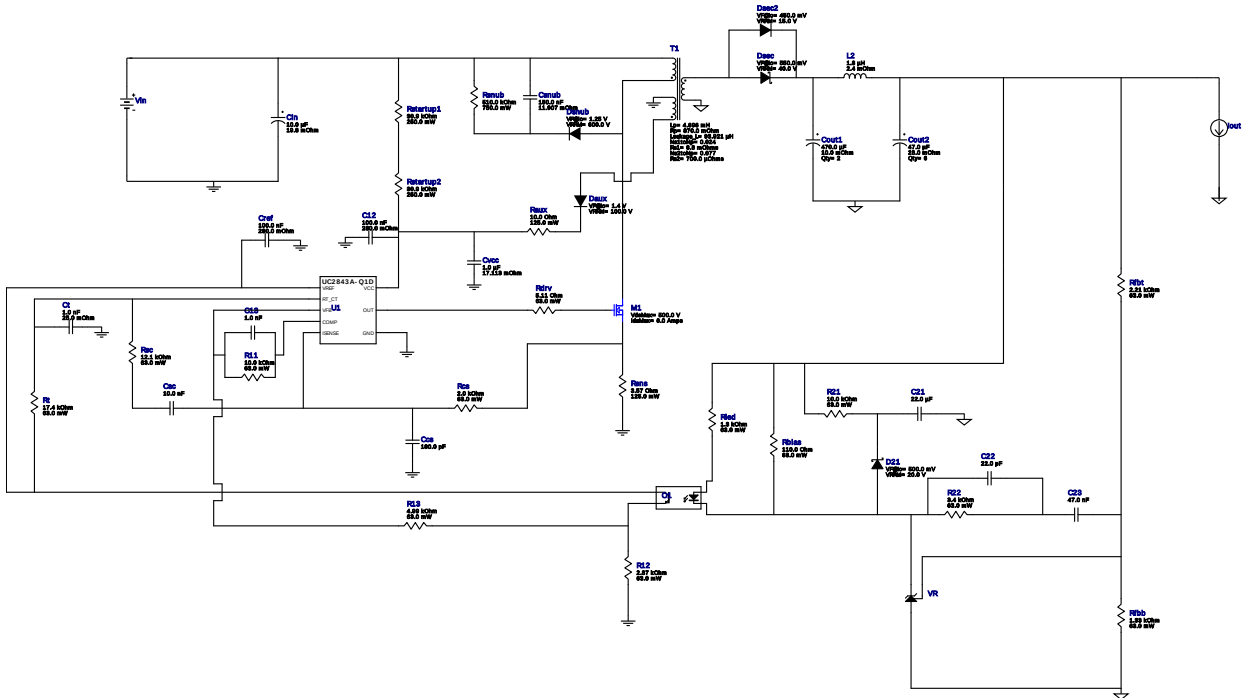


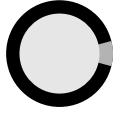
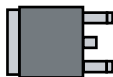
WEBENCH® Design Report

Design : 4689508/3 UC2843AQD8RQ1
UC2843AQD8RQ1 110.0V-110.0V to 3.30V @ 2.0A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	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
2.	C13	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	C21	Taiyo Yuden	LMK212BJ226MG-T Series= X5R	Cap= 22.0 uF VDC= 10.0 V IRMS= 0.0 A	1	\$0.12	0805 7 mm ²
4.	C22	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	C23	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
6.	Ccs	Kemet	C0805C181K5GACTU Series= C0G/NP0	Cap= 180.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	Cin	Rubycon	200RX3010M8X16 Series= ?	Cap= 10.0 uF ESR= 19.8 mOhm VDC= 200.0 V IRMS= 200.0 mA	1	\$0.18	RX30_800x1600 100 mm ²

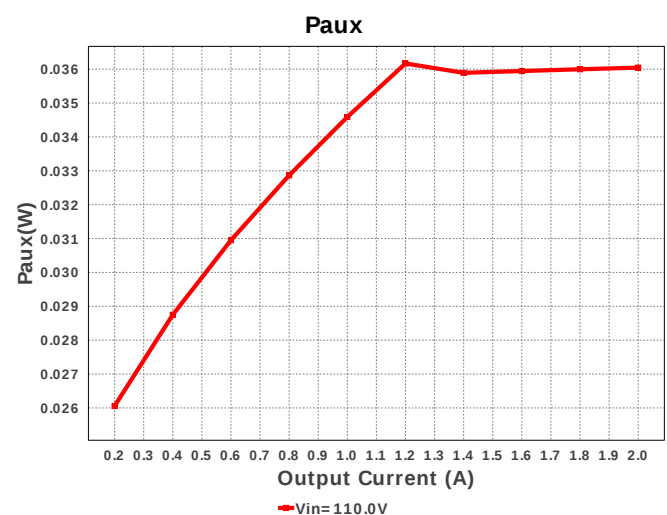
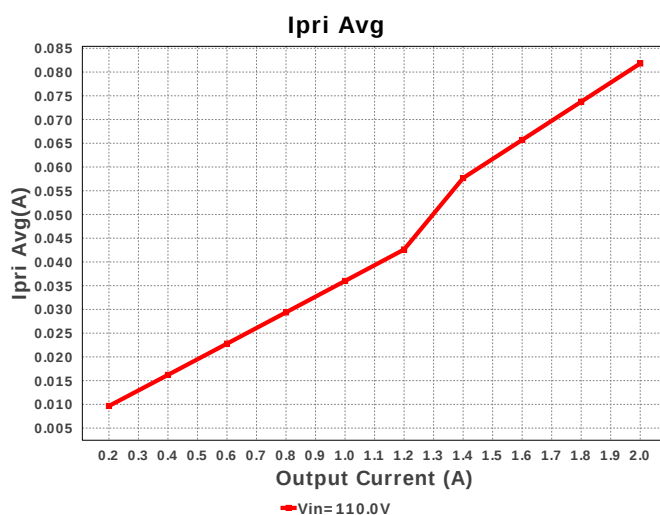
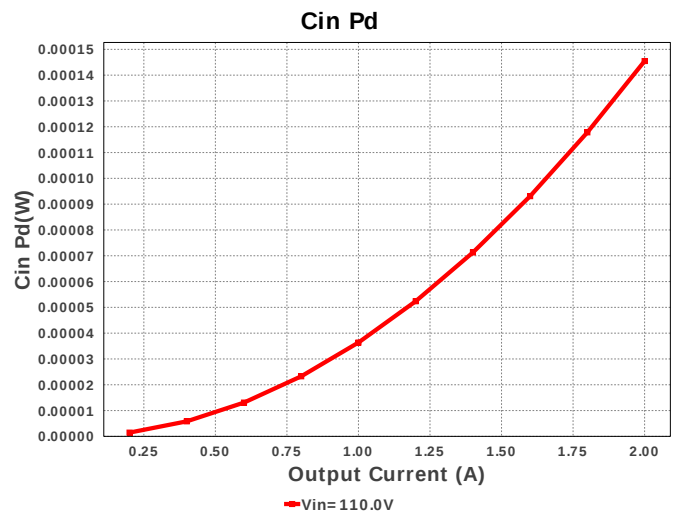
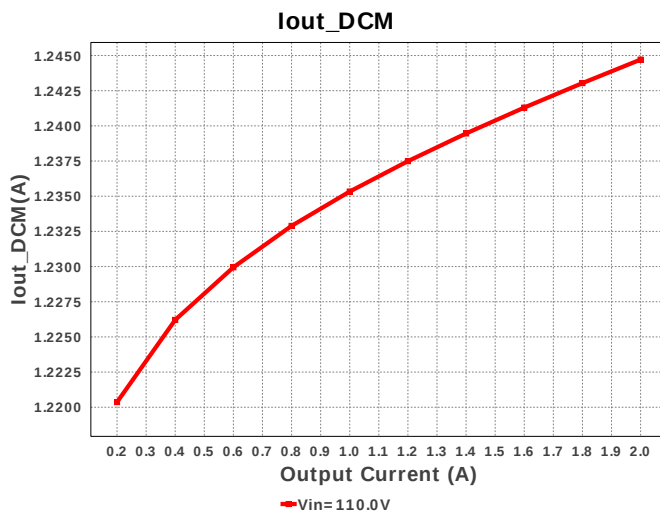
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8.	Cout1	Nichicon	RNU1C471MDN1PH Series= ?	Cap= 470.0 uF ESR= 10.0 mOhm VDC= 16.0 V IRMS= 6.1 A	2	\$0.52	 NU_1000x1250 144 mm ²
