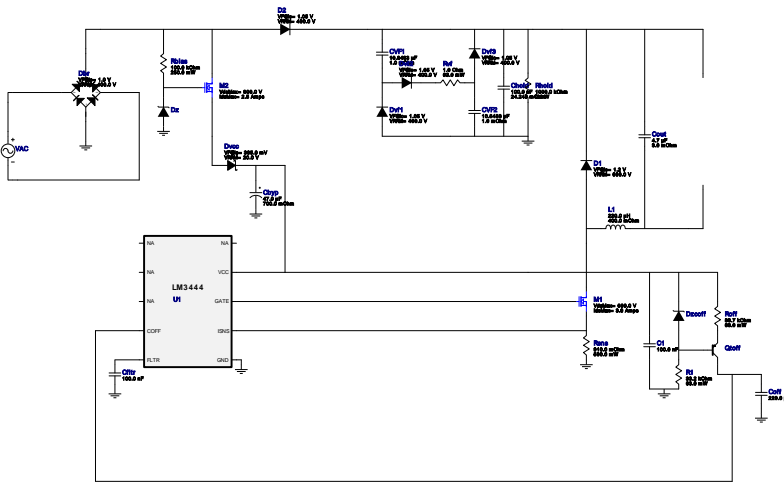









WEBENCH[®] Design Report

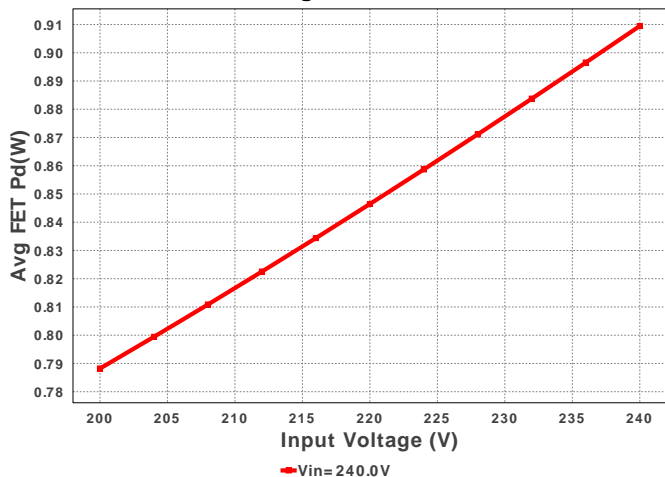
 Design : 1998766/21 LM3444MM/NOPB
 LM3444MM/NOPB 200.0V-240.0V to 41.90V @ 0.7A

Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C1	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
2.	CVF1	CUSTOM	CUSTOM Series= ?	Cap= 10.8483 uF ESR= 1.0 mOhm VDC= 271.529 V IRMS= 934.02 mA	1	NA	CUSTOM 0 mm ²
3.	CVF2	CUSTOM	CUSTOM Series= ?	Cap= 10.8483 uF ESR= 1.0 mOhm VDC= 271.529 V IRMS= 934.02 mA	1	NA	CUSTOM 0 mm ²
4.	Cbyp	Panasonic	EEE-FK1C470UR Series= FK	Cap= 47.0 uF ESR= 700.0 mOhm VDC= 16.0 V IRMS= 160.0 mA	1	\$0.11	 SM_RADIAL_C 62 mm ²
5.	Cftr	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
6.	Chold	TDK	C3216X7T2V104M Series= 480	Cap= 100.0 nF ESR= 24.248 mOhm VDC= 350.0 V IRMS= 0.0 A	1	\$0.09	 1206 11 mm ²
7.	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

