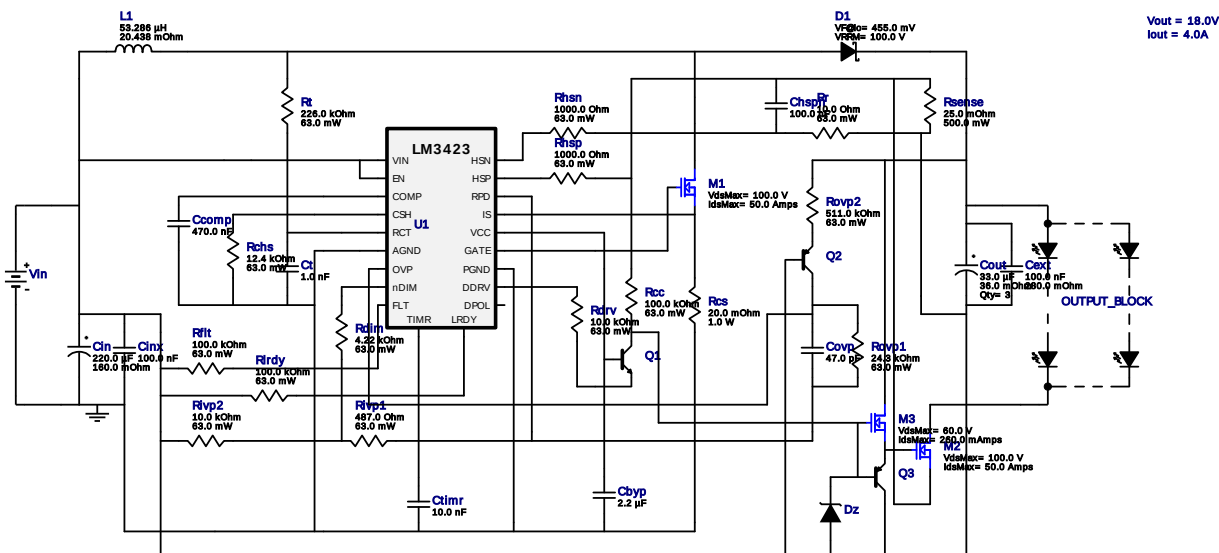


Design : 906020/2250 LM3423MHX/NOPB
LM3423MHX/NOPB 30.0V-36.0V to 17.95V @ 3.783860967741935A

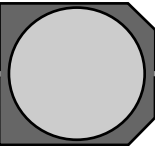
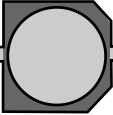
VinMin = 30.0V
VinMax = 36.0V
Vout = 18.0V
Iout = 4.0A

Device = LM3423MHX/NOPB
Topology = Buck_Boost
Created = 7/16/16 6:35:06 PM
BOM Cost = \$0.00
BOM Count = 58
Total Pd = 4.89W



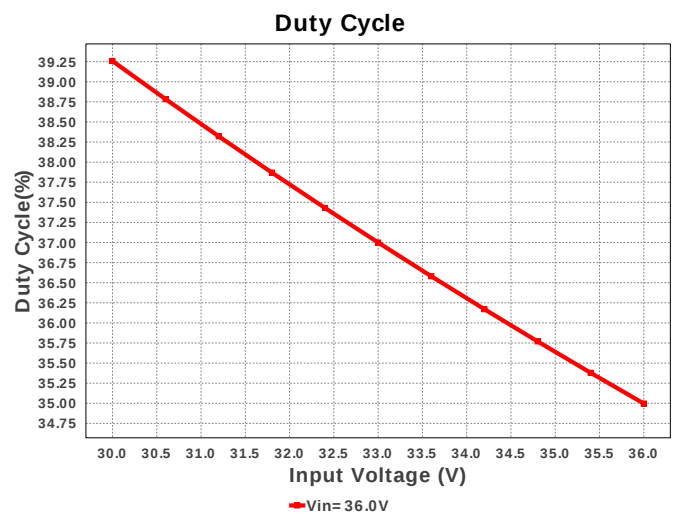
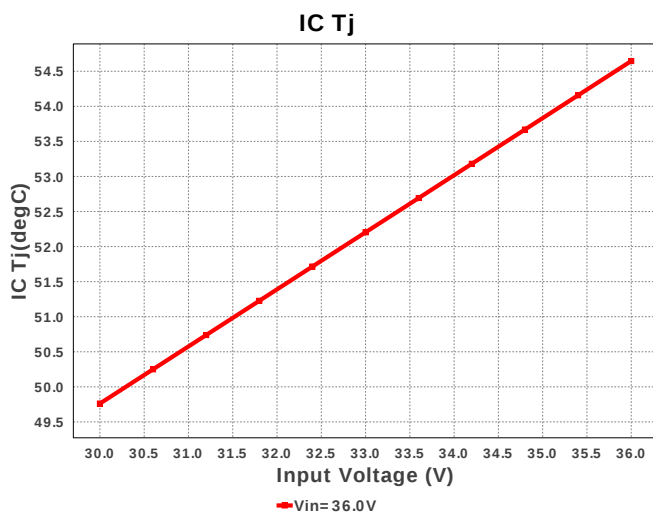
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application. View WEBENCH(R) Disclaimer.

