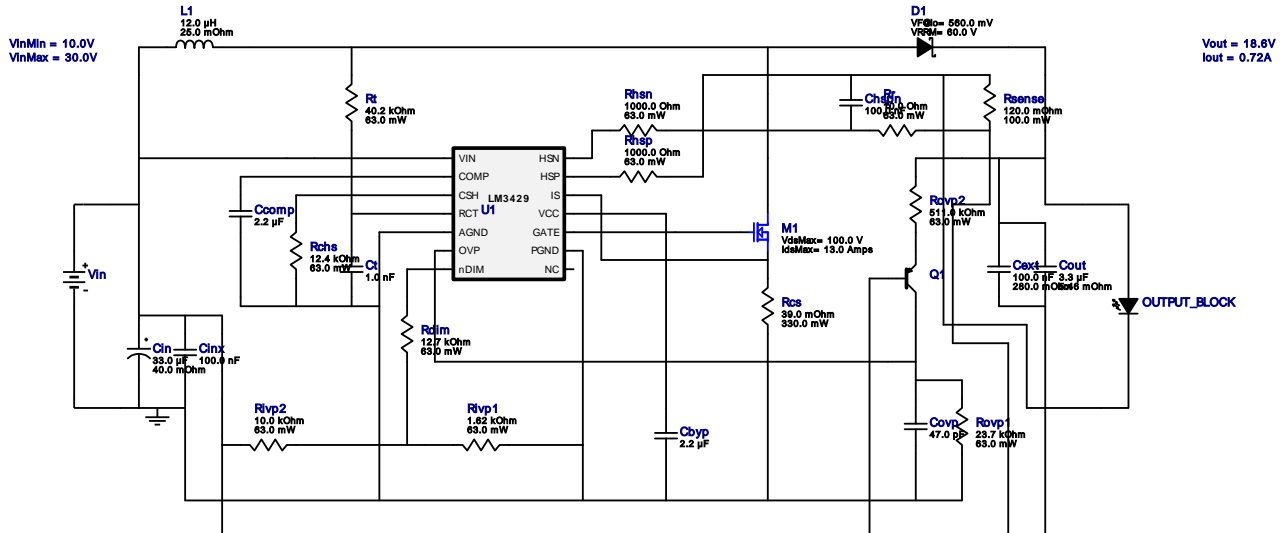






## WEBENCH® Design Report

Design : 4392296/4 LM3429MH/NOPB  
LM3429MH/NOPB 10.0V-30.0V to 10.41V @ 0.7882964516129033A





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.

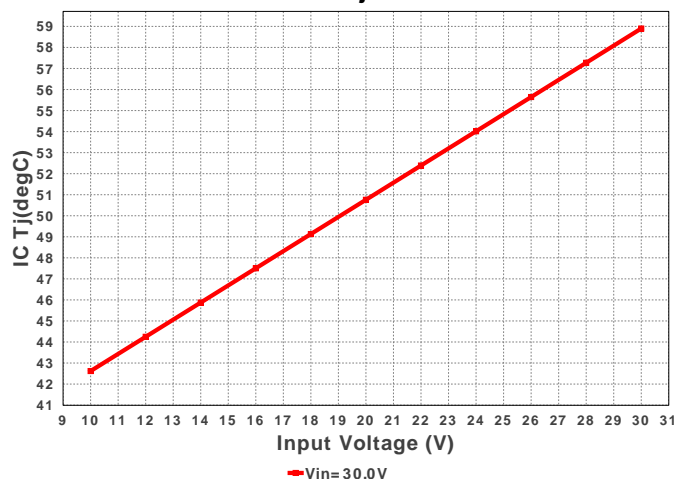
## Electrical BOM

#	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 <sup>2</sup>
2.	Ccomp	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm <sup>2</sup>
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 <sup>2</sup>
4.	Chspn	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
5.	Cin	Panasonic	EEHZA1H330XP Series= 1267	Cap= 33.0 uF ESR= 40.0 mOhm VDC= 50.0 V IRMS= 1.6 A	1	\$0.70	 SM_RADIAL_6.3BMM 80 mm <sup>2</sup>
6.	Cinx	MuRata	GRM188R72A104KA35D Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	\$0.03	 0603 5 mm <sup>2</sup>
7.	Cout	TDK	C3225X7S2A335K200AB Series= 479	Cap= 3.3 uF ESR= 5.46 mOhm VDC= 100.0 V IRMS= 7.0356 A	1	\$0.24	 1210 15 mm <sup>2</sup>
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 <sup>2</sup>