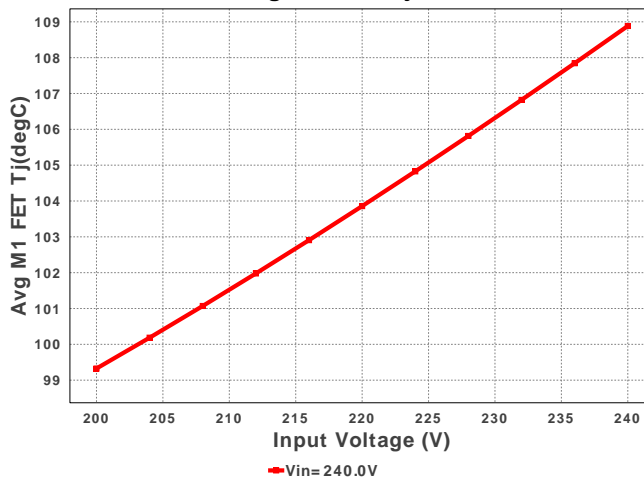
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Cout	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.07	 1206 11 mm ²
9.	D1	Bourns	CD214B-F3600	VF@Io= 1.2 V VRRM= 600.0 V	1	\$0.14	 SMB 44 mm ²
10.	D2	Bourns	CD1408-FU1400	VF@Io= 1.05 V VRRM= 400.0 V	1	\$0.13	 Diode_1408 13 mm ²
11.	D_LED	Cree	XHP50A-00-0000-0D00J40E1LED		2	NA	 xlampxhp 0 mm ²
12.	Dbr	Diodes Inc.	HD04-T	VF@Io= 1.0 V VRRM= 400.0 V	1	\$0.12	 MiniDIP 62 mm ²
13.	Dvcc	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	\$0.06	 SOD-123 13 mm ²
14.	Dvf1	Bourns	CD1408-FU1400	VF@Io= 1.05 V VRRM= 400.0 V	1	\$0.13	 Diode_1408 13 mm ²
15.	Dvf2	Bourns	CD1408-FU1400	VF@Io= 1.05 V VRRM= 400.0 V	1	\$0.13	 Diode_1408 13 mm ²
16.	Dvf3	Bourns	CD1408-FU1400	VF@Io= 1.05 V VRRM= 400.0 V	1	\$0.13	 Diode_1408 13 mm ²
17.	Dz	ON Semiconductor	BZX84C15LT1G	Zener	1	\$0.02	 SOT-23 14 mm ²
18.	Dzcoff	ON Semiconductor	BZX84C5V1LT1G	Zener	1	\$0.02	 SOT-23 14 mm ²
19.	L1	Bourns	SRR1280-221K	L= 220.0 uH DCR= 400.0 mOhm	1	\$0.41	 SRR1280 210 mm ²
20.	M1	Fairchild Semiconductor	FCD4N60TM	VdsMax= 600.0 V IdsMax= 3.9 Amps	1	\$0.49	 DPAK 102 mm ²
21.	M2	STMicroelectronics	STD3NK80ZT4	VdsMax= 800.0 V IdsMax= 2.5 Amps	1	\$0.46	 DPAK 102 mm ²
22.	Qtoff	Fairchild Semiconductor	MMBT4403	Bipolar Transistor	1	\$0.03	 SOT-23 14 mm ²
23.	R1	Vishay-Dale	CRCW040233K2FKED Series= CRCW..e3	Res= 33.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
24.	Rbias	Panasonic	ERJ-8ENF1003V Series= ERJ-8E	Res= 100.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
25.	Rhold	CUSTOM	CUSTOM Series= ?	Res= 1000.0 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
26.	Roff	Vishay-Dale	CRCW040288K7FKED Series= CRCW..e3	Res= 88.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
27.	Rsns	Bourns	CRM1206-FX-R910ELF Series= ?	Res= 910.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.03	 1206 11 mm ²
28.	Rvf	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
29.	U1	Texas Instruments	LM3444MM/NOPB	Switcher	1	\$0.55	0 mm ²