9.	Cout2	Chemi-Con	APXE100ARA470ME61G Series= PXE	Cap= 47.0 uF ESR= 28.0 mOhm VDC= 10.0 V IRMS= 2.31 A	6	\$0.39	 CAPSMT_62_E61 53 mm ²
10.	Cref	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
11.	Csc	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
12.	Csnub	TDK	C3225X7T2J154K Series= X7T	Cap= 150.0 nF ESR= 11.907 mOhm VDC= 630.0 V IRMS= 0.0 A	1	\$0.19	 1210 15 mm ²
13.	Ct	Kemet	C0805C102J5GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 50.0 V IRMS= 1.71 A	1	\$0.01	 0805 7 mm ²
14.	Cvcc	MuRata	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	\$0.01	 0603 5 mm ²
15.	D21	Vishay-Semiconductor	SS12-E3/61T	VF@Io= 500.0 mV VRRM= 20.0 V	1	\$0.08	 SMA 37 mm ²
16.	Daux	NXP Semiconductor	BAS316,115	VF@Io= 1.4 V VRRM= 100.0 V	1	\$0.02	 SOD-323 9 mm ²
17.	Dsec	Diodes Inc.	B540C-13-F	VF@Io= 550.0 mV VRRM= 40.0 V	1	\$0.17	 SMC 83 mm ²
18.	Dsec2	ON Semiconductor	MBRB2515LT4G	VF@Io= 450.0 mV VRRM= 15.0 V	1	\$1.00	 DDPAK 210 mm ²
19.	Dsnub	Diodes Inc.	MURS160-13-F	VF@Io= 1.25 V VRRM= 600.0 V	1	\$0.11	 SMB 44 mm ²
20.	L2	Coilcraft	SER1360-182KLB	L= 1.8 uH DCR= 2.4 mOhm	1	\$0.72	 SER1360 225 mm ²
21.	M1	Fairchild Semiconductor	FDD6N50TM	VdsMax= 500.0 V IdsMax= 6.0 Amps	1	\$0.47	 DPAK 102 mm ²
22.	O1	Vishay-Semiconductor	TCMT1109	Optocoupler	1	\$0.21	 SOP-4 44 mm ²
