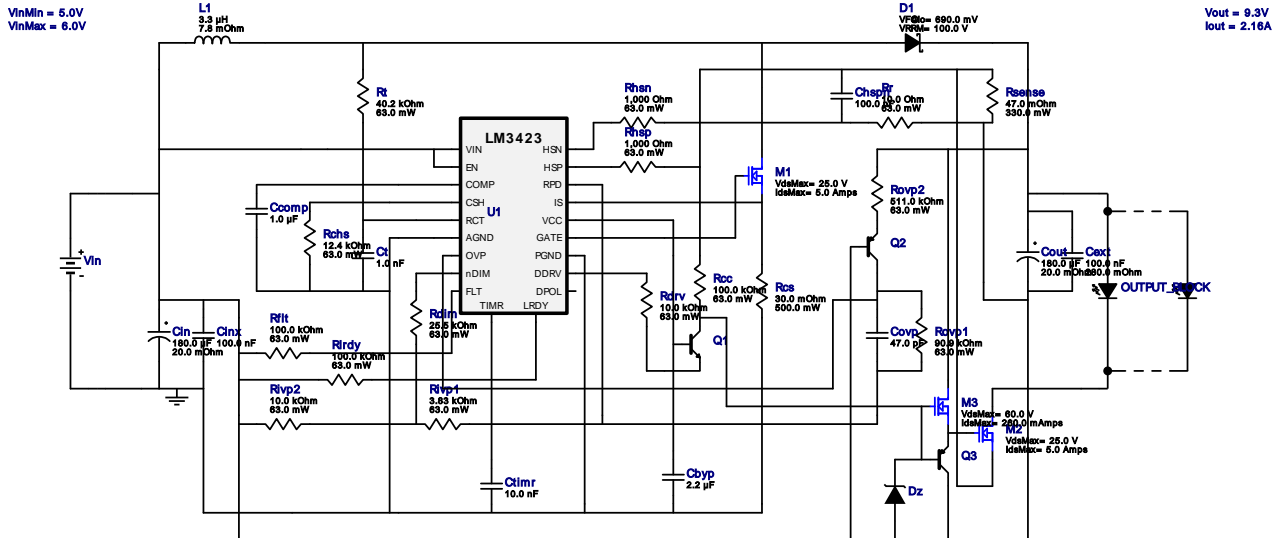
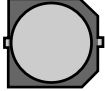
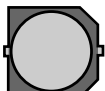


WEBENCH® Design Report

 Design : 906020/493 LM3423MH/NOPB
 LM3423MHX/NOPB 5.0V-6.0V to 5.063185875134092V @ 2.0126873232669866A


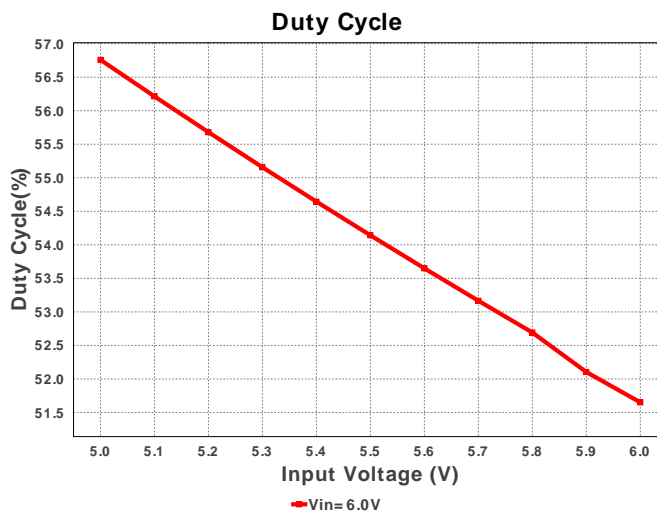
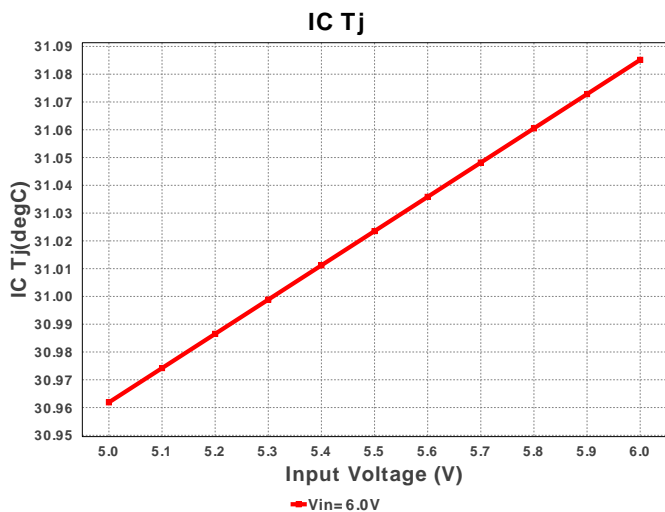
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

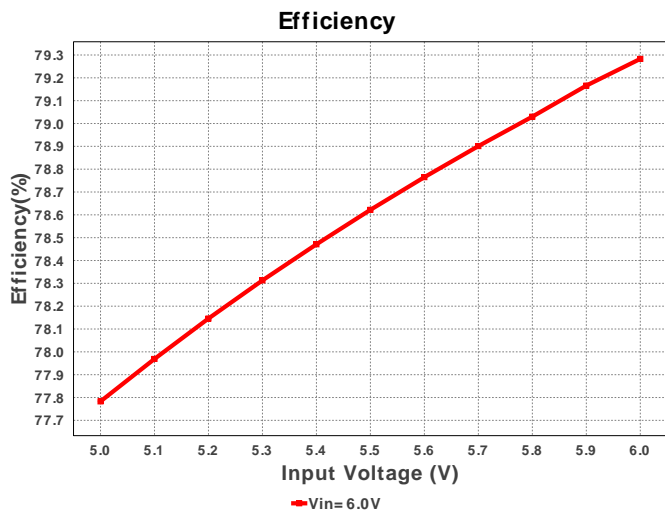
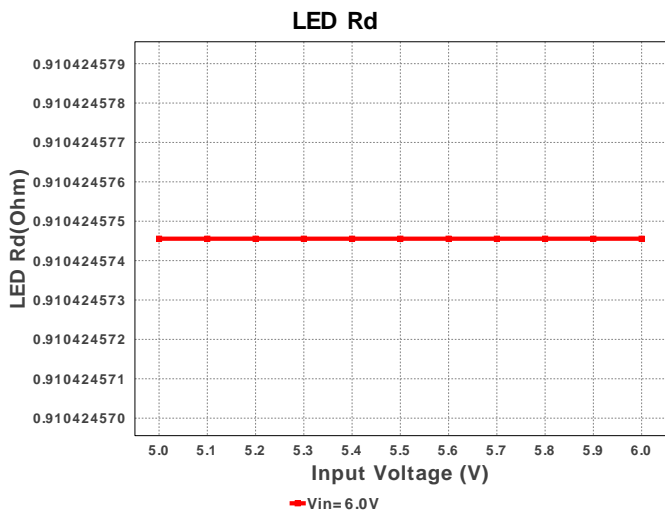
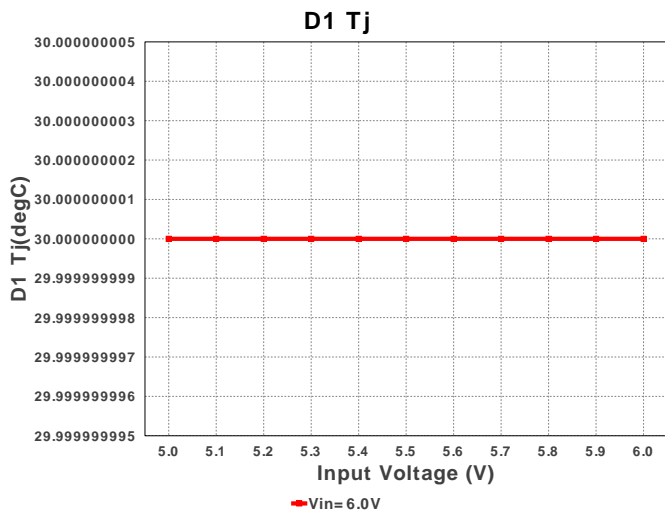
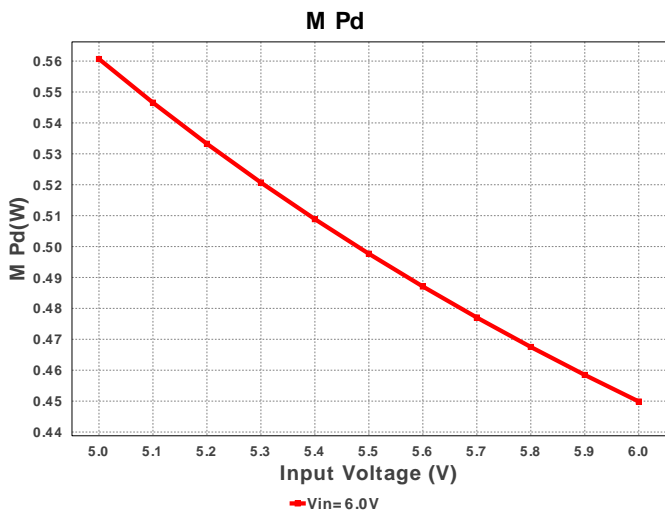
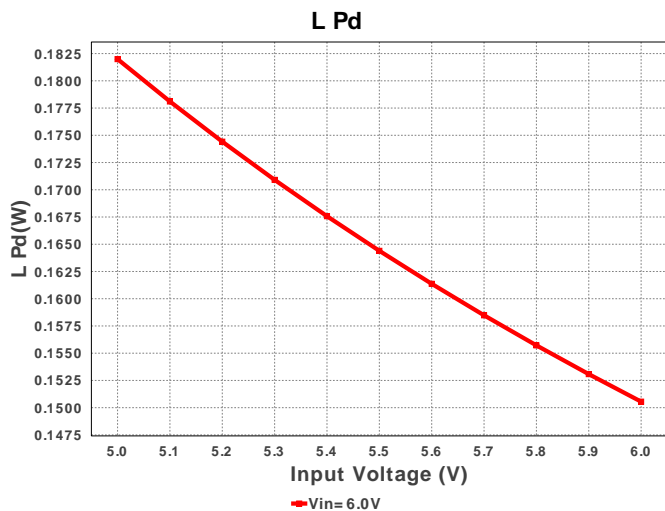
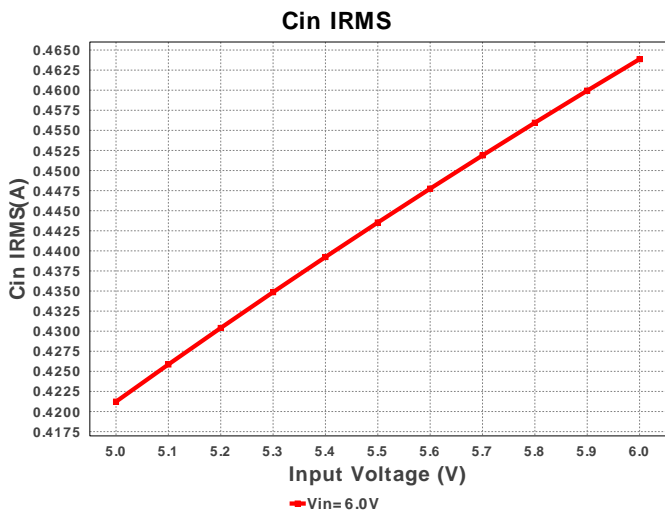
Electrical BOM

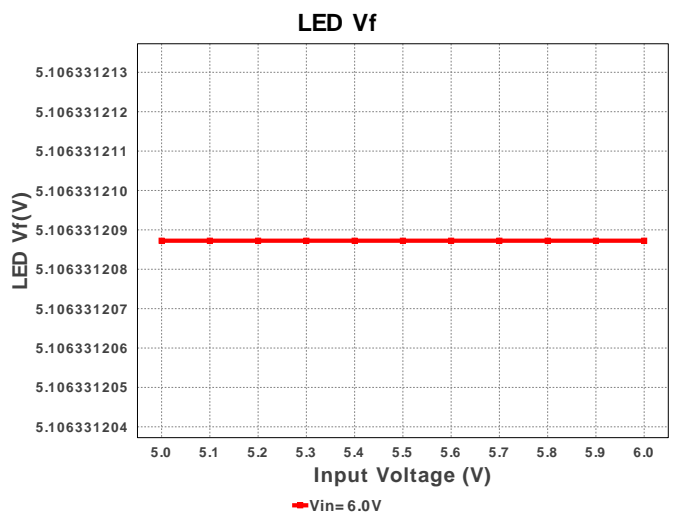
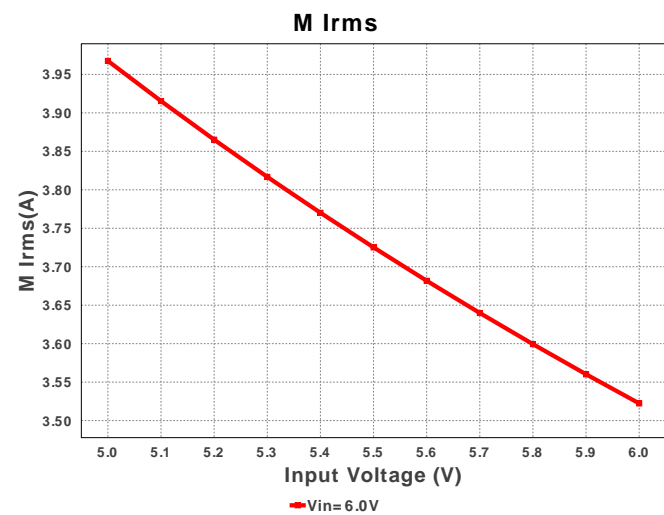
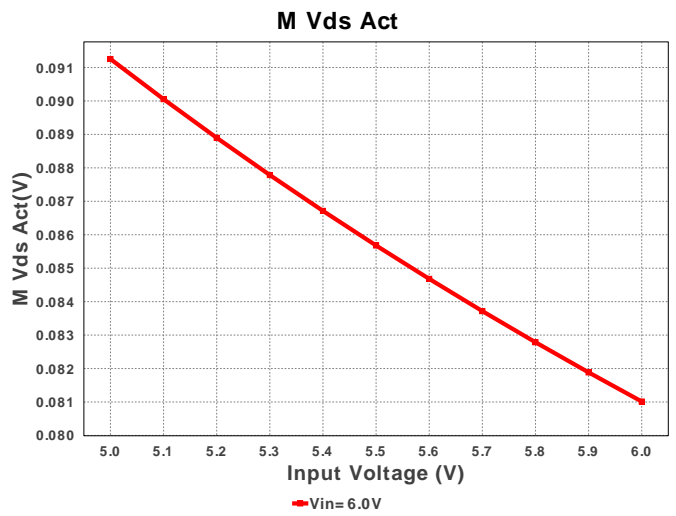
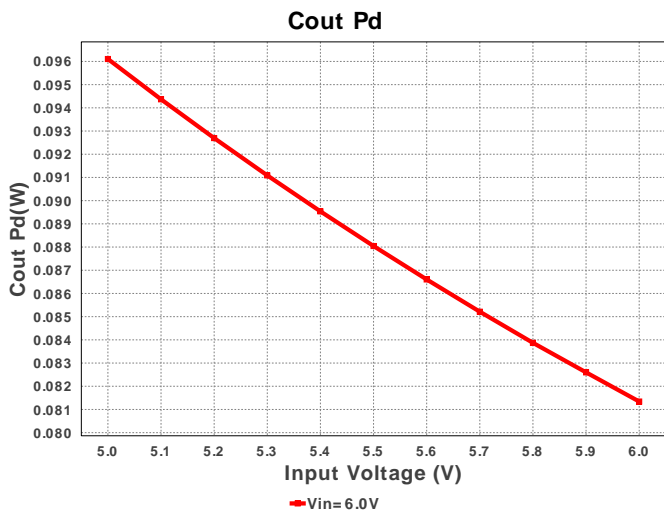
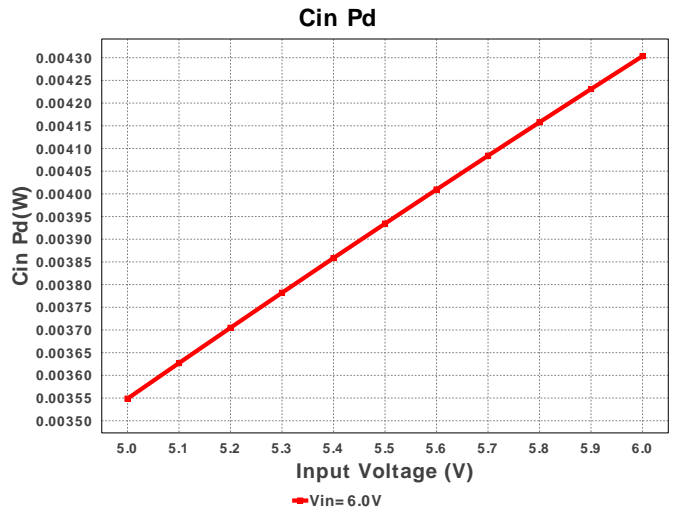
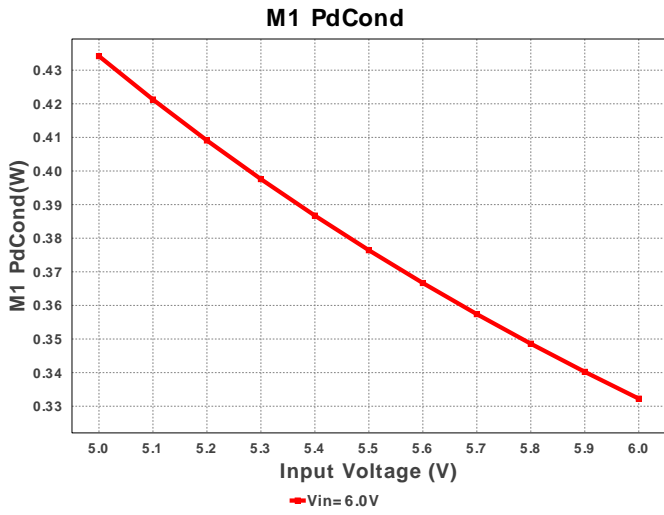
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1.	Cbyp	Kemet	C0603C225K9PACTU Series= X5R	Cap= 2.2 µF VDC= 6.3 V IRMS= 0.0 A	1	\$0.02	0603 5mm2
