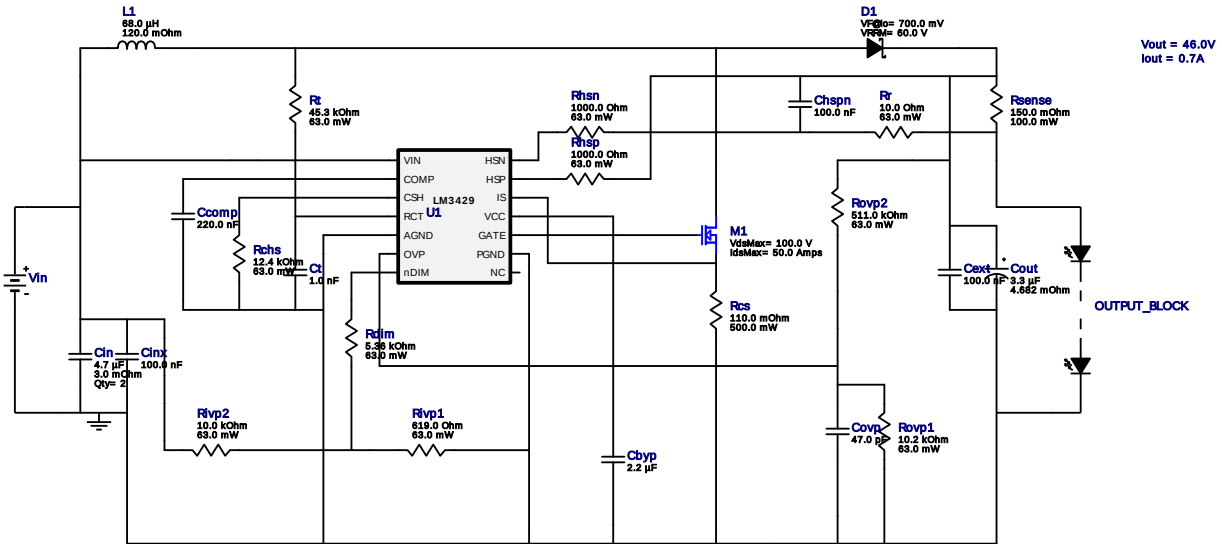
TEXAS INSTRUMENTS

WEBENCH® Design Report

VinMin = 24.0V
VinMax = 32.0V
Vout = 46.0V
Iout = 0.7A

Device = LM3429MH/NOPB
Topology = Boost
Created = 9/27/16 9:44:21 PM
BOM Cost = $2.81
BOM Count = 30
Total Pd = 7.25W

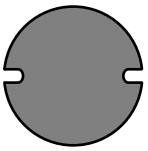
Design : 1284796/4340 LM3429MH/NOPB
LM3429MH/NOPB 24.0V-32.0V to 75.45V @ 0.6639684946236559A

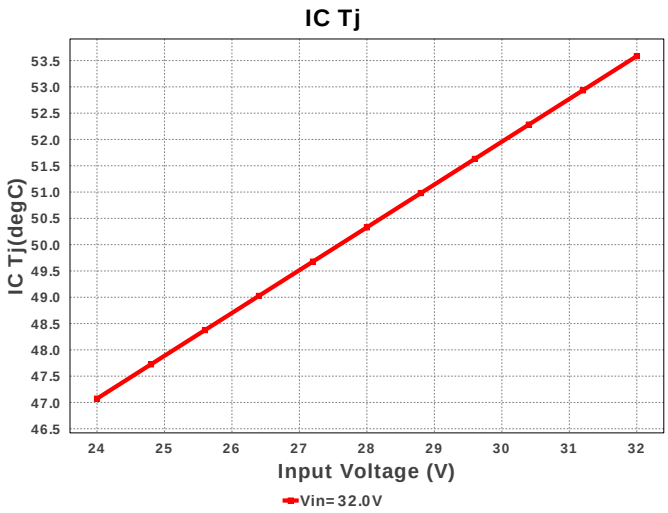


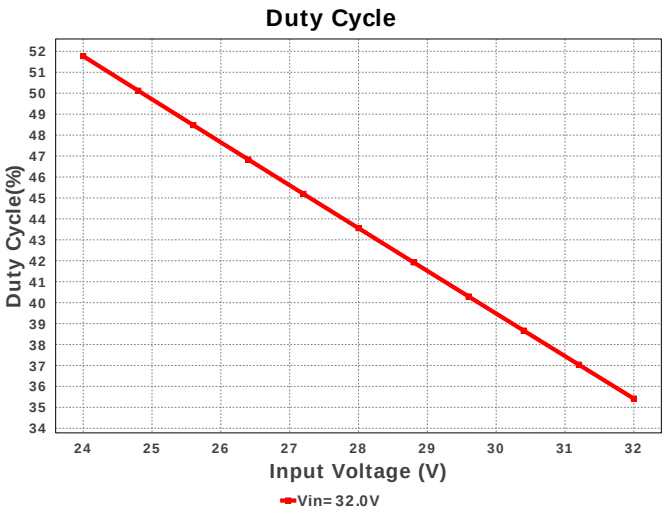
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