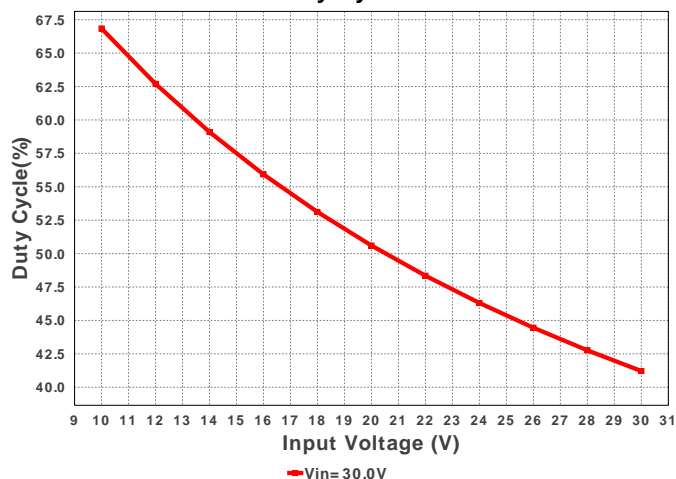
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Ct	Yageo America	CC0805JRNPO9BN102 Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm <sup>2</sup>
10.	D1	Diodes Inc.	PDS760-13	VF@Io= 560.0 mV VRRM= 60.0 V	1	\$0.60	 PowerDI5 50 mm <sup>2</sup>
11.	D_LED	Citizen Electronics	CL-L233-C13N1-C	LED	1	NA	 CIT_LED_5 501 mm <sup>2</sup>
12.	L1	Bourns	SRR1208-120ML	L= 12.0 µH DCR= 25.0 mOhm	1	\$0.37	 SRR1208 216 mm <sup>2</sup>
13.	M1	Texas Instruments	CSD19533Q5A	VdsMax= 100.0 V IdsMax= 13.0 Amps	1	\$0.83	 TRANS_NexFET_Q5A 55 mm <sup>2</sup>
14.	Q1	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm <sup>2</sup>
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 <sup>2</sup>
16.	Rcs	Panasonic	ERJ-L14KF39MU Series= 232	Res= 39.0 mOhm Power= 330.0 mW Tolerance= 1.0%	1	\$0.11	 1210 15 mm <sup>2</sup>
17.	Rdim	Vishay-Dale	CRCW040212K7FKED Series= CRCW..e3	Res= 12.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
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 <sup>2</sup>
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 <sup>2</sup>
20.	Rivp1	Vishay-Dale	CRCW04021K62FKED Series= CRCW..e3	Res= 1.62 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
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 <sup>2</sup>
22.	Rovp1	Vishay-Dale	CRCW040223K7FKED Series= CRCW..e3	Res= 23.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
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 <sup>2</sup>
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 <sup>2</sup>
25.	Rsense	Panasonic	ERJ-3RSFR12V Series= 227	Res= 120.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.03	 0603 5 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
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

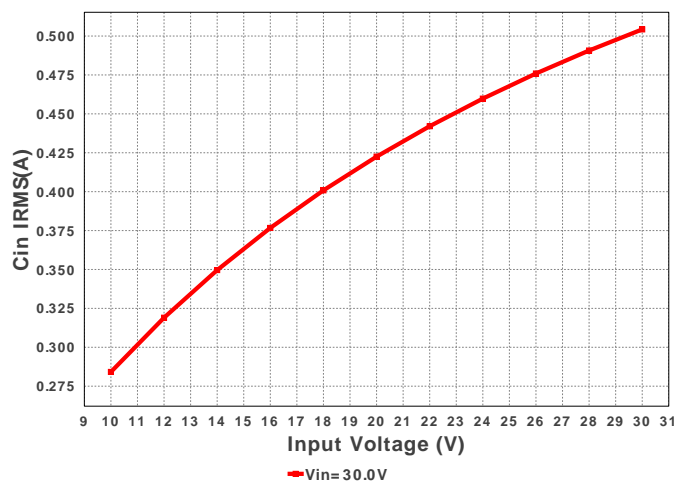
IC Tj



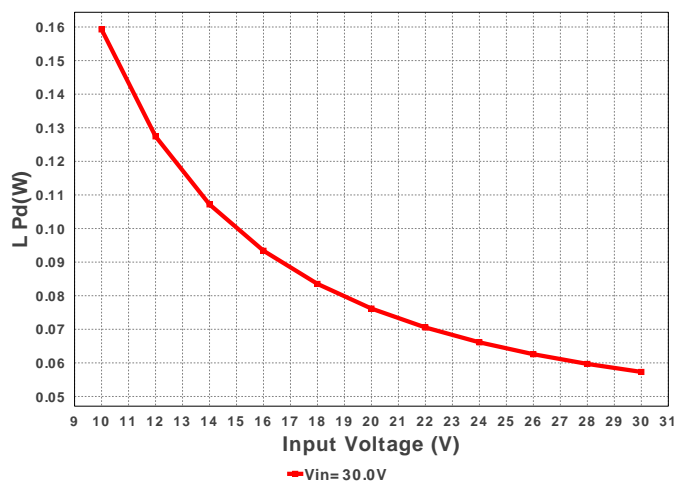
Duty Cycle



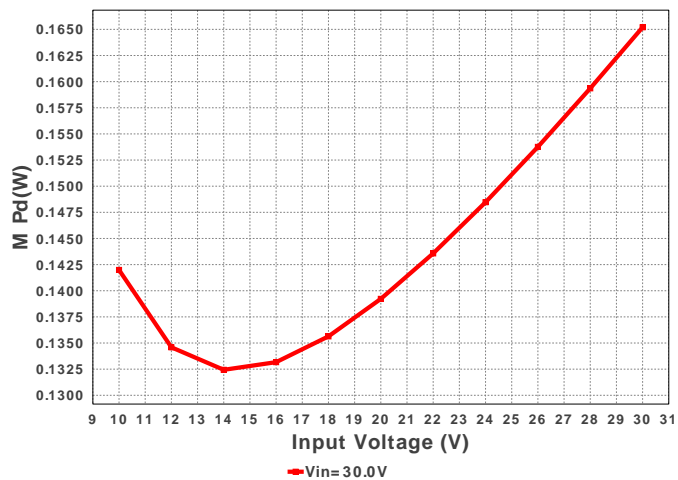
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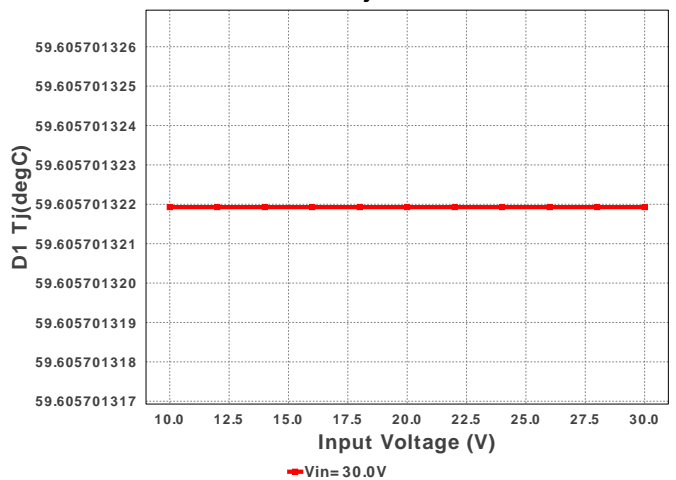
L Pd