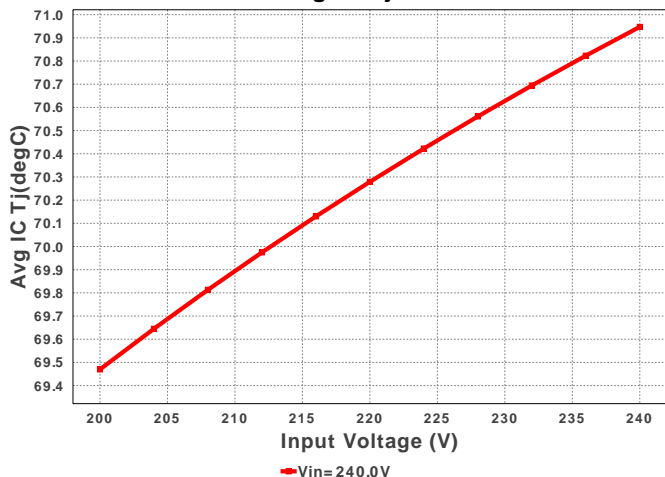
Avg FET Pd



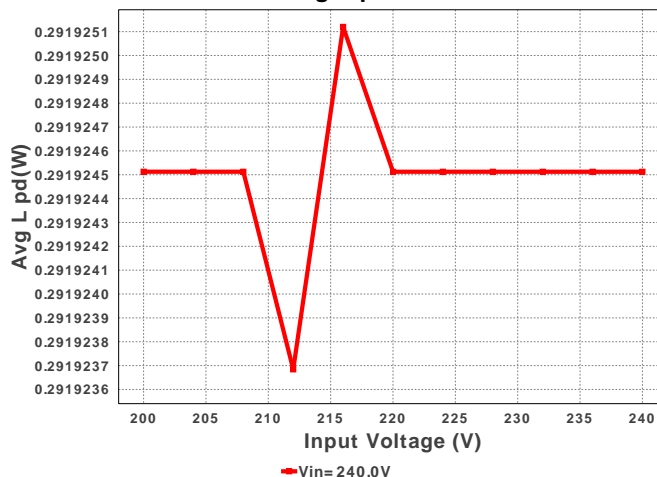
Avg M1 FET Tj



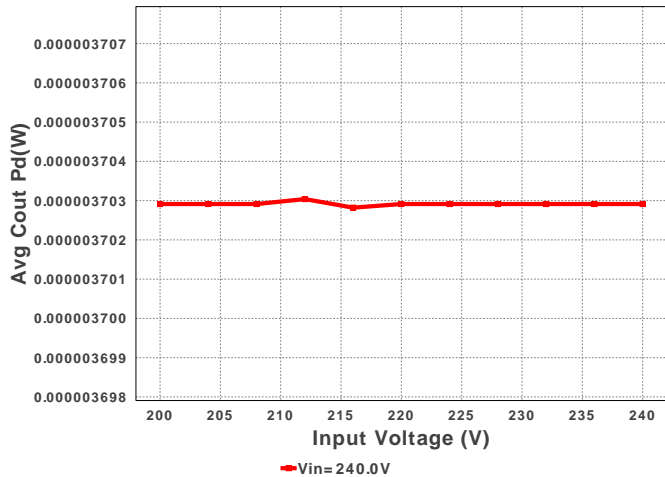
