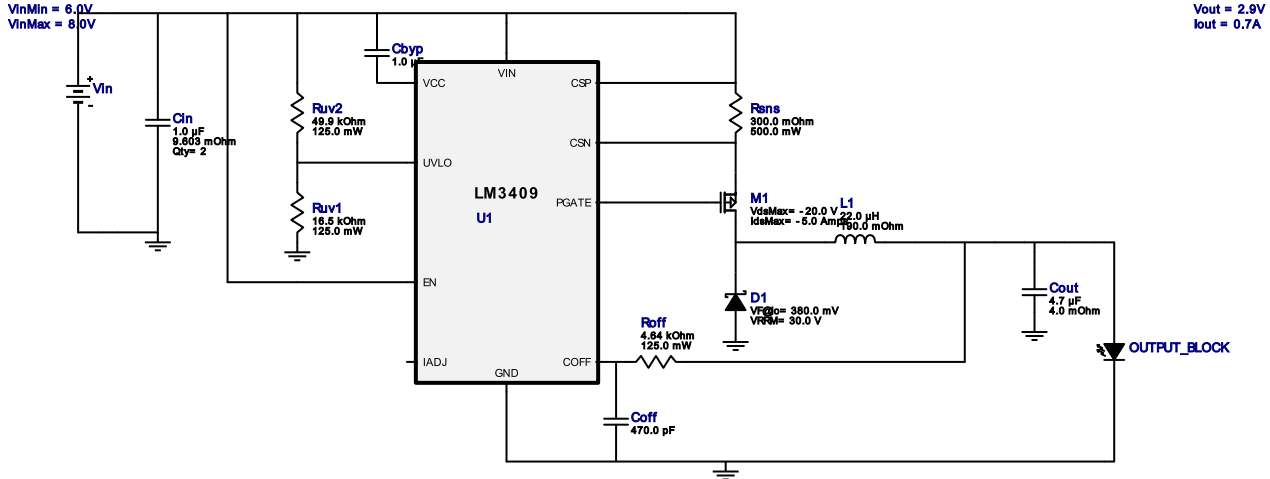






## WEBENCH<sup>®</sup> Design Report

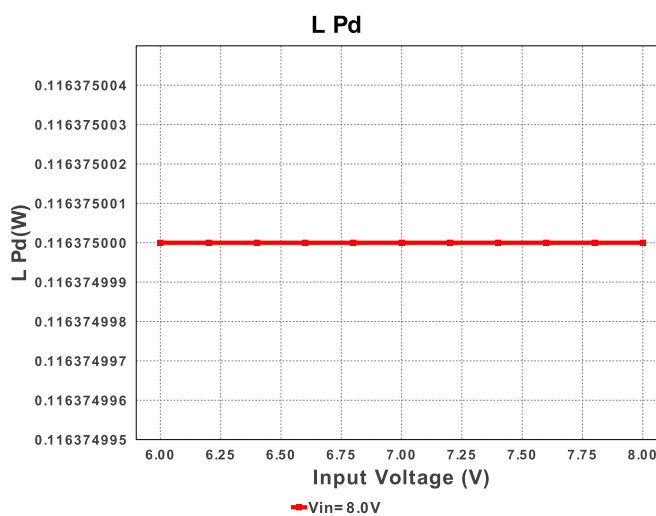
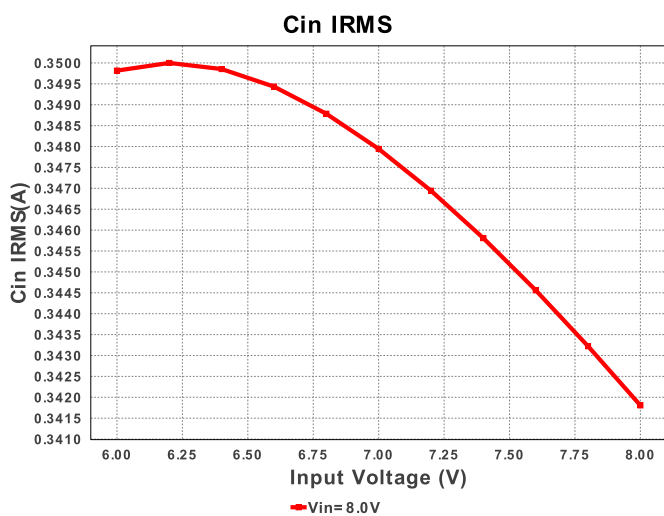
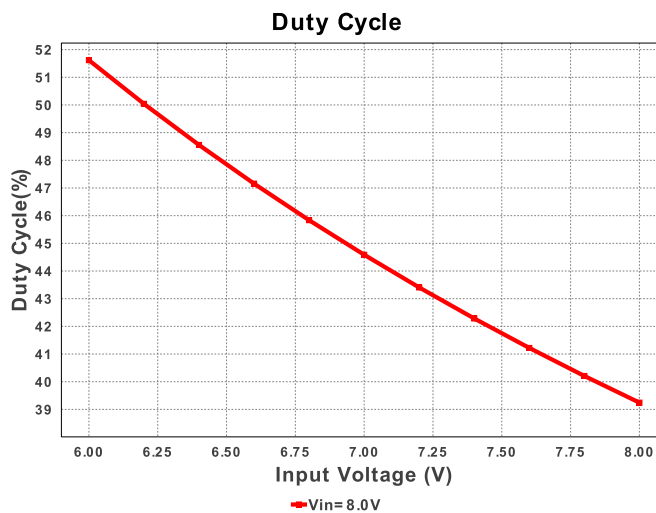
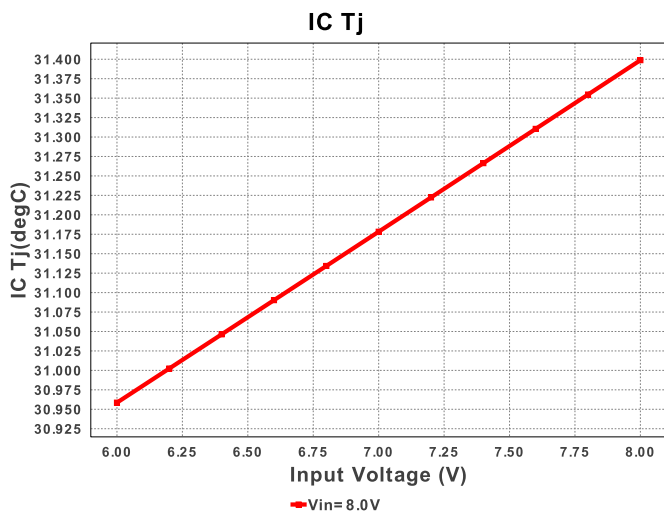
 Design : 474740/10 LM3409MY/NOPB  
