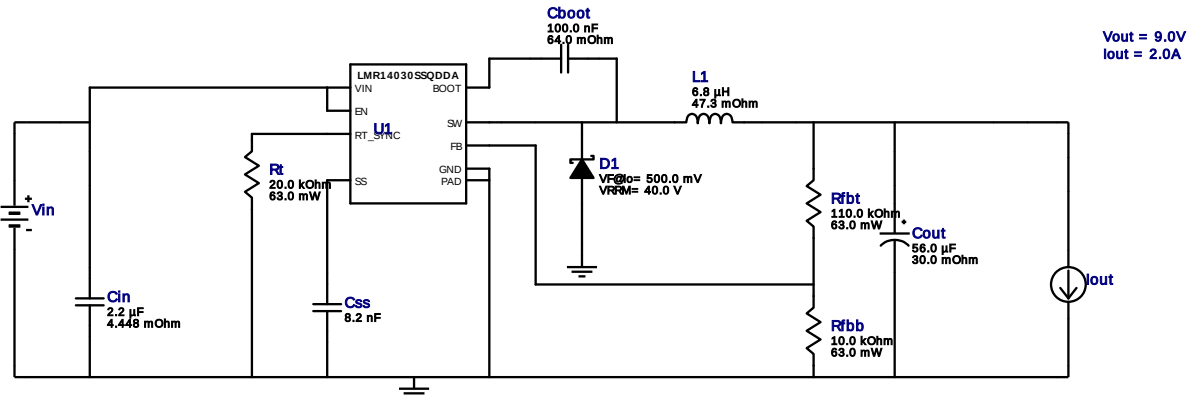


WEBENCH® Design Report

Design : 4743359/283 LMR14030SSQDDARQ1
LMR14030SSQDDARQ1 14.0V-22.0V to 9.00V @ 2.000224999999995A

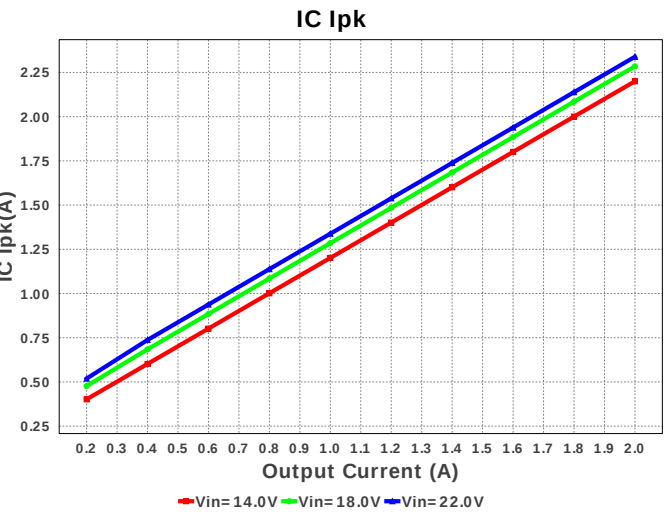
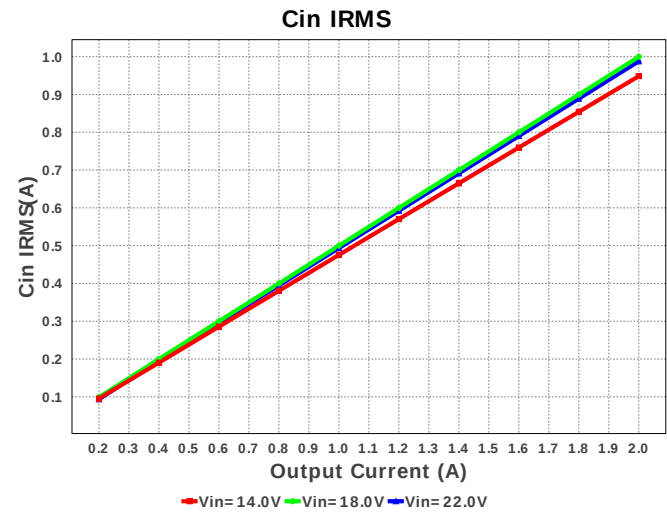
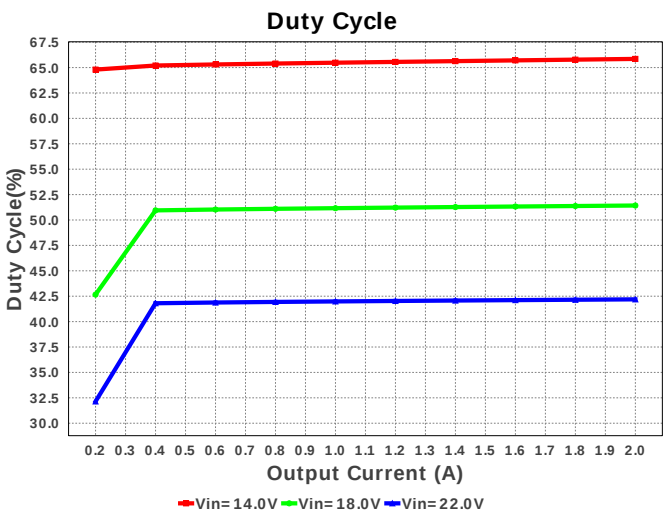
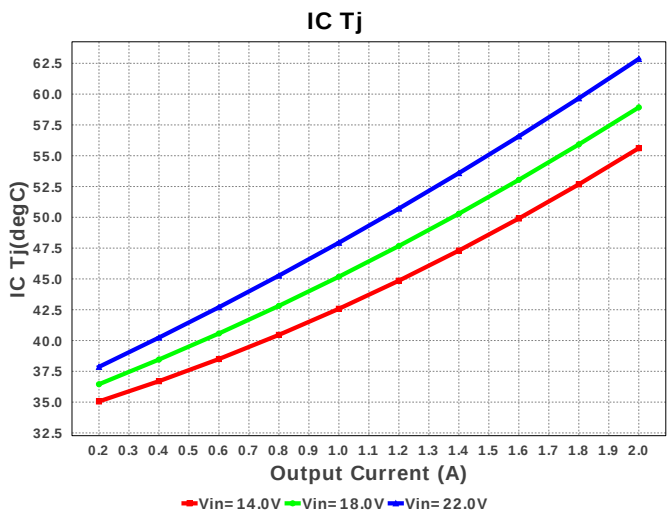


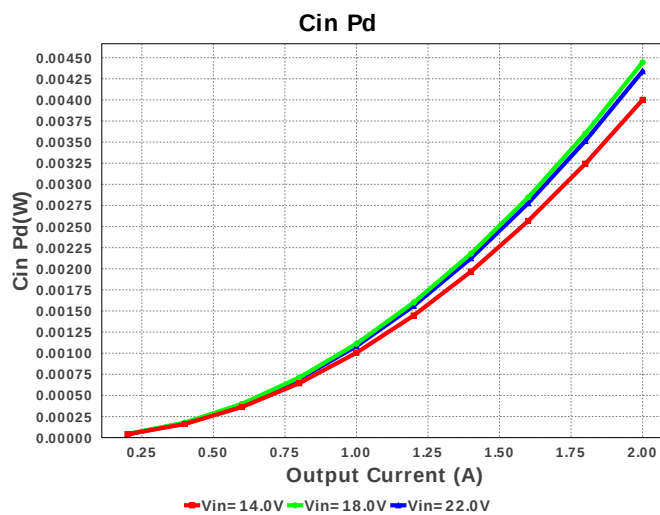
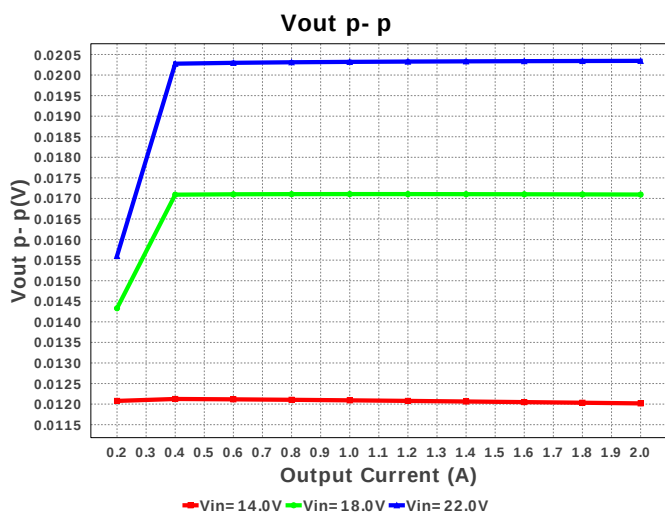
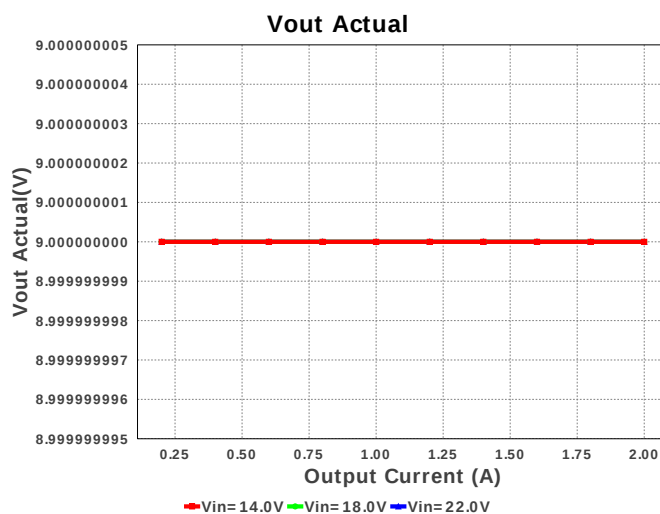
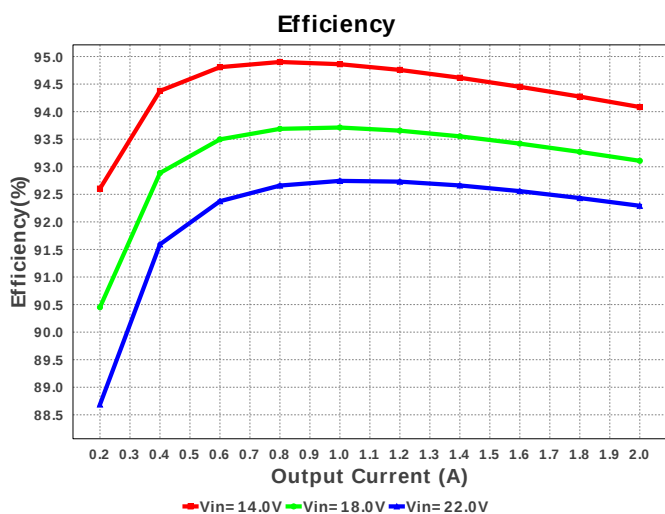
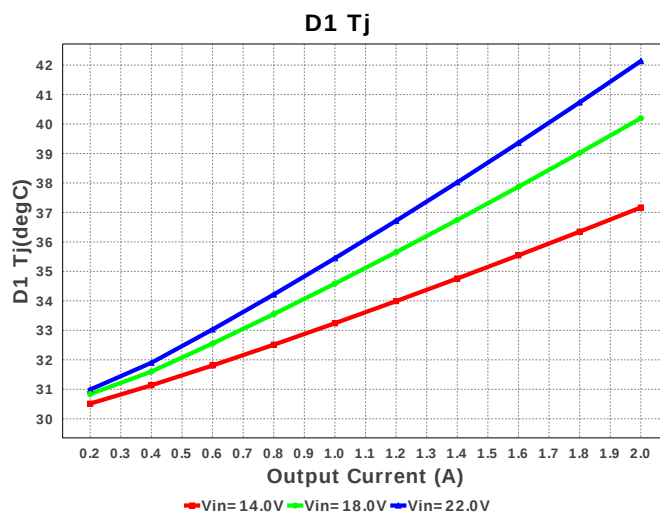