2.	Ccomp	MuRata	GRM155R61A105KE15D Series= X5R	Cap= 1.0 µF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
3.	Cext	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
4.	Chspn	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
5.	Cin	Panasonic	16SVP180M Series= 261	Cap= 180.0 µF ESR= 20.0 mOhm VDC= 16.0 V IRMS= 3.64 A	1	\$0.29	 SM_RADIAL_8MM 113mm2
6.	Cinx	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
7.	Cout	Panasonic	16SVP180M Series= 261	Cap= 180.0 µF ESR= 20.0 mOhm VDC= 16.0 V IRMS= 3.64 A	1	\$0.29	 SM_RADIAL_8MM 113mm2
8.	Covp	Yageo America	CC0805JRNP09BN470 Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2

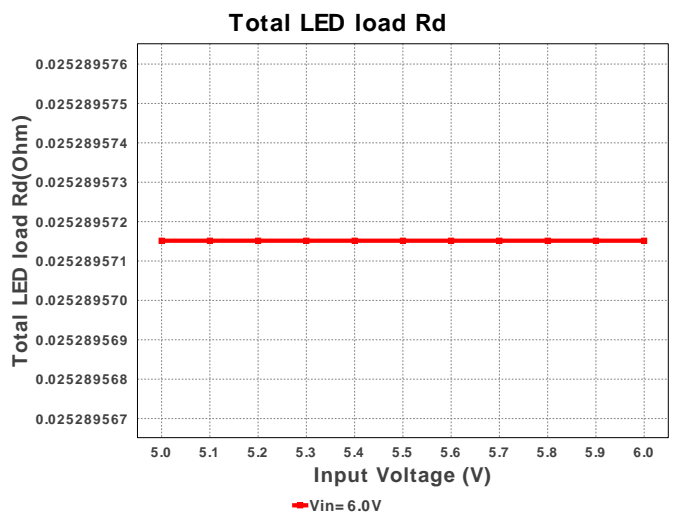
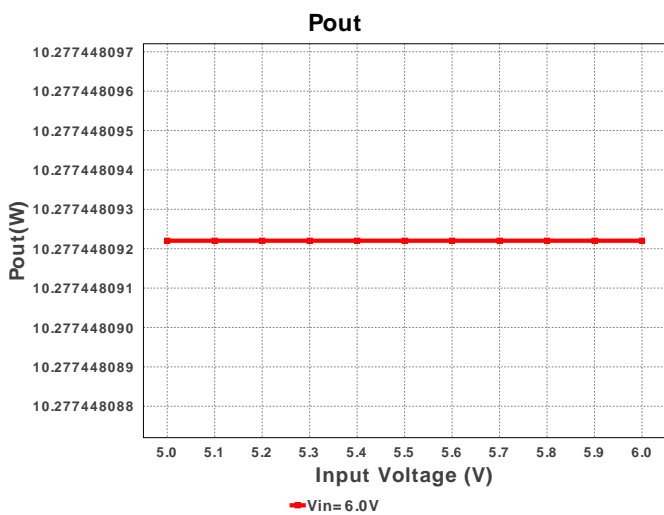
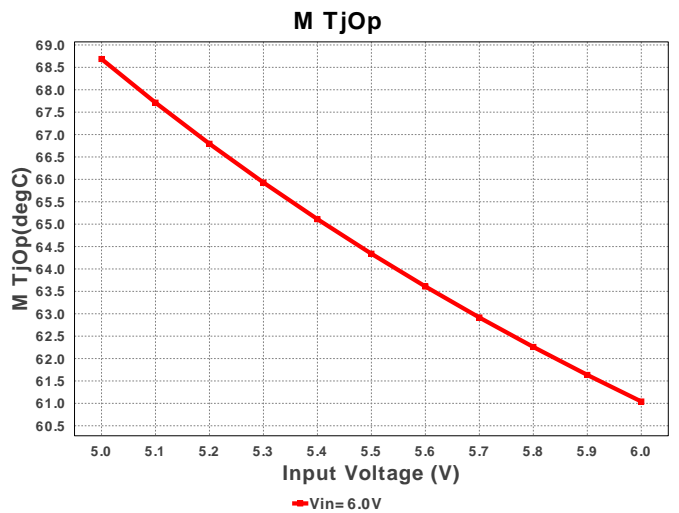
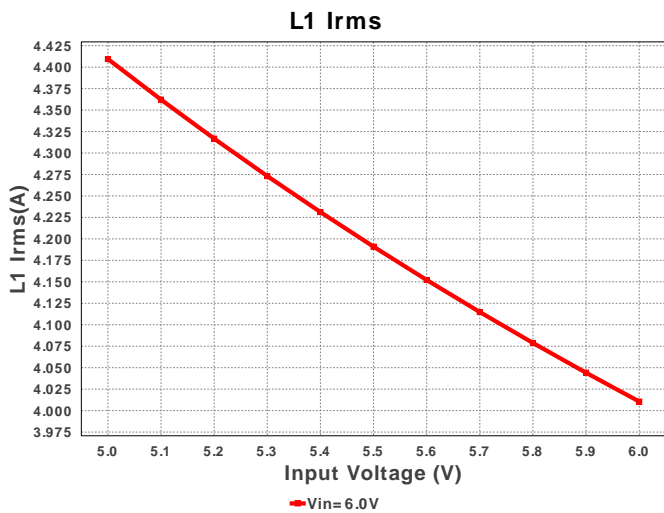
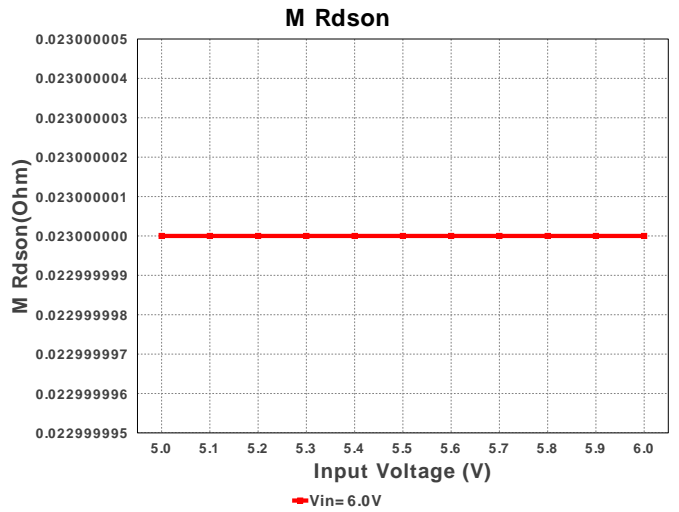
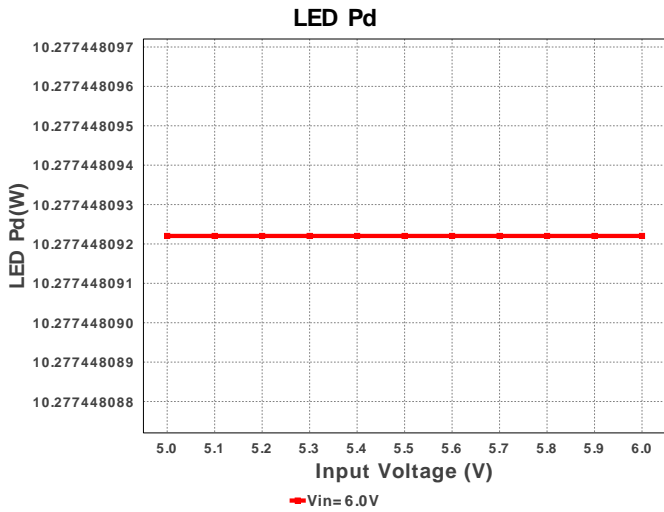
