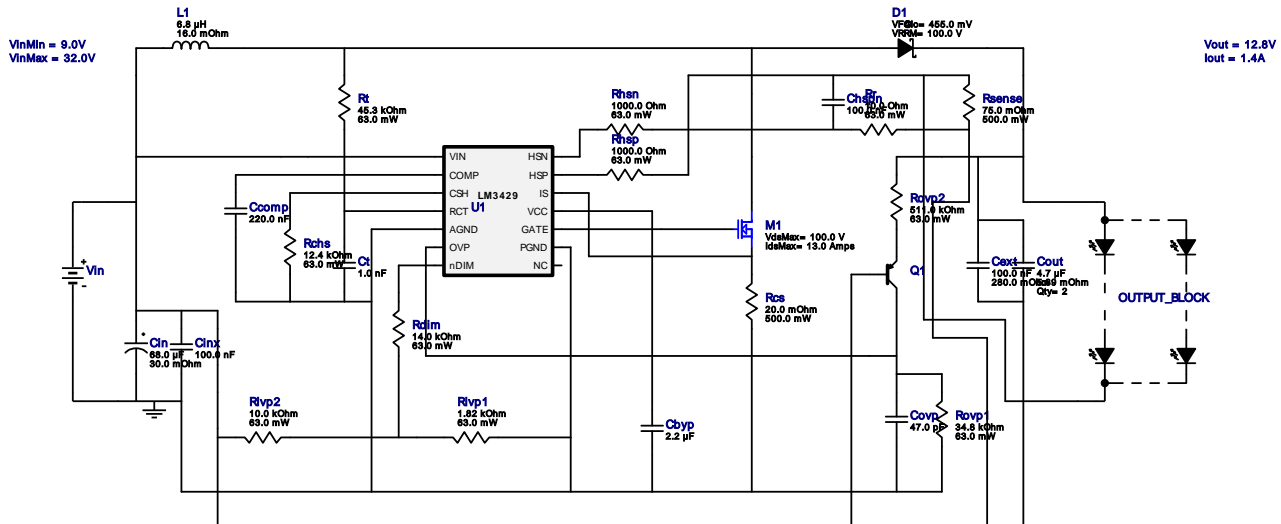





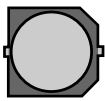



WEBENCH® Design Report

Design : 4410947/5 LM3429MH/NOPB
LM3429MH/NOPB 9.0V-32.0V to 13.54V @ 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.

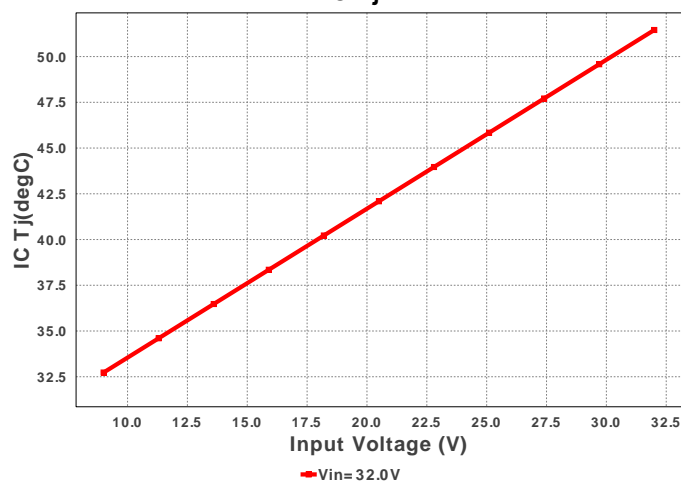
Electrical BOM

#	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 mm ²
2.	Ccomp	MuRata	GRM155C80G224KE01D Series= 379	Cap= 220.0 nF VDC= 4.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
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 7 mm ²
4.	Chspn	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
5.	Cin	Panasonic	EEHZA1H680P Series= 1267	Cap= 68.0 uF ESR= 30.0 mOhm VDC= 50.0 V IRMS= 1.8 A	1	\$0.97	 SM_RADIAL_8MM 113 mm ²
6.	Cinx	MuRata	GRM188R72A104KA35D Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	\$0.03	 0603 5 mm ²
7.	Cout	TDK	C3225X7S2A475M200AB Series= 479	Cap= 4.7 uF ESR= 5.89 mOhm VDC= 100.0 V IRMS= 6.7739 A	2	\$0.42	 1210 15 mm ²
8.	Covp	Kemet	C0805C470K5GACTU Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²

