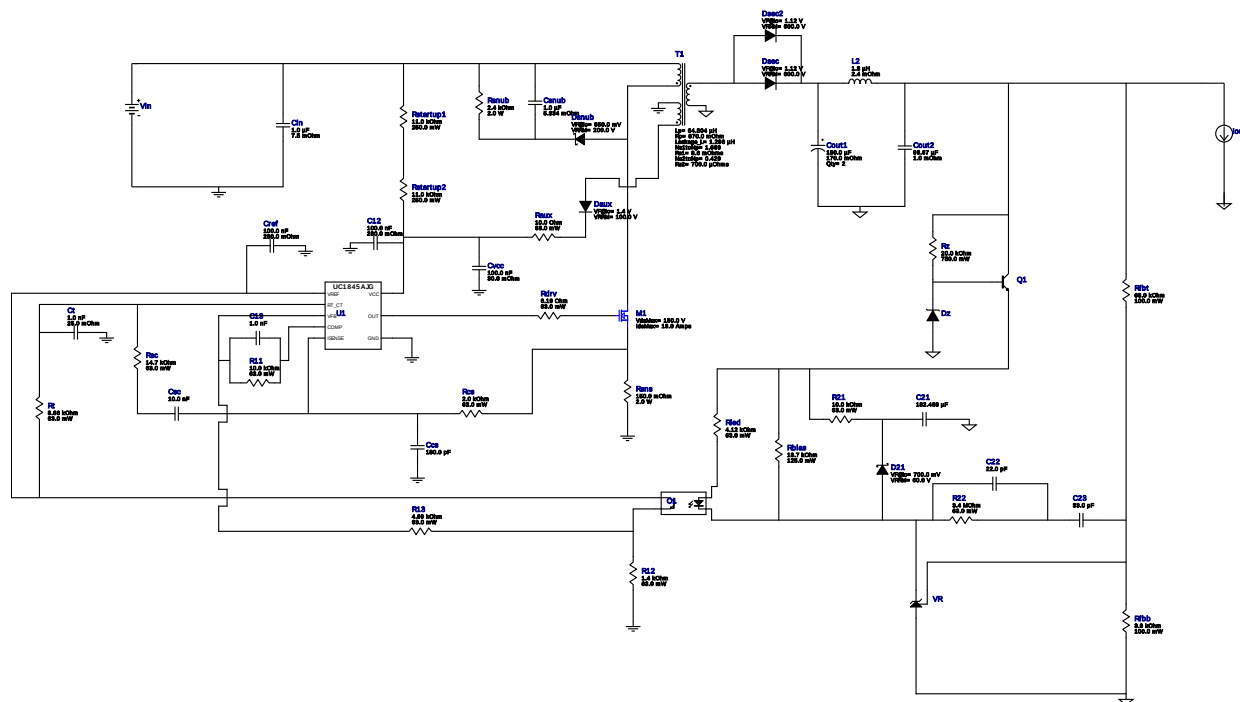


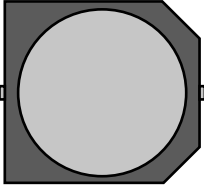
WEBENCH® Design Report

Design : 4738744/32 UC1845AJ
UC1845AJ 45.0V-59.0V to 46.00V @ 1.0A

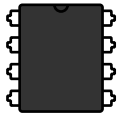


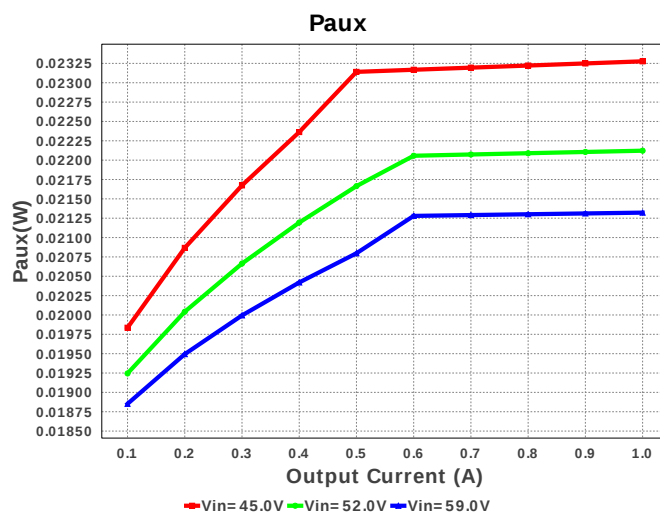
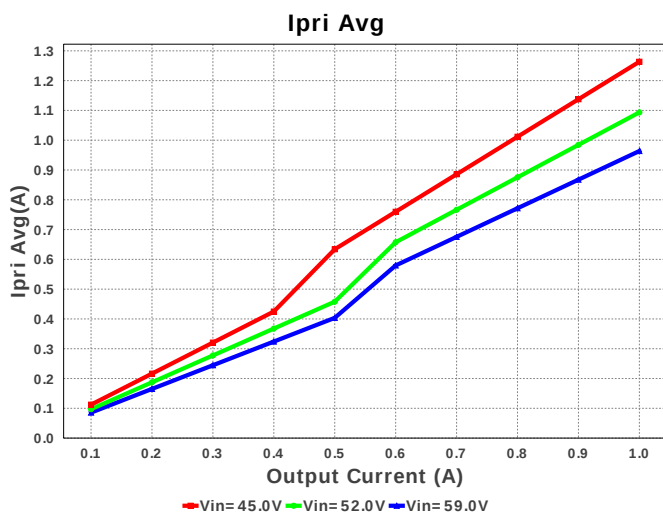
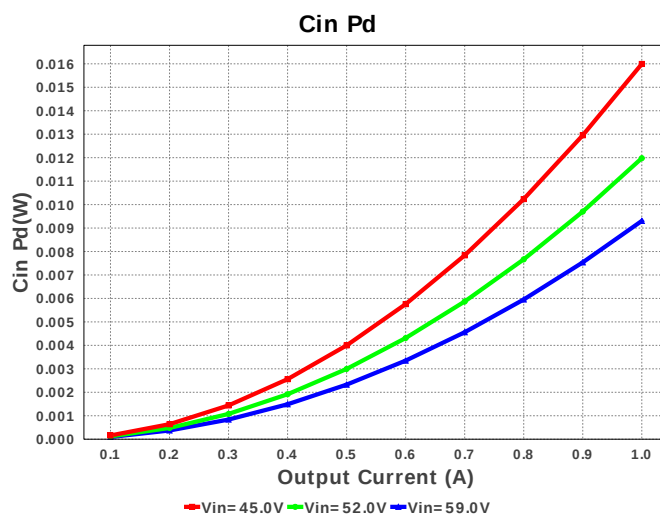
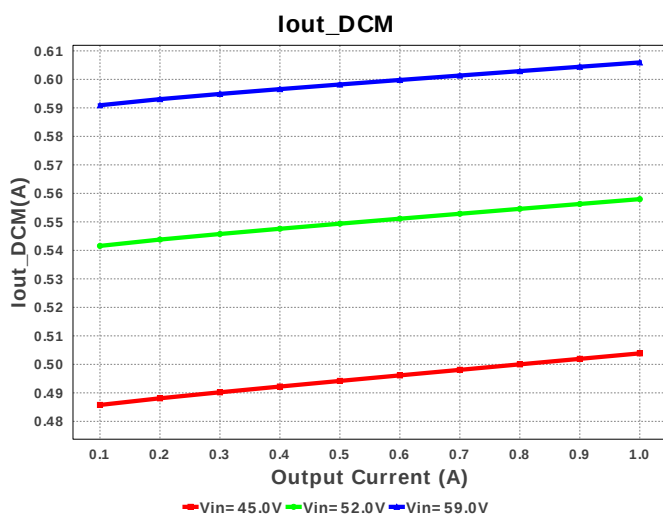
Electrical BOM

