Design 4 - LM3404MA

Introduction

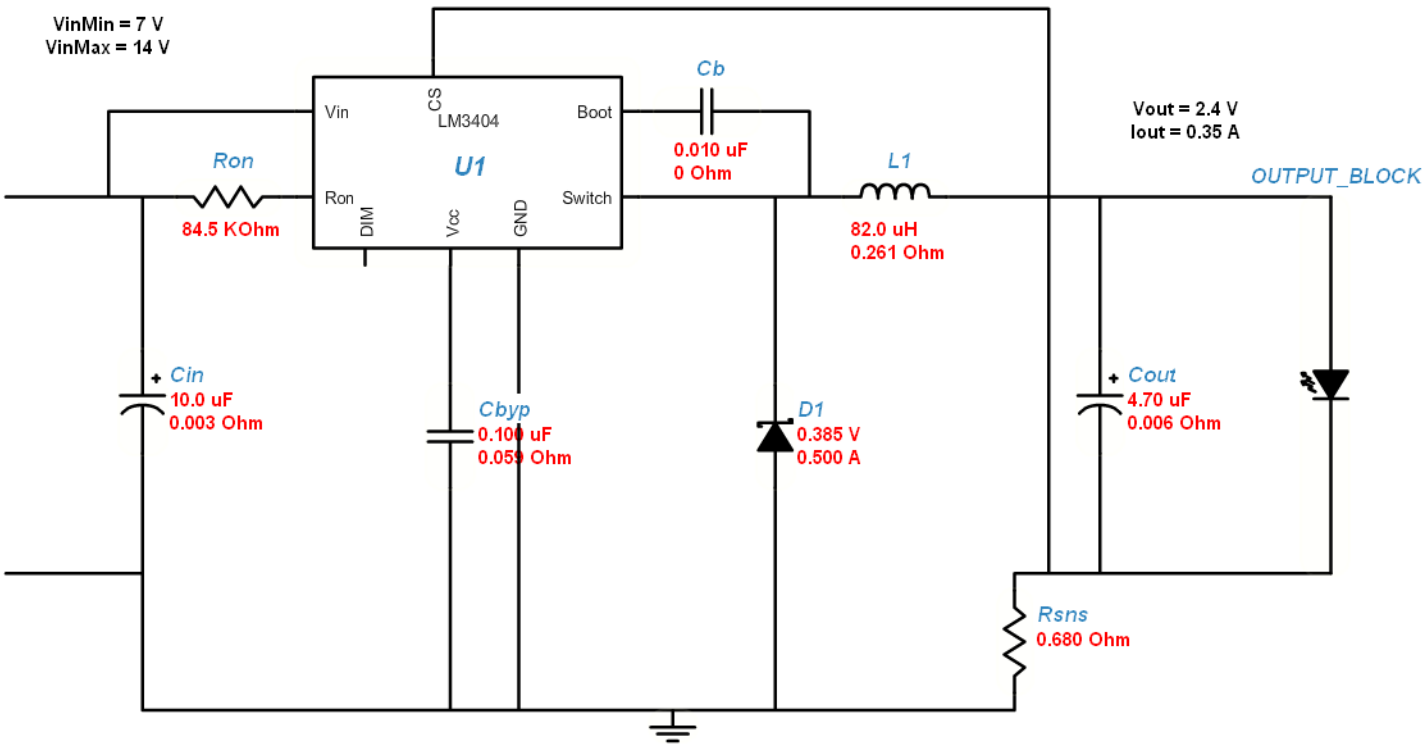
Design Specifications

IC	LM3404
VinMin	7 V
VinMax	14 V
Vout	2.4 V
Iout	0.35 A
ta	30

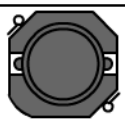
Optimization Factor	4
application	LED_DRIVER
ledpartnumber	Custom
ledseries	1
ledparallel	1