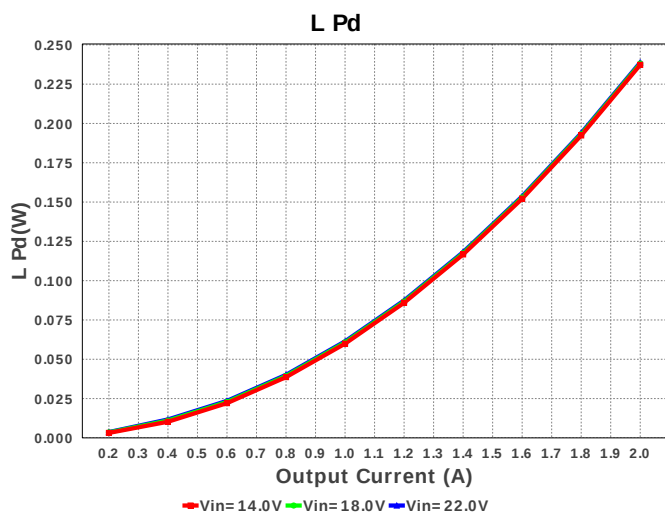
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

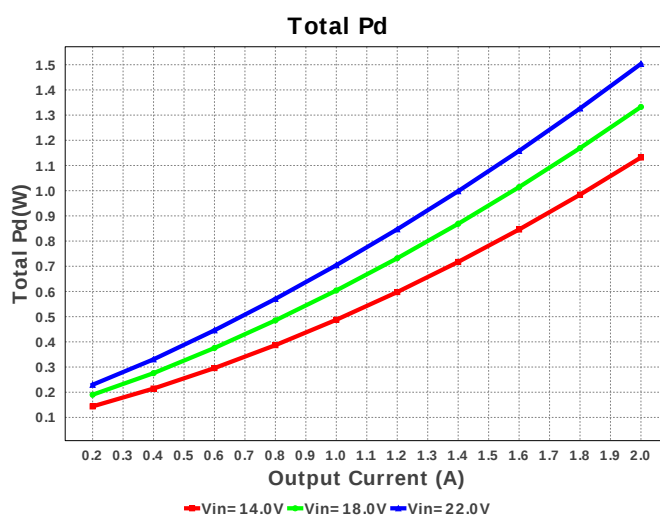
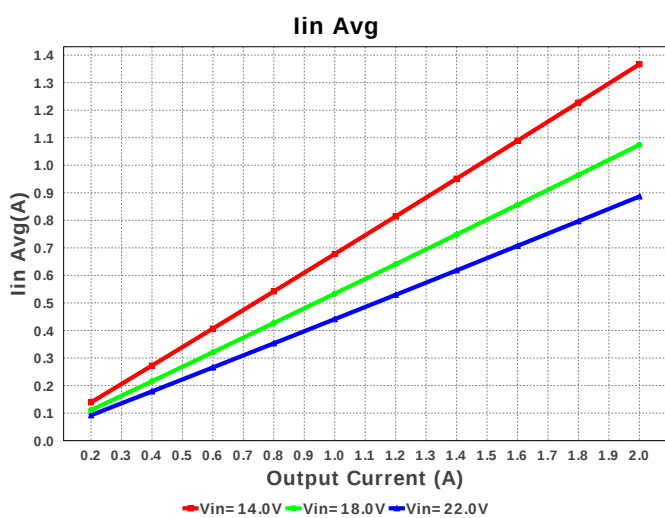
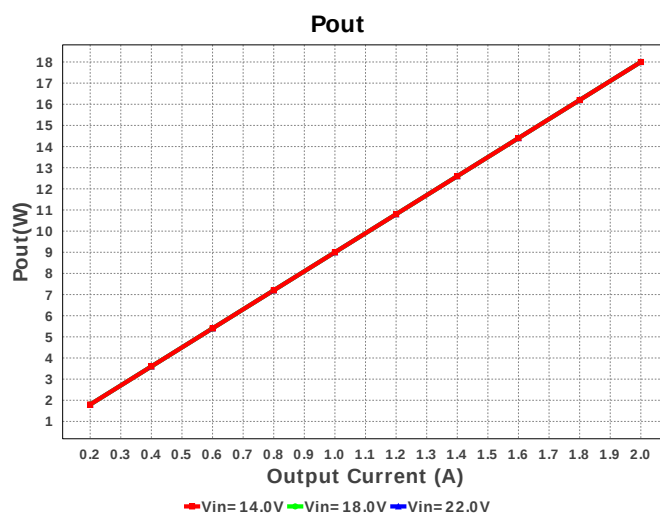
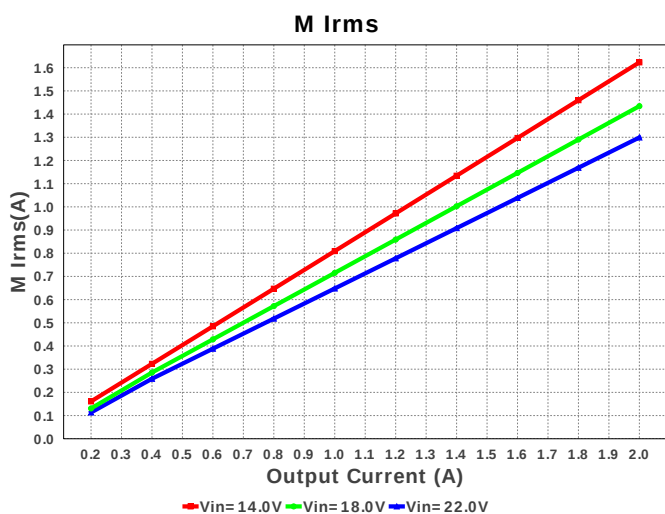
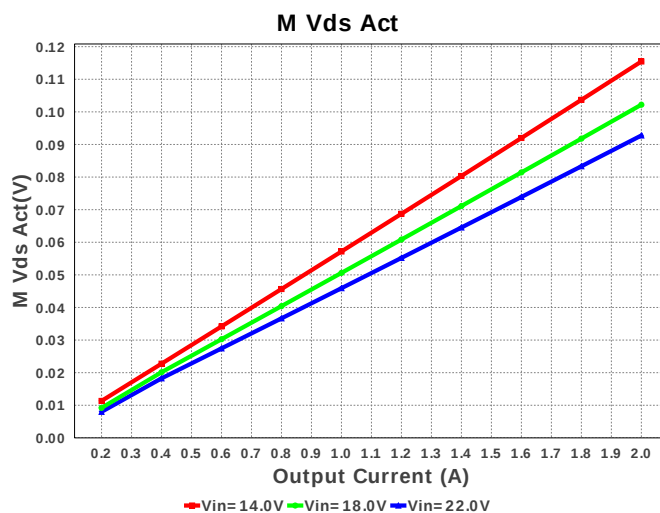
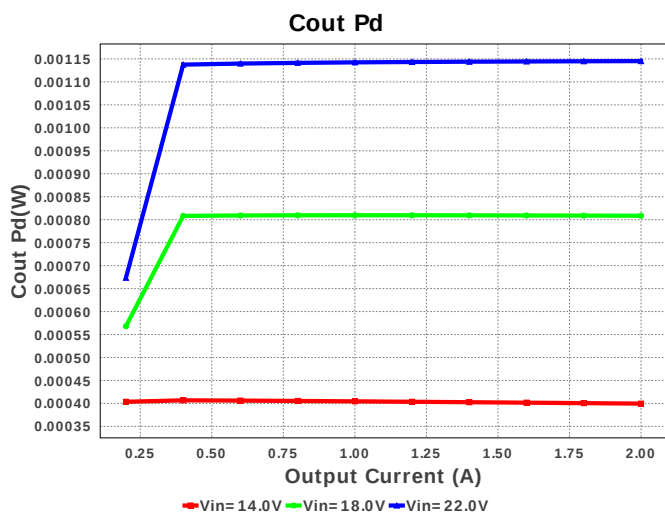
Electrical BOM

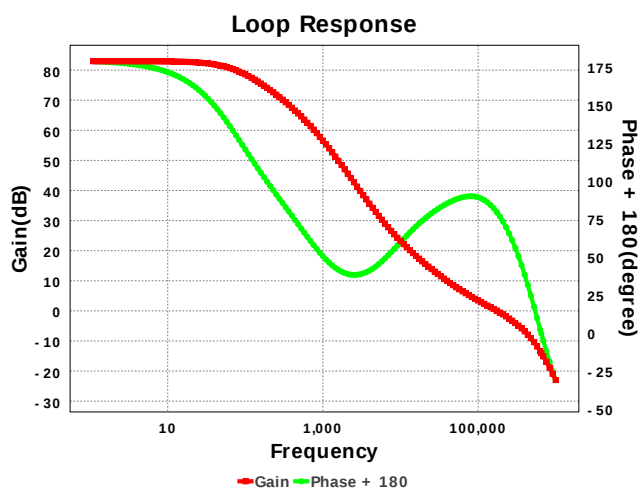
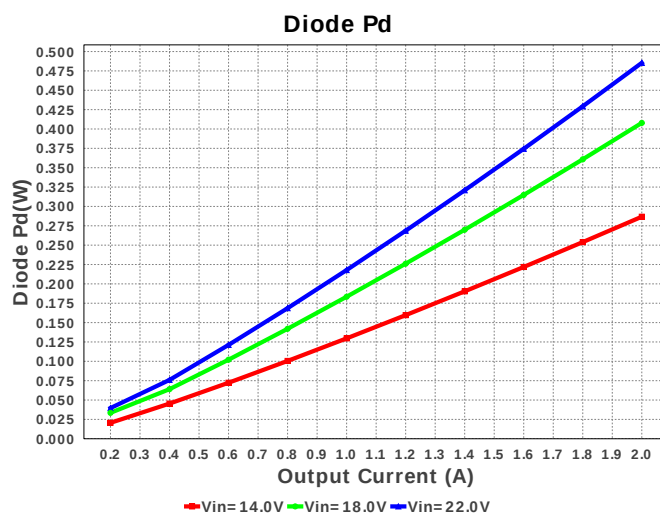
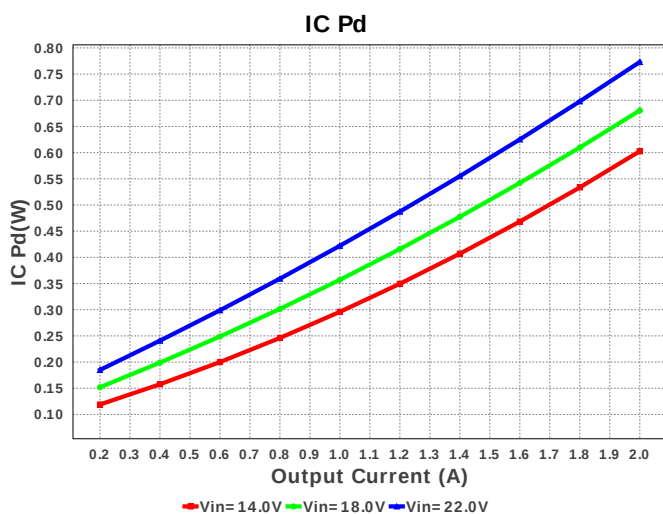
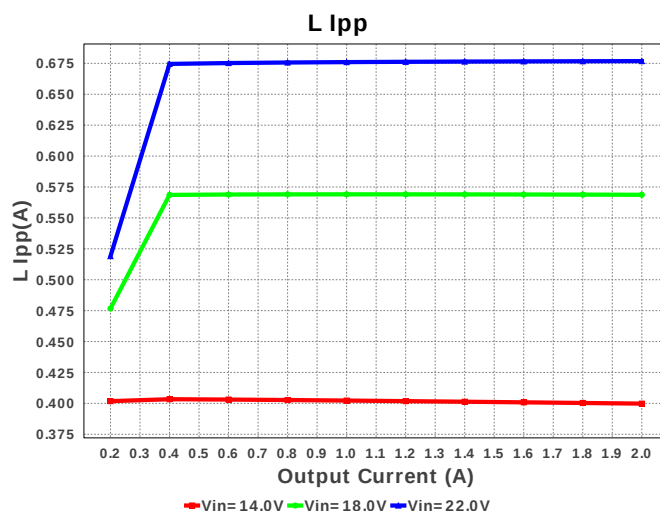
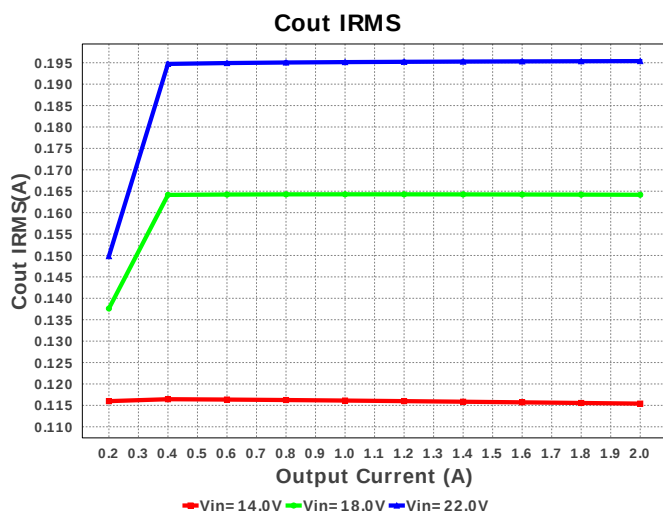
