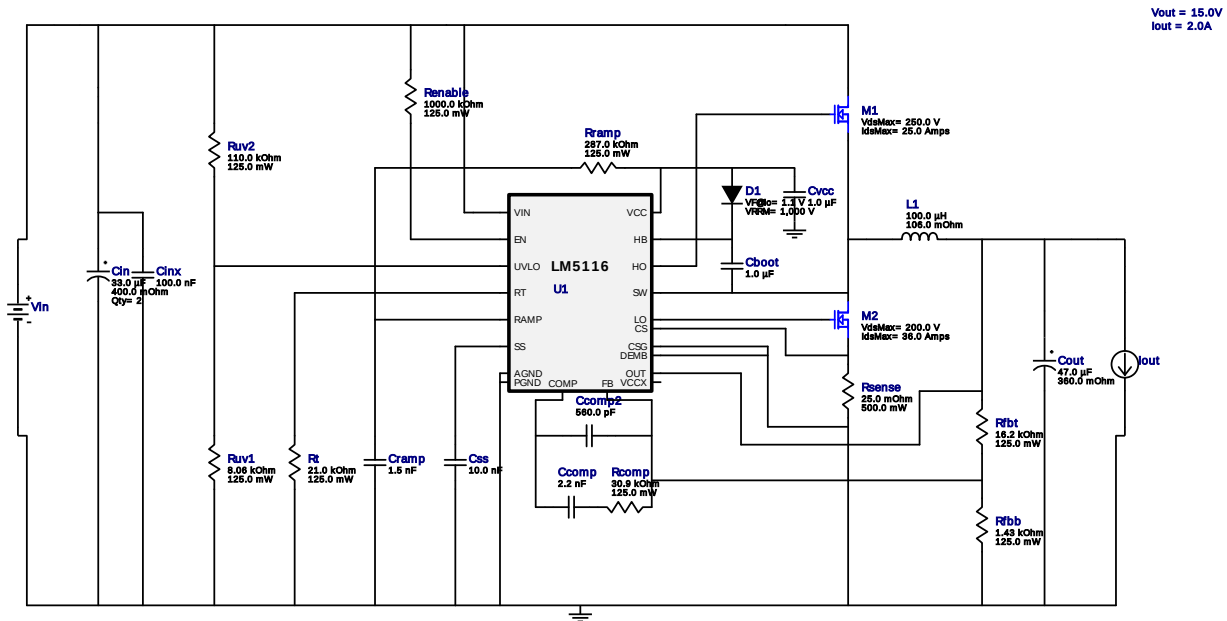
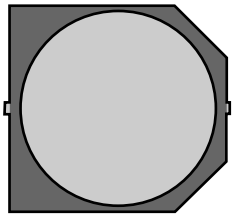