ledrd	0.8
SoftStart Time	0 mili second
usecustomfsw	N
NoOutputCap_Confi	N
Ipp	0

Schematic



Bill of Materials

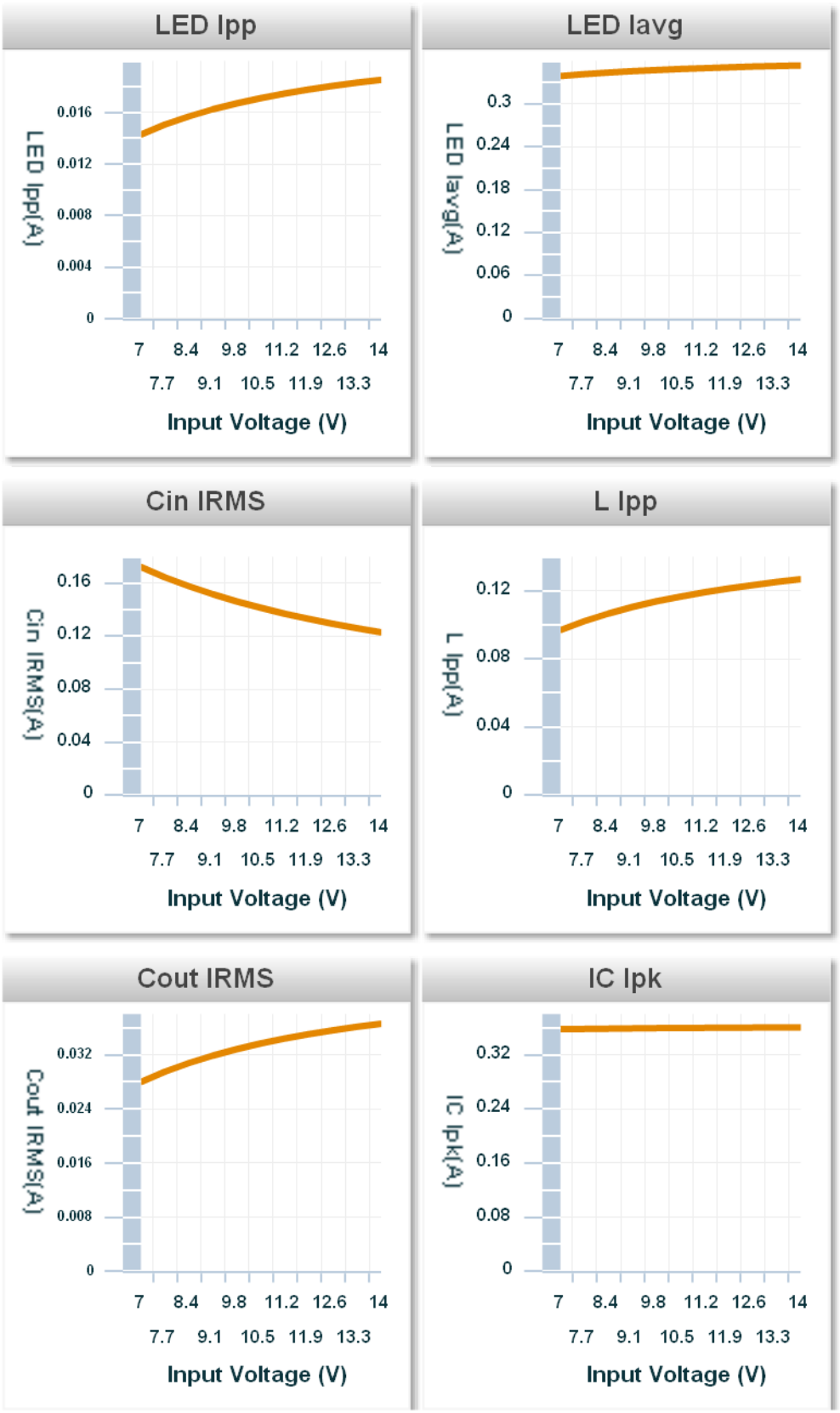
Part	Manufacturer	Part Number	Quant	Price	Attributes	Top View
Cb	Yageo America	CC1206KRX7R9BB103	1	0.02	Cap=10nF, ESR=0Ohm, VDC=50V	
Cbyp	Kemet	C1206C104K5RACTU	1	0.02	Cap=100nF, ESR=0.059Ohm, VDC=50V	
Cin	TDK	C3225X7R1E106M	1	0.41	Cap=10uF, ESR=2.7mOhm, VDC=25V	
Cout	TDK	C3216X7R1E475K	1	0.11	Cap=4.7uF, ESR=6.3mOhm, VDC=25V	
D1	ON Semiconductor	MBR0520LT1G	1	0.07	VFatIo=0.385V, Io=0.5A, VRRM=20V	
L1	Coilcraft Inc.	MSS1038-823MLB	1	0.45	L=82uH, DCR=0.261Ohm, IDC=1.5A	
Ron	Panasonic	ERJ-6ENF8452V	1	0.02	Resistance=84.5KOhm, Tolerance=1%, Power=0.125W	
Rsns	Panasonic	ERJ-3RQFR68V	1	0.06	Resistance=0.68Ohm, Tolerance=1%, Power=0.1W	
U1	National Semiconductor	LM3404MA	1	1.93		

