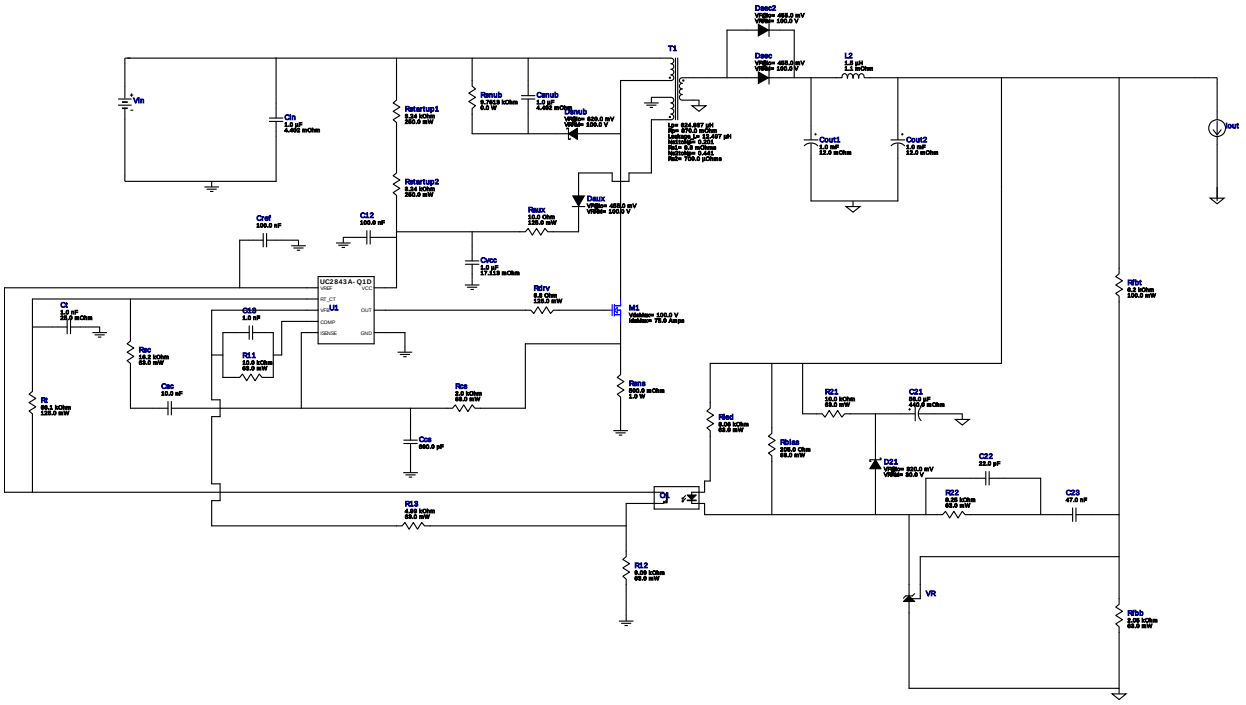
WEBENCH® Design Report

VinMin = 20.0V
VinMax = 30.0V
Vout = 5.0V
Iout = 2.0A

Device = UC2843AQD8RQ1
Topology = Flyback
Created = 7/12/16 10:58:07 PM
BOM Cost = $0.00
BOM Count = 43
Total Pd = 0.0W

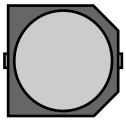
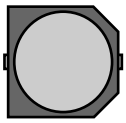
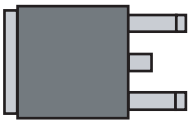
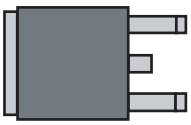
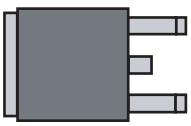
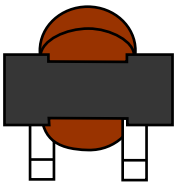
Design : 3893481/2 UC2843AQD8RQ1
UC2843AQD8RQ1 20.0V-30.0V to 5.00V @ 2.0A



My Comments
High Efficient AC-DC

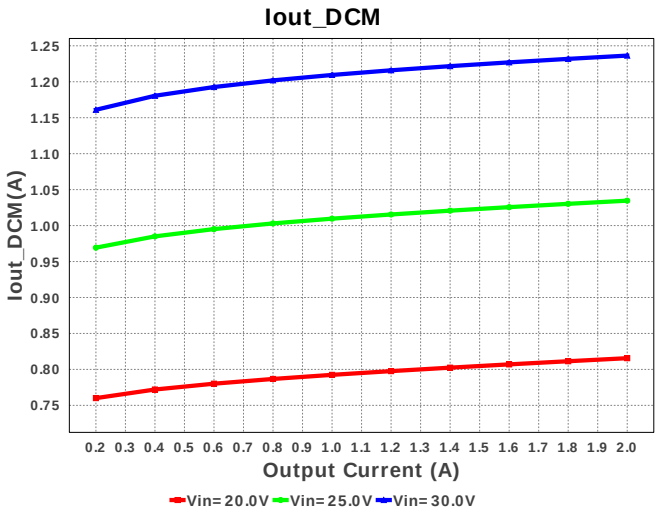
Electrical BOM

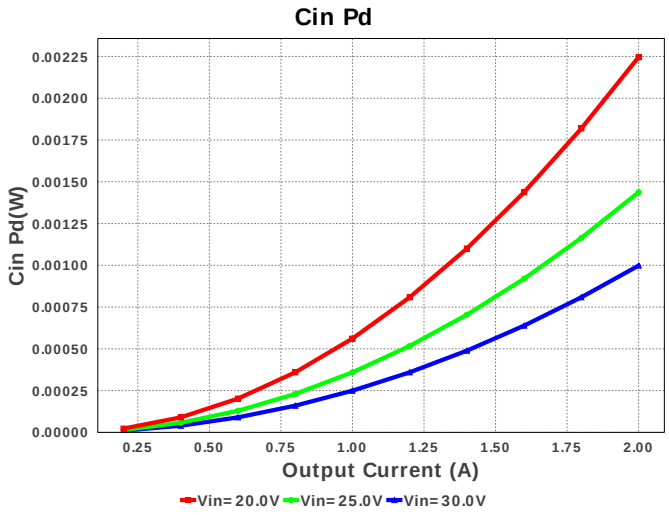
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
2.	C13	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm^2
3.	C21	Nichicon	UUD1A560MCL1GS Series= uD	Cap= 56.0 uF ESR= 440.0 mOhm VDC= 10.0 V IRMS= 230.0 mA	1	$0.11	SM_RADIAL_6.3AMM 80 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	MuRata	GRM033R71C681KA01D Series= X7R	Cap= 680.0 pF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm^2
7.	Cin	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 uF ESR= 4.402 mOhm VDC= 50.0 V IRMS= 1.677 A	1	$0.05	0805 7 mm^2