23.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

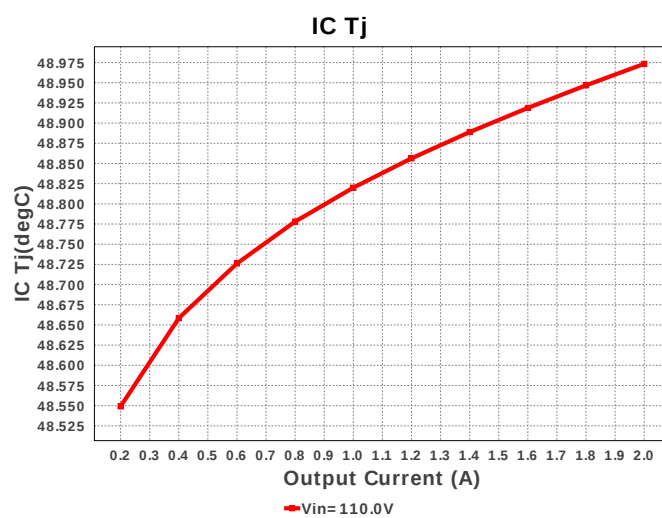
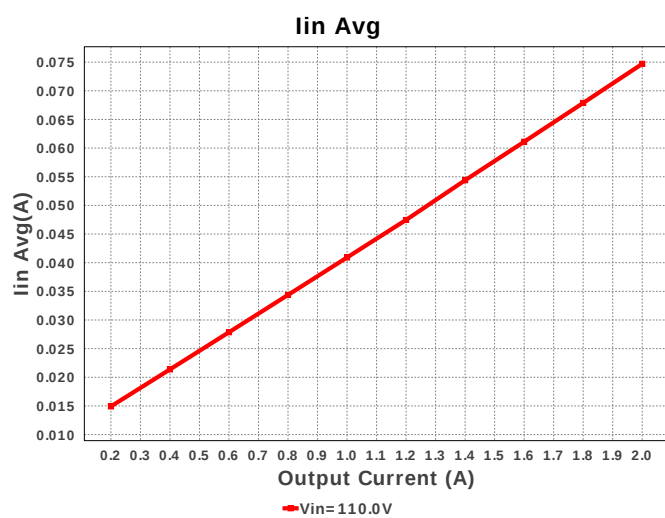
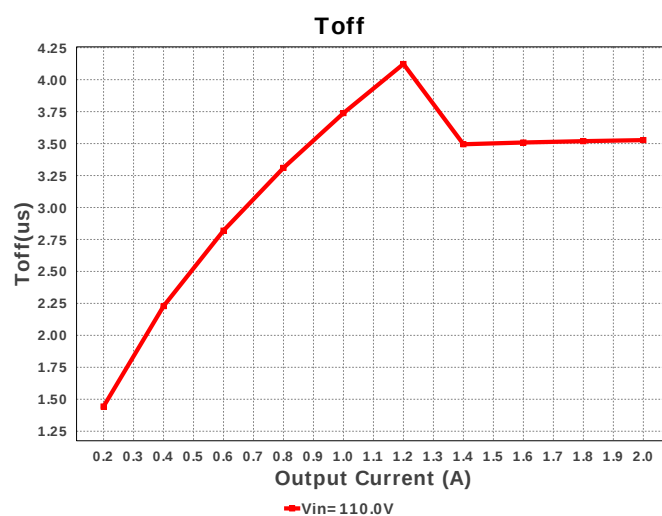
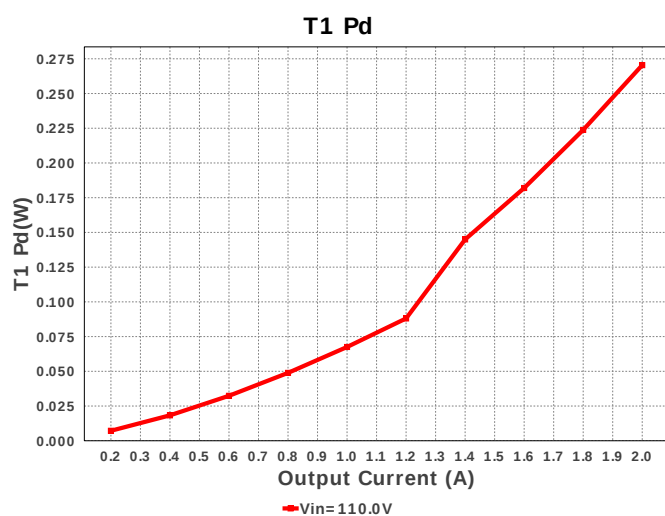
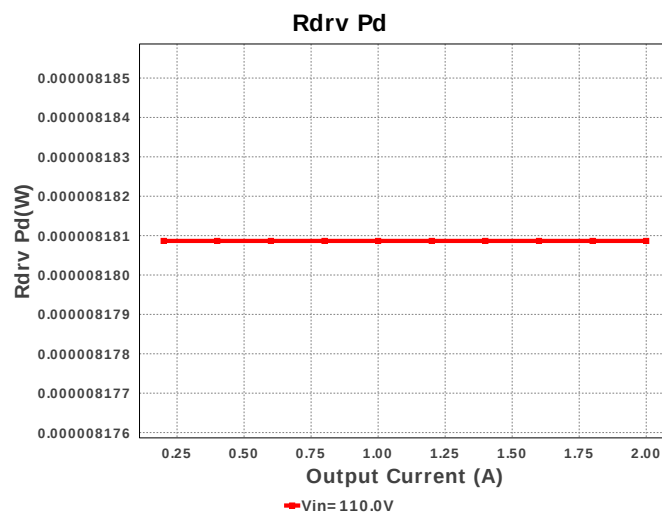
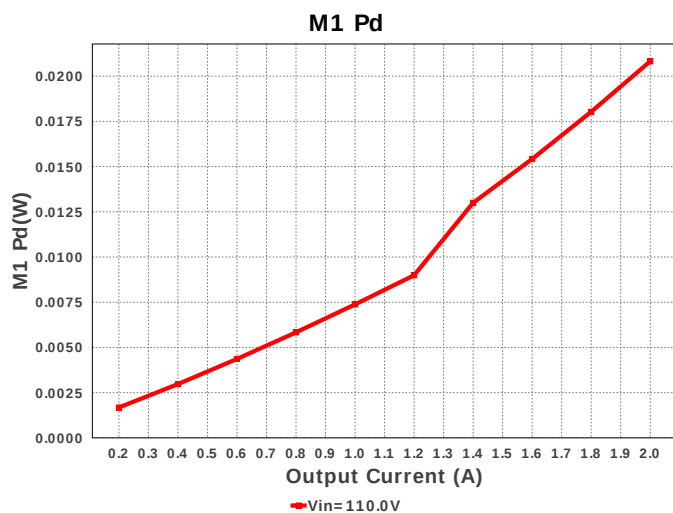
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	R12	Vishay-Dale	CRCW04022K87FKED Series= CRCW..e3	Res= 2.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
25.	R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
26.	R21	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
27.	R22	Vishay-Dale	CRCW04023K40FKED Series= CRCW..e3	Res= 3.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
28.	Raux	Vishay-Dale	CRCW080510R0FKEA Series= CRCW..e3	Res= 10.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
29.	Rbias	Vishay-Dale	CRCW0402110RFKED Series= CRCW..e3	Res= 110.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
30.	Rcs	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
31.	Rdrv	Vishay-Dale	CRCW04025R11FKED Series= CRCW..e3	Res= 5.11 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
32.	Rfbb	Vishay-Dale	CRCW04021K33FKED Series= CRCW..e3	Res= 1.33 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
33.	Rfbt	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
