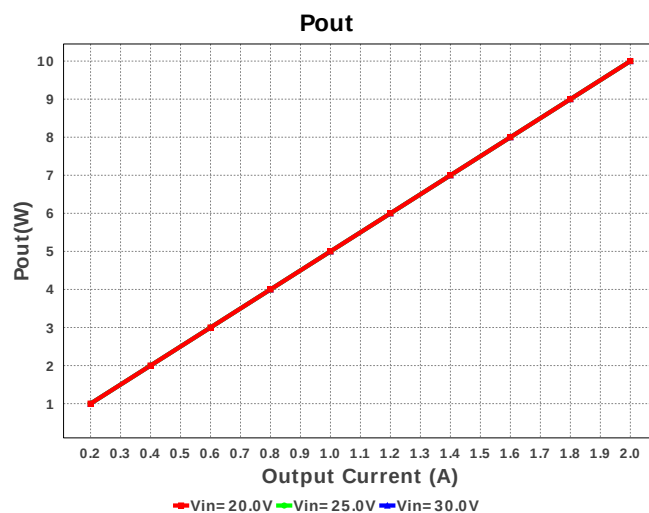
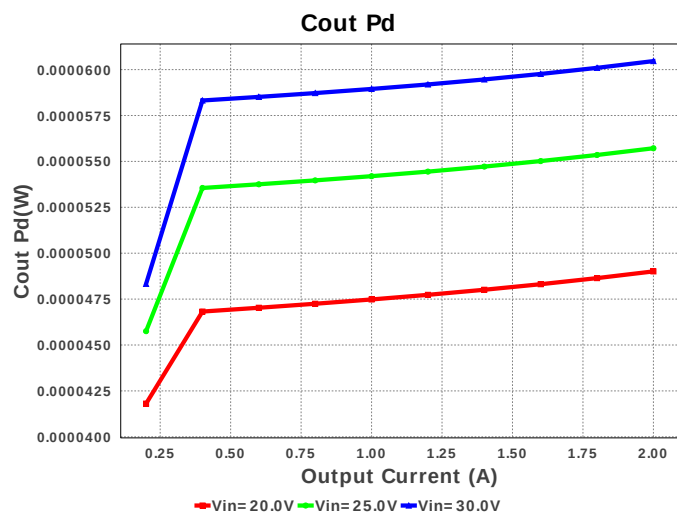
Electrical BOM

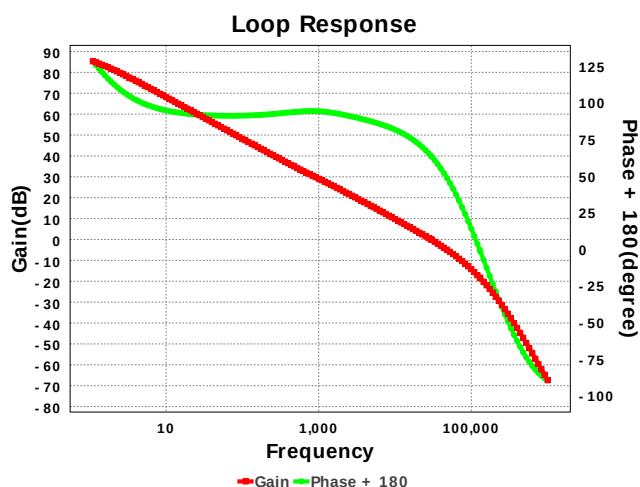
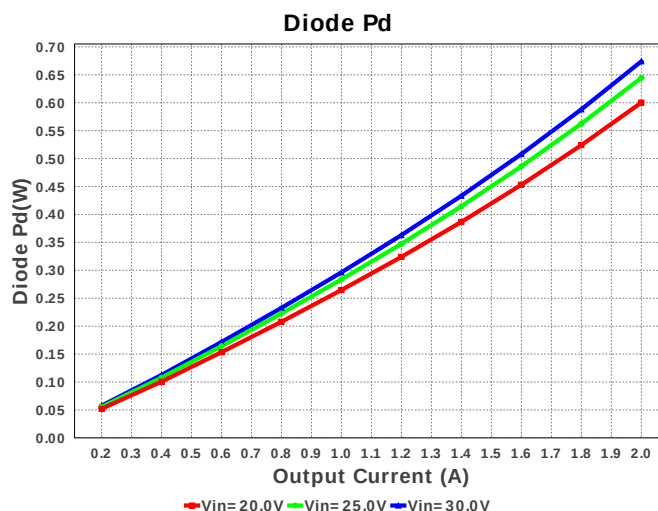
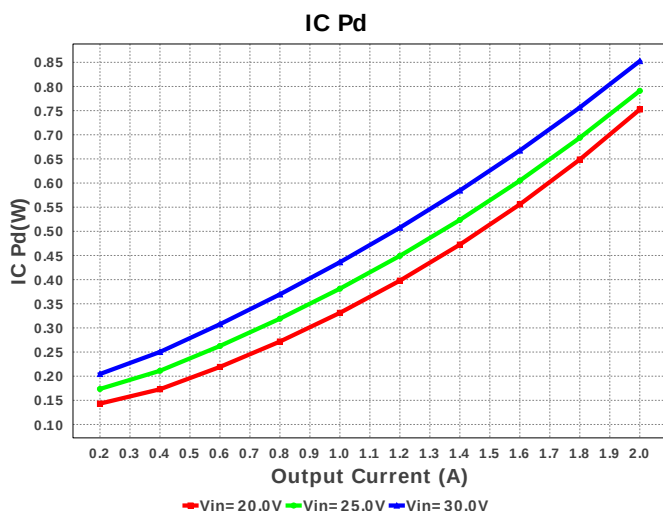
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB562 Series= X7R	Cap= 5.6 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	MuRata	GQM2195C2A5R0CB01D Series= C0G/NP0	Cap= 5.0 pF VDC= 100.0 V IRMS= 0.0 A	1	\$0.15	 0805 7 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	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	2	\$0.15	 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.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
8.	L1	Bourns	SRR1208-150ML	L= 15.0 uH DCR= 36.0 mOhm	1	\$0.37	 SRR1208 216 mm ²
9.	Rcomp	Vishay-Dale	CRCW040233K2FKED Series= CRCW..e3	Res= 33.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	RenB	Vishay-Dale	CRCW04027K87FKED Series= CRCW..e3	Res= 7.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
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
13.	Rfbt	Vishay-Dale	CRCW040253K6FKED Series= CRCW..e3	Res= 53.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rt	Vishay-Dale	CRCW0402249KFKED Series= CRCW..e3	Res= 249.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	U1	Texas Instruments	TPS54240DGQR	Switcher	1	\$1.49	 S-PDSO-G10 24 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	726.189 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	181.677 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.0 A	Current	Peak switch current in IC
4.	Iin Avg	391.81 mA	Current	Average input current
5.	L Ipp	629.35 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	16	General	Total Design BOM count
