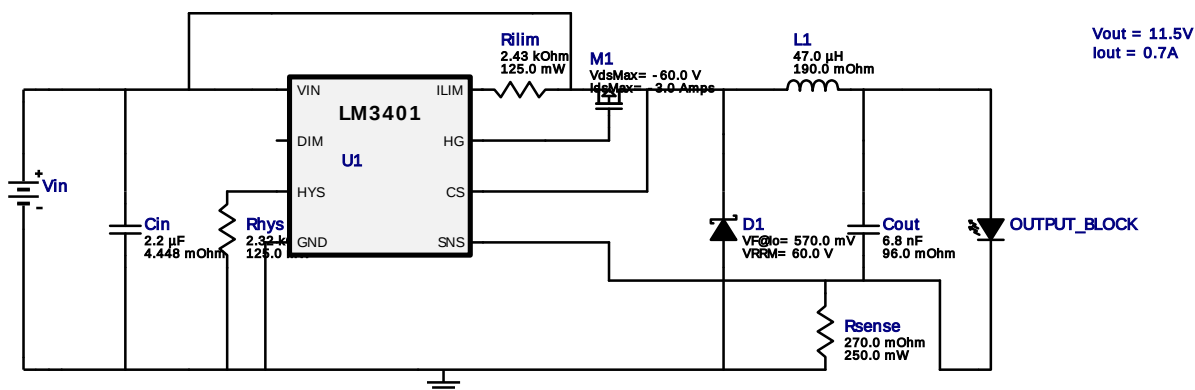


WEBENCH® Design Report

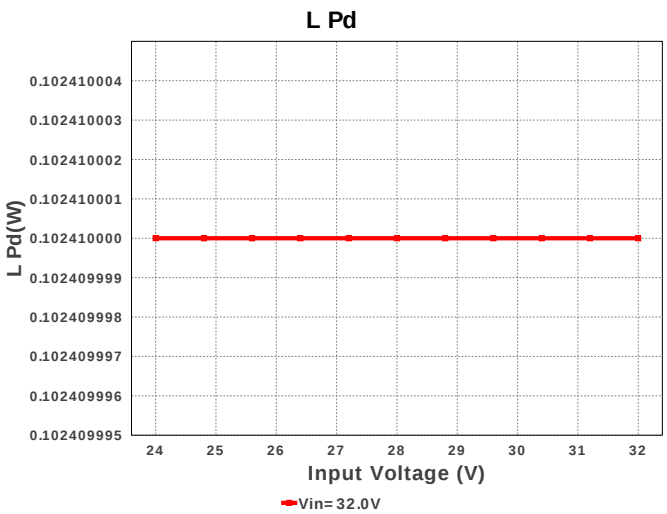
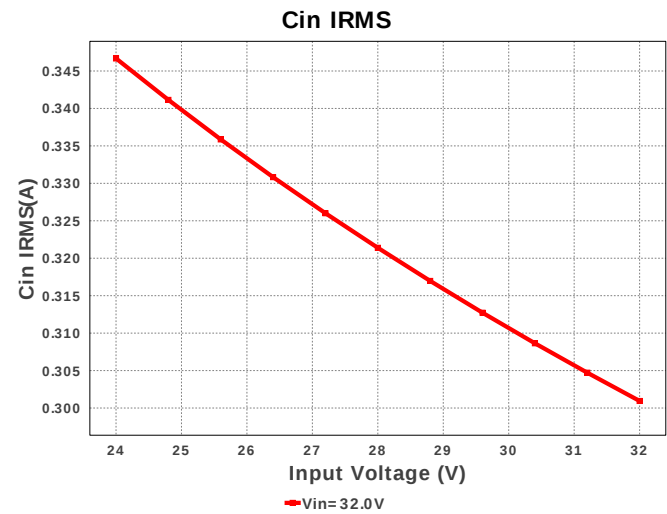
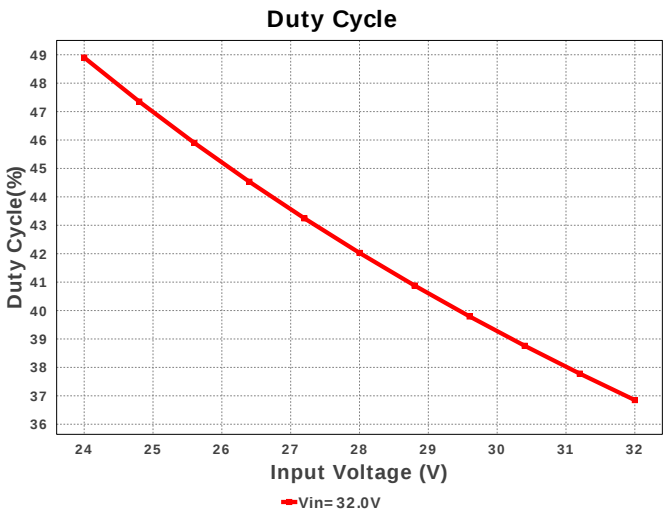
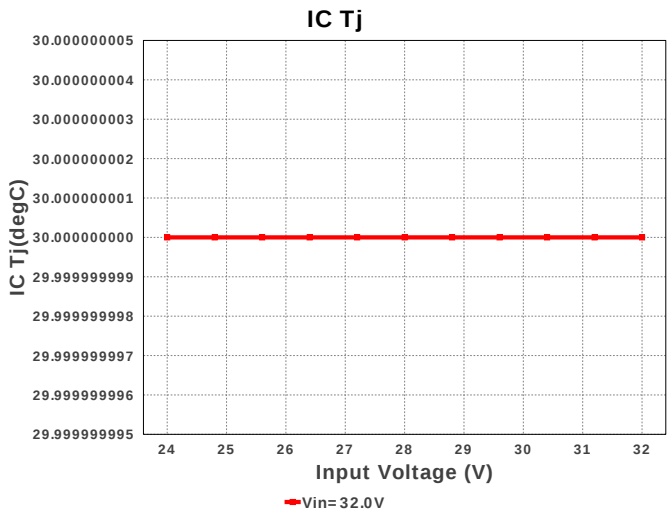
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LM3401MMX/NOPB 24.0V-32.0V to 11.50V @ 0.7A

