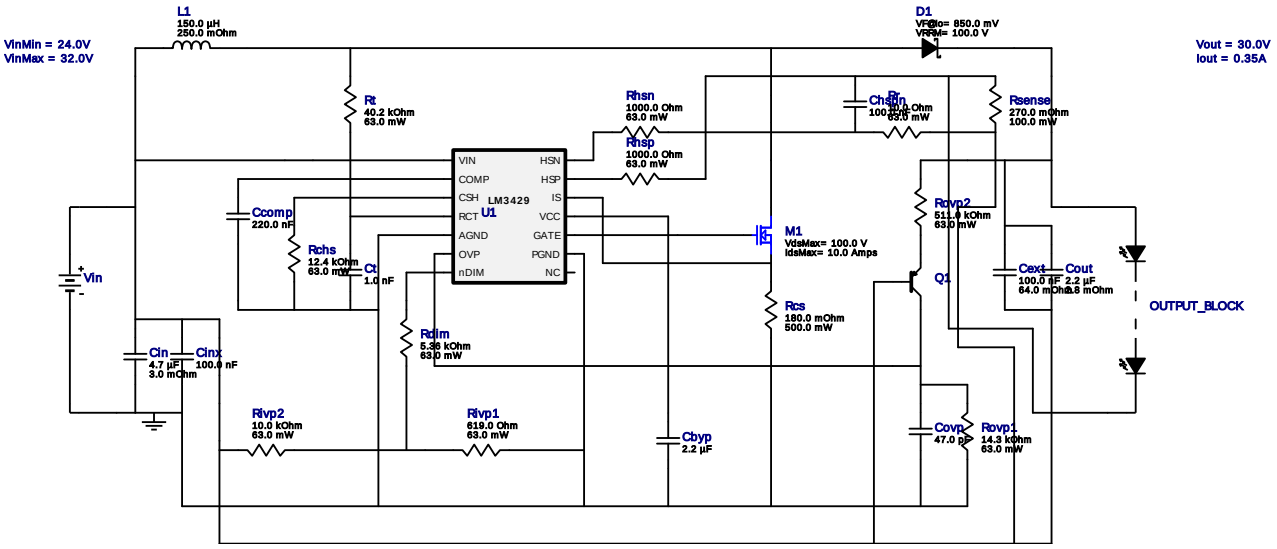
WEBENCH® Design Report

VinMin = 24.0V
VinMax = 32.0V
Vout = 30.0V
Iout = 0.35A

Device = LM3429MH/NOPB
Topology = Buck_Boost
Created = 6/5/15 11:36:58 PM
BOM Cost = $25.77
Footprint = 706.0 mm²
BOM Count = 36
Total Pd = 1.66W

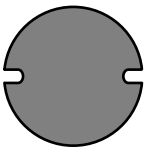
Design : 3789752/2 LM3429MH/NOPB
LM3429MH/NOPB 24.0V-32.0V to 30.11V @ 0.35034842293906804A

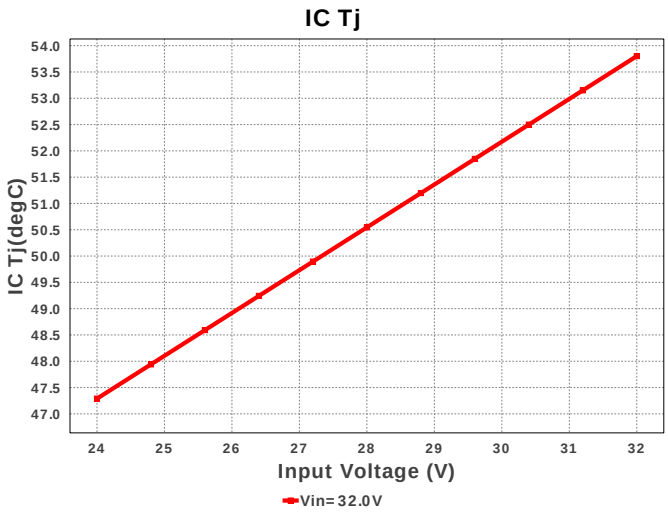


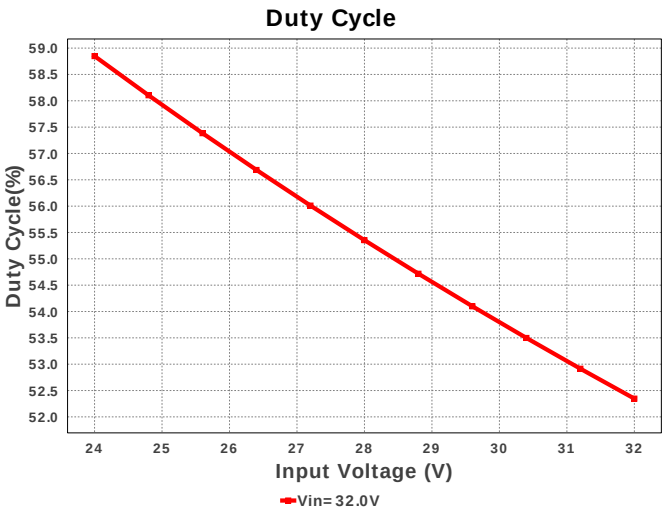
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