Operating Values

Name	Value	Category	Description
LED Ipp	0.02A	Current	LED Ripple Current
LED Iavg	0.35A	Current	LED Average Current
Cin IRMS	0.12A	Current	Input capacitor RMS ripple current
L Ipp	0.12A	Current	Peak-to-peak inductor ripple current
Cout IRMS	0.03A	Current	Output capacitor RMS ripple current
IC Ipk	0.43A	Current	Peak switch current in IC
Iin Avg	0.08A	Current	Average input current
Pout	0.91W	General	Total output power
Frequency	230KHz	General	Switching frequency
Mode	CCM	General	Conduction Mode
FootPrint	169mm2	General	Total Foot Print Area of BOM components
Total BOM	0$	General	Total BOM price
ICThetaJA	155degC/W	Op_point	IC junction-to-ambient thermal resistance
Efficiency	76.2%	Op_point	Steady state efficiency
M_Vds_Act	0.13V	Op_point	
VIN_OP	14V	Op_point	Vin operating point
Duty Cycle	20.9%	Op_point	Duty cycle
IOUT_OP	0.35A	Op_point	Iout operating point
M_Irms_Act	0.16A	Op_point	Q Iavg
IC Tj	39.3degC	Op_point	IC junction temperature
LED Vf	2.4V	Op_point	Total LED Forward Calculated Voltage
LED Rd	0.8Ohm	Op_point	LED DynamicResistance
Cin Pd	40.8uW	Power	Input capacitor power dissipation
Cout Pd	8.44uW	Power	Output capacitor power dissipation
Diode Pd	0.10W	Power	Diode power dissipation
Rsense Pd	0.08W	Power	LED Power Dissipation
IC Pd	0.06W	Power	IC power dissipation
LED Pd	0.84W	Power	LED Power Dissipation
L Pd	0.03W	Power	Inductor power dissipation
Total Pd	0.28W	Power	Total Power Dissipation