Avg IC Tj



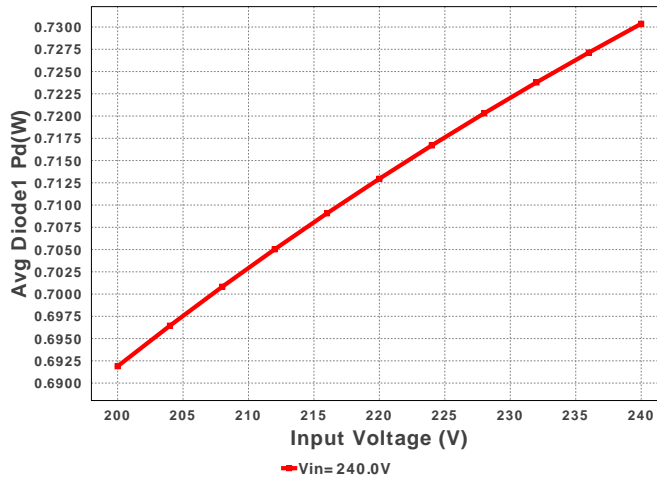
Avg L pd

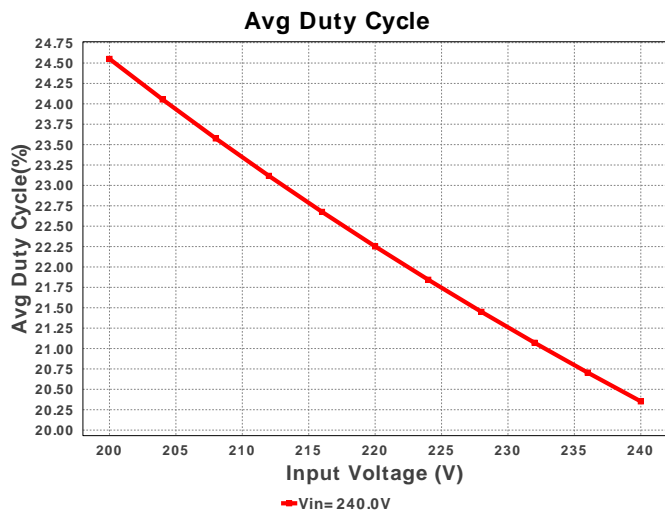
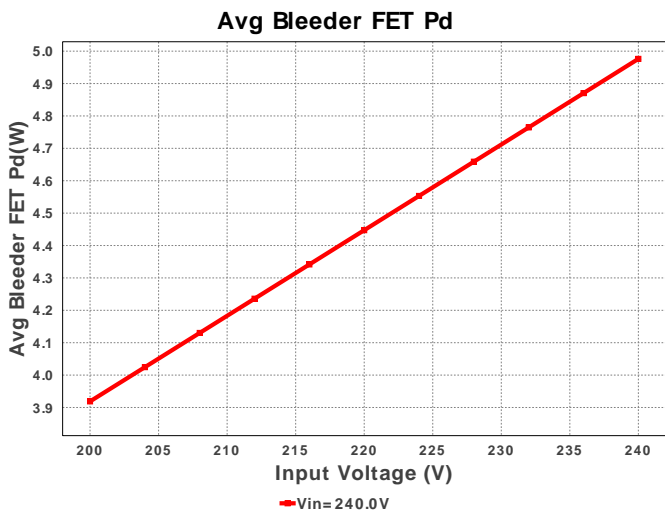