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9.	Ct	Yageo America	CC0805KRX7R9BB102 Series= X7R	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
10.	Ctimr	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
11.	D1	Vishay-Semiconductor	VB20100S-E3/8W	VF@Io= 690.0 mV VRRM= 100.0 V	1	\$0.68	 DDPAK 210mm2
12.	D_LED	Citizen Electronics	CL-L251-MC6L1-C	LED	3	NA	 CIT_LED_4 242mm2
13.	Dz	Diodes Inc.	BZX84C11-7-F	Zener	1	\$0.02	 SOT-23 14mm2
14.	L1	Bourns	SDR2207-3R3ML	L= 3.3 μ H DCR= 7.8 mOhm	1	\$0.55	 SDR2207 408mm2
15.	M1	Texas Instruments	CSD16301Q2	VdsMax= 25.0 V IdsMax= 5.0 Amps	1	\$0.17	 TRANS_NexFET_Q2 9mm2
16.	M2	Texas Instruments	CSD16301Q2	VdsMax= 25.0 V IdsMax= 5.0 Amps	1	\$0.17	 TRANS_NexFET_Q2 9mm2
17.	M3	ON Semiconductor	2N7002ET1G	VdsMax= 60.0 V IdsMax= 260.0 mAmps	1	\$0.02	 SOT-23 14mm2
18.	Q1	Diodes Inc.	MMBT3904-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14mm2
19.	Q2	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14mm2
