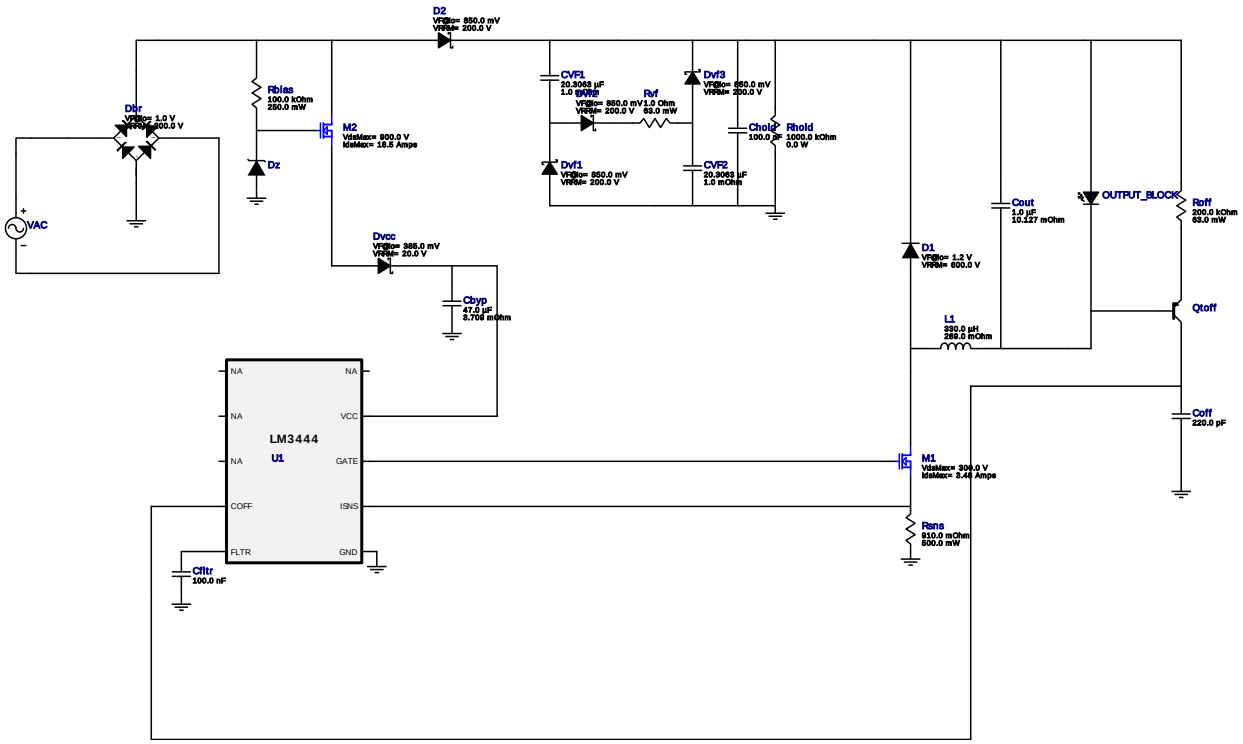
WEBENCH® Design Report

VinMin = 110.0V
VinMax = 130.0V
Vout = 11.5V
Iout = 0.7A

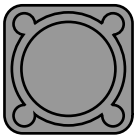
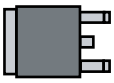
Device = LM3444MM/NOPB
Topology = Buck
Created = 9/8/16 6:07:36 PM
BOM Cost = $0.00
BOM Count = 26
Total Pd = 0.0W