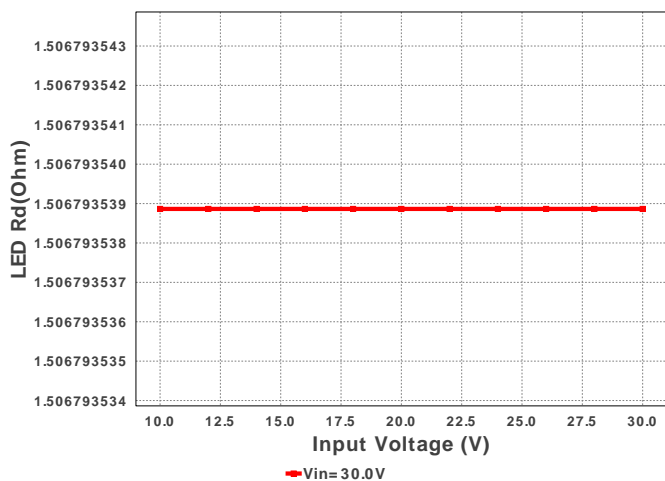
M Pd



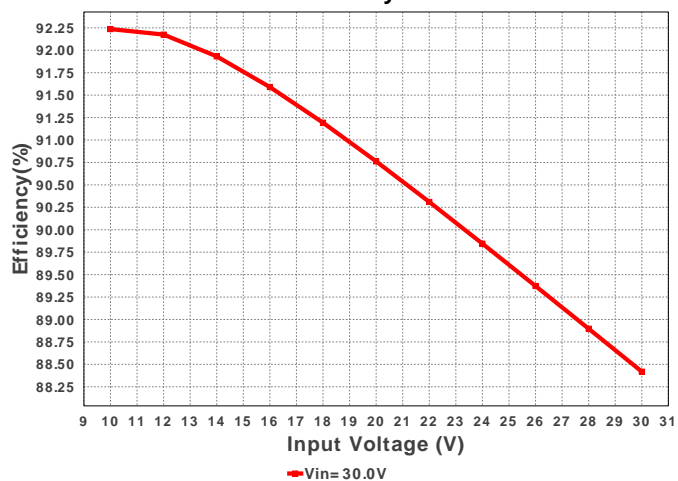
D1 Tj



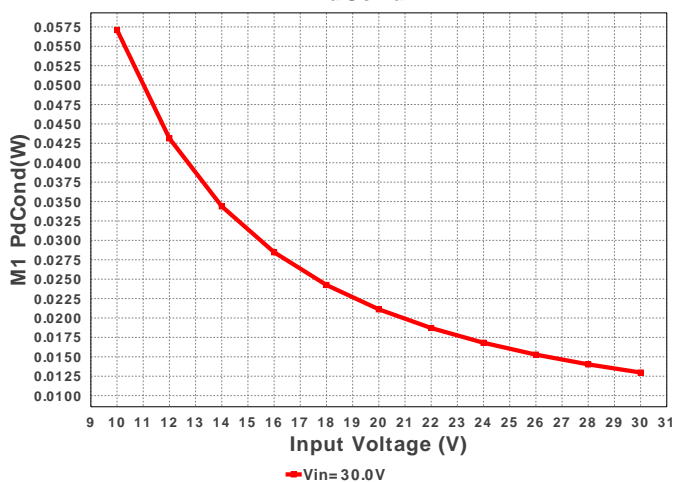
LED Rd



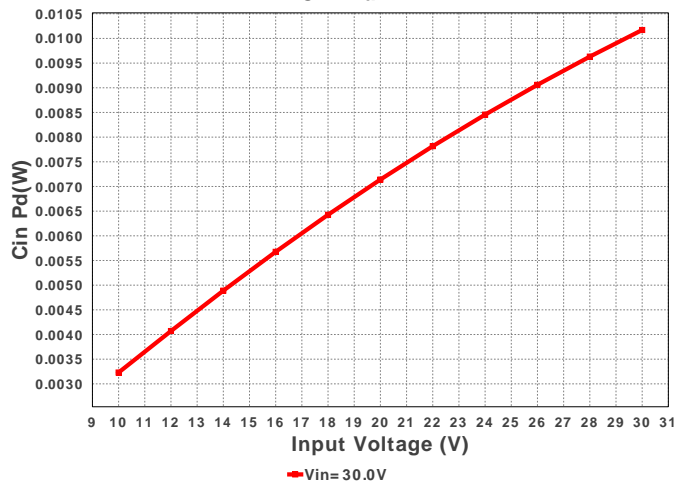