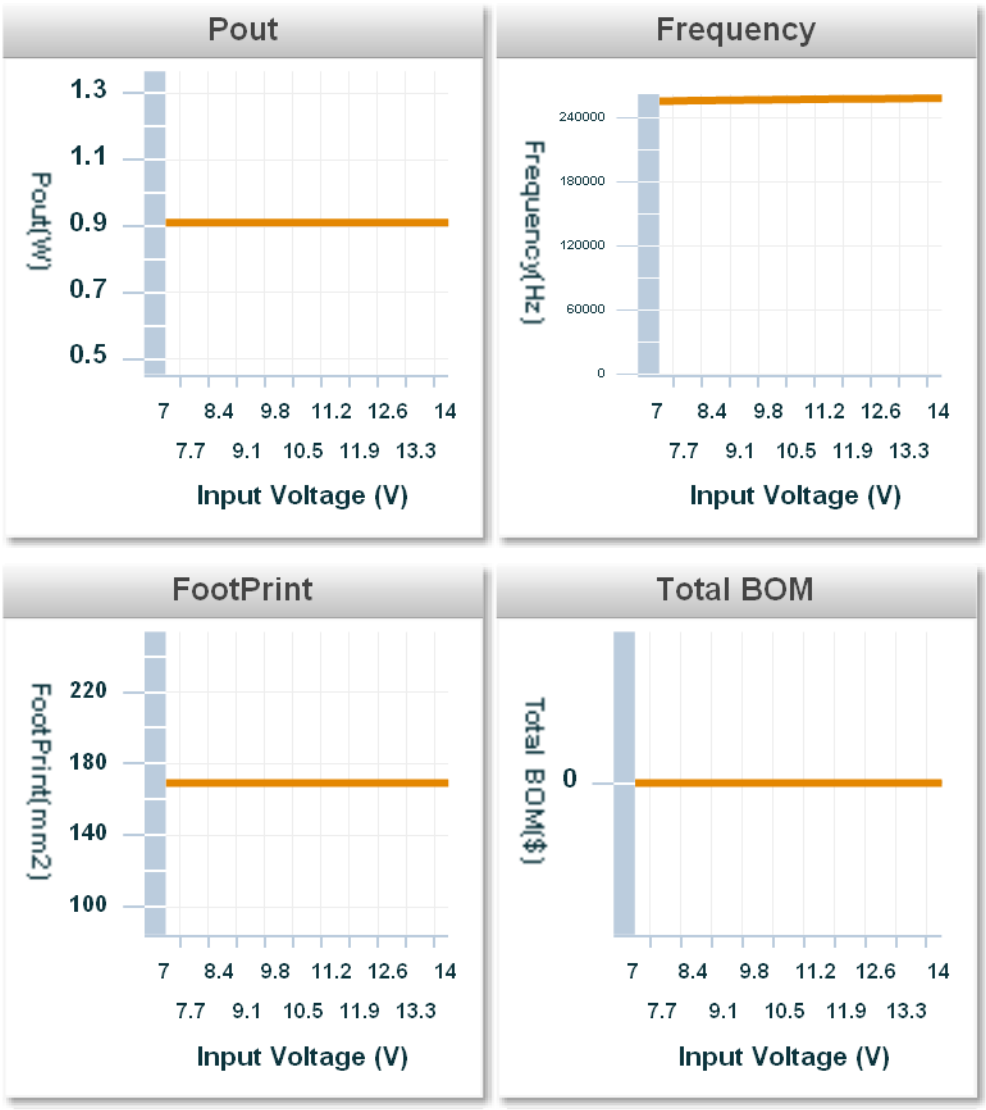
Charts

Current



Charts (Continued)

