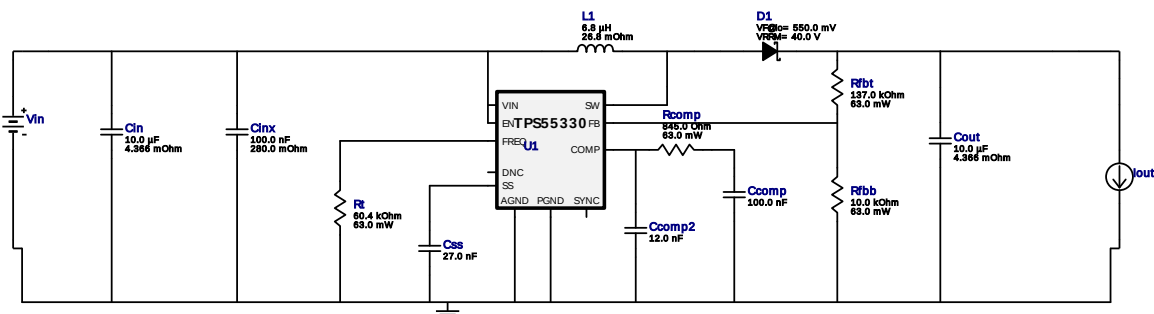


WEBENCH® Design Report

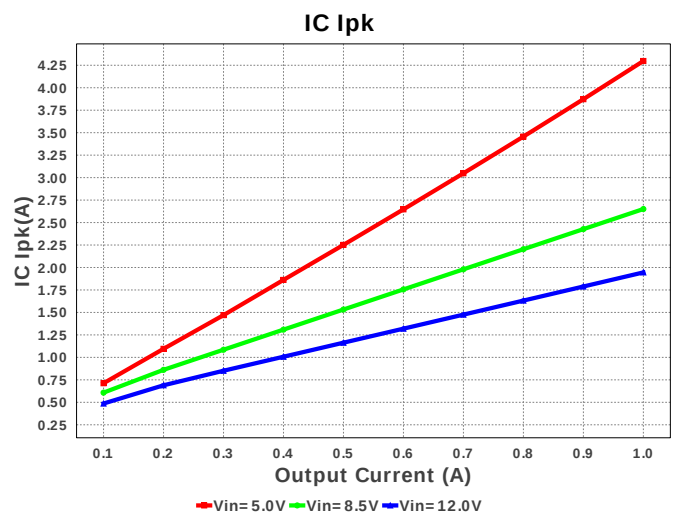
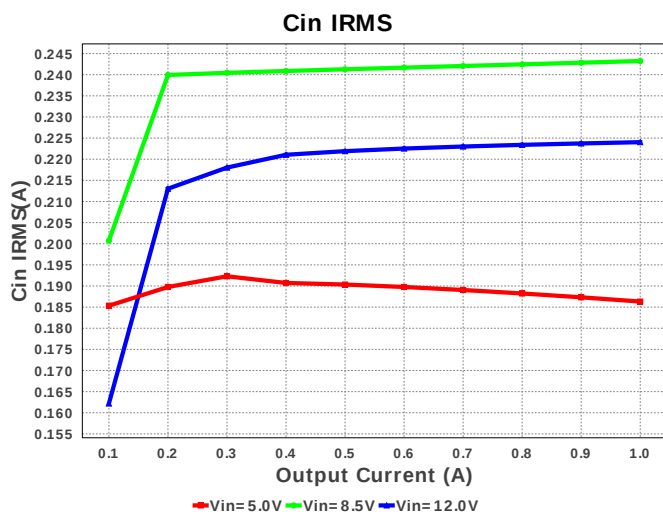
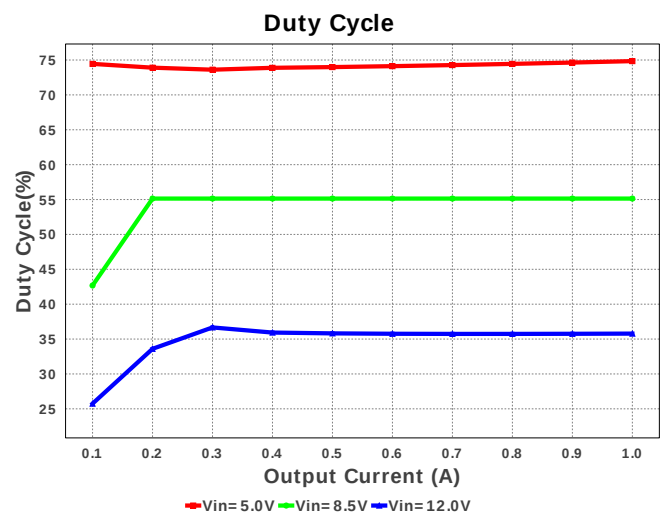
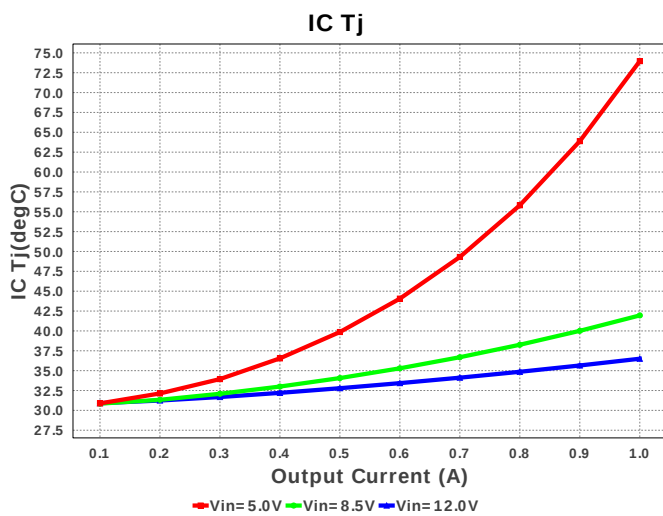
Design : 4551144/152 TPS55330RTER
TPS55330RTER 5.0V-12.0V to 18.00V @ 1.0A

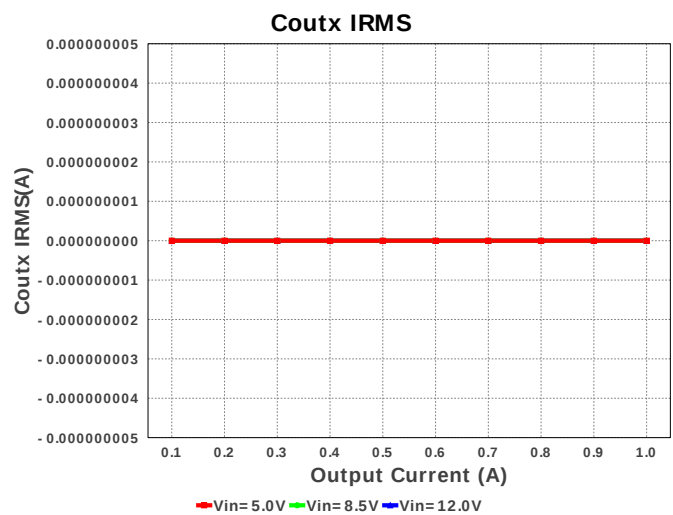
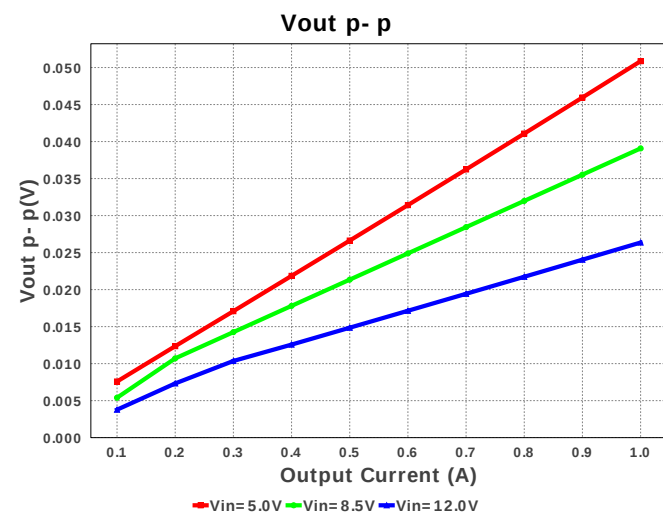
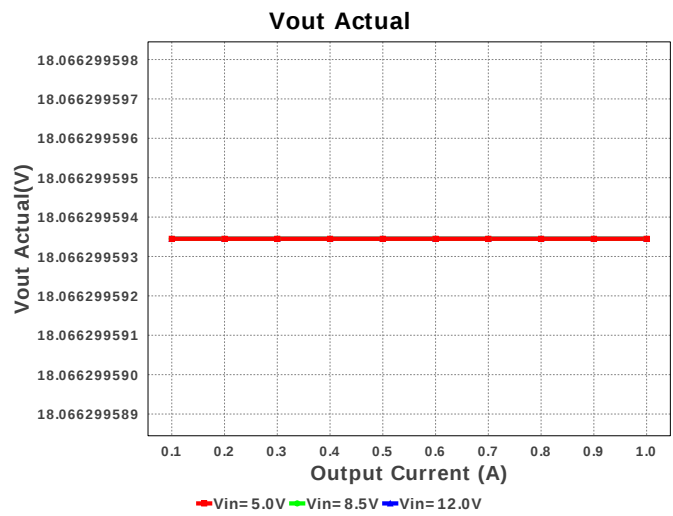
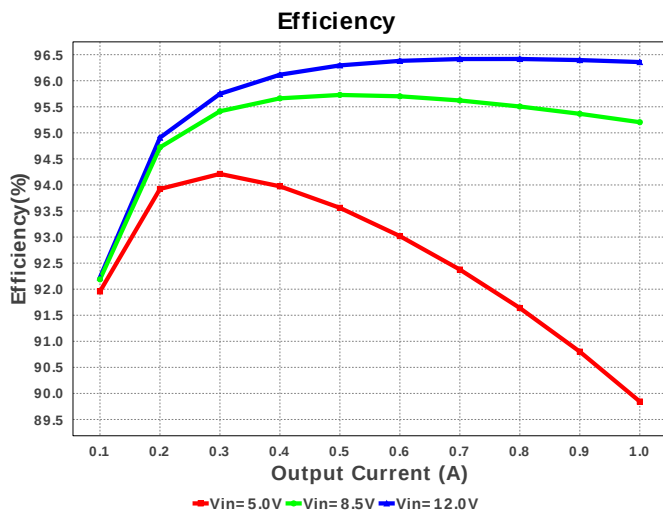
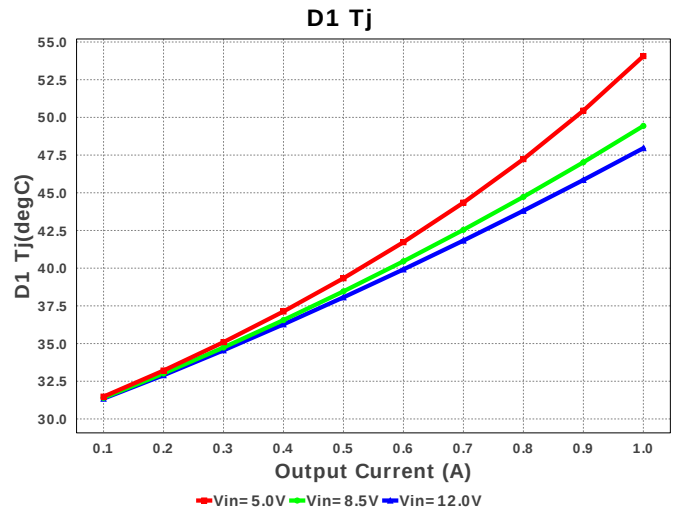
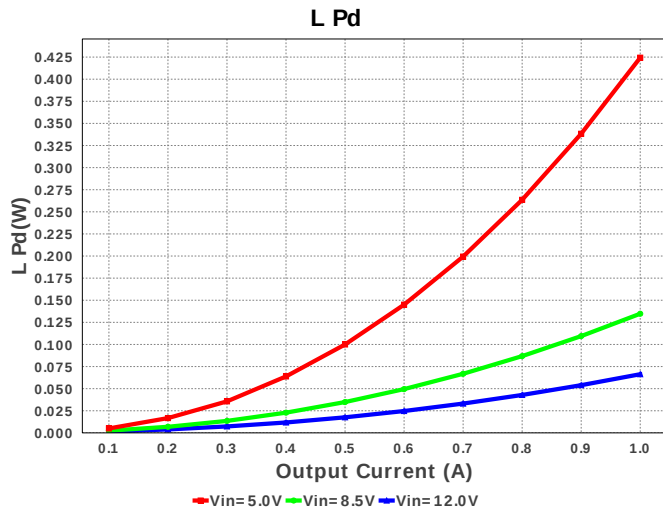


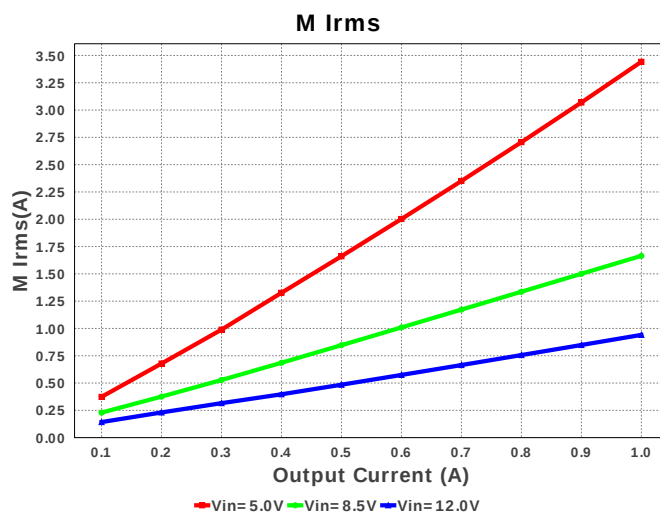
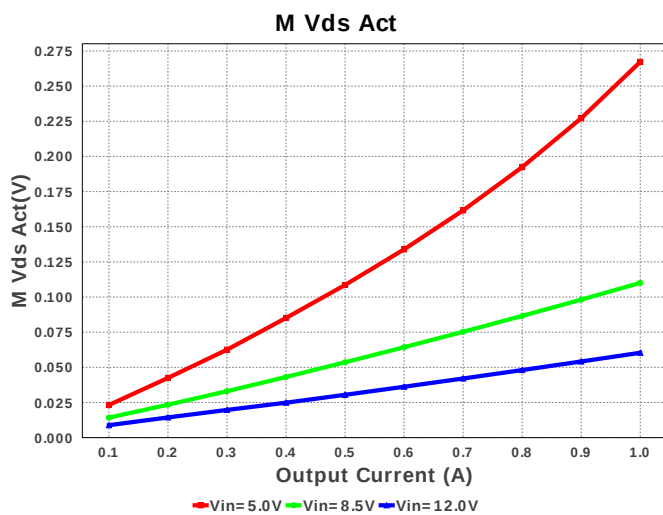
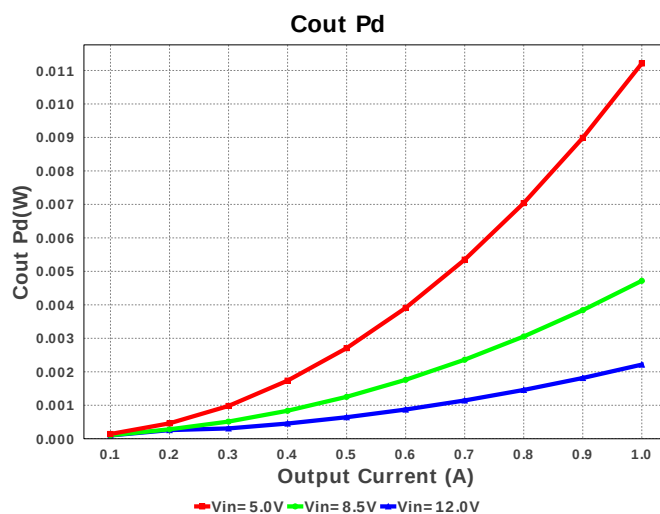