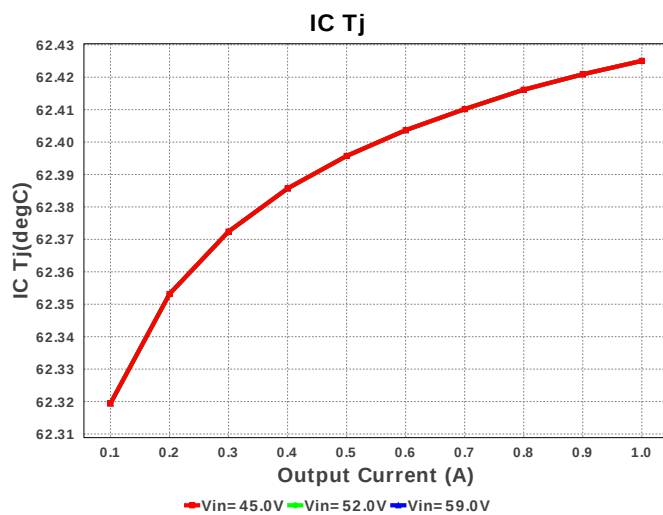
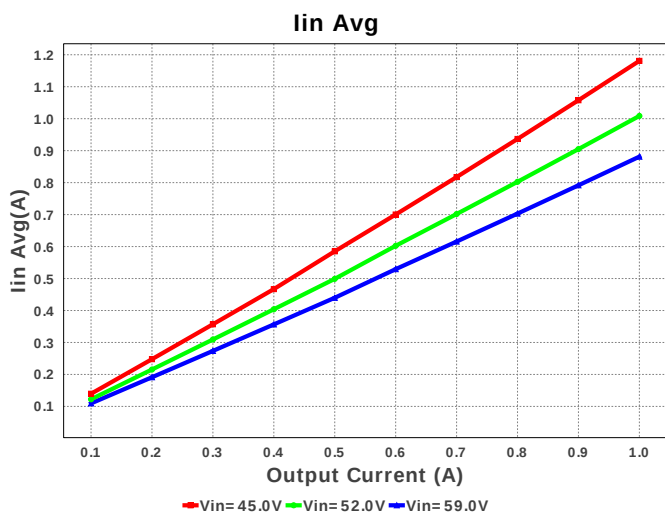
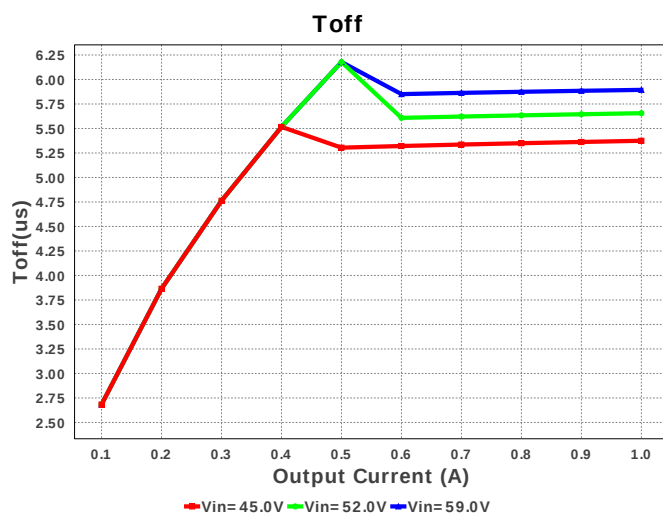
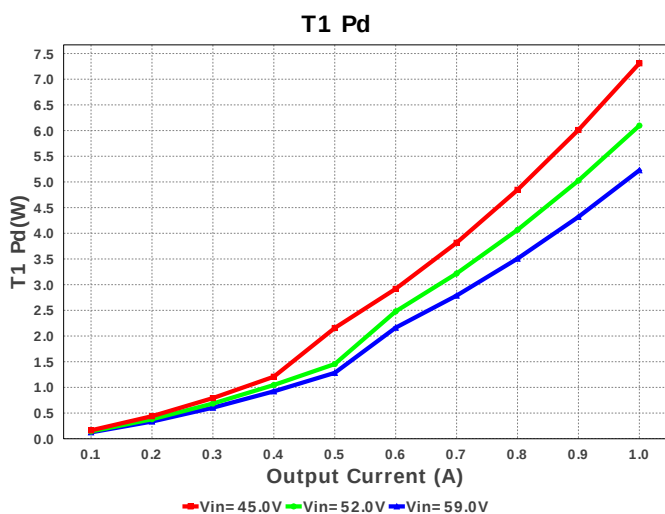
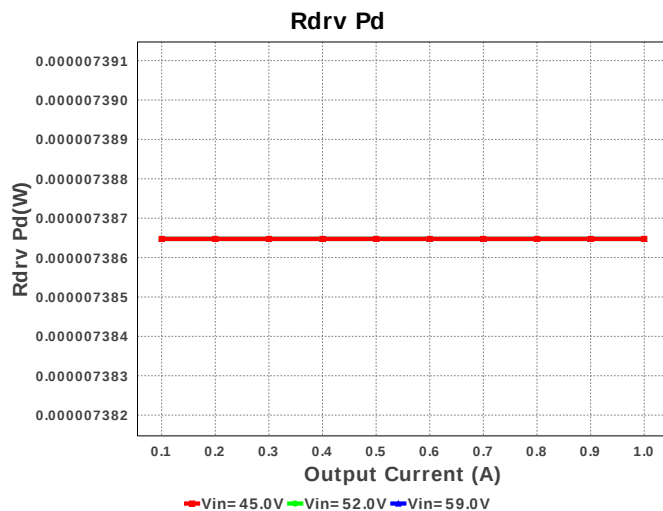
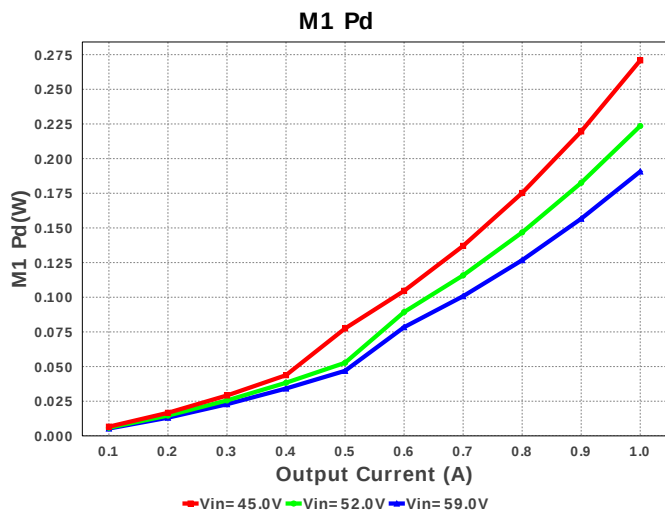
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1.	C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	C13	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	C21	CUSTOM	CUSTOM Series= ?	Cap= 182.468 uF VDC= 40.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 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	Kemet	C0805C330K5GACTU Series= C0G/NP0	Cap= 33.0 pF VDC= 50.0 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	TDK	C3216X7R2A105M160AA Series= X7R	Cap= 1.0 uF ESR= 7.5 mOhm VDC= 100.0 V IRMS= 5.9235 A	1	\$0.11	1206 11 mm ²