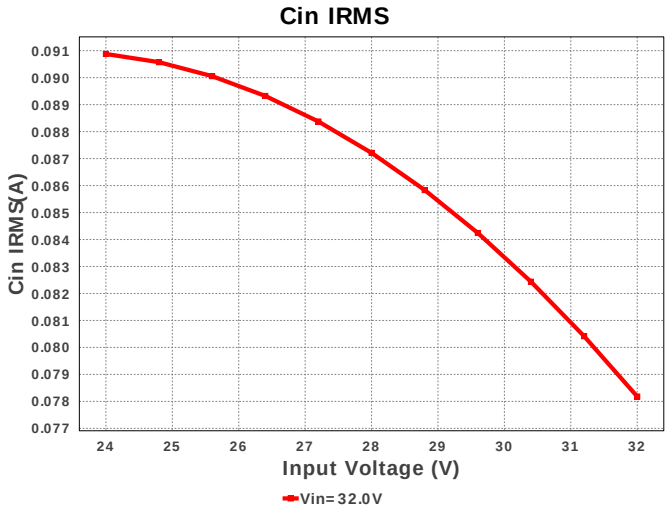
Electrical BOM

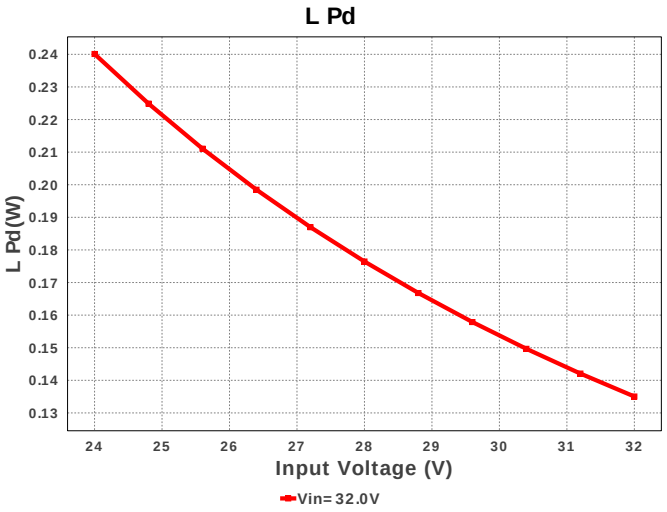
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
2.	Ccomp	MuRata	GRM155C80G224KE01D Series= X6S	Cap= 220.0 nF VDC= 4.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cext	Taiyo Yuden	HMK212B7104KG-T Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	$0.03	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	2	$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	C3225X7S2A335K200AB Series= X7S	Cap= 3.3 uF ESR= 4.682 mOhm VDC= 100.0 V IRMS= 3.39944 A	1	$0.24	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	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²

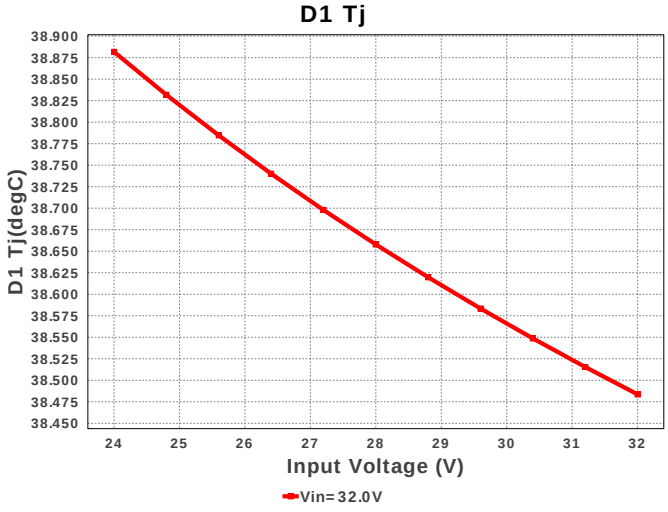
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	D1	Diodes Inc.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.09	 SMA 37 mm^2
11.	D_LED	Cree	XHP50A-00-0000-0D0BJ40CB	LED	4	$5.18	 xlampxhp 0 mm^2
12.	L1	Bourns	SDR1307-680KL	L= 68.0 µH DCR= 120.0 mOhm	1	$0.35	 SDR1307 227 mm^2
13.	M1	Texas Instruments	CSD19537Q3	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	$0.50	 DQG0008A 18 mm^2
14.	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
15.	Rcs	Rohm	MCR25JZHFLR110 Series= MCR25	Res= 110.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.03	 1210 15 mm^2
16.	Rdim	Vishay-Dale	CRCW04025K36FKED Series= CRCW..e3	Res= 5.36 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
17.	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
18.	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
19.	Rivp1	Vishay-Dale	CRCW0402619RFKED Series= CRCW..e3	Res= 619.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
20.	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
21.	Rovp1	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
22.	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
23.	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
24.	Rsense	Panasonic	ERJ-3RSFR15V Series= ERJ-3R	Res= 150.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.03	 0603 5 mm^2
25.	Rt	Vishay-Dale	CRCW040245K3FKED Series= CRCW..e3	Res= 45.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
26.	U1	Texas Instruments	LM3429MH/NOPB	Switcher	1	$1.20	 MXA14A 59 mm^2

