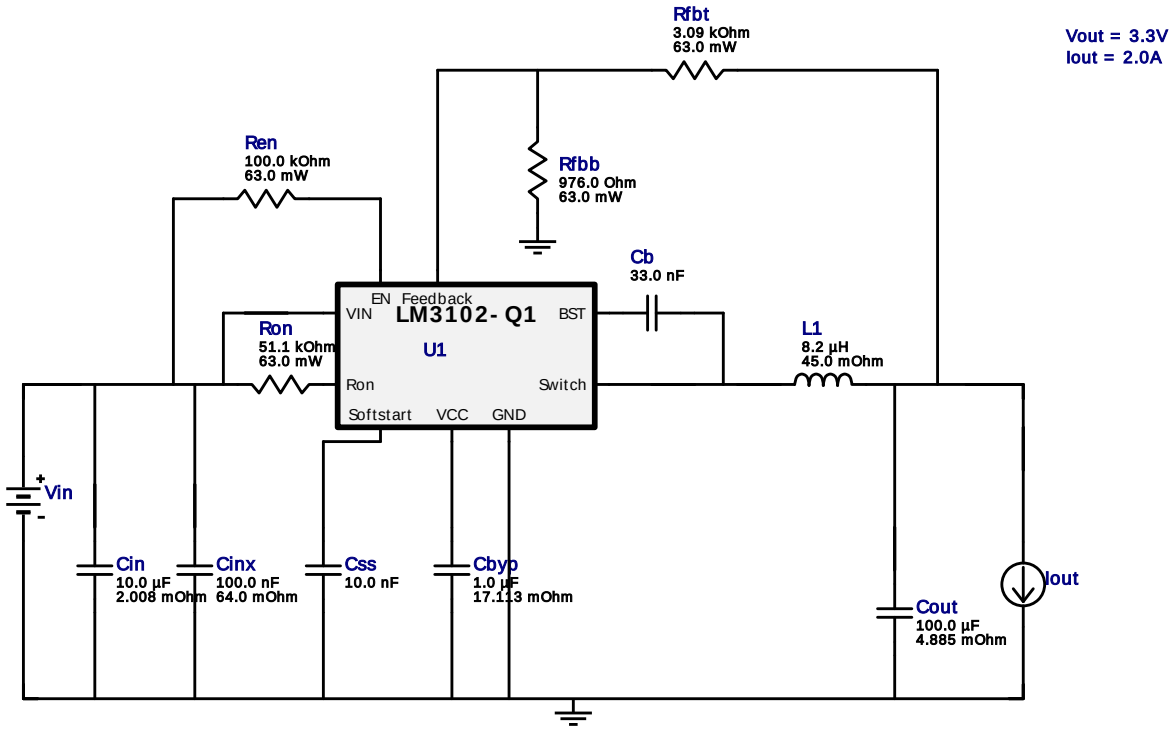
VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 2.0A

Device = LM3102QMHX/NOPB
Topology = Buck
Created = 7/12/16 2:00:30 AM
BOM Cost = $3.11
BOM Count = 12
Total Pd = 1.4W