7.	FootPrint	351.0 mm ²	General	Total Foot Print Area of BOM components
8.	Frequency	478.381 kHz	General	Switching frequency
9.	Pout	10.0 W	General	Total output power
10.	Total BOM	\$2.56	General	Total BOM Cost
11.	D1 Tj	103.949 degC	Op_Point	D1 junction temperature
12.	Low Freq Gain	85.237 dB	Op_Point	Gain at 10Hz
13.	Vout Actual	5.088 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
15.	Cross Freq	29.487 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	18.064 %	Op_point	Duty cycle
17.	Efficiency	85.075 %	Op_point	Steady state efficiency
18.	Gain Marg	-18.264 dB	Op_point	Bode Plot Gain Margin
19.	IC Tj	83.379 degC	Op_point	IC junction temperature
20.	ICThetaJA	62.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	2.0 A	Op_point	Iout operating point
22.	Phase Marg	63.796 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	30.0 V	Op_point	Vin operating point
24.	Vout p-p	2.34 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	2.346 mW	Power	Input capacitor power dissipation
26.	Cout Pd	61.211 μ W	Power	Output capacitor power dissipation
27.	Diode Pd	739.493 mW	Power	Diode power dissipation
28.	IC Pd	854.066 mW	Power	IC power dissipation
29.	L Pd	158.4 mW	Power	Inductor power dissipation
30.	Total Pd	1.754 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
31.	Vout Tolerance	2.72 %		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	30.0	Maximum input voltage
3.	VinMin	20.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54240	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54240** Product Folder : <http://www.ti.com/product/TPS54240> : contains the data sheet and other resources.

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