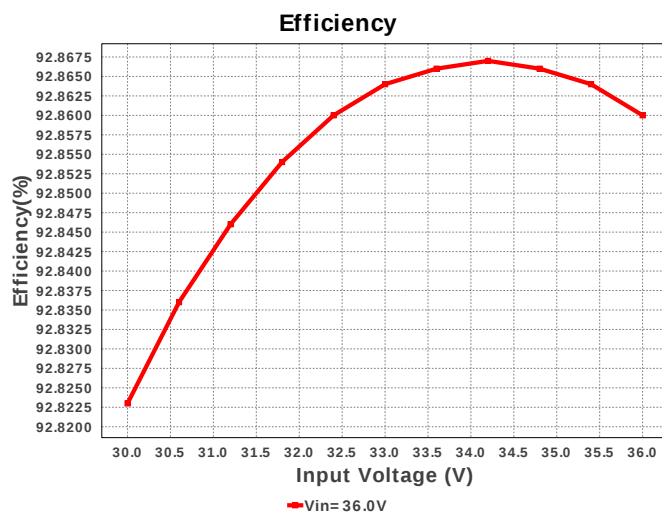
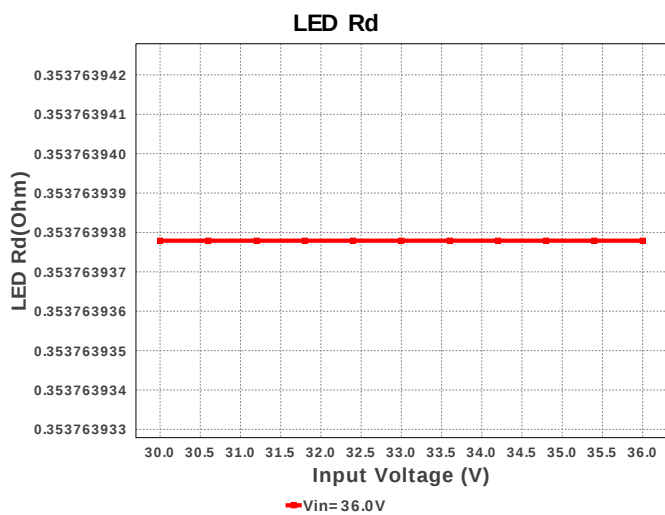
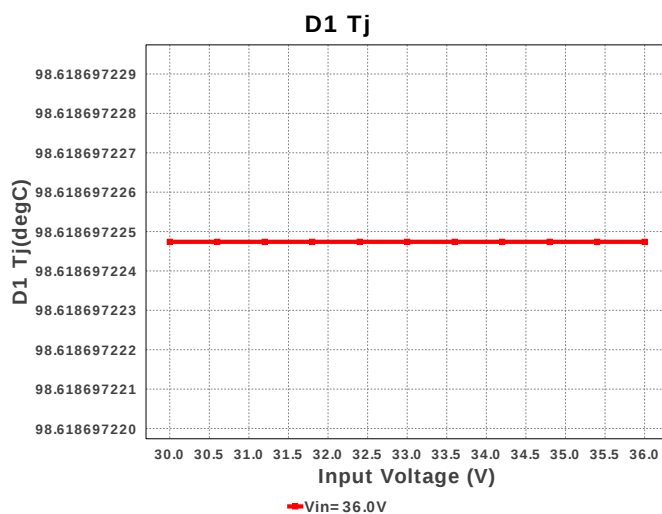
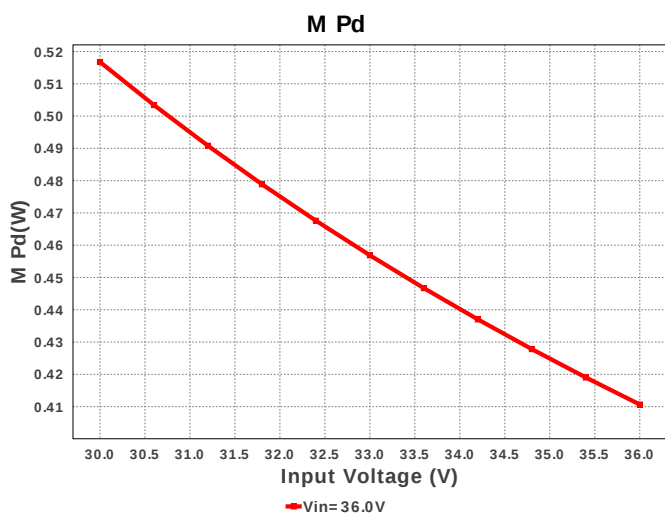
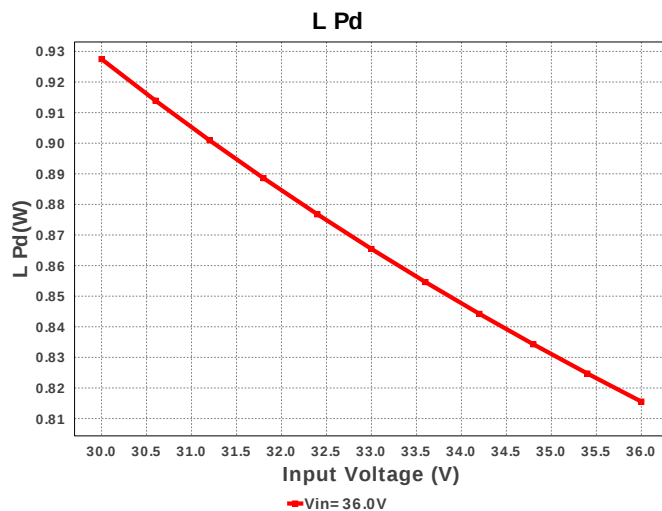
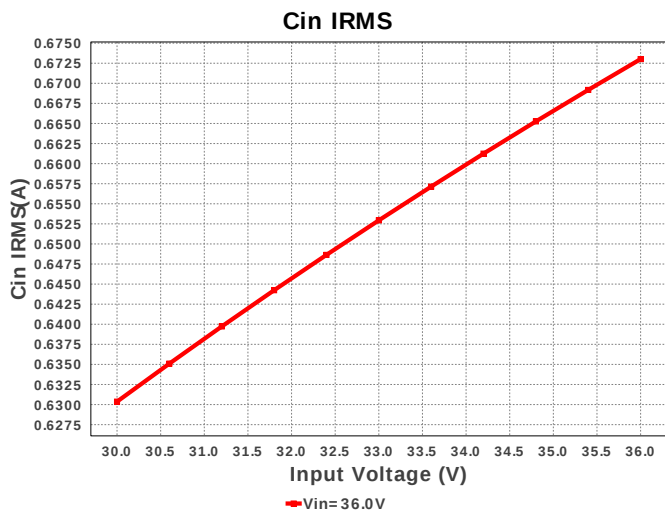
Electrical BOM

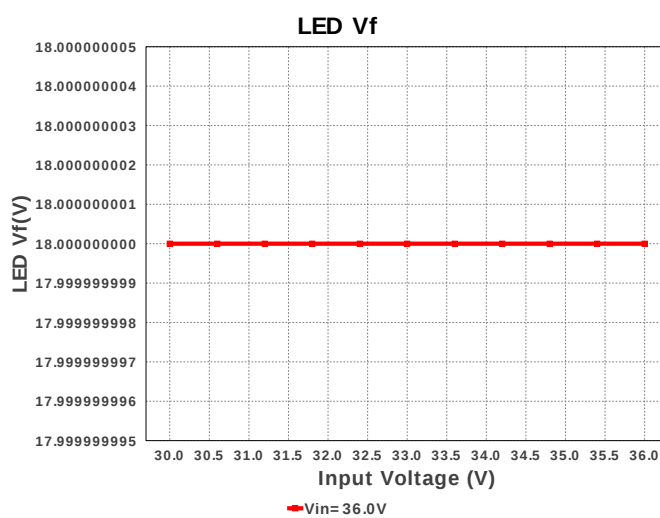
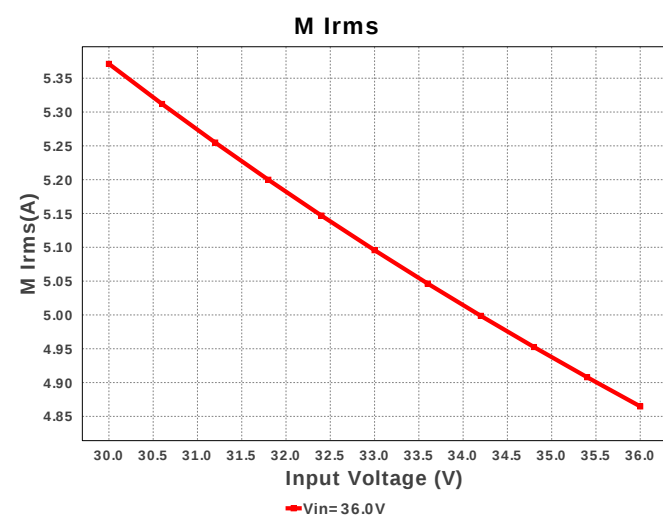
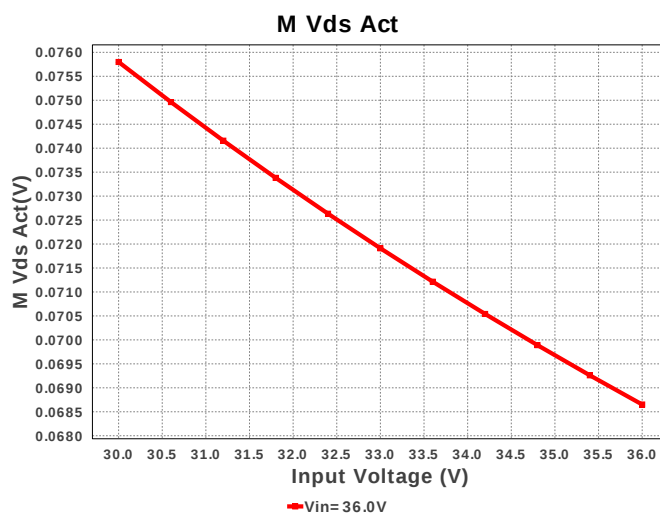
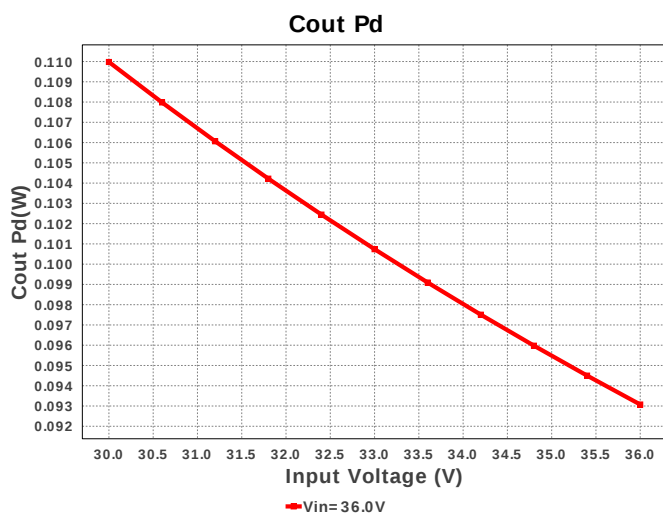
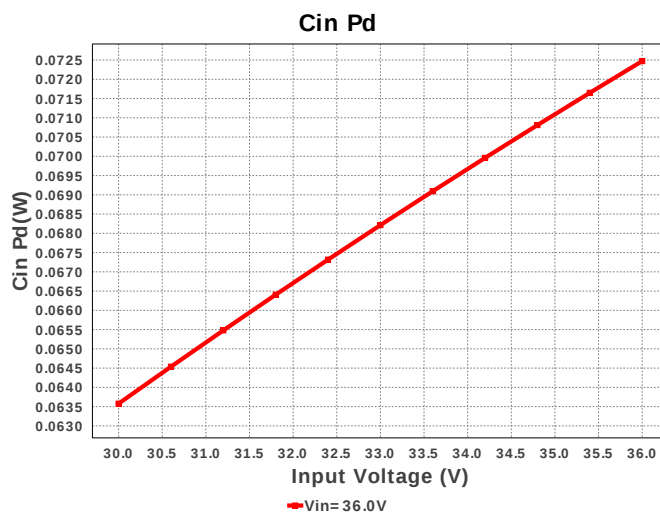
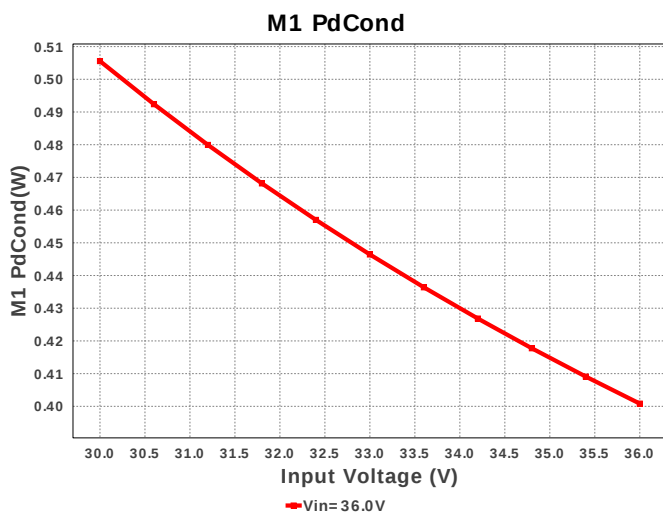
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm ²
2.	Ccomp	MuRata	GRM155C80J474KE19D Series= X6S	Cap= 470.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	Cext	AVX	08053C104KAT2A 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
4.	Chspn	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
5.	Cin	Panasonic	EEV-FK1J221Q Series= FK	Cap= 220.0 uF ESR= 160.0 mOhm VDC= 63.0 V IRMS= 800.0 mA	1	\$0.51	 SM_RADIAL_H13 264 mm ²
6.	Cinx	MuRata	GRM188R72A104KA35D Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	\$0.03	 0603 5 mm ²