WEBENCH® Design Report

Design : 4737567/68 LM3102QMHX/NOPB
LM3102QMHX/NOPB 14.0V-22.0V to 3.30V @ 2.0A

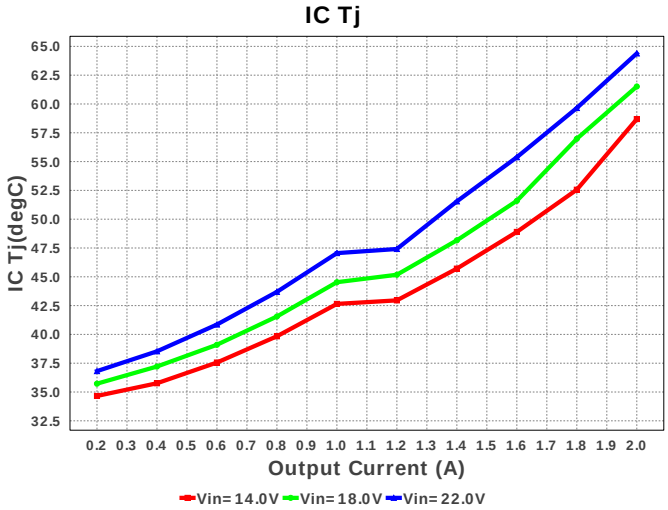


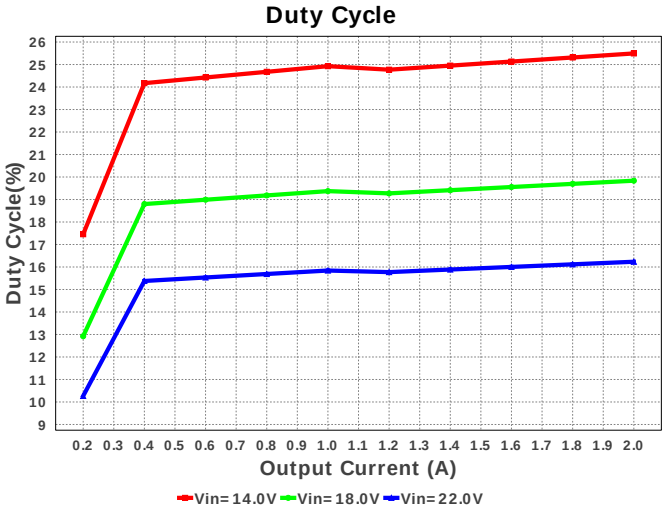
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application.View WEBENCH(R) Disclaimer.

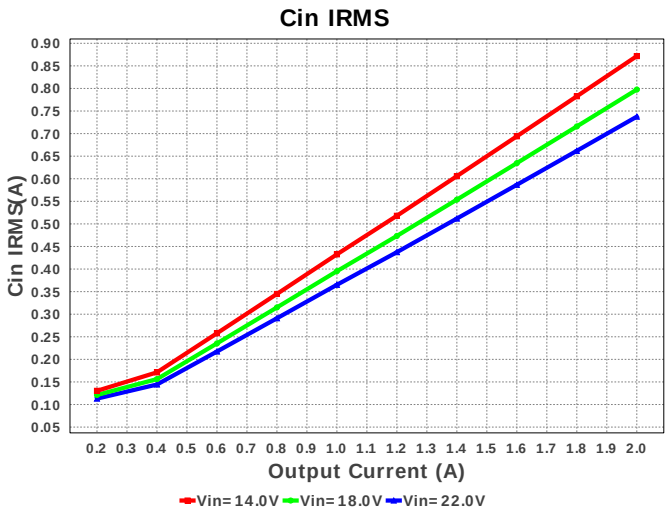
Electrical BOM

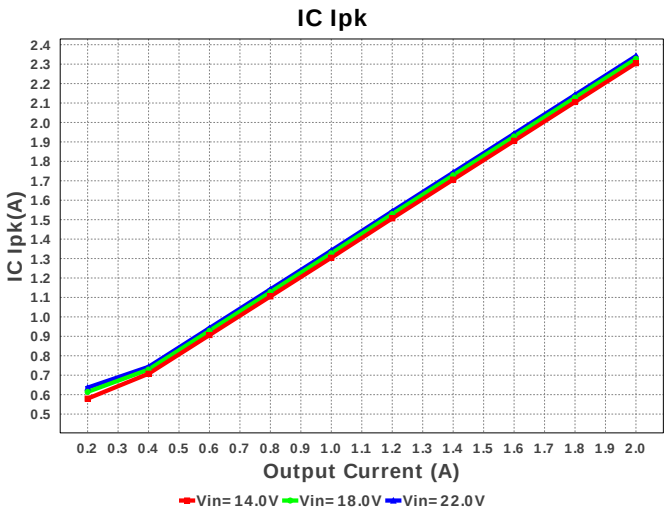
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM155R71E333KA88D Series= X7R	Cap= 33.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
2.	Cbyp	MuRata	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	$0.01	0603 5 mm^2
3.	Cin	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	1	$0.22	1210_280 15 mm^2
4.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm^2
5.	Cout	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	1	$0.14	1206_190 11 mm^2
6.	Css	MuRata	GRM155R71E103KA01D Series= X7R	Cap= 10.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2