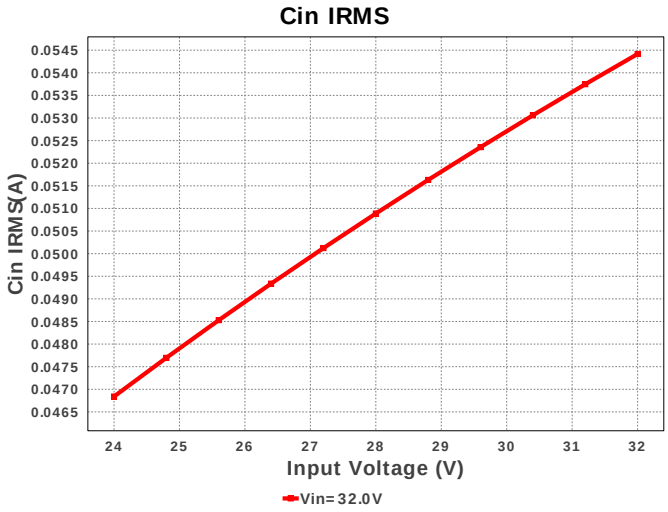
Electrical BOM

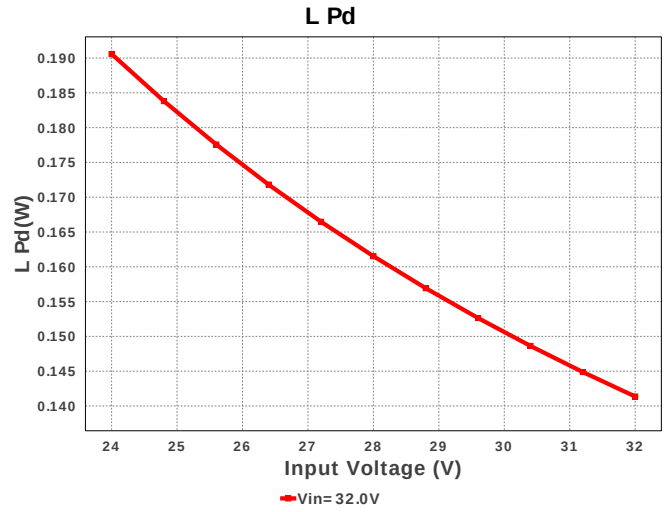
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
2.	Ccomp	MuRata	GRM155C80G224KE01D Series= 379	Cap= 220.0 nF VDC= 4.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cext	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
4.	Chspn	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
5.	Cin	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 mm²
6.	Cinx	MuRata	GRM188R72A104KA35D Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	$0.03	0603 5 mm²
7.	Cout	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 2.8 mOhm VDC= 100.0 V IRMS= 9.8247 A	1	$0.19	1210 15 mm²
8.	Covp	Kemet	C0805C470K5GACTU Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
9.	Ct	Yageo America	CC0805JRNPO9BN102 Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²

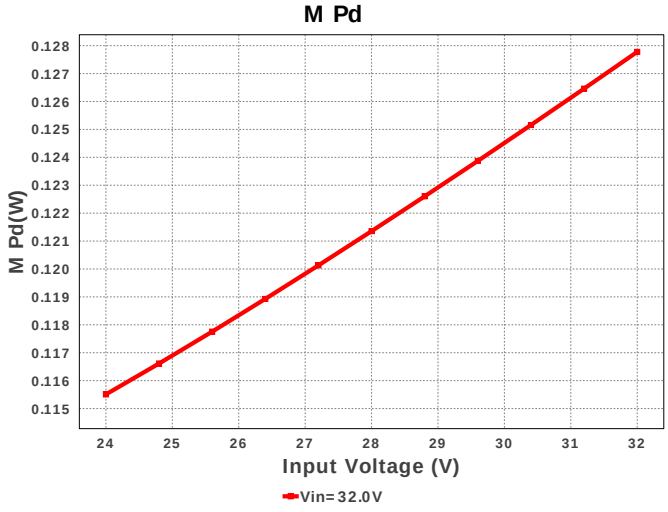
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	$0.10	 SMA 37 mm²
11.	D_LED	Cree	XPGWHT-L1-0000-00H51	LED	10	$2.29	 xlampxpg 20 mm²
12.	L1	Bourns	SDR1307-151KL	L= 150.0 µH DCR= 250.0 mOhm	1	$0.35	 SDR1307 227 mm²
13.	M1	Texas Instruments	CSD19534Q5A	VdsMax= 100.0 V IdsMax= 10.0 Amps	1	$0.68	 TRANS_NexFET_Q5A 55 mm²
14.	Q1	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	$0.02	 SOT-23 14 mm²
15.	Rchs	Vishay-Dale	CRCW040212K4FKED Series= CRCW..e3	Res= 12.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
16.	Rcs	Rohm	MCR25JZHFLR180 Series= 298	Res= 180.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.03	 1210 15 mm²
17.	Rdim	Vishay-Dale	CRCW04025K36FKED Series= CRCW..e3	Res= 5.36 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
18.	Rhsn	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
19.	Rhsp	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
20.	Rivp1	Vishay-Dale	CRCW0402619RFKED Series= CRCW..e3	Res= 619.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
21.	Rivp2	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
22.	Rovp1	Vishay-Dale	CRCW040214K3FKED Series= CRCW..e3	Res= 14.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
23.	Rovp2	Vishay-Dale	CRCW0402511KFKED Series= CRCW..e3	Res= 511.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
24.	Rr	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
25.	Rsense	Panasonic	ERJ-3RQFR27V Series= 227	Res= 270.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.02	 0603 5 mm²
26.	Rt	Vishay-Dale	CRCW040240K2FKED Series= CRCW..e3	Res= 40.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
27.	U1	Texas Instruments	LM3429MH/NOPB	Switcher	1	$1.20	 MXA14A 59 mm²