7.	Cout	Panasonic	EEHZA1K330P Series= ?	Cap= 33.0 uF ESR= 36.0 mOhm VDC= 80.0 V IRMS= 1.7 A	3	NA	 SM_RADIAL_10BMM 160 mm ²

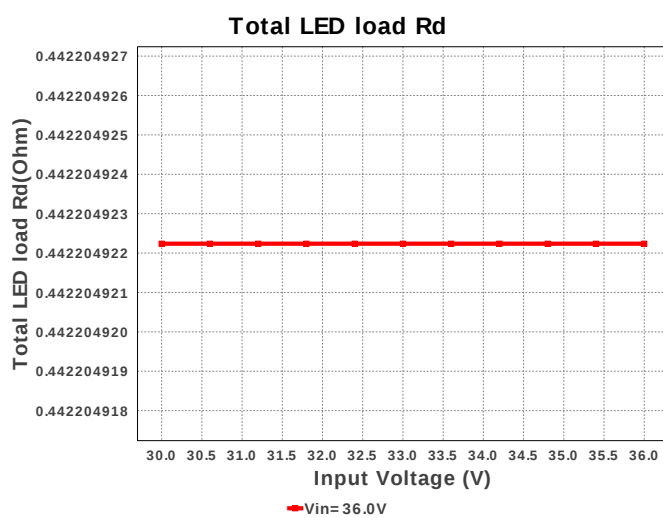
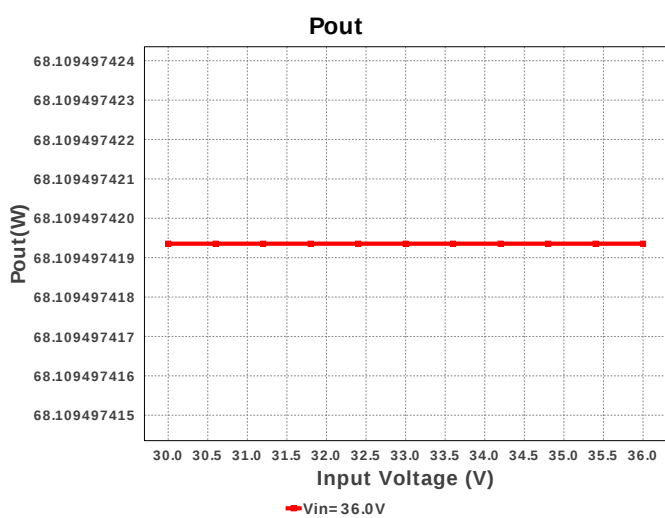
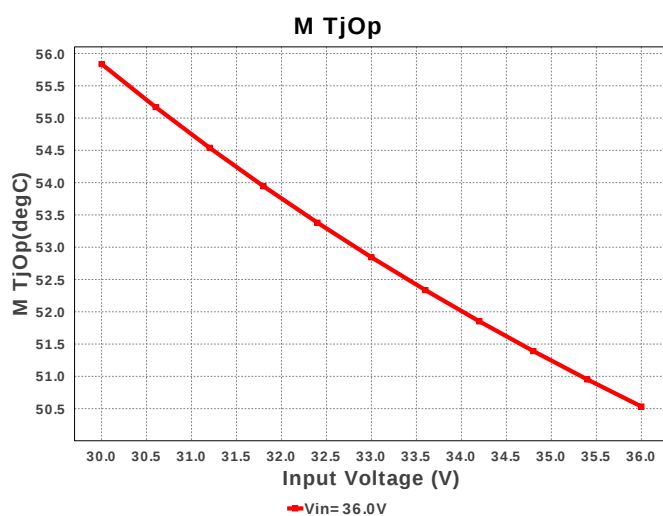
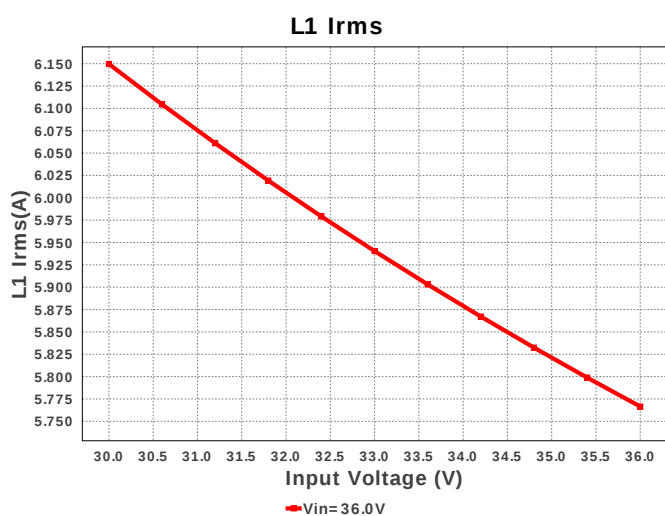
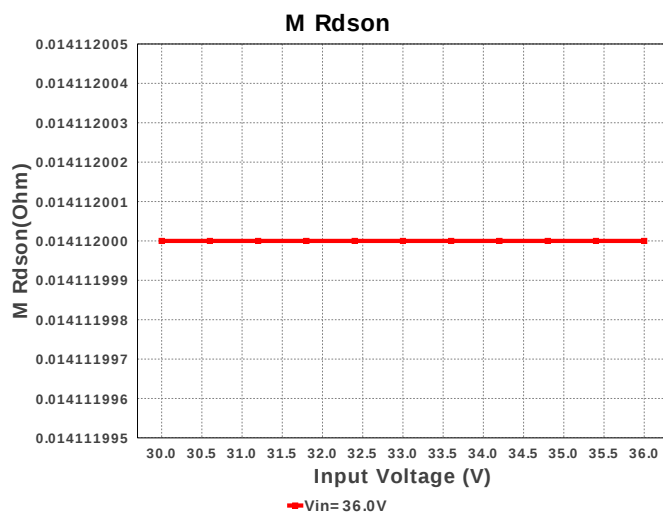
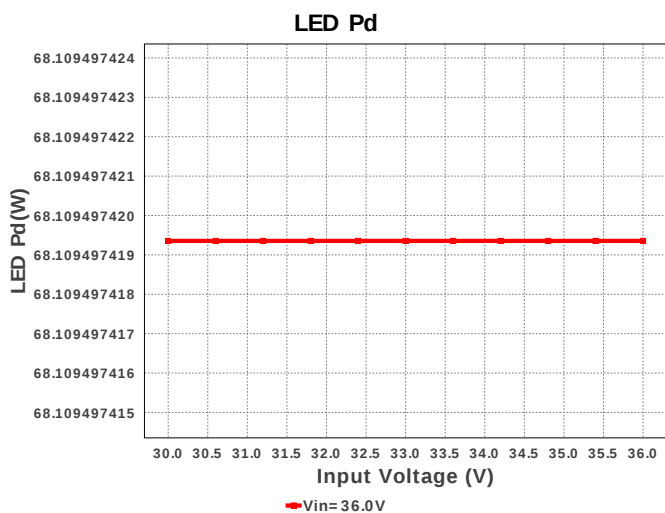
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8.	Covp	Kemet	C0805C470K5GACTU Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
9.	Ct	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
10.	Ctimr	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
11.	D1	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
12.	D_LED	LEDEngin	LZ1-10NW05	LED	20	NA	 ledengin_1 29 mm ²
13.	Dz	ON Semiconductor	BZX84C10LT1G	Zener	1	\$0.02	 SOT-23 14 mm ²
14.	L1	CUSTOM	CUSTOM	L= 53.286 µH DCR= 20.438 mOhm	1	NA	CUSTOM 0 mm ²
15.	M1	Texas Instruments	CSD19534Q5A	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	\$0.68	 TRANS_NexFET_Q5A 55 mm ²
16.	M2	Texas Instruments	CSD19534Q5A	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	\$0.68	 TRANS_NexFET_Q5A 55 mm ²