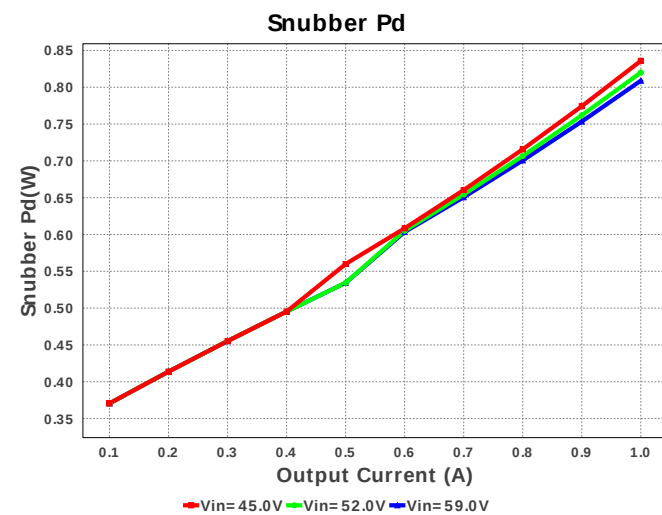
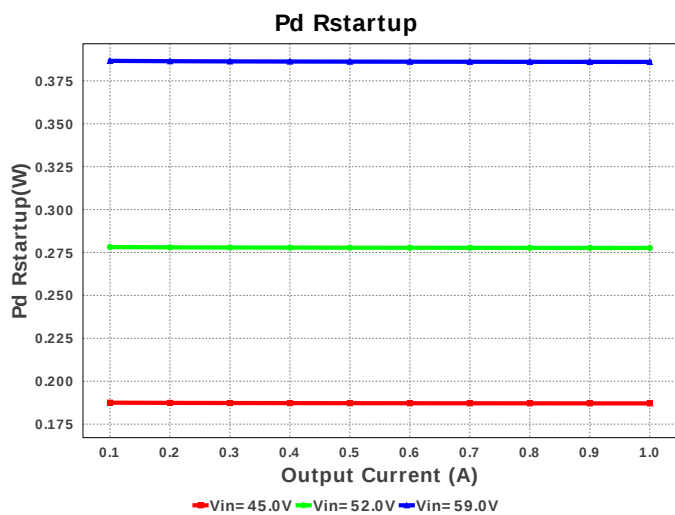
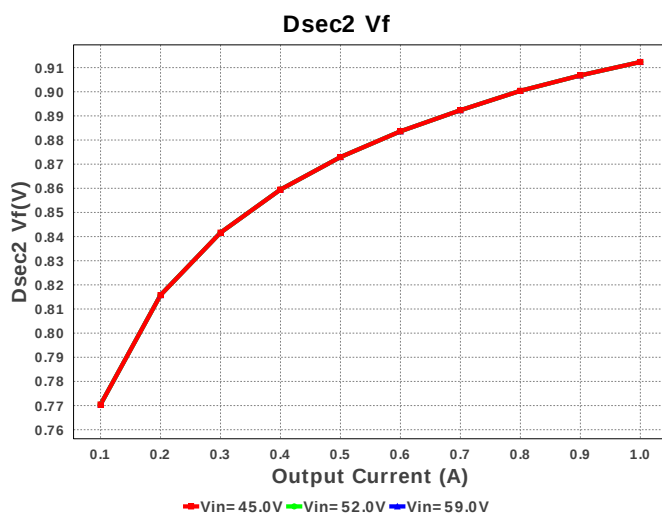
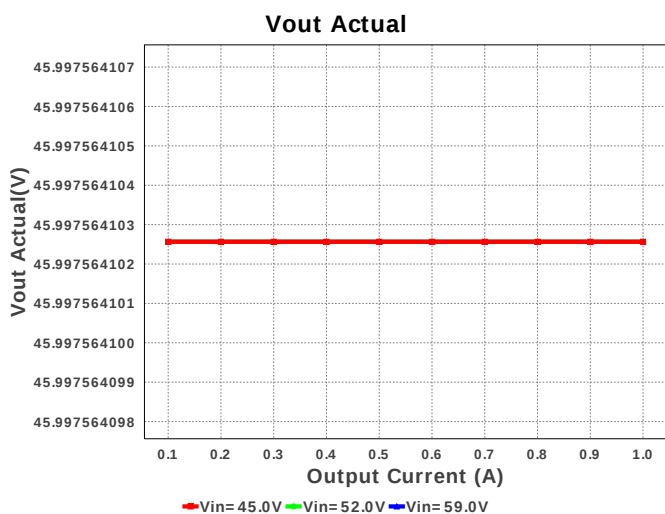
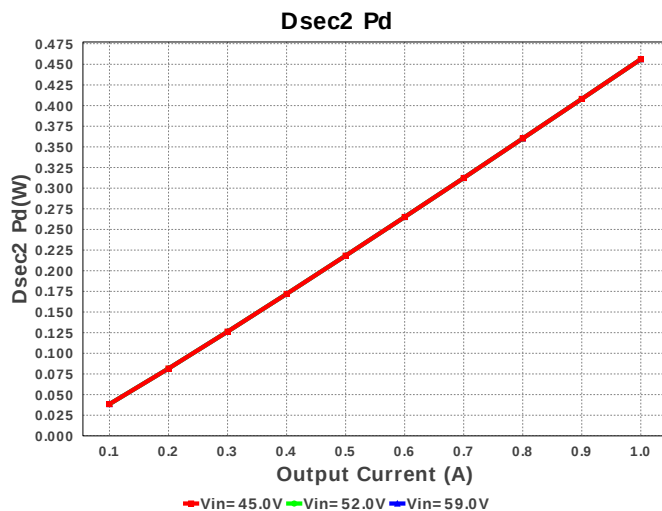
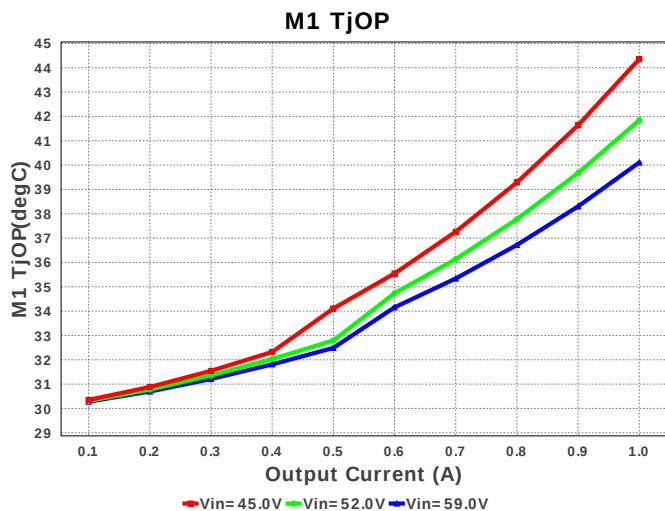
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Cout1	Panasonic	EEV-FK2A151M Series= FK	Cap= 150.0 uF ESR= 170.0 mOhm VDC= 100.0 V IRMS= 793.0 mA	2	\$0.78	 SM_RADIAL_J16 399 mm²
9.	Cout2	CUSTOM	CUSTOM Series= ?	Cap= 96.67 uF ESR= 1.0 mOhm VDC= 115.0 V IRMS= 1.31022 A	1	NA	CUSTOM 0 mm²
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 mm²
11.	Csc	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm²
12.	Csnub	MuRata	GRM31CR72A105KA01L Series= X7R	Cap= 1.0 uF ESR= 5.334 mOhm VDC= 100.0 V IRMS= 1.55432 A	1	\$0.11	 1206_190 11 mm²
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 mm²
14.	Cvcc	MuRata	GRM188R71E104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 1.51 A	1	\$0.01	 0603 5 mm²
15.	D21	Diodes Inc.	B160-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.06	 SMA 37 mm²
16.	Daux	NXP Semiconductor	BAS316,115	VF@Io= 1.4 V VRRM= 100.0 V	1	\$0.02	 SOD-323 9 mm²
17.	Dsec	Bourns	CD214C-F3600	VF@Io= 1.12 V VRRM= 600.0 V	1	\$0.18	 SMC 83 mm²
18.	Dsec2	Bourns	CD214C-F3600	VF@Io= 1.12 V VRRM= 600.0 V	1	\$0.18	 SMC 83 mm²
19.	Dsnub	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	\$0.21	 PowerDI123 13 mm²
20.	Dz	Diodes Inc.	MMSZ5250B-7-F	Zener	1	\$0.03	 SOD-123 13 mm²
21.	L2	Coilcraft	SER1360-182KLB	L= 1.8 uH DCR= 2.4 mOhm	1	\$0.72	 SER1360 225 mm²
22.	M1	Fairchild Semiconductor	FDMC86240	VdsMax= 150.0 V IdsMax= 16.0 Amps	1	\$0.93	 TRANS_Fairchild_MLP08S 18 mm²
23.	O1	Vishay-Semiconductor	TCMT1107	Optocoupler	1	\$0.21	 SOP-4 44 mm²