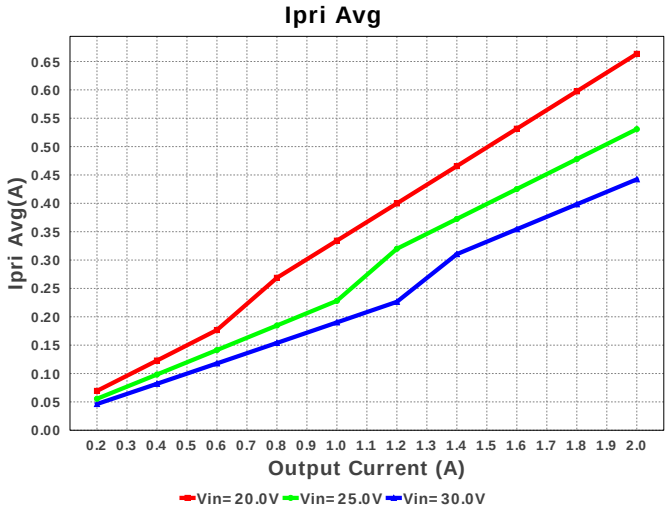
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Cout1	Panasonic	16SVPF1000M Series= ?	Cap= 1.0 mF ESR= 12.0 mOhm VDC= 16.0 V IRMS= 5.4 A	1	$0.74	 CAPSMT_62_F12 151 mm²
9.	Cout2	Panasonic	16SVPF1000M Series= ?	Cap= 1.0 mF ESR= 12.0 mOhm VDC= 16.0 V IRMS= 5.4 A	1	$0.74	 CAPSMT_62_F12 151 mm²
10.	Cref	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	 0402 3 mm²
11.	Csc	MuRata	GRM033R60J103KA01D Series= X5R	Cap= 10.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	 0201 2 mm²
12.	Csnub	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 uF ESR= 4.402 mOhm VDC= 50.0 V IRMS= 1.677 A	1	$0.05	 0805 7 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	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	$0.01	 0603 5 mm²
15.	D21	Toshiba	CMS06	VF@Io= 320.0 mV VRRM= 30.0 V	1	$0.19	 M-FLAT 19 mm²
16.	Daux	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	$1.33	 DDPAK 210 mm²
17.	Dsec	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	$1.33	 DDPAK 210 mm²
18.	Dsec2	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	$1.33	 DDPAK 210 mm²
19.	Dsnub	Vishay-Semiconductor	SS2PH10-M3	VF@Io= 620.0 mV VRRM= 100.0 V	1	$0.14	DO-220AA 14 mm²
20.	L2	Coilcraft	SER1590-152MLB	L= 1.5 µH DCR= 1.1 mOhm	1	$1.12	 SER1590 324 mm²
21.	M1	Texas Instruments	CSD19533Q5A	VdsMax= 100.0 V IdsMax= 75.0 Amps	1	$0.83	 TRANS_NexFET_Q5A 55 mm²

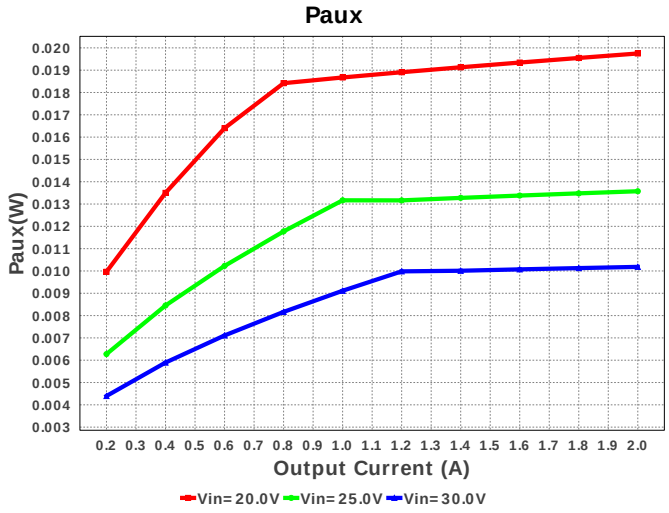
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
22.	O1	Vishay-Semiconductor	TCMT1109	Optocoupler	1	$0.21	 SOP-4 44 mm²
23.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
24.	R12	Vishay-Dale	CRCW04029K09FKED Series= CRCW..e3	Res= 9.09 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	CRCW04028K25FKED Series= CRCW..e3	Res= 8.25 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	CRCW0402205RFKED Series= CRCW..e3	Res= 205.0 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	Yageo America	RC0805FR-076R8L Series= ?	Res= 6.8 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
32.	Rfbb	Vishay-Dale	CRCW04022K05FKED Series= CRCW..e3	Res= 2.05 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
33.	Rfbt	Yageo America	RC0603FR-076K2L Series= ?	Res= 6.2 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
34.	Rled	Vishay-Dale	CRCW04028K06FKED Series= CRCW..e3	Res= 8.06 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
35.	Rsc	Vishay-Dale	CRCW040216K2FKED Series= CRCW..e3	Res= 16.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
36.	Rsns	Stackpole Electronics Inc	CSRN2010FKR500 Series= ?	Res= 500.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	$0.10	 2010 32 mm²
37.	Rsnub	CUSTOM	CUSTOM Series= ?	Res= 9.7613 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm²
38.	Rstartup1	Panasonic	ERJ-8ENF3241V Series= ERJ-8E	Res= 3.24 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	 1206 11 mm²
39.	Rstartup2	Panasonic	ERJ-8ENF3241V Series= ERJ-8E	Res= 3.24 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	 1206 11 mm²
40.	Rt	Panasonic	ERJ-6ENF6812V Series= ERJ-6E	Res= 68.1 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²

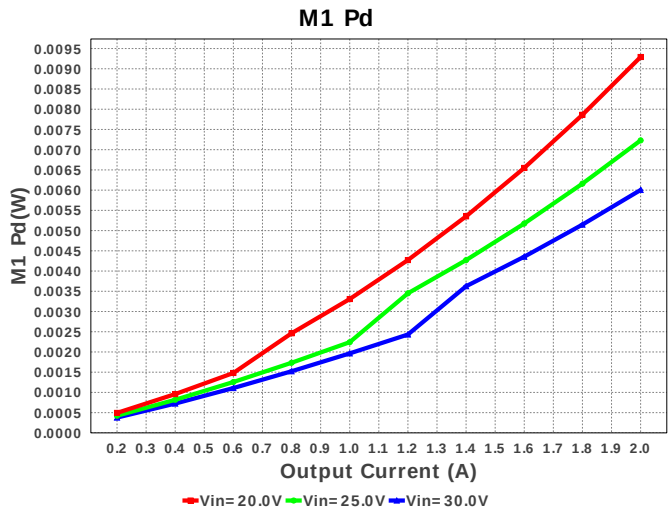
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
41.	T1	CUSTOM	CUSTOM	Lp= 624.837 µH Rp= 870.0 mOhm Leakage_L= 12.497 µH Ns1toNp= 0.201 Rs1= 8.6 mOhms Ns2toNp= 0.441 Rs2= 700.0 µOhms	1	NA	CUSTOM 0 mm^2
42.	U1	Texas Instruments	UC2843AQD8RQ1	Switcher	1	$0.49	 D0008A 57 mm^2
43.	VR	Texas Instruments	LMV431CM5/NOPB	Voltage References	1	$0.16	 R-PDSO-G3 16 mm^2

