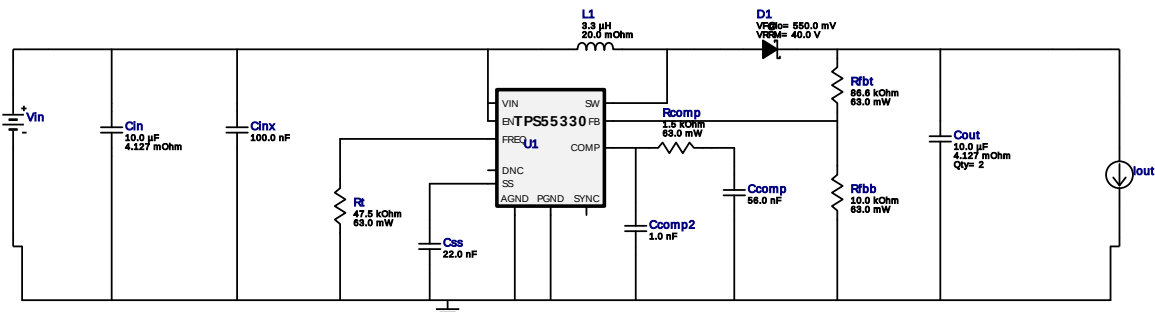


WEBENCH® Design Report

Design : 1194016/2166 TPS55330RTER
TPS55330RTER 4.5V-5.5V to 12.00V @ 1.0A



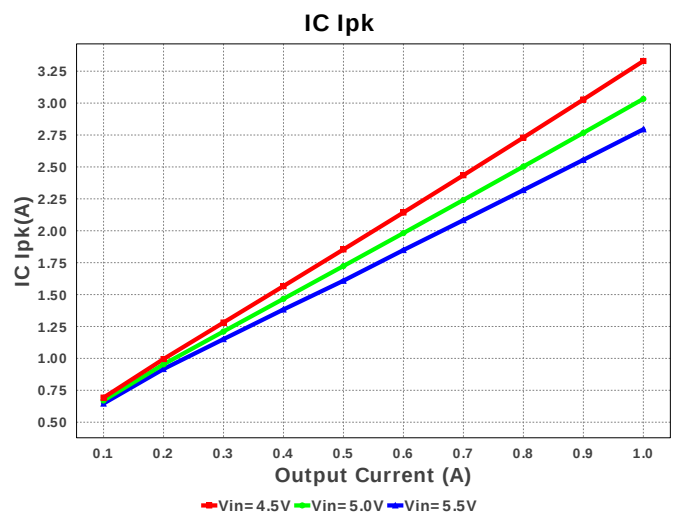
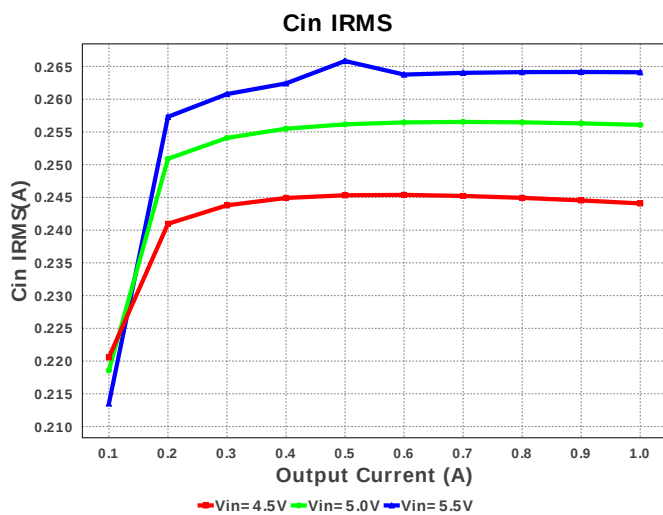
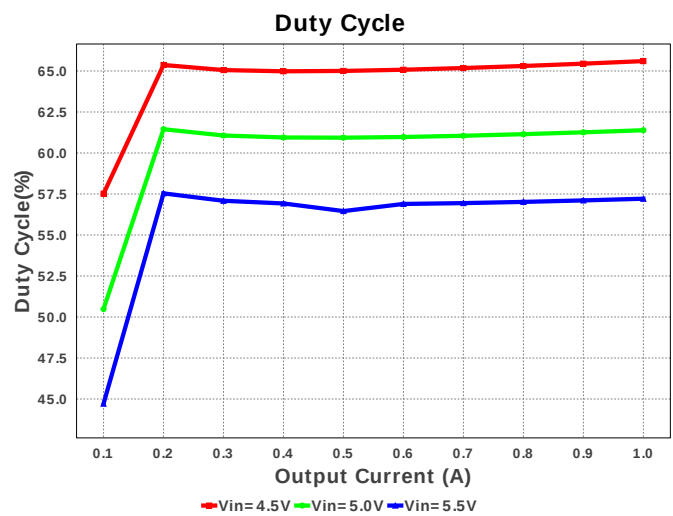
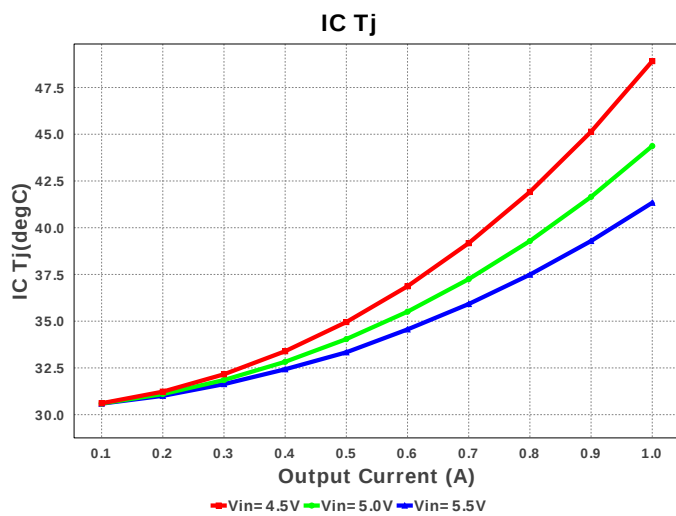
My Comments

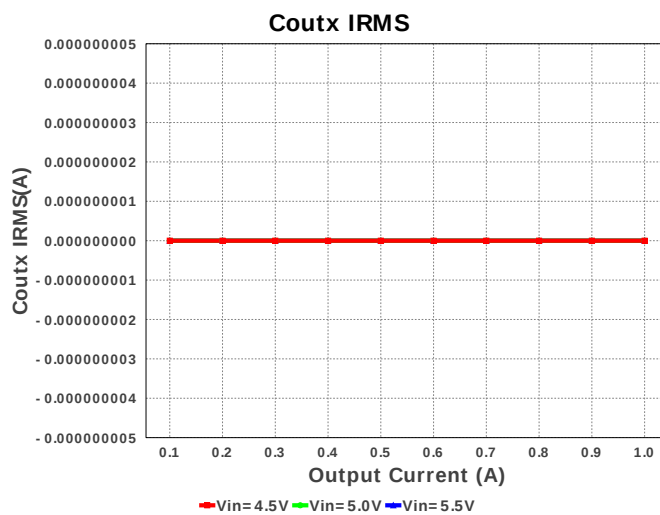
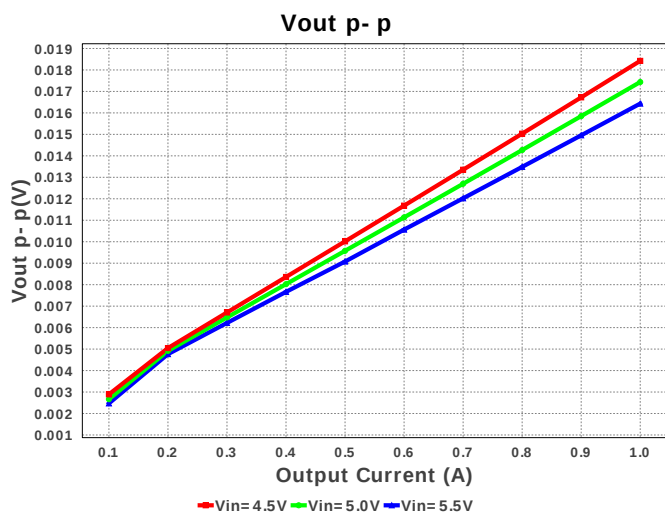
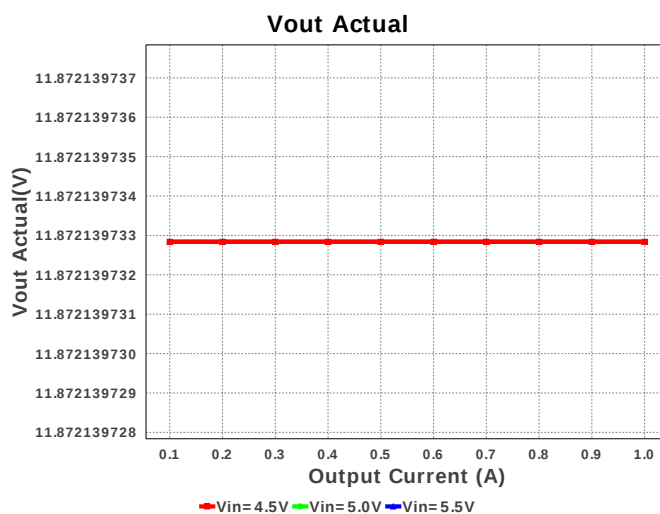
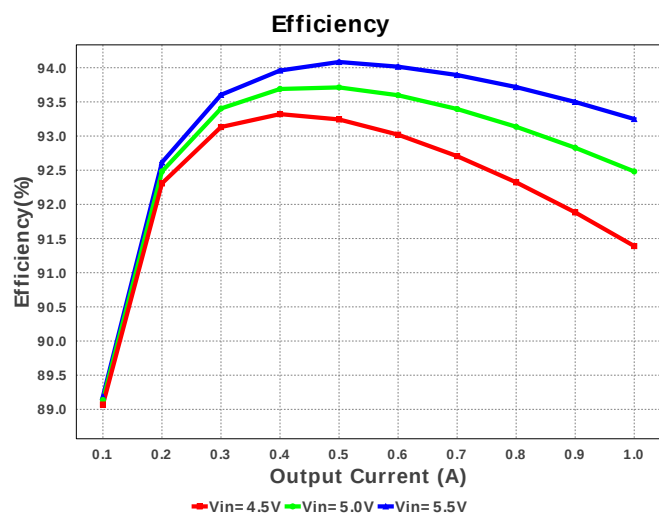
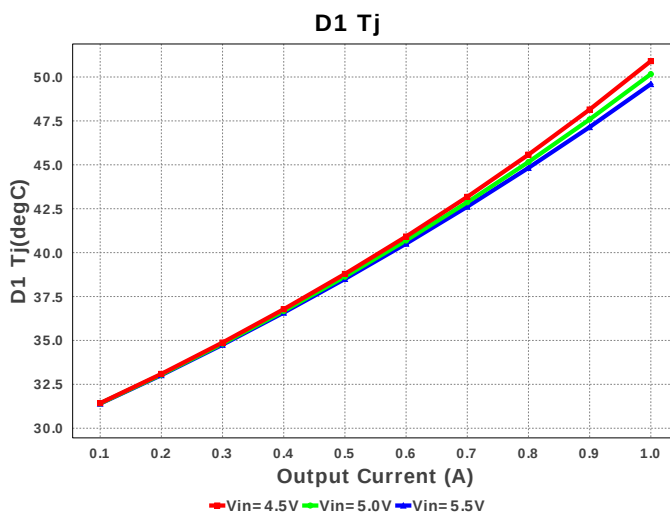
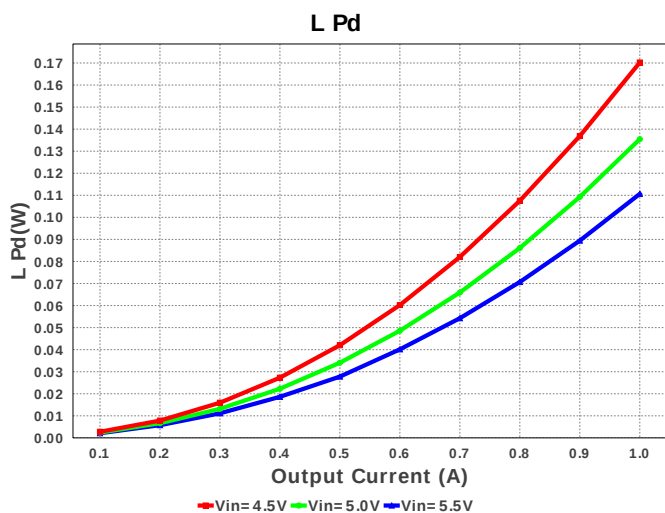
