TEXAS INSTRUMENTS

VinMin = 25.0V
VinMax = 25.0V
Vout = 17.6V
Iout = 0.36A

Device = LM3404MA/NOPB
Topology = Buck
Created = 10/15/13 3:18:07 AM
BOM Cost = $0.00
Total Pd = 0.42W
Footprint = 307.0mm2
BOM Count = 154

WEBENCH ® Design Report

Design : 3757525/14 LM3404MA/NOPB
LM3404MA/NOPB 25.0V-25.0V to 17.8V @ 0.36A
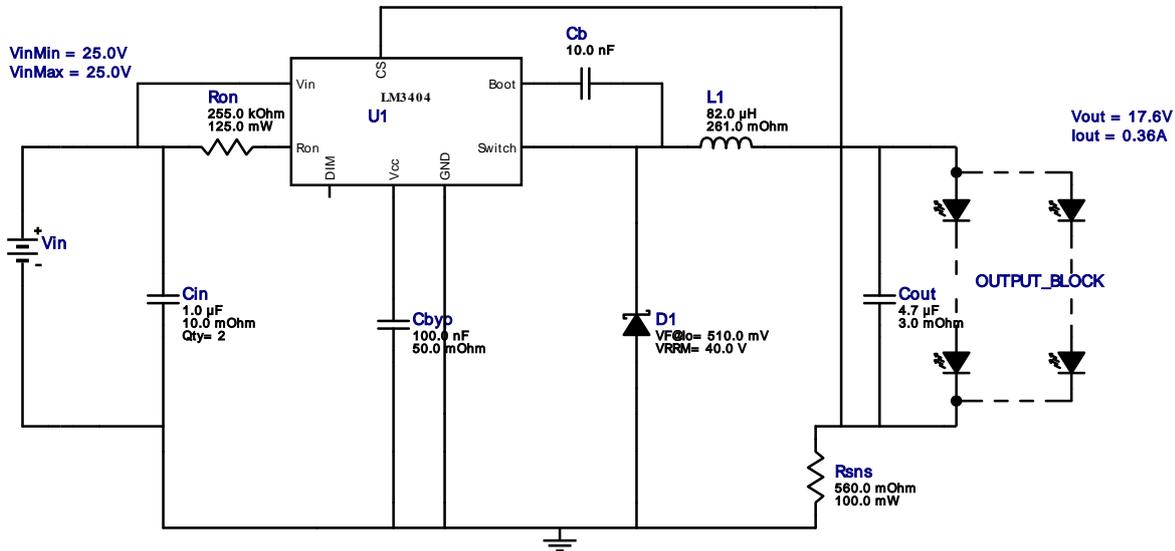
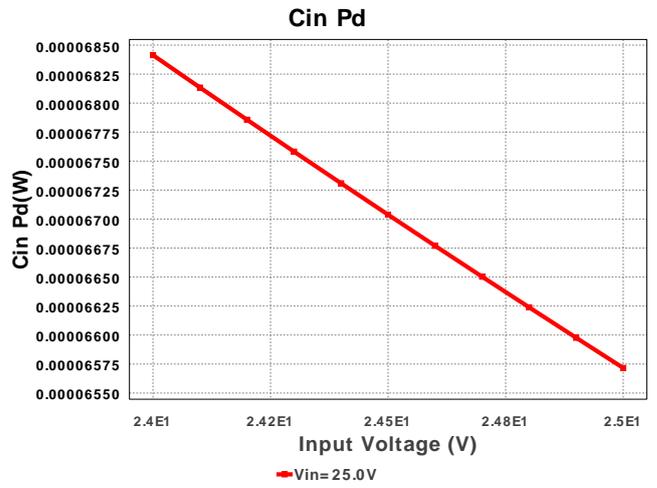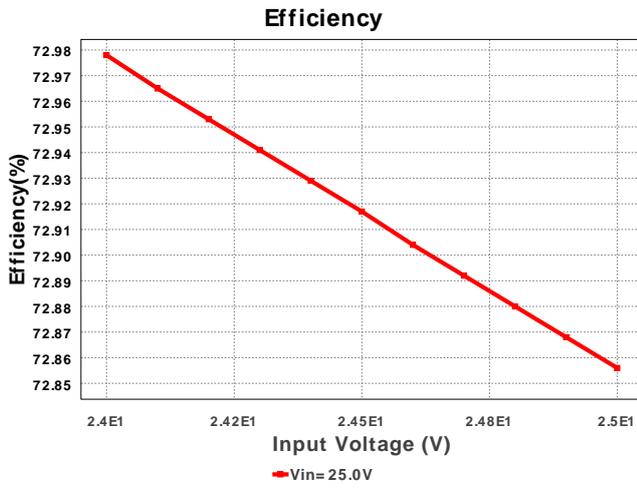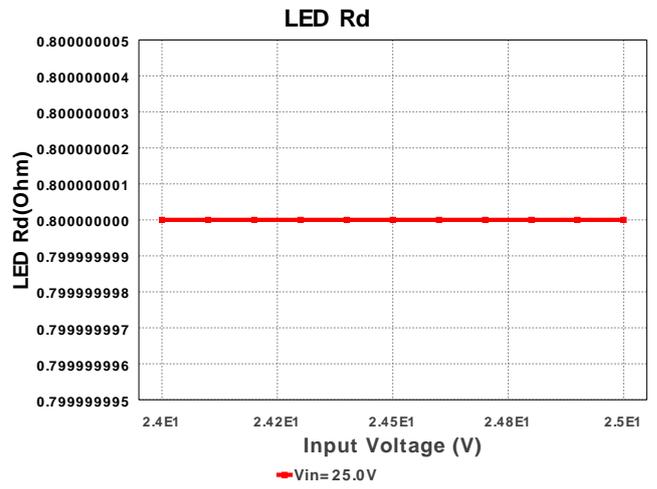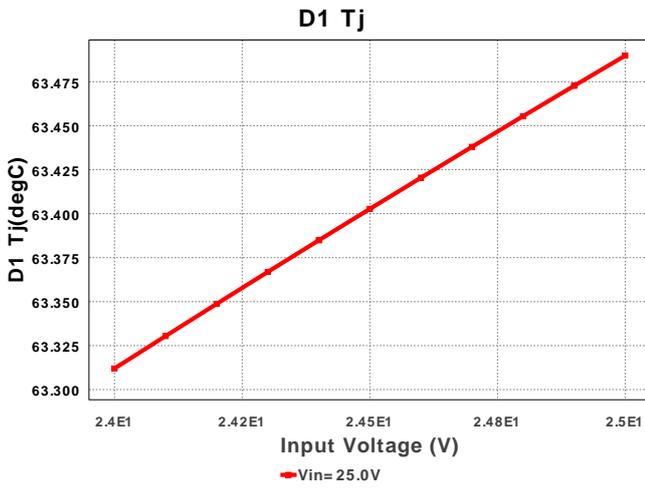## Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM188R71C103KA01D Series= X7R	Cap: 10.0 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0603 5mm2
2.	Cbyp	AVX	06033C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 50.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5mm2
3.	Cin	TDK	C3216X7R1H105K Series= X7R	Cap= 1.0 µF ESR= 10.0 mOhm VDC= 50.0 V IRMS= 3.2 A	2	$0.04	1206 11mm2
4.	Cout	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	$0.10	1206 11mm2
5.	D1	ON Semiconductor	MBR0540T1G	VF@Io= 510.0 mV VRRM= 40.0 V	1	$0.06	SOD-123 13mm2
6.	D_LED	CUSTOM	CUSTOM	LED	144	NA	CUSTOM 0mm2
7.	L1	Coilcraft	MSS1038-823MLB	L= 82.0 µH DCR= 261.0 mOhm	1	$0.49	MSS1038 151mm2
8.	Ron	Vishay-Dale	CRCW0805255KFKEA Series= CRCW..e3	Res= 255.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7mm2
9.	Rsns	Panasonic	ERJ-3RQFR56V Series= 227	Res= 560.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.02	0603 5mm2
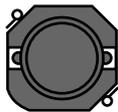
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#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	LM3404MA/NOPB	Switcher	1	$1.17	M08A 55mm2