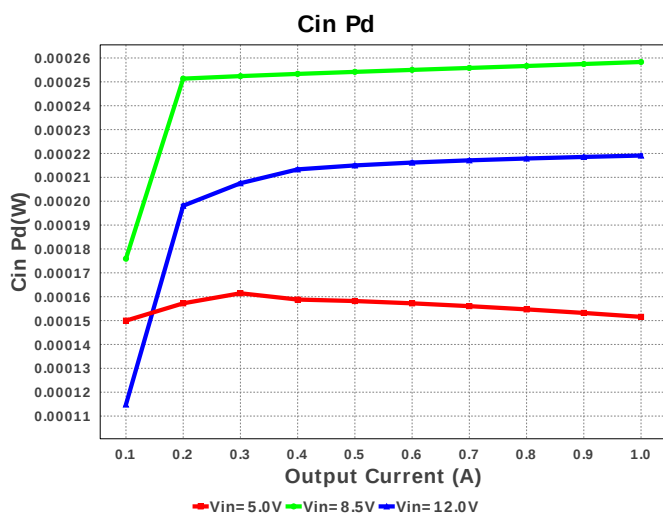
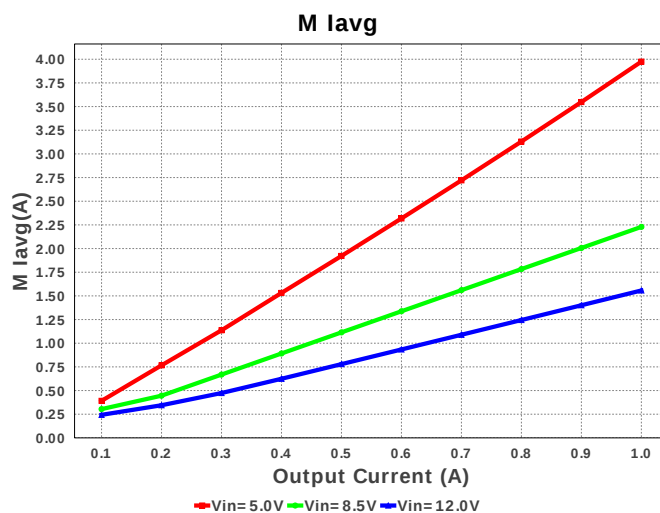
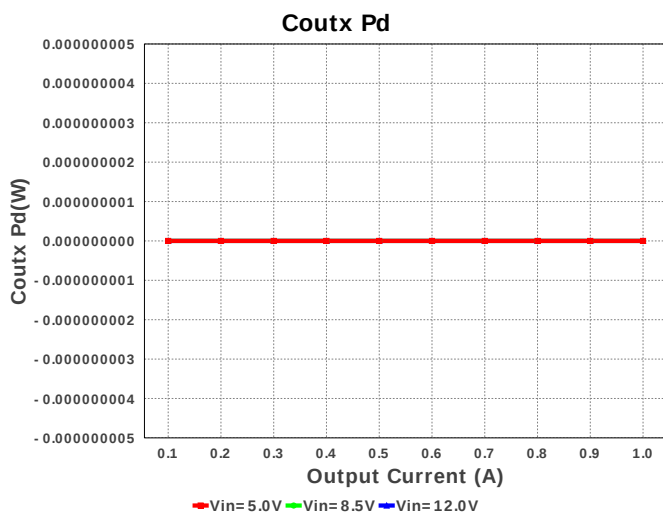
Electrical BOM

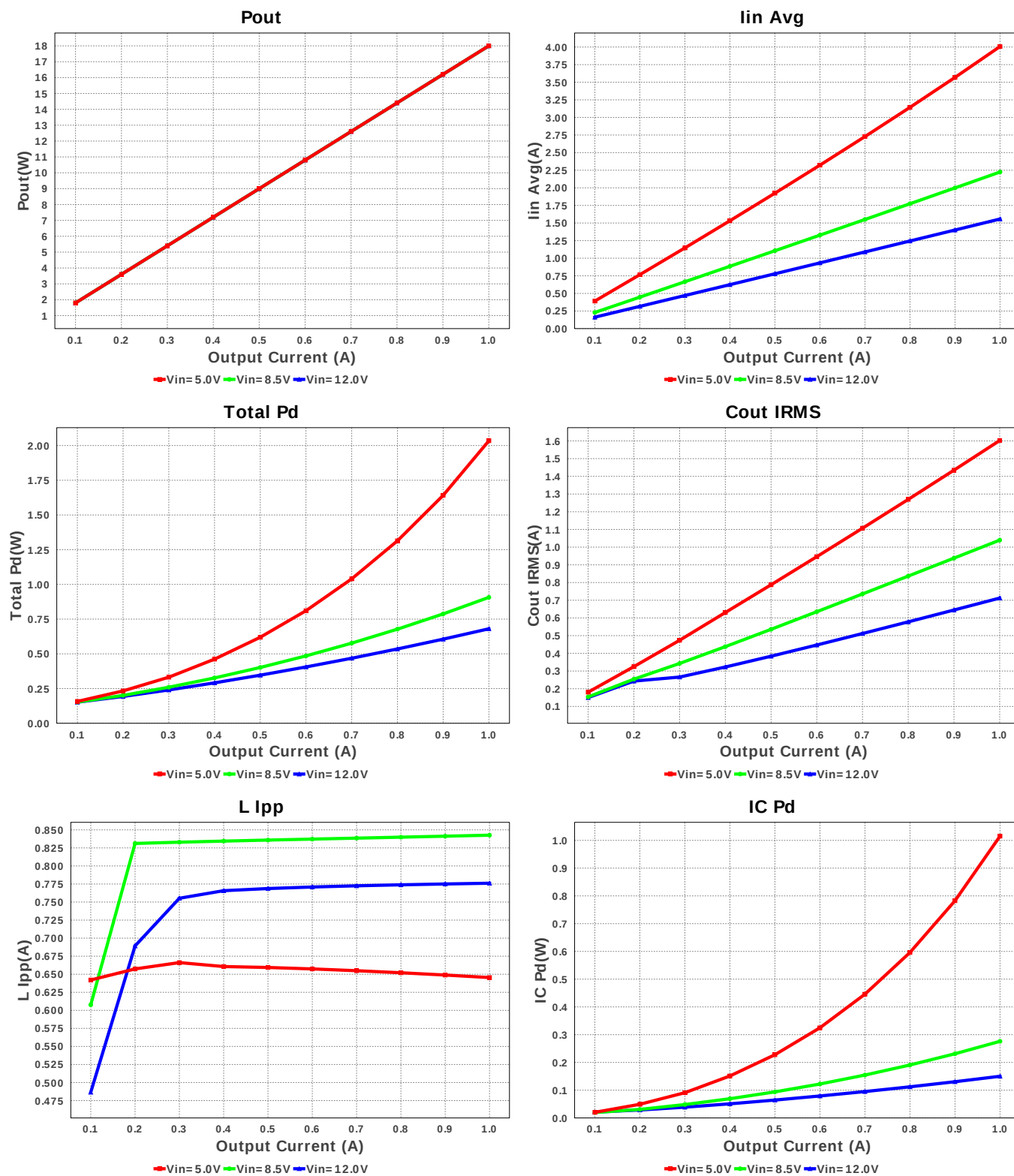
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	Ccomp2	MuRata	GRM033C80J123KE01D Series= X6S	Cap= 12.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0201 2 mm ²
3.	Cin	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.366 mOhm VDC= 25.0 V IRMS= 2.8022 A	1	\$0.05	1206_190 11 mm ²
4.	Cinx	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	Cout	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.366 mOhm VDC= 25.0 V IRMS= 2.8022 A	1	\$0.05	1206_190 11 mm ²