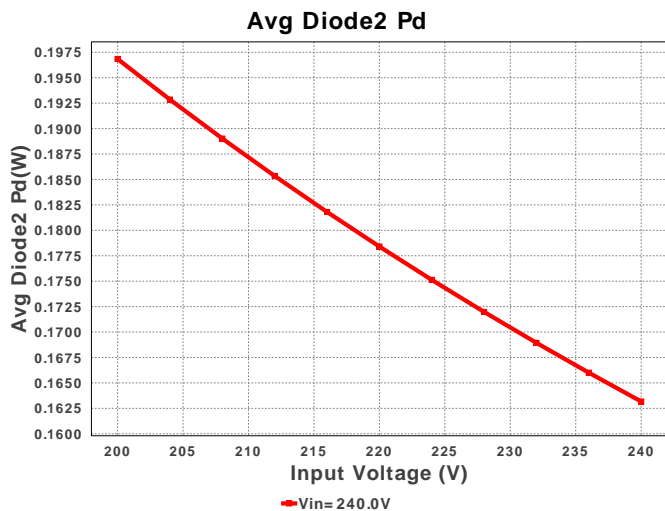
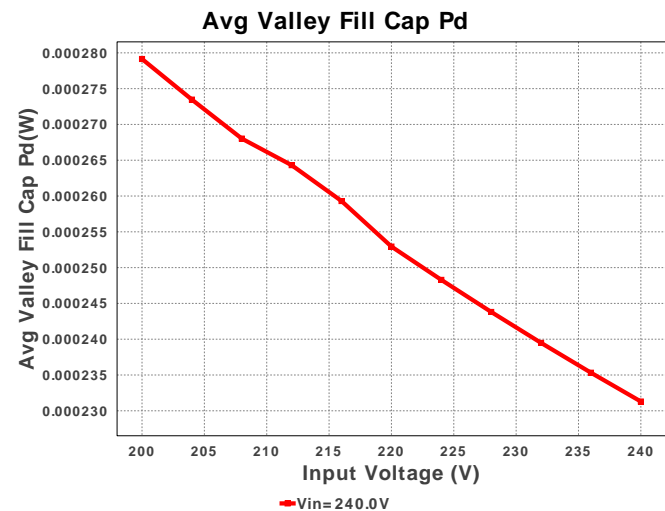
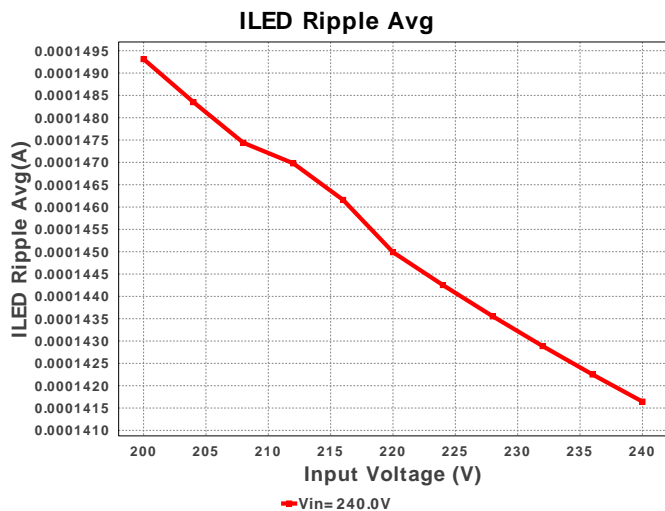
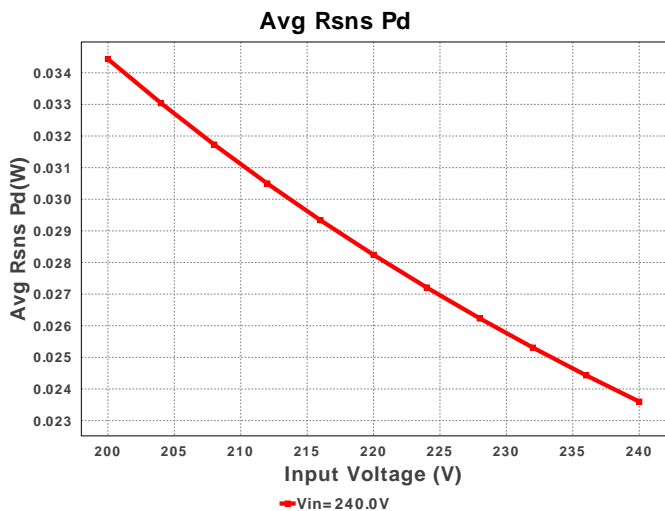


