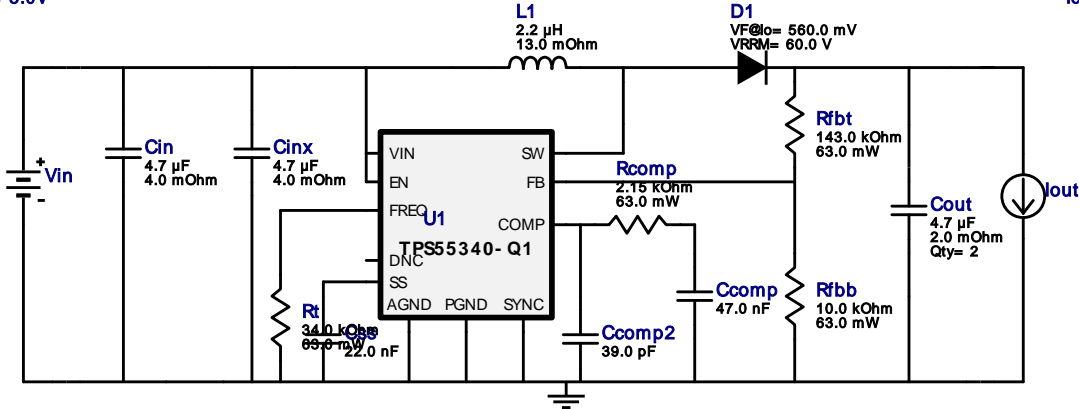


WEBENCH[®] Design Report

 Design : 1982346/48 TPS55340QRTERQ1
 TPS55340QRTERQ1 5.0V-5.0V to 19.00V @ 1.0A

 VinMin = 5.0V
 VinMax = 5.0V

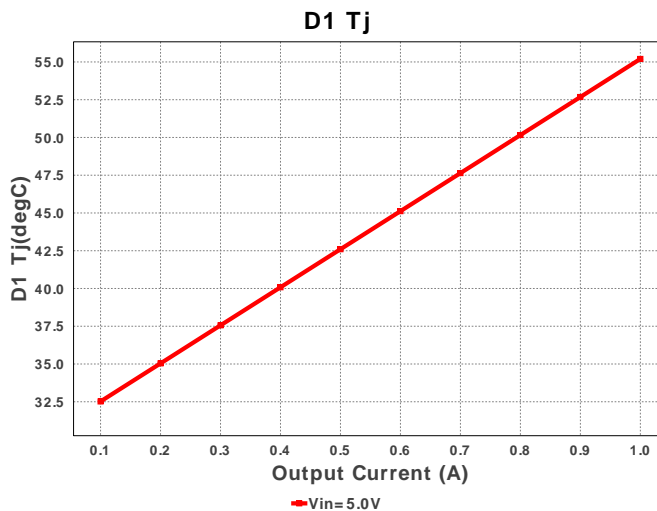
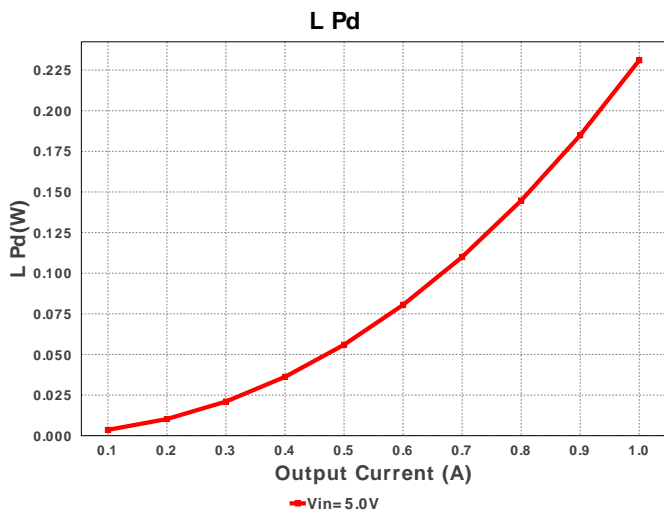
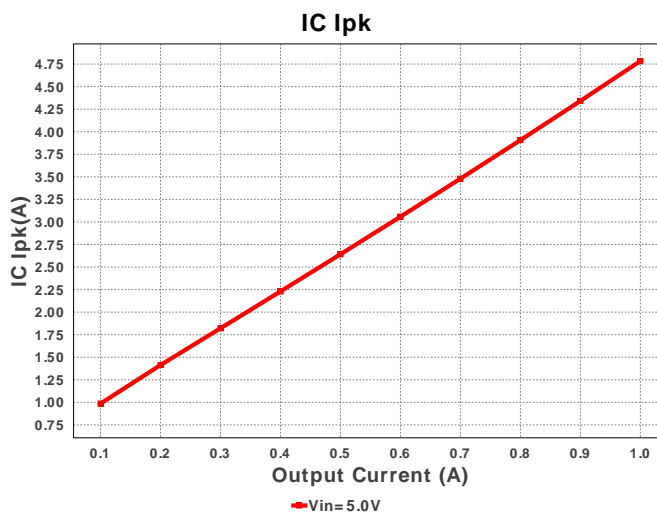
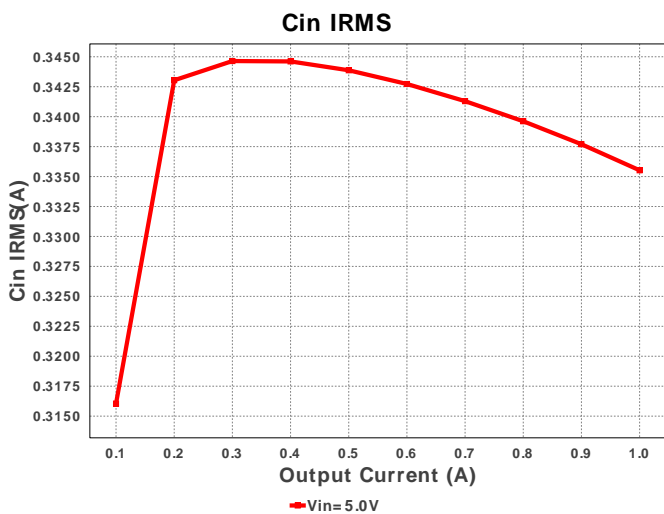
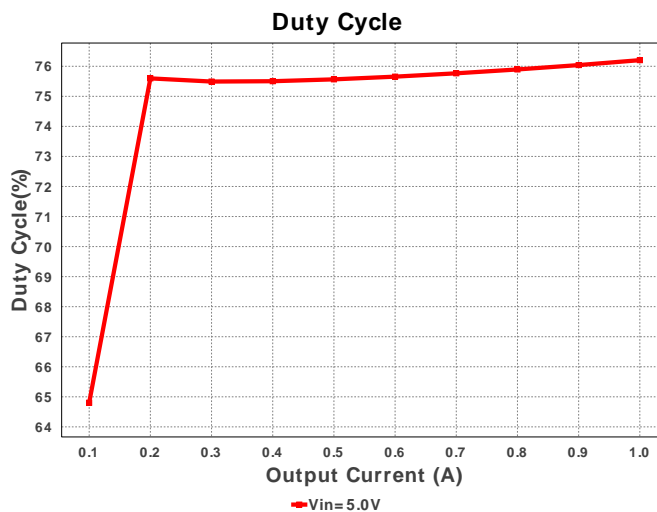
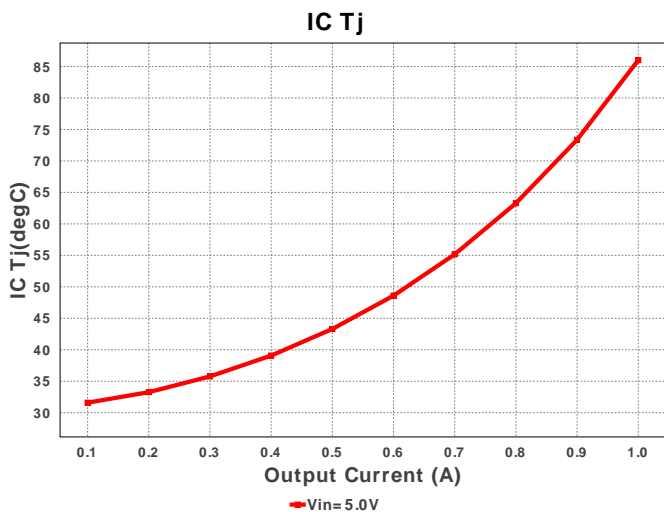
 Vout = 19.0V
 Iout = 1.0A


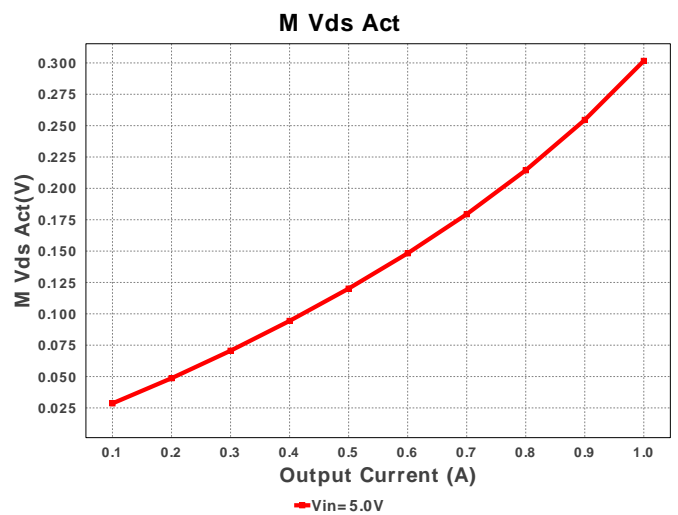
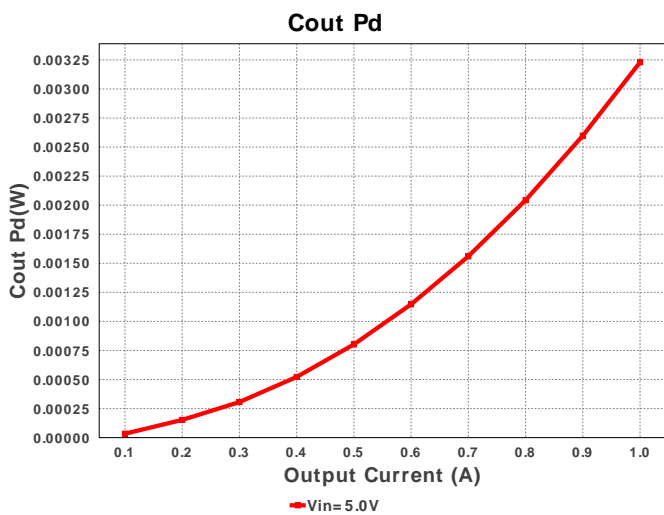
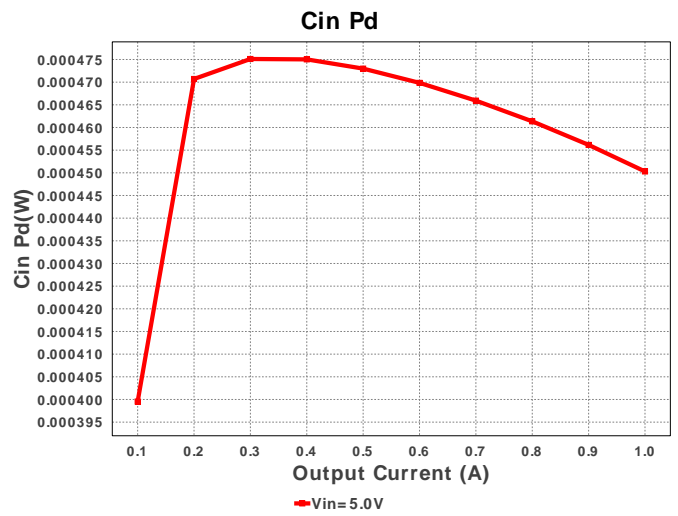
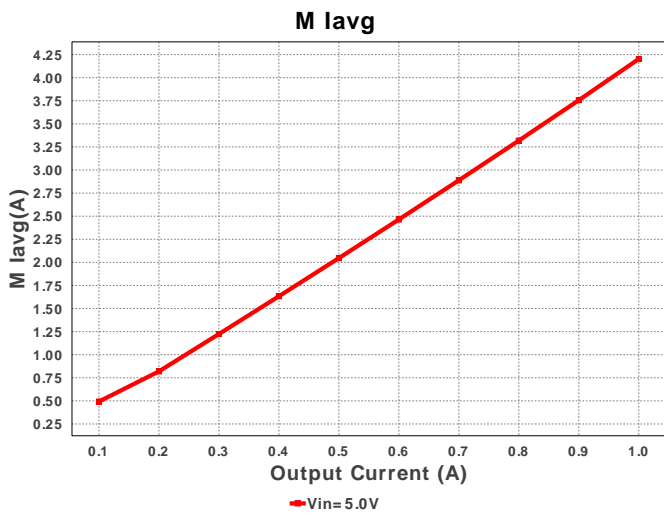
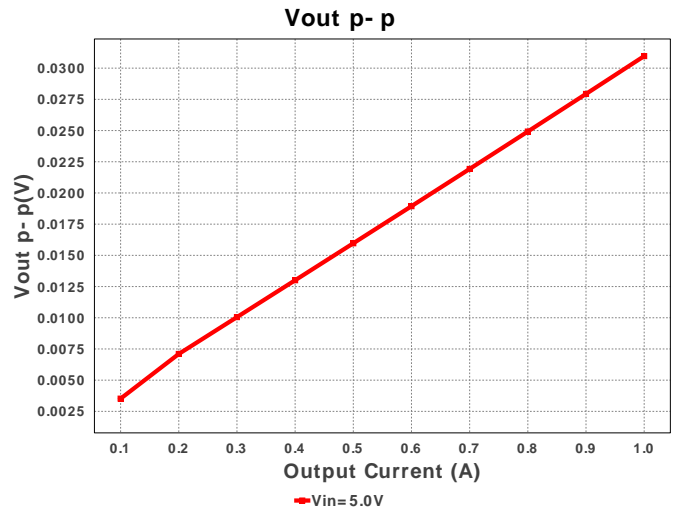
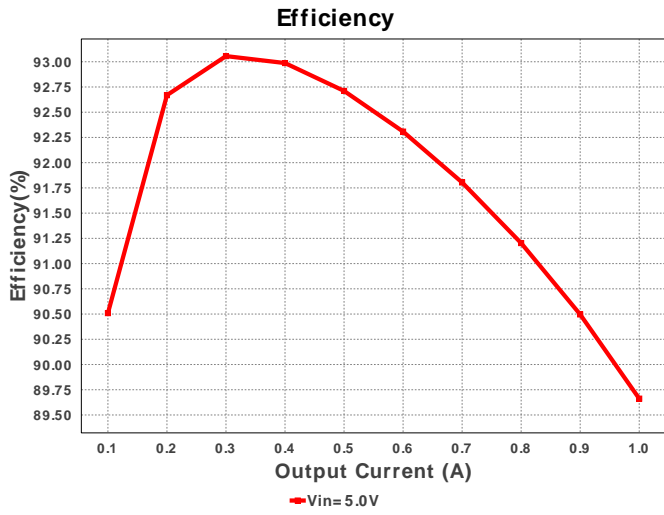