Design : 3876120/17 LM3444MM/NOPB
LM3444MM/NOPB 110.0V-130.0V to 20.95V @ 0.7A

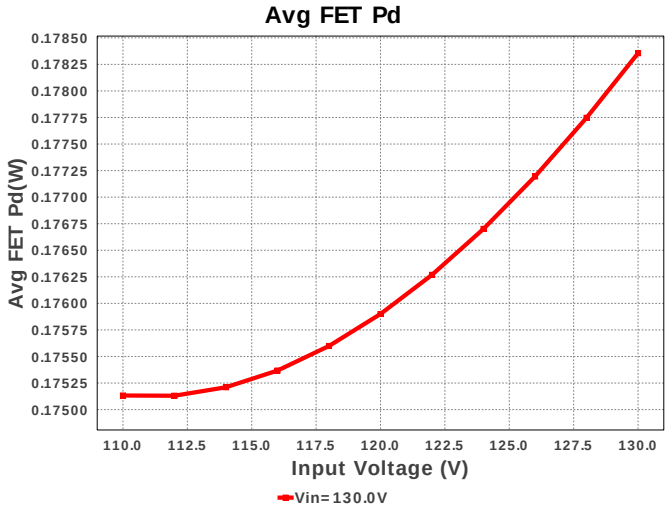


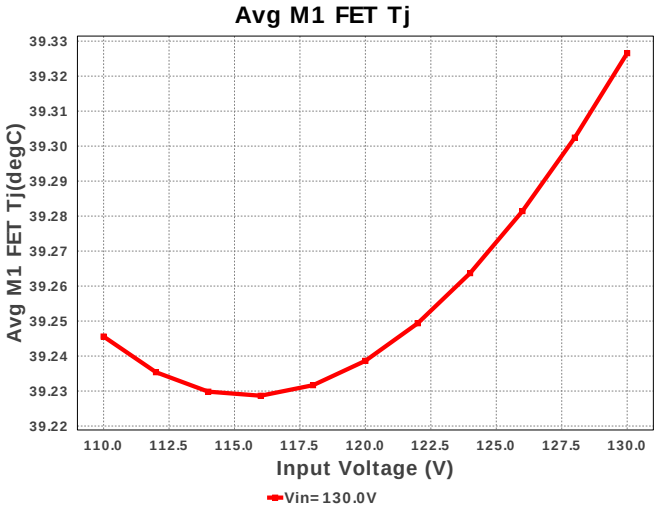
Electrical BOM

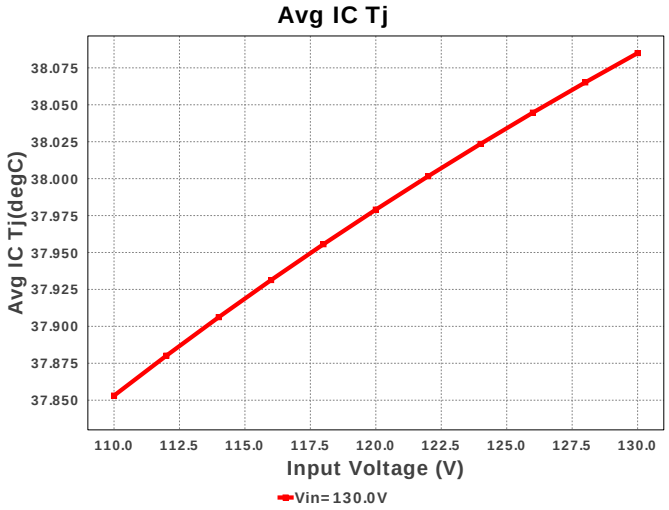
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	CVF1	CUSTOM	CUSTOM Series= ?	Cap= 20.3063 uF ESR= 1.0 mOhm VDC= 147.078 V IRMS= 923.66 mA	1	NA	CUSTOM 0 mm^2
2.	CVF2	CUSTOM	CUSTOM Series= ?	Cap= 20.3063 uF ESR= 1.0 mOhm VDC= 147.078 V IRMS= 923.66 mA	1	NA	CUSTOM 0 mm^2
3.	Cbyp	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	$0.15	1206_190 11 mm^2
4.	Cfltr	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
5.	Chold	MuRata	GRM31CR72E104KW03L Series= X7R	Cap= 100.0 nF VDC= 250.0 V IRMS= 0.0 A	1	$0.06	1206 11 mm^2
6.	Coff	Yageo America	CC0805JRNPO9BN221 Series= C0G/NP0	Cap= 220.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
7.	Cout	MuRata	GRM188R61C105KA93D Series= X5R	Cap= 1.0 uF ESR= 10.127 mOhm VDC= 16.0 V IRMS= 994.63 mA	1	$0.01	0603 5 mm^2