20.	Q3	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14mm2
21.	Rcc	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
22.	Rchs	Vishay-Dale	CRCW040212K4FKED Series= CRCW..e3	Res= 12.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
23.	Rcs	Stackpole Electronics Inc	CSR1206FK30L0 Series= ?	Res= 30.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11mm2
24.	Rdim	Vishay-Dale	CRCW040225K5FKED Series= CRCW..e3	Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
25.	Rdrv	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
26.	Rfit	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2

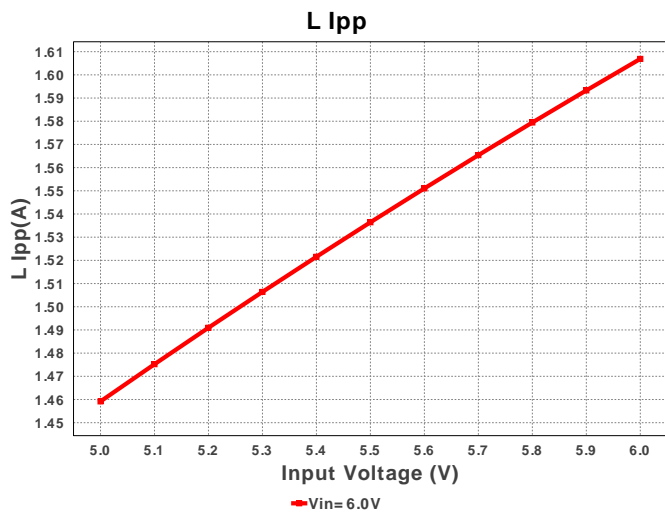
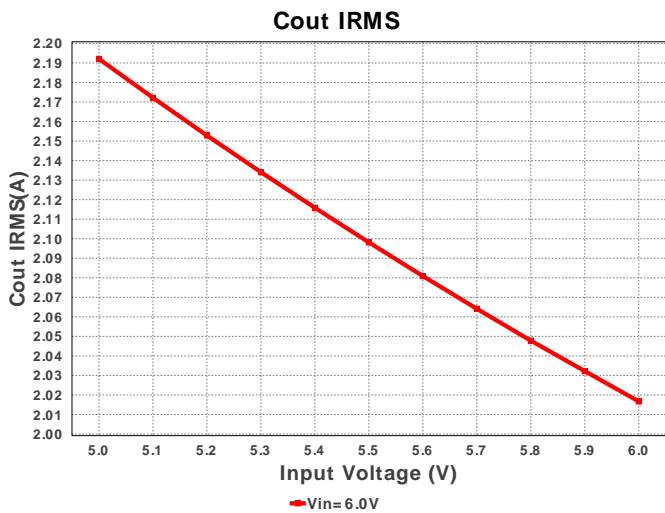
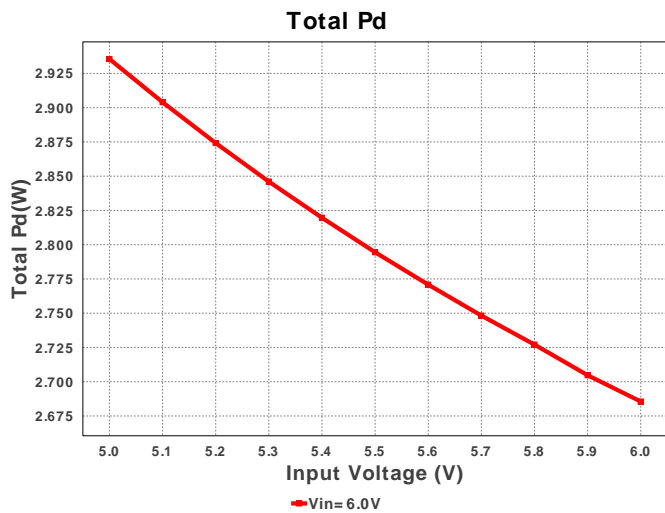
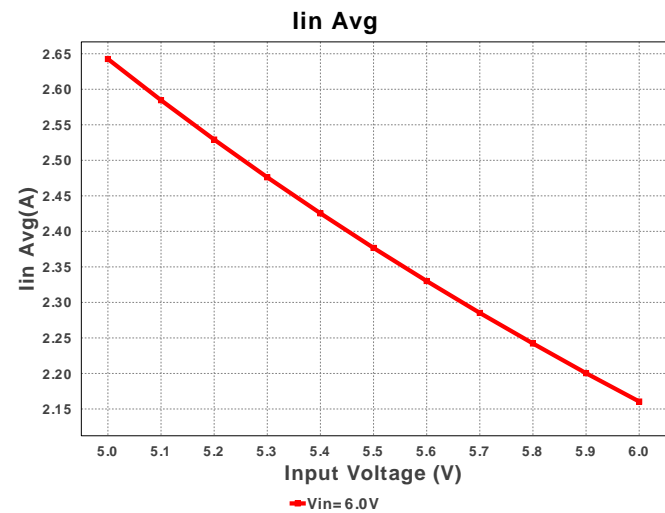
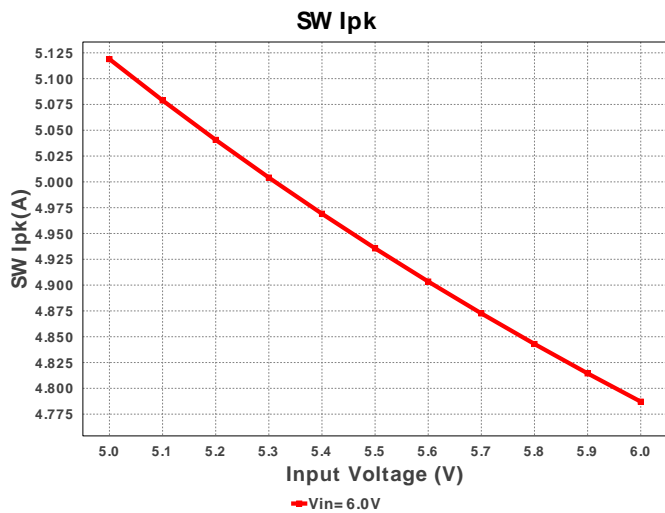
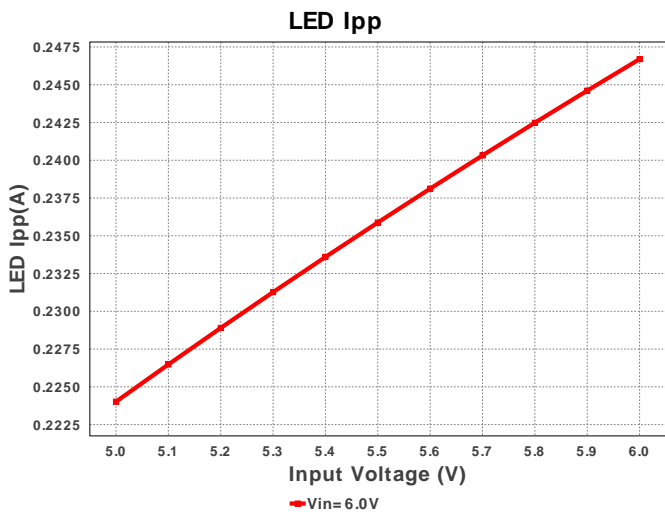
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
27.	Rhsn	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
28.	Rhsp	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