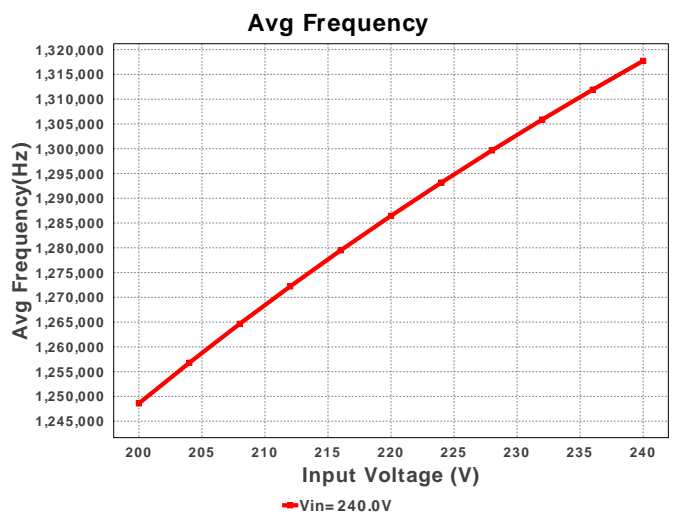
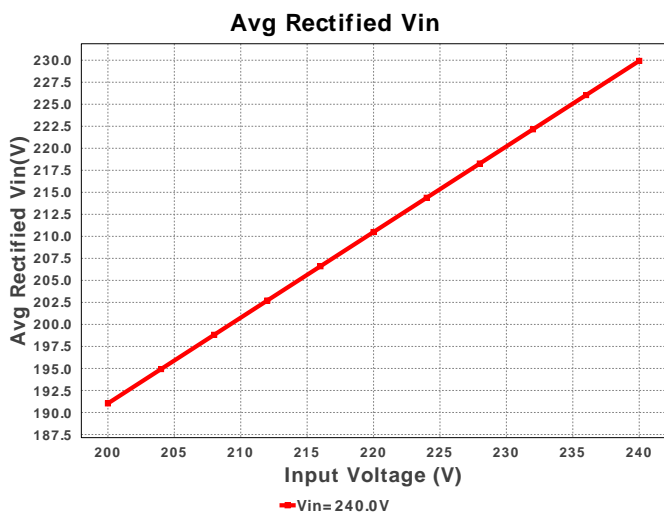
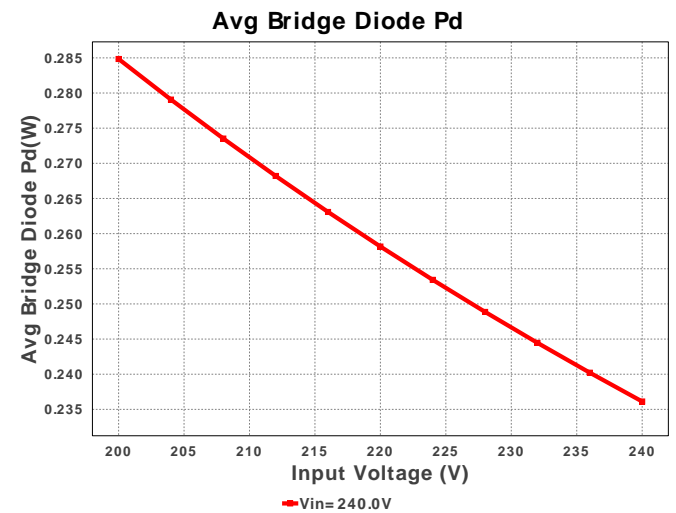
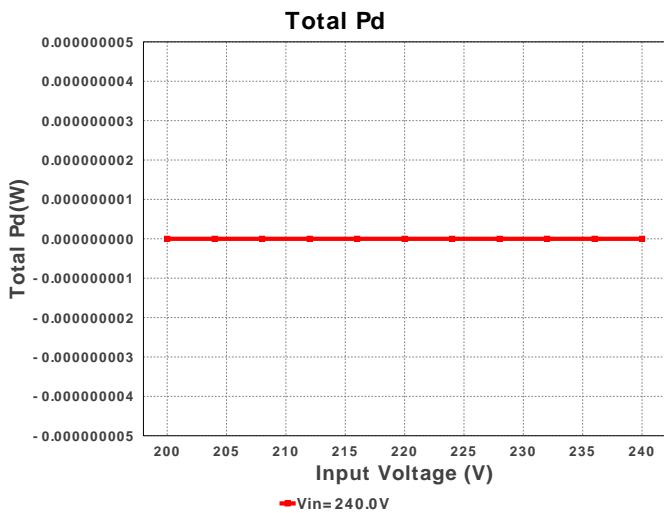
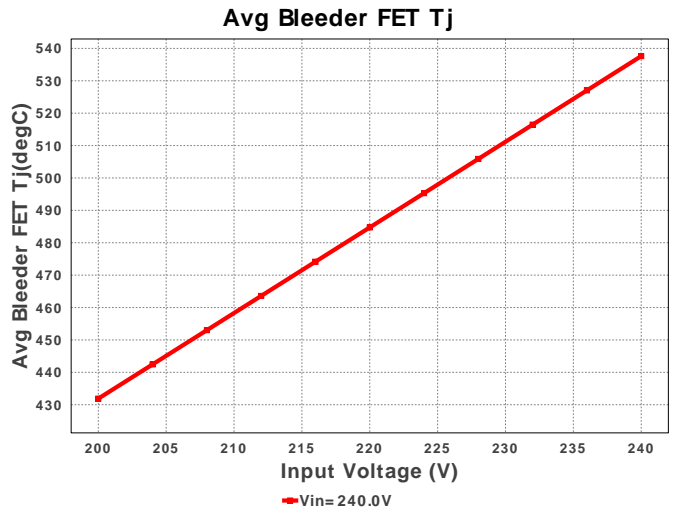
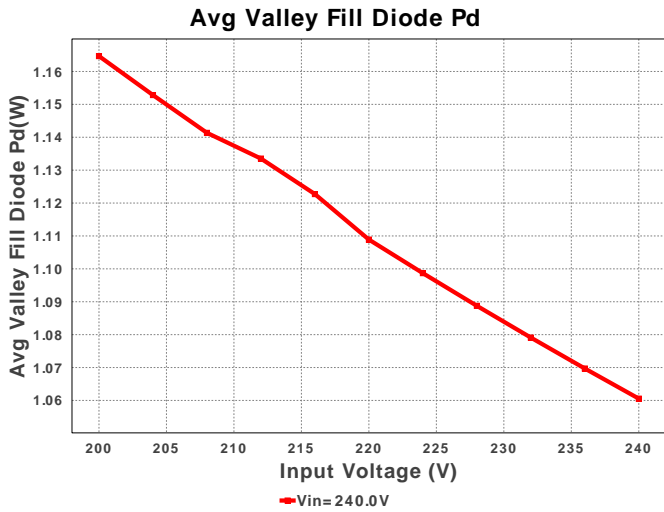
Avg Cout Pd