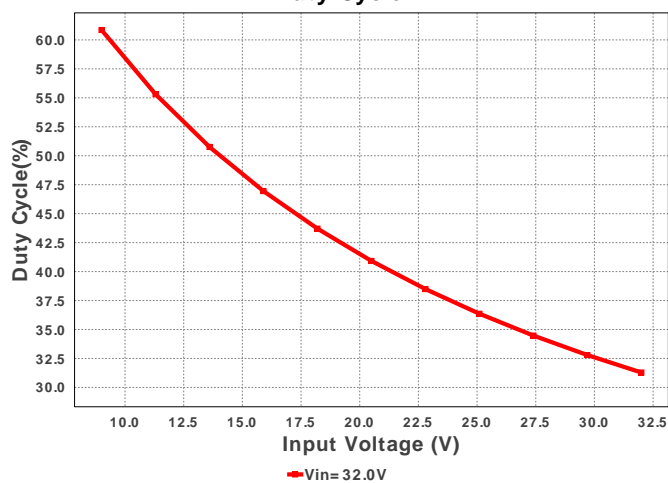
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Ct	Yageo America	CC0805JRNPO9BN102 Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
10.	D1	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
11.	D_LED	OSRAM	LD CP7P1T2U	LED	16	\$3.33	 oslon 17 mm ²
12.	L1	Bourns	SRP1250-6R8M	L= 6.8 µH DCR= 16.0 mOhm	1	\$0.64	 SRP1250 253 mm ²
13.	M1	Texas Instruments	CSD19533Q5A	VdsMax= 100.0 V IdsMax= 13.0 Amps	1	\$0.83	 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	CSR1206FK20L0 Series= ?	Res= 20.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11 mm ²
17.	Rdim	Vishay-Dale	CRCW040214K0FKED Series= CRCW..e3	Res= 14.0 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.	Rvp1	Vishay-Dale	CRCW04021K82FKED Series= CRCW..e3	Res= 1.82 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
21.	Rvp2	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	CRCW040234K8FKED Series= CRCW..e3	Res= 34.8 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
26.	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

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
27.	U1	Texas Instruments	LM3429MH/NOPB	Switcher	1	\$1.20	 MXA14A 59 mm ²

