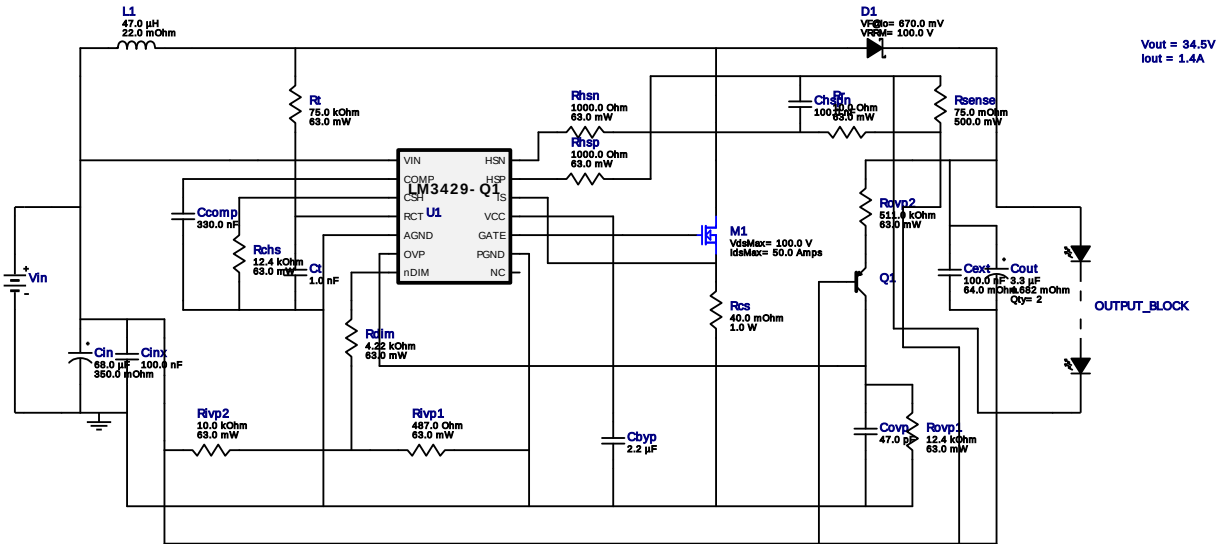
VinMin = 30.0V
VinMax = 36.0V
Vout = 34.5V
Iout = 1.4A

Device = LM3429Q1MH/NOPB
Topology = Buck_Boost
Created = 7/16/16 6:29:14 PM
BOM Cost = $25.68
BOM Count = 33
Total Pd = 4.45W

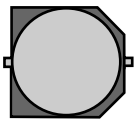
WEBENCH® Design Report

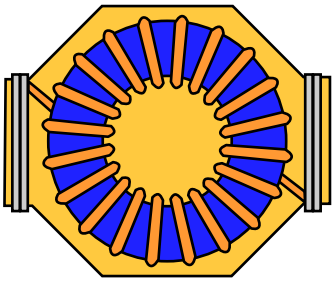
Design : 906020/2248 LM3429Q1MH/NOPB
LM3429Q1MH/NOPB 30.0V-36.0V to 56.59V @ 1.3279469892473117A



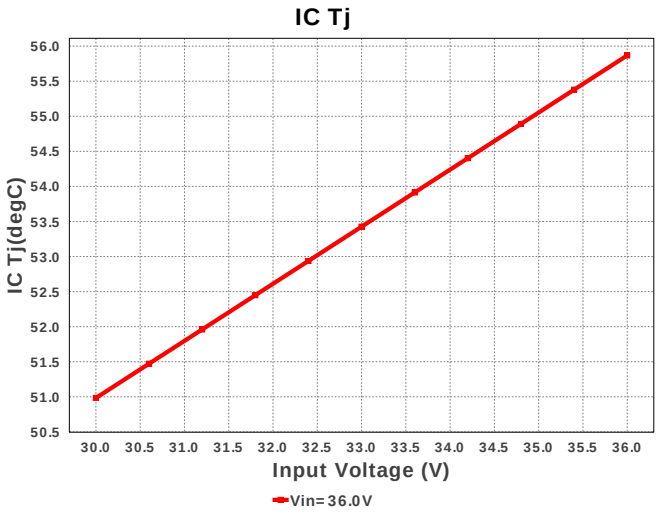
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