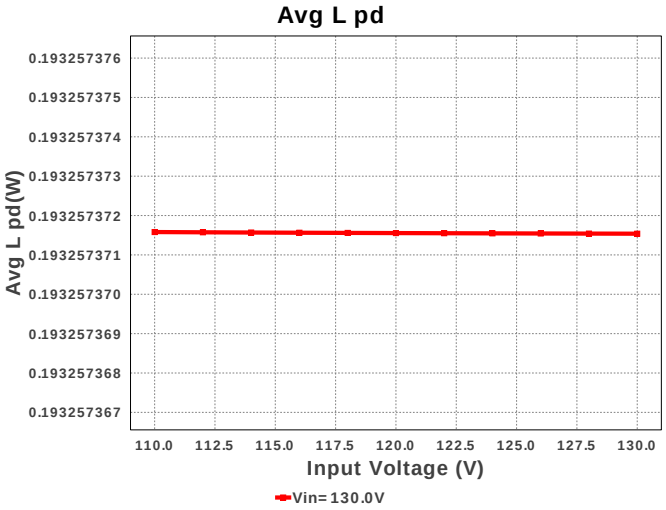
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	D1	Bourns	CD214B-F3600	VF@Io= 1.2 V VRRM= 600.0 V	1	$0.14	 SMB 44 mm²
9.	D2	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	 PowerDI123 13 mm²
10.	D_LED	Cree	XHP50A-00-0000-0D00J40CB	LED	1	$5.02	 xlampxhp 0 mm²
11.	Dbr	Diodes Inc.	HD02-T	VF@Io= 1.0 V VRRM= 200.0 V	1	$0.12	 MiniDIP 62 mm²
12.	Dvcc	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	 SOD-123 13 mm²
13.	Dvf1	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	 PowerDI123 13 mm²
14.	Dvf2	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	 PowerDI123 13 mm²
15.	Dvf3	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	 PowerDI123 13 mm²
16.	Dz	ON Semiconductor	BZX84C15LT1G	Zener	1	$0.02	 SOT-23 14 mm²
17.	L1	Coilcraft	MSS1210-334KEB	L= 330.0 µH DCR= 289.0 mOhm	1	$0.81	 MSS1210 204 mm²
18.	M1	Fairchild Semiconductor	FQD7N30TM	VdsMax= 300.0 V IdsMax= 3.48 Amps	1	$0.40	 DPAK 102 mm²
19.	M2	STMicroelectronics	STW21N90K5	VdsMax= 900.0 V IdsMax= 18.5 Amps	1	$3.94	 TO-247 123 mm²
20.	Qtoff	Fairchild Semiconductor	MMBTA92	Bipolar Transistor	1	$0.05	 SOT-23 14 mm²
21.	Rbias	Panasonic	ERJ-8ENF1003V Series= ERJ-8E	Res= 100.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	 1206 11 mm²
22.	Rhold	CUSTOM	CUSTOM Series= ?	Res= 1000.0 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm²
23.	Roff	Vishay-Dale	CRCW0402200KFKED Series= CRCW..e3	Res= 200.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
24.	Rsns	Bourns	CRM1206-FX-R910ELF Series= ?	Res= 910.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.03	 1206 11 mm²
25.	Rvf	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²

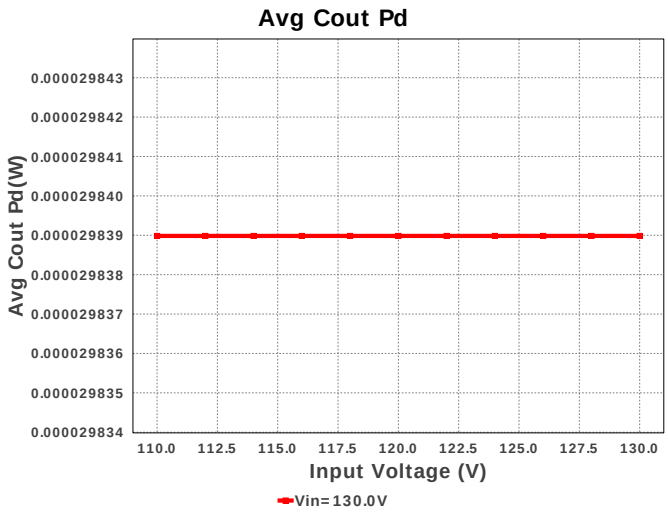
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
26.	U1	Texas Instruments	LM3444MM/NOPB	Switcher	1	$0.35	0 mm²