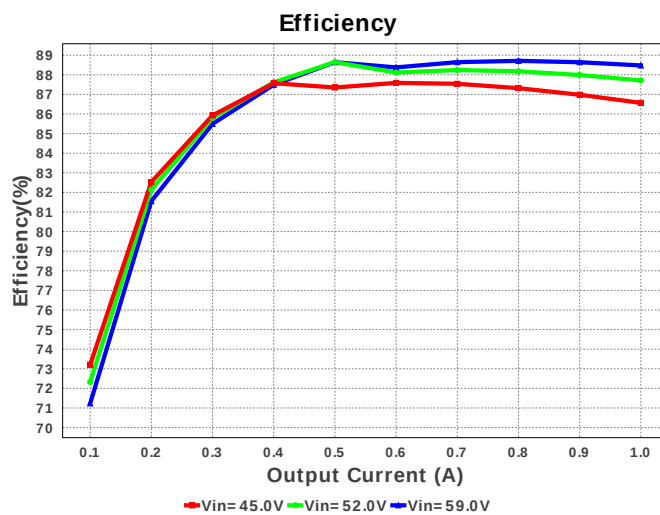
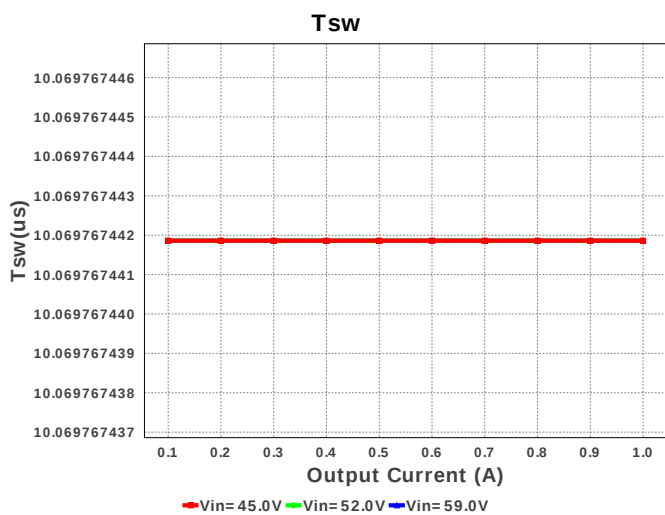
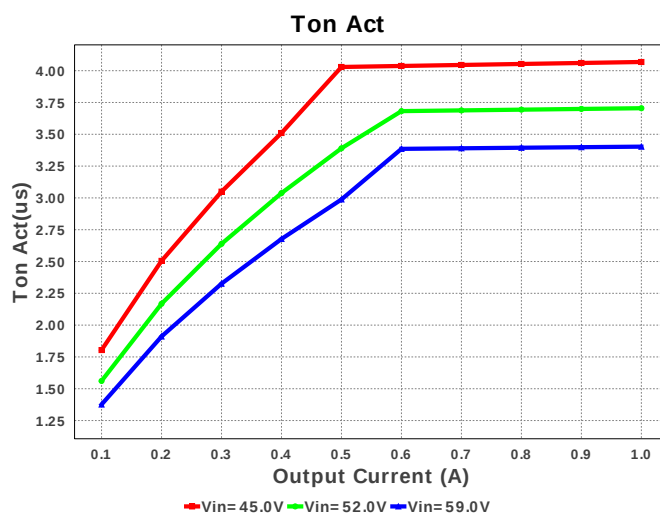
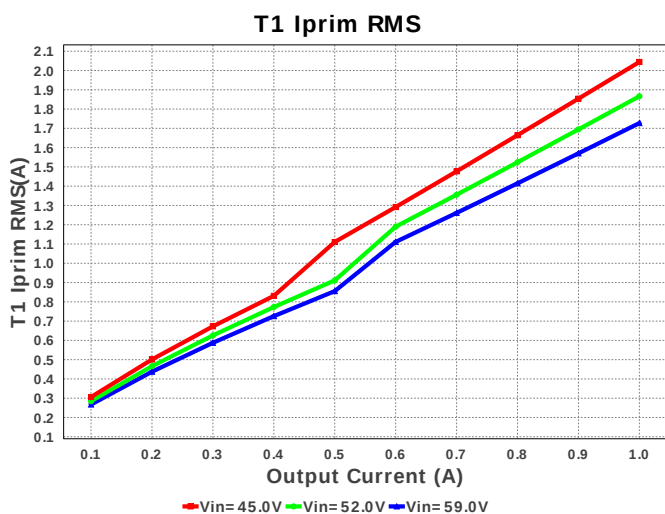
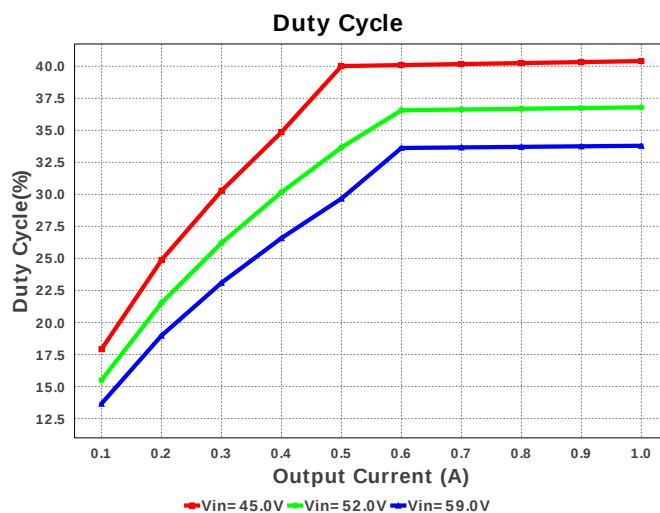
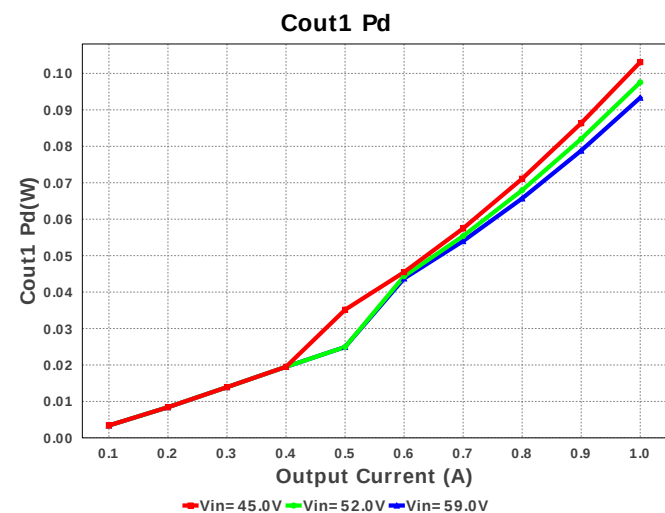
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	Q1	ON Semiconductor	BC846BLT1G	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
25.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
26.	R12	Vishay-Dale	CRCW04021K40FKED Series= CRCW..e3	Res= 1.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
27.	R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
28.	R21	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
29.	R22	Vishay-Dale	CRCW04023M40FKED Series= CRCW..e3	Res= 3.4 MOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
30.	Raux	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
31.	Rbias	Panasonic	ERJ-6ENF1372V Series= ERJ-6E	Res= 13.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
32.	Rcs	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
33.	Rdrv	Vishay-Dale	CRCW04026R19FKED Series= CRCW..e3	Res= 6.19 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
34.	Rfbb	Yageo America	RC0603FR-073K9L Series= ?	Res= 3.9 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
35.	Rfbt	Yageo America	RC0603FR-0768KL Series= ?	Res= 68.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
36.	Rled	Vishay-Dale	CRCW04024K12FKED Series= CRCW..e3	Res= 4.12 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
37.	Rsc	Vishay-Dale	CRCW040214K7FKED Series= CRCW..e3	Res= 14.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
38.	Rsns	Stackpole Electronics Inc	CSRN2512FKR150 Series= ?	Res= 150.0 mOhm Power= 2.0 W Tolerance= 1.0%	1	\$0.13	 2512 43 mm ²
39.	Rsns	Vishay-Bccomponents	PR02000202401JR500 Series= ?	Res= 2.4 kOhm Power= 2.0 W Tolerance= 5.0%	1	\$0.05	PR02 113 mm ²
40.	Rstartup1	Panasonic	ERJ-8ENF1102V Series= ERJ-8E	Res= 11.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
41.	Rstartup2	Panasonic	ERJ-8ENF1102V Series= ERJ-8E	Res= 11.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
42.	Rt	Vishay-Dale	CRCW04028K66FKED Series= CRCW..e3	Res= 8.66 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
43.	Rz	Vishay-Dale	CRCW201020K0FKEF Series= CRCW..e3	Res= 20.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
44.	T1	CUSTOM	CUSTOM	Lp= 64.804 μ H Rp= 870.0 mOhm Leakage_L= 1.296 μ H Ns1toNp= 1.669 Rs1= 8.6 mOhms Ns2toNp= 0.429 Rs2= 700.0 μ Ohms	1	NA	CUSTOM 0 mm ²
45.	U1	Texas Instruments	UC1845AJ	Switcher	1	\$14.16	 JG0008A 111 mm ²
46.	VR	Texas Instruments	TL431AIDBVR	Voltage References	1	\$0.07	 R-PDSO-G3 16 mm ²