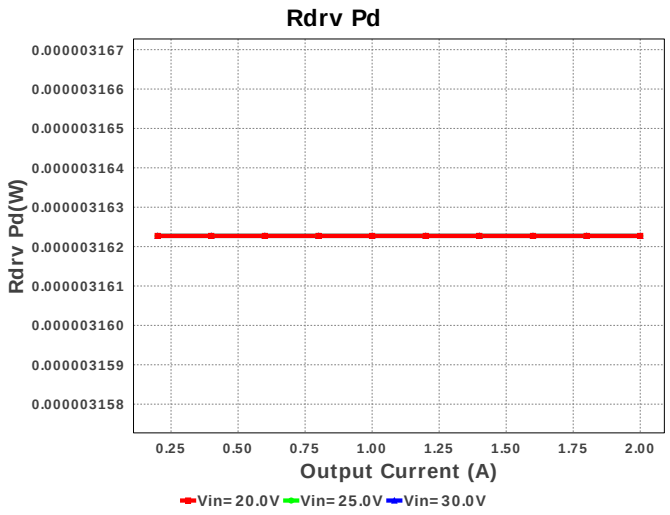


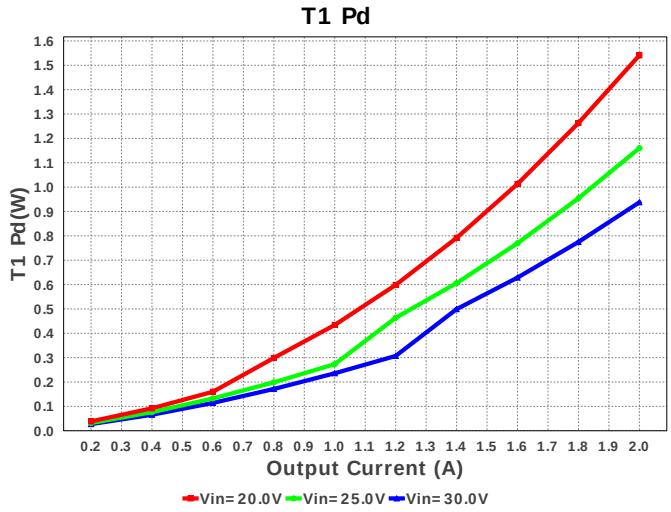


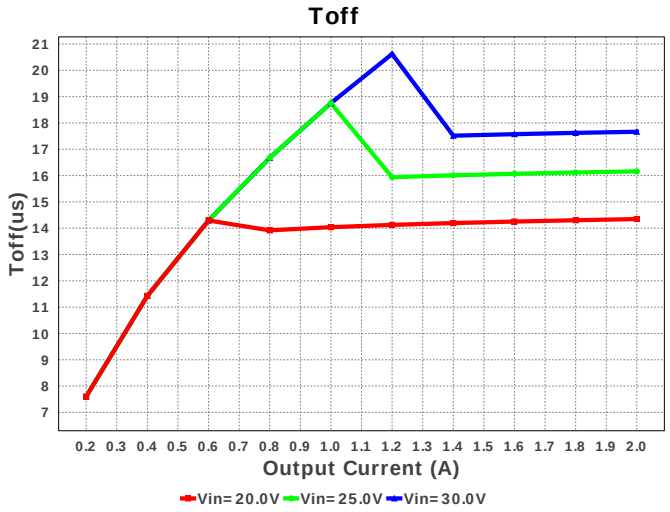


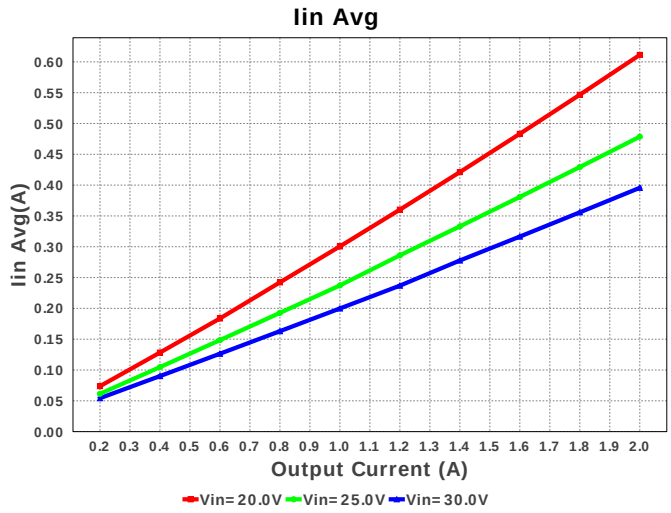


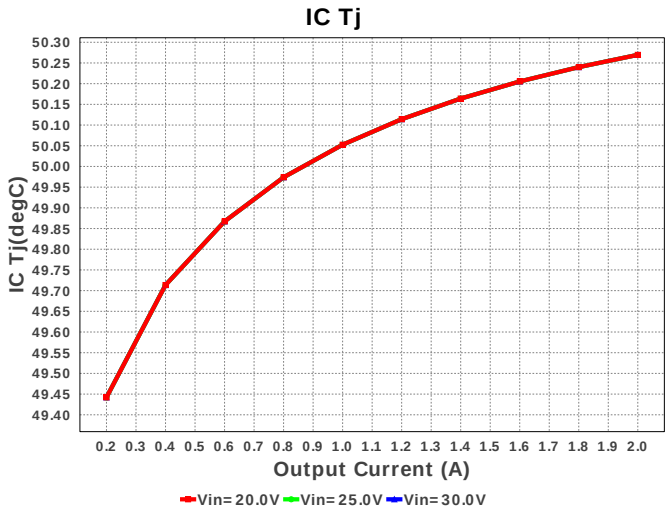


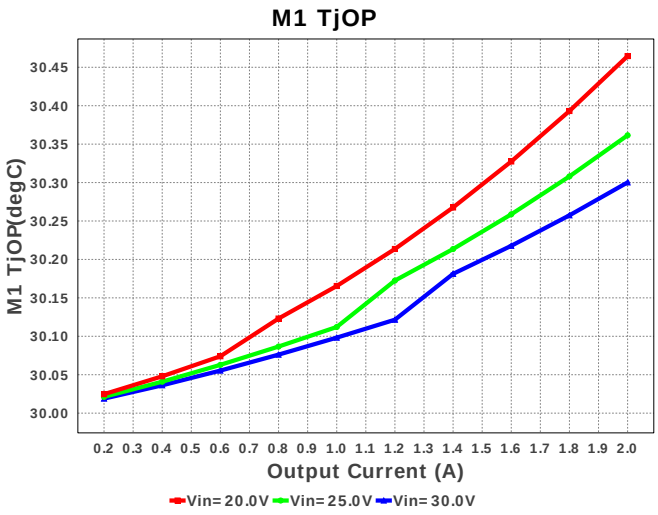


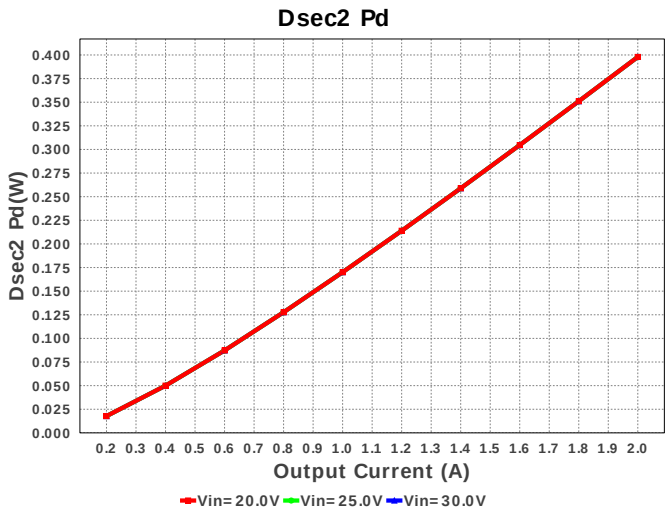


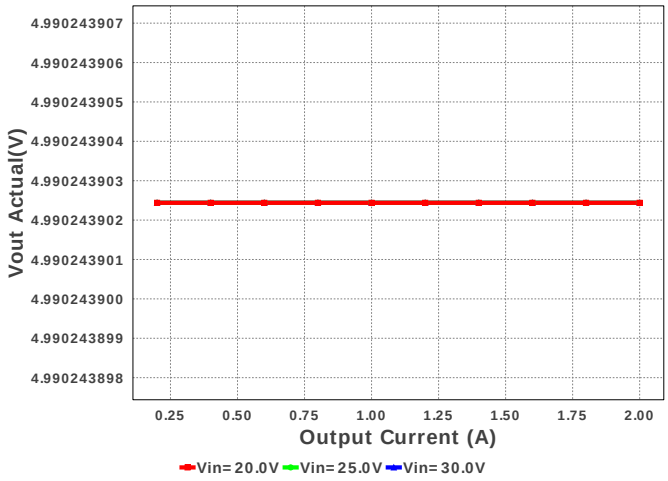


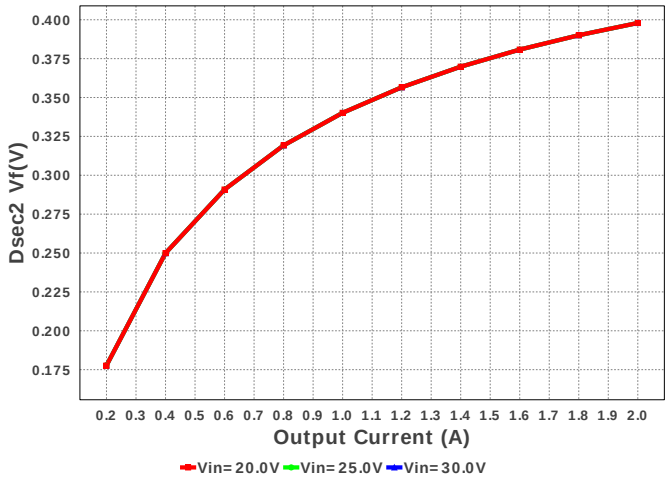


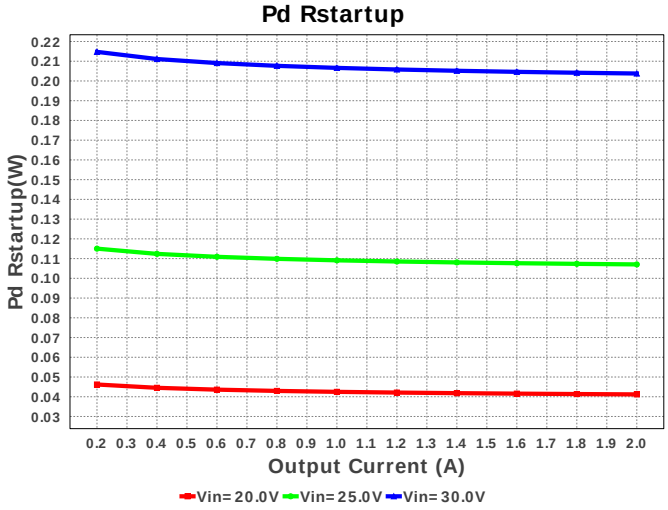


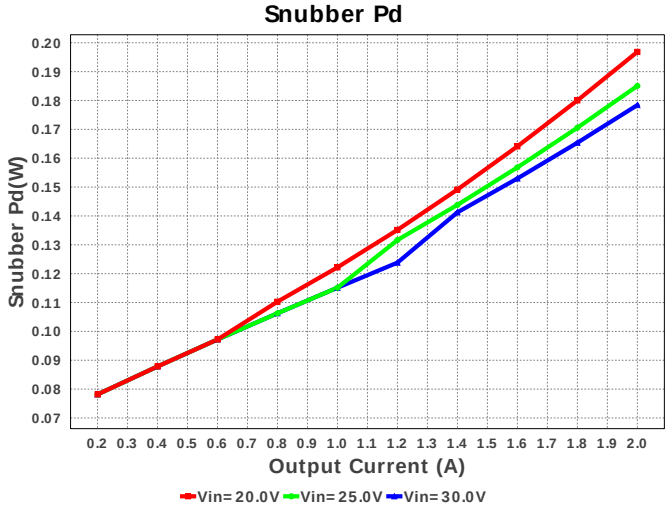


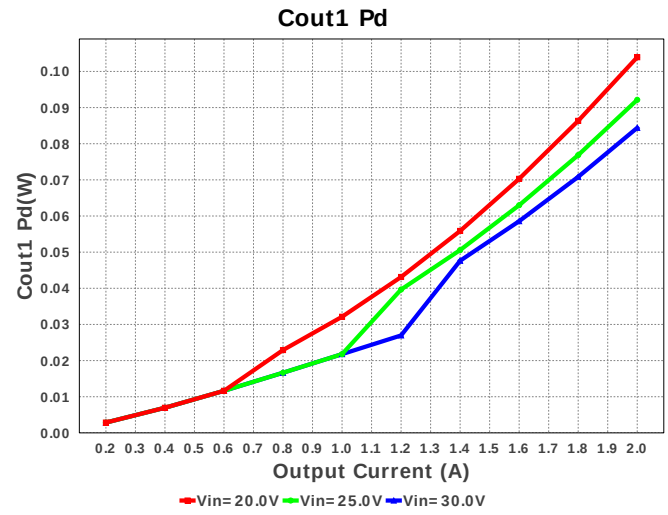


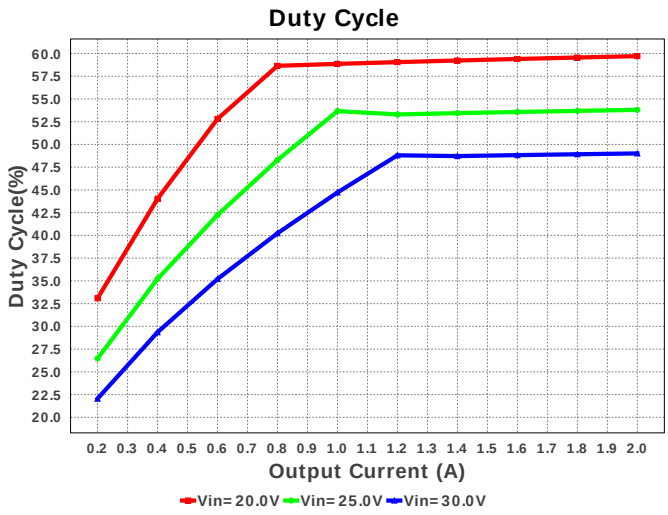


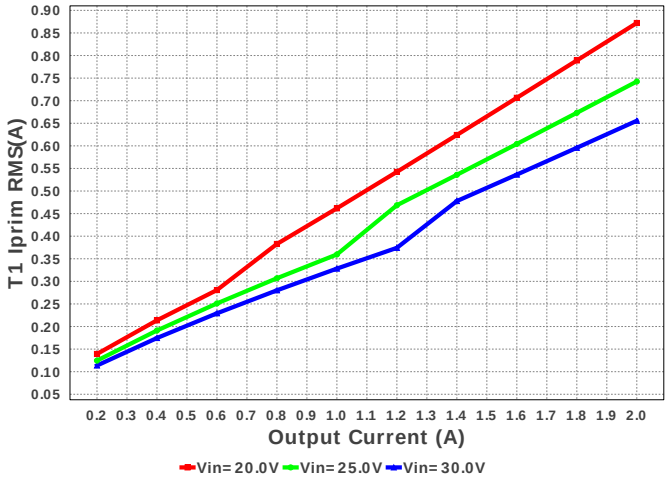


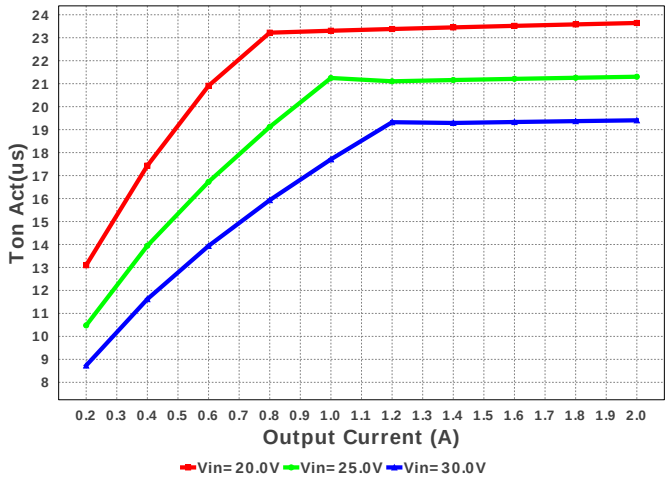


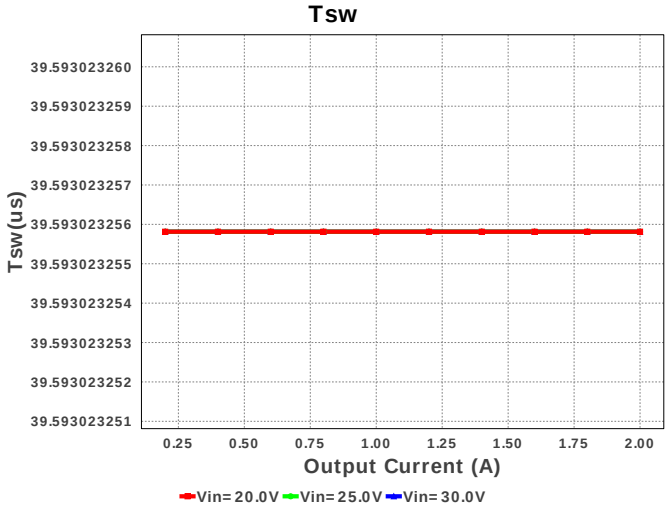


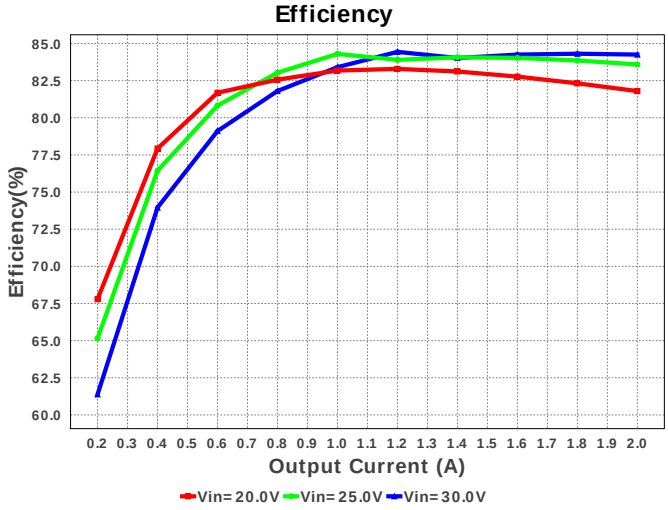


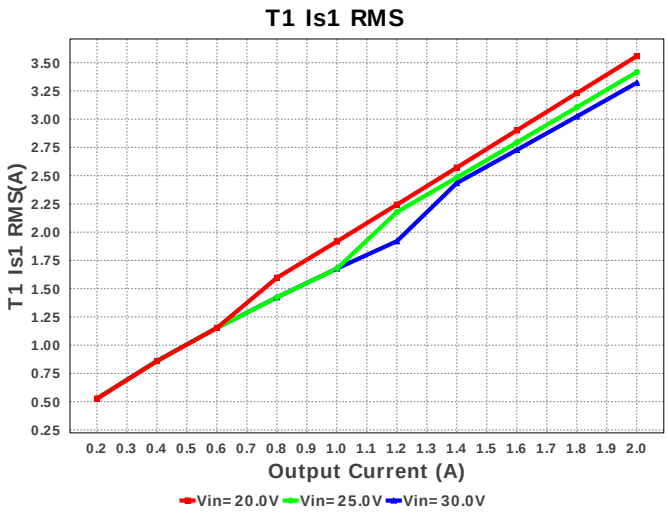


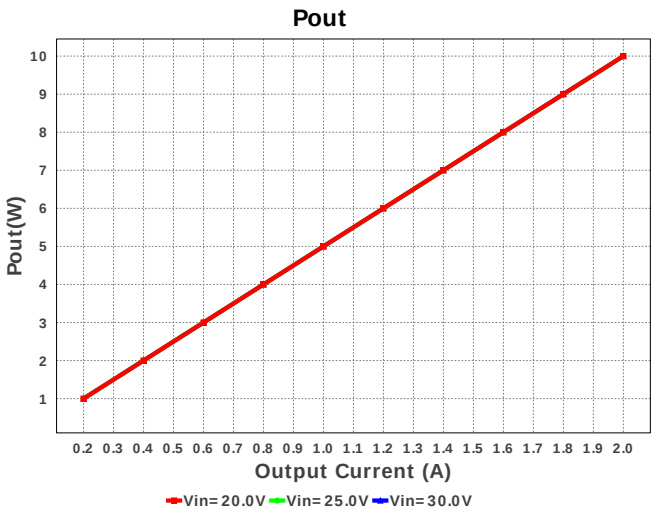


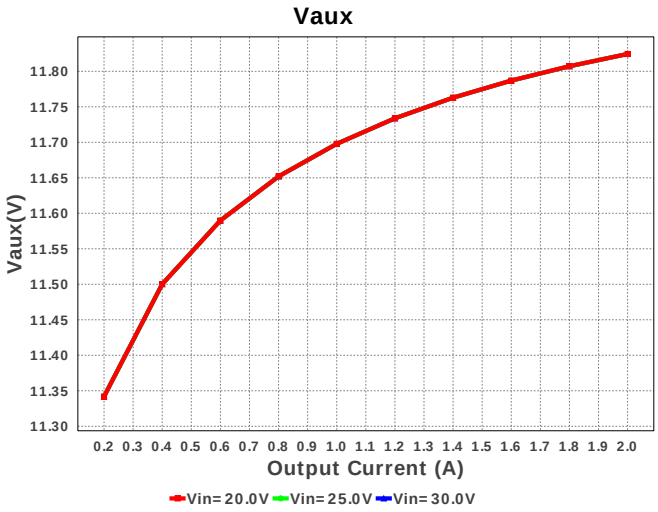