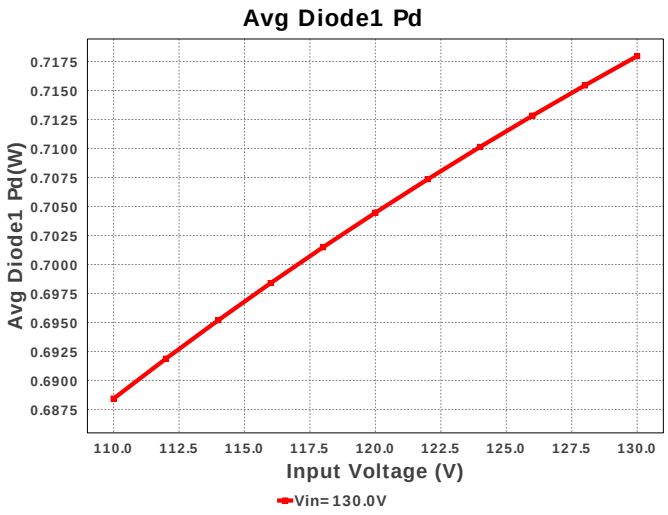


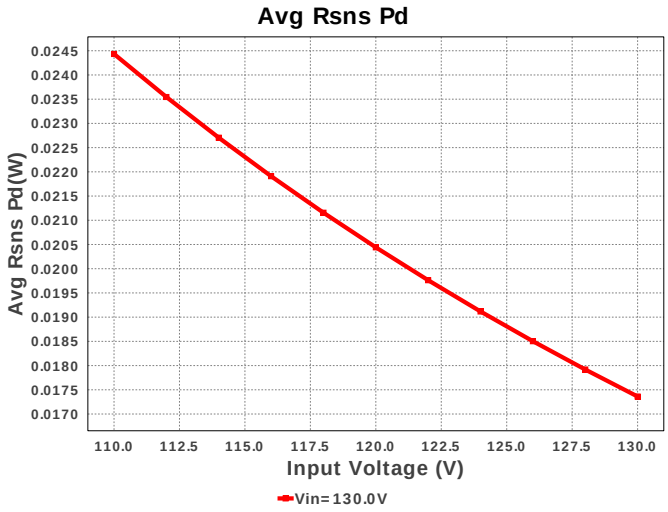


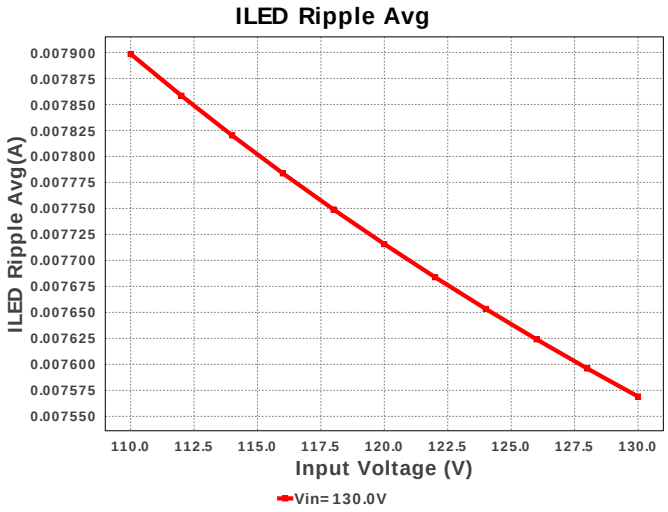


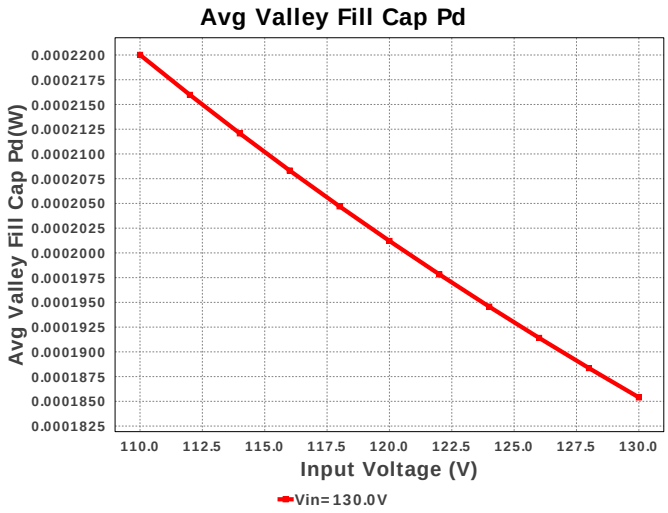


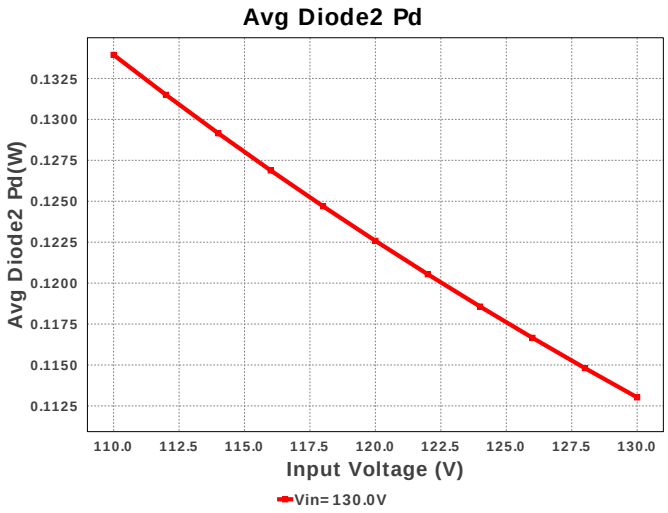


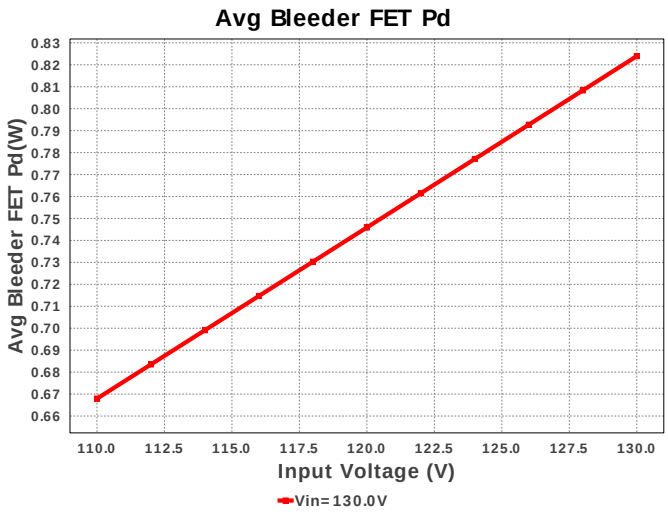


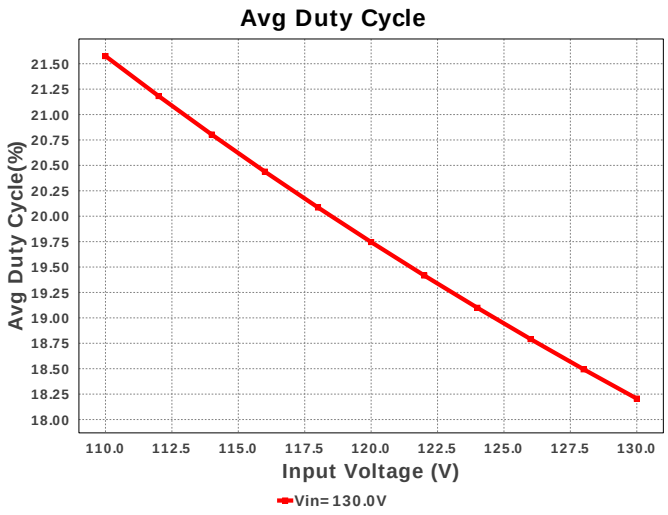


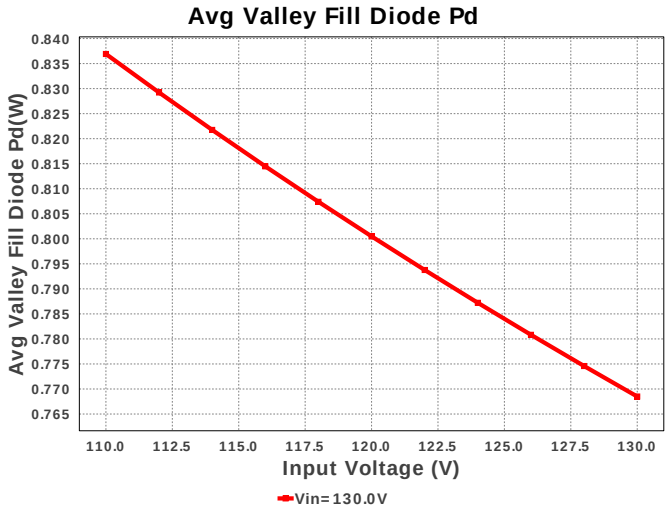


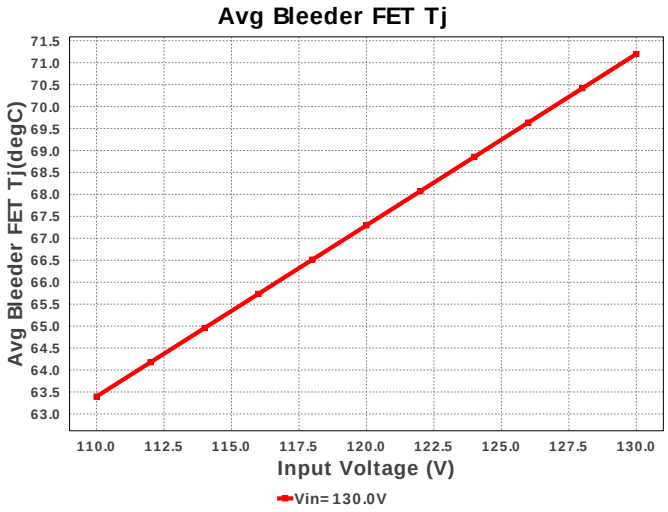


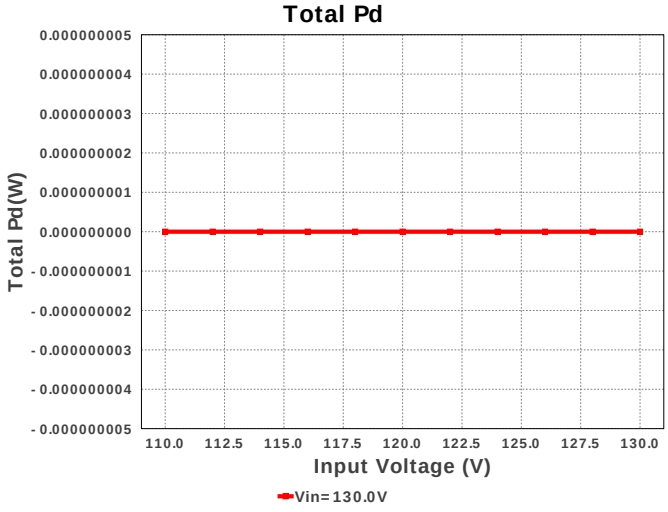


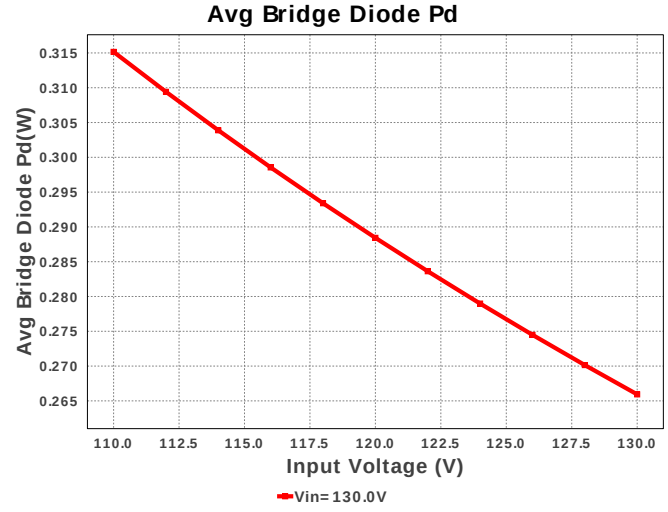


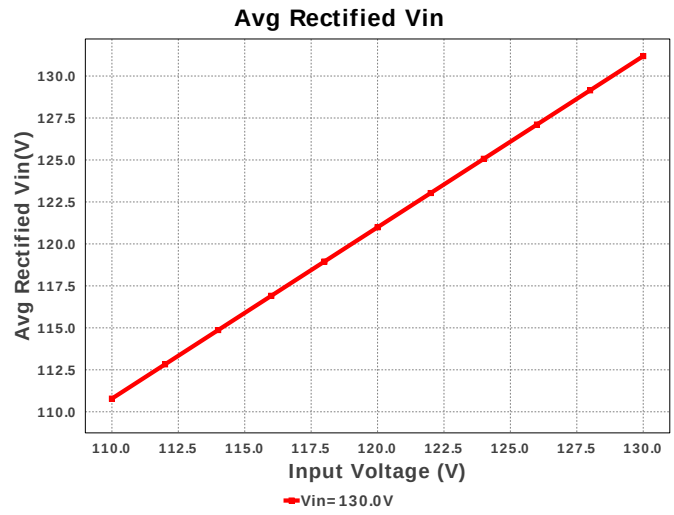


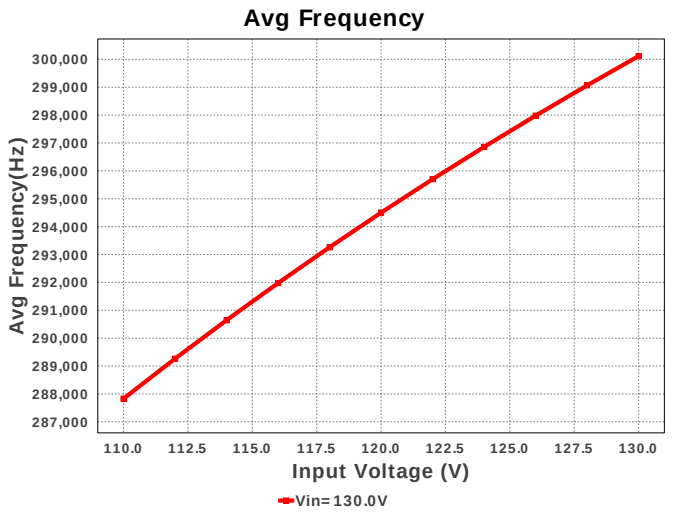


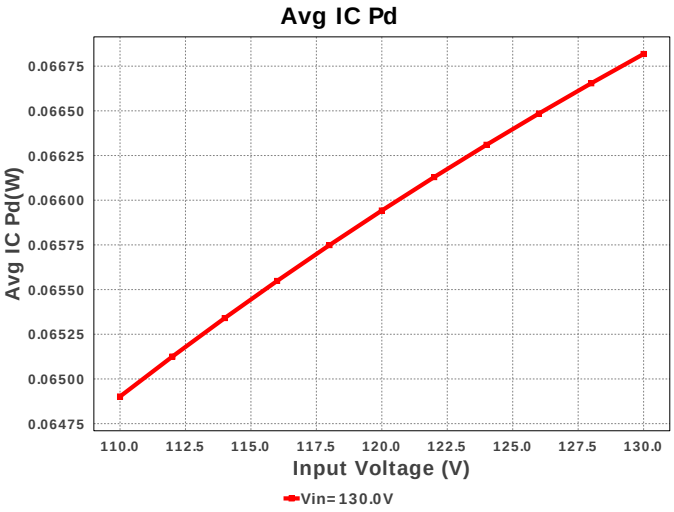


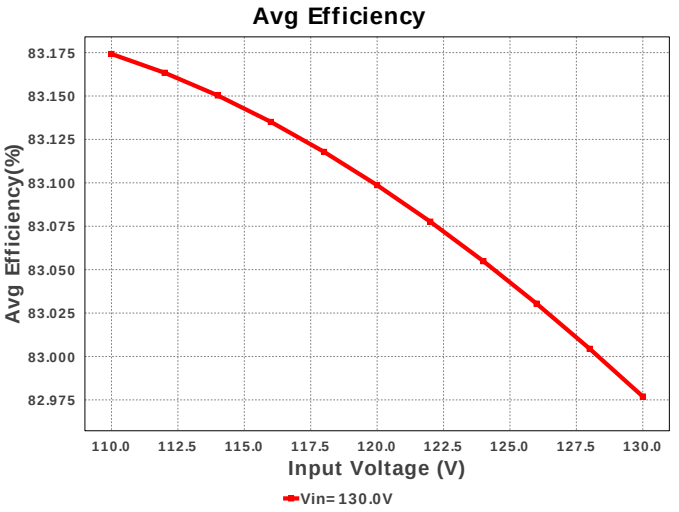


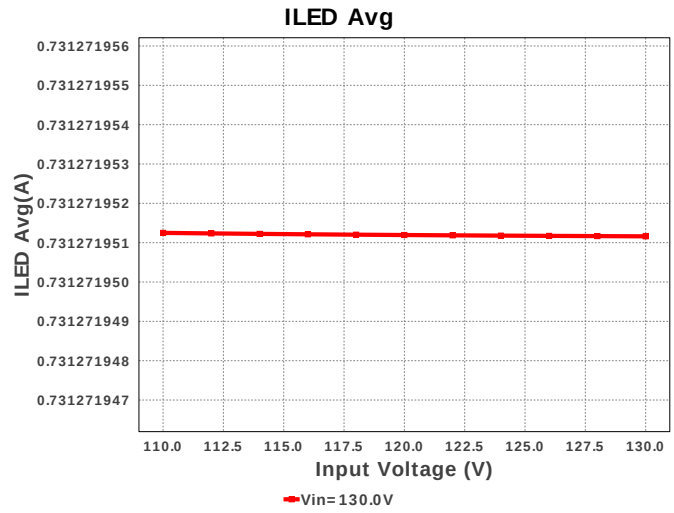












Operating Values