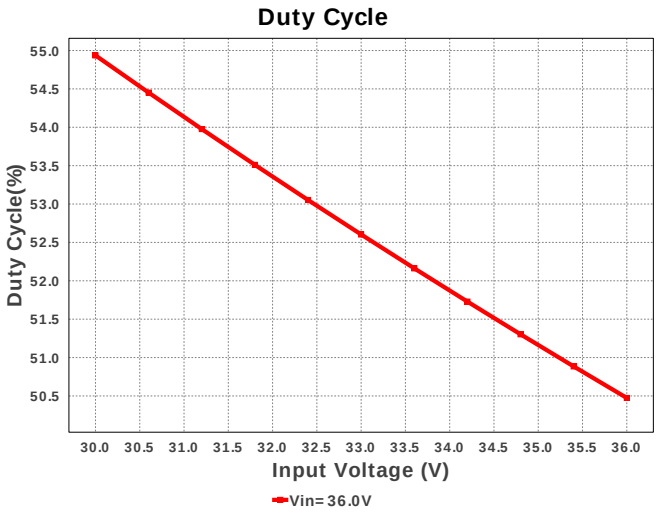
Electrical BOM

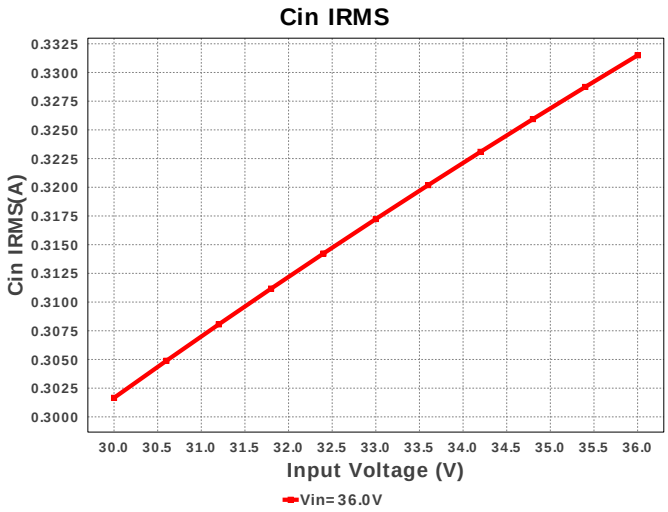
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
2.	Ccomp	MuRata	GRM155R60J334KE01D Series= X5R	Cap= 330.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cext	Kemet	C0805C104K5RACTU Series= 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	Panasonic	EEE-FK1J680UP Series= FK	Cap= 68.0 uF ESR= 350.0 mOhm VDC= 63.0 V IRMS= 400.0 mA	1	$0.21	 SM_RADIAL_G 172 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	2	$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

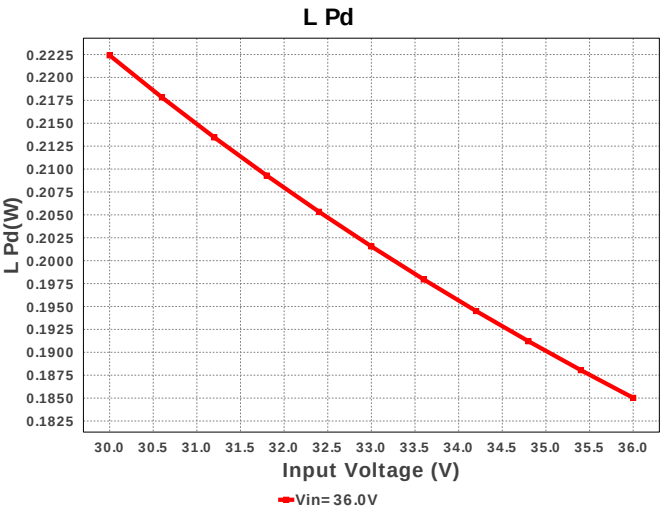
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Ct	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0805 7 mm^2
10.	D1	Fairchild Semiconductor	FSV8100V	VF@Io= 670.0 mV VRRM= 100.0 V	1	$0.21	 TO-277A 56 mm^2
11.	D_LED	Cree	XHP50A-00-0000-0D00J20DT	LED	6	$3.51	 xlampxhp 0 mm^2
12.	L1	Bourns	PM2110-470K-RC	L= 47.0 µH DCR= 22.0 mOhm	1	$1.21	 PM2110 890 mm^2
13.	M1	Texas Instruments	CSD19534Q5A	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	$0.68	 TRANS_NexFET_Q5A 55 mm^2
14.	Q1	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	$0.02	 SOT-23 14 mm^2
15.	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
16.	Rcs	Stackpole Electronics Inc	CSRN2010FK40L0 Series= ?	Res= 40.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	$0.15	 2010 32 mm^2
17.	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
18.	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
19.	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
20.	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
21.	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
22.	Rovp1	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.	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
24.	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
25.	Rsense	Stackpole Electronics Inc	CSR1206FK75L0 Series= ?	Res= 75.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.10	 1206 11 mm^2

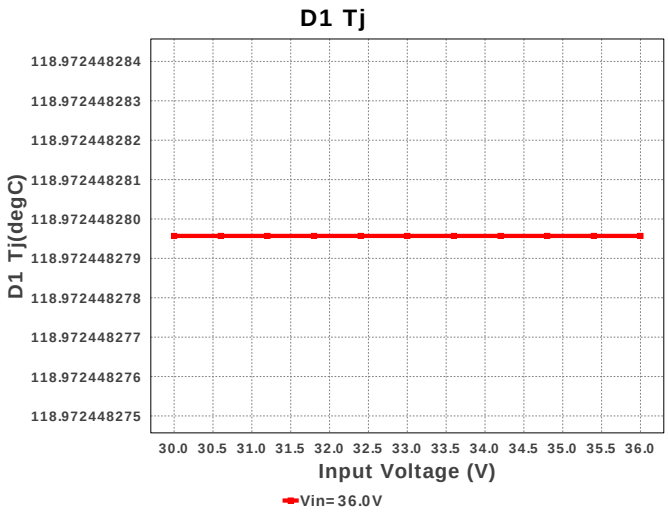
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
26.	Rt	Vishay-Dale	CRCW040275K0FKED Series= CRCW..e3	Res= 75.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
27.	U1	Texas Instruments	LM3429Q1MH/NOPB	Switcher	1	$1.35	 MXA14A 59 mm^2