Efficiency



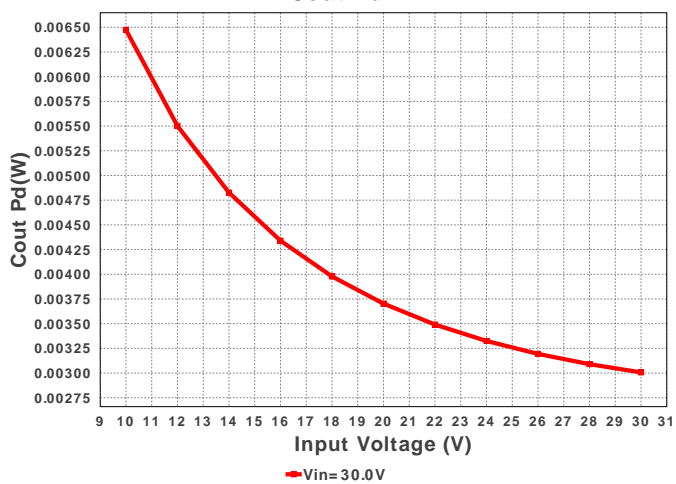
M1 PdCond



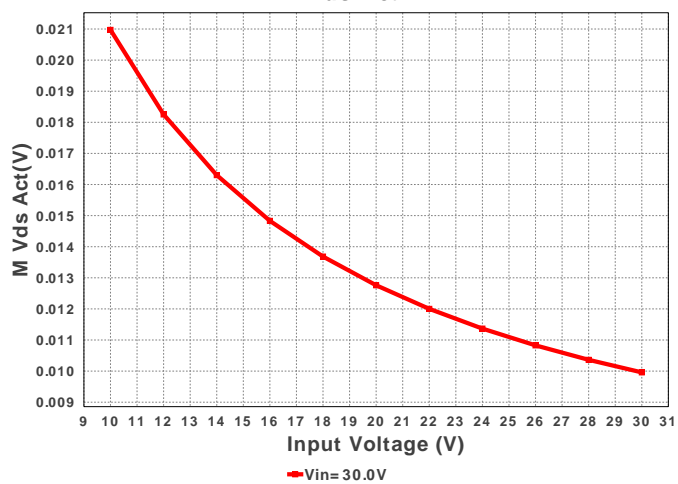
Cin Pd

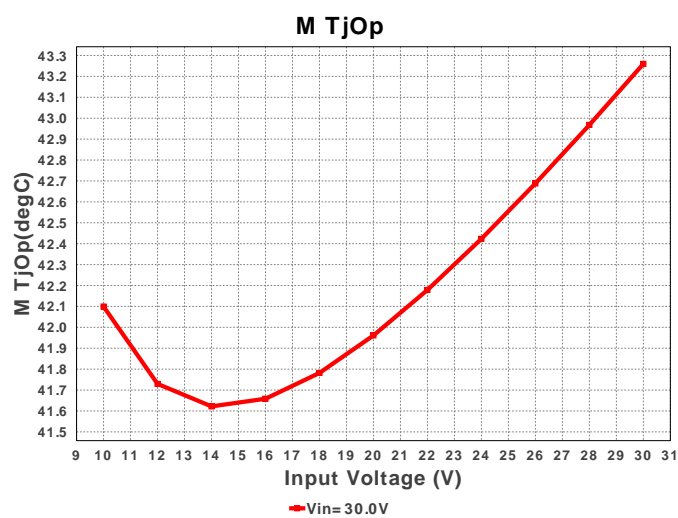
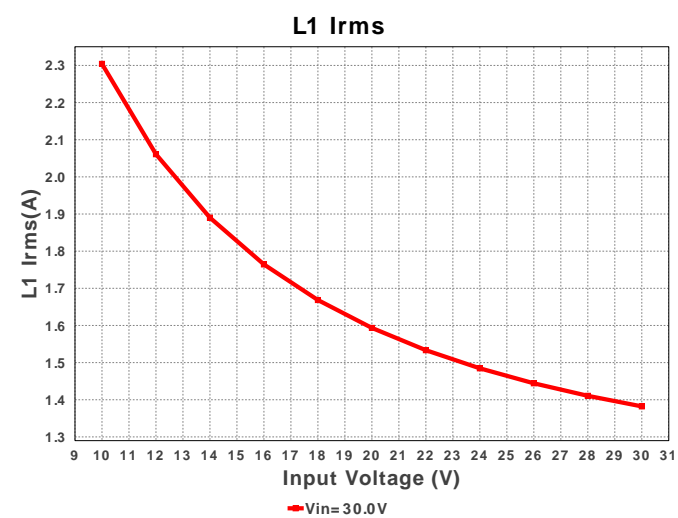