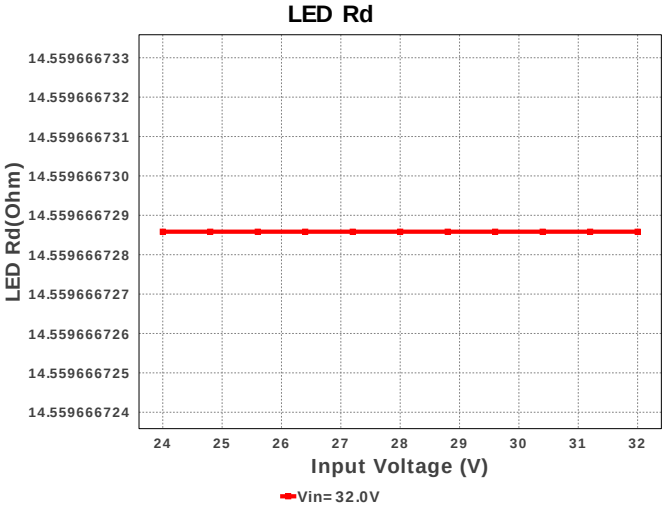


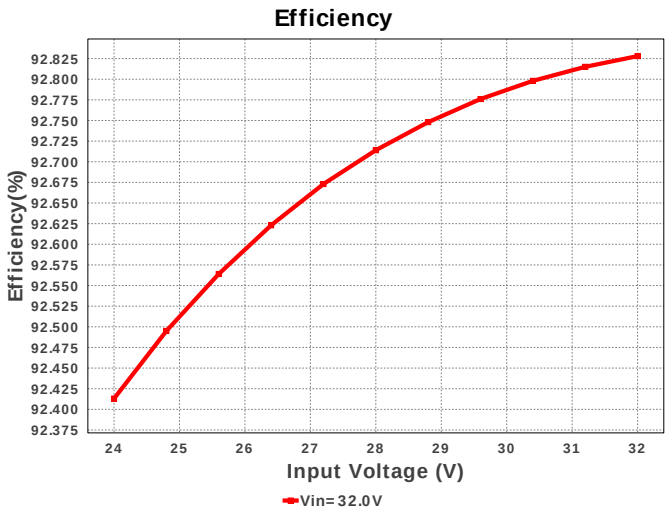


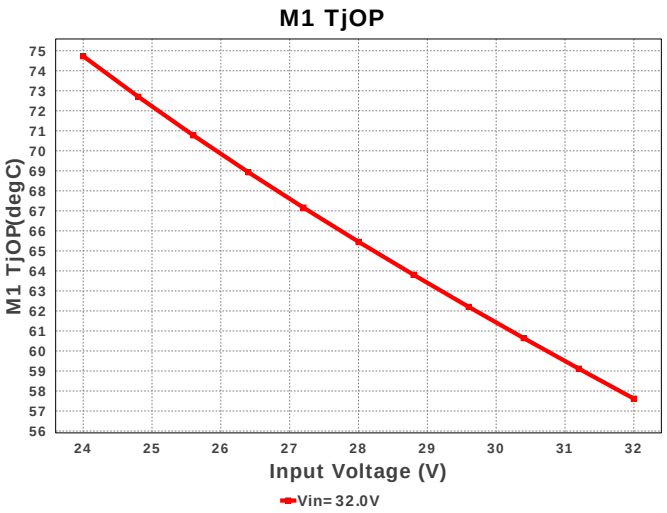


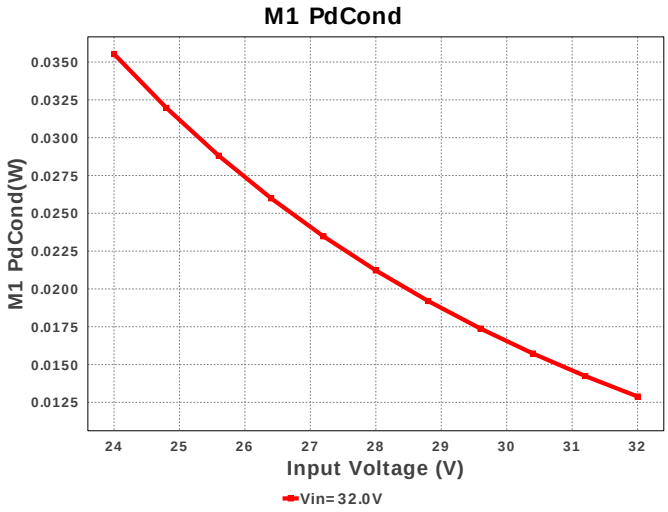


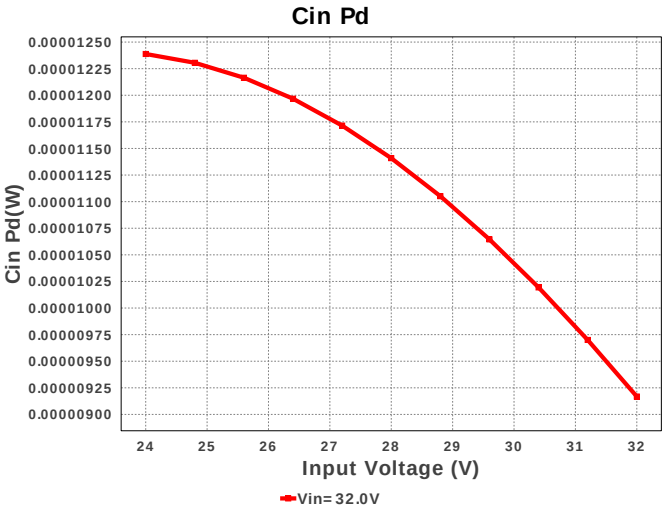


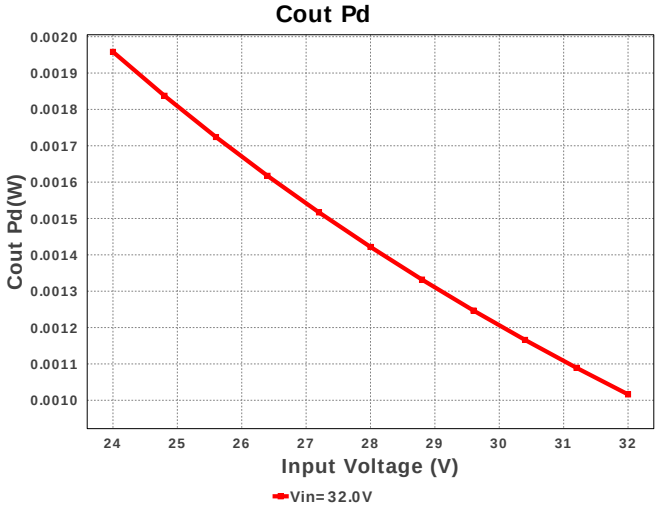


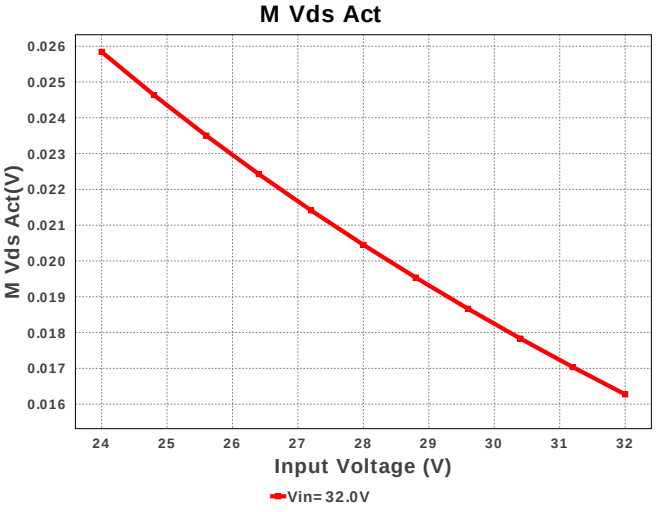


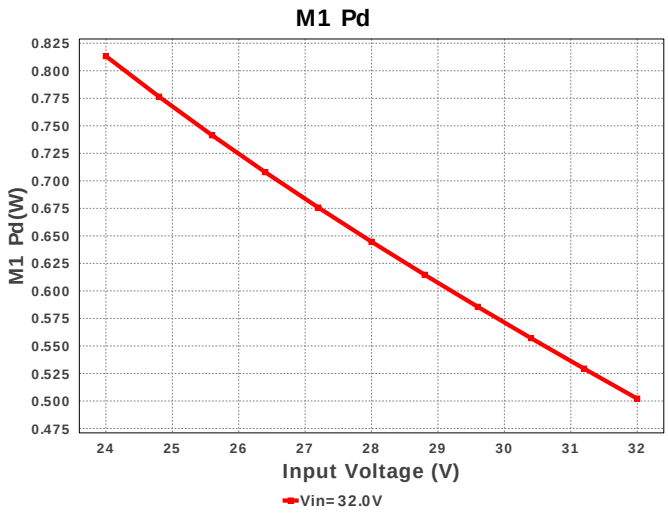


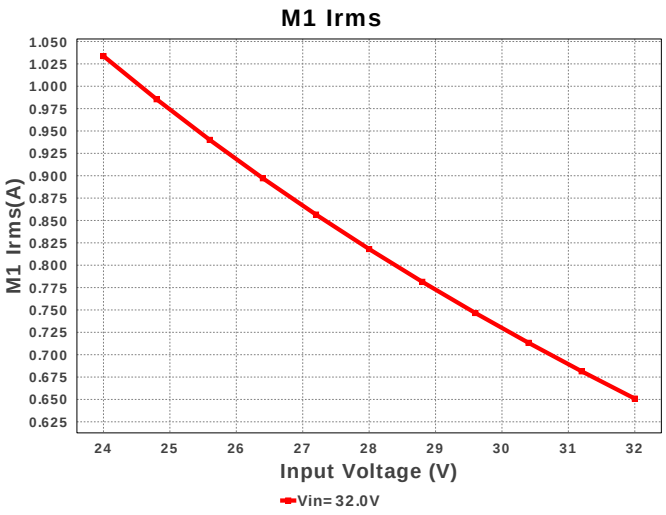


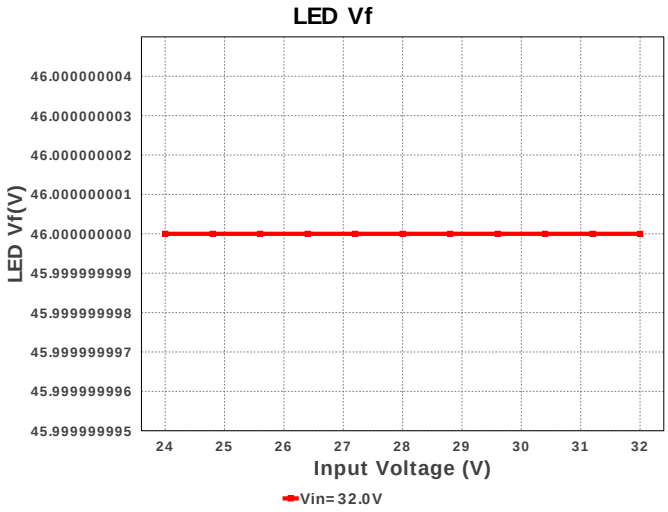


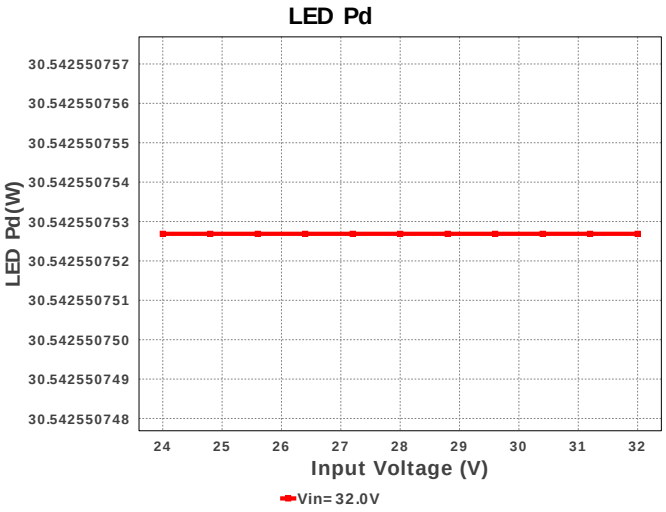


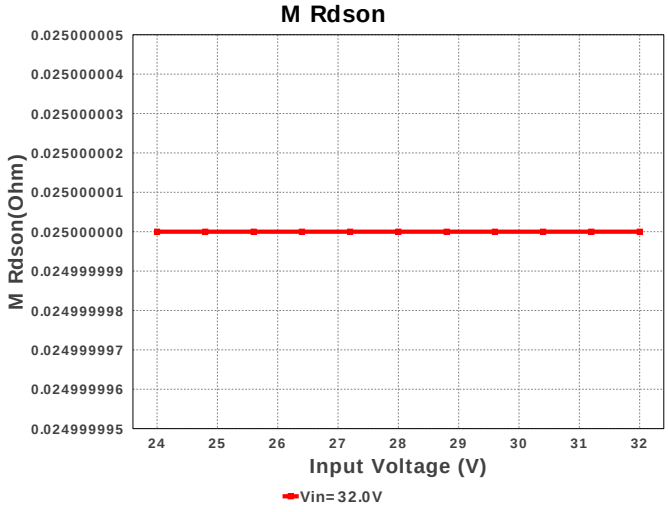


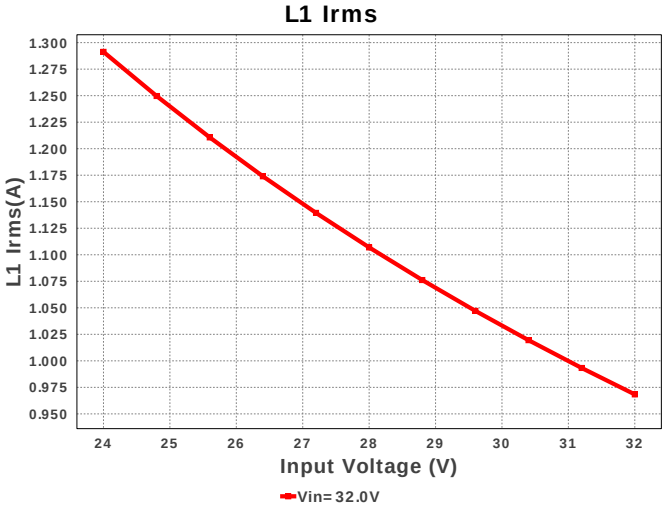


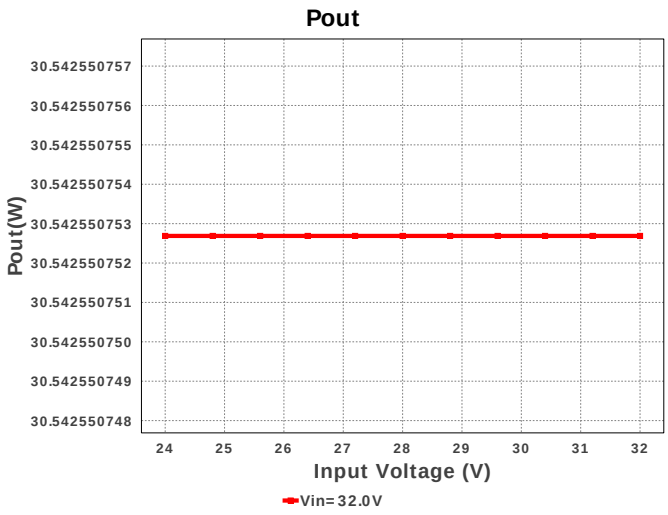


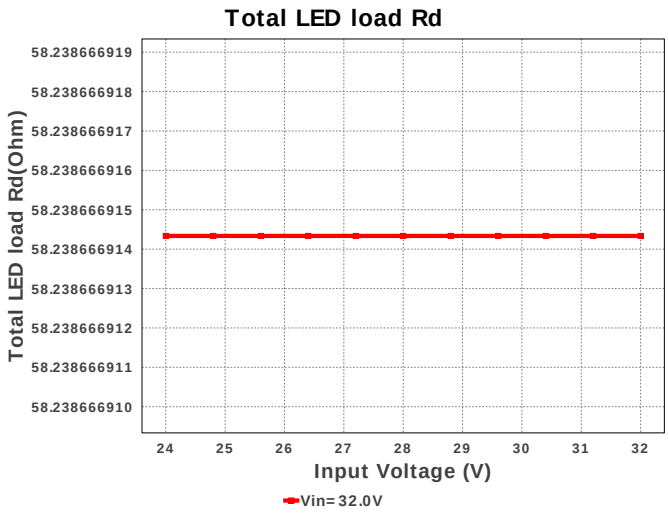