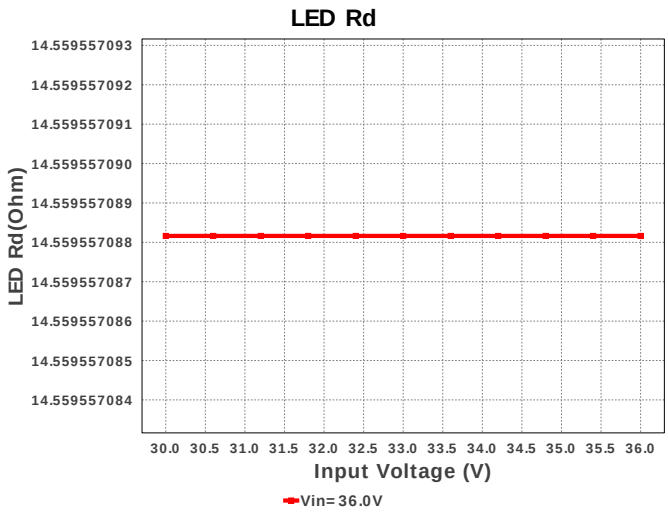


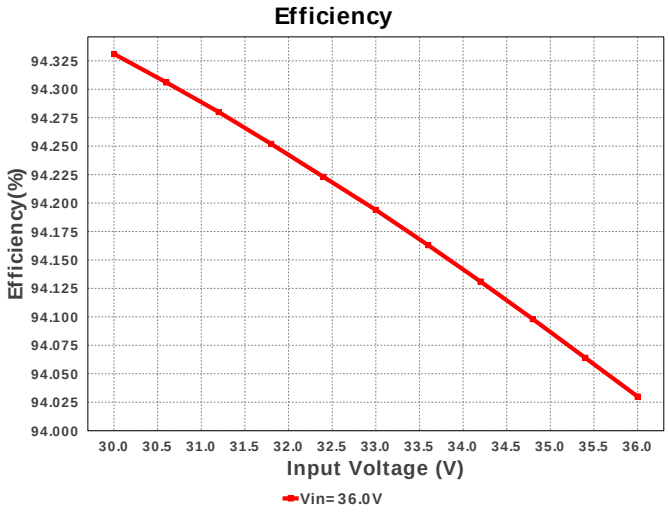


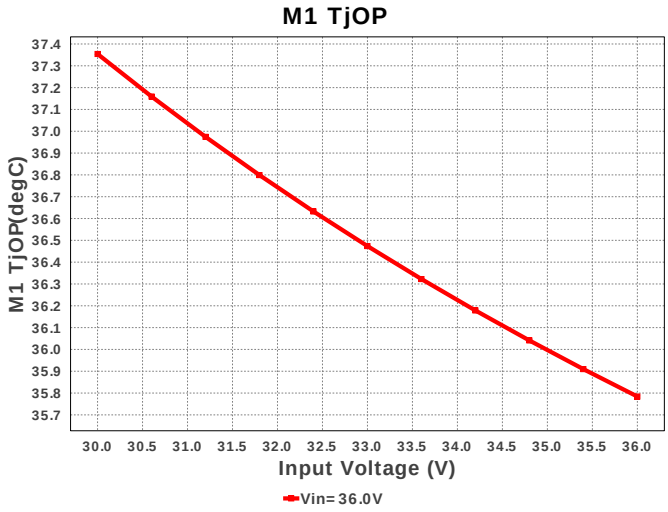


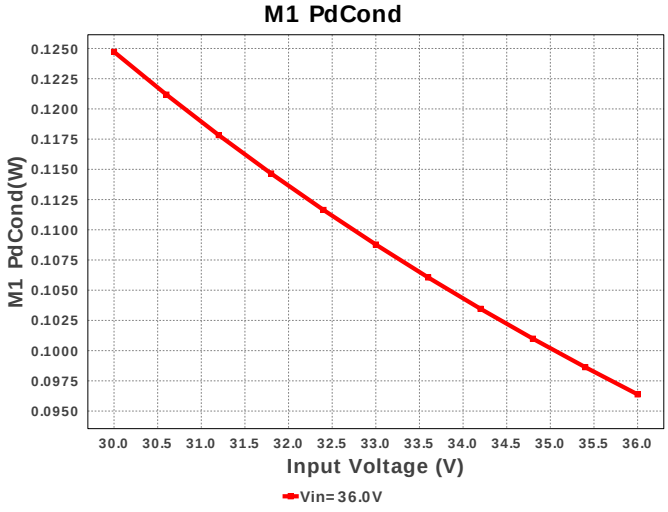


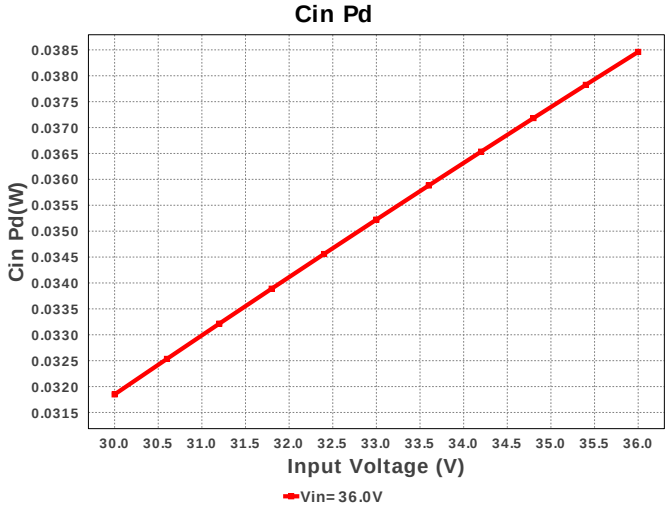


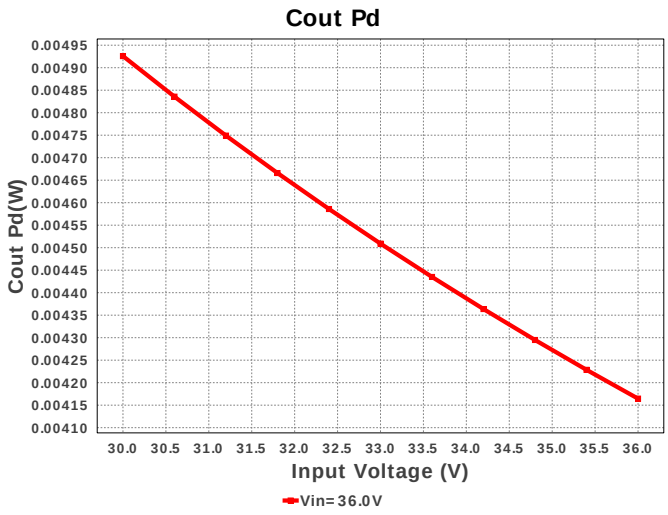


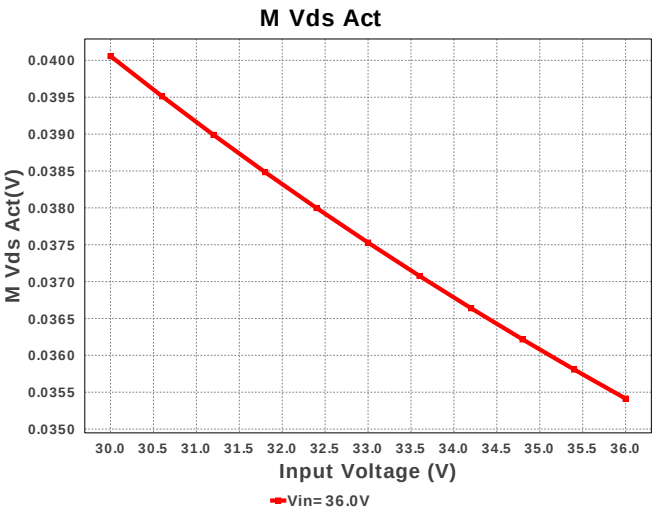


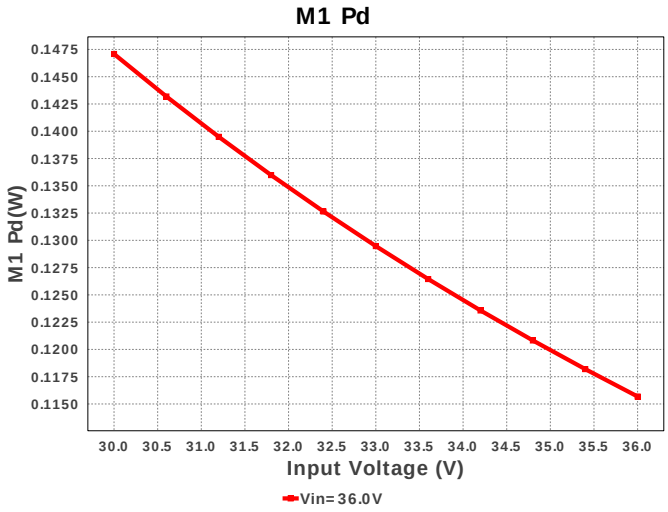


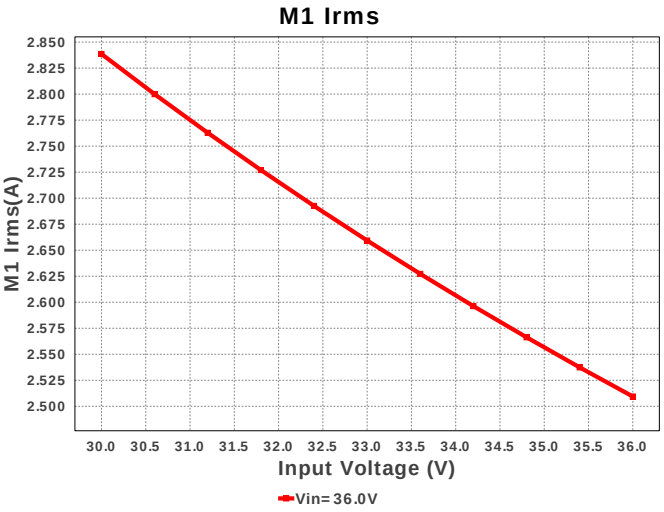


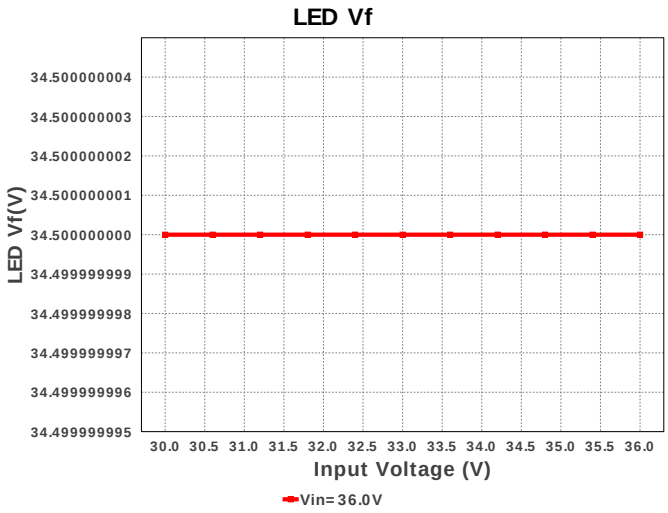


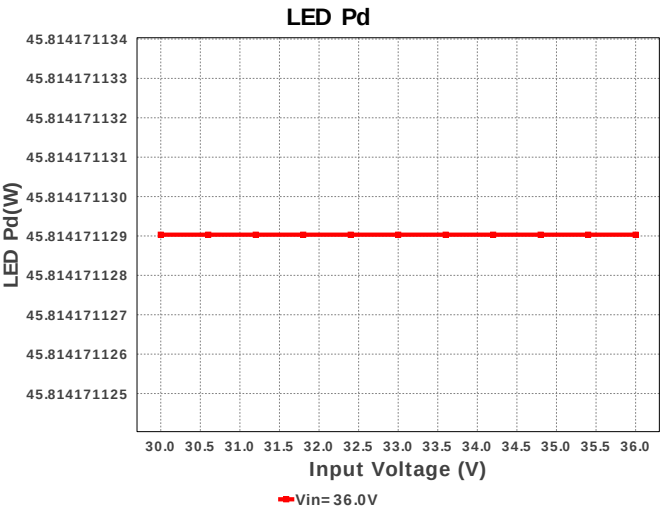


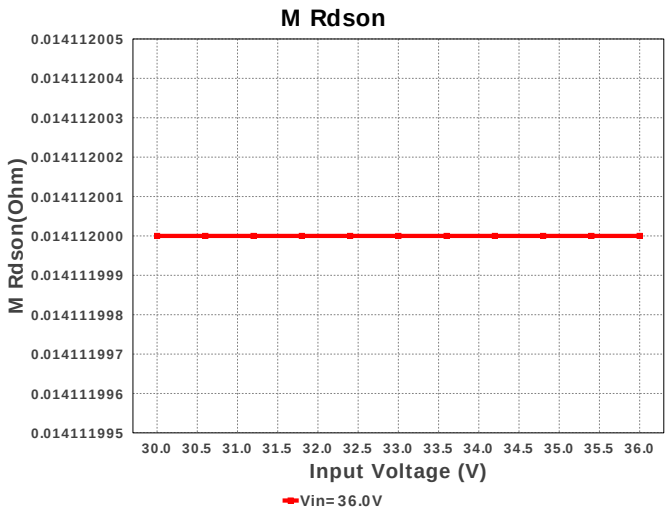


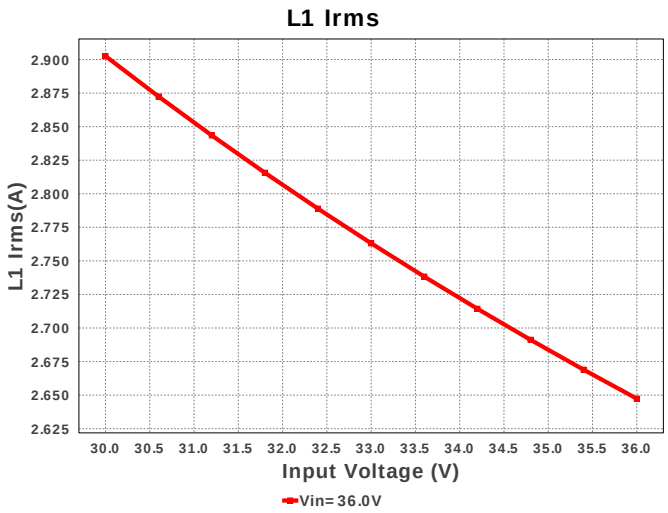


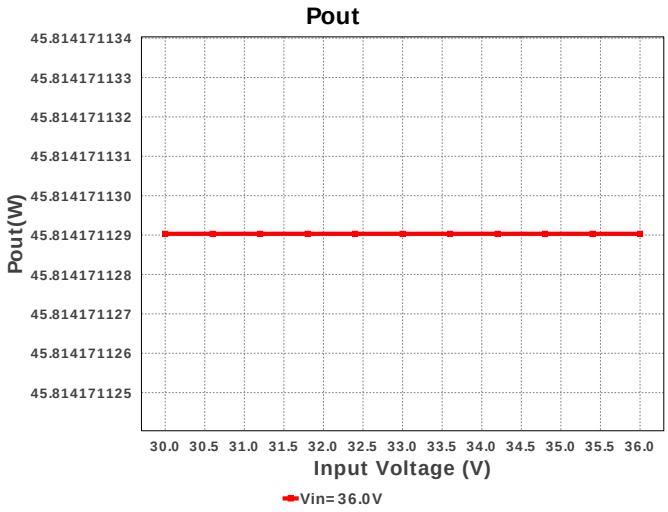


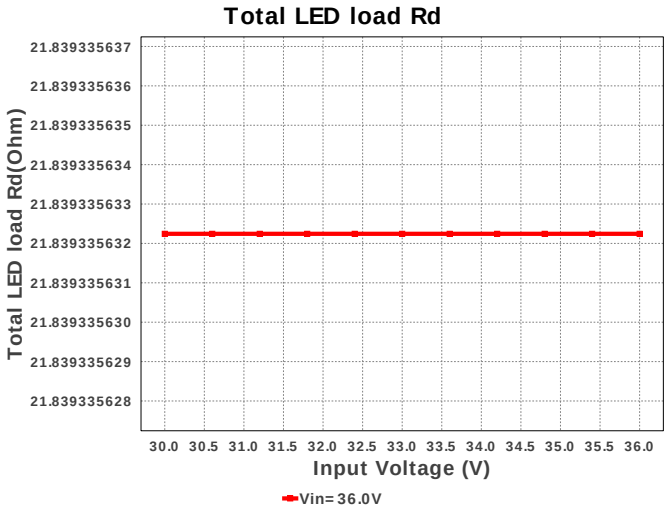


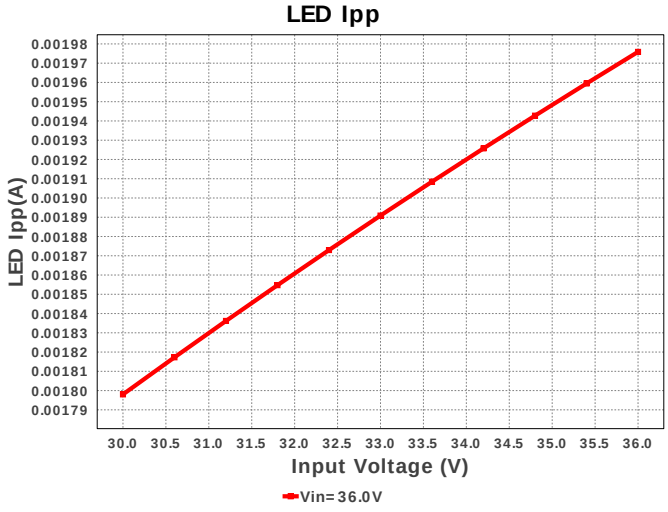