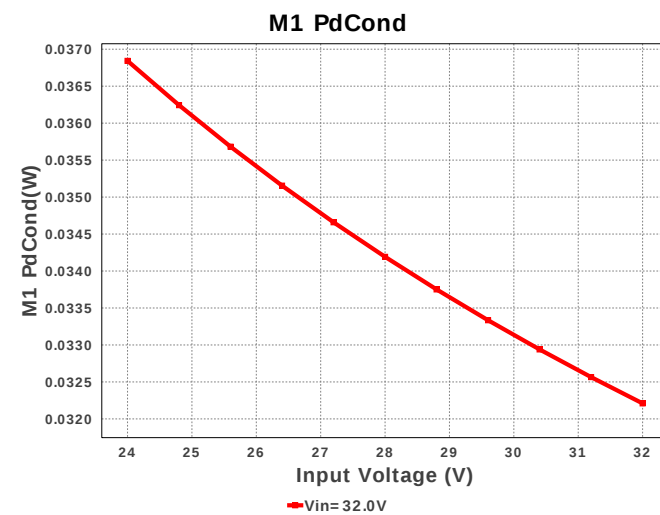
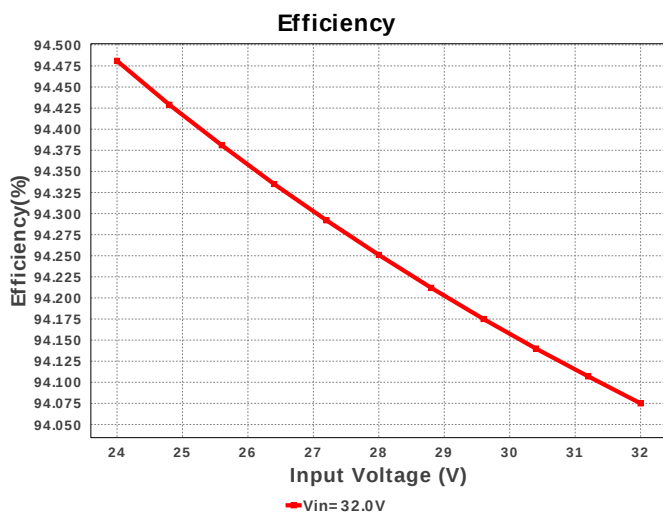
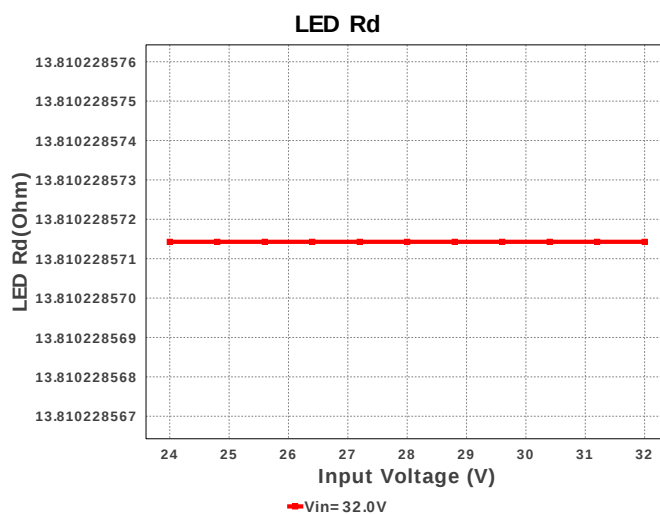
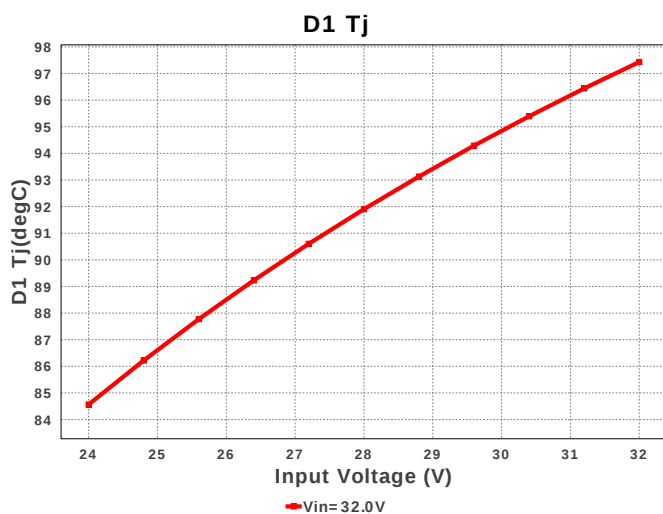
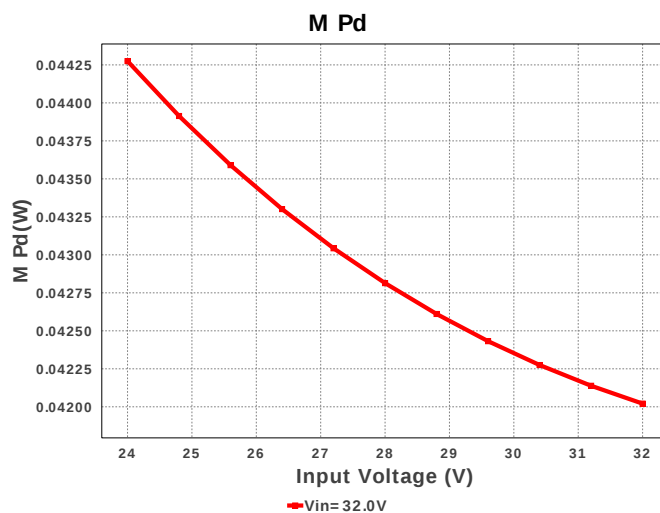
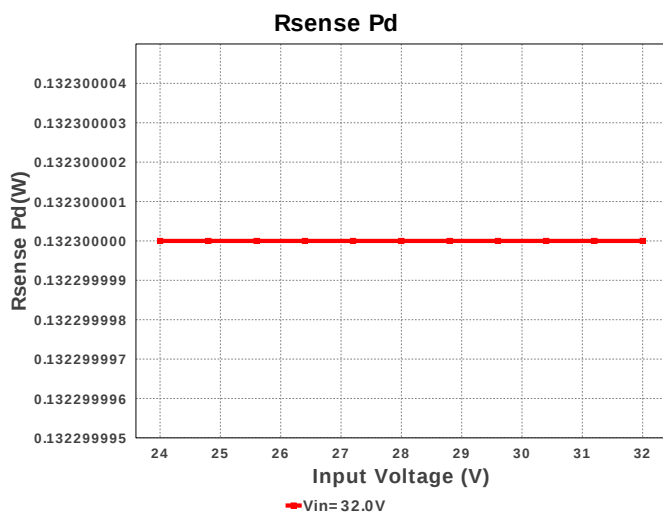