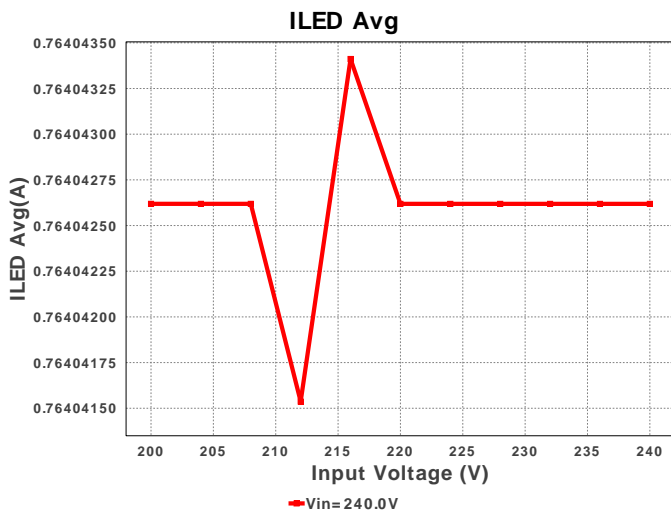
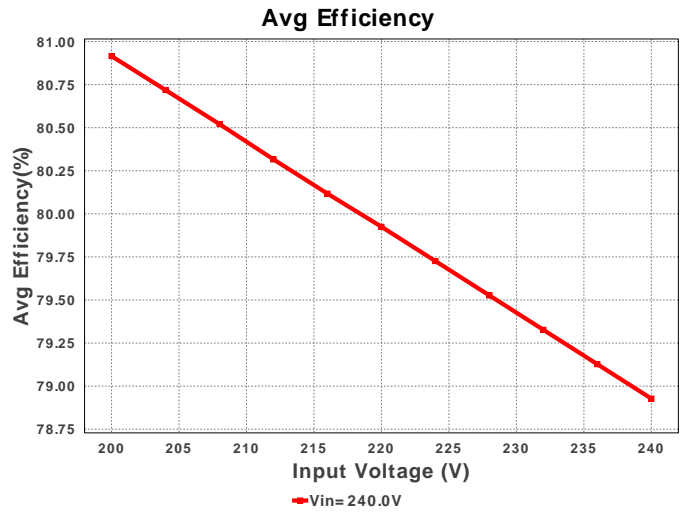
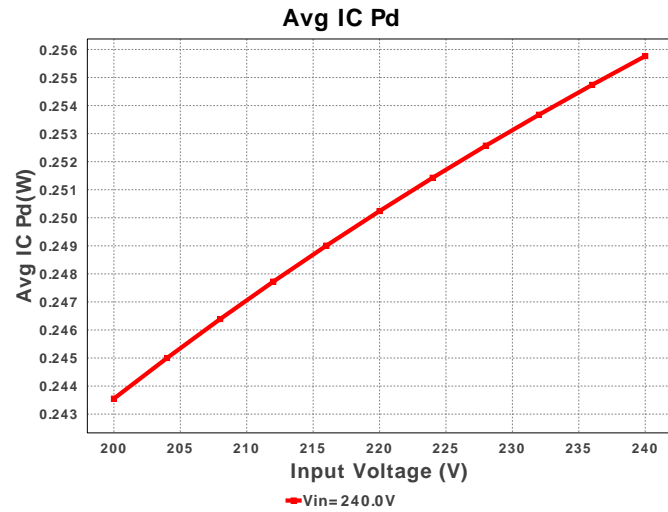


