



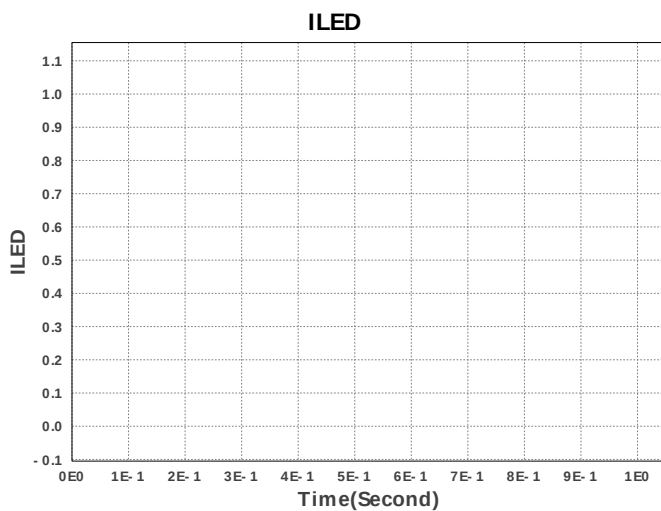
Device = LM3404MR/NOPB
Topology = Buck
Created = 7/12/16 5:13:00 PM
User ID = 4354344
Design Id = 28
eSim Id = 1
Simulation Type = Steady State

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM188R71E103KA01D Series= X7R	Cap= 10.0 nF ESR= 300.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
2.	Cbyp	MuRata	GRM188R71E104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 1.51 A	1	\$0.01	0603 5 mm ²
3.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 µF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.225 A	1	\$0.05	1206_190 11 mm ²
4.	Cout	TDK	C1608X7R1V105K080AC Series= X7R	Cap= 1.0 µF ESR= 5.522 mOhm VDC= 35.0 V IRMS= 2.216 A	1	\$0.05	0603 5 mm ²
5.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	\$0.04	SOD-123F 12 mm ²
6.	D_LED	Cree	XPGWHT-L1-0000-00H51	LED	3	\$1.60	xlampxpg 20 mm ²
7.	L1	TDK	VLP8040T-470M	L= 47.0 µH DCR= 160.0 mOhm	1	\$0.22	VLP8040 113 mm ²
8.	Ron	Panasonic	ERJ-6ENF1103V Series= ERJ-6E	Res= 110.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm ²
9.	Rsns	Panasonic	ERJ-6RQFR47V Series= ERJ-6R	Res= 470.0 mOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.04	0805 7 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	LM3404MR/NOPB	Switcher	1	\$1.02	 MRA08B 56 mm ²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cbyp	IC	Initial Condition Across CByp (supports 7V internal rail)	6.9 V
2.	Cin	IC	Initial Condition Across Cin	18.0 V
3.	Cout	IC	Initial Condition Across Cout	8.933 V
4.	L1	IC	Initial Condition Across Cin	0.5 V



Design Inputs

#	Name	Value	Description
1.	Iout	511.0 mA	Maximum Output Current
2.	VinMax	22.0 V	Maximum input voltage
3.	VinMin	14.0 V	Minimum input voltage
4.	Vout	8.933 V	Output Voltage
5.	application	LED_DRIVER	LED Application
6.	base_pn	LM3404	Base Product Number
7.	LED_Architect	Y	LED Architect Project
8.	ledparallel	1.0	Number of LED in parallel
9.	ledpartnumber	XPGWHT-L1-0000-00H51	LED Part number
10.	ledseries	3.0	Number of LED in series
11.	line_fsw	NaN	AC Line Frequency
12.	source	DC	Input Source Type
13.	Ta	30.0 degC	Ambient temperature

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	191.394 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	54.962 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	618.552 mA	Current	Peak switch current in IC
4.	Iin Avg	239.67 mA	Current	Average input current
5.	L Ipp	190.39 mA	Current	Peak-to-peak inductor ripple current
6.	LED Iavg	499.353 mA	Current	LED Average Current
7.	LED Ipp	27.667 mA	Current	LED Ripple Current
8.	M1 Irms	335.44 mA	Current	Q Iavg
9.	BOM Count	12	General	Total Design BOM count
10.	FootPrint	219.0 mm ²	General	Total Foot Print Area of BOM components
11.	Frequency	619.607 kHz	General	Switching frequency
12.	IC Tolerance	6.0 mV	General	IC Feedback Tolerance
13.	M Vds Act	258.625 mV	General	Voltage drop across the MosFET
14.	Mode	CCM	General	Conduction Mode
15.	Pout	4.667 W	General	Total output power

#	Name	Value	Category	Description
16.	Total BOM	\$1.45	General	Total BOM Cost
17.	D1 Tj	69.73 degC	Op_Point	D1 junction temperature
18.	Vout OP	9.133 V	Op_Point	Operational Output Voltage
19.	Duty Cycle	43.091 %	Op_point	Duty cycle
20.	Efficiency	88.511 %	Op_point	Steady state efficiency
21.	IC Tj	45.825 degC	Op_point	IC junction temperature
22.	ICThetaJA	50.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	511.0 mA	Op_point	Iout operating point
24.	LED Rd	514.423 mOhm	Op_point	LED DynamicResistance
25.	LED Vf	8.933 V	Op_point	Total LED Forward Calculated Voltage
26.	VIN_OP	22.0 V	Op_point	Vin operating point
27.	Cin Pd	162.937 μ W	Power	Input capacitor power dissipation
28.	Cout Pd	16.681 μ W	Power	Output capacitor power dissipation
29.	Diode Pd	120.395 mW	Power	Diode power dissipation
30.	IC Pd	316.498 mW	Power	IC power dissipation
31.	L Pd	45.957 mW	Power	Inductor power dissipation
32.	LED Pd	4.565 W	Power	LED Power Dissipation
33.	Rsense Pd	122.727 mW	Power	LED Power Dissipation
34.	Total Pd	605.785 mW	Power	Total Power Dissipation
35.	Vout Tolerance	65.696 m%	Unknown	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Assistance

1. **LM3404** Product Folder : <http://www.ti.com/product/LM3404> : contains the data sheet and other resources.

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