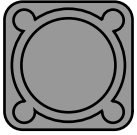
WEBENCH® Design Report

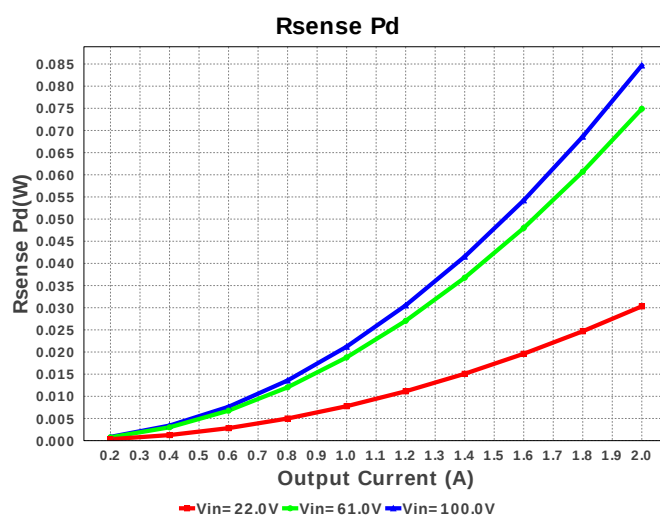
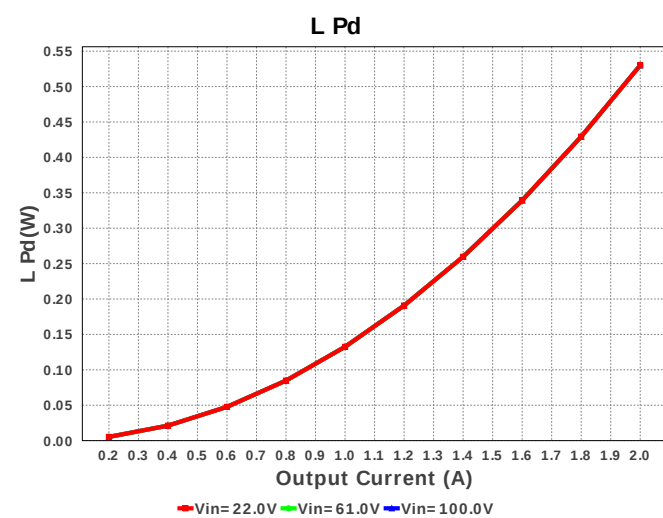
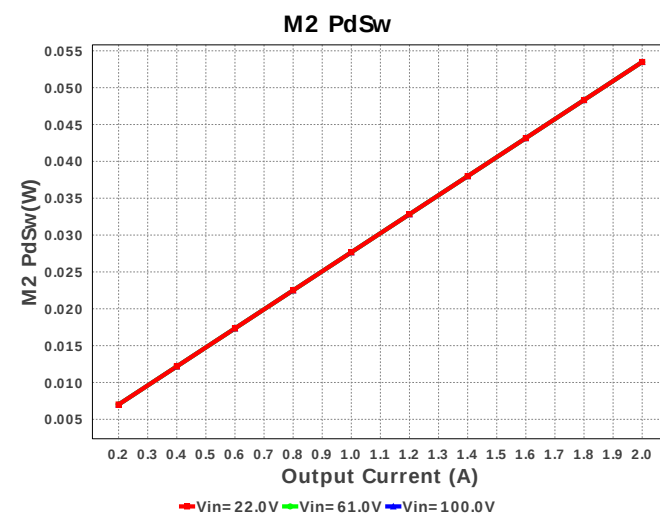
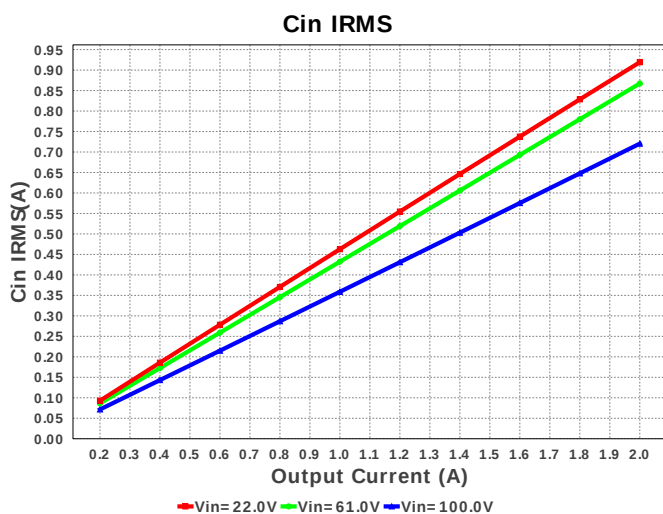
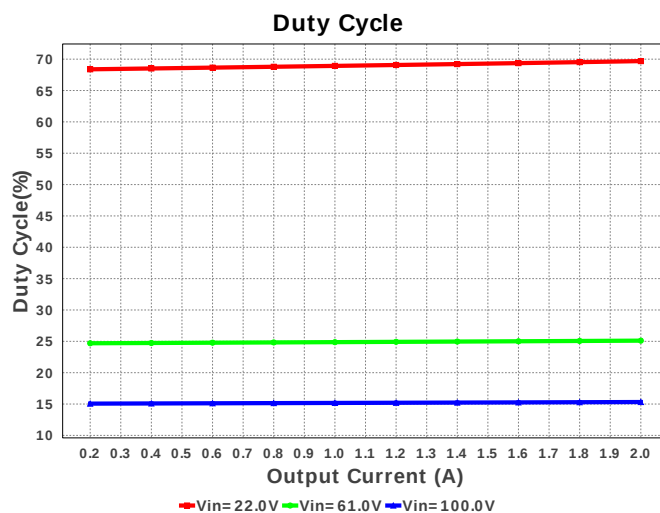
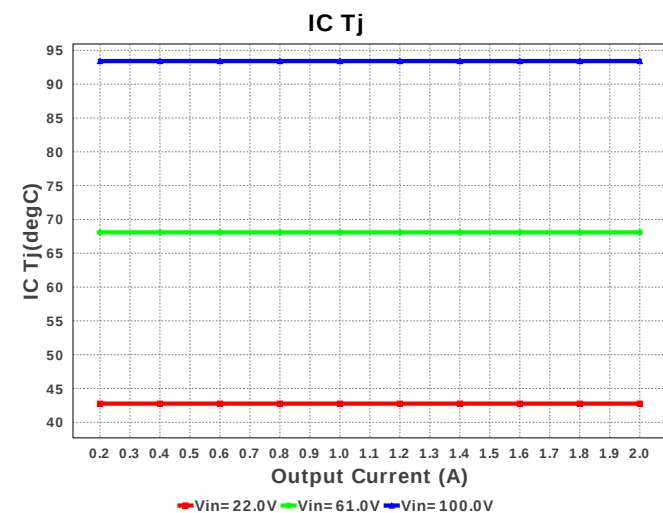
Design : 4352199/31 LM5116MHX/NOPB
LM5116MHX/NOPB 22.0V-100.0V to 15.00V @ 2.0A