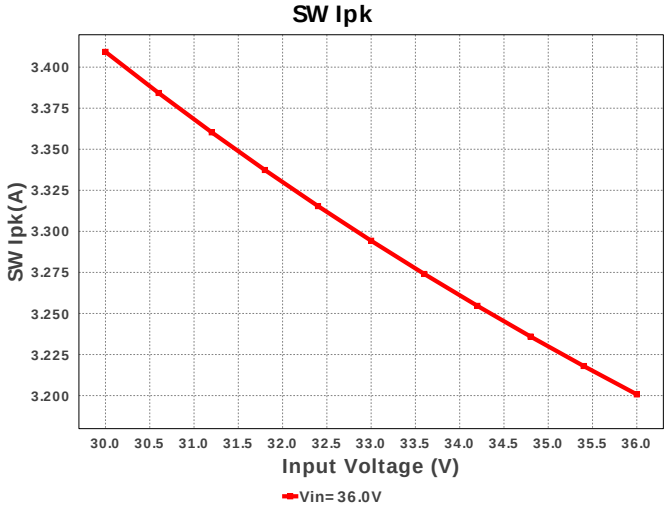


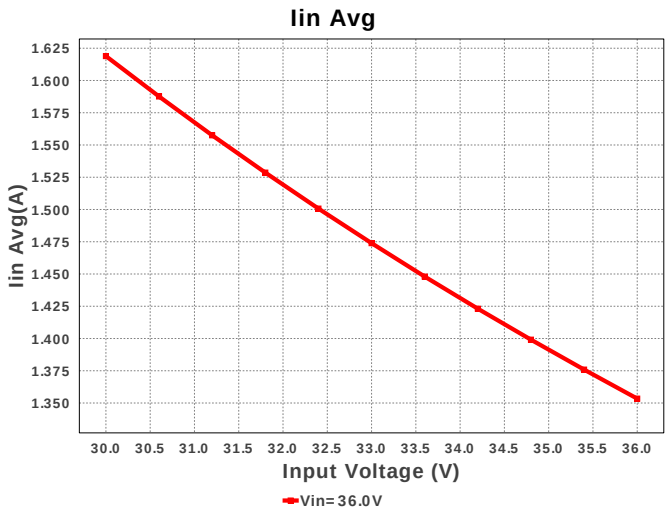


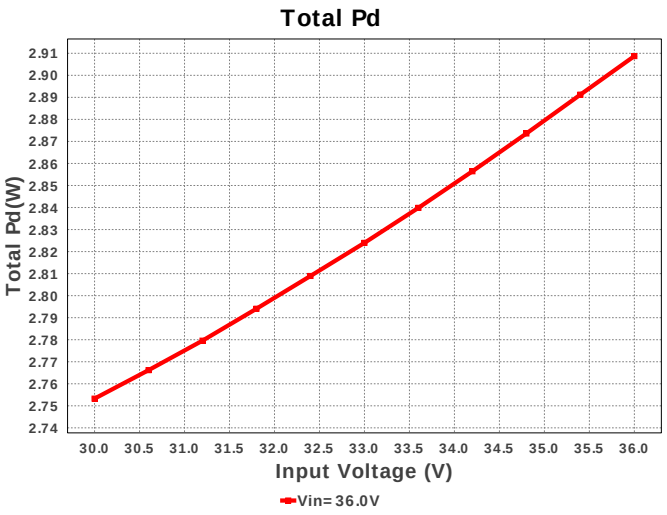


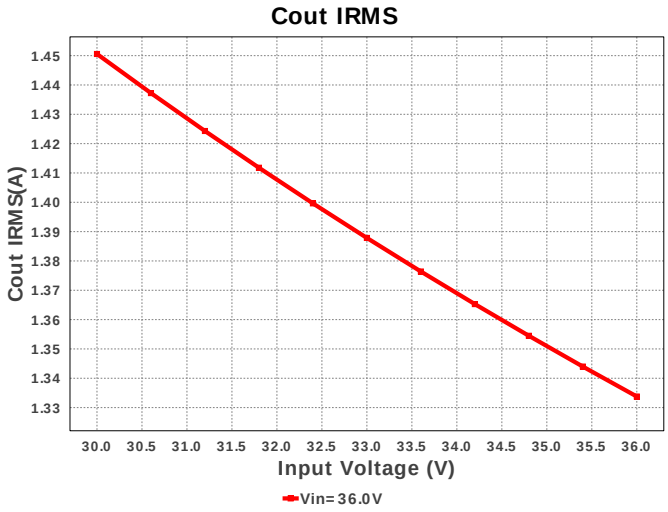


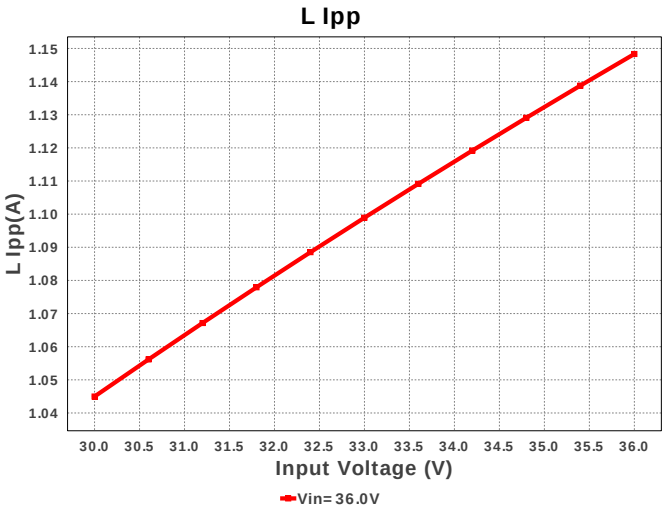


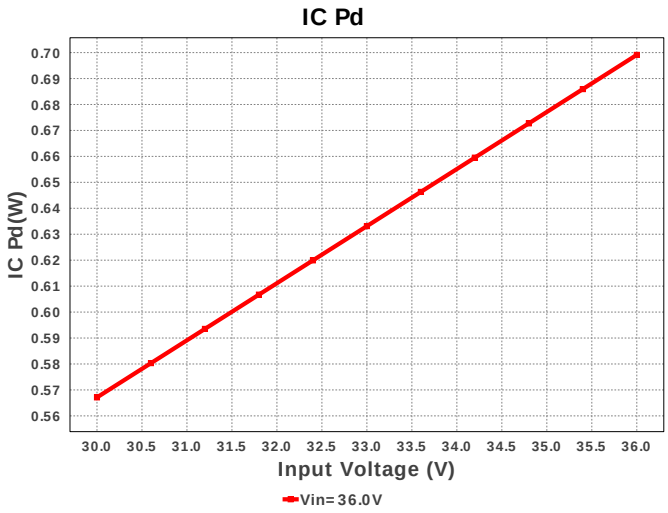


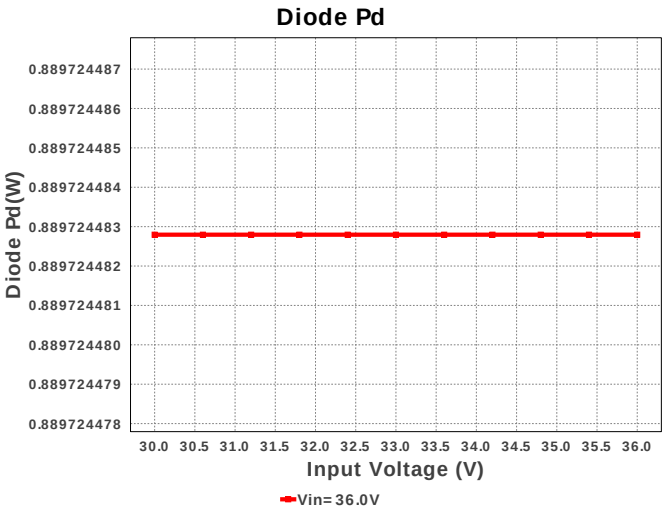


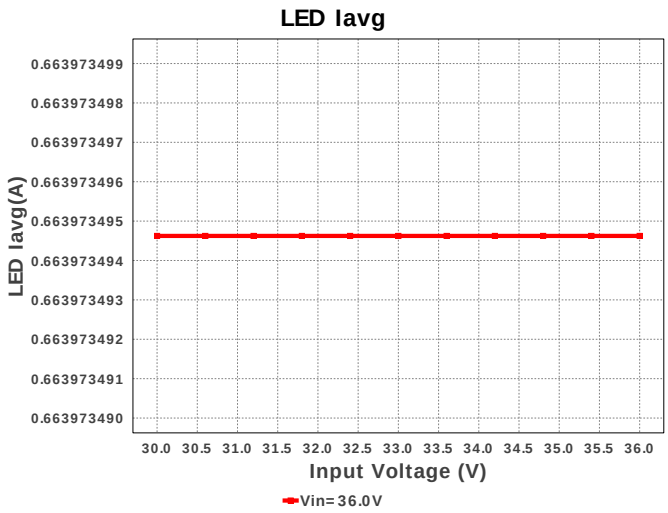


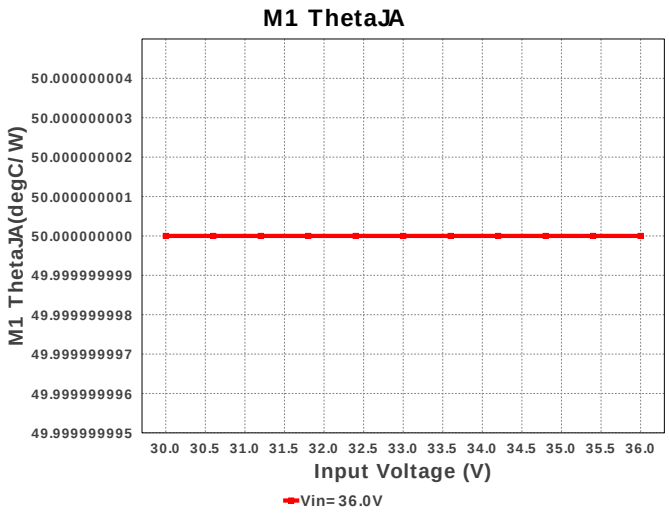


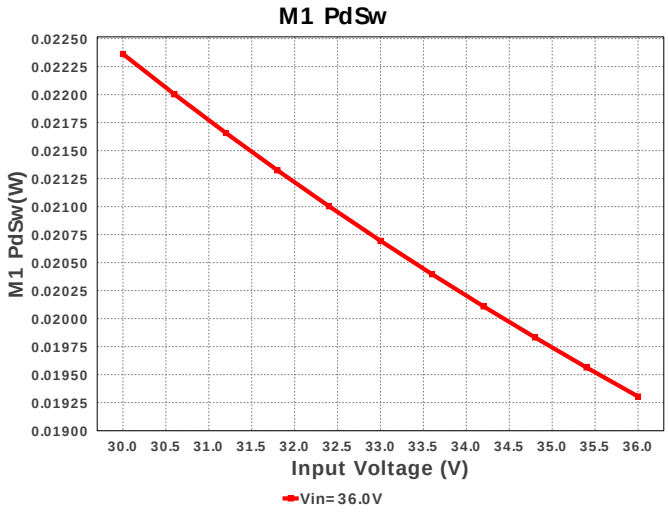












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	366.716 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.835 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.653 A	Current	Average input current