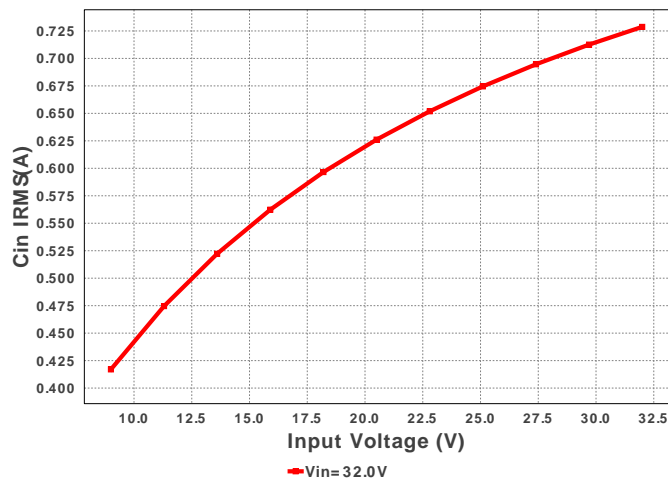
IC Tj



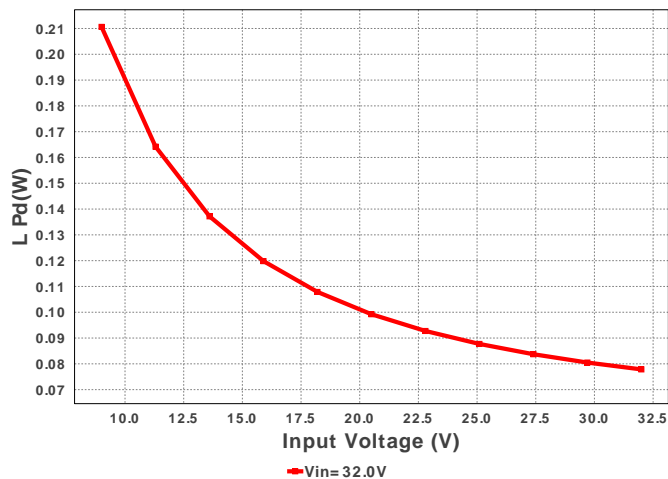
Duty Cycle



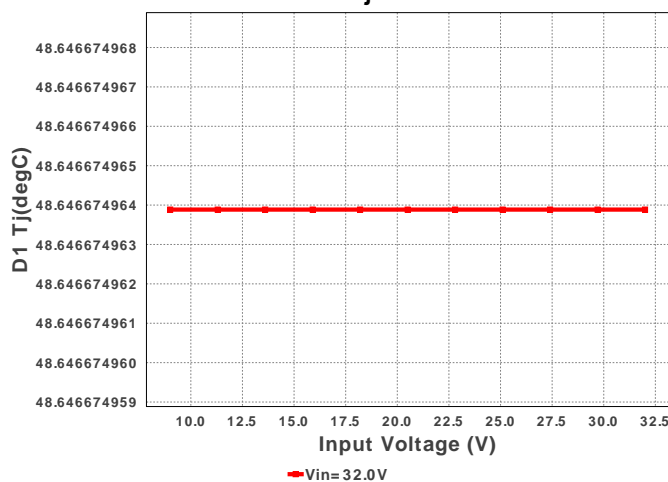
Cin IRMS



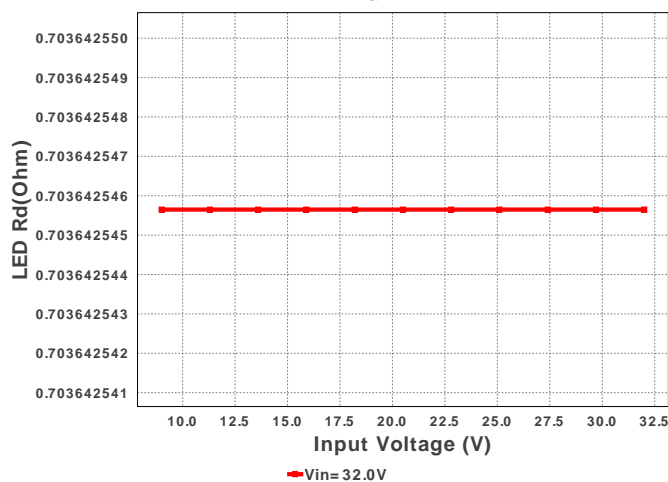
L Pd



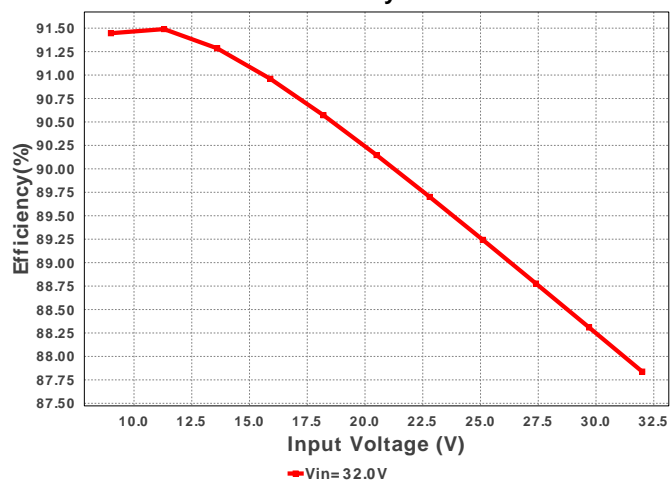
D1 Tj