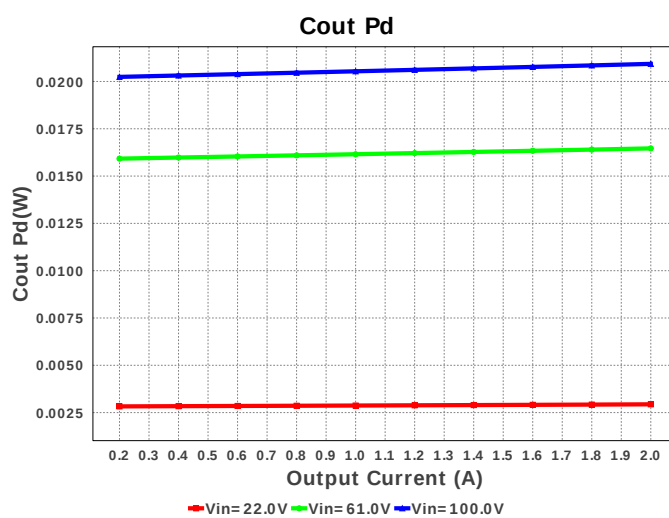
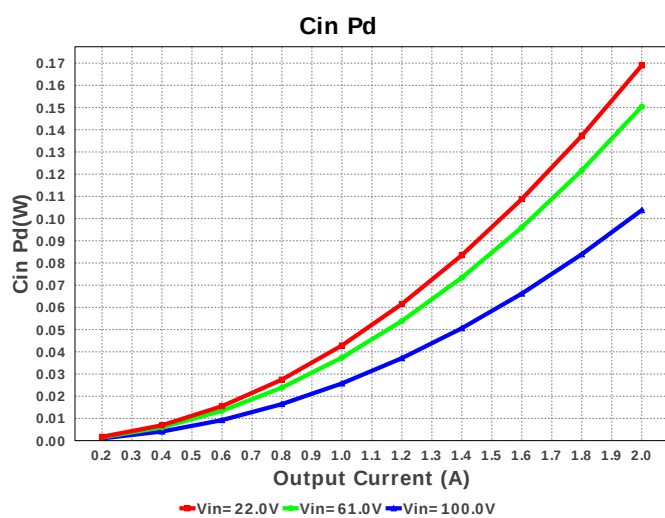
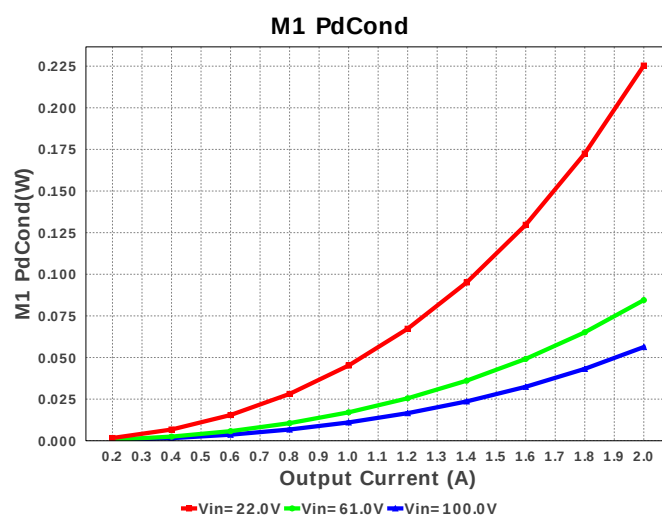
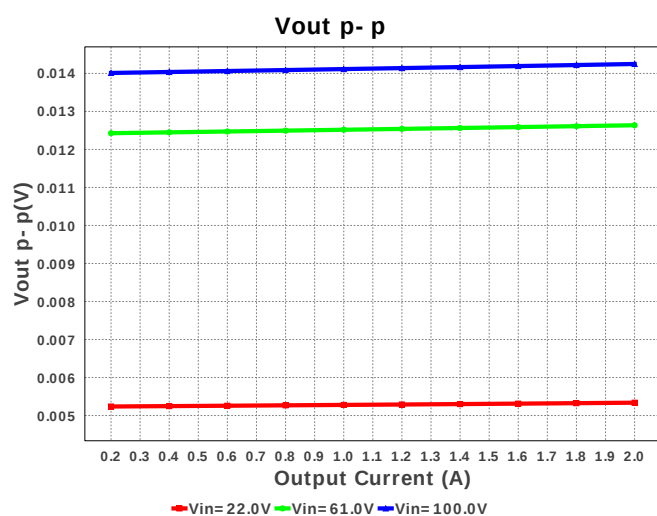
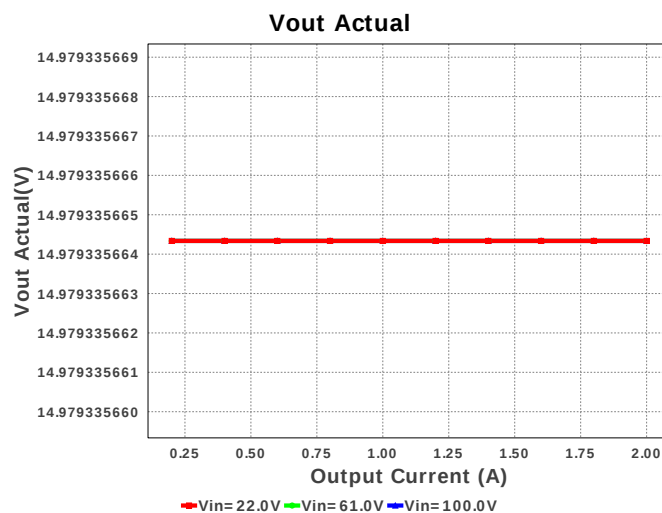
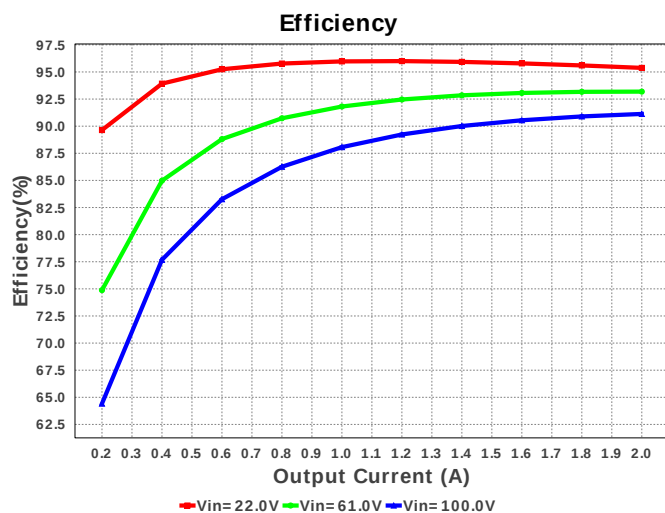