34.	Rled	Vishay-Dale	CRCW04021K30FKED Series= CRCW..e3	Res= 1.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
35.	Rsc	Vishay-Dale	CRCW040212K1FKED Series= CRCW..e3	Res= 12.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
36.	Rsns	Vishay-Dale	CRCW08053R57FKEA Series= CRCW..e3	Res= 3.57 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
37.	Rsns	Vishay-Dale	CRCW2010510KFKEF Series= ?	Res= 510.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm²
38.	Rstartup1	Panasonic	ERJ-8ENF3092V Series= ERJ-8E	Res= 30.9 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm²
39.	Rstartup2	Panasonic	ERJ-8ENF3092V Series= ERJ-8E	Res= 30.9 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm²
40.	Rt	Vishay-Dale	CRCW040217K4FKED Series= CRCW..e3	Res= 17.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
41.	T1	CUSTOM	CUSTOM	Lp= 4.696 mH Rp= 870.0 mOhm Leakage_L= 93.921 μH Ns1toNp= 0.024 Rs1= 8.6 mOhms Ns2toNp= 0.077 Rs2= 700.0 μOhms	1	NA	CUSTOM 0 mm²

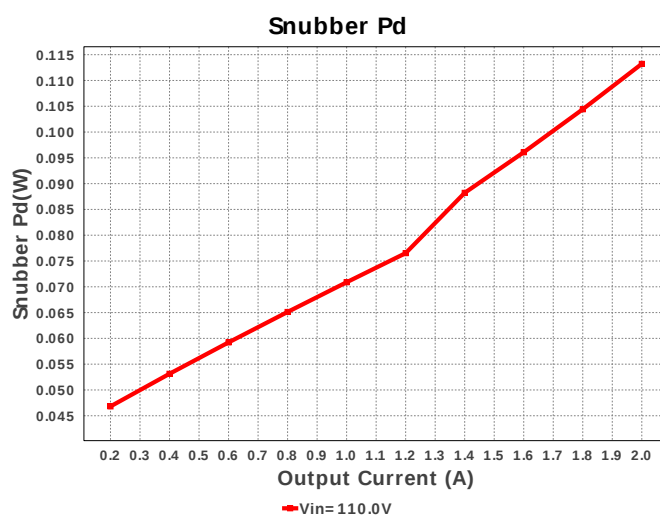
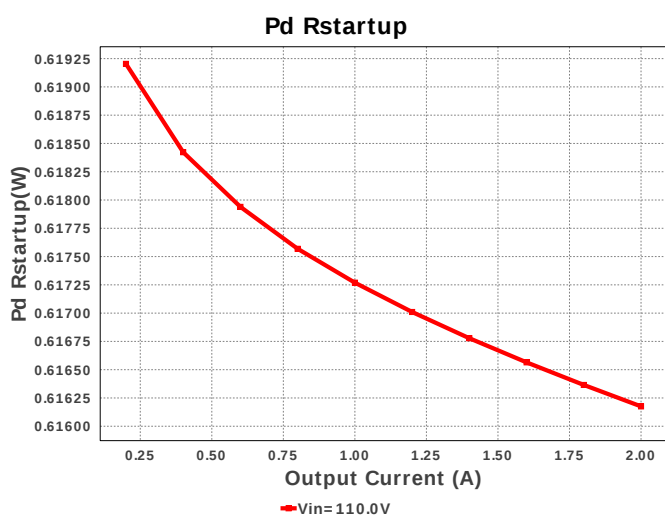
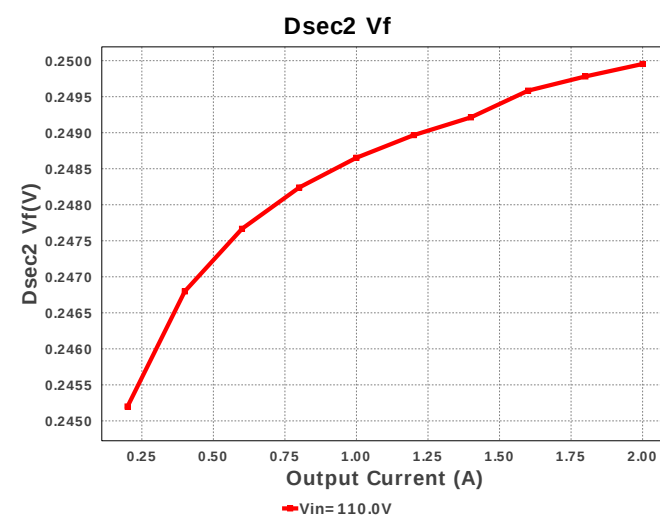
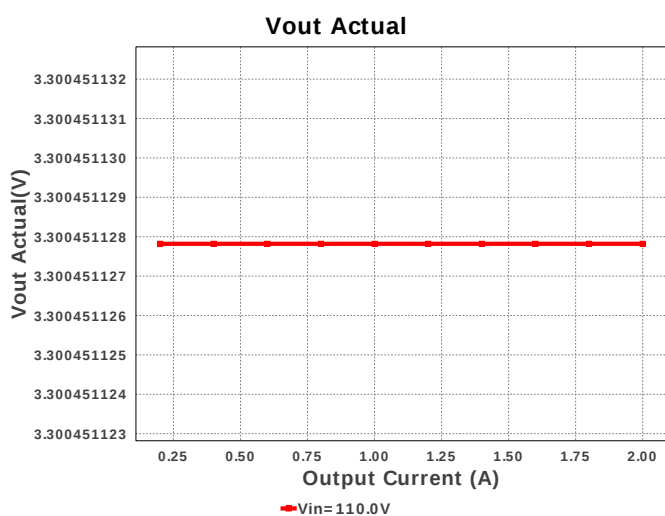
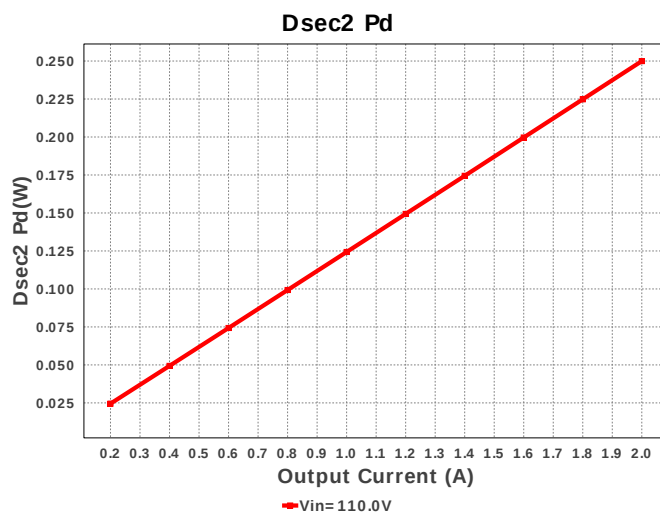
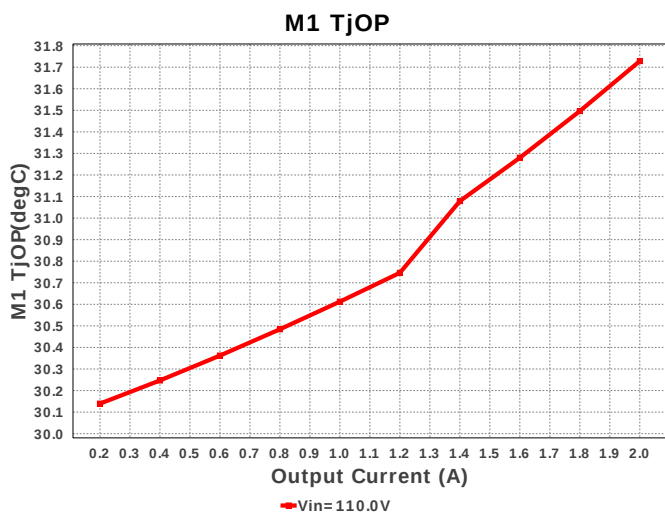