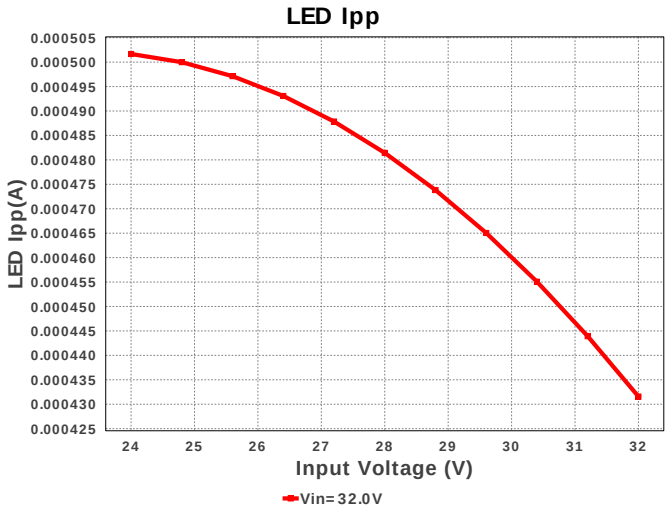


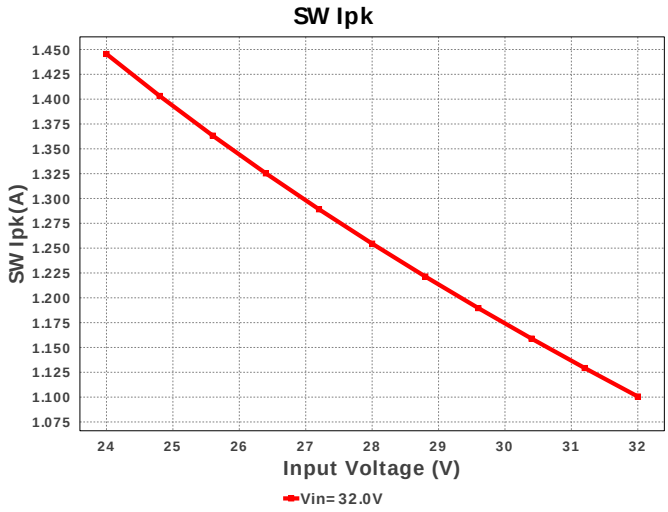


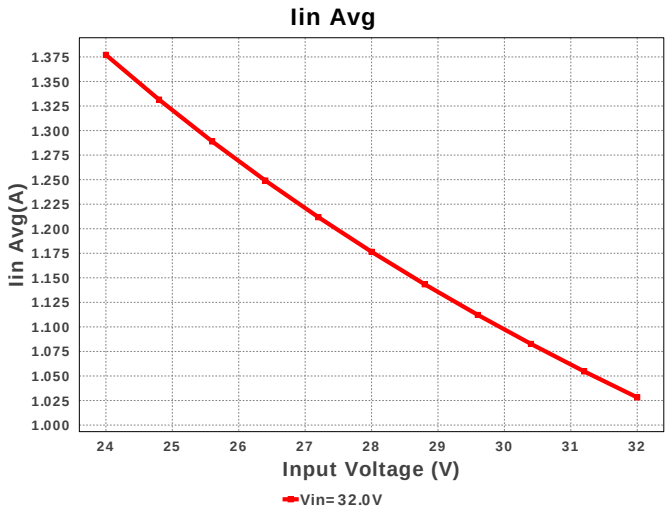


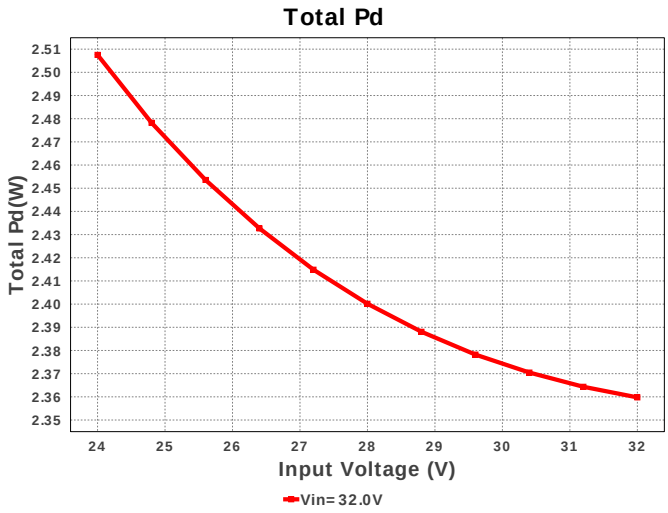


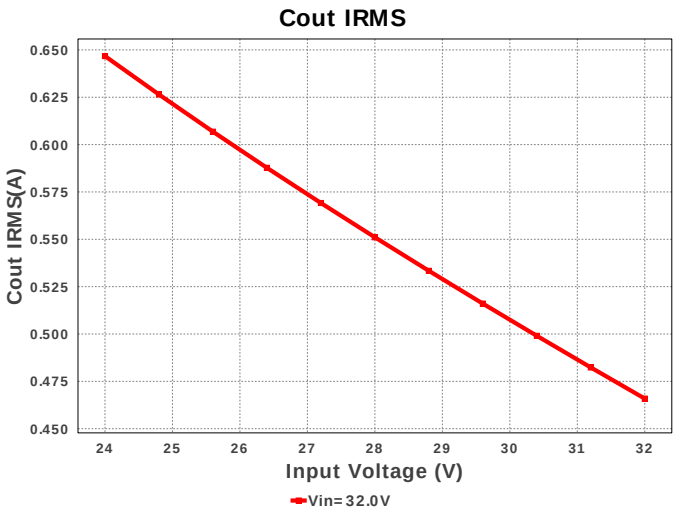


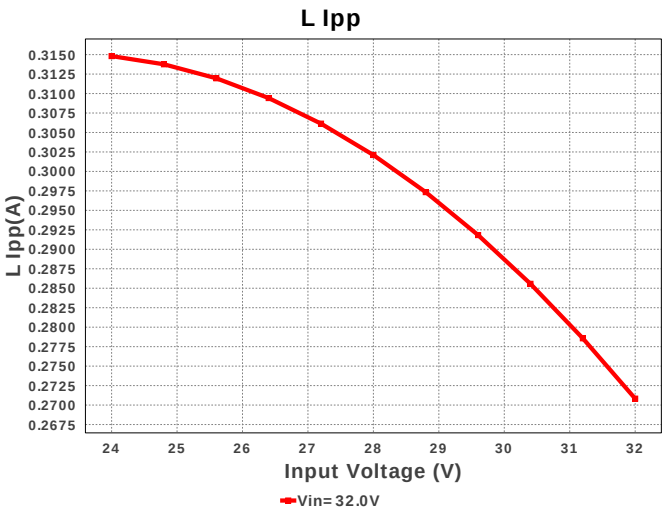


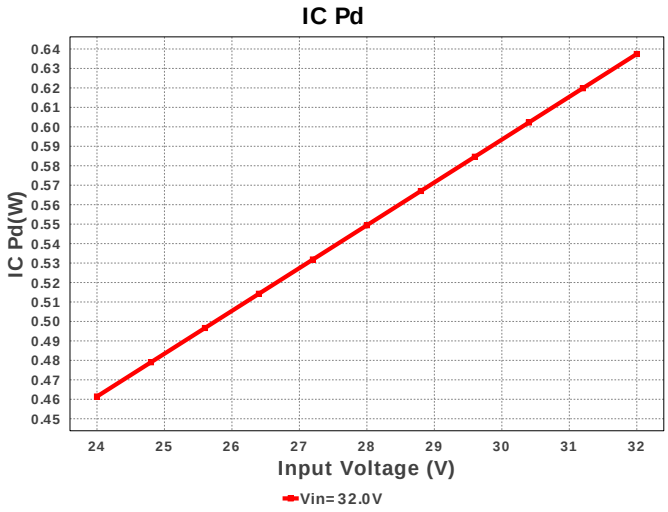


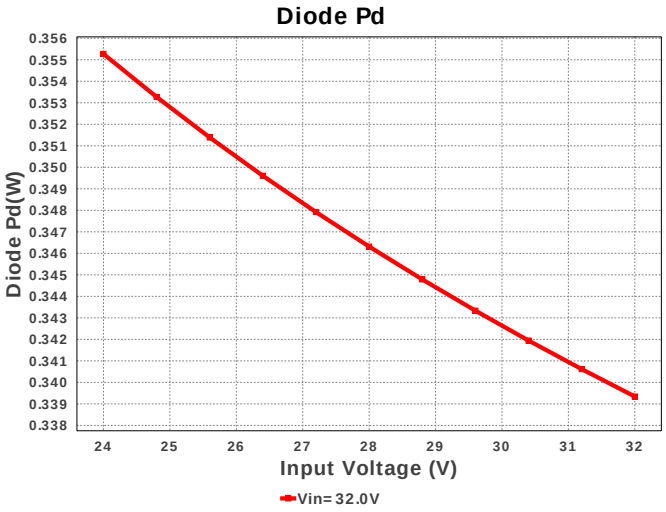


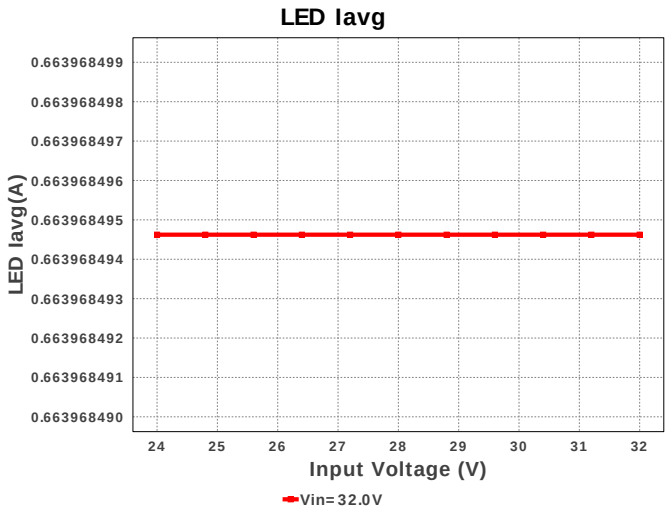


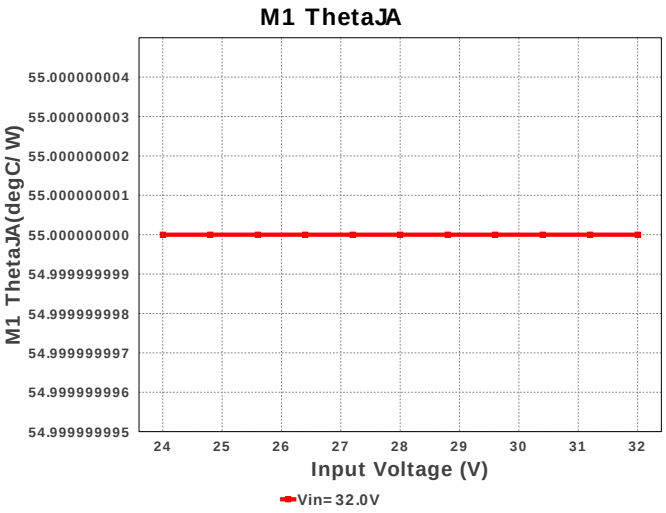


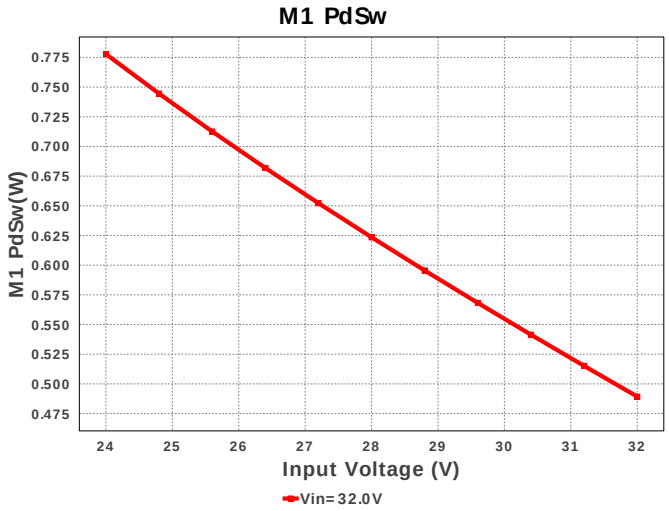












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	128.151 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	944.83 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.39 A	Current	Average input current