#	Name	Value	Category	Description
1.	ILED Avg	731.272 mA	Current	Average Current per LED for the AC line period
2.	ILED Ripple Avg	7.569 mA	Current	Average LED Ripple Current for the AC line period
3.	Avg Rectified Vin	131.187 V	General	Average Rectified Voltage for the AC Line Period
4.	BOM Count	26	General	Total Design BOM count
5.	FootPrint	737.0 mm^2	General	Total Foot Print Area of BOM components
6.	Total BOM	$0.0	General	Total BOM Cost
7.	Avg Bleeder FET Tj	71.198 degC	Op_Point	Bleeder MOSFET average junction temperature over the AC Line Period
8.	Avg M1 FET Tj	39.327 degC	Op_Point	M1 MOSFET average junction temperature over the AC Line Period
9.	Avg Duty Cycle	18.206 %	Op_point	Average Duty Cycle over the AC Line Period
10.	Avg Efficiency	84.493 %	Op_point	Average Efficiency over the AC Line Period

#	Name	Value	Category	Description
11.	Avg Frequency	300.116 kHz	Op_point	Average Switching Frequency over the AC Line Period
12.	Avg IC Tj	38.085 degC	Op_point	Average IC junction temperature for the AC line period
13.	VIN_OP	130.0 V	Op_point	AC Input RMS Voltage
14.	Avg Bleeder FET Pd	823.963 mW	Power	Average power dissipation in the bleeder FET over the AC line period
15.	Avg Bridge Diode Pd	190.102 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
16.	Avg Cout Pd	29.839 µW	Power	Average Power Dissipation in the Output Capacitor over the AC Line Period
17.	Avg Diode1 Pd	717.967 mW	Power	Average Power Dissipation in D1 over the AC Line Period