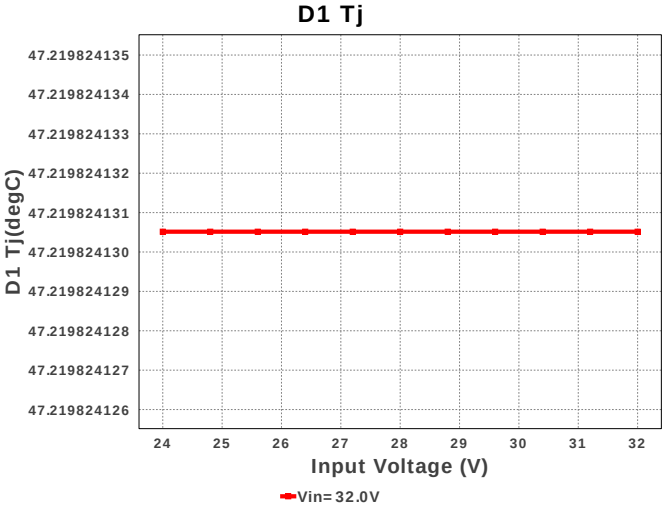


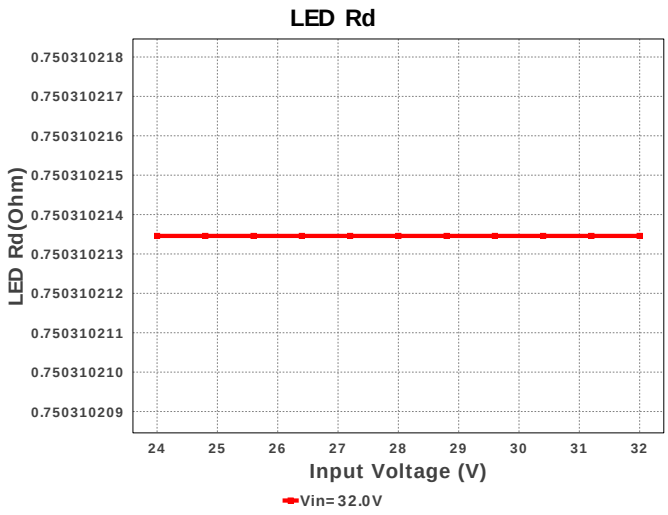


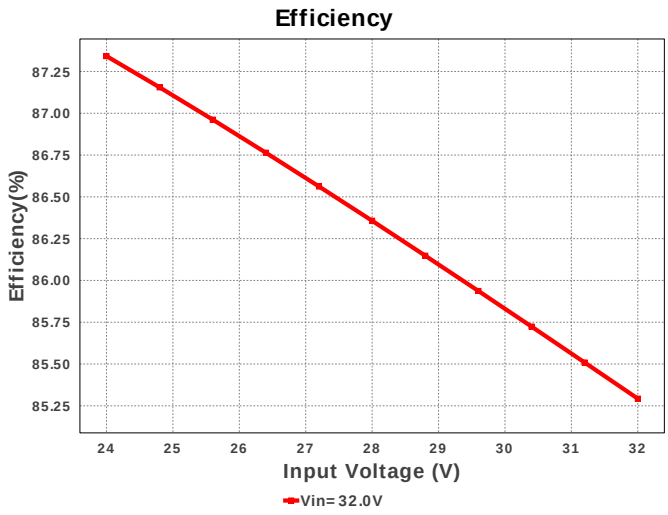


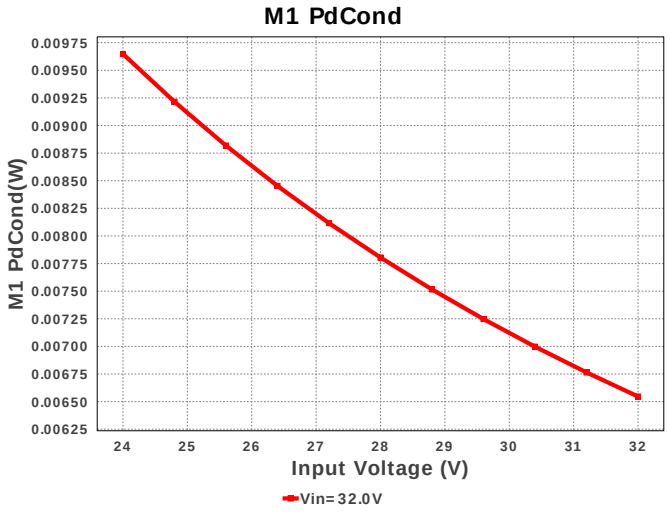


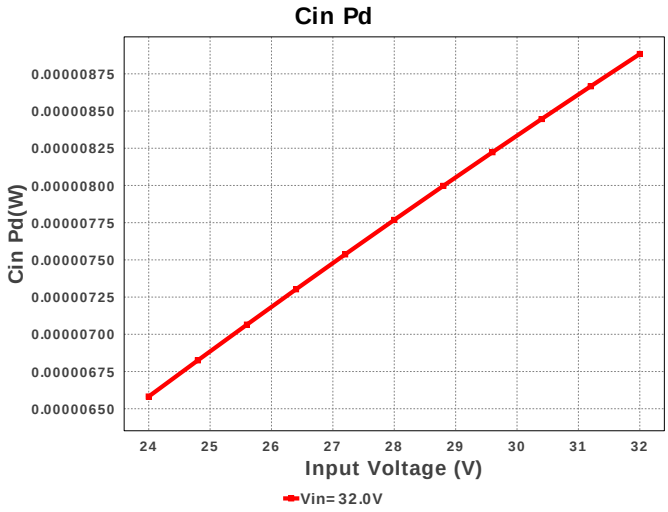


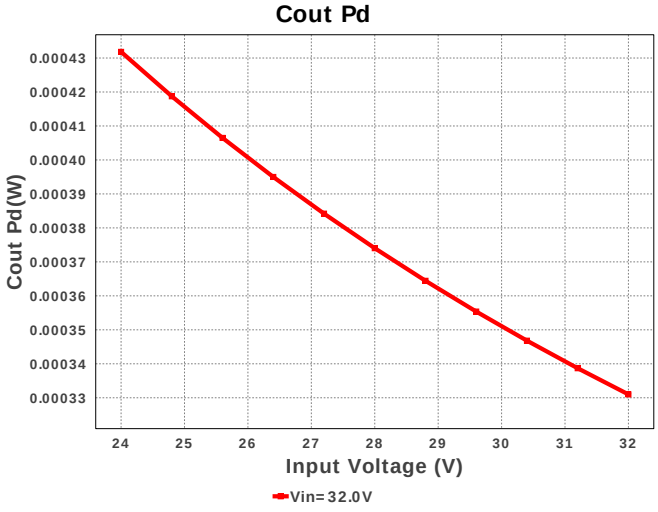


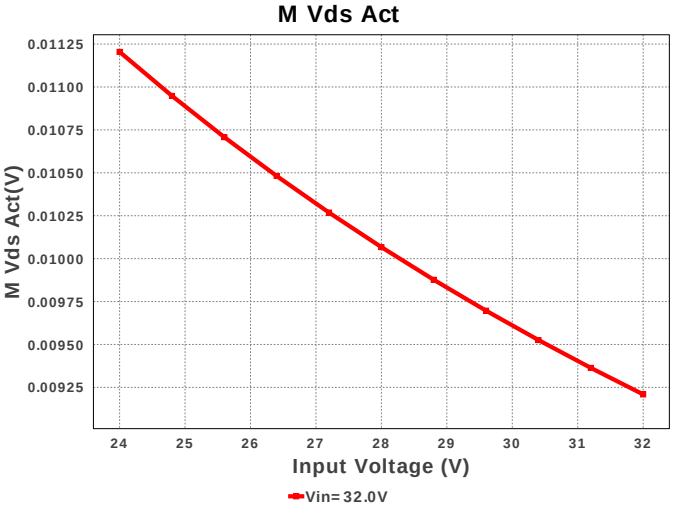


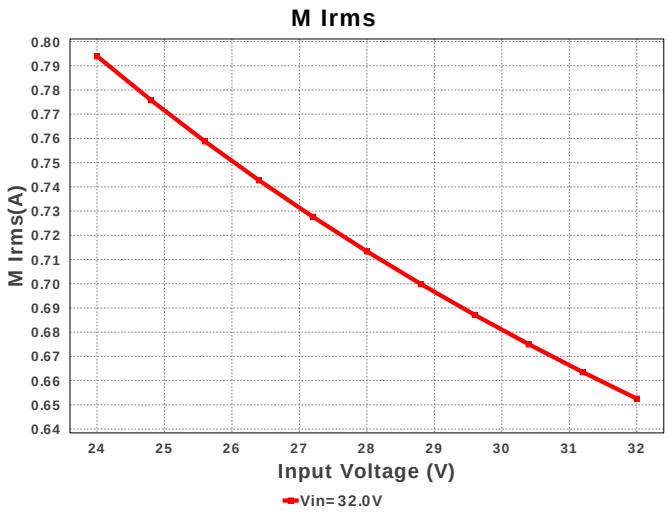


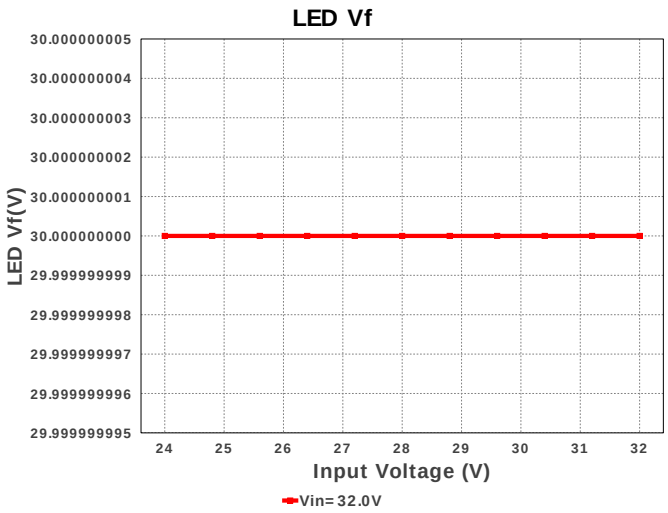


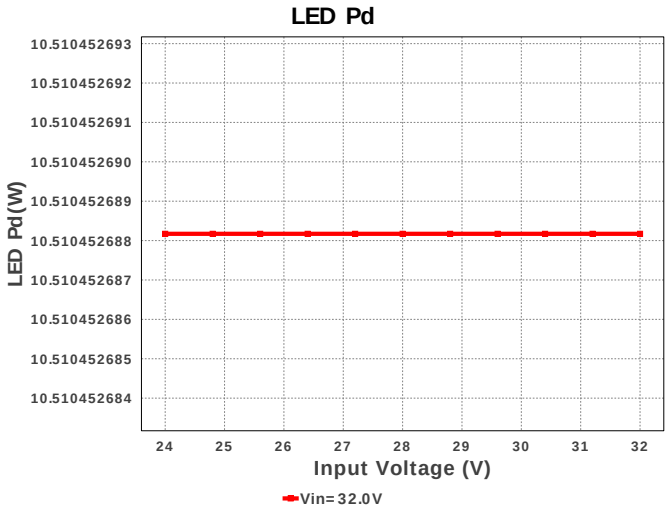


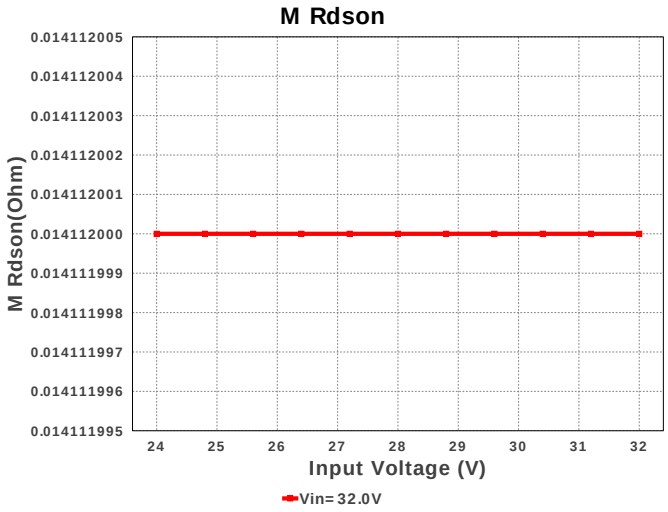


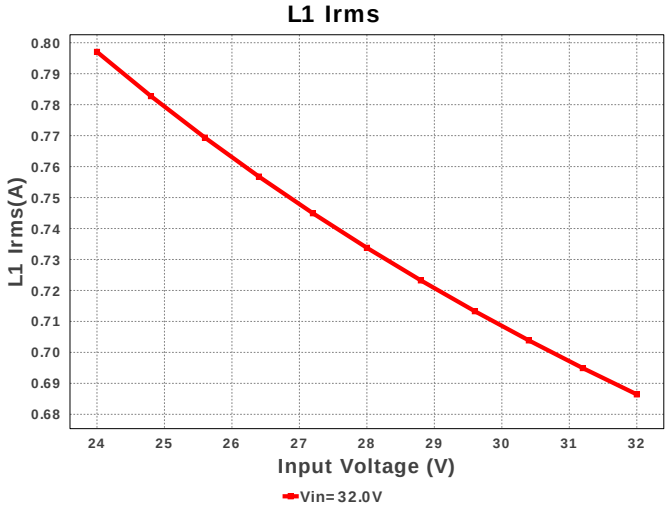


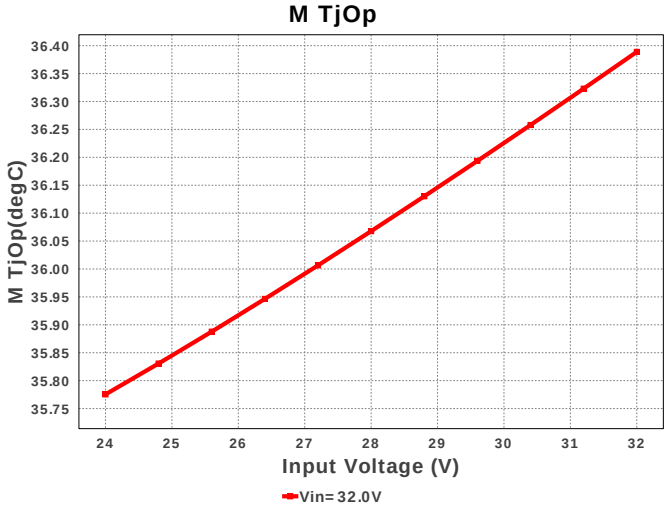


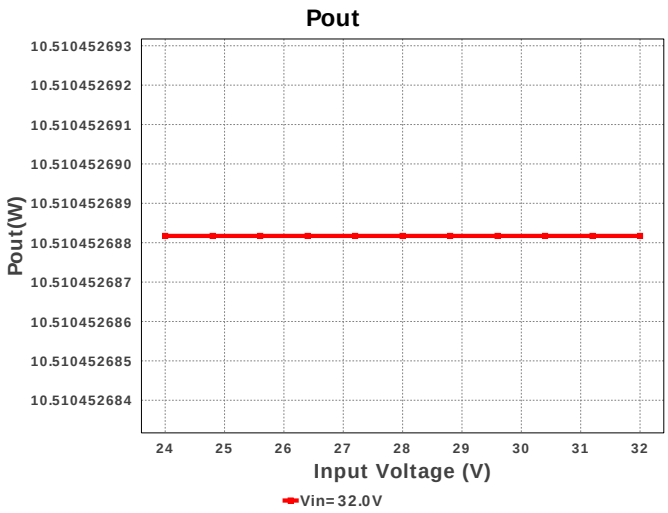


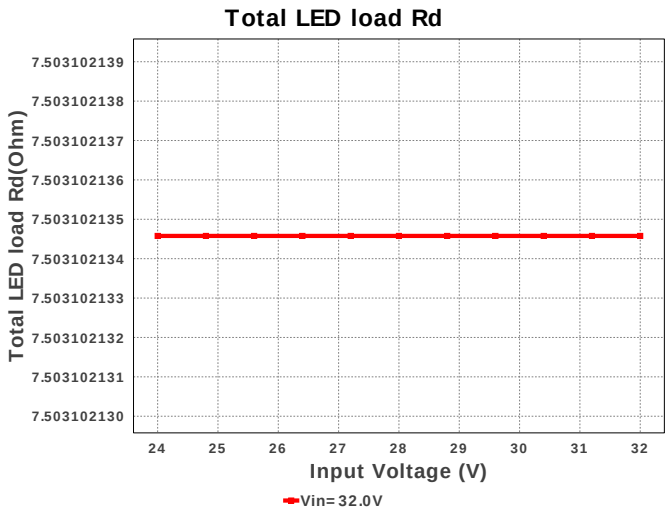