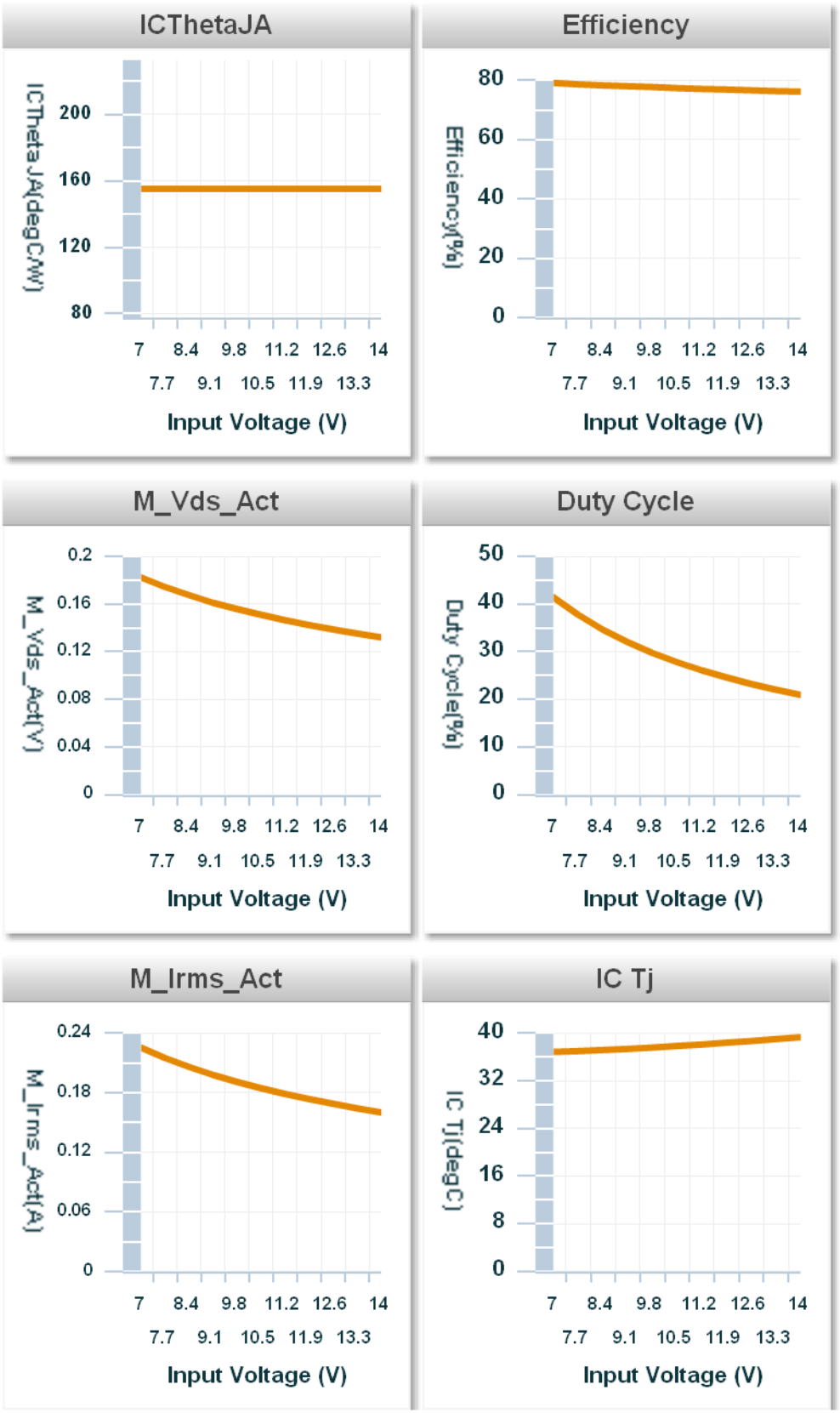
General



Charts (Continued)