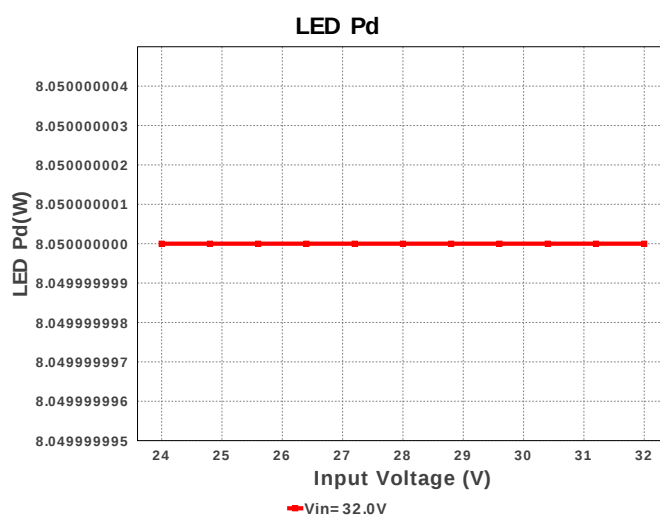
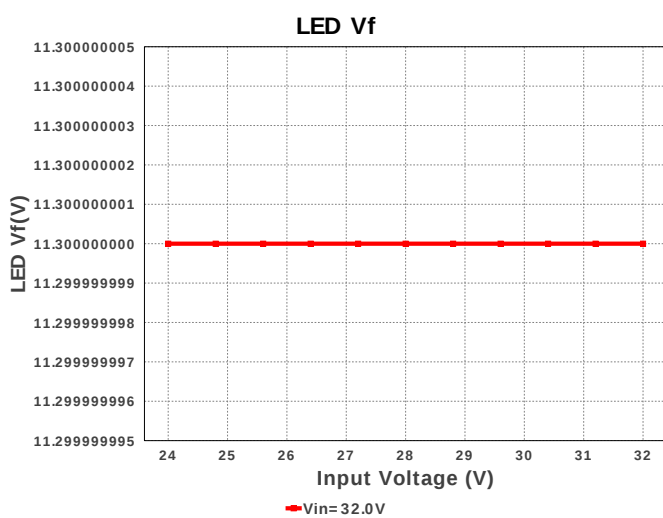
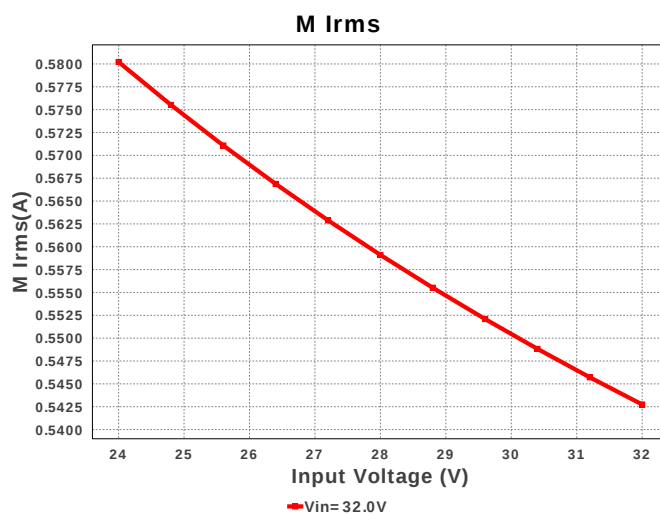
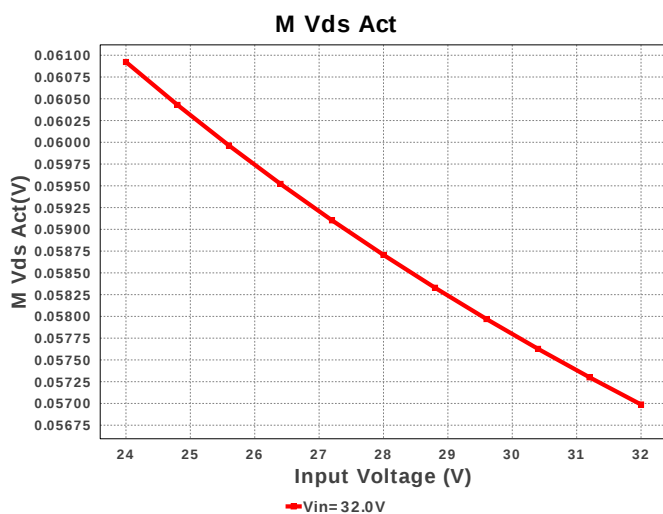
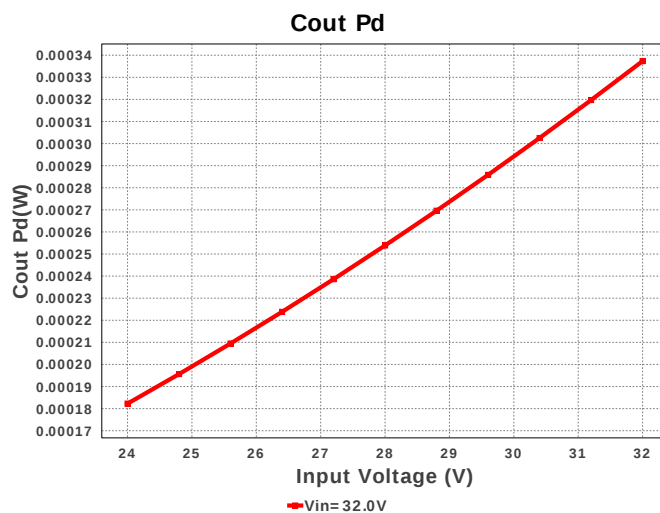
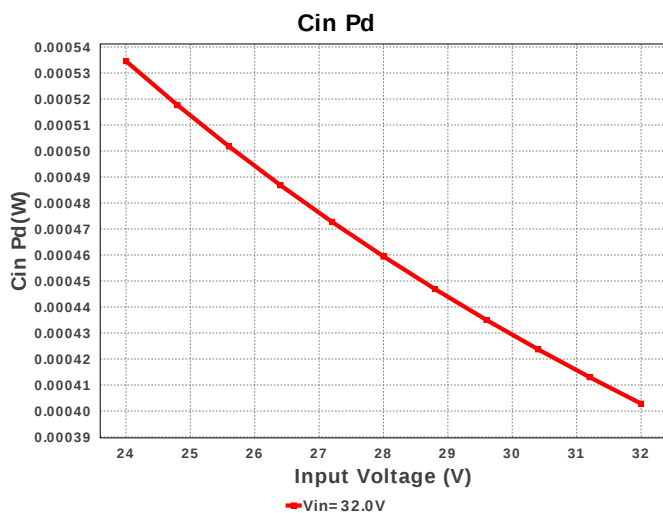
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	\$0.05	 1206_190 11 mm ²
2.	Cout	AVX	08051C682KAT2A Series= X7R	Cap= 6.8 nF ESR= 96.0 mOhm VDC= 100.0 V IRMS= 0.0 A	1	\$0.02	 0805 7 mm ²
3.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	\$0.04	 SOD-123F 12 mm ²
4.	D_LED	Cree	XHP50A-00-0000-0D00J20CB	LED	1	\$3.91	 xlampxhp 0 mm ²
5.	L1	Bourns	SRN8040-470M	L= 47.0 uH DCR= 190.0 mOhm	1	\$0.22	 SRN8040 100 mm ²
6.	M1	Fairchild Semiconductor	FDC5614P	VdsMax= -60.0 V IdsMax= -3.0 Amps	1	\$0.23	 SOT-23-6 15 mm ²
7.	Rhys	Panasonic	ERJ-6ENF2321V Series= ERJ-6E	Res= 2.32 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
8.	Rilim	Panasonic	ERJ-6ENF2431V Series= ERJ-6E	Res= 2.43 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
9.	Rsense	Panasonic	ERJ-8RQFR27V Series= ERJ-8R	Res= 270.0 mOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.04	 1206 11 mm ²