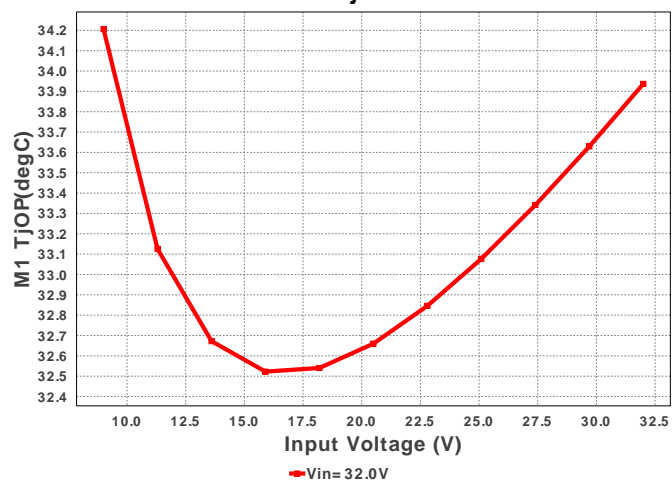
LED Rd



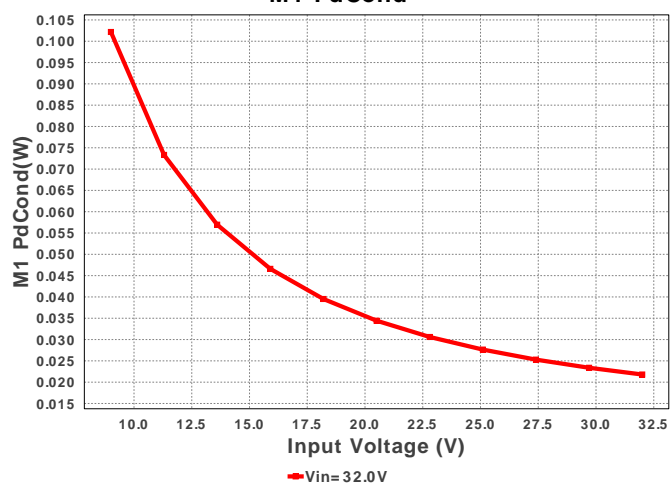
Efficiency



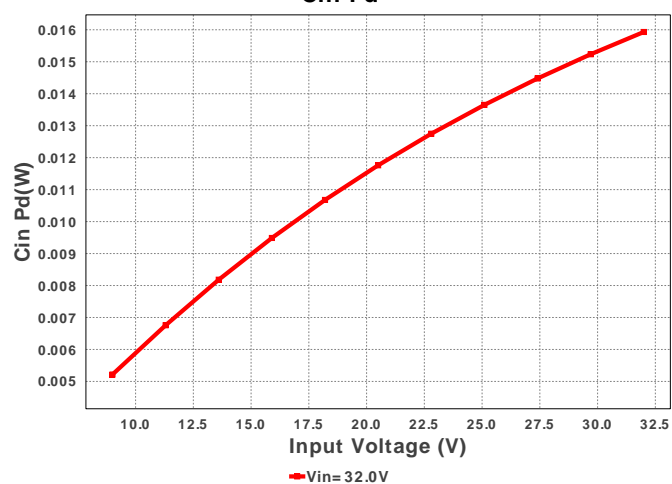
M1 TjOP



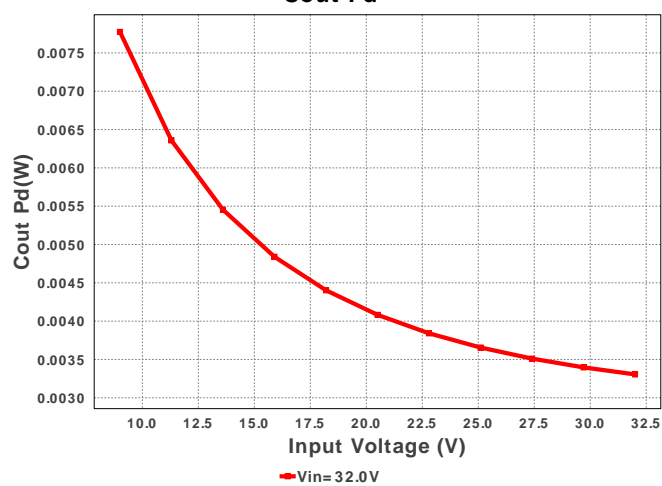
M1 PdCond



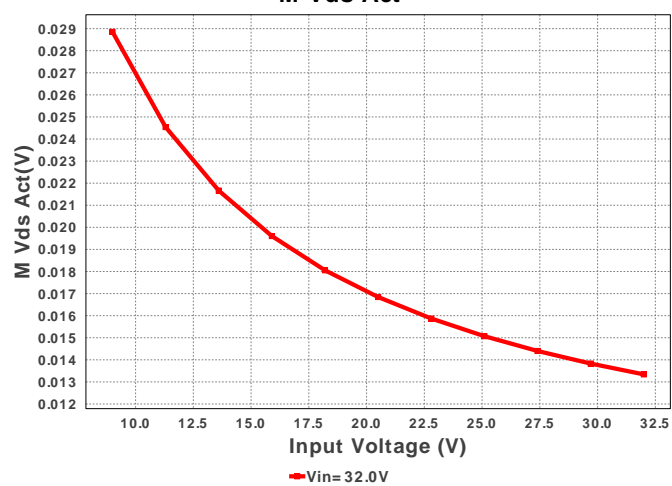