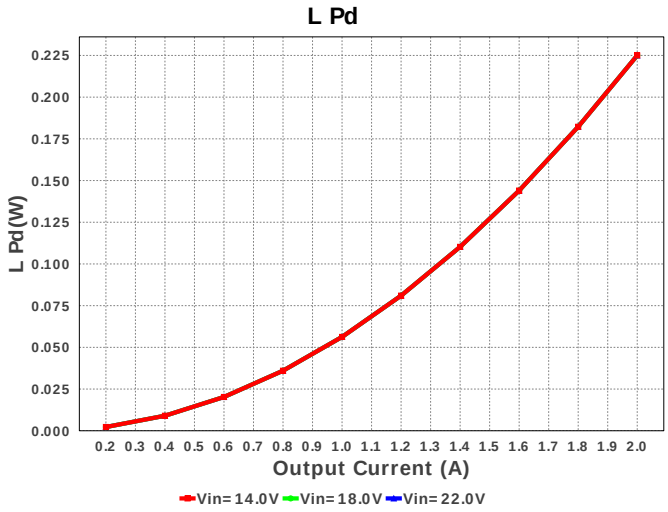
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	L1	Bourns	SRN8040-8R2Y	L= 8.2 µH DCR= 45.0 mOhm	1	$0.22	 SRN8040 100 mm^2
8.	Ren	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
9.	Rfbb	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
10.	Rfbt	Vishay-Dale	CRCW04023K09FKED Series= CRCW..e3	Res= 3.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
11.	Ron	Vishay-Dale	CRCW040251K1FKED Series= CRCW..e3	Res= 51.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2
12.	U1	Texas Instruments	LM3102QMHX/NOPB	Switcher	1	$2.45	 MXA20A 71 mm^2