Electrical BOM

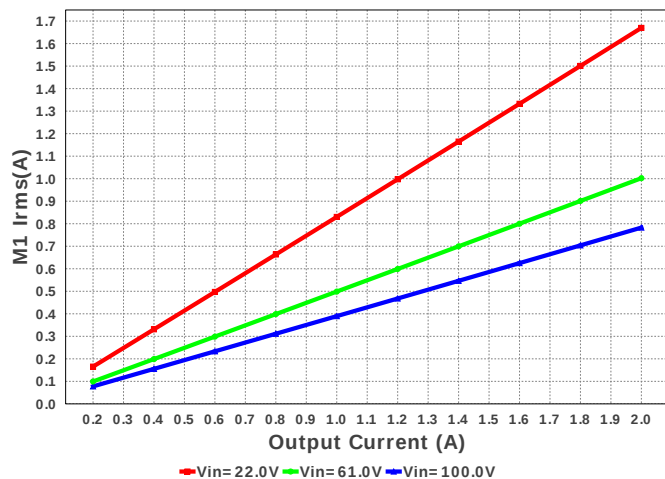
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Taiyo Yuden	EMK212B7105KG-T Series= X7R	Cap= 1.0 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	 0805 7 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB222 Series= X7R	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB561 Series= X7R	Cap= 560.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
4.	Cin	Panasonic	EEV-EB2E330SM Series= ?	Cap= 33.0 uF ESR= 400.0 mOhm VDC= 250.0 V IRMS= 560.0 mA	2	\$1.25	 EB_K16 483 mm ²
5.	Cinx	MuRata	GRM31CR72E104KW03L Series= X7R	Cap= 100.0 nF VDC= 250.0 V IRMS= 0.0 A	1	\$0.06	 1206 11 mm ²
6.	Cout	Panasonic	EEE-FK1E470P Series= FK	Cap= 47.0 uF ESR= 360.0 mOhm VDC= 25.0 V IRMS= 240.0 mA	1	\$0.12	 SM_RADIAL_D 84 mm ²
7.	Cramp	Yageo America	CC0805KRX7R9BB152 Series= X7R	Cap= 1.5 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Css	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
9.	Cvcc	Taiyo Yuden	EMK212B7105KG-T Series= X7R	Cap= 1.0 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	 0805 7 mm ²
10.	D1	Fairchild Semiconductor	1N4007	VF@Io= 1.1 V VRRM= 1,000.0 V	1	\$0.03	 DO-41 43 mm ²
11.	L1	Coilcraft	MSS1210-104KEB	L= 100.0 uH DCR= 106.0 mOhm	1	\$0.81	 MSS1210 204 mm ²
12.	M1	Infineon Technologies	BSC600N25NS3 G	VdsMax= 250.0 V IdsMax= 25.0 Amps	1	\$1.41	 PG-TDSON-8 55 mm ²
13.	M2	Infineon Technologies	BSC320N20NS3 G	VdsMax= 200.0 V IdsMax= 36.0 Amps	1	\$1.32	 PG-TDSON-8 55 mm ²
14.	Rcomp	Panasonic	ERJ-6ENF3092V Series= ERJ-6E	Res= 30.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
15.	Renable	Panasonic	ERJ-6ENF1004V Series= ERJ-6E	Res= 1000.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
16.	Rfbb	Panasonic	ERJ-6ENF1431V Series= ERJ-6E	Res= 1.43 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
17.	Rfbt	Panasonic	ERJ-6ENF1622V Series= ERJ-6E	Res= 16.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
18.	Rramp	Panasonic	ERJ-6ENF2873V Series= ERJ-6E	Res= 287.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
19.	Rsense	Stackpole Electronics Inc	CSR1206FK25L0 Series= ?	Res= 25.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11 mm ²
20.	Rt	Panasonic	ERJ-6ENF2102V Series= ERJ-6E	Res= 21.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
21.	Ruv1	Panasonic	ERJ-6ENF8061V Series= ERJ-6E	Res= 8.06 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
22.	Ruv2	Panasonic	ERJ-6ENF1103V Series= ERJ-6E	Res= 110.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
23.	U1	Texas Instruments	LM5116MHX/NOPB	Switcher	1	\$2.42	 MXA20A 71 mm ²