18.	Avg Diode2 Pd	81.872 mW	Power	Average Power Dissipation in D1 over the AC Line Period
19.	Avg FET Pd	178.527 mW	Power	Average power dissipation in the switching FET over the AC line period
20.	Avg IC Pd	66.818 mW	Power	Average Power Dissipation in the IC over the AC line period
21.	Avg L pd	193.257 mW	Power	Average Inductor power disspation over the AC line period
22.	Avg Rsns Pd	17.362 mW	Power	Average power dissipation in the Current limit resistor over the AC line period
23.	Avg Valley Fill Cap Pd	185.405 µW	Power	Average Power Dissipation in the Valley Fill Capacitors over the AC Line Period
24.	Avg Valley Fill Diode Pd	545.271 mW	Power	Average Power Dissipation in the Valley Fill Diodes over the AC Line Period
25.	Total Pd	0.0 W	Power	Total Power Dissipation
26.	Vout Tolerance	143.18 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	700.0 m	Maximum Output Current
2.	VinMax	130.0	Maximum input voltage
3.	VinMin	110.0	Minimum input voltage
4.	Vout	11.5	Output Voltage
5.	line_fsw	60.0	Light Output in Lumen
6.	application	LED_DRIVER	LED Application
7.	base_pn	LM3444	Base Product Number
8.	LED_Architect	N	LED Architect Project
9.	ledparallel	1.0	Number of LED in parallel
10.	ledpartnumber	XHP50A-00-0000-0D00140CB	LED Part number
11.	ledseries	1.0	Number of LED in series
12.	line_fsw	60.0	AC Line Frequency
13.	source	AC	Input Source Type
14.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM3444** Product Folder : http://www.ti.com/product/LM3444 : contains the data sheet and other resources.