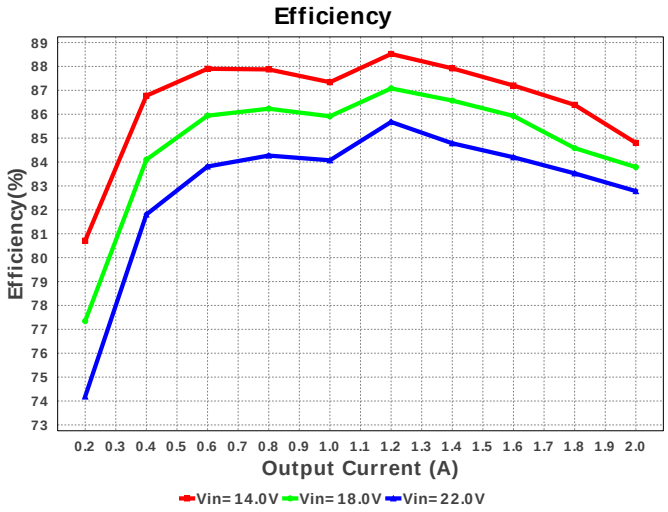


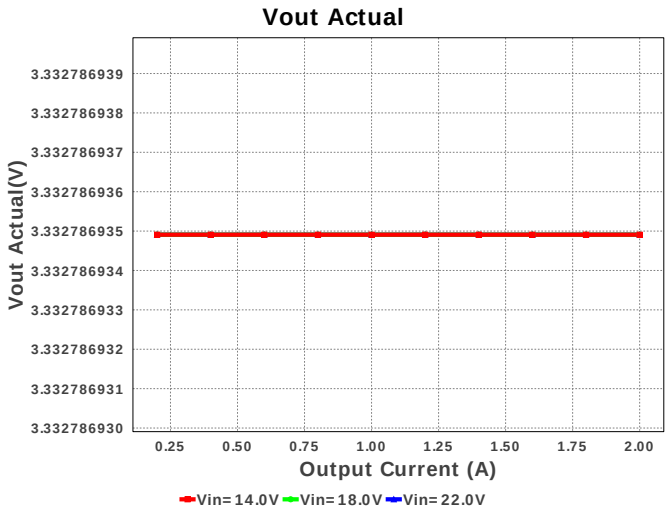


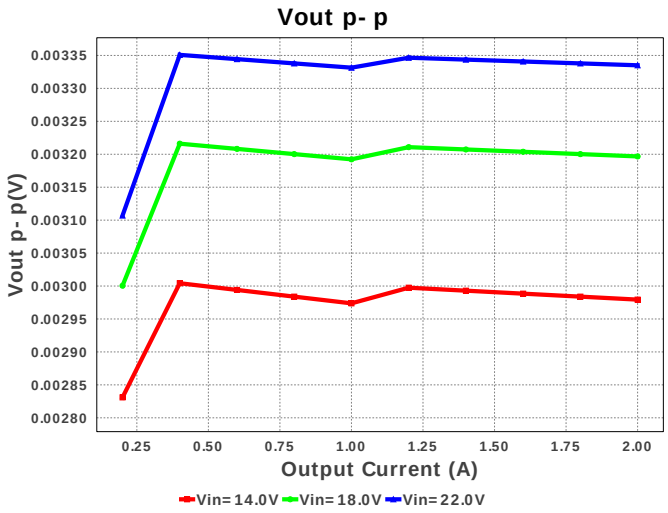


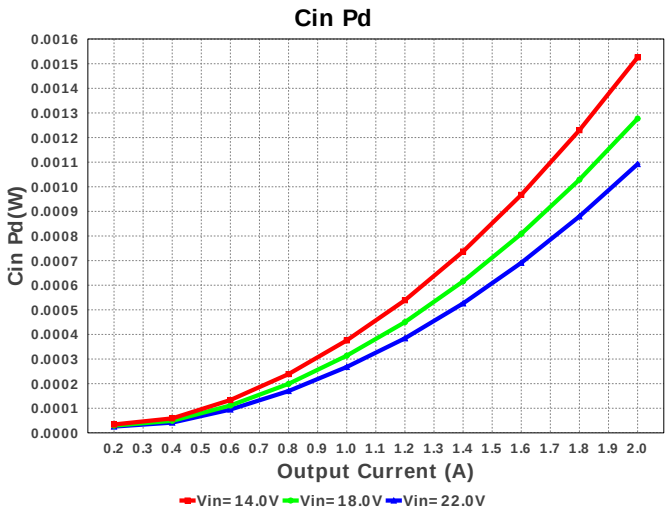


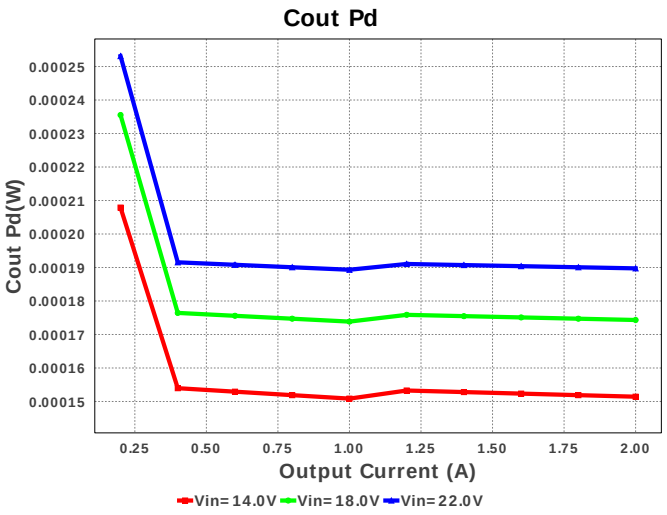


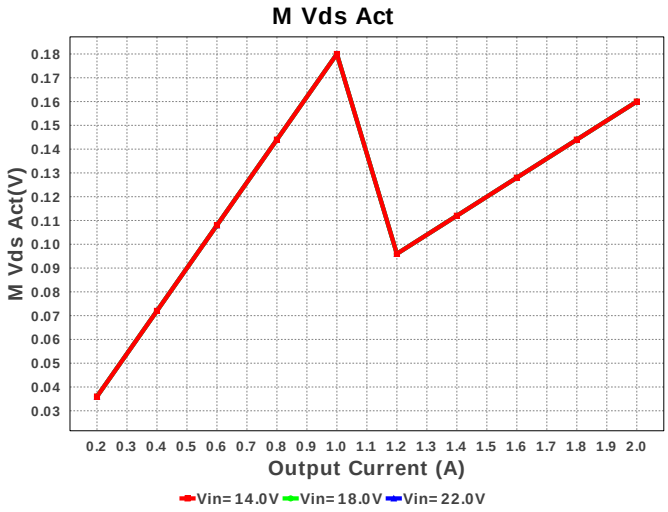


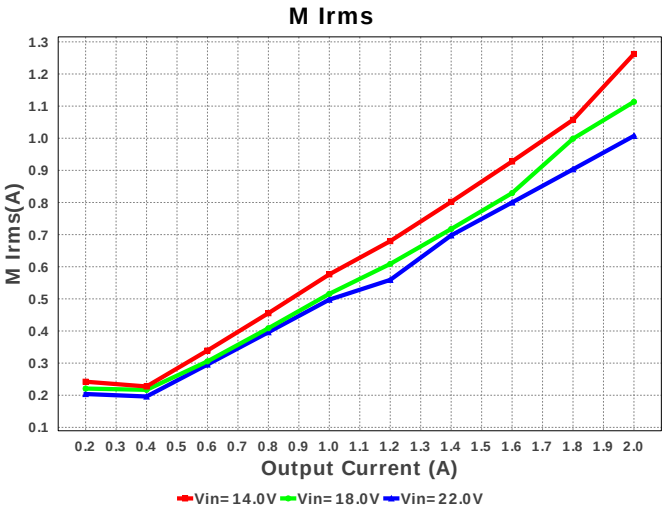


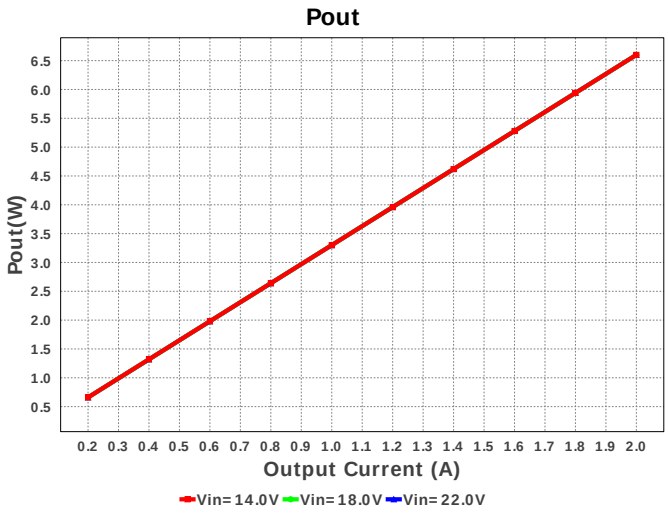


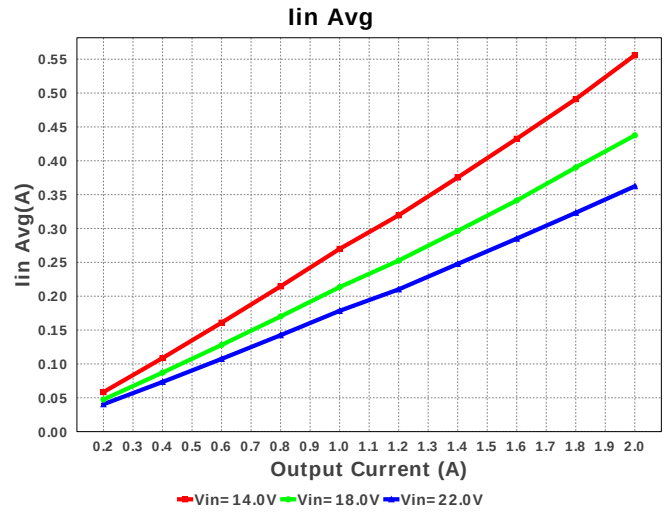


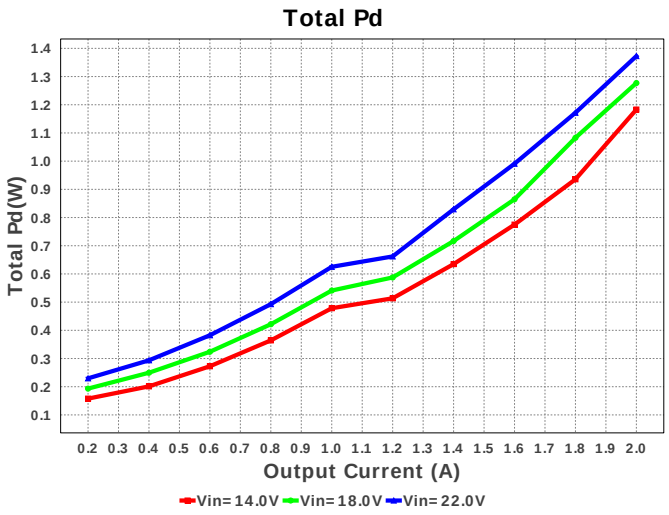


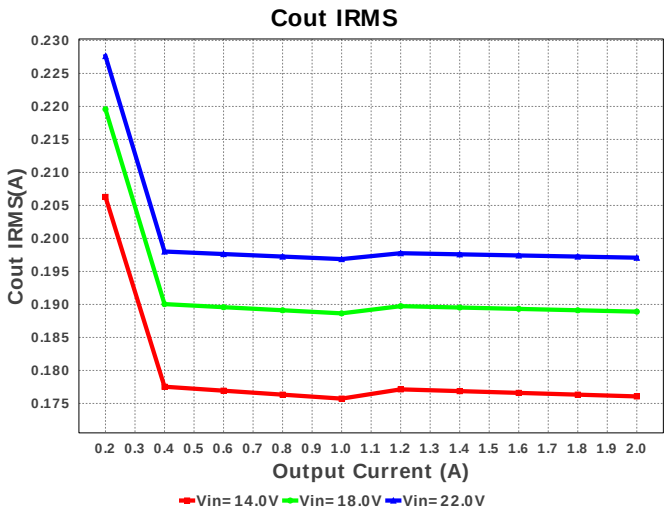


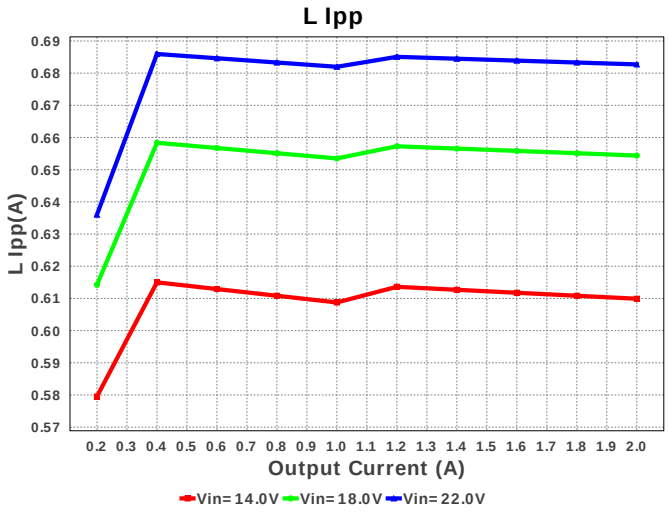


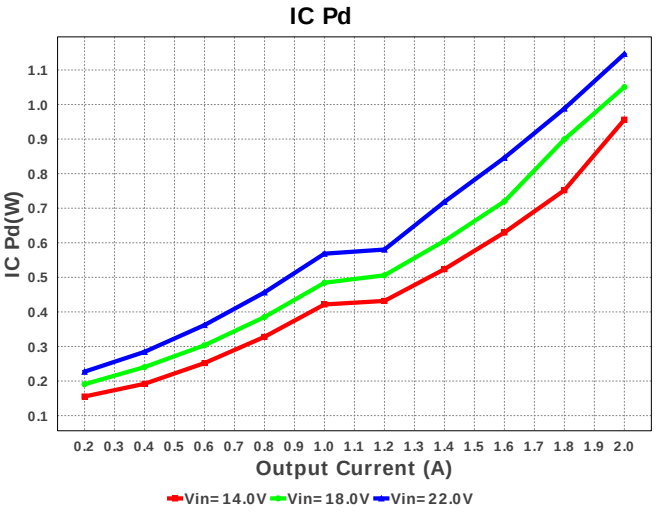












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	737.513 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	197.082 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.341 A	Current	Peak switch current in IC