IC Tj

Duty Cycle

Cin IRMS

IC Ipk

L Pd

Rsense Pd

D1 Tj

Vin= 25.0V

LED Rd

Vin= 25.0V

Efficiency

Vin= 25.0V

Cin Pd

Vin= 25.0V

Cout Pd

Vin= 25.0V

M Vds Act

Vin= 25.0V

M Irms

LED Vf

LED Pd

Pout

LED Ipp

Iin Avg

Total Pd

Vin= 25.0V

Cout IRMS

Vin= 25.0V

L Ipp

Vin= 25.0V

IC Pd

Vin= 25.0V

Diode Pd

Vin= 25.0V

LED Iavg

Vin= 25.0V
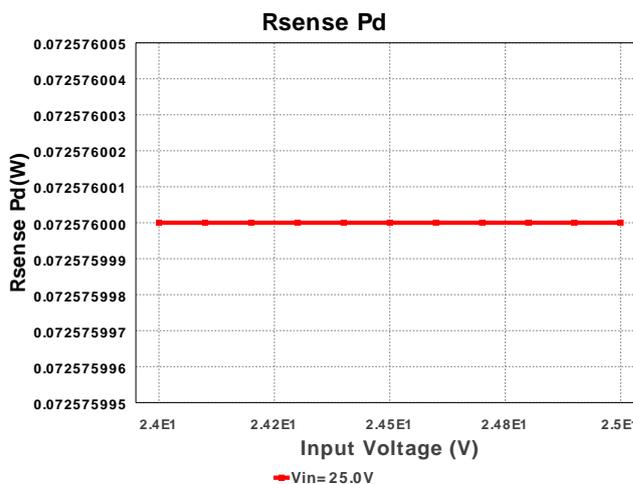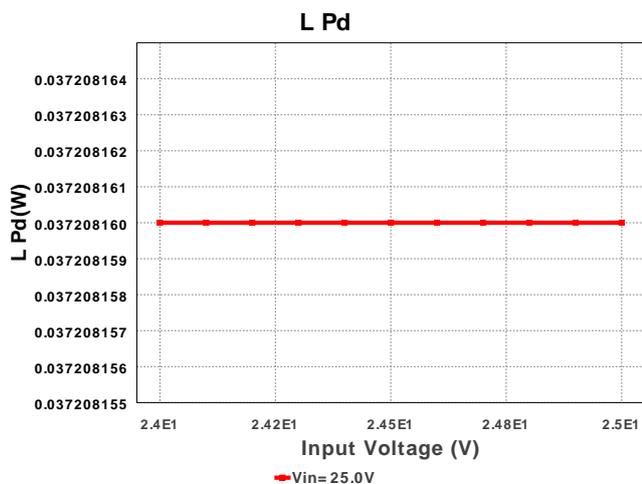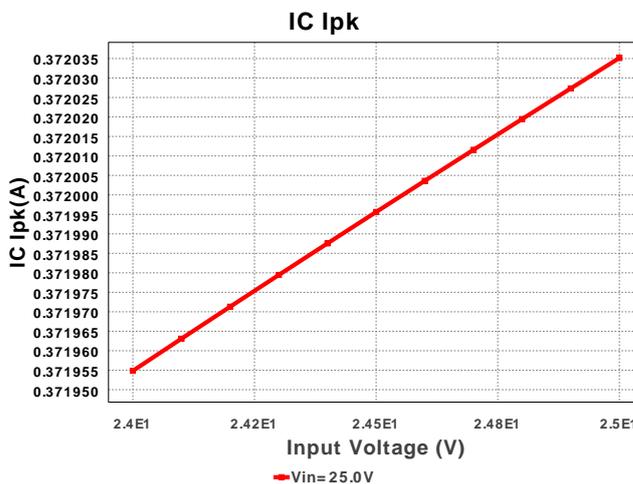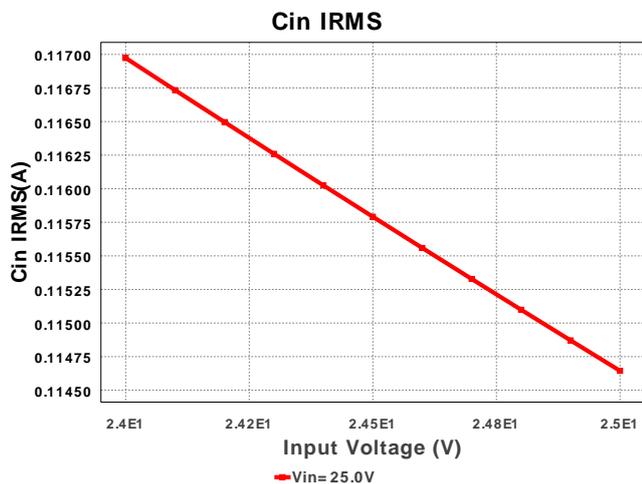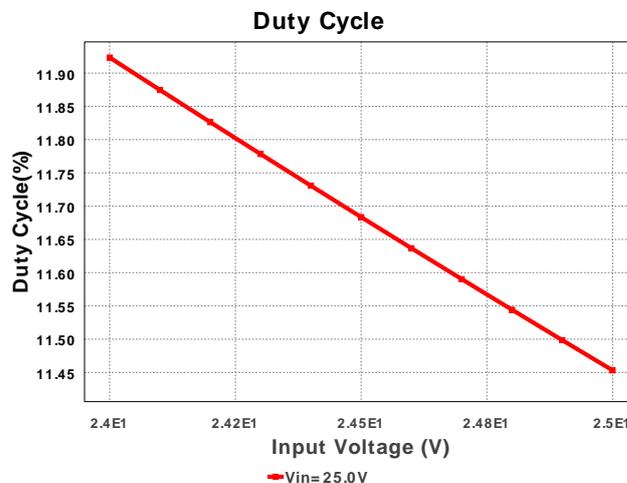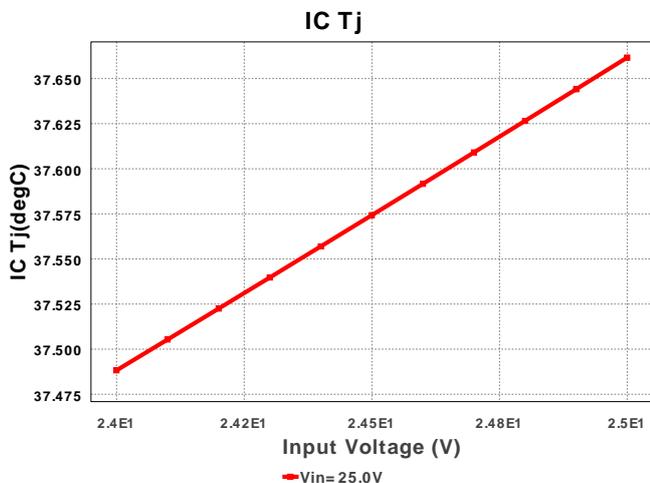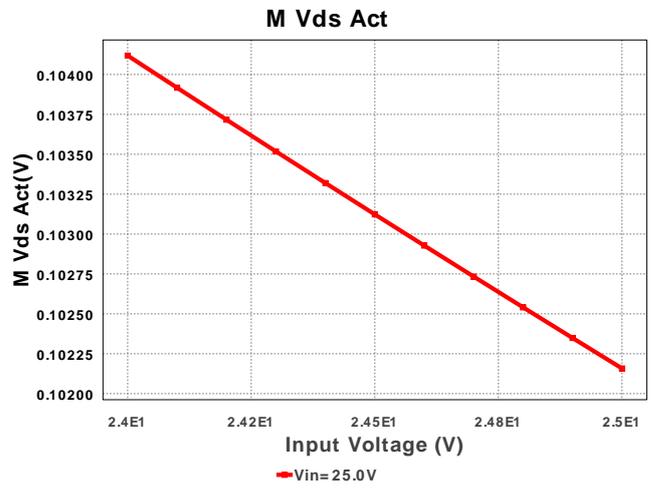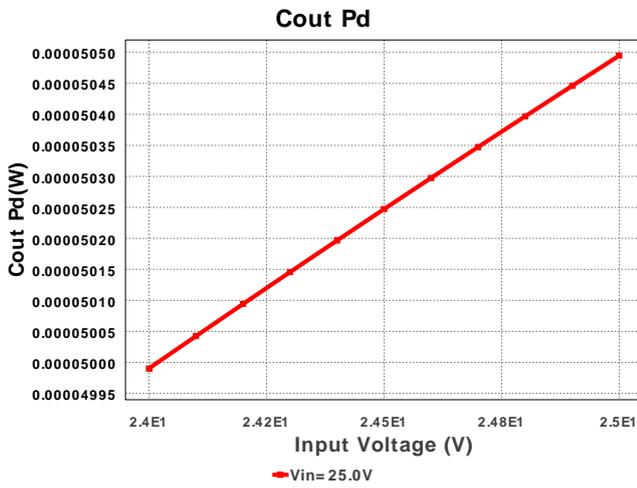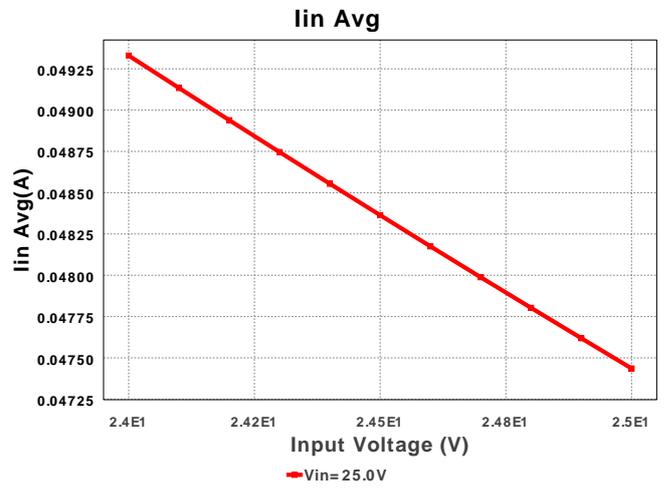