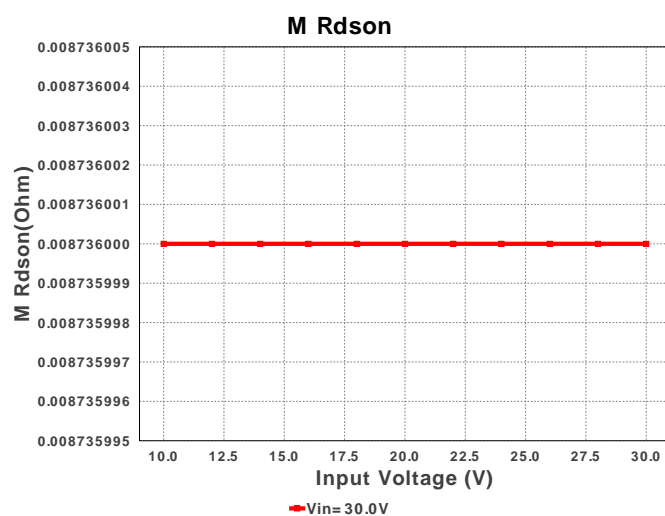
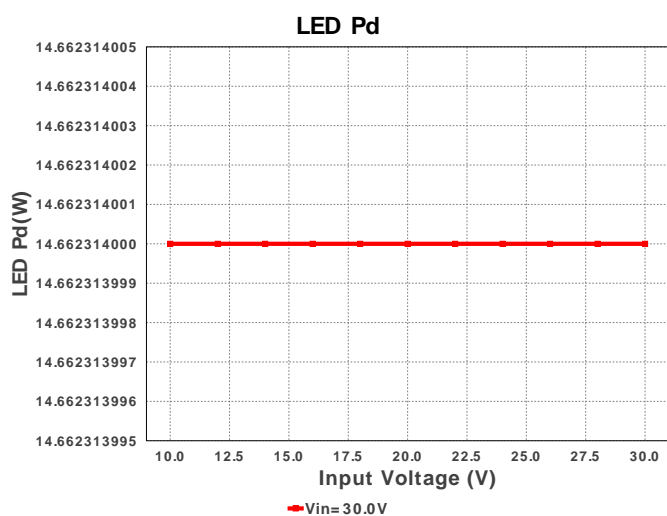
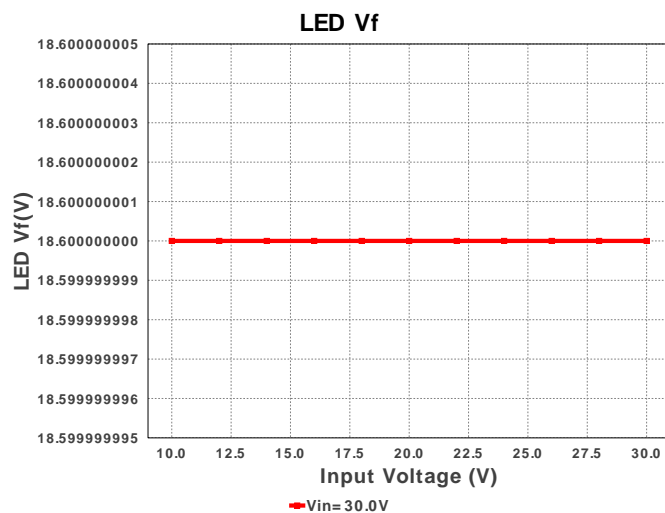
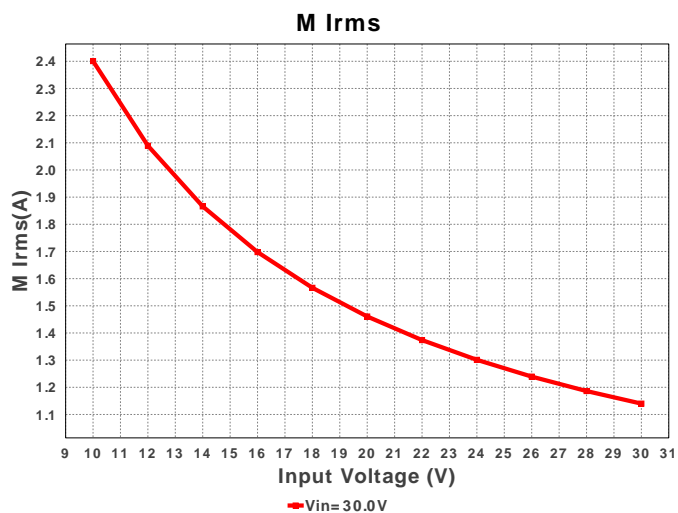