 LM3409MY/NOPB 6.0V-8.0V to 2.9V @ 0.7A


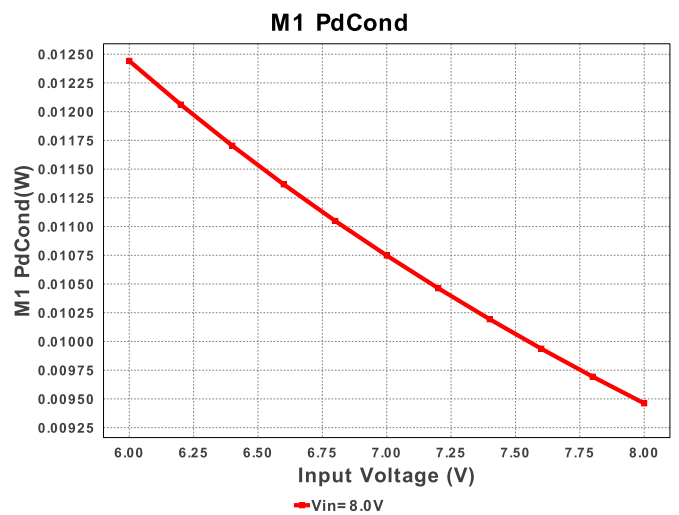
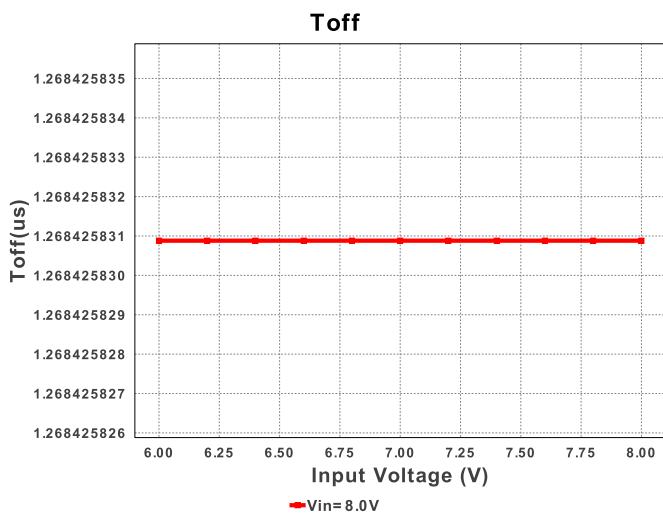
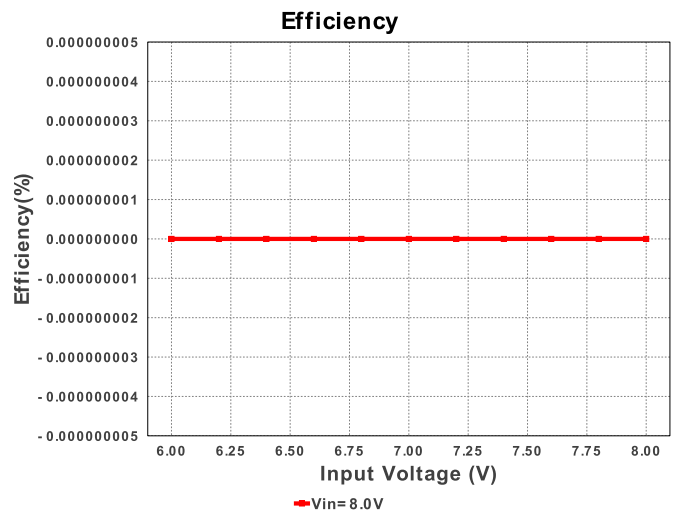
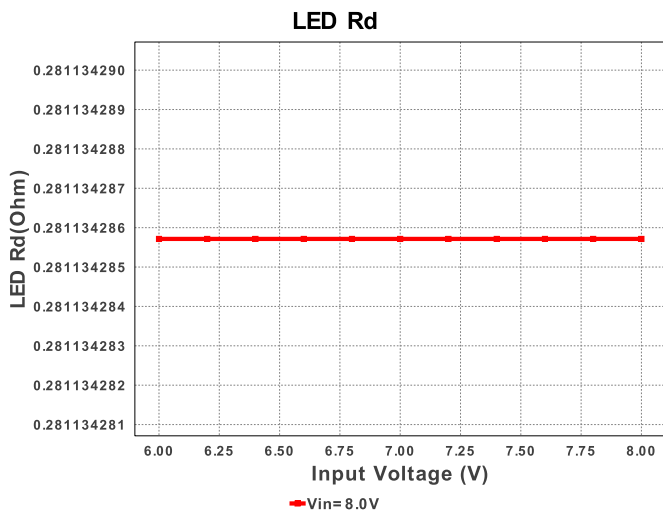
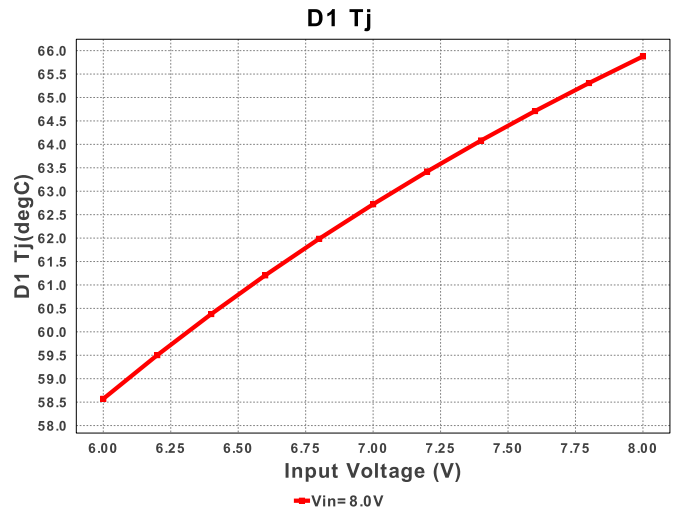
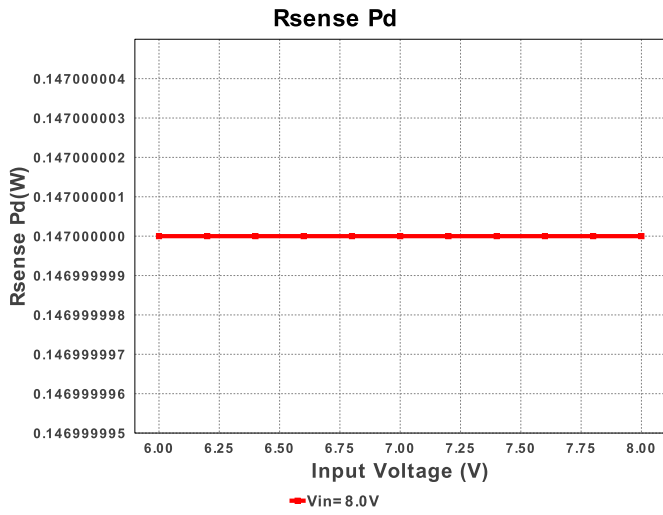
1. Bypass Capacitor Connection : WEBENCH schematic configured for the selected PFET's total gate charge (Qg). If the Qg value is > 30 nC, the Bypass Capacitor (Cbyp or CF) is connected from the VCC pin to CSN pin instead of the typically connected from VCC to Vin when Qg < 30nC.