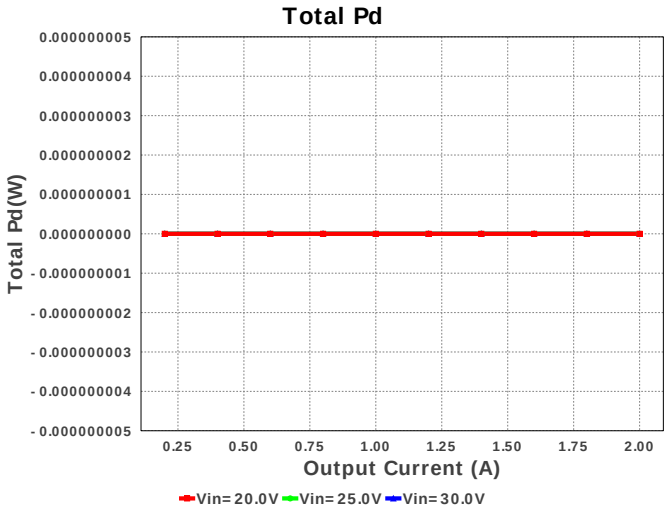


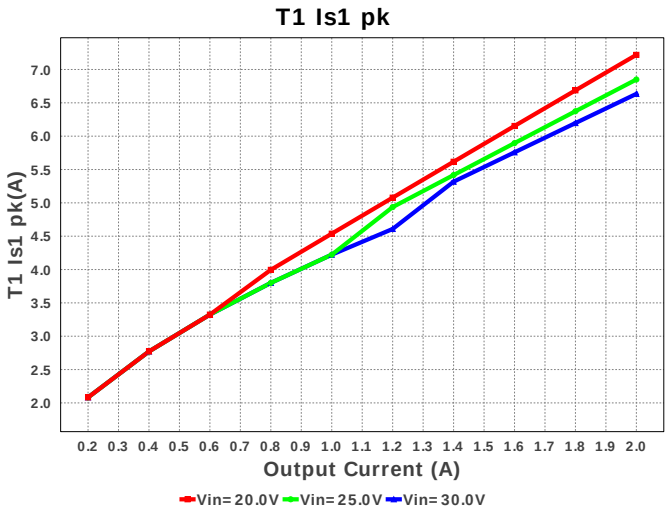


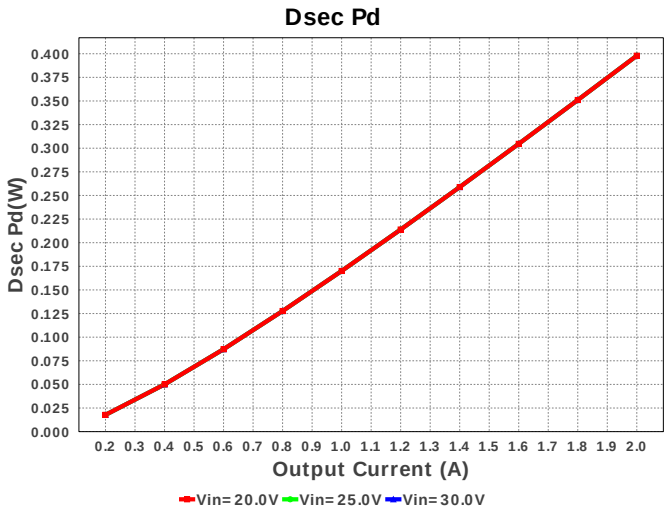


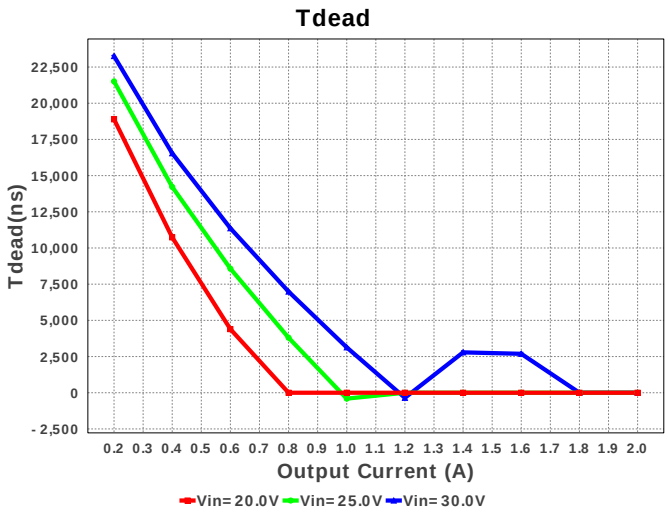


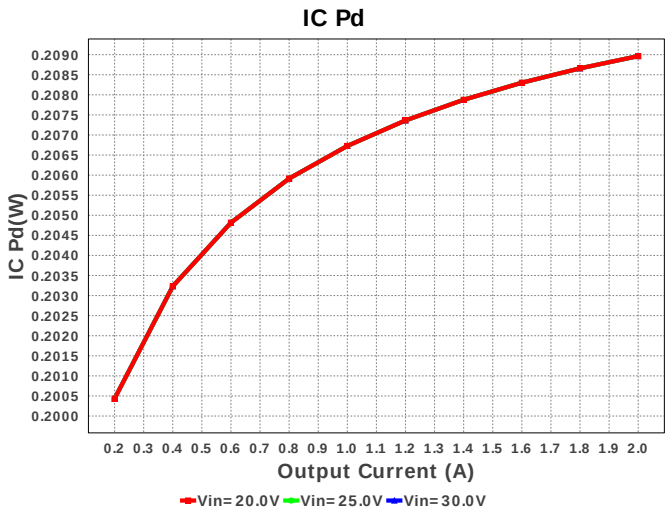


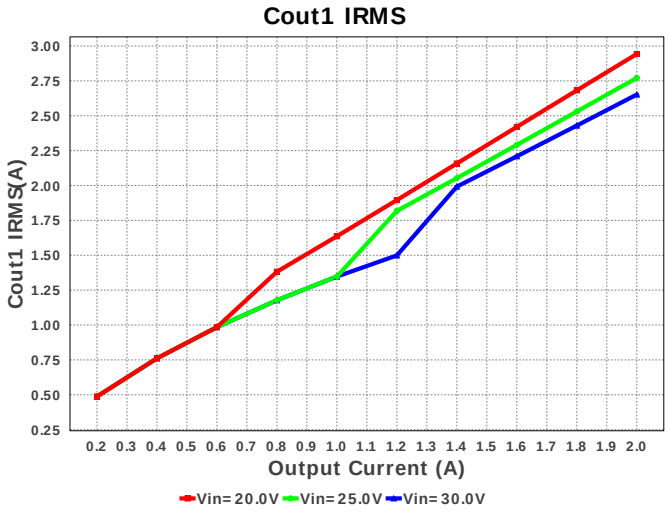


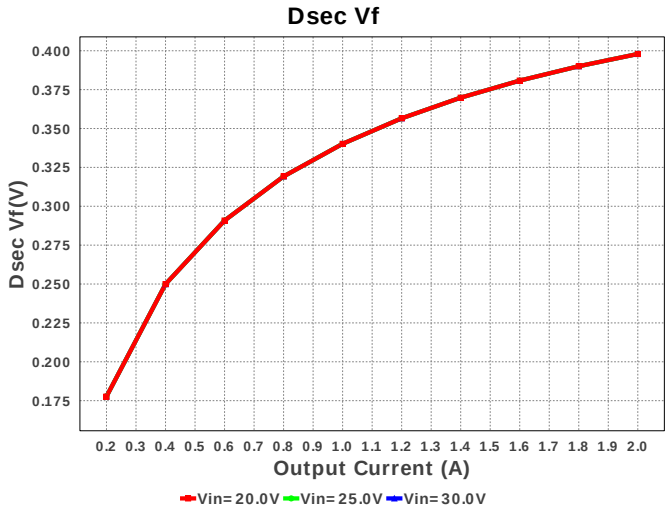


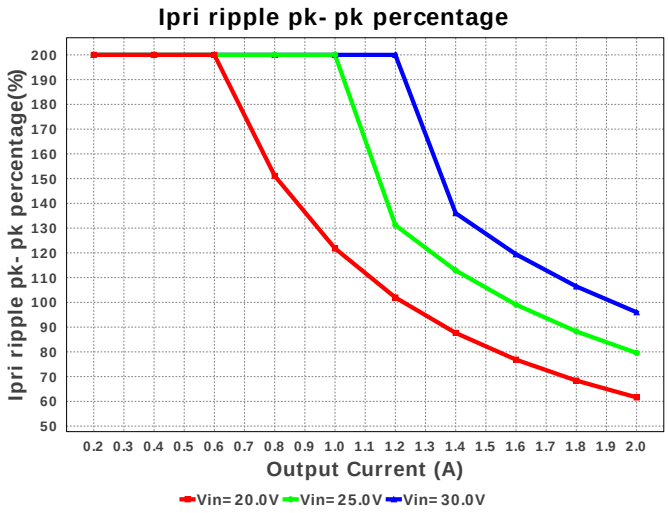


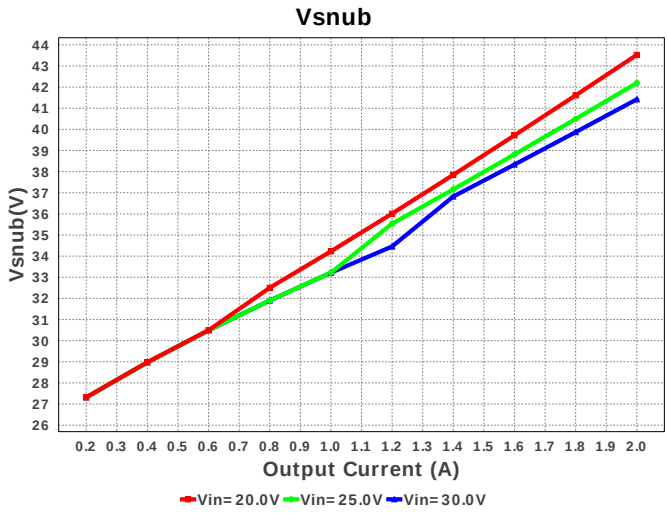


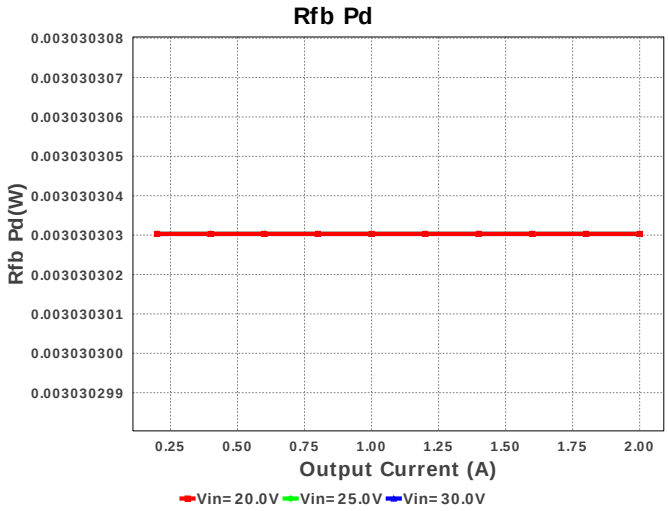


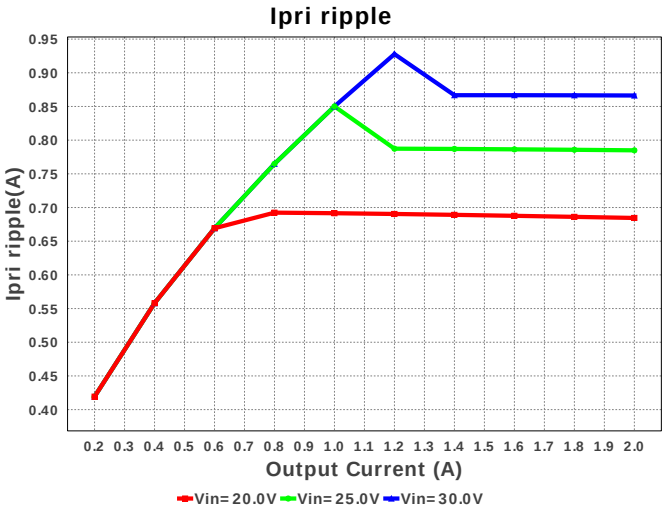


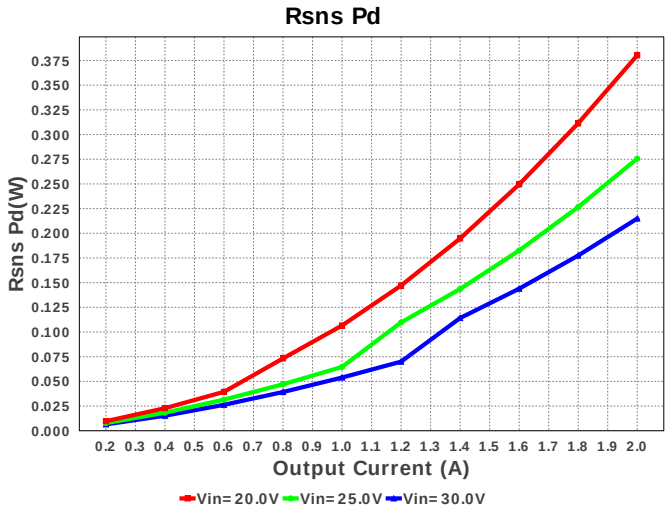


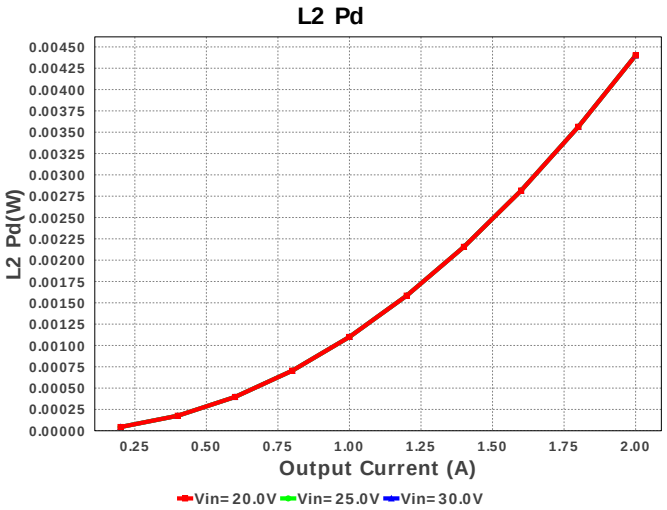


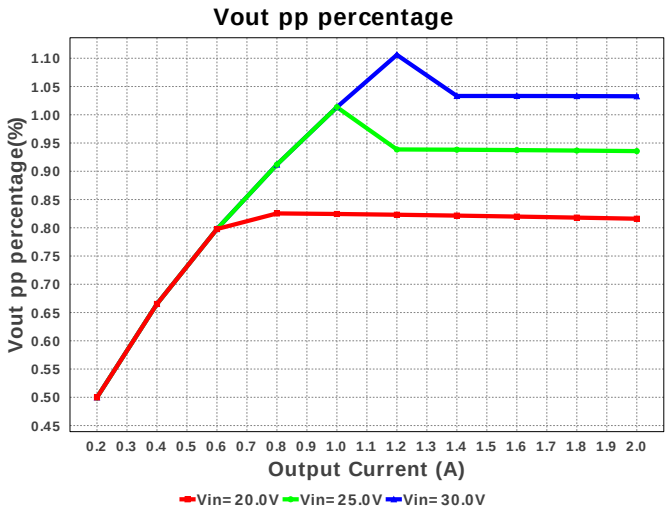


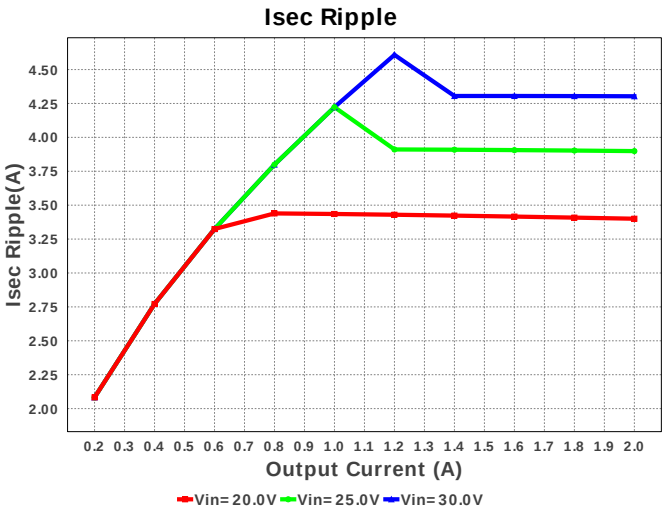


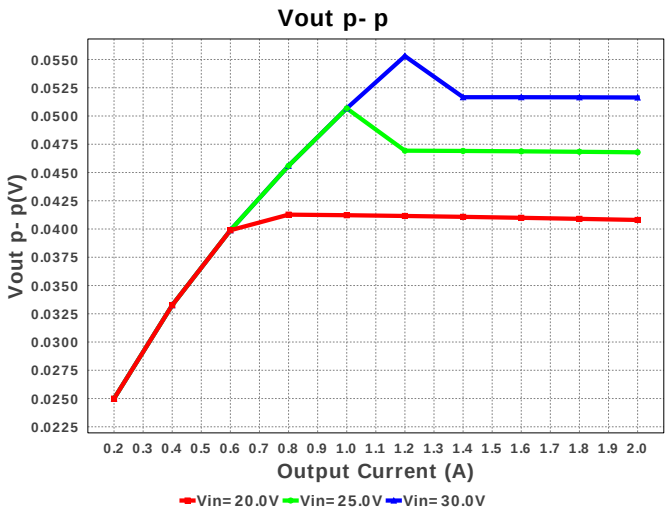


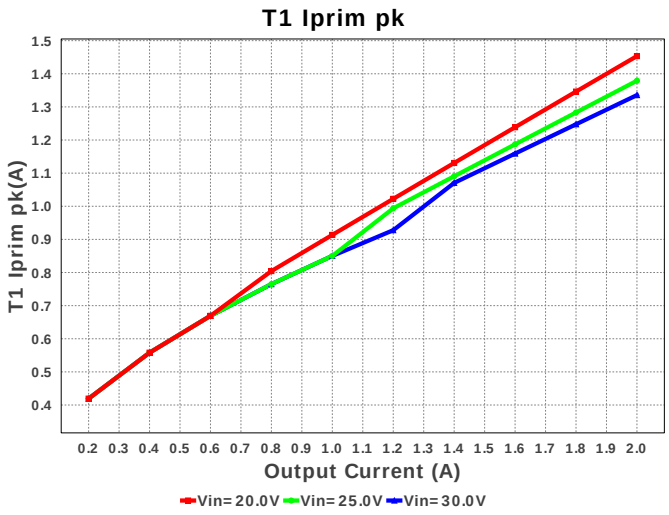












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	2.943 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	611.276 mA	Current	Average input current