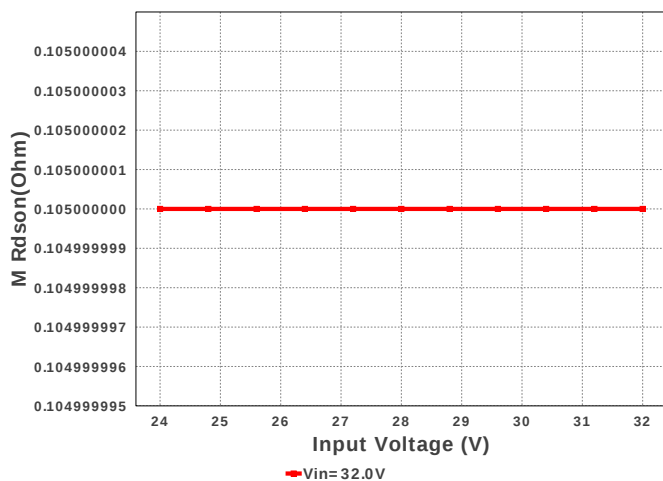
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	LM3401MMX/NOPB	Switcher	1	\$0.60	 MUA08A 24 mm²



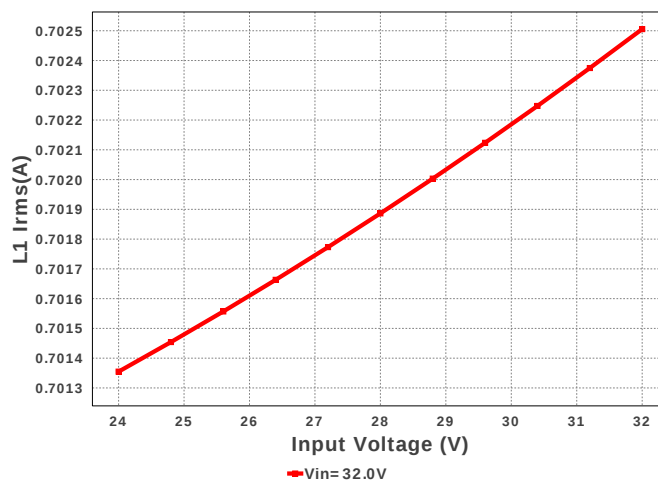




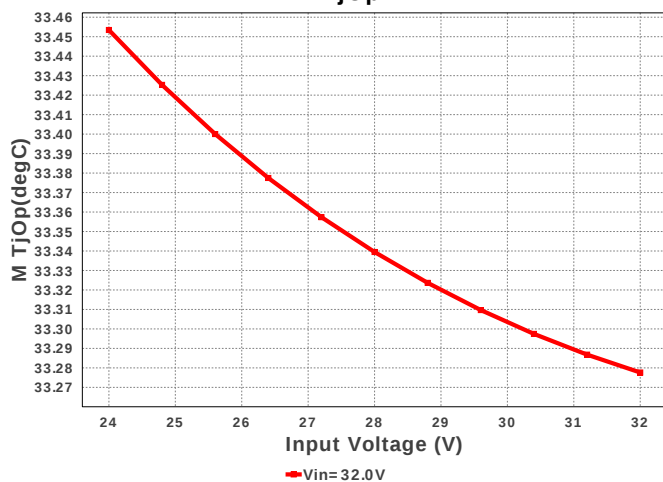