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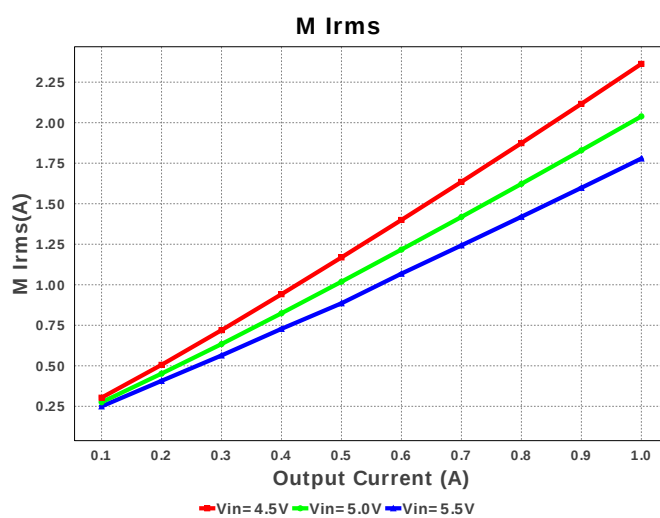
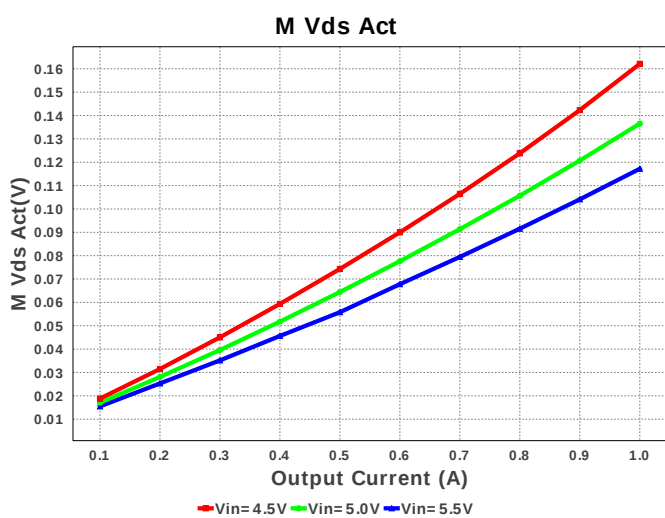
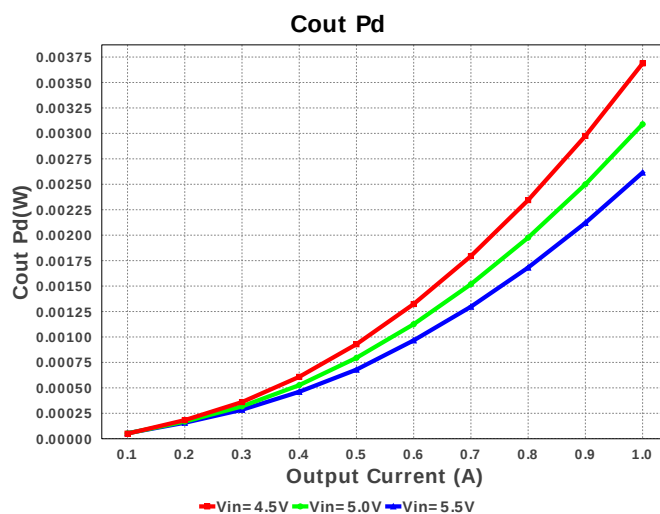
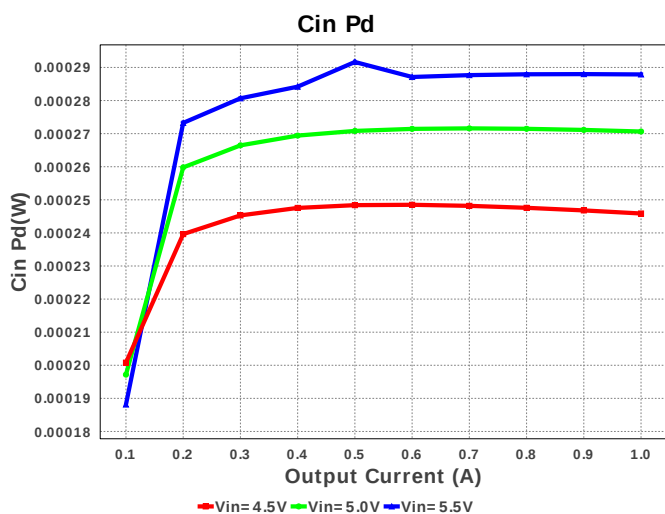
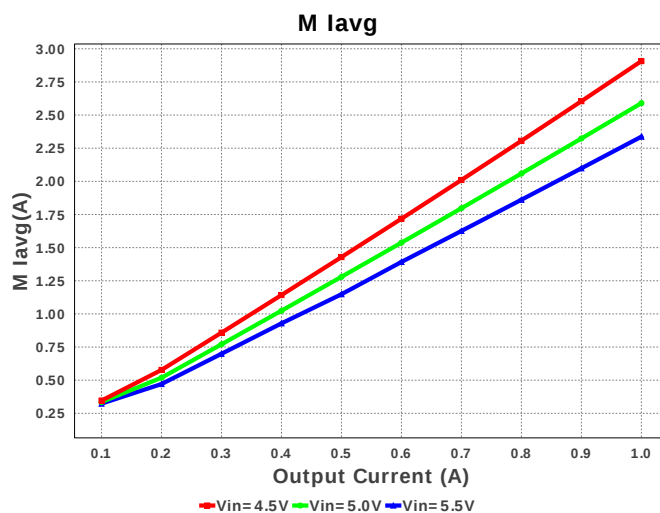
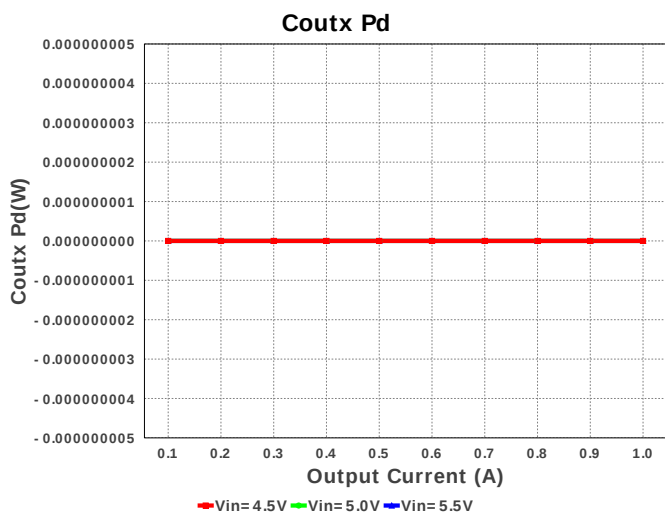
Electrical BOM

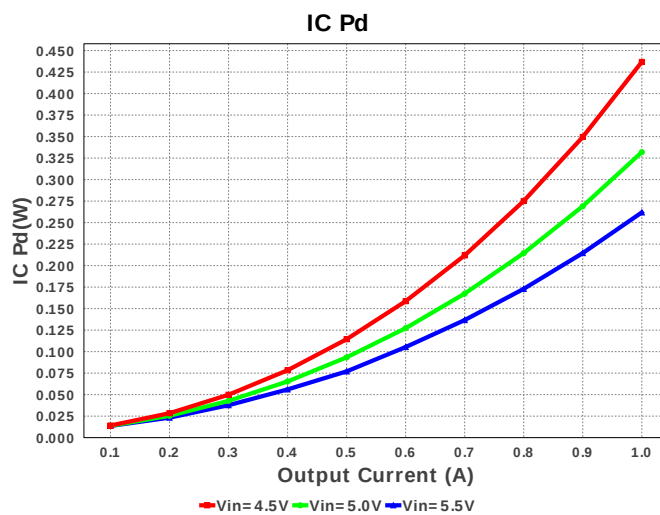
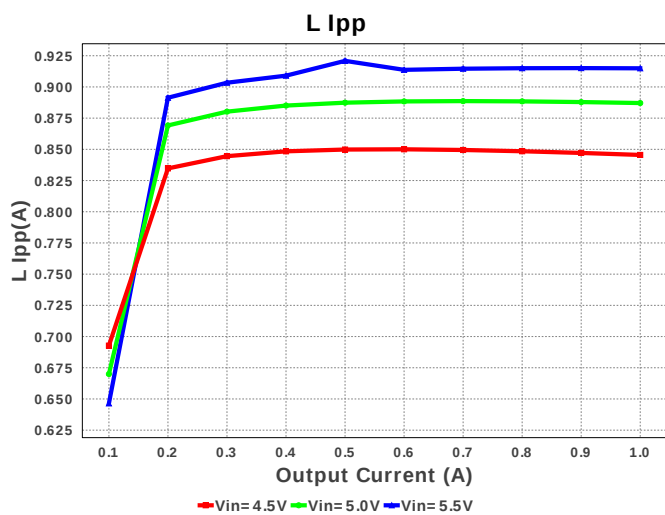
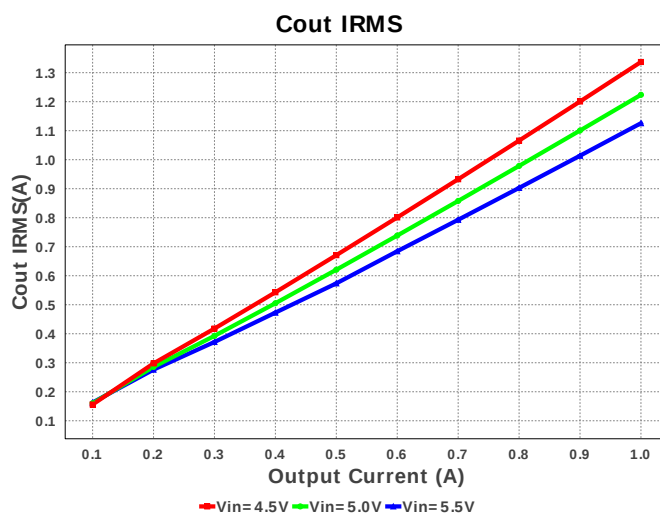
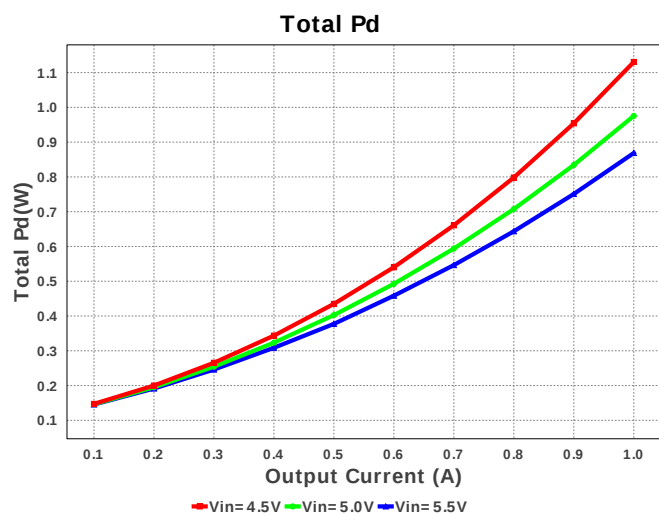
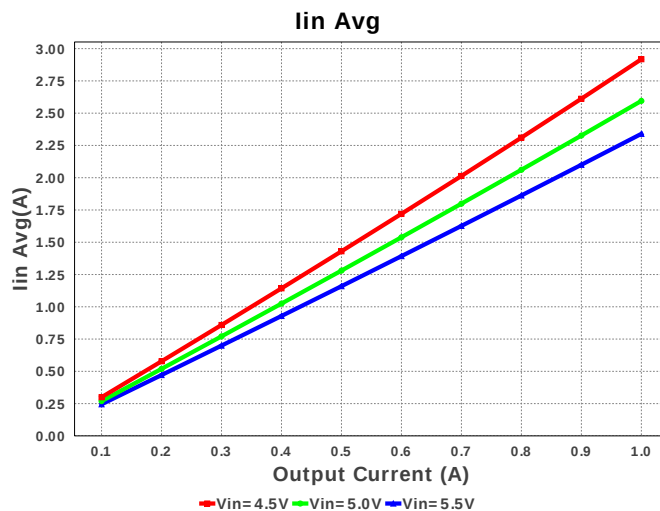
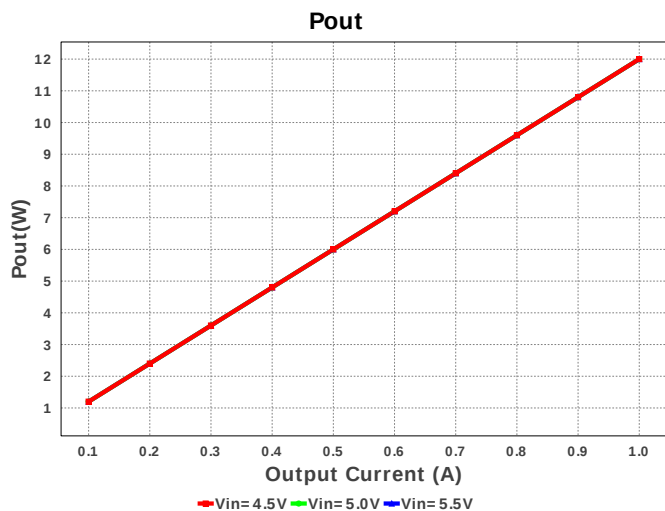