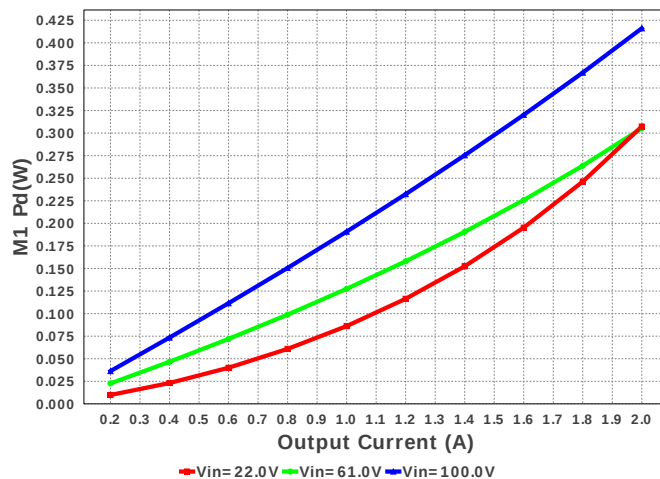




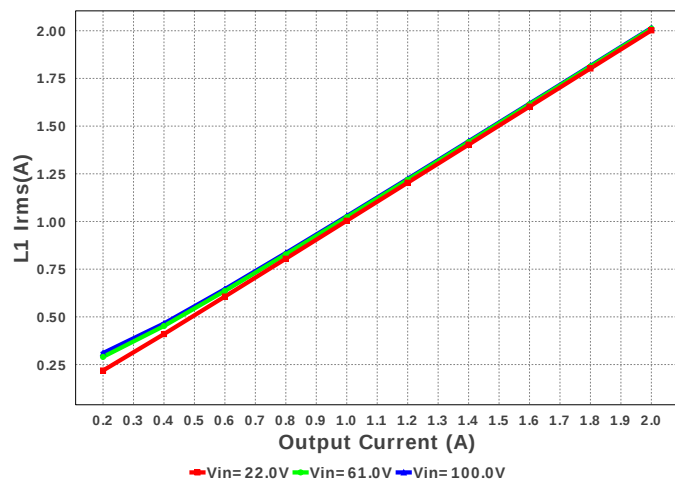
M1 Irms



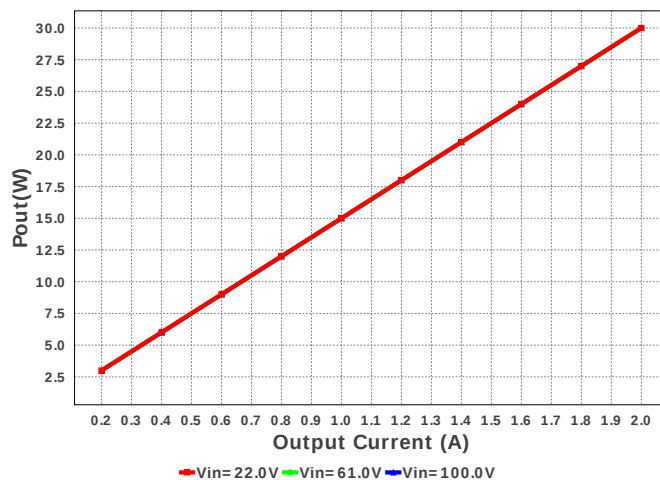
M1 Pd



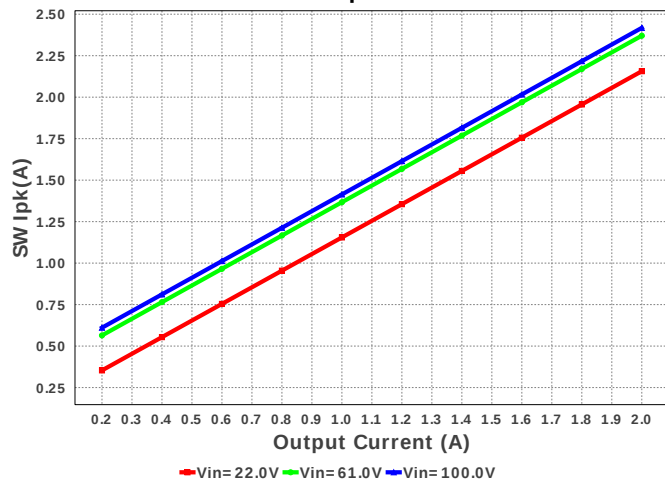
L1 Irms



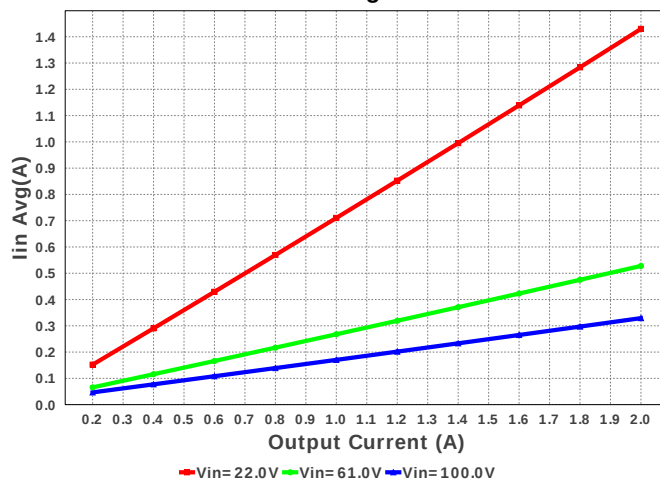
Pout