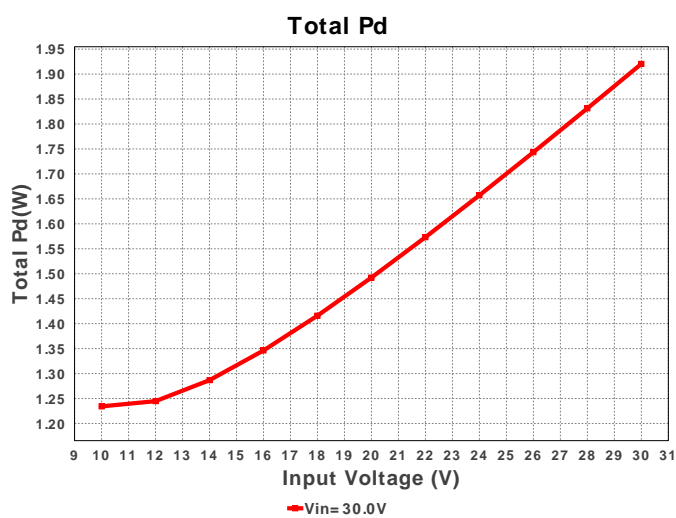
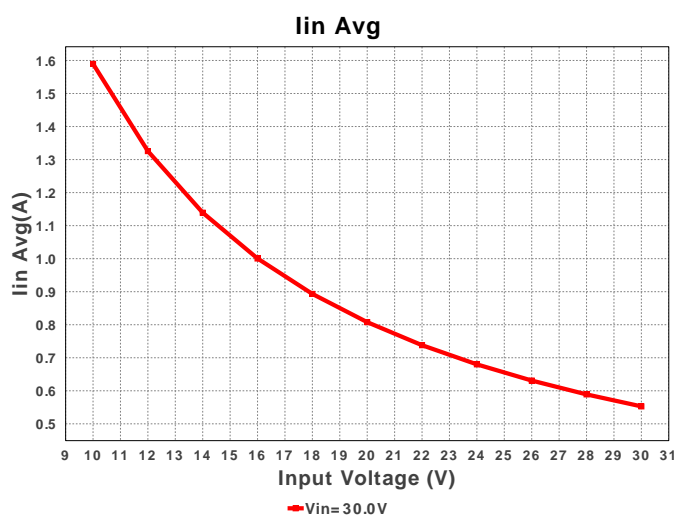
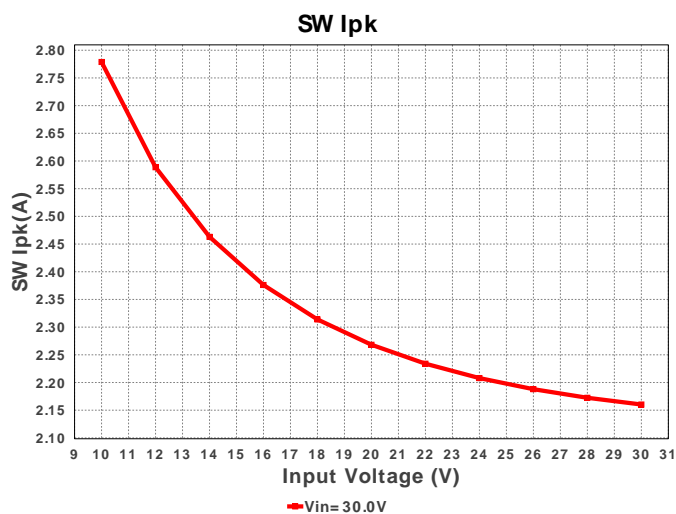
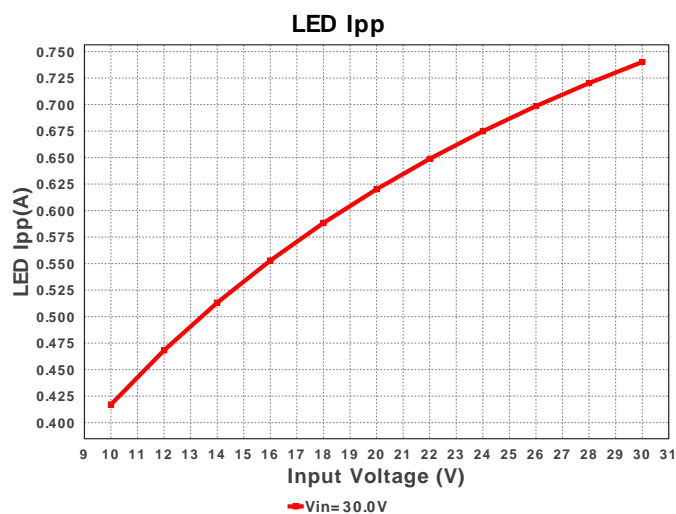
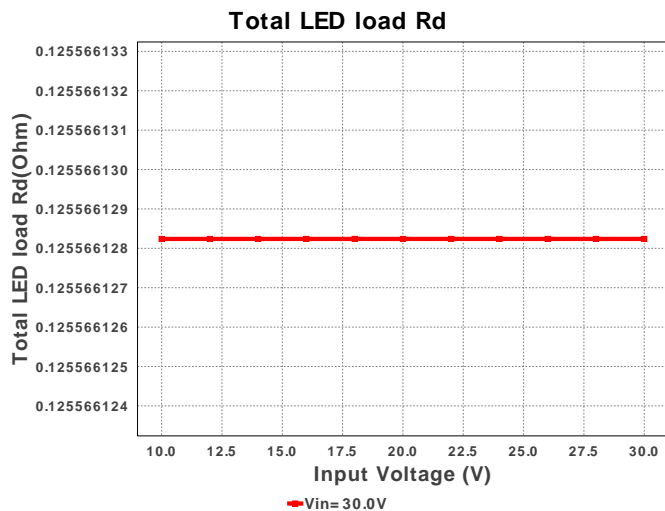
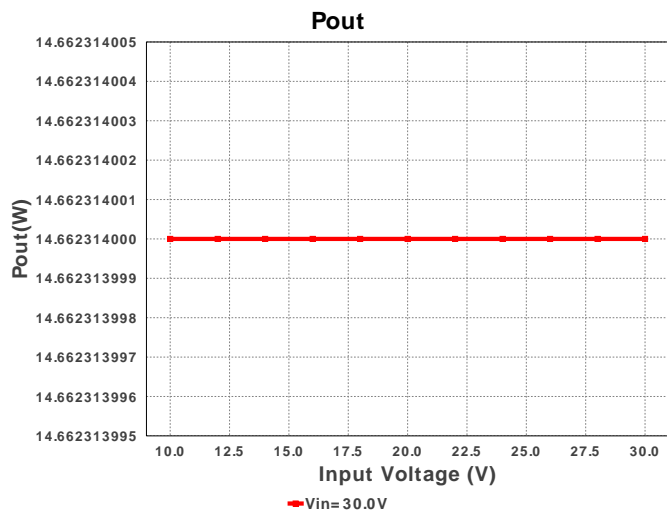
Cout Pd