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
42.	U1	Texas Instruments	UC2843AQD8RQ1	Switcher	1	\$0.49	

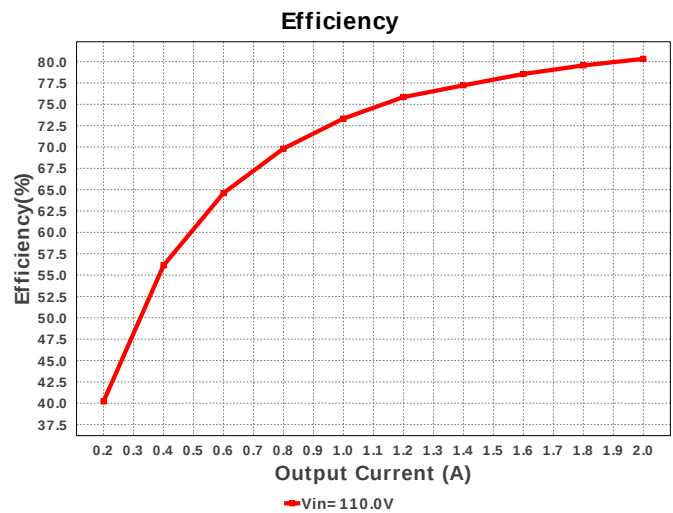
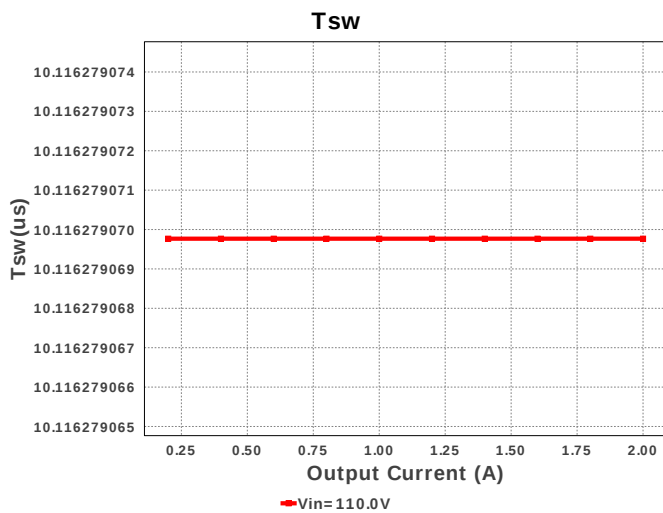
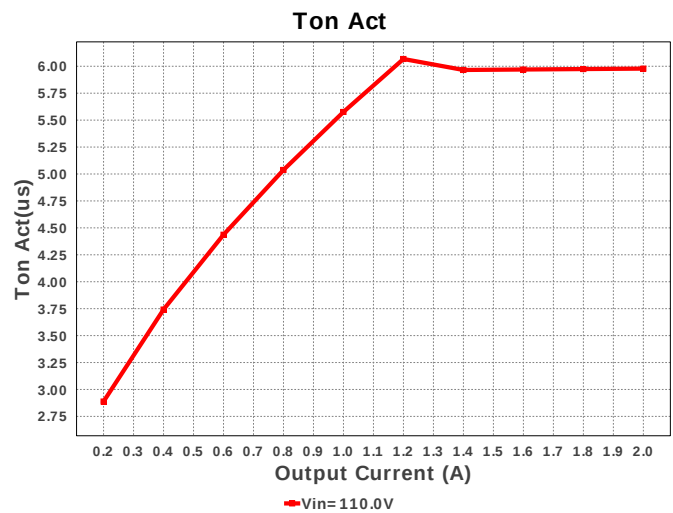
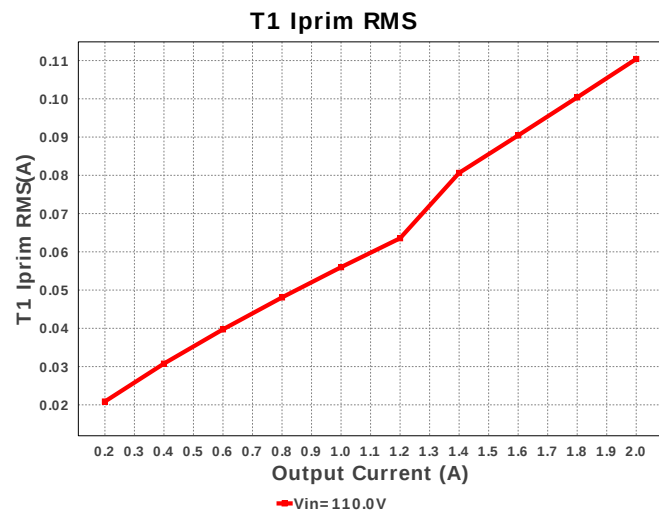
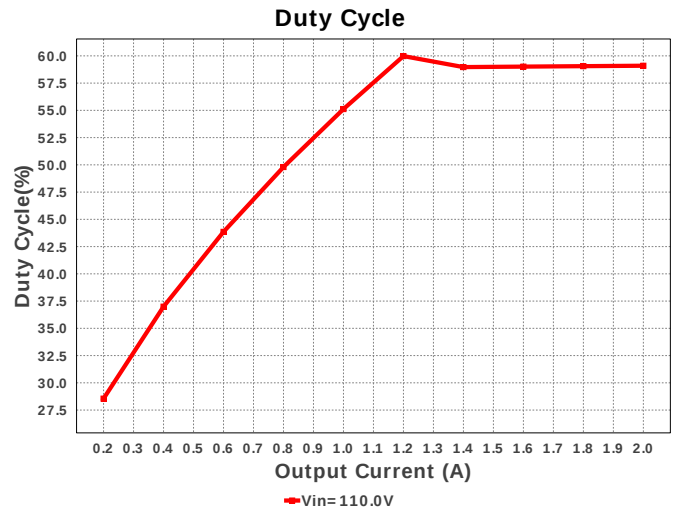
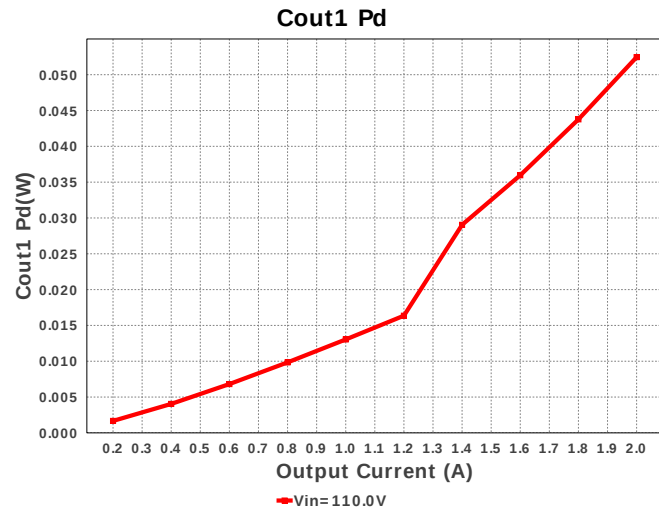
D0008A 57 mm²

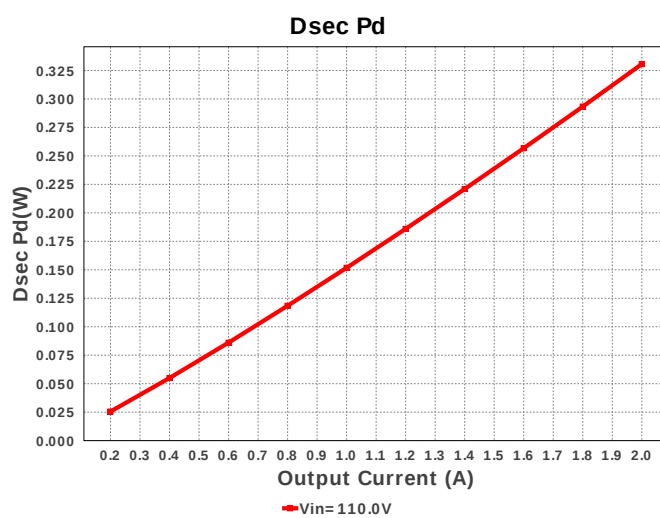
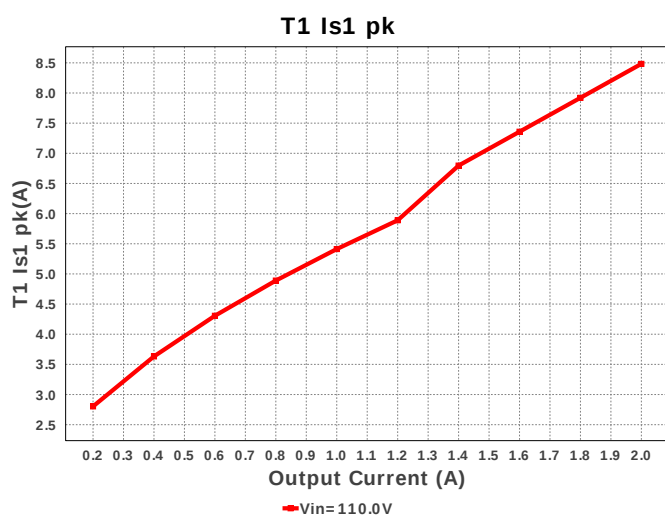
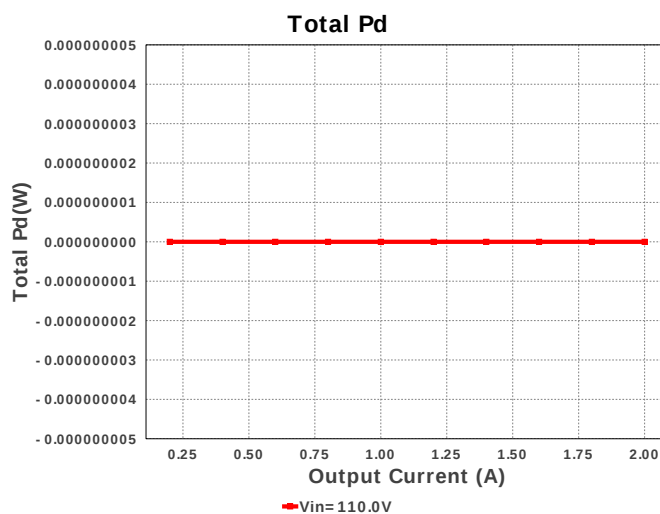
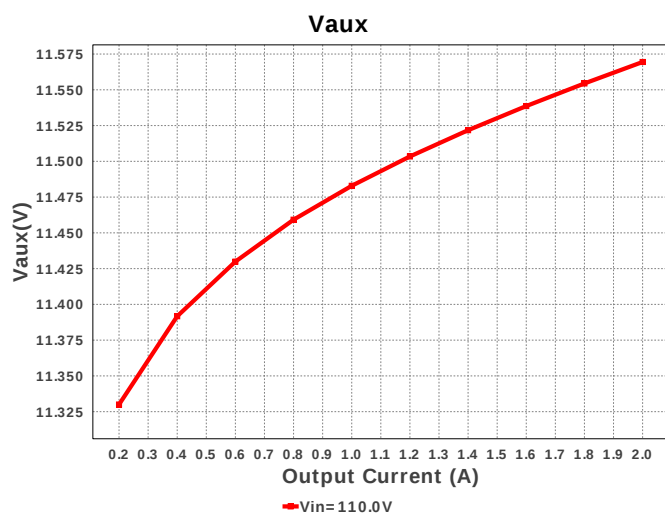
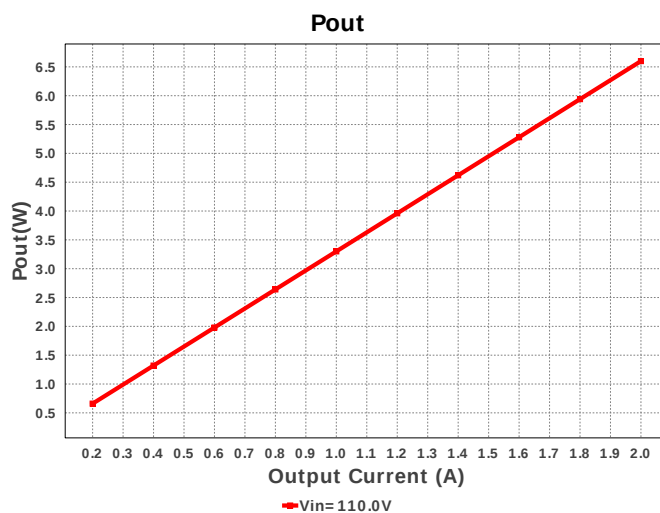
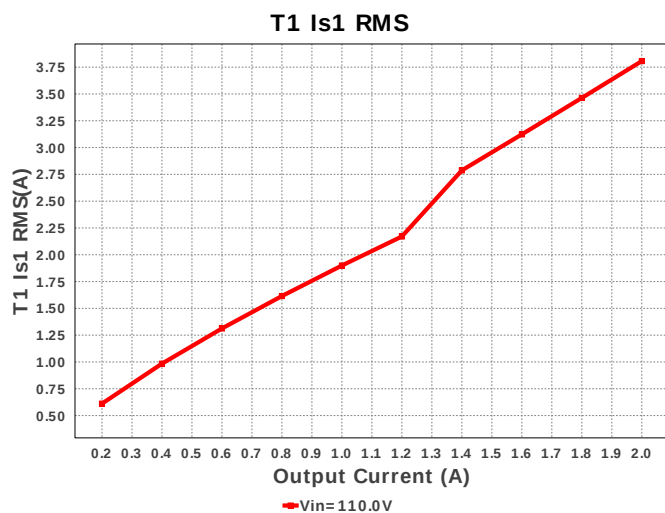
43.	VR	Texas Instruments	LMV431CM5/NOPB	Voltage References	1	\$0.16	
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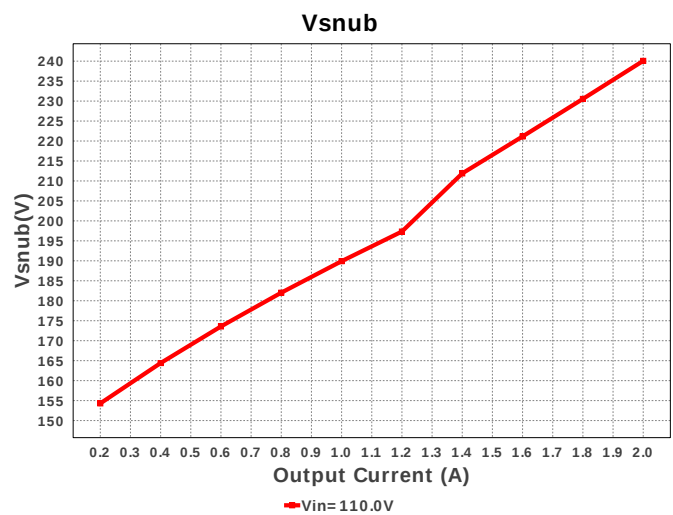
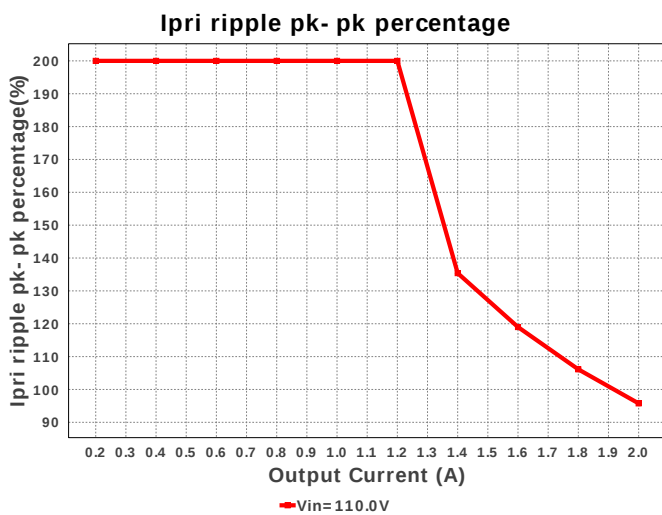
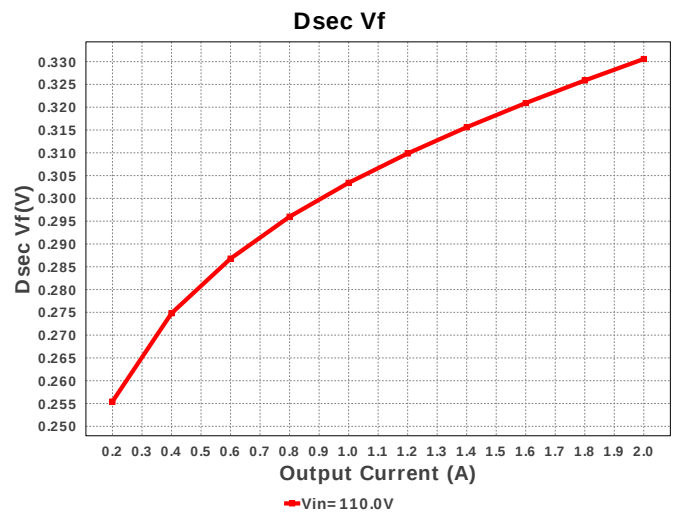
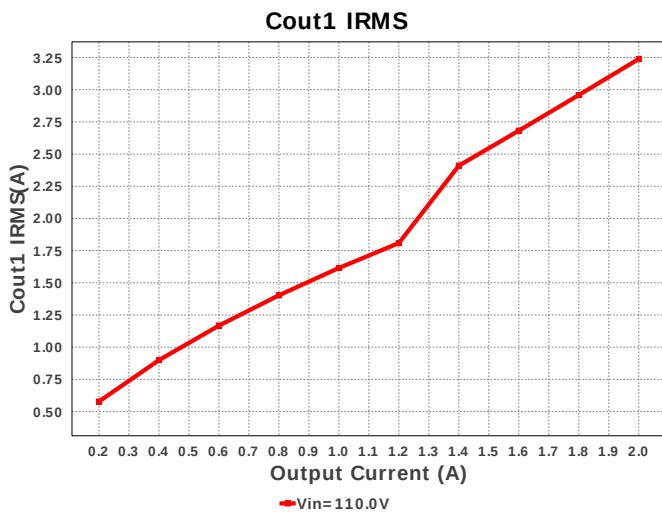
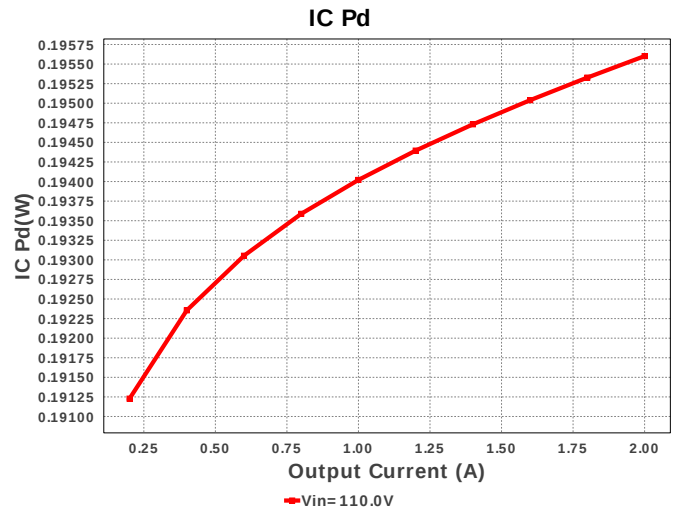
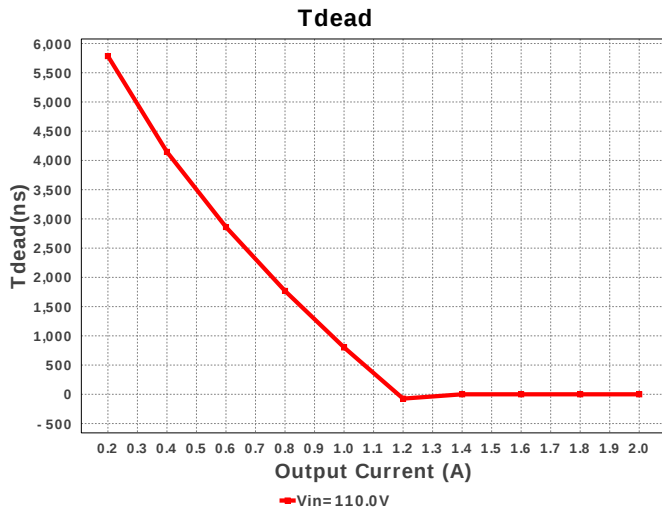
R-PDSO-G3 16 mm²

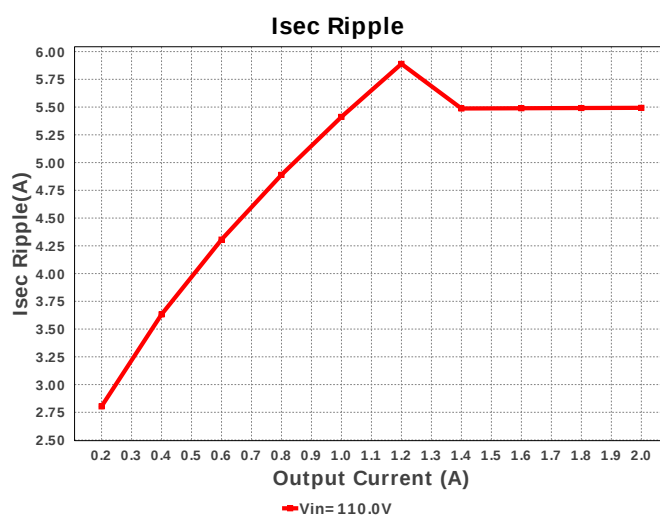
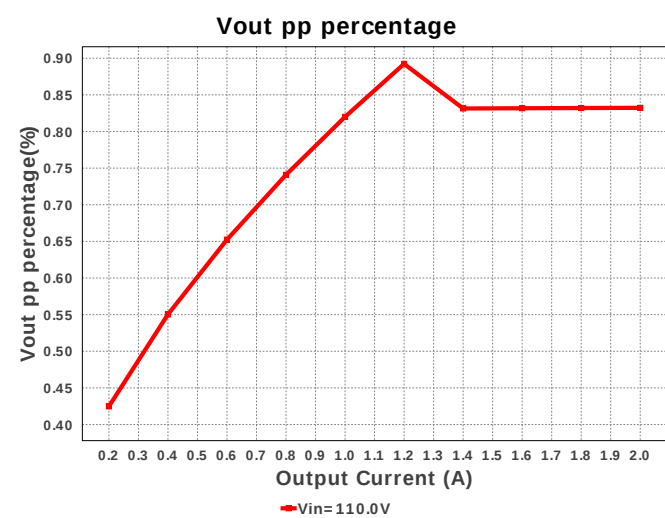
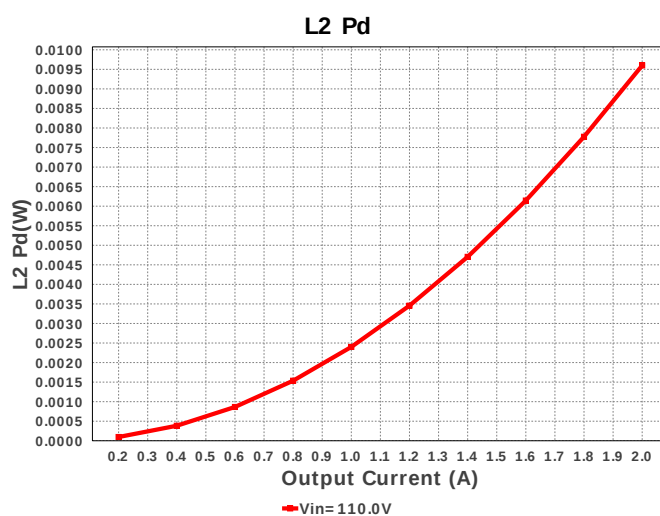
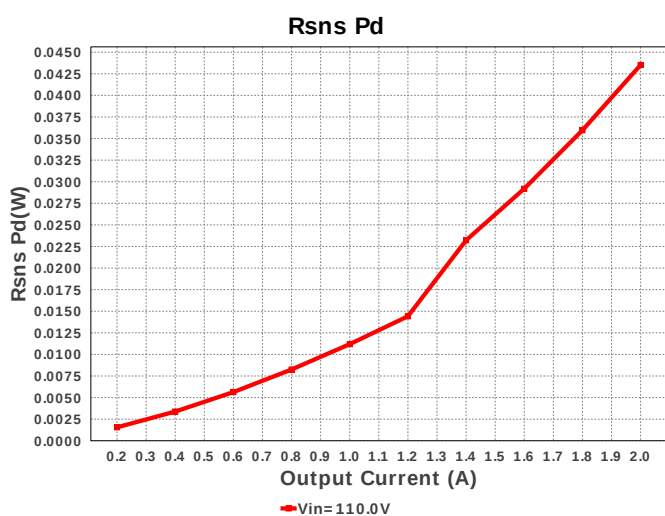
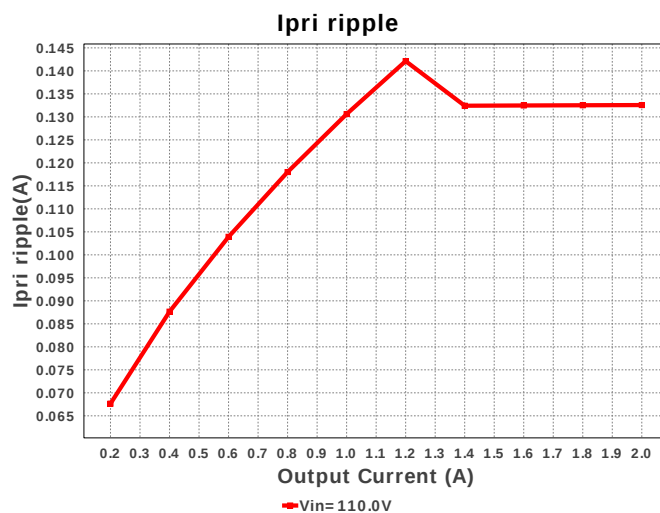
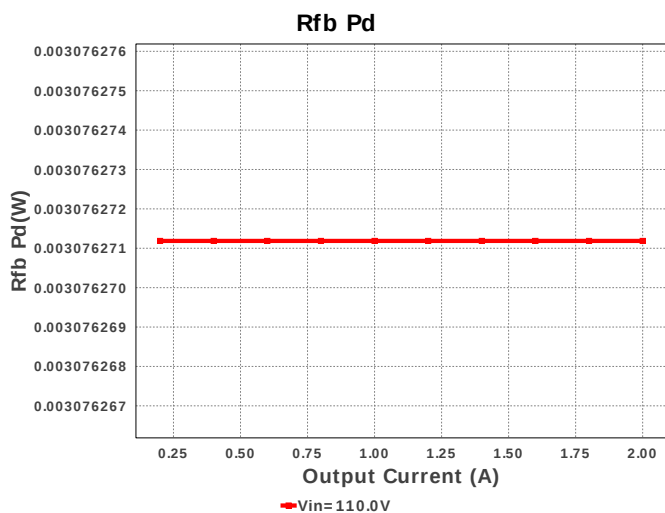