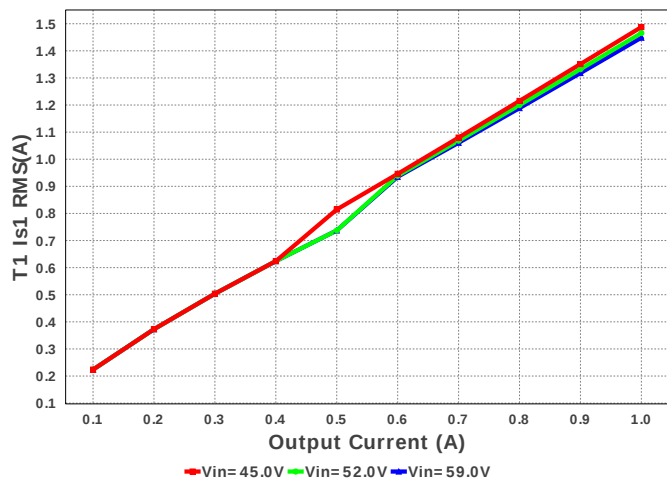




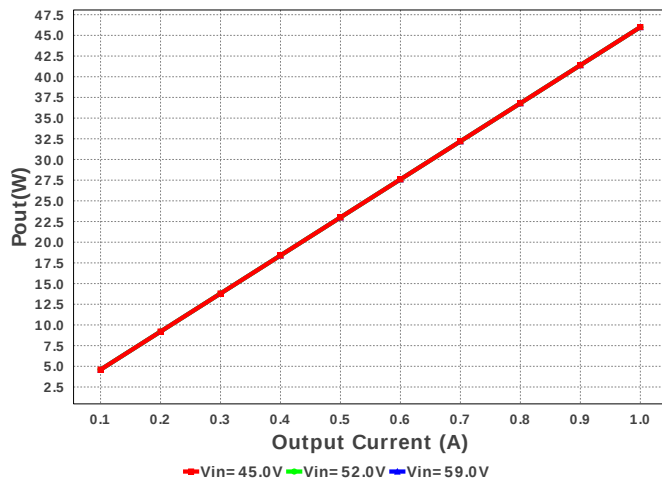




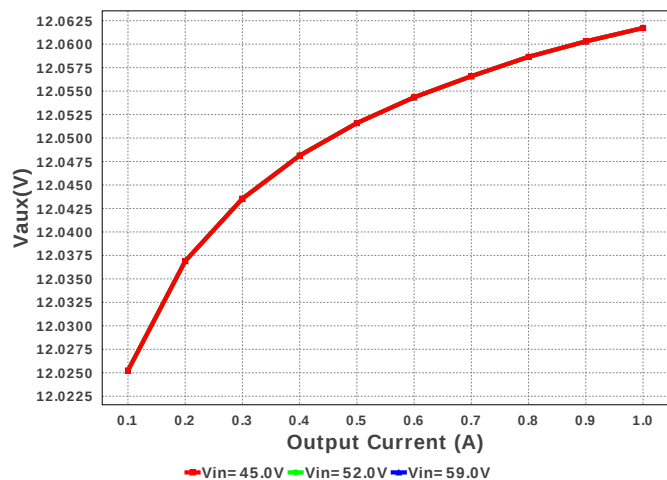
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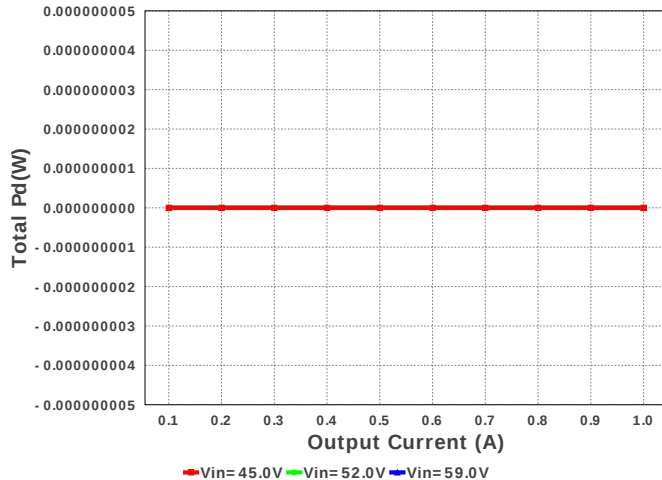
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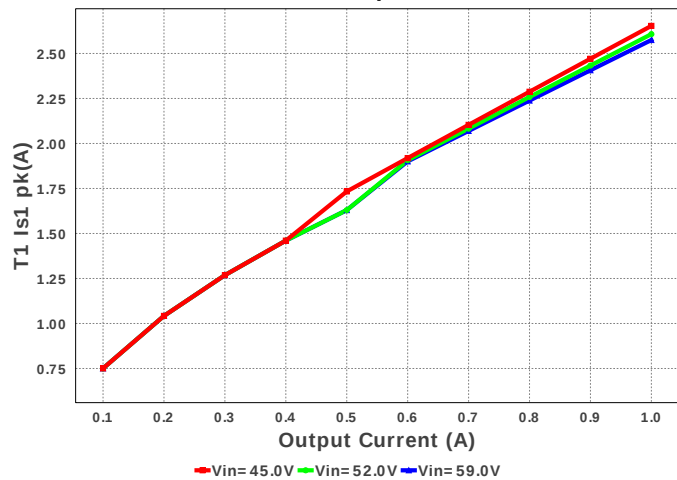
Vaux