4.	L Ipp	1.27 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	3.882 A	Current	Inductor ripple current
6.	LED Iavg	663.973 mA	Current	LED Average Current
7.	LED Ipp	2.186 mA	Current	LED Ripple Current
8.	M1 Irms	4.08 A	Current	M1 MOSFET Irms
9.	SW Ipk	4.5 A	Current	Peak switch current
10.	BOM Count	33	General	Total Design BOM count
11.	FootPrint	1.39 k mm^2	General	Total Foot Print Area of BOM components
12.	Frequency	330.0 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	27.744 mV	General	M Vds
16.	M1 ThetaJA	50.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
17.	Pout	75.146 W	General	Total output power
18.	Total BOM	$25.68	General	Total BOM Cost
19.	D1 Tj	237.422 degC	Op_Point	D1 junction temperature
20.	Vout OP	56.588 V	Op_Point	Operational Output Voltage
21.	Duty Cycle	66.642 %	Op_point	Duty cycle
22.	Efficiency	94.415 %	Op_point	Steady state efficiency
23.	IC Tj	51.702 degC	Op_point	IC junction temperature
24.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
25.	IOUT_OP	1.328 A	Op_point	Iout operating point
26.	LED Rd	14.56 Ohm	Op_point	LED DynamicResistance
27.	LED Vf	56.588 V	Op_point	Total LED Forward Calculated Voltage
28.	M1 TjOP	39.529 degC	Op_point	M1 MOSFET junction temperature
29.	VIN_OP	30.0 V	Op_point	Vin operating point
30.	Cin Pd	47.068 mW	Power	Input capacitor power dissipation
31.	Cout Pd	7.878 mW	Power	Output capacitor power dissipation