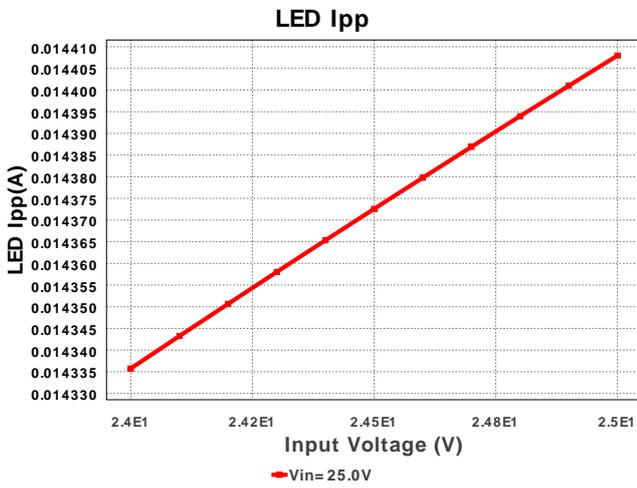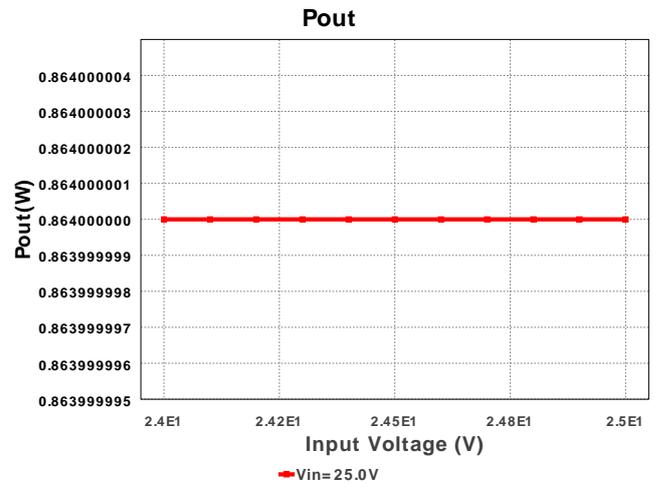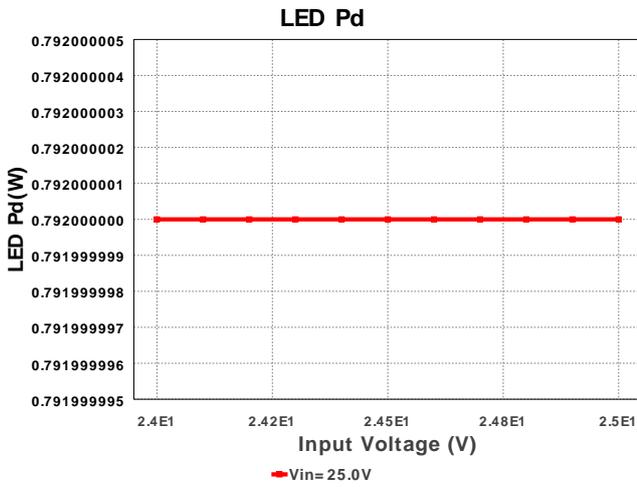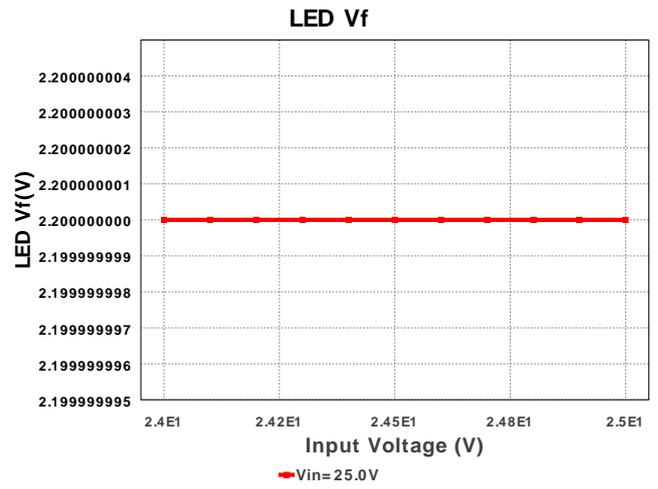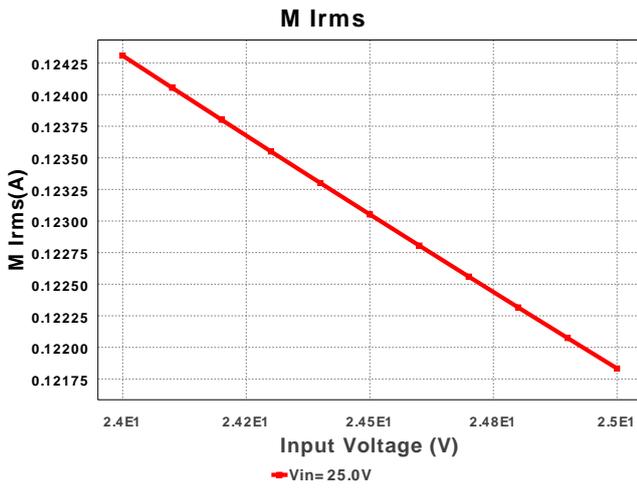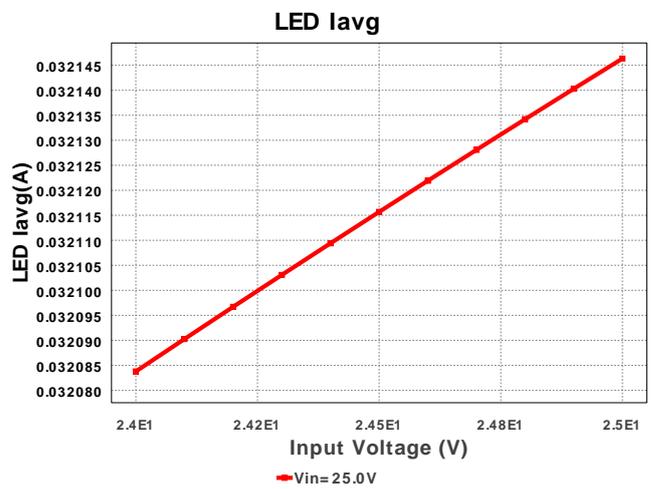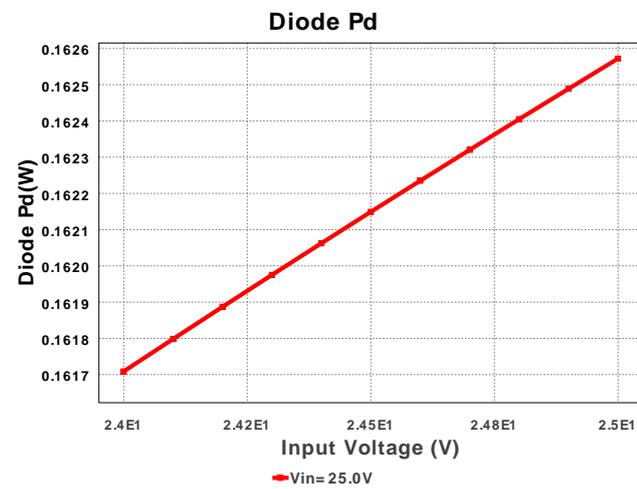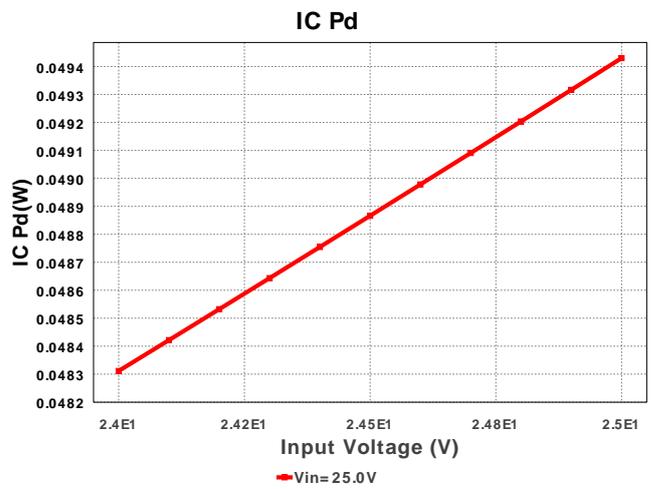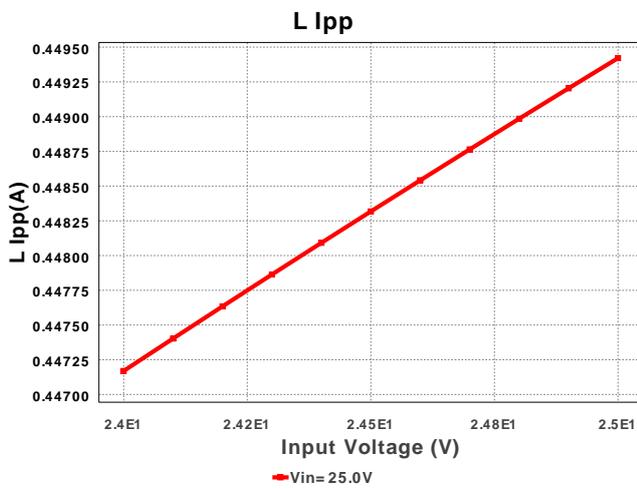