29.	Rivp1	Vishay-Dale	CRCW04023K83FKED Series= CRCW..e3	Res= 3.83 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
30.	Rivp2	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
31.	Rlrdy	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
32.	Rovp1	Vishay-Dale	CRCW040290K9FKED Series= CRCW..e3	Res= 90.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
33.	Rovp2	Vishay-Dale	CRCW0402511KFKED Series= CRCW..e3	Res= 511.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
34.	Rr	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
35.	Rsense	Panasonic	ERJ-L14KF47MU Series= 232	Res= 47.0 mOhm Power= 330.0 mW Tolerance= 1.0%	1	\$0.11	1210 15mm2
36.	Rt	Vishay-Dale	CRCW040240K2FKED Series= CRCW..e3	Res= 40.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3mm2
37.	U1	Texas Instruments	LM3423MHX/NOPB	Switcher	1	\$1.25	 MXA20A 71mm2

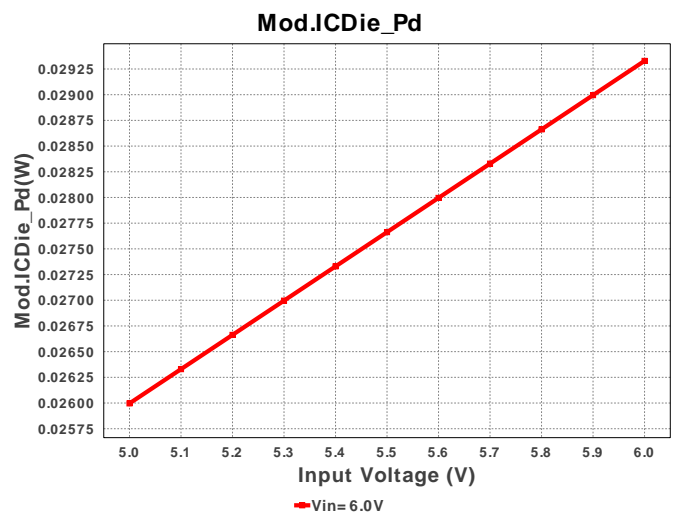
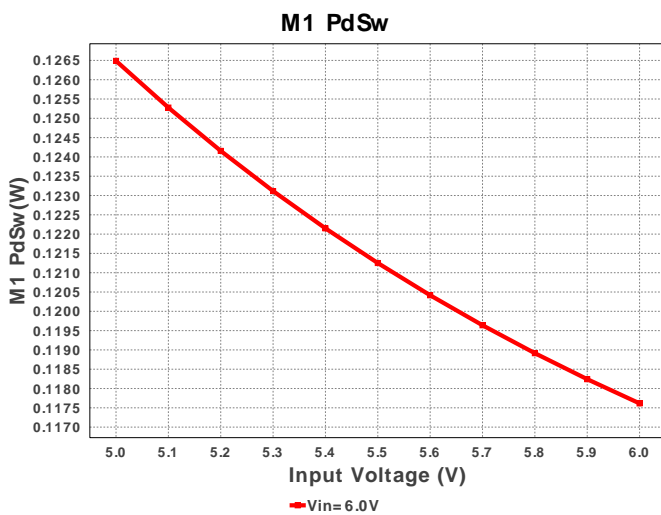