1. For frequency > 1.6 MHz, the user is required to make sure load current is always greater than "Iout Min" value shown in the Op Vals.

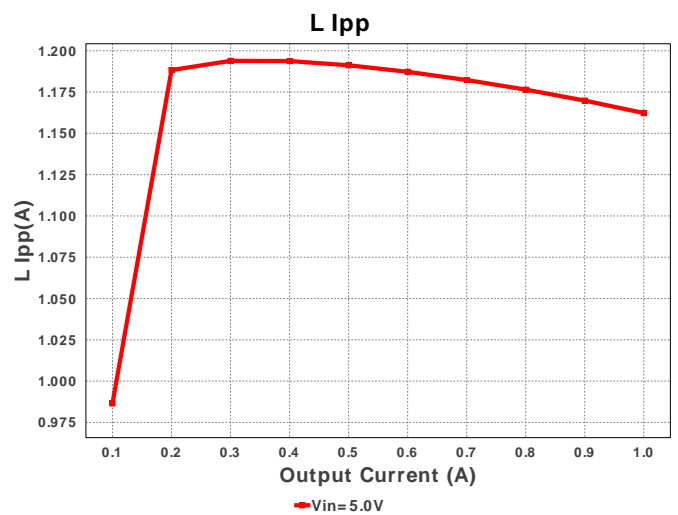
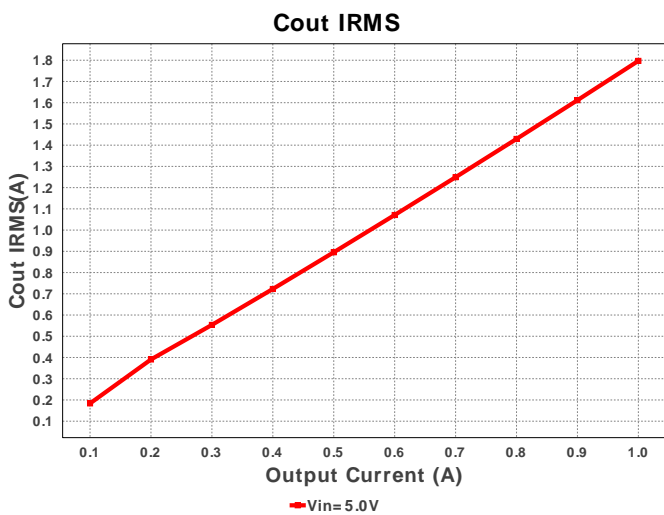
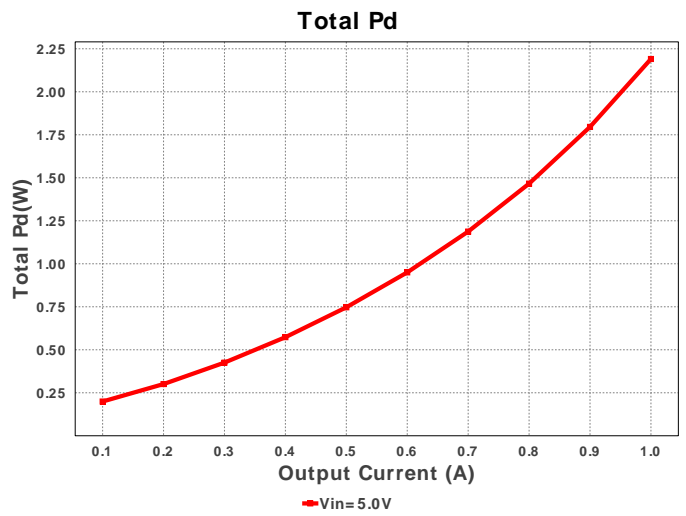
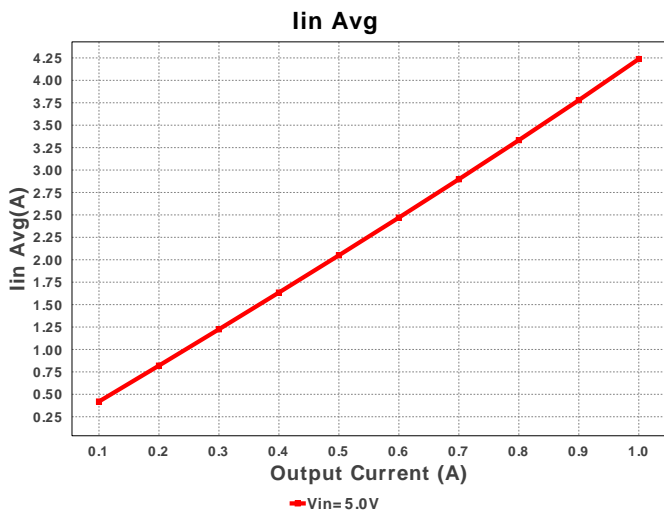
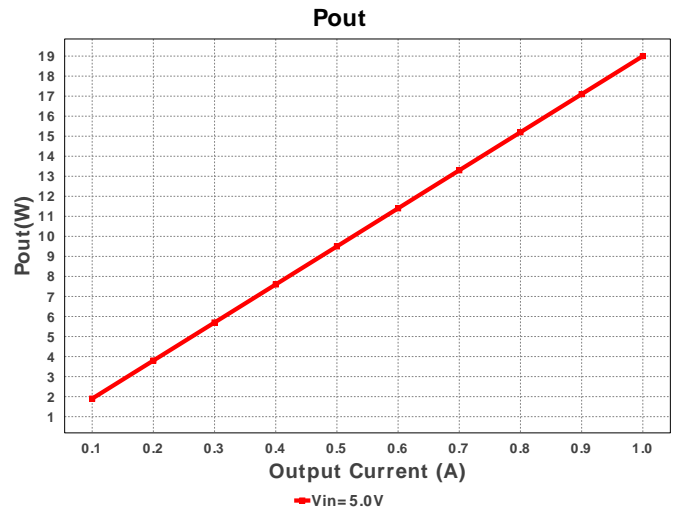
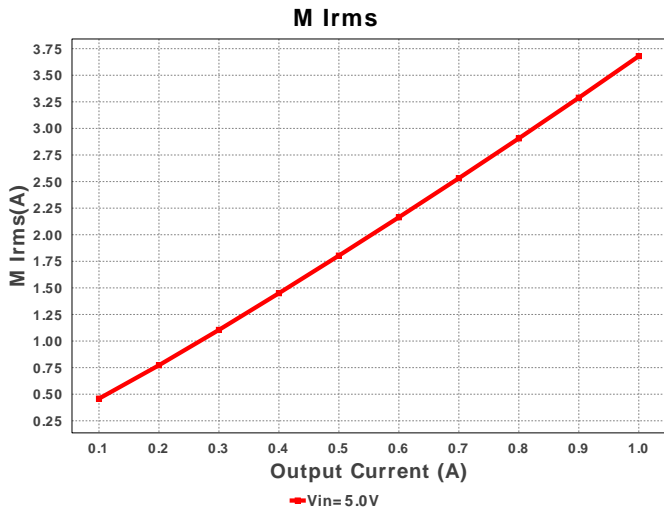
Electrical BOM

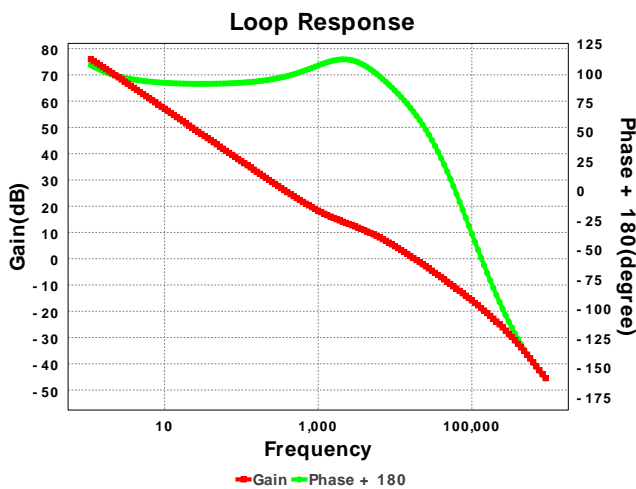
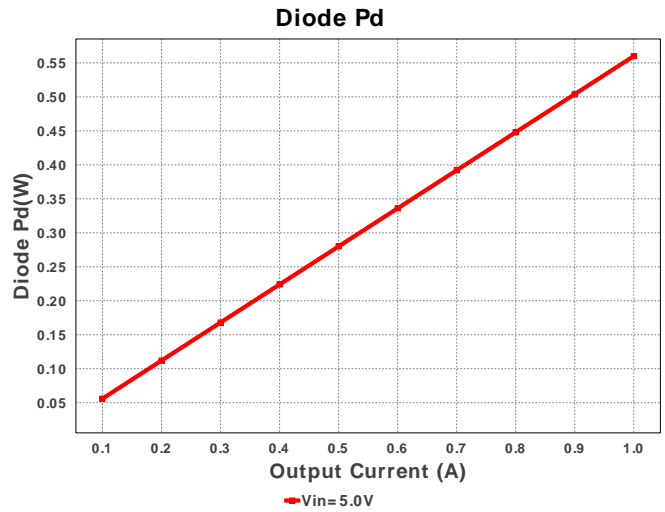
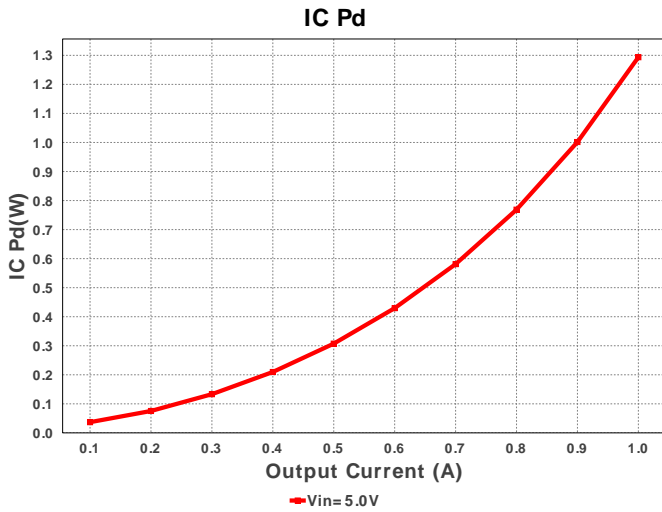
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Taiyo Yuden	TMK212B7473KD-T Series= X7R	Cap= 47.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