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	MuRata	GRM155R61A563KA01D Series= X5R	Cap= 56.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Ccomp2	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0201 2 mm ²
3.	Cin	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	1	\$0.03	0805 7 mm ²
4.	Cinx	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
5.	Cout	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	2	\$0.03	0805 7 mm ²
6.	Css	MuRata	GRM033C80J223KE01D Series= X6S	Cap= 22.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0201 2 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	Bourns	SDR0805-3R3ML	L= 3.3 uH DCR= 20.0 mOhm	1	\$0.22	SDR0805 96 mm ²
9.	Rcomp	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 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
11.	Rfbb	Vishay-Dale	CRCW040286K6FKED Series= CRCW..e3	Res= 86.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

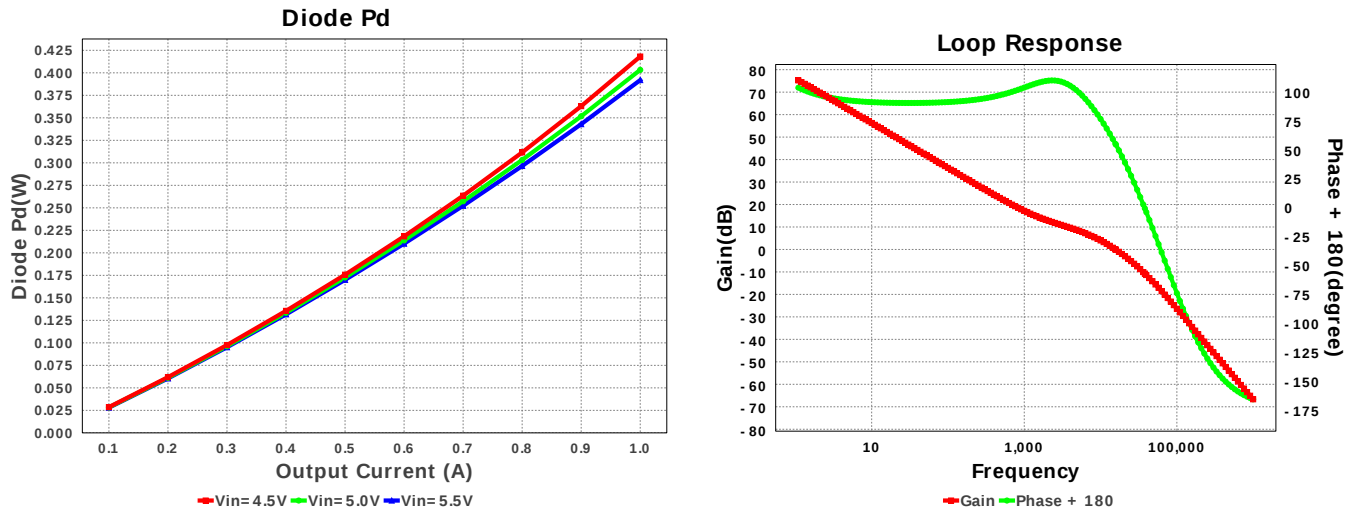
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rt	Vishay-Dale	CRCW040247K5FKED Series= CRCW..e3	Res= 47.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
13.	U1	Texas Instruments	TPS55330RTER	Switcher	1	\$1.75	 S-PWQFN-N16 17 mm ²











Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	244.081 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.321 A	Current	Output capacitor RMS ripple current
3.	Coutx IRMS	0.0 A	Current	Output capacitor_x RMS ripple current
4.	IC Ipk	3.33 A	Current	Peak switch current in IC
5.	Iin Avg	2.918 A	Current	Average input current
6.	L Ipp	845.52 mA	Current	Peak-to-peak inductor ripple current
7.	M Iavg	2.907 A	Current	MOSFET Average current
8.	M1 Irms	2.363 A	Current	Q Iavg
9.	BOM Count	15	General	Total Design BOM count
10.	FootPrint	244.0 mm ²	General	Total Foot Print Area of BOM components
11.	Frequency	983.333 kHz	General	Switching frequency
12.	IC Tolerance	9.0 mV	General	IC Feedback Tolerance
13.	M Vds Act	162.113 mV	General	Voltage drop across the MosFET
14.	Pout	12.0 W	General	Total output power
15.	Total BOM	\$2.32	General	Total BOM Cost
16.	D1 Tj	50.905 degC	Op_Point	D1 junction temperature
17.	Low Freq Gain	74.837 dB	Op_Point	Gain at 10Hz
18.	Vout Actual	11.872 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
19.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
20.	Cross Freq	12.917 kHz	Op_point	Bode plot crossover frequency