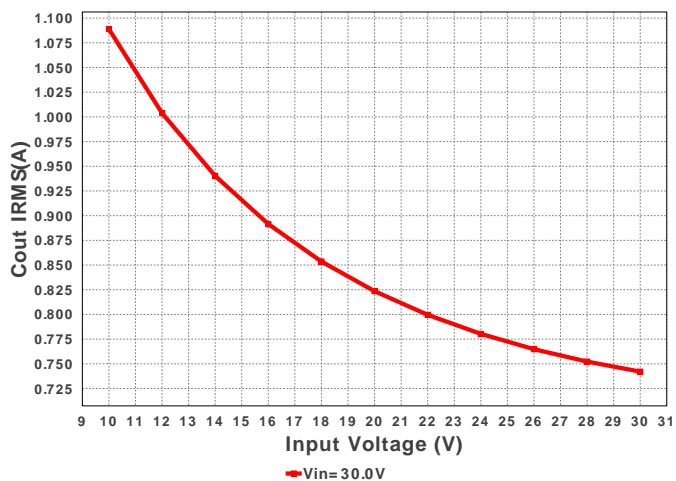
M Vds Act



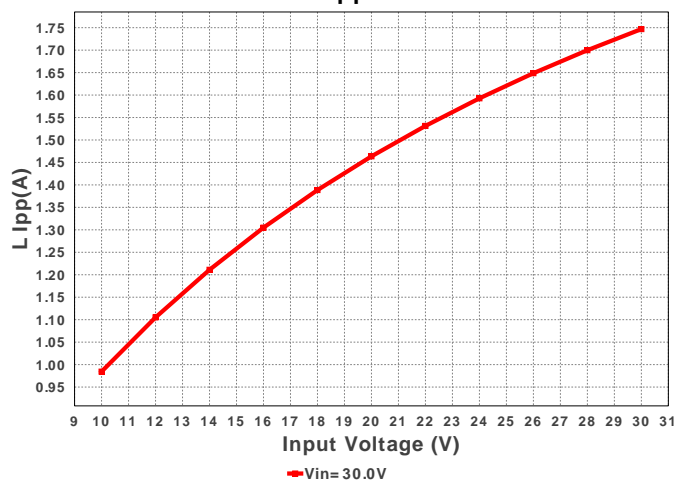




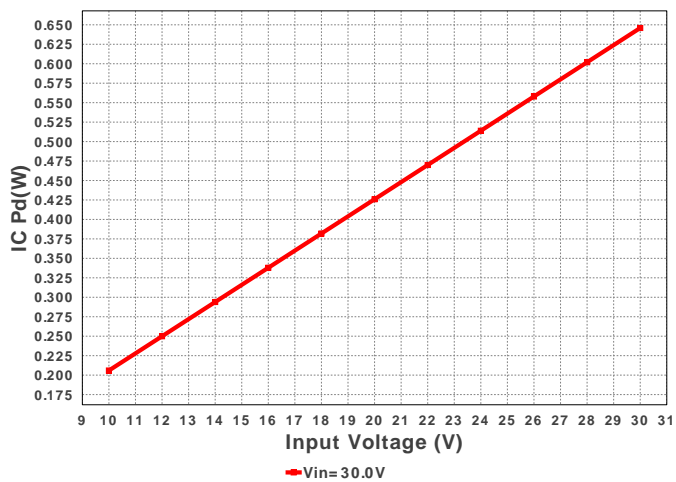
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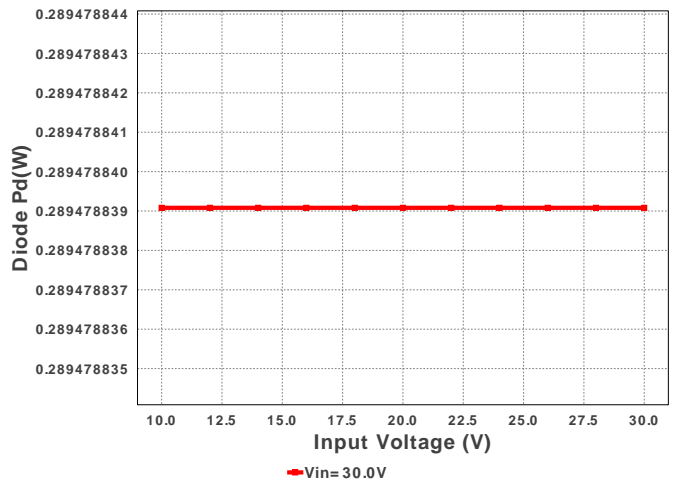
L Ipp