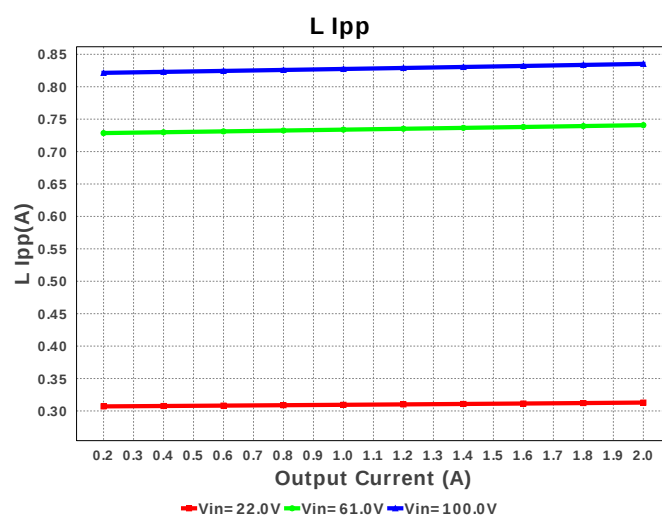
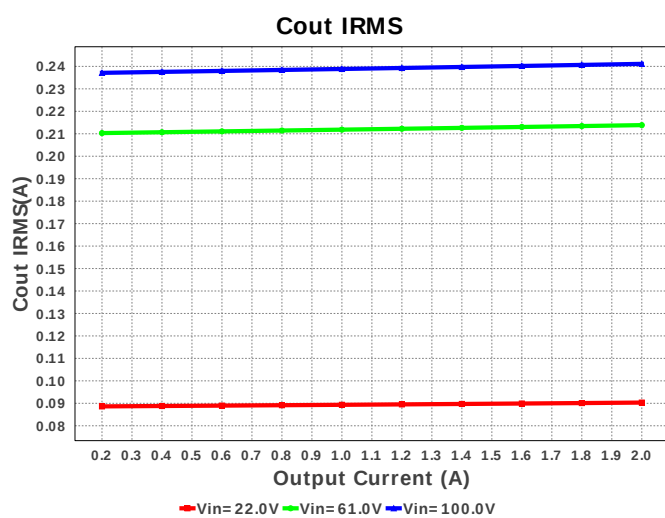
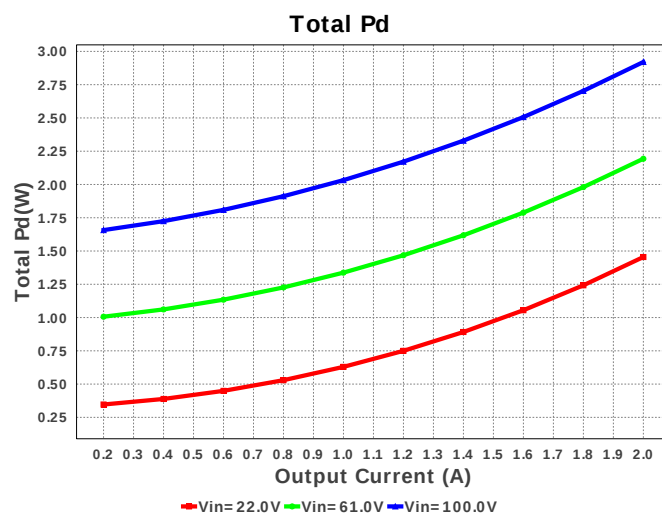
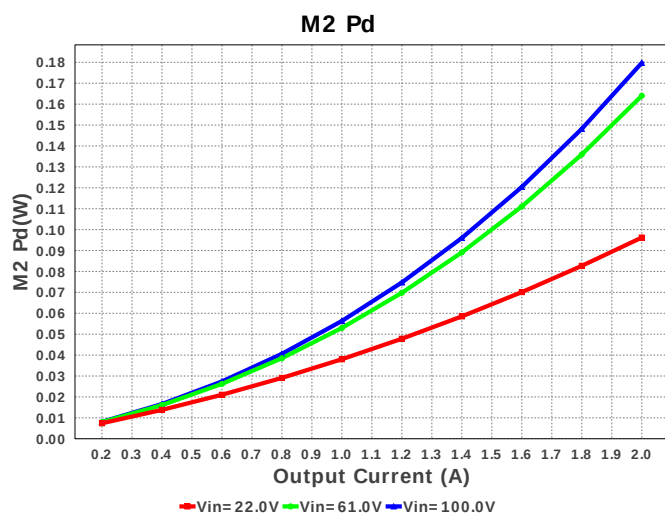
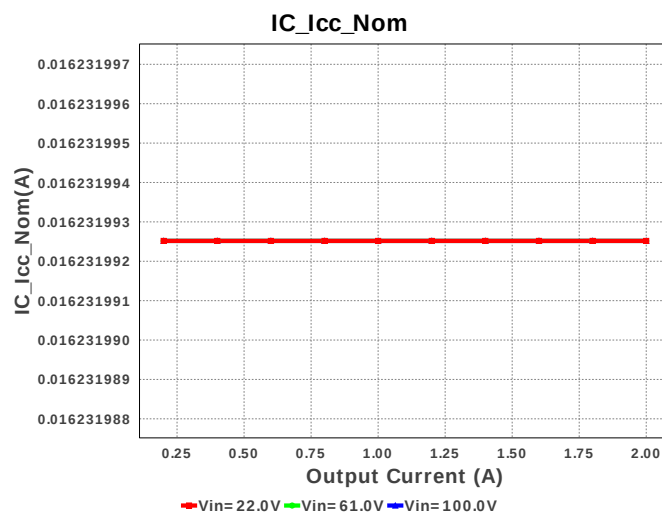
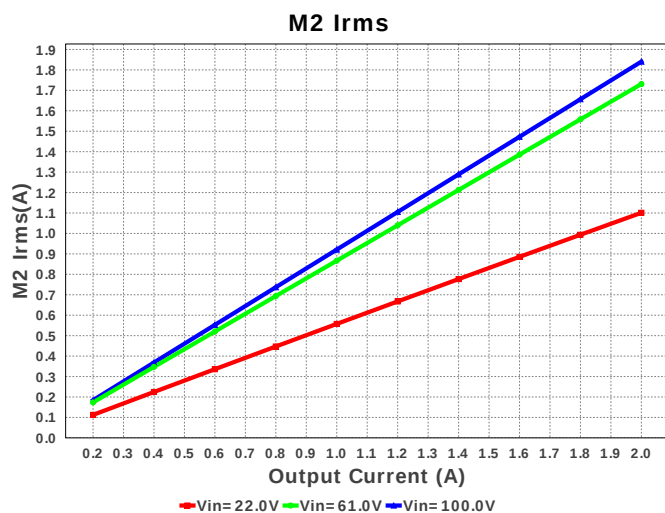