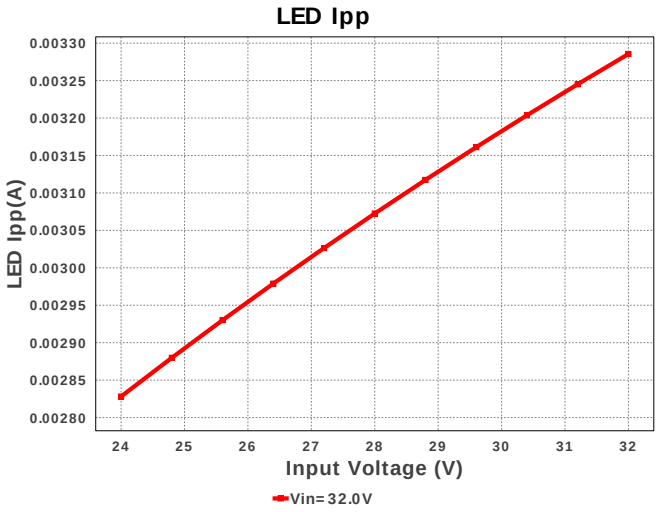


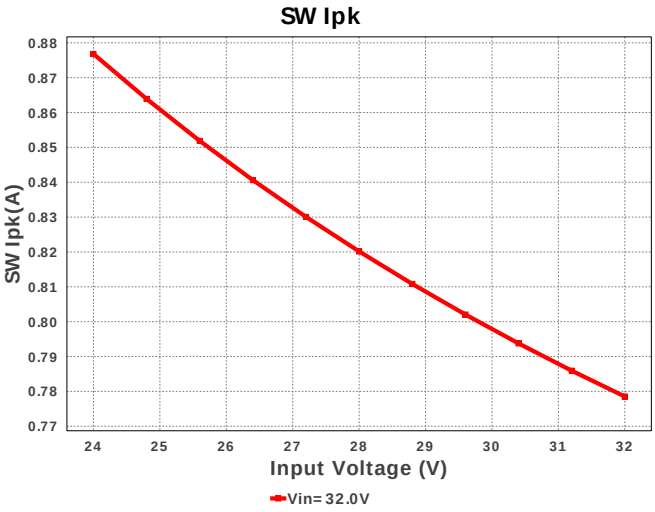


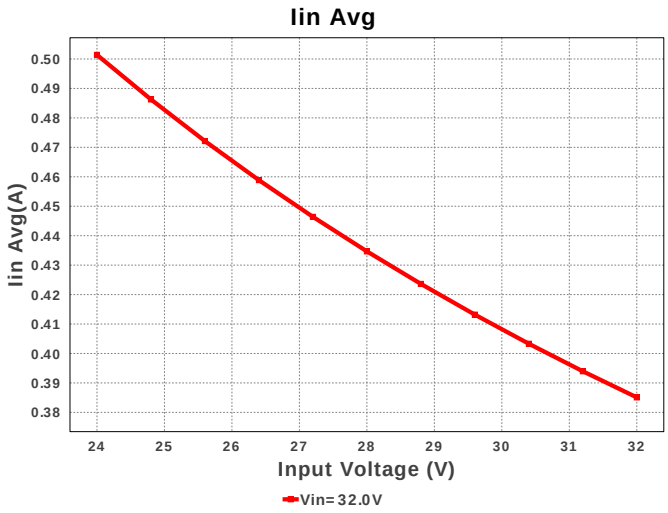


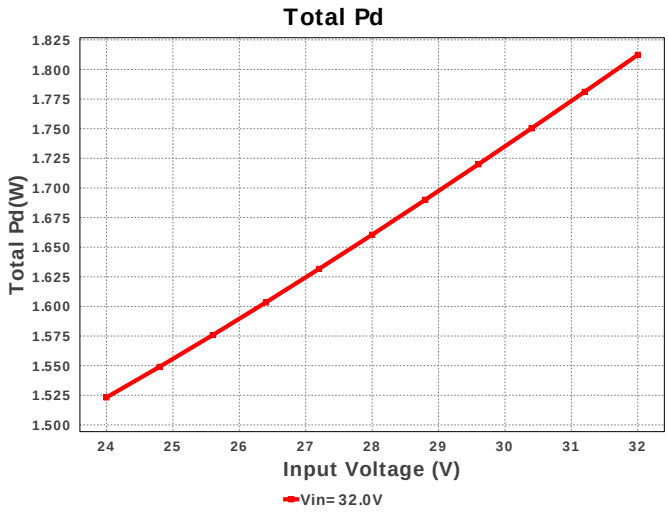


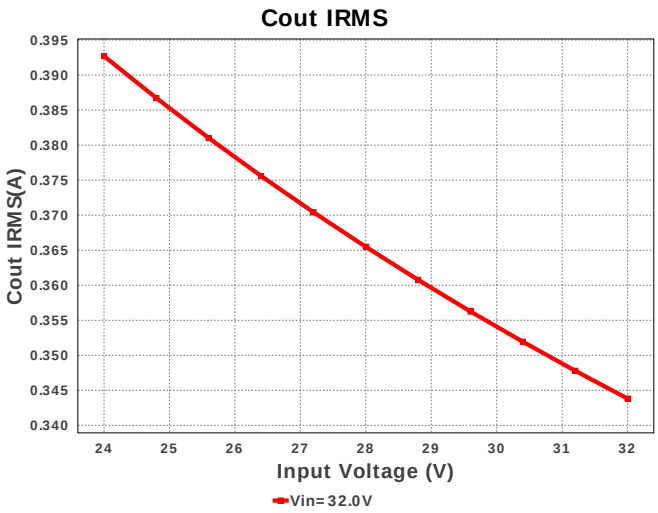


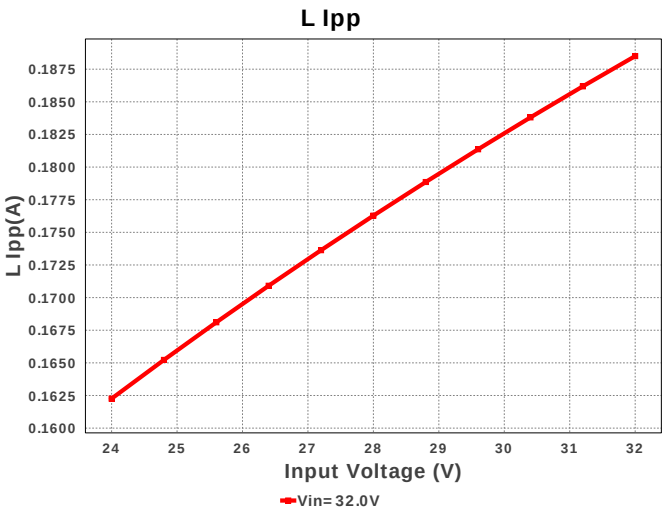


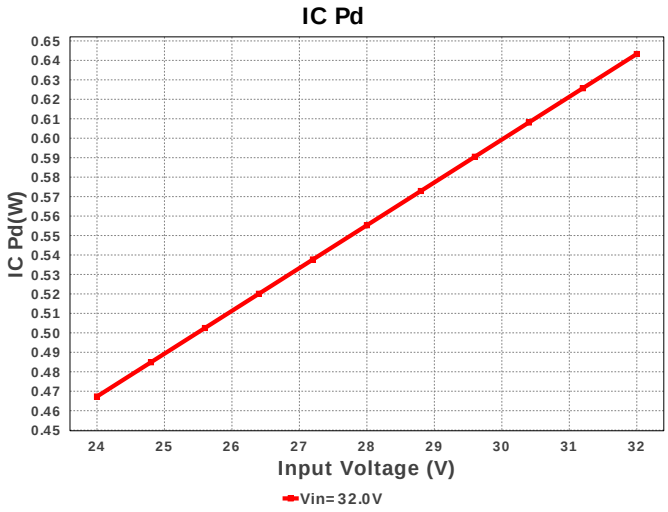


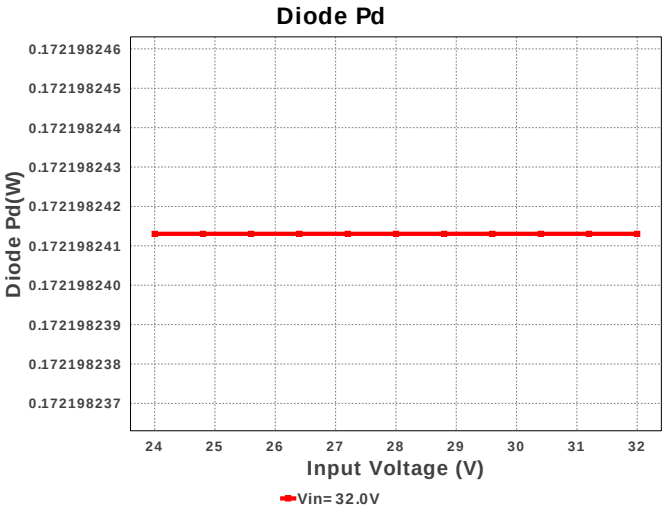


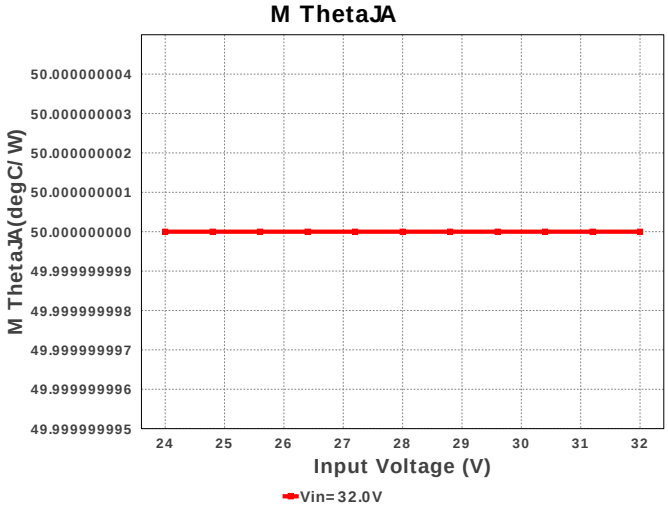


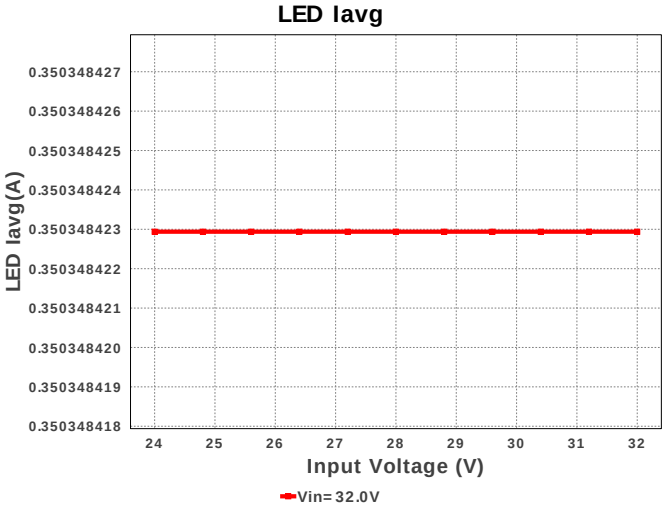


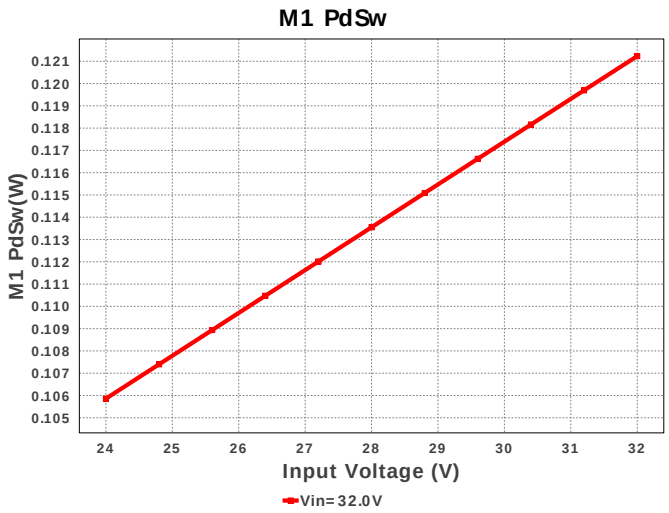












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	46.94 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	393.141 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	508.61 mA	Current	Average input current