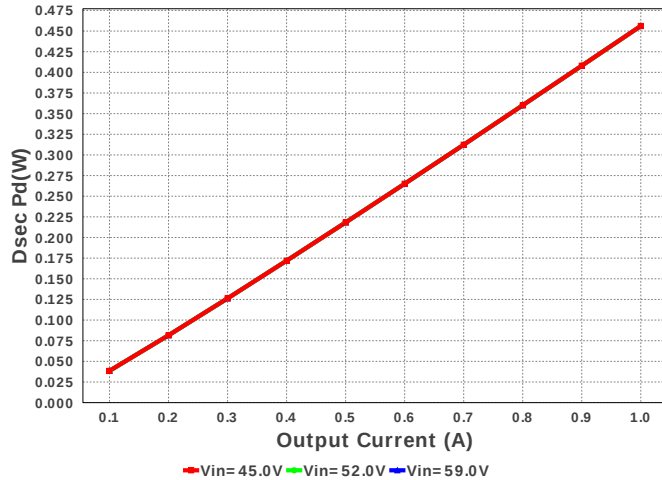
Total Pd

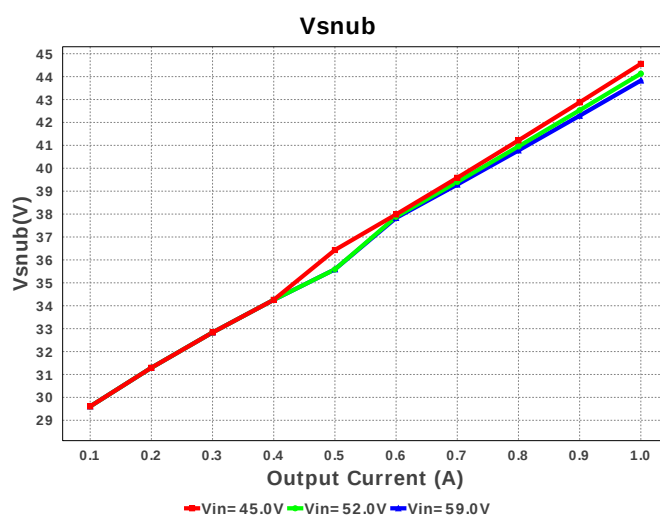
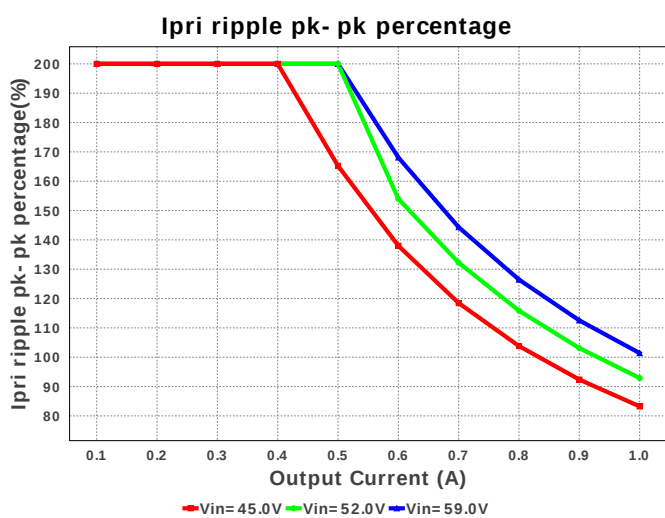
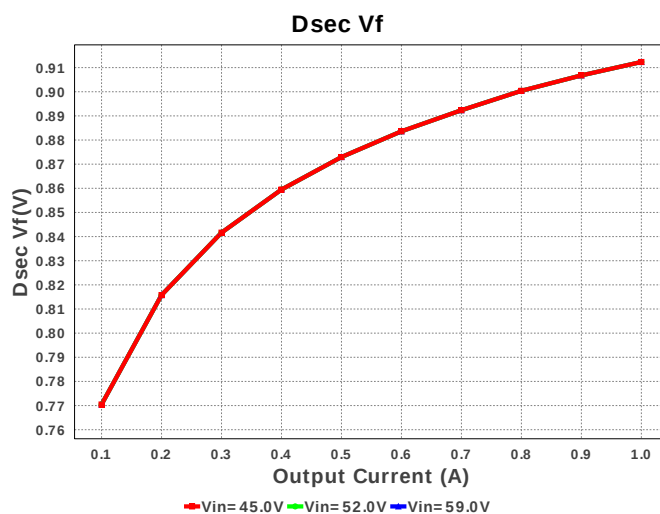
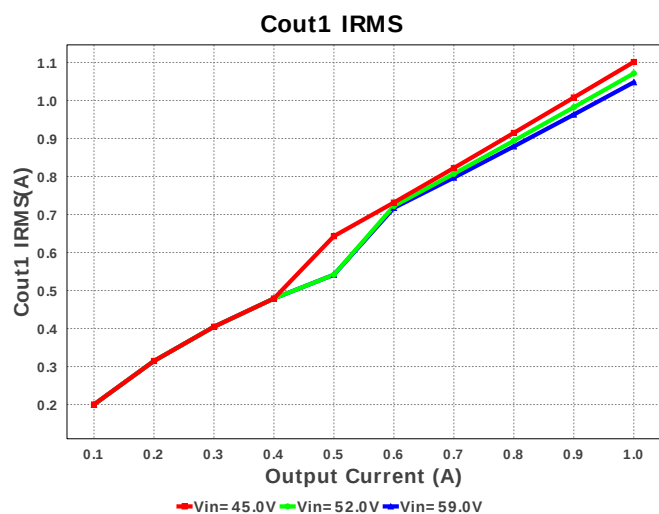
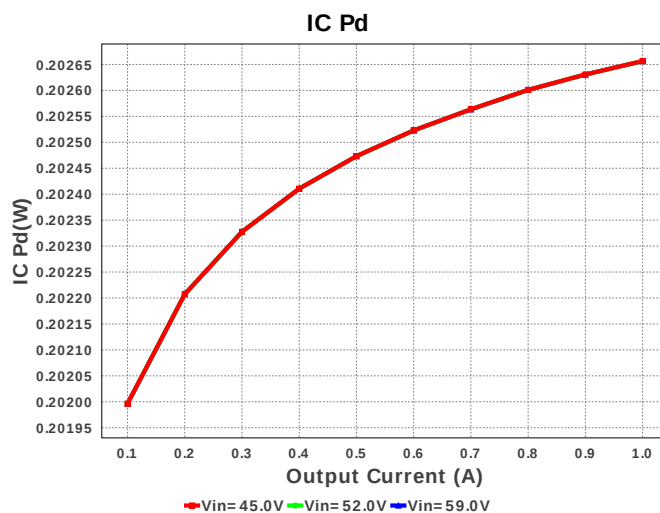
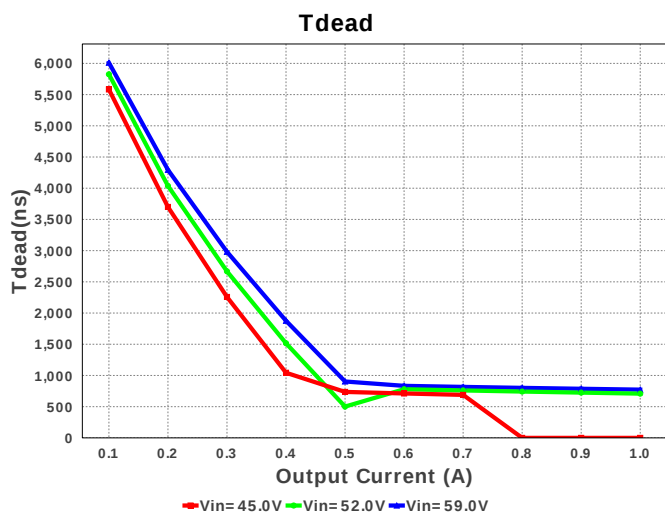