6.	Css	MuRata	GRM155R61A273KA01D Series= X5R	Cap= 27.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
7.	D1	Diodes Inc.	B540C-13-F	VF@Io= 550.0 mV VRRM= 40.0 V	1	\$0.17	SMC 83 mm ²
8.	L1	Coilcraft	XAL5050-682MEB	L= 6.8 uH DCR= 26.8 mOhm	1	\$0.92	XAL5050 54 mm ²
9.	Rcomp	Vishay-Dale	CRCW0402845RFKED Series= CRCW..e3	Res= 845.0 Ohm 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
11.	Rfbt	Vishay-Dale	CRCW0402137KFKED Series= CRCW..e3	Res= 137.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

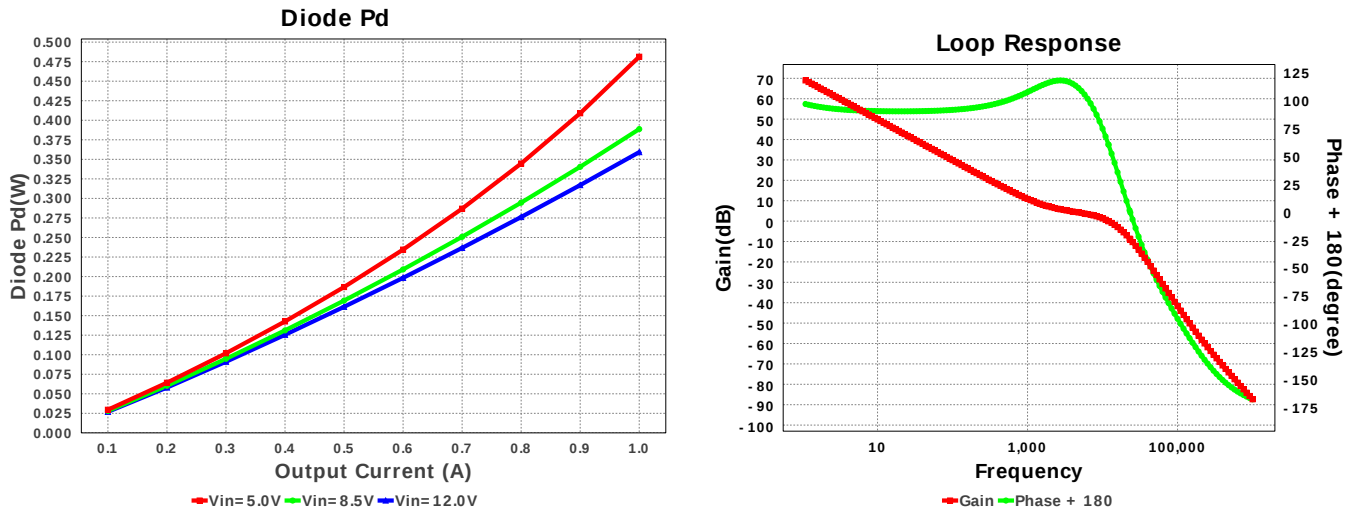
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rt	Vishay-Dale	CRCW040260K4FKED Series= CRCW..e3	Res= 60.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