17.	M3	ON Semiconductor	2N7002ET1G	VdsMax= 60.0 V IdsMax= 260.0 mAmps	1	\$0.02	 SOT-23 14 mm ²
18.	Q1	Diodes Inc.	MMBT3904-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
19.	Q2	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
20.	Q3	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
21.	Rcc	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
22.	Rchs	Vishay-Dale	CRCW040212K4FKED Series= CRCW..e3	Res= 12.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
23.	Rcs	Susumu Co Ltd	PRL1632-R020-F-T1 Series= PRL1632	Res= 20.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.19	 0612 11 mm ²
24.	Rdim	Vishay-Dale	CRCW04024K22FKED Series= CRCW..e3	Res= 4.22 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
25.	Rdrv	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.	Rflt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

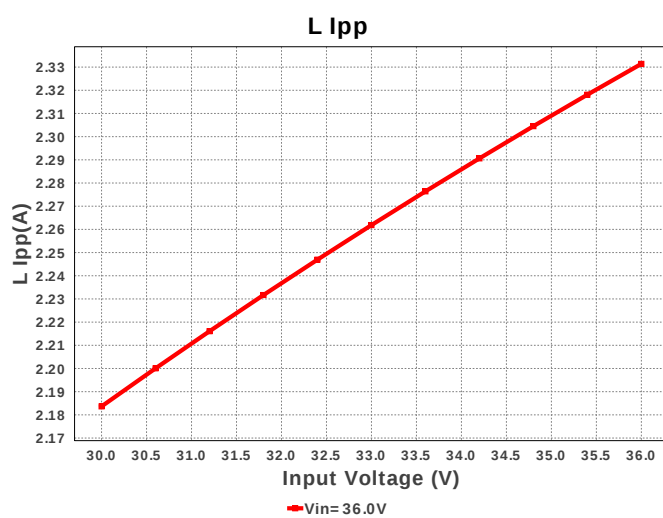
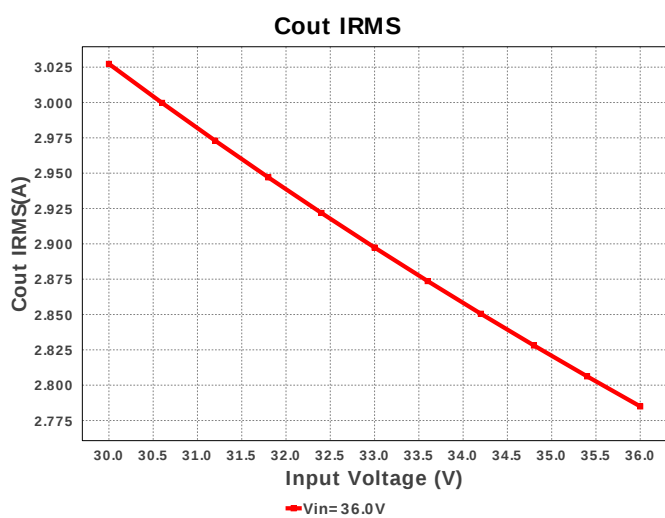
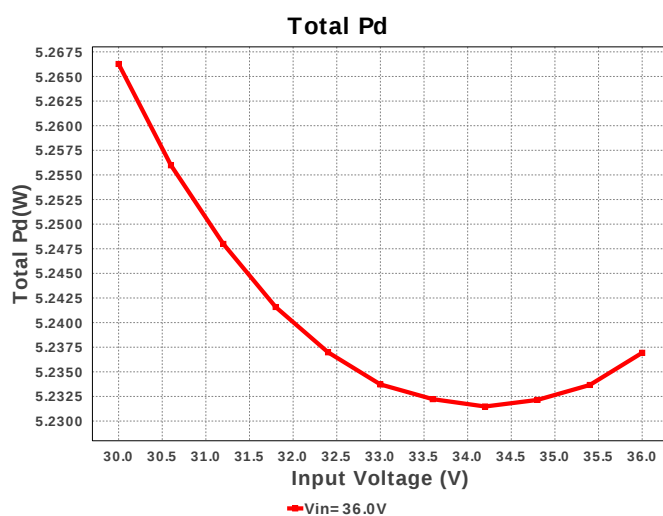
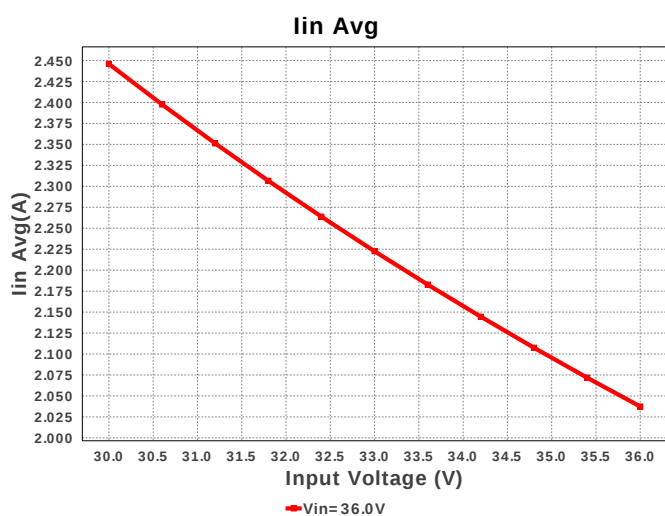
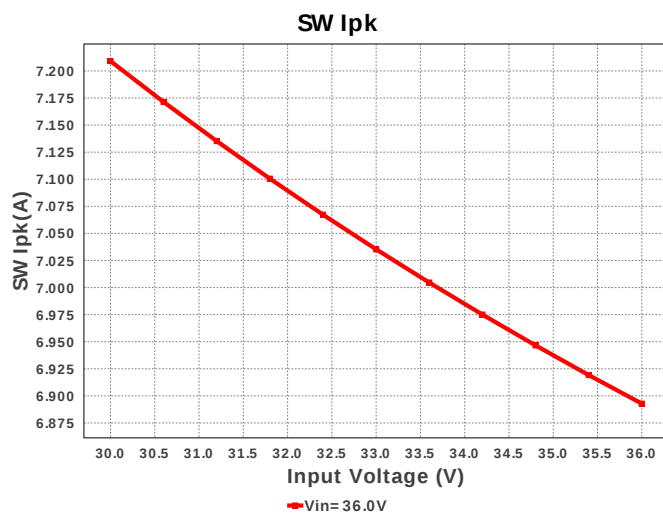