Cin Pd

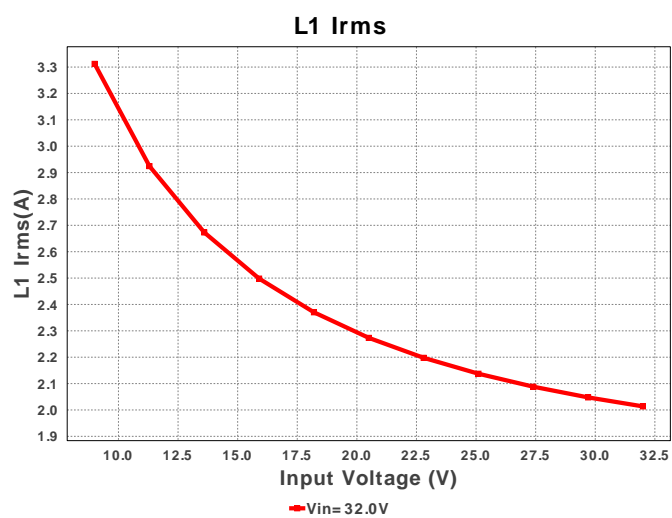
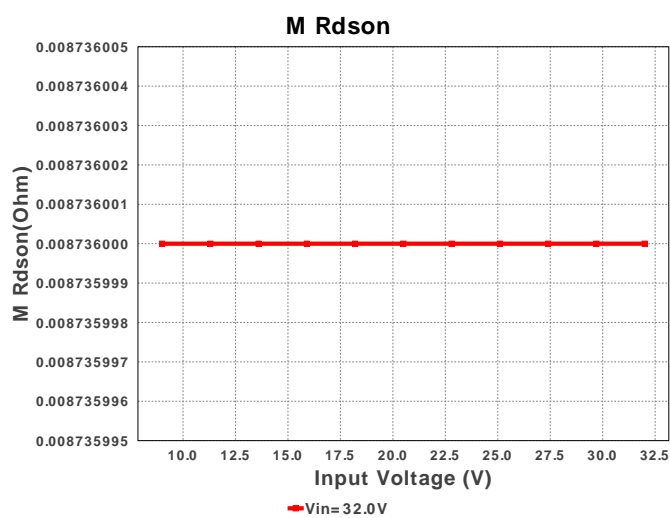
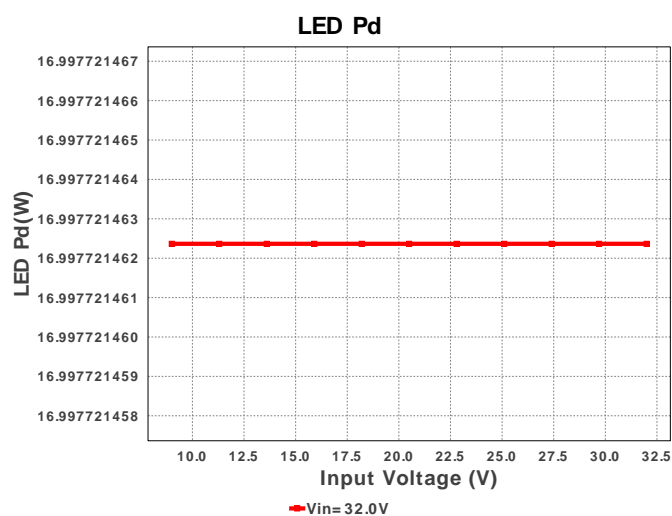
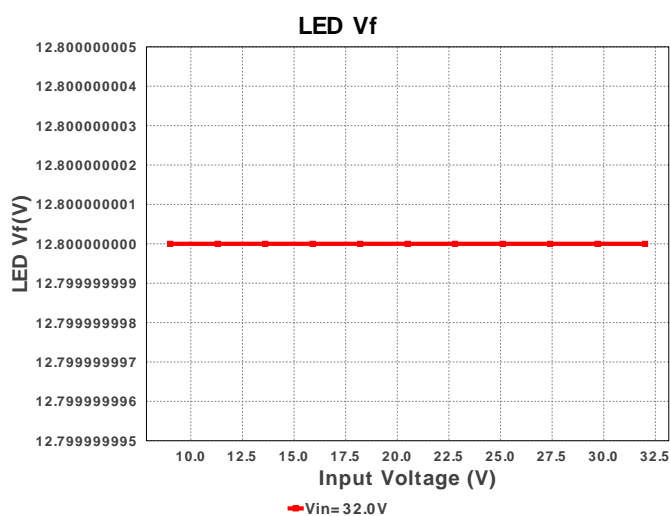
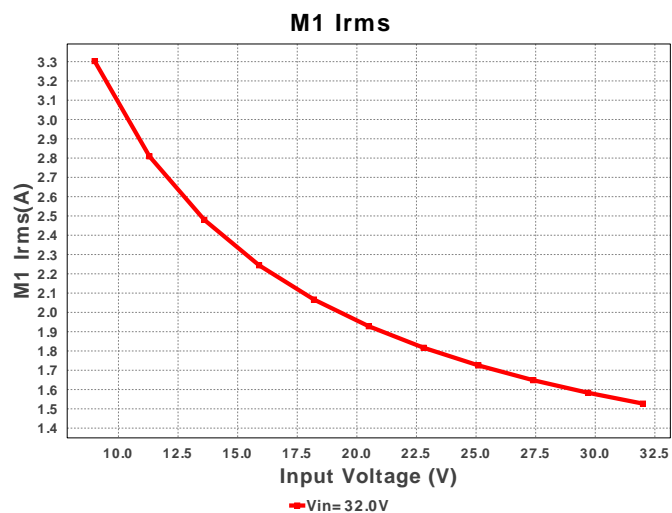
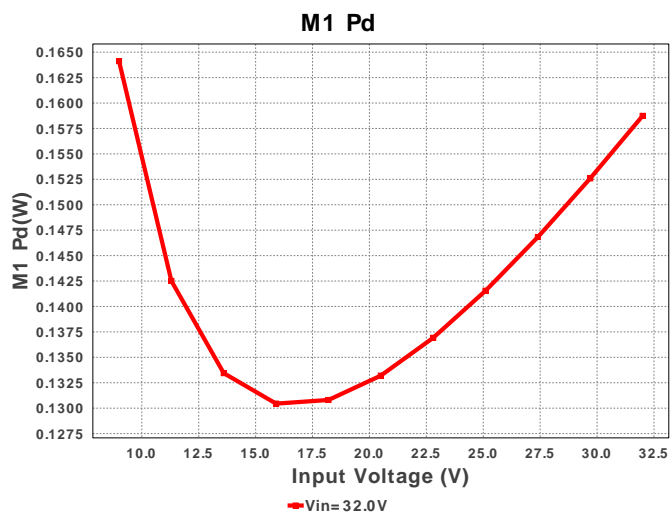