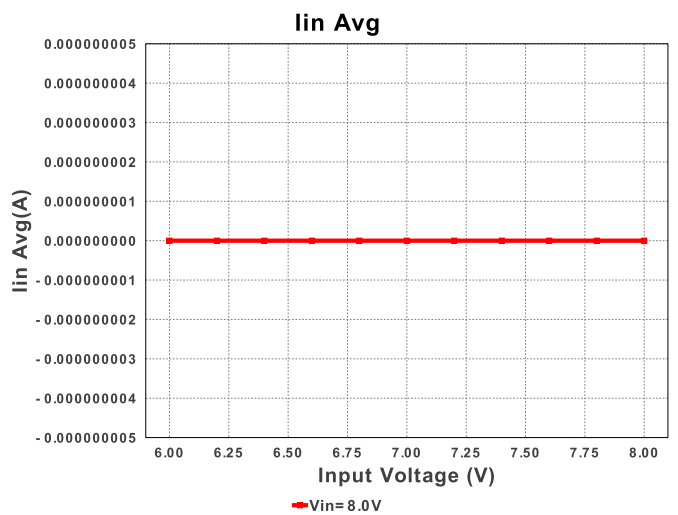
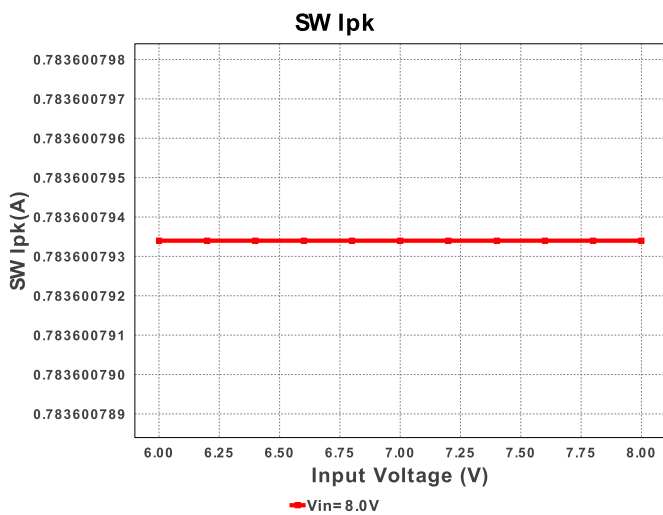
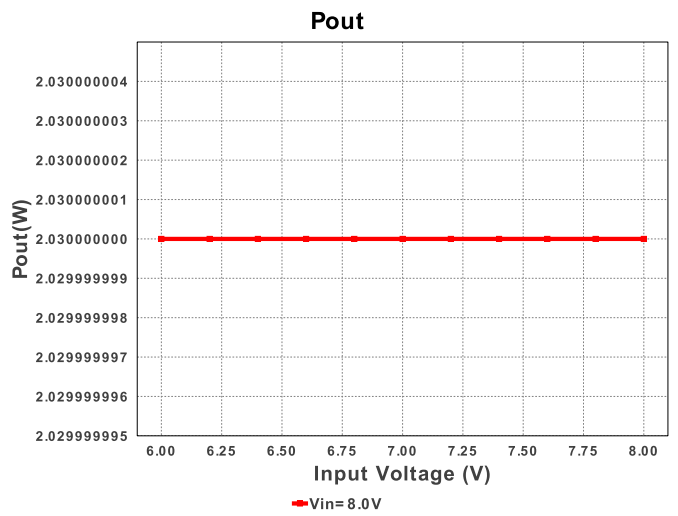
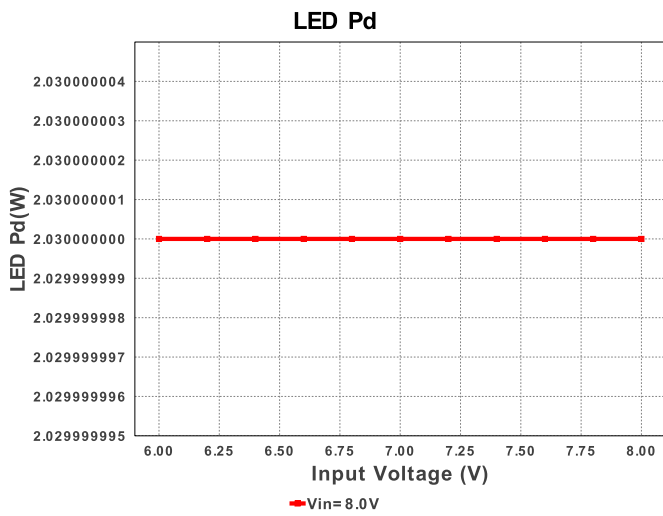
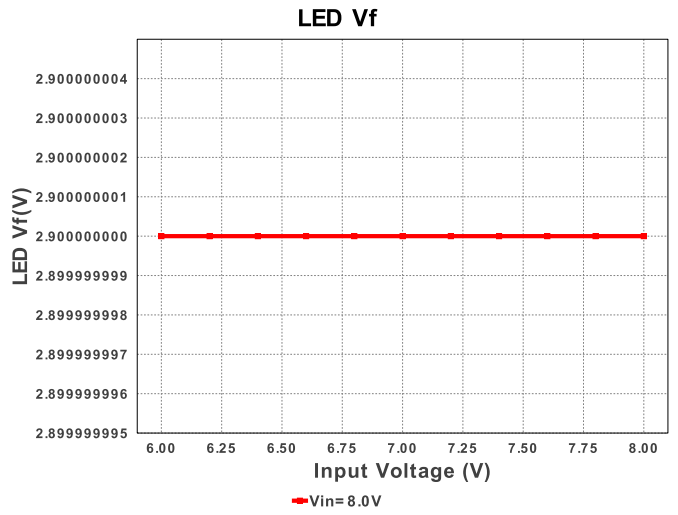
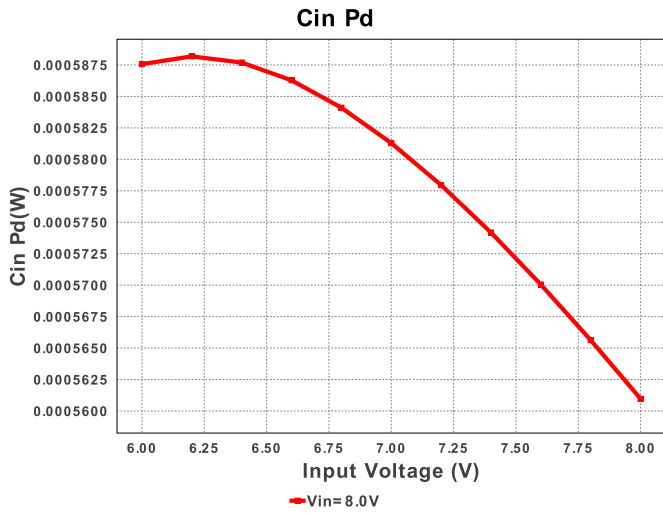
### Electrical BOM

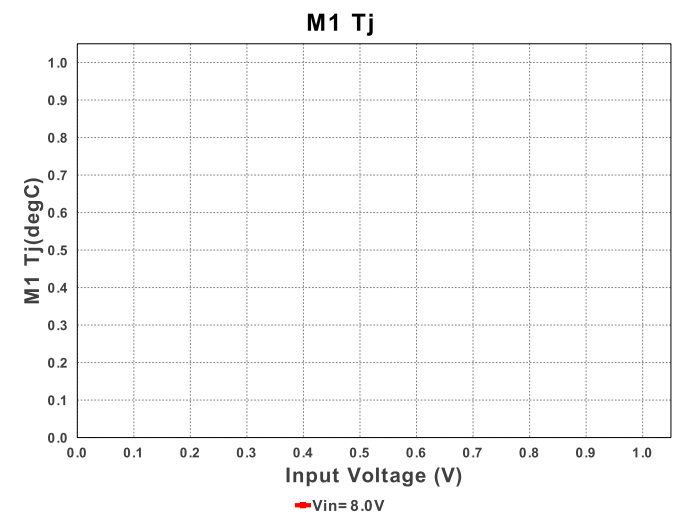
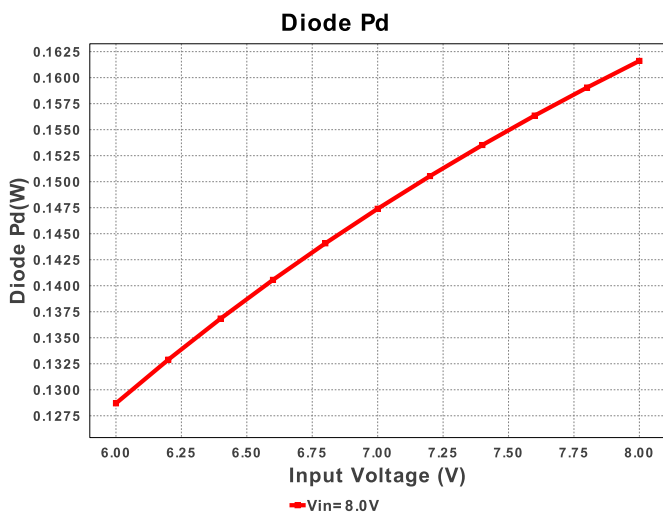
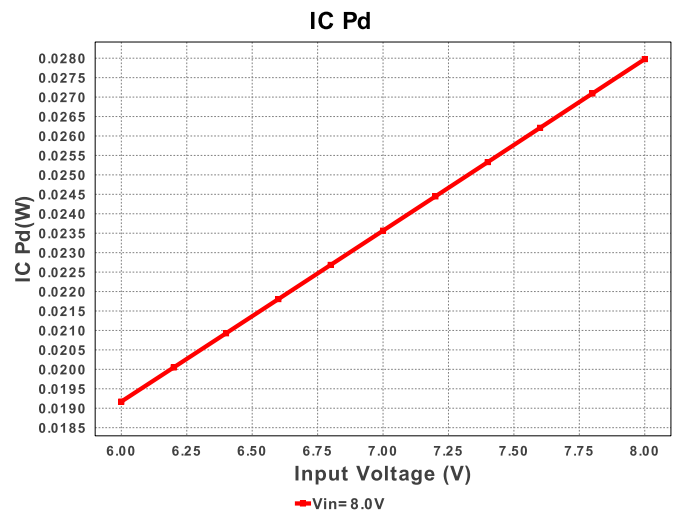
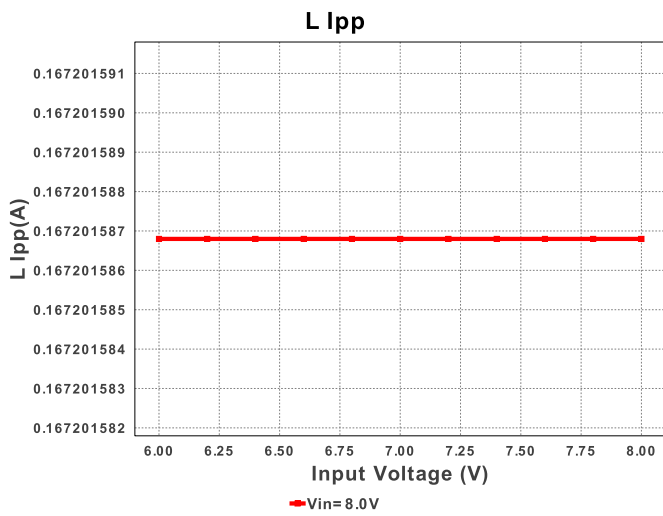
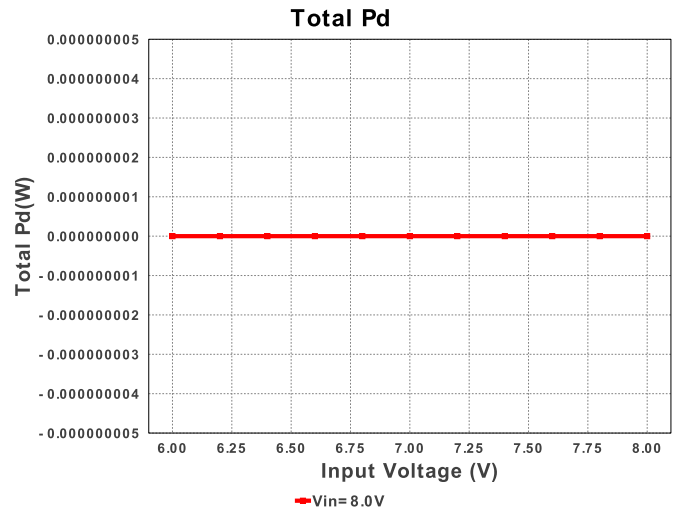
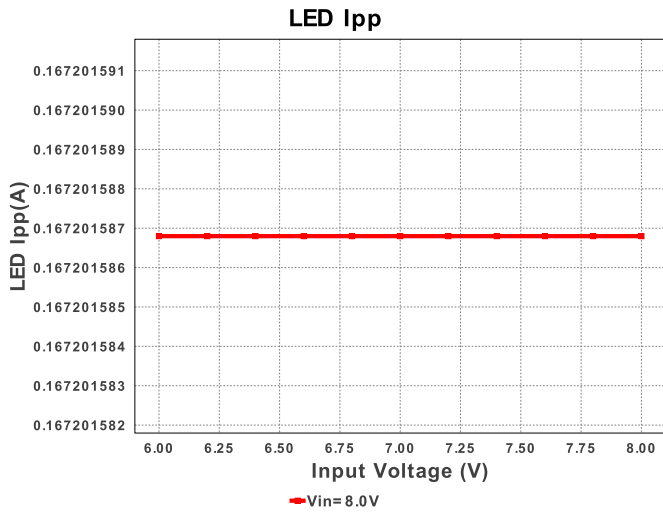
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	Taiyo Yuden	EMK212B7105KG-T Series= X7R	Cap= 1.0 µF VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	 0805 7mm2
2.	Cin	TDK	C1608X5R1A105K Series= 285	Cap= 1.0 µF ESR= 9.603 mOhm VDC= 10.0 V IRMS= 0.0 A	2	\$0.01	 0603 5mm2
3.	Coff	Yageo America	CC0805KRX7R9BB471 Series= X7R	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
4.	Cout	Kemet	C0805C475K8PACTU Series= X5R	Cap= 4.7 µF ESR= 4.0 mOhm VDC= 10.0 V IRMS= 9.89 A	1	\$0.03	 0805 7mm2