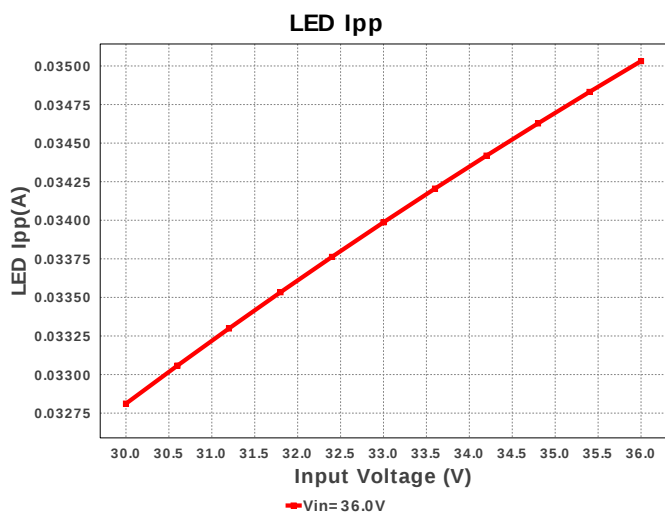
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
27.	Rhsn	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
28.	Rhsp	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
29.	Rivp1	Vishay-Dale	CRCW0402487RFKED Series= CRCW..e3	Res= 487.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
30.	Rivp2	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
31.	Rlrdy	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
32.	Rovp1	Vishay-Dale	CRCW040224K3FKED Series= CRCW..e3	Res= 24.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
33.	Rovp2	Vishay-Dale	CRCW0402511KFKED Series= CRCW..e3	Res= 511.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
34.	Rr	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
35.	Rsense	Stackpole Electronics Inc	CSR1206FK25L0 Series= ?	Res= 25.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11 mm ²
36.	Rt	Vishay-Dale	CRCW0402226KFKED Series= CRCW..e3	Res= 226.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
37.	U1	Texas Instruments	LM3423MHX/NOPB	Switcher	1	\$1.25	 MXA20A 71 mm ²