4.	L Ipp	443.93 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	2.107 A	Current	Inductor ripple current
6.	LED Iavg	663.968 mA	Current	LED Average Current
7.	LED Ipp	707.43 µA	Current	LED Ripple Current
8.	M1 Irms	1.963 A	Current	M1 MOSFET Irms
9.	SW Ipk	2.325 A	Current	Peak switch current
10.	BOM Count	30	General	Total Design BOM count
11.	FootPrint	468.0 mm^2	General	Total Foot Print Area of BOM components
12.	Frequency	546.358 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	13.346 mV	General	M Vds
16.	M1 ThetaJA	50.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
17.	Mode	CCM	General	Conduction Mode
18.	Pout	50.097 W	General	Total output power
19.	Total BOM	$2.81	General	Total BOM Cost
20.	D1 Tj	38.882 degC	Op_Point	D1 junction temperature
21.	Vout OP	75.45 V	Op_Point	Operational Output Voltage
22.	Duty Cycle	72.175 %	Op_point	Duty cycle
23.	Efficiency	87.35 %	Op_point	Steady state efficiency
24.	IC Tj	48.431 degC	Op_point	IC junction temperature
25.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
26.	IOUT_OP	663.97 mA	Op_point	Iout operating point
27.	LED Rd	14.56 Ohm	Op_point	LED DynamicResistance
28.	LED Vf	75.45 V	Op_point	Total LED Forward Calculated Voltage