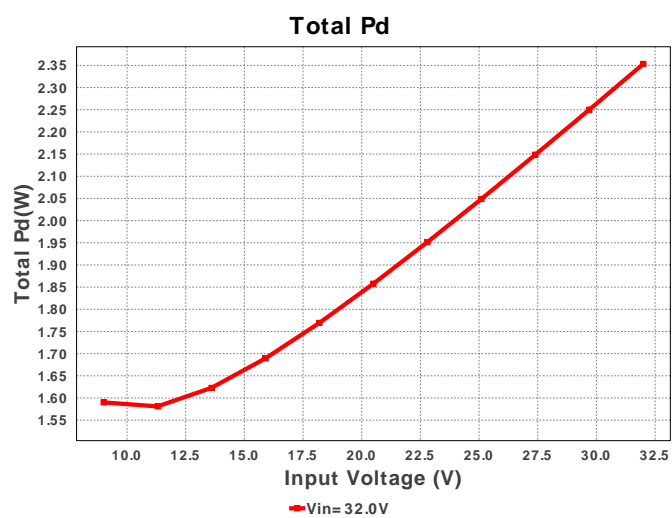
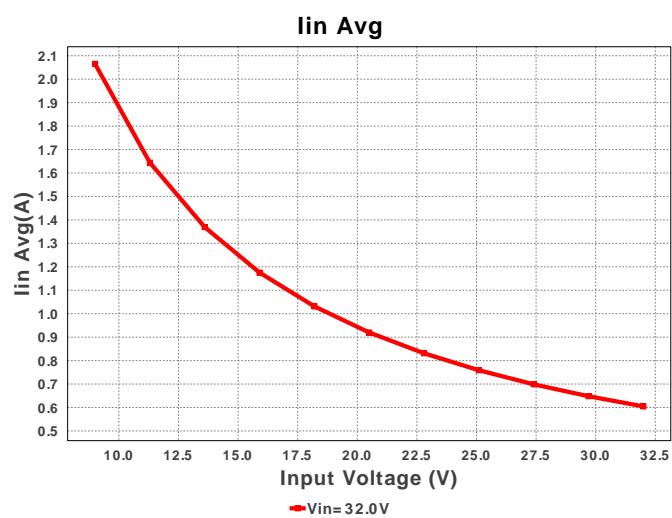
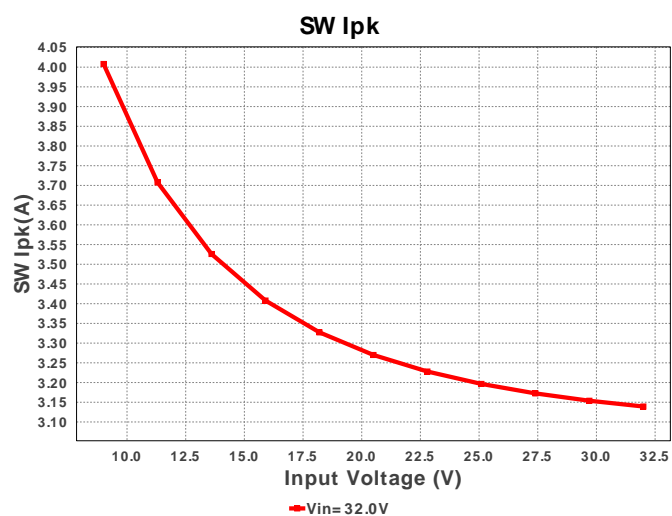
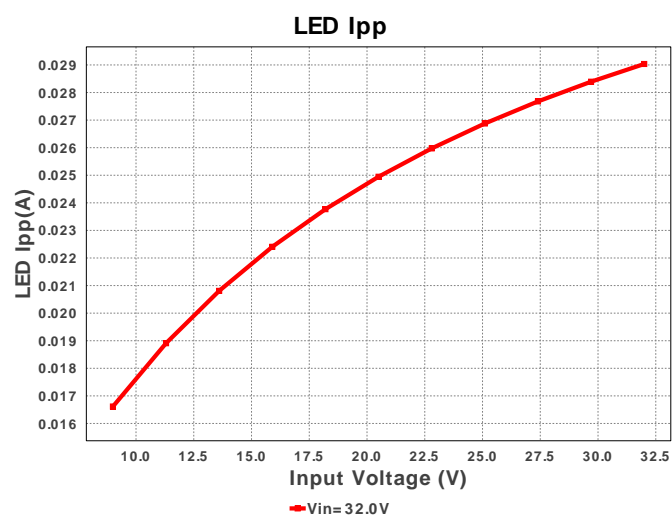
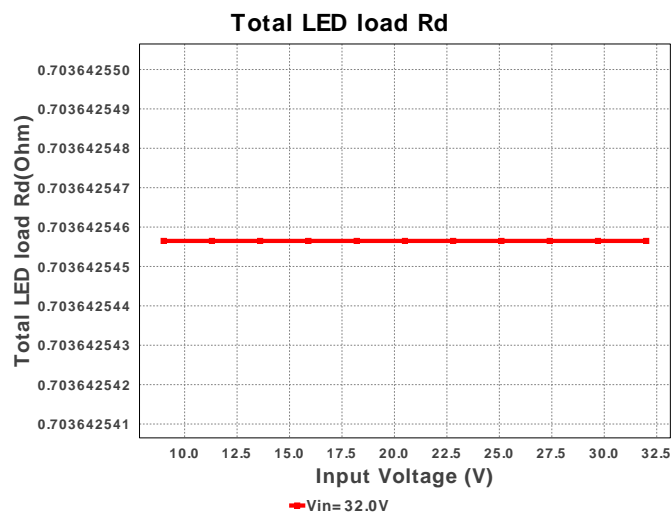
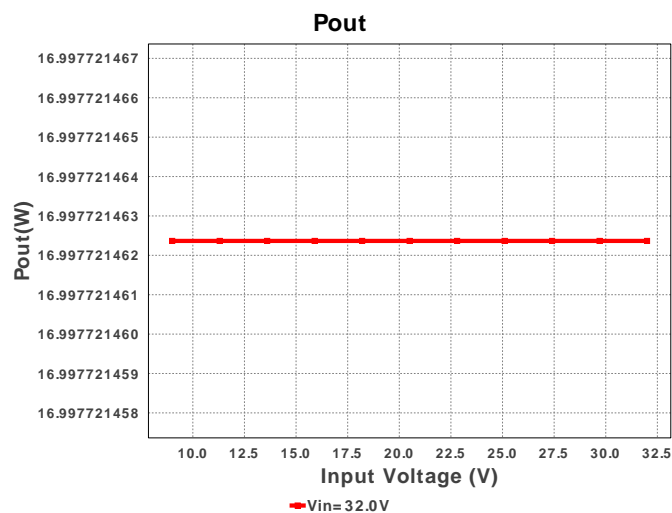
Cout Pd