4.	Iin Avg	363.61 mA	Current	Average input current
5.	L Ipp	682.71 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	1.007 A	Current	MOSFET RMS current
7.	BOM Count	12	General	Total Design BOM count
8.	FootPrint	226.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	496.764 kHz	General	Switching frequency
10.	IC Tolerance	16.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	160.0 mV	General	Voltage drop across the MosFET
12.	Pout	6.6 W	General	Total output power
13.	Total BOM	$3.11	General	Total BOM Cost
14.	Vout Actual	3.333 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	16.233 %	Op_point	Duty cycle
17.	Efficiency	82.507 %	Op_point	Steady state efficiency
18.	IC Tj	76.921 degC	Op_point	IC junction temperature
19.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	VIN_OP	22.0 V	Op_point	Vin operating point
22.	Vout p-p	3.335 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.092 mW	Power	Input capacitor power dissipation
24.	Cout Pd	189.74 µW	Power	Output capacitor power dissipation
25.	IC Pd	1.173 W	Power	IC power dissipation
26.	L Pd	225.0 mW	Power	Inductor power dissipation
27.	Total Pd	1.399 W	Power	Total Power Dissipation
28.	Vout Tolerance	3.566 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	22.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LM3102-Q1	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: Automotive Qualified LED Driver. Please consult product datasheet for detailed specifications.

2. The LM3102-Q1 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

3. LM3102-Q1 Product Folder : http://www.ti.com/product/LM3102%2DQ1 : contains the data sheet and other resources.