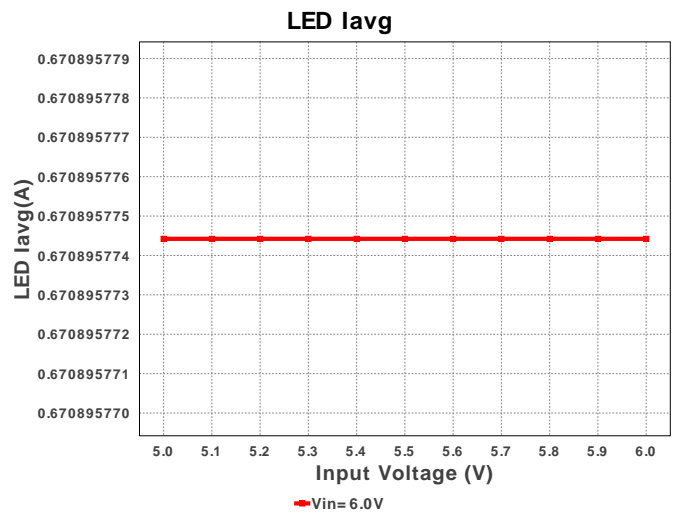
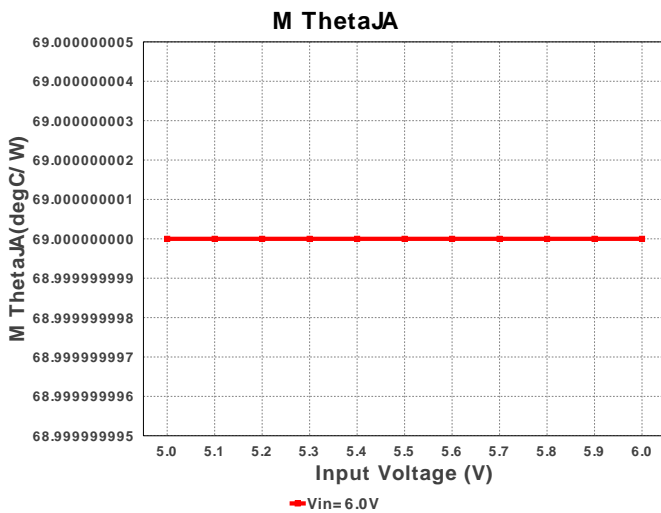
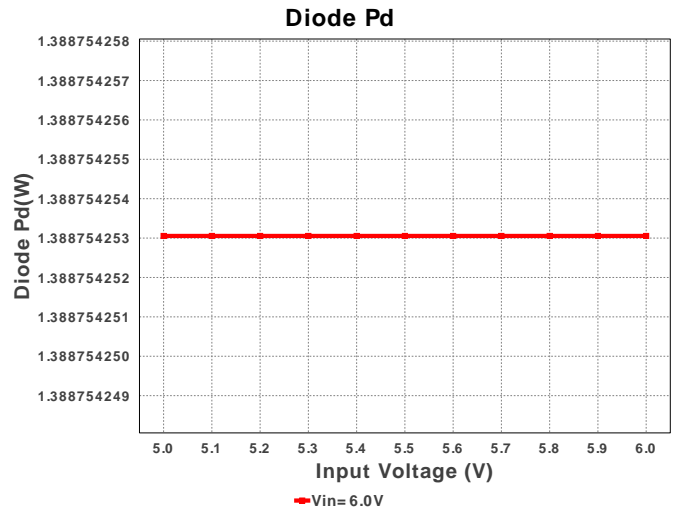
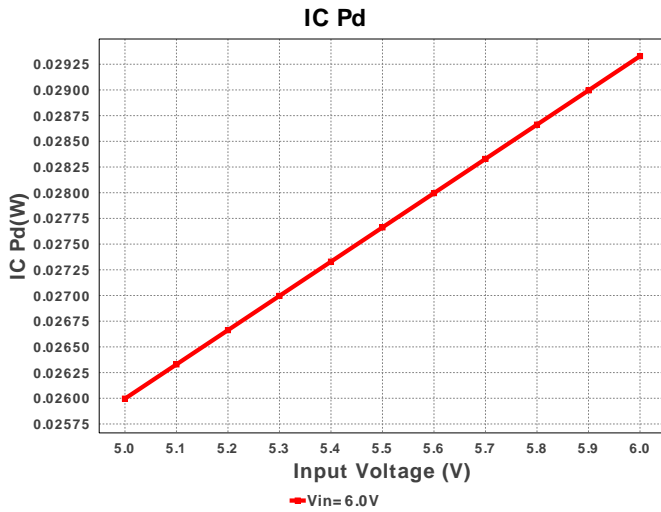












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	422.735 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	2.154 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.867 A	Current	Average input current
4.	L Ipp	1.464 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	4.362 A	Current	Inductor ripple current
6.	LED Iavg	670.896 mA	Current	LED Average Current
7.	LED Ipp	224.819 mA	Current	LED Ripple Current
8.	M Irms	3.937 A	Current	MOSFET RMS ripple current
9.	SW Ipk	5.073 A	Current	Peak switch current
10.	BOM Count	39	General	Total Design BOM count
11.	FootPrint	1.841 kmm ²	General	Total Foot Print Area of BOM components

#	Name	Value	Category	Description
12.	Frequency	555.224 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	26.771 mV	General	M Vds
16.	Pout	10.191 W	General	Total output power