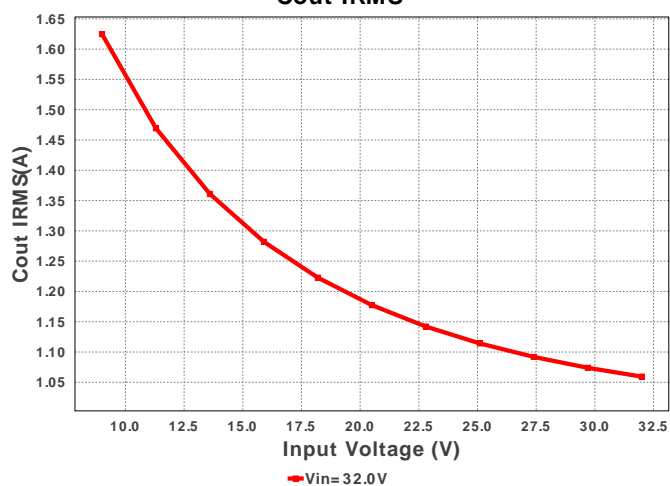
M Vds Act



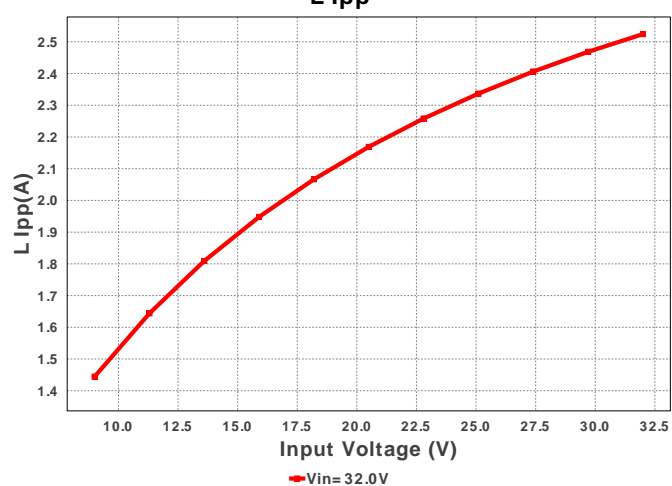




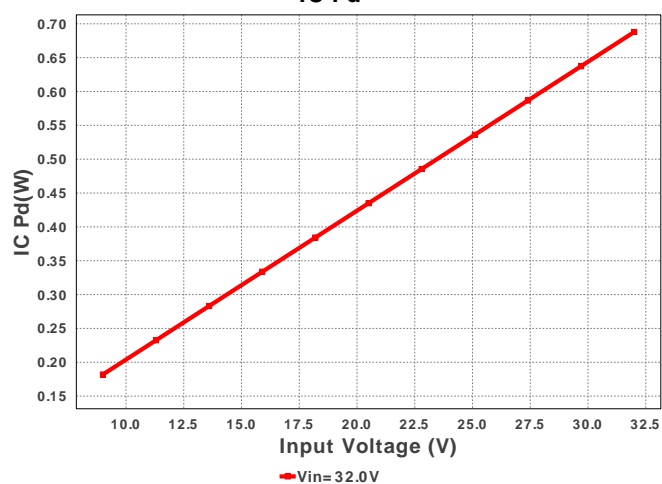
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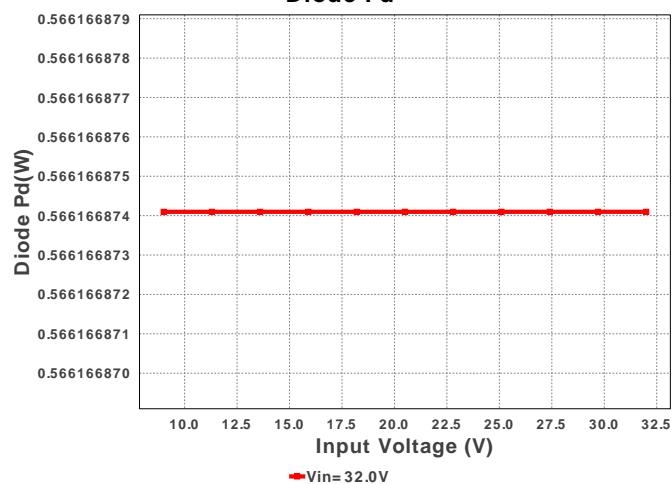
L Ipp