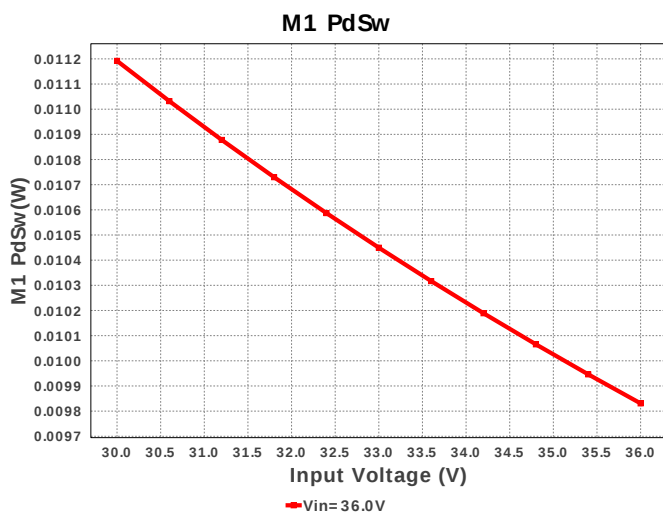
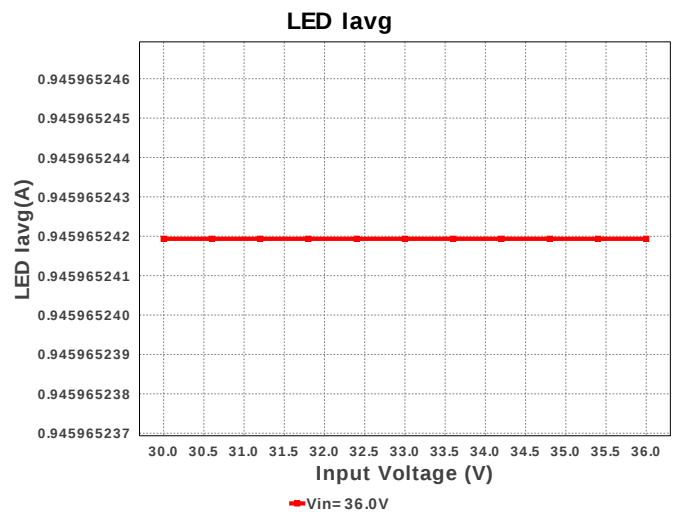
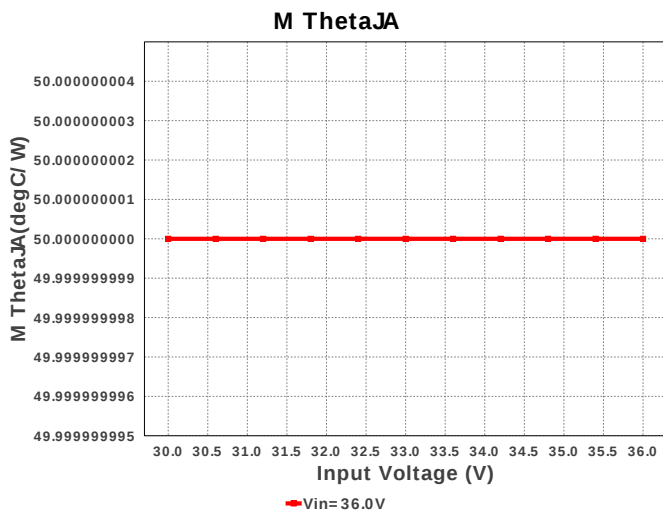
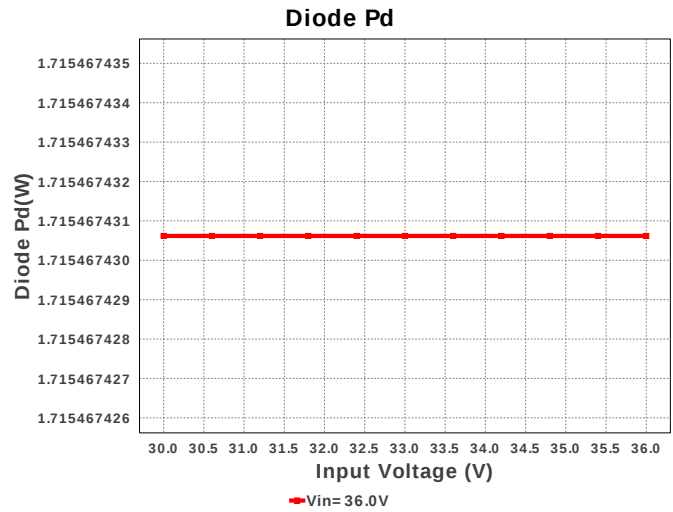
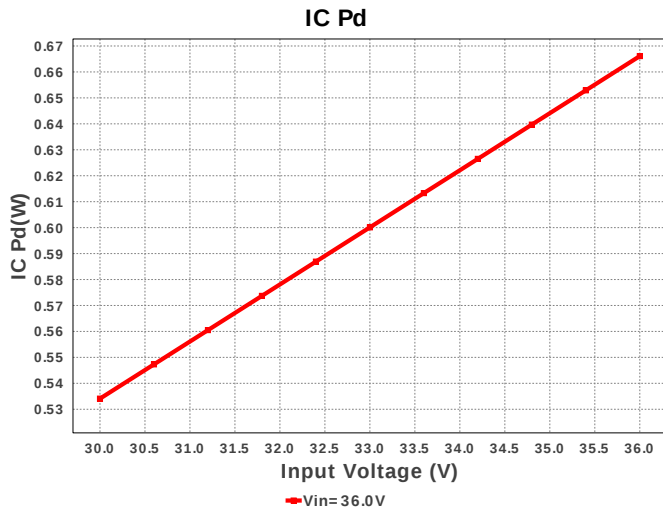












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	629.615 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	3.02 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.427 A	Current	Average input current
4.	L Ipp	2.181 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	6.14 A	Current	Inductor ripple current
6.	LED Iavg	945.965 mA	Current	LED Average Current
7.	LED Ipp	32.773 mA	Current	LED Ripple Current
8.	M Irms	5.351 A	Current	MOSFET RMS ripple current
9.	SW Ipk	7.198 A	Current	Peak switch current
10.	BOM Count	58	General	Total Design BOM count
11.	FootPrint	2.7 k mm ²	General	Total Foot Print Area of BOM components

#	Name	Value	Category	Description
12.	Frequency	98.761 kHz	General	Switching frequency
13.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
14.	M Rdson	6.8 mOhm	General	Drain-Source On-resistance