Avg Diode1 Pd









Operating Values

#	Name	Value	Category	Description
1.	ILED Avg	764.043 mA	Current	Average Current per LED for the AC line period
2.	ILED Ripple Avg	141.583 μ A	Current	Average LED Ripple Current for the AC line period
3.	Avg Rectified Vin	229.927 V	General	Average Rectified Voltage for the AC Line Period
4.	BOM Count	30	General	Total Design BOM count
5.	FootPrint	801.0 mm ²	General	Total Foot Print Area of BOM components
6.	Total BOM	\$0.0	General	Total BOM Cost
7.	Avg Bleeder FET Tj	537.771 degC	Op_Point	Bleeder MOSFET average junction temperature over the AC Line Period
8.	Avg M1 FET Tj	108.869 degC	Op_Point	M1 MOSFET average junction temperature over the AC Line Period
9.	Avg Duty Cycle	20.319 %	Op_point	Average Duty Cycle over the AC Line Period
10.	Avg Efficiency	79.195 %	Op_point	Average Efficiency over the AC Line Period
11.	Avg Frequency	1.318 MHz	Op_point	Average Switching Frequency over the AC Line Period
12.	Avg IC Tj	70.959 degC	Op_point	Average IC junction temperature for the AC line period
13.	VIN_OP	240.0 V	Op_point	AC Input RMS Voltage
14.	Avg Bleeder FET Pd	4.978 W	Power	Average power dissipation in the bleeder FET over the AC line period
15.	Avg Bridge Diode Pd	215.36 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
16.	Avg Cout Pd	3.703 μ W	Power	Average Power Dissipation in the Output Capacitor over the AC Line Period
17.	Avg Diode1 Pd	730.674 mW	Power	Average Power Dissipation in D1 over the AC Line Period
18.	Avg Diode2 Pd	162.905 mW	Power	Average Power Dissipation in D1 over the AC Line Period
19.	Avg FET Pd	795.63 mW	Power	Average power dissipation in the switching FET over the AC line period
20.	Avg IC Pd	255.861 mW	Power	Average Power Dissipation in the IC over the AC line period
21.	Avg L pd	291.925 mW	Power	Average Inductor power dissipation over the AC line period
22.	Avg Rsns Pd	23.516 mW	Power	Average power dissipation in the Current limit resistor over the AC line period
23.	Avg Valley Fill Cap Pd	231.299 μ W	Power	Average Power Dissipation in the Valley Fill Capacitors over the AC Line Period
24.	Avg Valley Fill Diode Pd	1.061 W	Power	Average Power Dissipation in the Valley Fill Diodes over the AC Line Period
25.	Total Pd	0.0 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	700.0 m	Maximum Output Current
2.	Iout1	700.0 m	Output Current #1
3.	VinMax	240.0	Maximum input voltage
4.	VinMin	200.0	Minimum input voltage
5.	Vout	23.0	Output Voltage
6.	Vout1	23.0	Output Voltage #1
7.	acFrequency	50.0	Light Output in Lumen
8.	application	LED_DRIVER	LED Application
9.	base_pn	LM3444	Texas Instruments Base Part Number
10.	isLEDArchitect	N	LED Architect Project
11.	ledparallel	1.0	Number of LED in parallel
12.	ledpartnumber	XHP50A-00-0000-0D001401	LED Part number
13.	ledseries	2.0	Number of LED in series
14.	line_fsw	50.0	AC Line Frequency
15.	source	AC	Input Source Type
16.	ta	40.0	Ambient temperature

Design Assistance

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

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