21.	Duty Cycle	65.601 %	Op_point	Duty cycle
22.	Efficiency	91.391 %	Op_point	Steady state efficiency
23.	Gain Marg	-10.131 dB	Op_point	Bode Plot Gain Margin
24.	IC Tj	48.912 degC	Op_point	IC junction temperature
25.	ICThetaJA	43.3 degC/W	Op_point	IC junction-to-ambient thermal resistance
26.	IOUT_OP	1.0 A	Op_point	Iout operating point
27.	Phase Marg	55.397 deg	Op_point	Bode Plot Phase Margin
28.	VIN_OP	4.5 V	Op_point	Vin operating point
29.	Vout p-p	24.074 mV	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	245.868 μW	Power	Input capacitor power dissipation
31.	Cout Pd	3.602 mW	Power	Output capacitor power dissipation
32.	Coutx Pd	0.0 W	Power	Output capacitor_x power loss
33.	Diode Pd	418.106 mW	Power	Diode power dissipation
34.	IC Pd	436.76 mW	Power	IC power dissipation
35.	L Pd	170.216 mW	Power	Inductor power dissipation
36.	Total Pd	1.13 W	Power	Total Power Dissipation
37.	Vout Tolerance	2.557 %		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	5.5	Maximum input voltage
3.	VinMin	4.5	Minimum input voltage
4.	Vout	12.0	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.

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