5.	D1	Diodes Inc.	B130LAW-7-F	VF@Io= 380.0 mV VRRM= 30.0 V	1	\$0.11	 SOD-123 13mm2
6.	D_LED	Cree	XMLAWT-00-0000-000LT40E4ED		1	\$3.23	 xlampxml 51mm2
7.	L1	Bourns	SDR0604-220YL	L= 22.0 µH DCR= 190.0 mOhm	1	\$0.18	 SDR0604 61mm2
8.	M1	Texas Instruments	CSD25302Q2	VdsMax= -20.0 V IdsMax= -5.0 Amps	1	\$0.26	 TRANS_NexFET_Q2 9mm2
9.	Roff	Panasonic	ERJ-6ENF4641V Series= 225	Res= 4.64 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7mm2

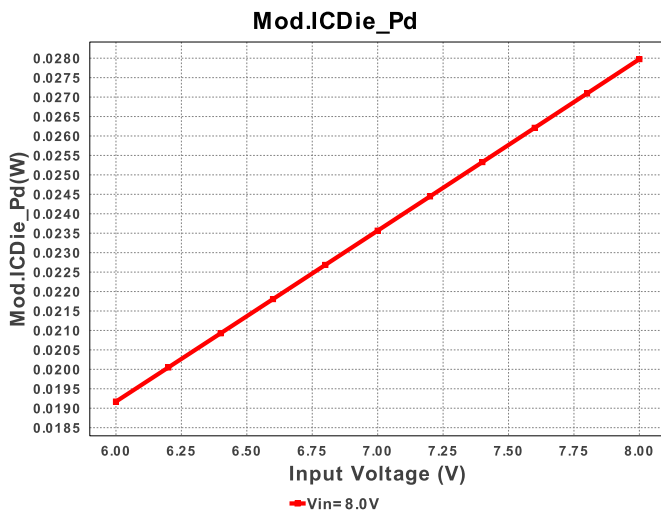
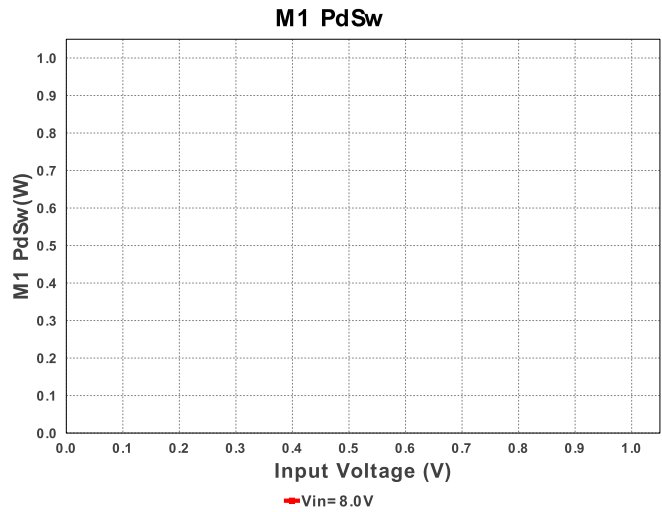
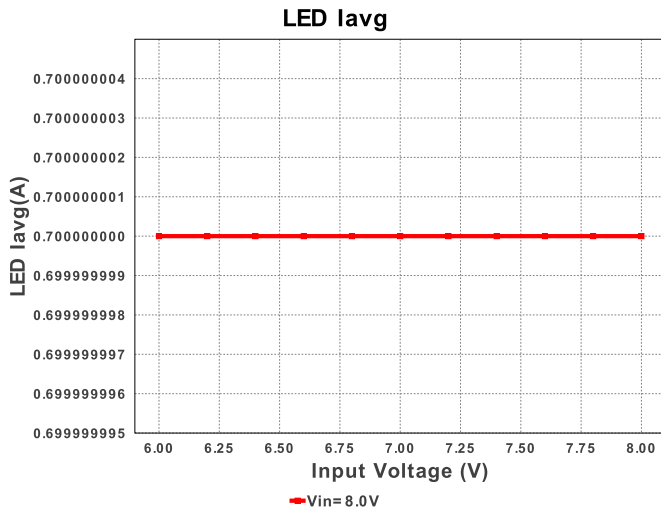
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rsns	Rohm	MCR25JZHFLR300 Series= 298	Res= 300.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.03	 1210 15mm2
11.	Ruv1	Panasonic	ERJ-6ENF1652V Series= 225	Res= 16.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7mm2
12.	Ruv2	Panasonic	ERJ-6ENF4992V Series= 225	Res= 49.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7mm2