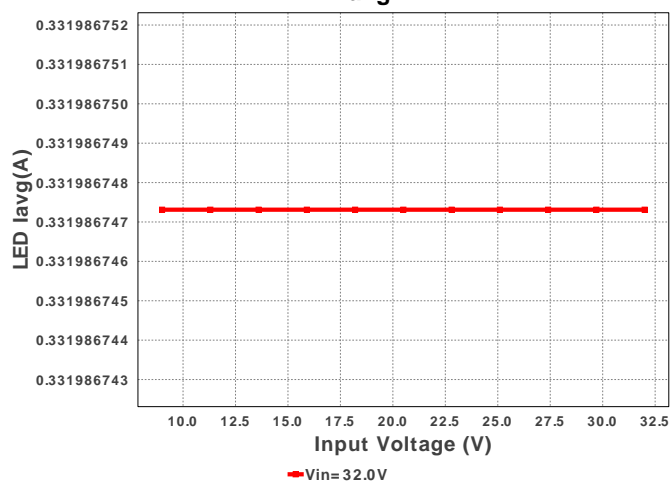
IC Pd



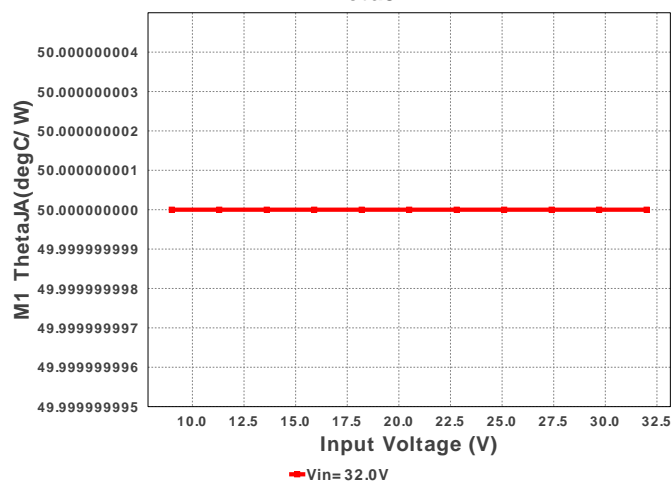
Diode Pd

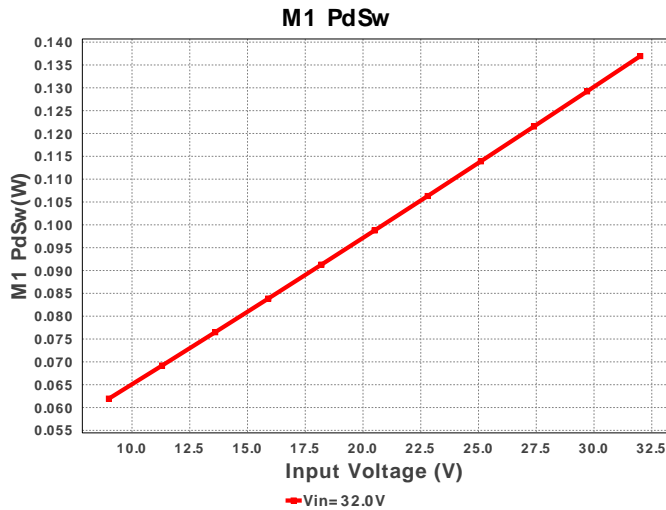


LED Iavg



M1 ThetaJA





Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	426.596 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.67 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.176 A	Current	Average input current
4.	L Ipp	1.478 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	3.425 A	Current	Inductor ripple current
6.	LED Iavg	331.987 mA	Current	LED Average Current
7.	LED Ipp	16.997 mA	Current	LED Ripple Current
8.	M1 Irms	3.435 A	Current	M1 MOSFET Irms
9.	SW Ipk	4.137 A	Current	Peak switch current
10.	BOM Count	43	General	Total Design BOM count
11.	FootPrint	1.095 k 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	23.361 mV	General	M Vds
16.	M1 ThetaJA	50.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
17.	Pout	17.982 W	General	Total output power
18.	Total BOM	\$59.52	General	Total BOM Cost
19.	D1 Tj	50.169 degC	Op_Point	D1 junction temperature
20.	Vout OP	13.541 V	Op_Point	Operational Output Voltage
21.	Duty Cycle	62.095 %	Op_point	Duty cycle
22.	Efficiency	91.809 %	Op_point	Steady state efficiency
23.	IC Tj	32.221 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	703.643 mOhm	Op_point	LED DynamicResistance
27.	LED Vf	13.541 V	Op_point	Total LED Forward Calculated Voltage
28.	M1 TjOP	33.013 degC	Op_point	M1 MOSFET junction temperature
29.	VIN_OP	9.0 V	Op_point	Vin operating point
30.	Cin Pd	5.46 mW	Power	Input capacitor power dissipation
31.	Cout Pd	8.209 mW	Power	Output capacitor power dissipation
32.	Diode Pd	604.216 mW	Power	Diode power dissipation
33.	IC Pd	168.146 mW	Power	IC power dissipation
34.	L Pd	225.245 mW	Power	Inductor power dissipation
35.	LED Pd	17.982 W	Power	LED Power Dissipation
36.	M1 Pd	140.265 mW	Power	M1 MOSFET total power dissipation
37.	M1 PdCond	82.83 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	57.435 mW	Power	M1 MOSFET switching losses
39.	Total Pd	1.604 W	Power	Total Power Dissipation
40.	Total LED load Rd	703.643 mOhm	Unknown	Total LED Load DynamicResistance

Design Inputs

#	Name	Value	Description
1.	Iout	1.4	Maximum Output Current
2.	Iout1	1.4	Output Current #1
3.	VinMax	32.0	Maximum input voltage
4.	VinMin	9.0	Minimum input voltage
5.	Vout	12.8	Output Voltage
6.	Vout1	12.8	Output Voltage #1
7.	application	LED_DRIVER	LED Application
8.	base_pn	LM3429	Base Product Number

#	Name	Value	Description
9.	LED_Architect	N	LED Architect Project
10.	ledparallel	4.0	Number of LED in parallel
11.	ledpartnumber	LD CP7P1T2U	LED Part number
12.	ledseries	4.0	Number of LED in series
13.	line_fsw	60.0	AC Line Frequency
14.	source	DC	Input Source Type
15.	Ta	26.0	Ambient temperature

Design Assistance

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

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