17.	Total BOM	\$0.0	General	Total BOM Cost
18.	D1 Tj	30.0 degC	Op_Point	D1 junction temperature
19.	Vout OP	5.063 V	Op_Point	Operational Output Voltage
20.	Duty Cycle	58.741 %	Op_point	Duty cycle
21.	Efficiency	71.094 %	Op_point	Steady state efficiency
22.	IC Tj	33.402 degC	Op_point	IC junction temperature
23.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	2.013 A	Op_point	Iout operating point
25.	LED Rd	910.425 mOhm	Op_point	LED DynamicResistance
26.	LED Vf	5.063 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	112.945 degC	Op_point	MOSFET junction temperature
29.	VIN_OP	5.0 V	Op_point	Vin operating point
30.	Cin Pd	3.574 mW	Power	Input capacitor power dissipation
31.	Cout Pd	92.818 mW	Power	Output capacitor power dissipation
32.	Diode Pd	1.389 W	Power	Diode power dissipation
33.	IC Pd	91.957 mW	Power	IC power dissipation
34.	L Pd	178.057 mW	Power	Inductor power dissipation
35.	LED Pd	10.191 W	Power	LED Power Dissipation
36.	M Pd	1.659 W	Power	MOSFET power dissipation
37.	M1 PdCond	142.472 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	1.516 W	Power	M1 MOSFET switching losses
39.	Total Pd	4.143 W	Power	Total Power Dissipation
40.	Total LED load Rd	25.29 mOhm	Unknown	Total LED Load DynamicResistance

Design Inputs

#	Name	Value	Description
1.	Iout	2.16 A	Maximum Output Current
2.	Iout1	2.16 Amps	Output Current #1
3.	VinMax	6.0 V	Maximum input voltage
4.	VinMin	5.0 V	Minimum input voltage
5.	Vout	9.3 V	Output Voltage
6.	Vout1	9.3 Volt	Output Voltage #1
7.	application	LED_DRIVER	LED Application
8.	base_pn	LM3423	Texas Instruments Base Part Number
9.	isLEDArchitect	N	LED Architect Project
10.	ledparallel	3.0	Number of LED in parallel
11.	ledpartnumber	CL-L251-MC6L1-C	LED Part number
12.	ledseries	1.0	Number of LED in series
13.	line_fsw	60.0	AC Line Frequency
14.	source	DC	Input Source Type
15.	ta	30.0 degC	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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