M Rdson



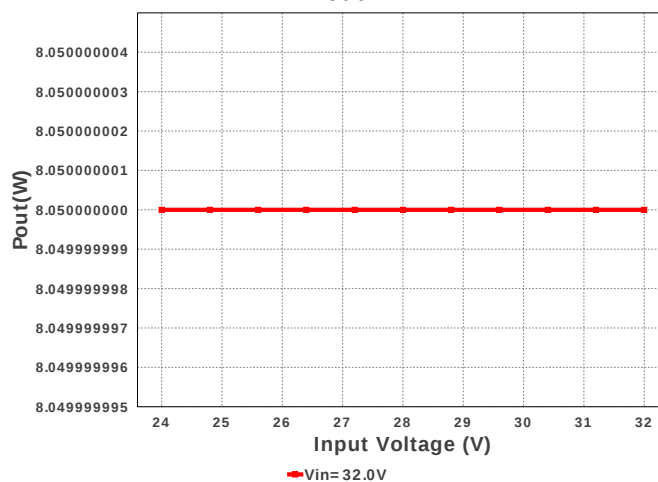
L1 Irms



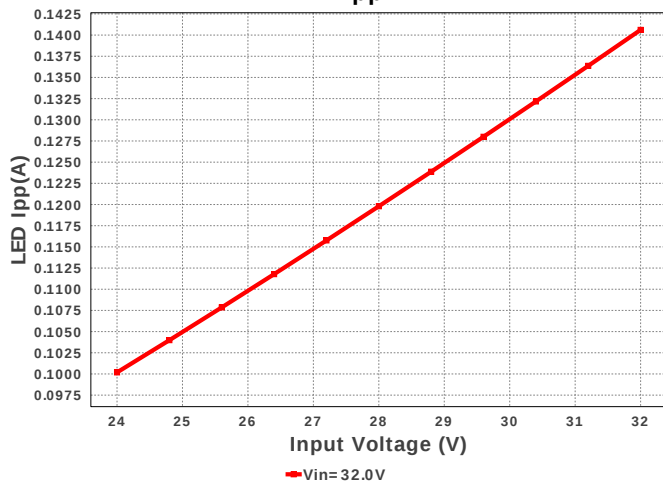
M TjOp



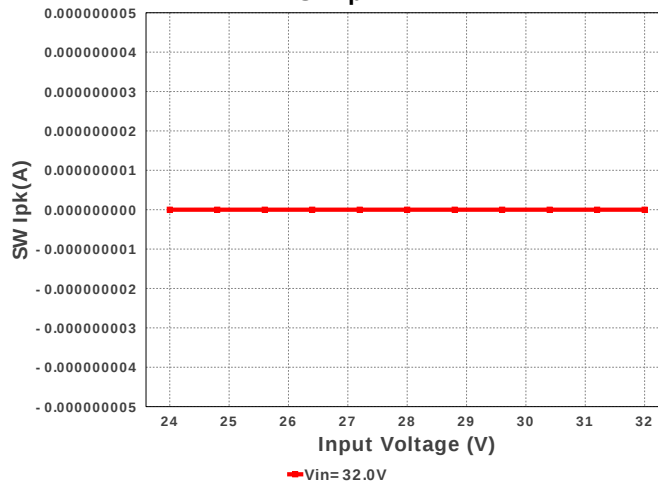
Pout

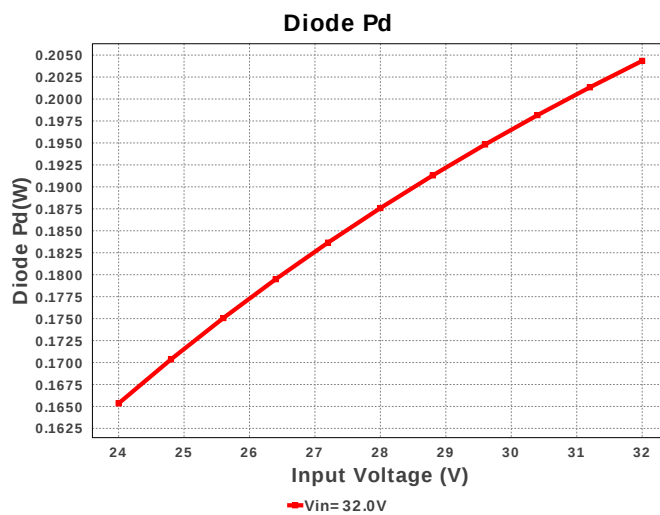