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7 mm ²
2.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	\$0.05	 1206_190 11 mm ²
3.	Cout	Panasonic	20SVPF56MX Series= ?	Cap= 56.0 uF ESR= 30.0 mOhm VDC= 20.0 V IRMS= 2.8 A	1	\$0.35	 CAPSMT_62_E61 53 mm ²
4.	Css	MuRata	GRM155R71C822KA01D Series= X7R	Cap= 8.2 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
5.	D1	Diodes Inc.	B240A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.09	 SMA 37 mm ²
6.	L1	Bourns	SRN6045-6R8Y	L= 6.8 uH DCR= 47.3 mOhm	1	\$0.16	 SRN6045 64 mm ²
7.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
8.	Rfbb	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
9.	Rt	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	LMR14030SSQDDARQ1	Switcher	1	\$2.15	 DDA0008E_N 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	987.763 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	195.382 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.338 A	Current	Peak switch current in IC
4.	Iin Avg	886.55 mA	Current	Average input current
5.	L Ipp	676.82 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.299 A	Current	Q lavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	242.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	1.183 MHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	92.74 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	18.0 W	General	Total output power
13.	Total BOM	\$2.85	General	Total BOM Cost
14.	D1 Tj	42.135 degC	Op_Point	D1 junction temperature
15.	Vout Actual	9.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	9.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	174.991 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	42.19 %	Op_point	Duty cycle
19.	Efficiency	92.292 %	Op_point	Steady state efficiency
20.	IC Tj	62.471 degC	Op_point	IC junction temperature
21.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	Phase Marg	79.683 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	22.0 V	Op_point	Vin operating point
25.	Vout p-p	20.345 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	4.34 mW	Power	Input capacitor power dissipation
27.	Cout Pd	1.145 mW	Power	Output capacitor power dissipation
28.	Diode Pd	485.398 mW	Power	Diode power dissipation
29.	IC Pd	773.11 mW	Power	IC power dissipation
30.	L Pd	238.775 mW	Power	Inductor power dissipation
31.	Total Pd	1.503 W	Power	Total Power Dissipation
32.	Vout Tolerance	4.296 %		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	9.0	Output Voltage
5.	base_pn	LMR14030SS-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR14030SS-Q1** Product Folder : <http://www.ti.com/product/LMR14030%2DQ1> : contains the data sheet and other resources.

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