2.	Ccomp2	MuRata	GRM1555C1E390JA01D Series= C0G/NP0	Cap= 39.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	Cin	Kemet	C0805C475K8PACTU Series= X5R	Cap= 4.7 uF ESR= 4.0 mOhm VDC= 10.0 V IRMS= 9.89 A	1	\$0.03	 0805 7 mm ²
4.	Cinx	Kemet	C0805C475K8PACTU Series= X5R	Cap= 4.7 uF ESR= 4.0 mOhm VDC= 10.0 V IRMS= 9.89 A	1	\$0.03	 0805 7 mm ²
5.	Cout	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	2	\$0.06	 0805 7 mm ²
6.	Css	MuRata	GRM033R60J223KE01D Series= X5R	Cap= 22.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
7.	D1	Diodes Inc.	PDS760-13	VF@Io= 560.0 mV VRRM= 60.0 V	1	\$0.60	 PowerDI5 50 mm ²
8.	L1	Bourns	SRN8040-2R2Y	L= 2.2 µH DCR= 13.0 mOhm	1	\$0.22	 SRN8040 100 mm ²
9.	Rcomp	Vishay-Dale	CRCW04022K15FKED Series= CRCW..e3	Res= 2.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	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
11.	Rfbt	Vishay-Dale	CRCW0402143KFKED Series= CRCW..e3	Res= 143.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rt	Vishay-Dale	CRCW040234K0FKED Series= CRCW..e3	Res= 34.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
13.	U1	Texas Instruments	TPS55340QRTERQ1	Switcher	1	\$2.41	S-PWQFN-N16 17 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	335.523 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.797 A	Current	Output capacitor RMS ripple current
3.	IC Ipk	4.784 A	Current	Peak switch current in IC
4.	Iin Avg	4.238 A	Current	Average input current