4.	L Ipp	162.6 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	798.961 mA	Current	Inductor ripple current
6.	LED Iavg	350.348 mA	Current	LED Average Current
7.	LED Ipp	2.834 mA	Current	LED Ripple Current
8.	M Irms	794.394 mA	Current	MOSFET RMS ripple current
9.	SW Ipk	878.883 mA	Current	Peak switch current
10.	BOM Count	36	General	Total Design BOM count
11.	FootPrint	706.0 mm^2	General	Total Foot Print Area of BOM components
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	5.402 mV	General	M Vds
16.	Pout	10.549 W	General	Total output power
17.	Total BOM	$25.77	General	Total BOM Cost
18.	D1 Tj	48.216 degC	Op_Point	D1 junction temperature
19.	Vout OP	30.11 V	Op_Point	Operational Output Voltage
20.	Duty Cycle	59.191 %	Op_point	Duty cycle
21.	Efficiency	86.421 %	Op_point	Steady state efficiency
22.	IC Tj	48.498 degC	Op_point	IC junction temperature
23.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	350.348 mA	Op_point	Iout operating point
25.	LED Rd	750.31 mOhm	Op_point	LED DynamicResistance
26.	LED Vf	30.11 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	38.594 degC	Op_point	MOSFET junction temperature
29.	VIN_OP	24.0 V	Op_point	Vin operating point
30.	Cin Pd	6.61 µW	Power	Input capacitor power dissipation