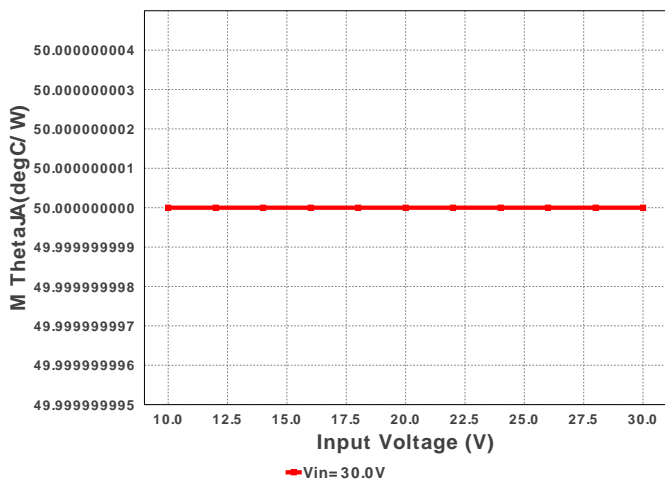
IC Pd



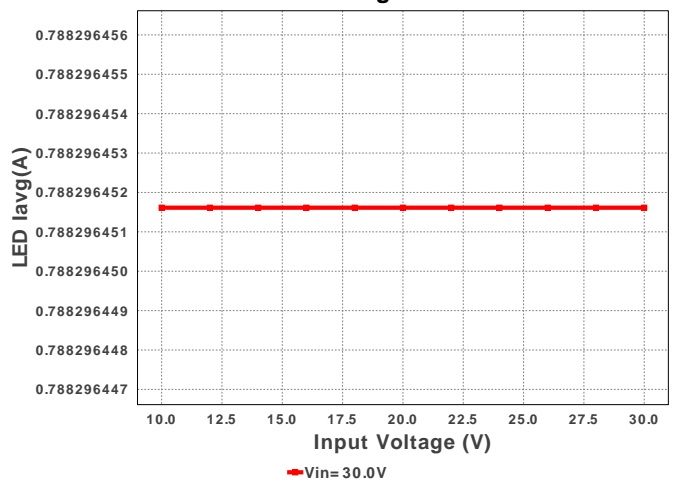
Diode Pd



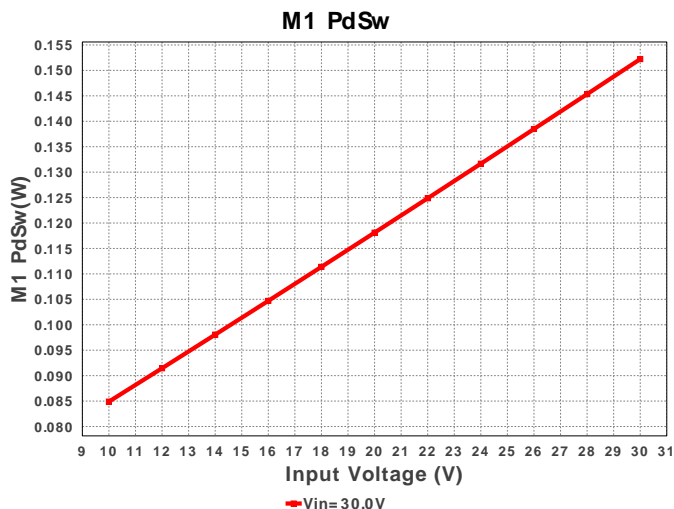
M ThetaJA



LED Iavg







## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	227.371 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	838.302 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	932.65 mA	Current	Average input current
4.	L Ipp	787.64 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	1.669 A	Current	Inductor ripple current
6.	LED Iavg	788.296 mA	Current	LED Average Current
7.	LED Ipp	333.735 mA	Current	LED Ripple Current
8.	M Irms	1.571 A	Current	MOSFET RMS ripple current
9.	SW Ipk	2.048 A	Current	Peak switch current
10.	BOM Count	27	General	Total Design BOM count
11.	FootPrint	1.084 k mm <sup>2</sup>	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	10.681 mV	General	M Vds
16.	Pout	8.205 W	General	Total output power
17.	Total BOM	\$0.0	General	Total BOM Cost
18.	D1 Tj	72.523 degC	Op_Point	D1 junction temperature
19.	Vout OP	10.409 V	Op_Point	Operational Output Voltage
20.	Duty Cycle	54.176 %	Op_point	Duty cycle
21.	Efficiency	87.976 %	Op_point	Steady state efficiency
22.	IC Tj	42.102 degC	Op_point	IC junction temperature
23.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	788.296 mA	Op_point	Iout operating point
25.	LED Rd	1.507 Ohm	Op_point	LED DynamicResistance
26.	LED Vf	10.409 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	38.474 degC	Op_point	MOSFET junction temperature
29.	VIN_OP	10.0 V	Op_point	Vin operating point
30.	Cin Pd	2.068 mW	Power	Input capacitor power dissipation
31.	Cout Pd	3.837 mW	Power	Output capacitor power dissipation
32.	Diode Pd	441.446 mW	Power	Diode power dissipation
33.	IC Pd	191.933 mW	Power	IC power dissipation
34.	L Pd	83.61 mW	Power	Inductor power dissipation
35.	LED Pd	8.205 W	Power	LED Power Dissipation
36.	M Pd	69.483 mW	Power	MOSFET power dissipation
37.	M1 PdCond	17.68 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	51.802 mW	Power	M1 MOSFET switching losses
39.	Total Pd	1.121 W	Power	Total Power Dissipation
40.	Total LED load Rd	125.566 mOhm	Unknown	Total LED Load DynamicResistance

## Design Inputs

#	Name	Value	Description
1.	Iout	720.0 m	Maximum Output Current
2.	Iout1	720.0 m	Output Current #1
3.	VinMax	30.0	Maximum input voltage
4.	VinMin	10.0	Minimum input voltage
5.	Vout	18.6	Output Voltage
6.	Vout1	18.6	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	CL-L233-C13N1-C	LED Part number
12.	ledseries	1.0	Number of LED in series
13.	line_fsw	60.0	AC Line Frequency
14.	source	DC	Input Source Type
15.	ta	35.0	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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