15.	M Vds Act	36.389 mV	General	M Vds
16.	Pout	67.912 W	General	Total output power
17.	Total BOM	\$0.0	General	Total BOM Cost
18.	D1 Tj	98.866 degC	Op_Point	D1 junction temperature
19.	Vout OP	17.948 V	Op_Point	Operational Output Voltage
20.	Duty Cycle	39.07 %	Op_point	Duty cycle
21.	Efficiency	93.288 %	Op_point	Steady state efficiency
22.	IC Tj	49.977 degC	Op_point	IC junction temperature
23.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	3.784 A	Op_point	Iout operating point
25.	LED Rd	353.764 mOhm	Op_point	LED DynamicResistance
26.	LED Vf	17.948 V	Op_point	Total LED Forward Calculated Voltage
27.	M ThetaJA	50.0 degC/W	Op_point	MOSFET junction-to-ambient thermal resistance
28.	M TjOp	41.512 degC	Op_point	MOSFET junction temperature
29.	VIN_OP	30.0 V	Op_point	Vin operating point
30.	Cin Pd	63.426 mW	Power	Input capacitor power dissipation
31.	Cout Pd	109.466 mW	Power	Output capacitor power dissipation
32.	Diode Pd	1.722 W	Power	Diode power dissipation
33.	IC Pd	539.91 mW	Power	IC power dissipation
34.	L Pd	924.632 mW	Power	Inductor power dissipation
35.	LED Pd	67.912 W	Power	LED Power Dissipation
36.	M Pd	230.236 mW	Power	MOSFET power dissipation
37.	M1 PdCond	207.592 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	22.644 mW	Power	M1 MOSFET switching losses
39.	Total Pd	4.886 W	Power	Total Power Dissipation
40.	Total LED load Rd	442.205 mOhm		Total LED Load DynamicResistance
41.	Vout Tolerance	139.293 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	4.0	Maximum Output Current
2.	VinMax	36.0	Maximum input voltage
3.	VinMin	30.0	Minimum input voltage
4.	Vout	18.0	Output Voltage
5.	application	LED_DRIVER	LED Application
6.	base_pn	LM3423	Texas Instruments Base Part Number
7.	isLEDArchitect	N	LED Architect Project
8.	ledparallel	4.0	Number of LED in parallel
9.	ledpartnumber	LZ1-10NW05	LED Part number
10.	ledseries	5.0	Number of LED in series
11.	line_fsw	60.0	AC Line Frequency
12.	source	DC	Input Source Type
13.	ta	30.0	Ambient temperature

Design Assistance

1. LM3423 Product Folder : <http://www.ti.com/product/LM3423> : contains the data sheet and other resources.

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