13.	U1	Texas Instruments	TPS55330RTER	Switcher	1	\$1.75	 S-PWQFN-N16 17 mm ²











Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	186.317 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.602 A	Current	Output capacitor RMS ripple current
3.	Coutx IRMS	0.0 A	Current	Output capacitor_x RMS ripple current
4.	IC IpK	4.297 A	Current	Peak switch current in IC
5.	Iin Avg	4.007 A	Current	Average input current
6.	L Ipp	645.42 mA	Current	Peak-to-peak inductor ripple current
7.	M Iavg	3.975 A	Current	MOSFET Average current
8.	M1 Irms	3.442 A	Current	Q Iavg
9.	BOM Count	14	General	Total Design BOM count
10.	FootPrint	214.0 mm ²	General	Total Foot Print Area of BOM components
11.	Frequency	778.91 kHz	General	Switching frequency
12.	IC Tolerance	9.0 mV	General	IC Feedback Tolerance
13.	M Vds Act	267.214 mV	General	Voltage drop across the MosFET
14.	Mode	CCM	General	Conduction Mode
15.	Pout	18.0 W	General	Total output power
16.	Total BOM	\$3.05	General	Total BOM Cost
17.	D1 Tj	54.065 degC	Op_Point	D1 junction temperature
18.	Low Freq Gain	68.093 dB	Op_Point	Gain at 10Hz
19.	Vout Actual	18.066 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
20.	Vout OP	18.0 V	Op_Point	Operational Output Voltage
21.	Cross Freq	4.679 kHz	Op_point	Bode plot crossover frequency