13.	U1	Texas Instruments	LM3409MY/NOPB	Switcher	1	\$0.70	 MUC10A 24mm2











## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	341.802 mA	Current	Input capacitor RMS ripple current
2.	Iin Avg	0.0 A	Current	Average input current
3.	L Ipp	167.202 mA	Current	Peak-to-peak inductor ripple current
4.	LED Iavg	700.0 mA	Current	LED Average Current
5.	LED Ipp	35.08 mA	Current	LED Ripple Current
6.	SW Ipk	783.601 mA	Current	Peak switch current
7.	BOM Count	14	General	Total Design BOM count
8.	FootPrint	222.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
9.	Frequency	479.342 kHz	General	Switching frequency
10.	IC Tolerance	54.0 mV	General	IC Feedback Tolerance
11.	Pout	2.03 W	General	Total output power
12.	Total BOM	\$4.62	General	Total BOM Cost
13.	D1 Tj	65.879 degC	Op_Point	D1 junction temperature
14.	Vout OP	2.9 V	Op_Point	Operational Output Voltage
15.	Duty Cycle	39.241 %	Op_point	Duty cycle
16.	Efficiency	0.0 %	Op_point	Steady state efficiency
17.	IC Tj	31.398 degC	Op_point	IC junction temperature
18.	ICThetaJA	50.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	700.0 mA	Op_point	Iout operating point
20.	LED Rd	281.134 mOhm	Op_point	LED DynamicResistance
21.	LED Vf	2.9 V	Op_point	Total LED Forward Calculated Voltage
22.	VIN_OP	8.0 V	Op_point	Vin operating point
23.	Cin Pd	560.952 μW	Power	Input capacitor power dissipation
24.	Diode Pd	161.618 mW	Power	Diode power dissipation
25.	IC Pd	27.964 mW	Power	IC power dissipation
26.	L Pd	116.375 mW	Power	Inductor power dissipation
27.	LED Pd	2.03 W	Power	LED Power Dissipation
28.	M1 PdSw	9.46 mW	Power	M1 MOSFET conduction losses
29.	Rsense Pd	147.0 mW	Power	LED Power Dissipation
30.	Total Pd	0.0 W	Power	Total Power Dissipation
31.	Toff	1.268 us	Unknown	Fixed Off Time

## Design Inputs

#	Name	Value	Description
1.	Iout	700.0 mA	Maximum Output Current
2.	Iout1	700.0 mAmps	Output Current #1
3.	VinMax	8.0 V	Maximum input voltage
4.	VinMin	6.0 V	Minimum input voltage
5.	Vout	2.9 V	Output Voltage
6.	Vout1	2.9 Volt	Output Voltage #1
7.	application	LED_DRIVER	LED Application
8.	base_pn	LM3409	Base Product Number
9.	LED_Architect	N	LED Architect Project
10.	ledparallel	1.0	Number of LED in parallel
11.	ledpartnumber	XMLAWT-00-0000-0000	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	30.0 degC	Ambient temperature

## Design Assistance

1. Application Hints Bypass Capacitor Connection WEBENCH schematic configured for the selected PFET's total gate charge (Qg) If the Qg value is > 30 nC, the Bypass Capacitor (C<sub>byp</sub> or CF) is connected from the VCC pin to CSN pin instead of typically connected from VCC to Vin when Qg < 30nC. Please see the datasheet for further design guidance. <http://www.ti.com/lit/ds/symlink/LM3409HV.pdf>

2. **LM3409** Product Folder : <http://www.ti.com/product/lm3409> : contains the data sheet and other resources.

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**You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.**

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