5.	L Ipp	1.162 A	Current	Peak-to-peak inductor ripple current
6.	M Iavg	4.202 A	Current	MOSFET Average current
7.	M1 Irms	3.68 A	Current	Q Iavg
8.	BOM Count	14	General	Total Design BOM count
9.	FootPrint	218.0 mm ²	General	Total Foot Print Area of BOM components
10.	Frequency	1.36 MHz	General	Switching frequency
11.	IC Tolerance	9.0 mV	General	IC Feedback Tolerance
12.	M Vds Act	301.637 mV	General	Voltage drop across the MosFET
13.	Pout	19.0 W	General	Total output power
14.	Total BOM	\$3.48	General	Total BOM Cost
15.	D1 Tj	55.2 degC	Op_Point	D1 junction temperature
16.	Vout OP	19.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	17.963 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	76.204 %	Op_point	Duty cycle
19.	Efficiency	89.662 %	Op_point	Steady state efficiency
20.	IC Tj	86.01 degC	Op_point	IC junction temperature
21.	ICThetaJA	43.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	1.0 A	Op_point	Iout operating point
23.	Phase Marg	66.343 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	5.0 V	Op_point	Vin operating point
25.	Vout p-p	41.347 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	450.301 μW	Power	Input capacitor power dissipation
27.	Cout Pd	3.229 mW	Power	Output capacitor power dissipation
28.	Diode Pd	560.0 mW	Power	Diode power dissipation
29.	IC Pd	1.294 W	Power	IC power dissipation
30.	L Pd	231.042 mW	Power	Inductor power dissipation
31.	Total Pd	2.191 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.0 A	Maximum Output Current
2.	Iout1	1.0 Amps	Output Current #1
3.	VinMax	5.0 V	Maximum input voltage
4.	VinMin	5.0 V	Minimum input voltage
5.	Vout	19.0 V	Output Voltage
6.	Vout1	19.0 Volt	Output Voltage #1
7.	base_pn	TPS55340-Q1	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. The TPS55340-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. **TPS55340-Q1** Product Folder : <http://www.ti.com/product/tps55340%2Dq1/description> : contains the data sheet and other resources.

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You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

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