#	Name	Value	Category	Description
32.	Diode Pd	2.074 W	Power	Diode power dissipation
33.	IC Pd	586.528 mW	Power	IC power dissipation
34.	L Pd	397.881 mW	Power	Inductor power dissipation
35.	LED Pd	75.146 W	Power	LED Power Dissipation
36.	M1 Pd	190.589 mW	Power	M1 MOSFET total power dissipation
37.	M1 PdCond	119.778 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	70.812 mW	Power	M1 MOSFET switching losses
39.	Total Pd	4.445 W	Power	Total Power Dissipation
40.	Total LED load Rd	21.839 Ohm		Total LED Load DynamicResistance
41.	Vout Tolerance	44.179 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.4	Maximum Output Current
2.	VinMax	36.0	Maximum input voltage
3.	VinMin	30.0	Minimum input voltage
4.	Vout	34.5	Output Voltage
5.	application	LED_DRIVER	LED Application
6.	base_pn	LM3429-Q1	Texas Instruments Base Part Number
7.	isLEDArchitect	N	LED Architect Project
8.	ledparallel	2.0	Number of LED in parallel
9.	ledpartnumber	XHP50A-00-0000-0D00L240F	LED Part number
10.	ledseries	3.0	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. Feature Highlights: Automotive Qualified LED Driver. Please consult product datasheet for detailed specifications.

2. The LM3429-Q1 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

3. LM3429-Q1 Product Folder : http://www.ti.com/product/LM3429%2DQ1 : contains the data sheet and other resources.