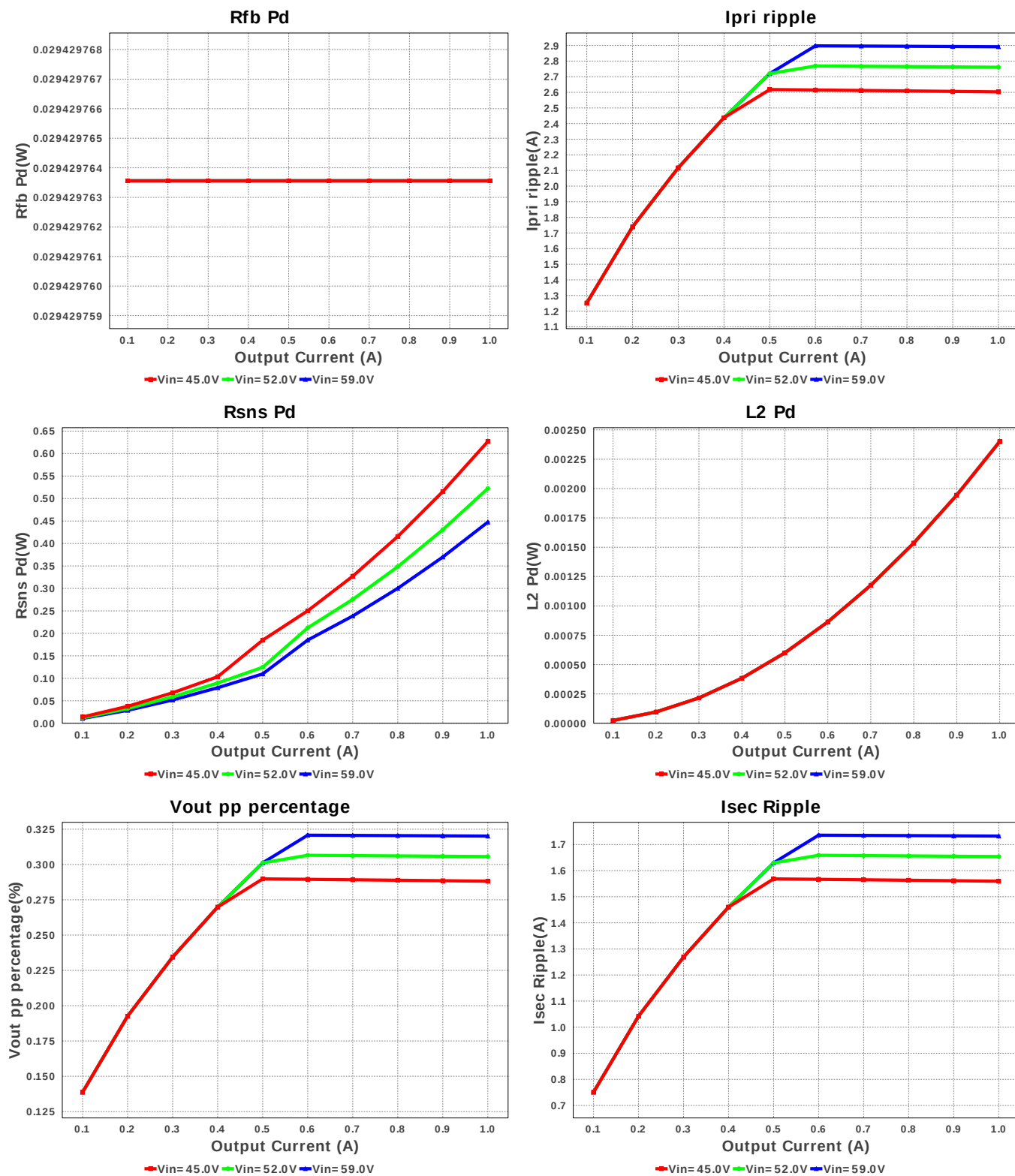
T1 Is1 pk

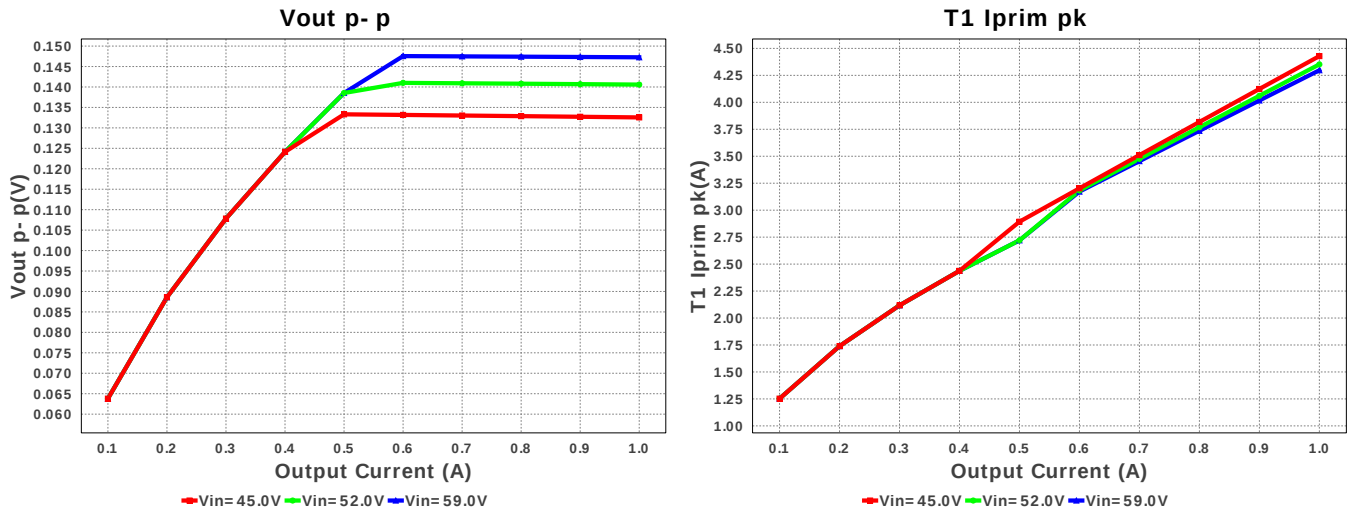


Dsec Pd









Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	1.101 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	1.181 A	Current	Average input current
3.	Iout_DCM	503.857 mA	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	1.263 A	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	2.603 A	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	83.238 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	1.56 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	2.044 A	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	4.429 A	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	1.488 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	2.653 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	47	General	Total Design BOM count
13.	Daux trr	4.0 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec Vf	912.33 mV	General	Effective Forward Voltage Drop at the Operating Current
15.	Dsec trr	30.0 ns	General	Output Diode Reverse Recovery Time
16.	Dsec2 Vf	912.33 mV	General	Effective Forward Voltage Drop at the Operating Current
17.	Dsnub trr	0.0 ns	General	Snubber Diode Reverse Recovery Time
18.	FootPrint	1.855 k mm ²	General	Total Foot Print Area of BOM components
19.	Frequency	99.307 kHz	General	Switching frequency
20.	Pout	46.0 W	General	Total output power
21.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
22.	Toff	5.375 us	General	Approximate Converter Off Time
23.	Ton Act	4.068 us	General	Approximate Converter On Time
24.	Total BOM	\$0.0	General	Total BOM Cost
25.	Tsw	10.07 us	General	Switching Time Period
26.	Vaux	12.062 V	General	Auxiliary Voltage
27.	Vsnub	44.556 V	General	Voltage Across the Snubber
28.	Vout Actual	45.998 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
29.	Vout OP	46.0 V	Op_Point	Operational Output Voltage
30.	Duty Cycle	40.402 %	Op_point	Duty cycle
31.	Efficiency	86.567 %	Op_point	Steady state efficiency