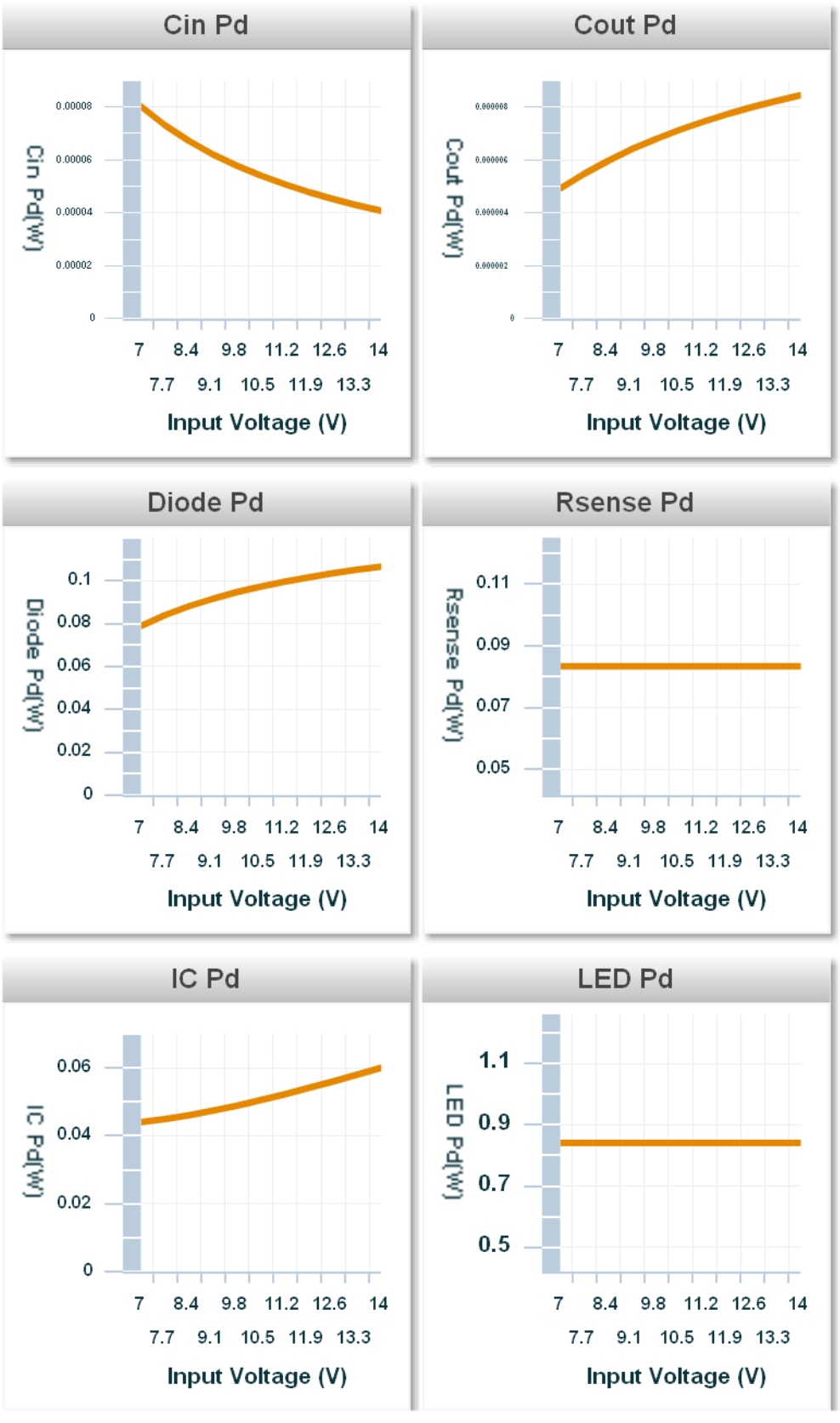
Op_point

Vin=14.00V



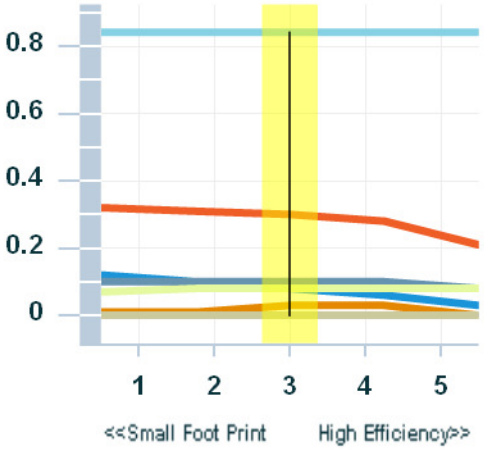
Charts (Continued)

Power



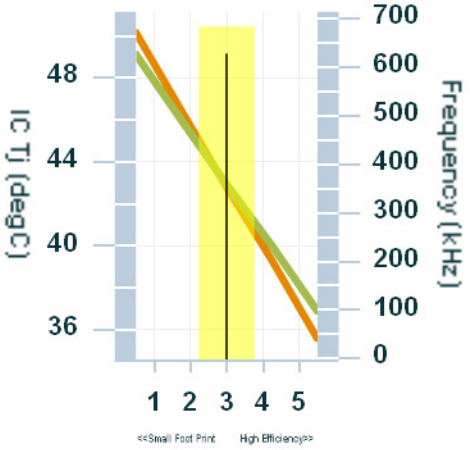
Optimization Plots

Power Dissipation Chart



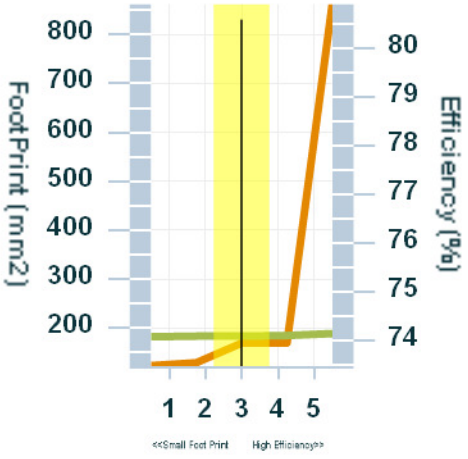
- L Pd
- Cin Pd
- IC Pd
- Cout Pd
- Diode Pd
- Total Pd
- LED Pd
- Rsense Pd

IC Temperature and Frequency Chart



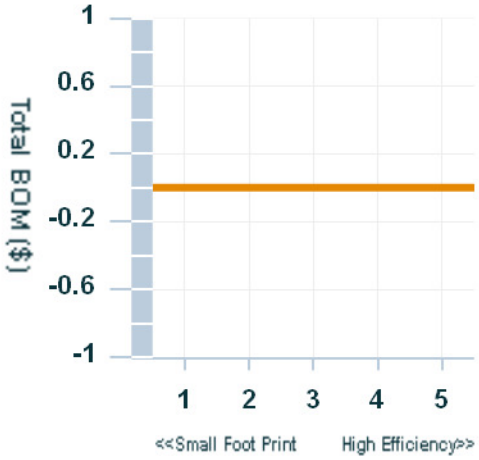
- IC Tj
- Frequency

Footprint And Efficiency Chart



- FootPrint
- Efficiency

Total BOM Price Chart



- Total BOM