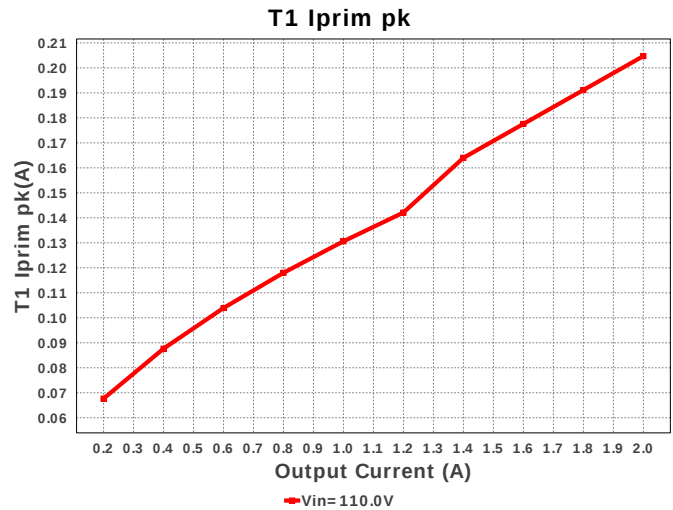
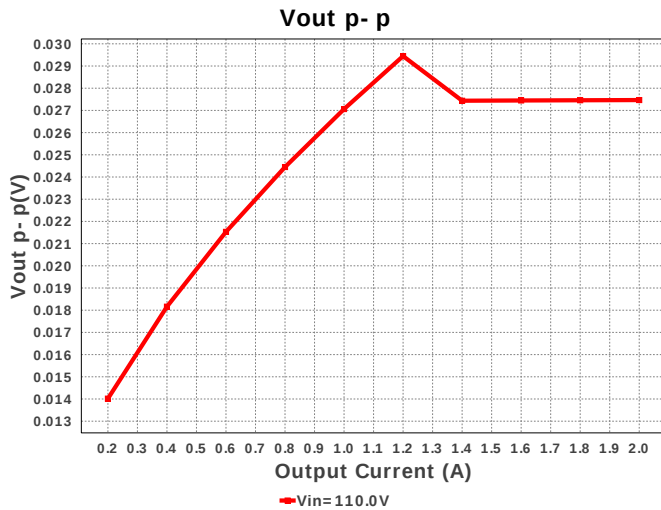












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	3.239 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	74.701 mA	Current	Average input current
3.	Iout_DCM	1.245 A	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	81.808 mA	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	132.567 mA	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	95.761 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	5.493 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	110.411 mA	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	204.72 mA	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	3.806 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	8.483 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	49	General	Total Design BOM count
13.	Daux trr	4.0 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec Vf	330.58 mV	General	Effective Forward Voltage Drop at the Operating Current
15.	Dsec trr	0.0 ns	General	Output Diode Reverse Recovery Time
16.	Dsec2 Vf	249.954 mV	General	Effective Forward Voltage Drop at the Operating Current
17.	Dsnub trr	50.0 ns	General	Snubber Diode Reverse Recovery Time
18.	FootPrint	1.725 k mm ²	General	Total Foot Print Area of BOM components