32.	IC Tj	62.425 degC	Op_point	IC junction temperature
33.	ICThetaJA	160.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
34.	IOUT_OP	1.0 A	Op_point	Iout operating point
35.	M1 TJOP	44.356 degC	Op_point	M1 MOSFET junction temperature
36.	Vout p-p	132.559 mV	Op_point	Peak-to-peak output ripple voltage
37.	Cin Pd	15.994 mW	Power	Input capacitor power dissipation
38.	Cout1 Pd	103.09 mW	Power	Output capacitor1 power dissipation
39.	Dsec Pd	456.165 mW	Power	Secondary Diode Power Dissipation
40.	Dsec2 Pd	456.165 mW	Power	Secondary Diode Power Dissipation
41.	IC Pd	202.656 mW	Power	IC power dissipation
42.	L2 Pd	2.4 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
43.	M1 Pd	270.863 mW	Power	M1 MOSFET total power dissipation
44.	Paux	23.277 mW	Power	Power Dissipation in Raux and Daux
45.	Pd Rstartup	187.088 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
46.	Rdrv Pd	7.386 μW	Power	Power Dissipation in Gate Drive Resistor
47.	Rfb Pd	29.43 mW	Power	Rfb Power Dissipation
48.	Rsns Pd	626.842 mW	Power	Current Limit Sense Resistor Power Dissipation
49.	Snubber Pd	835.822 mW	Power	Snubber Power Dissipation
50.	T1 Pd	7.309 W	Power	Estimated Losses in Transformer

#	Name	Value	Category	Description
51.	Total Pd	0.0 W	Power	Total Power Dissipation
52.	Vout Tolerance	2.237 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
53.	Vout pp percentage	288.171 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	Iout1	1.0	Output Current #1
3.	Iout2	1.0	Output Current #2
4.	Iout3	1.0	Output Current #3
5.	VinMax	59.0	Maximum input voltage
6.	VinMin	45.0	Minimum input voltage
7.	Vout	46.0	Output Voltage
8.	Vout1	46.0	Output Voltage #1
9.	Vout2	33.0	Output Voltage #2
10.	Vout3	56.0	Output Voltage #3
11.	base_pn	UC1845A	Texas Instruments Base Part Number
12.	source	DC	Input Source Type
13.	ta	30.0	Ambient temperature

Design Assistance

1. UC1845A Product Folder : <http://www.ti.com/product/UC1845A> : contains the data sheet and other resources.

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