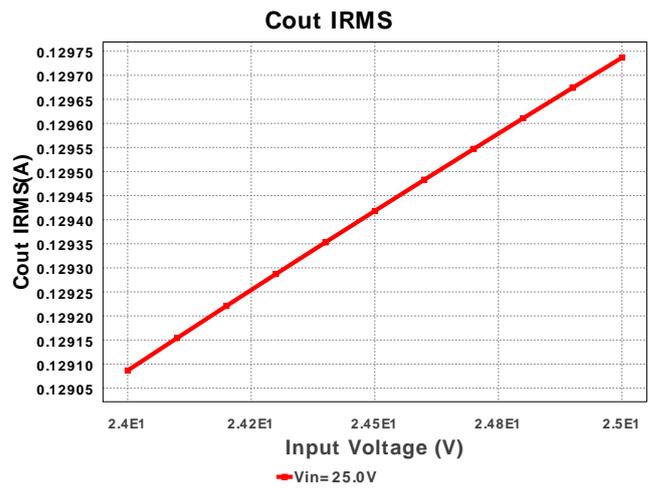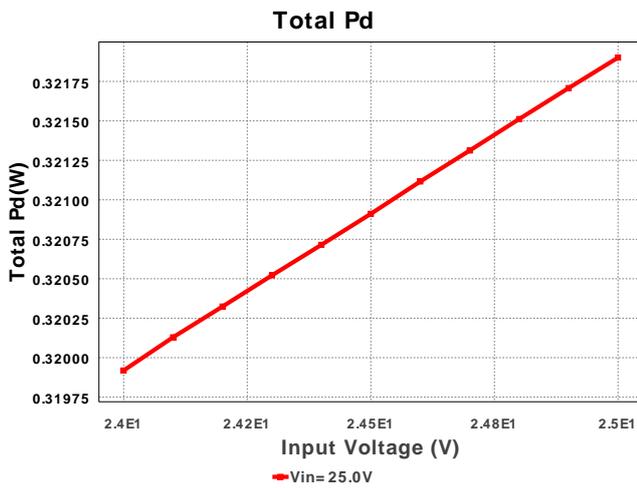
Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	160.829 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	35.254 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	425.054 mA	Current	Peak switch current in IC
4.	Iin Avg	273.08 mA	Current	Average input current
5.	L Ipp	122.125 mA	Current	Peak-to-peak inductor ripple current
6.	LED Iavg	21.907 mA	Current	LED Average Current
7.	LED Ipp	1.089 mA	Current	LED Ripple Current
8.	M1 Irms	306.431 mA	Current	Q Iavg
9.	BOM Count	154	General	Total Design BOM count
10.	FootPrint	307.0 mm2	General	Total Foot Print Area of BOM components
11.	Frequency	520.925 kHz	General	Switching frequency