19.	Frequency	98.851 kHz	General	Switching frequency
20.	Mode	CCM	General	Conduction Mode
21.	Pout	6.6 W	General	Total output power
22.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
23.	Toff	3.527 us	General	Approximate Converter Off Time
24.	Ton Act	5.978 us	General	Approximate Converter On Time
25.	Total BOM	\$0.0	General	Total BOM Cost
26.	Tsw	10.116 us	General	Switching Time Period
27.	Vaux	11.569 V	General	Auxiliary Voltage
28.	Vsnub	240.069 V	General	Voltage Across the Snubber
29.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
30.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
31.	Duty Cycle	59.094 %	Op_point	Duty cycle
32.	Efficiency	80.32 %	Op_point	Steady state efficiency
33.	IC Tj	48.973 degC	Op_point	IC junction temperature
34.	ICThetaJA	97.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
35.	IOUT_OP	2.0 A	Op_point	Iout operating point
36.	M1 TjOP	31.728 degC	Op_point	M1 MOSFET junction temperature
37.	Vout p-p	27.466 mV	Op_point	Peak-to-peak output ripple voltage
38.	Cin Pd	145.469 μW	Power	Input capacitor power dissipation
39.	Cout1 Pd	52.447 mW	Power	Output capacitor1 power dissipation
40.	Dsec Pd	330.58 mW	Power	Secondary Diode Power Dissipation