31.	Cout Pd	432.767 µW	Power	Output capacitor power dissipation
32.	Diode Pd	182.155 mW	Power	Diode power dissipation
33.	IC Pd	499.933 mW	Power	IC power dissipation
34.	L Pd	191.502 mW	Power	Inductor power dissipation
35.	LED Pd	10.549 W	Power	LED Power Dissipation
36.	M Pd	171.887 mW	Power	MOSFET power dissipation
37.	M1 PdCond	4.525 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	167.362 mW	Power	M1 MOSFET switching losses
39.	Total Pd	1.658 W	Power	Total Power Dissipation
40.	Total LED load Rd	7.503 Ohm	Unknown	Total LED Load DynamicResistance

Design Inputs

#	Name	Value	Description
1.	Iout	350.0 m	Maximum Output Current
2.	Iout1	350.0 m	Output Current #1
3.	VinMax	32.0	Maximum input voltage
4.	VinMin	24.0	Minimum input voltage
5.	Vout	30.0	Output Voltage
6.	Vout1	30.0	Output Voltage #1
7.	application	LED_DRIVER	LED Application
8.	base_pn	LM3429	Texas Instruments Base Part Number

#	Name	Value	Description
9.	isLEDArchitect	N	LED Architect Project
10.	ledparallel	1.0	Number of LED in parallel
11.	ledpartnumber	XPGWHT-L1-0000-00H51	LED Part number
12.	ledseries	10.0	Number of LED in series
13.	line_fsw	60.0	AC Line Frequency
14.	source	DC	Input Source Type
15.	ta	30.0	Ambient temperature

Design Assistance

1. LM3429 Product Folder : http://www.ti.com/product/LM3429 : contains the data sheet and other resources.