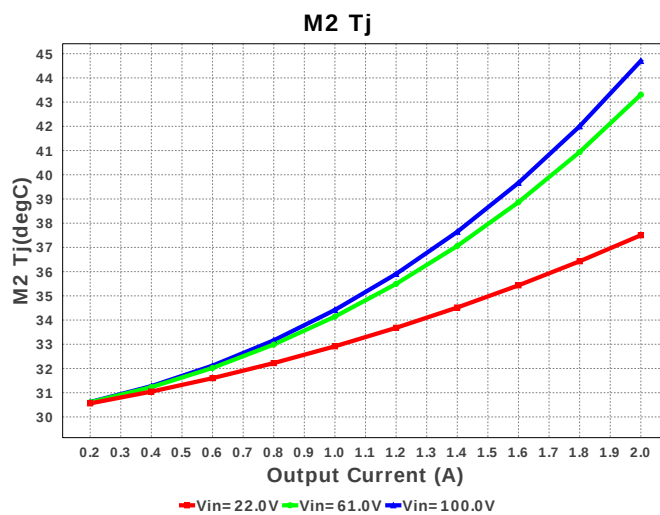
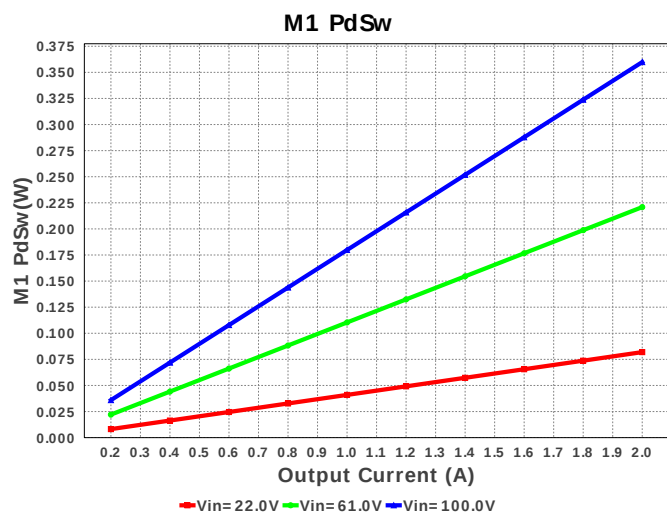
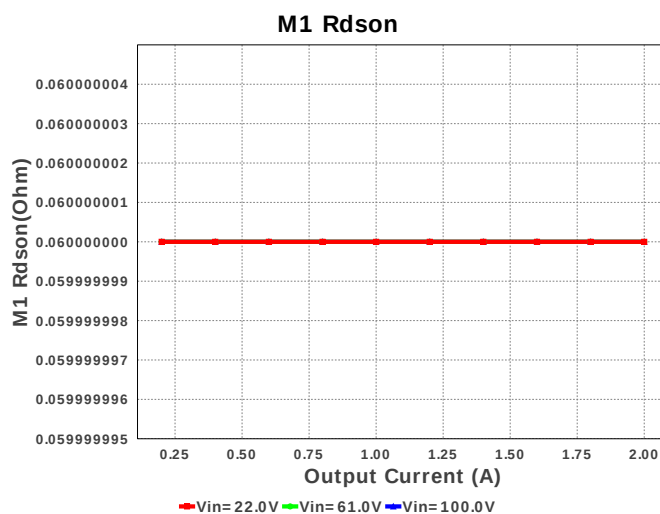
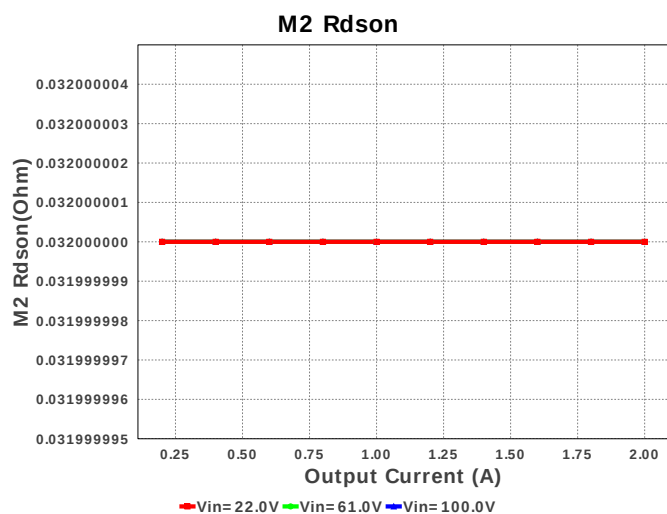
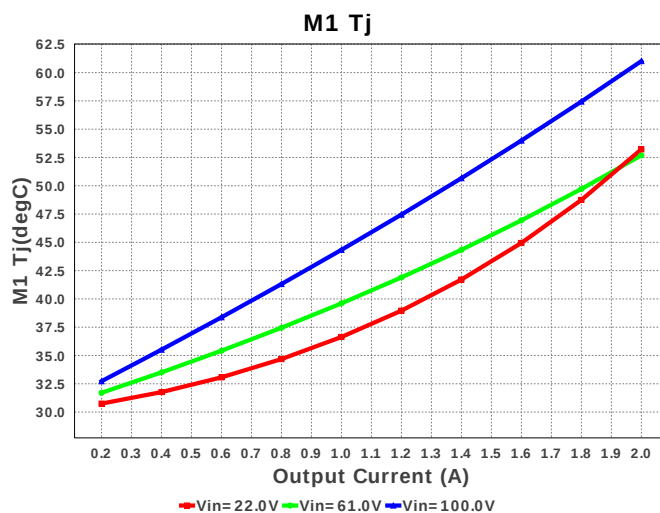
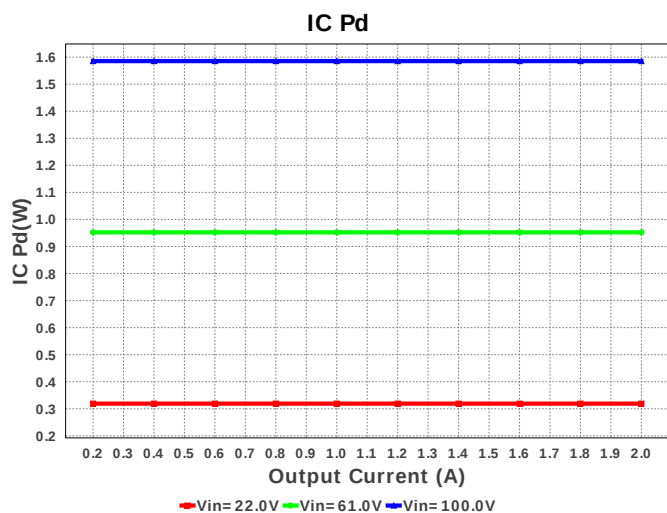
SW Ipk