41.	Dsec2 Pd	249.954 mW	Power	Secondary Diode Power Dissipation
42.	IC Pd	195.602 mW	Power	IC power dissipation
43.	L2 Pd	9.6 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
44.	M1 Pd	20.822 mW	Power	M1 MOSFET total power dissipation
45.	Paux	36.046 mW	Power	Power Dissipation in Raux and Daux
46.	Pd Rstartup	616.176 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
47.	Rdrv Pd	8.181 μW	Power	Power Dissipation in Gate Drive Resistor
48.	Rfb Pd	3.076 mW	Power	Rfb Power Dissipation
49.	Rsns Pd	43.521 mW	Power	Current Limit Sense Resistor Power Dissipation
50.	Snubber Pd	113.219 mW	Power	Snubber Power Dissipation

#	Name	Value	Category	Description
51.	T1 Pd	270.431 mW	Power	Estimated Losses in Transformer
52.	Total Pd	0.0 W	Power	Total Power Dissipation
53.	Vout Tolerance	1.914 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
54.	Vout pp percentage	832.312 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	110.0	Maximum input voltage
3.	VinMin	110.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	UC2843A-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **UC2843A-Q1** Product Folder : <http://www.ti.com/product/UC2843A%2DQ1> : contains the data sheet and other resources.

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