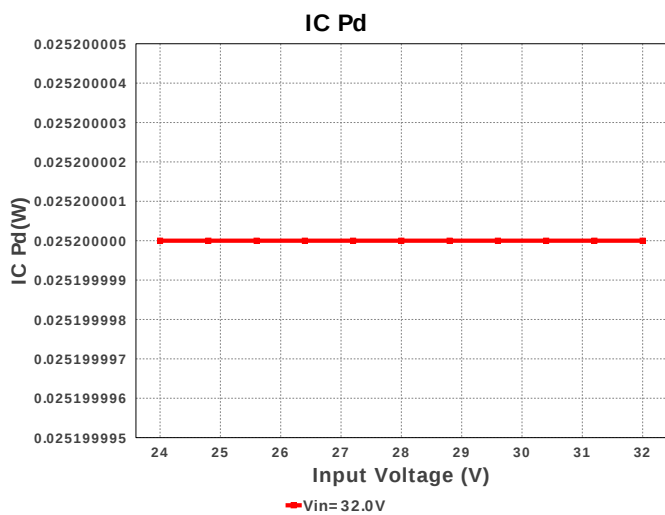
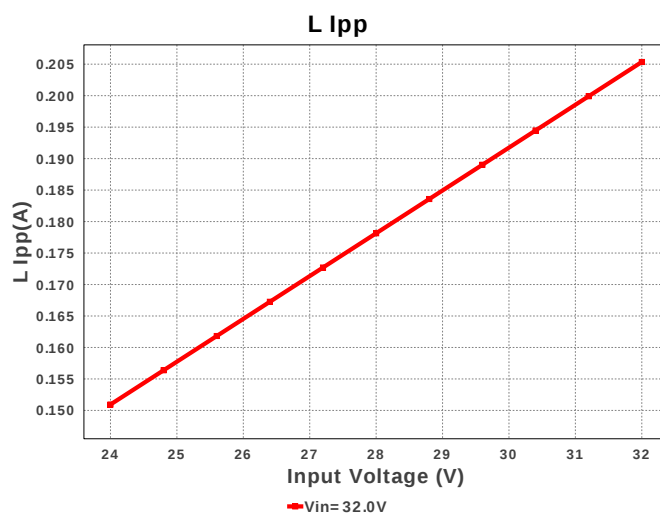
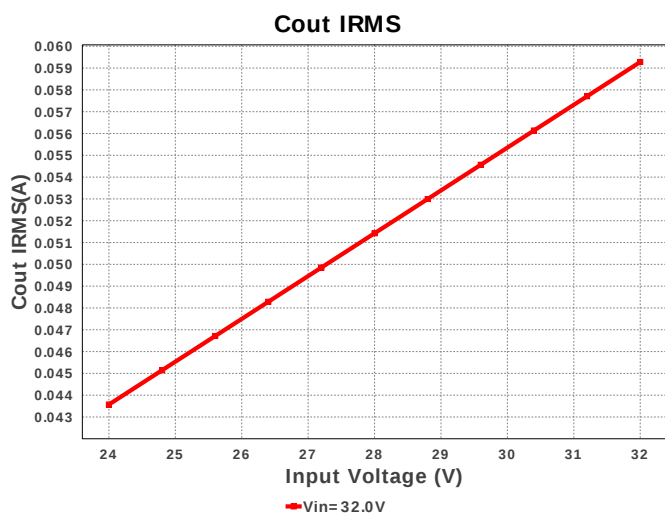
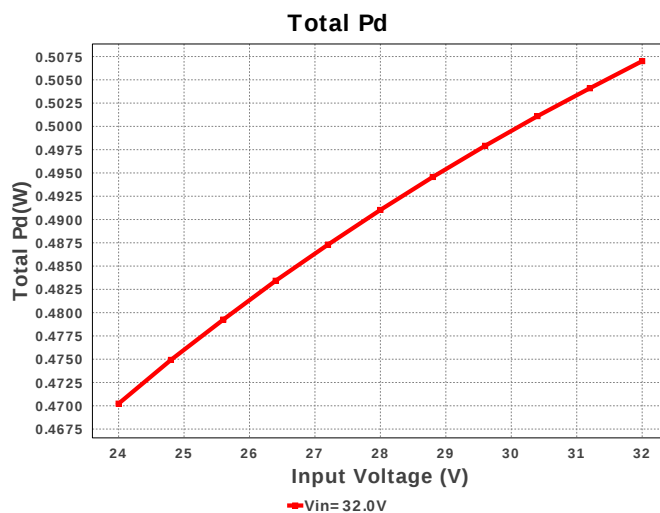
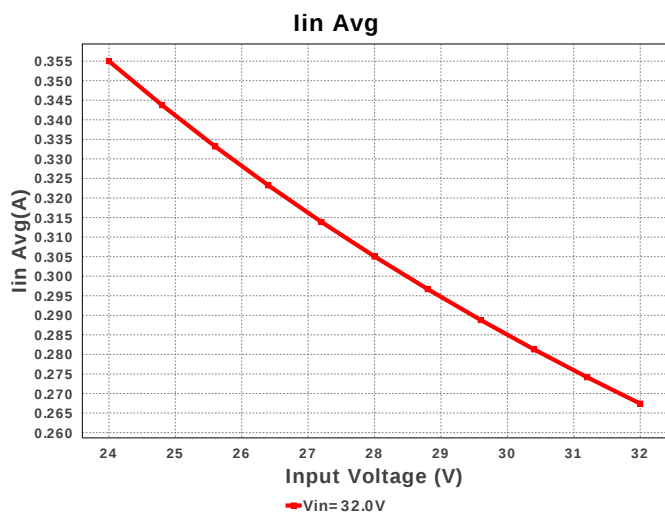