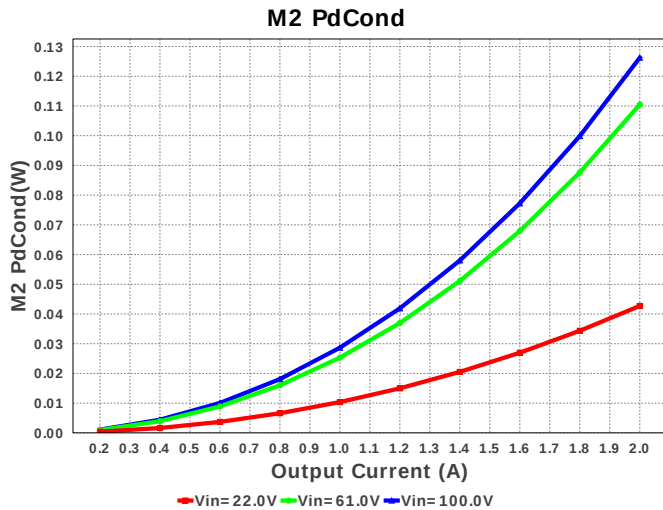


Iin Avg









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	720.373 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	241.121 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	329.2 mA	Current	Average input current
4.	L Ipp	835.27 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	2.014 A	Current	Inductor ripple current
6.	M1 Irms	782.833 mA	Current	MOSFET RMS ripple current
7.	M2 Irms	1.84 A	Current	MOSFET RMS ripple current
8.	SW Ipk	2.418 A	Current	Peak switch current
9.	BOM Count	24	General	Total Design BOM count
10.	FootPrint	1.596 k mm ²	General	Total Foot Print Area of BOM components
11.	Frequency	155.909 kHz	General	Switching frequency
12.	IC Tolerance	16.0 mV	General	IC Feedback Tolerance
13.	M1 Rdson	60.0 mOhm	General	Drain-Source On-resistance
14.	M2 Rdson	32.0 mOhm	General	Drain-Source On-resistance
15.	Pout	30.0 W	General	Total output power
16.	Total BOM	\$8.93	General	Total BOM Cost
17.	Low Freq Gain	95.991 dB	Op_Point	Gain at 10Hz
18.	Vout Actual	14.979 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
19.	Cross Freq	21.39 kHz	Op_point	Bode plot crossover frequency
20.	Duty Cycle	15.321 %	Op_point	Duty cycle
21.	Efficiency	91.129 %	Op_point	Steady state efficiency
22.	Gain Marg	-16.458 dB	Op_point	Bode Plot Gain Margin
23.	IC Tj	93.411 degC	Op_point	IC junction temperature
24.	IOUT_OP	2.0 A	Op_point	Iout operating point
25.	M1 Tj	61.223 degC	Op_point	M1 MOSFET junction temperature
26.	M2 Tj	44.482 degC	Op_point	M2 MOSFET junction temperature
27.	Phase Marg	60.103 deg	Op_point	Bode Plot Phase Margin
28.	VIN_OP	100.0 V	Op_point	Vin operating point
29.	Vout p-p	14.248 mV	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	103.788 mW	Power	Input capacitor power dissipation
31.	Cout Pd	20.93 mW	Power	Output capacitor power dissipation
32.	IC Pd	1.585 W	Power	IC power dissipation
33.	L Pd	530.0 mW	Power	Inductor power dissipation
34.	M1 Pd	418.678 mW	Power	M1 MOSFET total power dissipation
35.	M1 PdCond	56.196 mW	Power	M1 MOSFET conduction losses
36.	M1 PdSw	362.482 mW	Power	M1 MOSFET switching losses
37.	M2 Pd	177.126 mW	Power	M2 MOSFET total power dissipation
38.	M2 PdCond	126.203 mW	Power	M2 MOSFET conduction losses
39.	M2 PdSw	50.923 mW	Power	M2 MOSFET switching losses
40.	Rsense Pd	84.679 mW	Power	LED Current Rsns Power Dissipation
41.	Total Pd	2.92 W	Power	Total Power Dissipation
42.	IC Icc Nom	16.232 mA		IC Icc gate driver current
43.	Vout Tolerance	3.198 %		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	100.0	Maximum input voltage
3.	VinMin	22.0	Minimum input voltage
4.	Vout	15.0	Output Voltage

#	Name	Value	Description
5.	base_pn	LM5116	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM5116** Product Folder : <http://www.ti.com/product/LM5116> : contains the data sheet and other resources.

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