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#	Name	Value	Category	Description
12.	IC Tolerance	6.0 mV	General	IC Feedback Tolerance
13.	M Vds Act	238.738 mV	General	Voltage drop across the MosFET
14.	Pout	6.408 W	General	Total output power
15.	Total BOM	$0.0	General	Total BOM Cost
16.	D1 Tj	40.418 degC	Op_Point	D1 junction temperature
17.	Vout OP	17.8 V	Op_Point	Operational Output Voltage
18.	Duty Cycle	72.454 %	Op_point	Duty cycle
19.	Efficiency	93.864 %	Op_point	Steady state efficiency
20.	IC Tj	70.055 degC	Op_point	IC junction temperature
21.	ICThetaJA	155.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	360.0 mA	Op_point	Iout operating point
23.	LED Rd	800.0 mOhm	Op_point	LED DynamicResistance
24.	LED Vf	17.6 V	Op_point	Total LED Forward Calculated Voltage
25.	VIN_OP	25.0 V	Op_point	Vin operating point
26.	Cin Pd	129.329 µW	Power	Input capacitor power dissipation
27.	Cout Pd	3.729 µW	Power	Output capacitor power dissipation
28.	Diode Pd	50.575 mW	Power	Diode power dissipation
29.	IC Pd	258.418 mW	Power	IC power dissipation
30.	L Pd	37.208 mW	Power	Inductor power dissipation
31.	LED Pd	6.336 W	Power	LED Power Dissipation
32.	Rsense Pd	72.576 mW	Power	LED Power Dissipation
33.	Total Pd	418.905 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	360.0 mA	Maximum Output Current
2.	Iout1	360.0 mAmps	Output Current #1
3.	VinMax	25.0 V	Maximum input voltage
4.	VinMin	25.0 V	Minimum input voltage
5.	Vout	17.6 V	Output Voltage
6.	Vout1	17.6 Volt	Output Voltage #1
7.	application	LED_DRIVER	LED Application
8.	base_pn	LM3404	Base Product Number
9.	LED_Architect	N	LED Architect Project
10.	ledparallel	18.0	Number of LED in parallel
11.	ledpartnumber	Custom	LED Part number
12.	ledseries	8.0	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. **LM3404** Product Folder : http://www.ti.com/product/lm3404 : contains the data sheet and other resources.