29.	M1 TjOP	267.084 degC	Op_point	M1 MOSFET junction temperature
30.	VIN_OP	24.0 V	Op_point	Vin operating point
31.	Cin Pd	24.634 µW	Power	Input capacitor power dissipation
32.	Cout Pd	4.18 mW	Power	Output capacitor power dissipation
33.	Diode Pd	355.268 mW	Power	Diode power dissipation
34.	IC Pd	498.146 mW	Power	IC power dissipation
35.	L Pd	639.193 mW	Power	Inductor power dissipation
36.	LED Pd	50.097 W	Power	LED Power Dissipation
37.	M1 Pd	4.742 W	Power	M1 MOSFET total power dissipation
38.	M1 PdCond	51.557 mW	Power	M1 MOSFET conduction losses
39.	M1 PdSw	4.69 W	Power	M1 MOSFET switching losses
40.	Total Pd	7.255 W	Power	Total Power Dissipation
41.	Total LED load Rd	58.239 Ohm		Total LED Load DynamicResistance
42.	Vout Tolerance	33.134 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	46.0	Output Voltage
5.	application	LED_DRIVER	LED Application

#	Name	Value	Description
6.	base_pn	LM3429	Texas Instruments Base Part Number
7.	isLEDArchitect	N	LED Architect Project
8.	ledparallel	1.0	Number of LED in parallel
9.	ledpartnumber	XHP50A-00-0000-0D0BL40CB	LED part number
10.	ledseries	4.0	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. LM3429 Product Folder : http://www.ti.com/product/LM3429 : contains the data sheet and other resources.