3.	Iout_DCM	815.6 mA	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	663.461 mA	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	684.502 mA	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	61.605 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	3.4 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	872.061 mA	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	1.453 A	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	3.558 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	7.219 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	43	General	Total Design BOM count
13.	Daux trr	0.0 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec Vf	397.923 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	397.923 mV	General	Effective Forward Voltage Drop at the Operating Current
17.	Dsnub trr	0.0 ns	General	Snubber Diode Reverse Recovery Time
18.	FootPrint	1.71 k mm^2	General	Total Foot Print Area of BOM components
19.	Frequency	25.257 kHz	General	Switching frequency
20.	Pout	10.0 W	General	Total output power
21.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
22.	Toff	14.347 us	General	Approximate Converter Off Time
23.	Ton Act	23.642 us	General	Approximate Converter On Time
24.	Total BOM	$0.0	General	Total BOM Cost
25.	Tsw	39.593 us	General	Switching Time Period
26.	Vaux	11.824 V	General	Auxiliary Voltage
27.	Vsnub	43.526 V	General	Voltage Across the Snubber
28.	Vout Actual	4.99 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
29.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
30.	Duty Cycle	59.712 %	Op_point	Duty cycle
31.	Efficiency	81.796 %	Op_point	Steady state efficiency
32.	IC Tj	50.27 degC	Op_point	IC junction temperature
33.	ICThetaJA	97.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
34.	IOUT_OP	2.0 A	Op_point	Iout operating point
35.	M1 TjOP	30.465 degC	Op_point	M1 MOSFET junction temperature
36.	Vout p-p	40.801 mV	Op_point	Peak-to-peak output ripple voltage
37.	Cin Pd	2.246 mW	Power	Input capacitor power dissipation
38.	Cout1 Pd	103.925 mW	Power	Output capacitor1 power dissipation
39.	Dsec Pd	397.923 mW	Power	Secondary Diode Power Dissipation
40.	Dsec2 Pd	397.923 mW	Power	Secondary Diode Power Dissipation
41.	IC Pd	208.965 mW	Power	IC power dissipation
42.	L2 Pd	4.4 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
43.	M1 Pd	9.291 mW	Power	M1 MOSFET total power dissipation
44.	Paux	19.748 mW	Power	Power Dissipation in Raux and Daux
45.	Pd Rstartup	41.195 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
46.	Rdrv Pd	3.162 µW	Power	Power Dissipation in Gate Drive Resistor
47.	Rfb Pd	3.03 mW	Power	Rfb Power Dissipation
48.	Rsns Pd	380.245 mW	Power	Current Limit Sense Resistor Power Dissipation
49.	Snubber Pd	196.846 mW	Power	Snubber Power Dissipation
50.	T1 Pd	1.541 W	Power	Estimated Losses in Transformer

#	Name	Value	Category	Description
51.	Total Pd	0.0 W	Power	Total Power Dissipation
52.	Vout Tolerance	2.173 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
53.	Vout pp percentage	816.025 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	30.0	Maximum input voltage
3.	VinMin	20.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	UC2843A-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature
8.	UserFsw	98.851 k	Customer Selected Frequency

Design Assistance

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