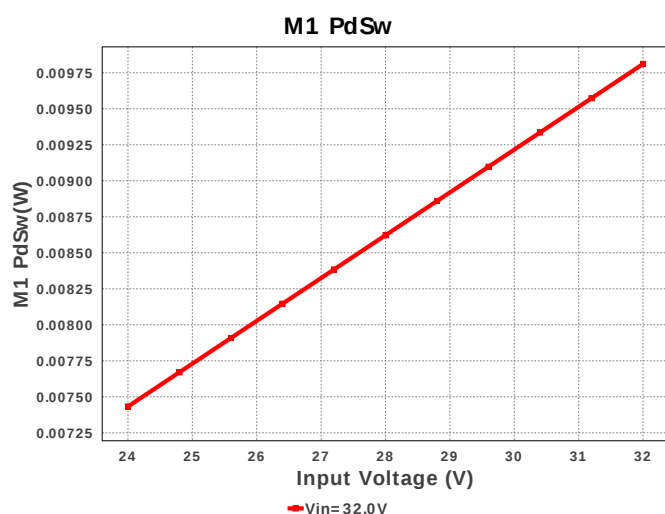
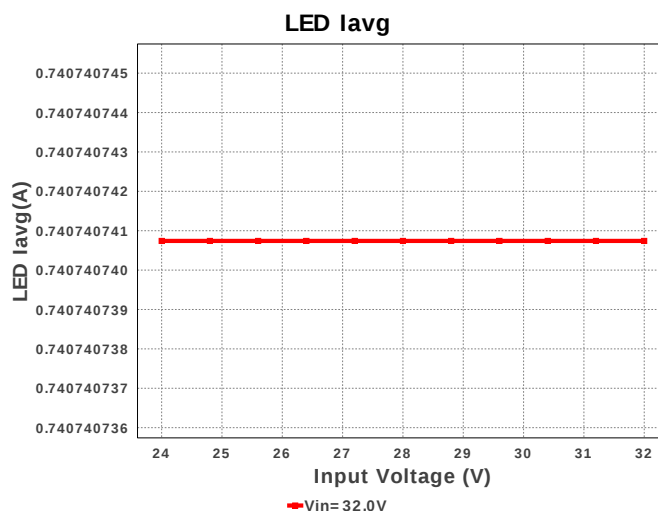
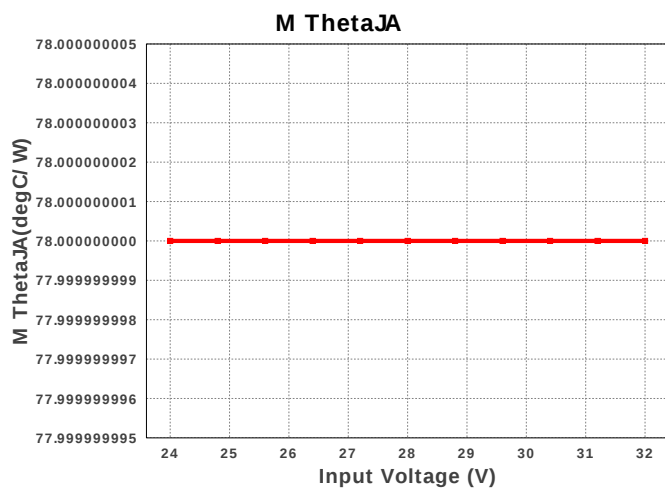
LED Ipp



SW Ipk







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	300.916 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	58.852 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	276.56 mA	Current	Average input current
4.	L Ipp	203.87 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	702.47 mA	Current	Inductor ripple current
6.	LED Iavg	740.741 mA	Current	LED Average Current
7.	LED Ipp	138.985 mA	Current	LED Ripple Current
8.	M Irms	547.44 mA	Current	MOSFET RMS ripple current
9.	SW Ipk	993.592 mA	Current	Peak switch current
10.	BOM Count	10	General	Total Design BOM count
11.	FootPrint	192.0 mm ²	General	Total Foot Print Area of BOM components
12.	Frequency	793.75 kHz	General	Switching frequency
13.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
14.	M Rdson	105.0 mOhm	General	Drain-Source On-resistance
15.	M Vds Act	57.481 mV	General	M Vds
16.	Pout	8.19 W	General	Total output power
17.	Total BOM	\$5.13	General	Total BOM Cost
18.	D1 Tj	96.776 degC	Op_Point	D1 junction temperature
19.	Vout OP	11.7 V	Op_Point	Operational Output Voltage
20.	Duty Cycle	37.466 %	Op_point	Duty cycle
21.	Efficiency	92.543 %	Op_point	Steady state efficiency
22.	IC Tj	92.605 degC	Op_point	IC junction temperature
23.	ICThetaJA	151.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	700.0 mA	Op_point	Iout operating point
25.	LED Rd	13.81 Ohm	Op_point	LED DynamicResistance
26.	LED Vf	11.5 V	Op_point	Total LED Forward Calculated Voltage
27.	M ThetaJA	78.0 degC/W	Op_point	MOSFET junction-to-ambient thermal resistance
28.	M TjOp	45.362 degC	Op_point	MOSFET junction temperature
29.	VIN_OP	32.0 V	Op_point	Vin operating point
30.	Cin Pd	402.767 μW	Power	Input capacitor power dissipation
31.	Cout Pd	332.499 μW	Power	Output capacitor power dissipation

#	Name	Value	Category	Description
32.	Diode Pd	202.35 mW	Power	Diode power dissipation
33.	IC Pd	414.6 mW	Power	IC power dissipation
34.	L Pd	102.41 mW	Power	Inductor power dissipation
35.	LED Pd	8.05 W	Power	LED Power Dissipation
36.	M Pd	196.947 mW	Power	MOSFET power dissipation
37.	M1 PdCond	34.671 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	162.276 mW	Power	M1 MOSFET switching losses
39.	Rsense Pd	132.3 mW	Power	LED Current Rsns Power Dissipation
40.	Total Pd	659.939 mW	Power	Total Power Dissipation
41.	Vout Tolerance	104.348 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	32.0	Maximum input voltage
3.	VinMin	24.0	Minimum input voltage
4.	Vout	11.5	Output Voltage
5.	application	LED_DRIVER	LED Application
6.	base_pn	LM3401	Base Product Number
7.	LED_Architect	N	LED Architect Project
8.	ledparallel	1.0	Number of LED in parallel
9.	ledpartnumber	XHP50A-00-0000-0D00120C	LED Part number
10.	ledseries	1.0	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. **LM3401** Product Folder : <http://www.ti.com/product/LM3401> : contains the data sheet and other resources.

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