22.	Duty Cycle	74.841 %	Op_point	Duty cycle
23.	Efficiency	89.845 %	Op_point	Steady state efficiency
24.	Gain Marg	-9.226 dB	Op_point	Bode Plot Gain Margin
25.	IC Tj	73.958 degC	Op_point	IC junction temperature
26.	ICThetaJA	43.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
27.	IOUT_OP	1.0 A	Op_point	Iout operating point
28.	Phase Marg	64.498 deg	Op_point	Bode Plot Phase Margin
29.	VIN_OP	5.0 V	Op_point	Vin operating point
30.	Vout p-p	50.86 mV	Op_point	Peak-to-peak output ripple voltage
31.	Cin Pd	151.562 μW	Power	Input capacitor power dissipation
32.	Cout Pd	11.21 mW	Power	Output capacitor power dissipation
33.	Coutx Pd	0.0 W	Power	Output capacitor_x power loss
34.	Diode Pd	481.298 mW	Power	Diode power dissipation
35.	IC Pd	1.015 W	Power	IC power dissipation
36.	L Pd	424.334 mW	Power	Inductor power dissipation
37.	Total Pd	2.035 W	Power	Total Power Dissipation
38.	Vout Tolerance	2.629 %		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	12.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	18.0	Output Voltage
5.	base_pn	TPS55330	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS55330** Product Folder : <http://www.ti.com/product/TPS55330> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

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

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).