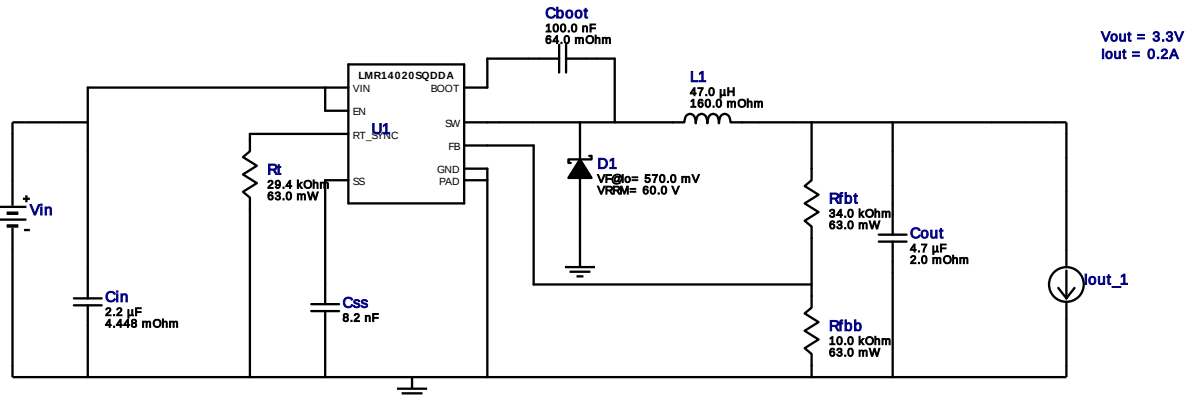


WEBENCH® Design Report

Design : 3747628/26 LMR14020SQDDARQ1
LMR14020SQDDARQ1 4.5V-30.0V to 3.30V @ 0.200225A



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.

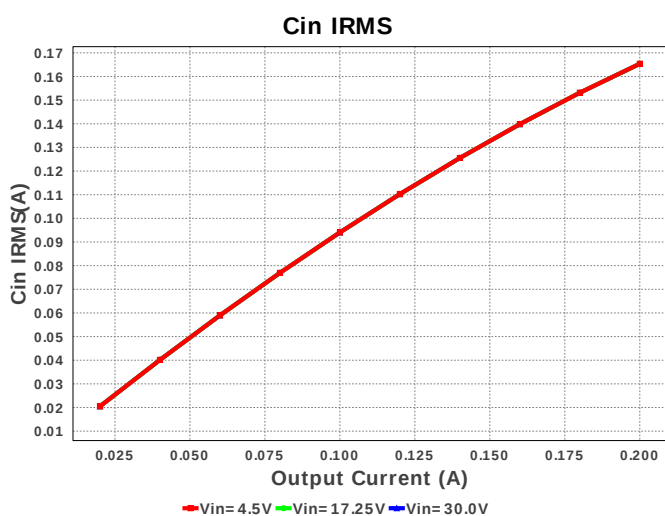
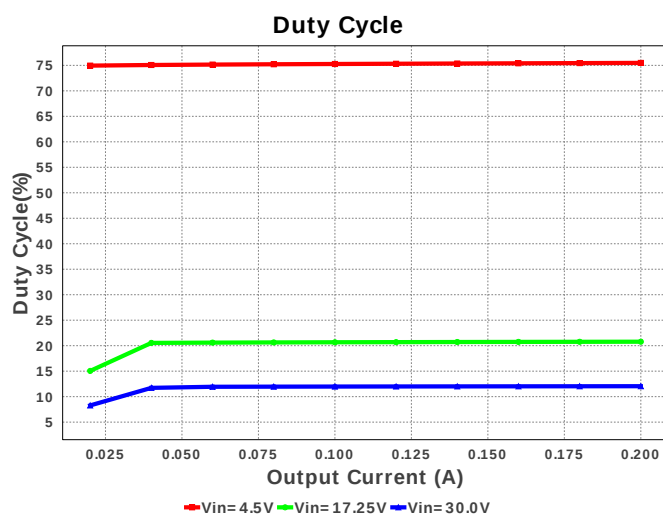
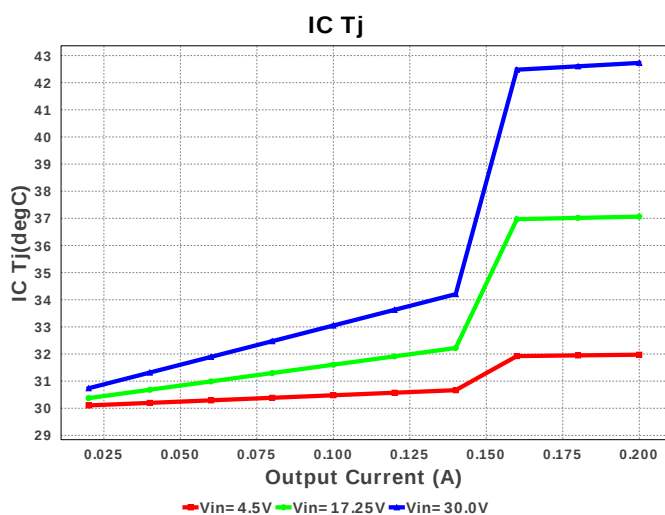
My Comments

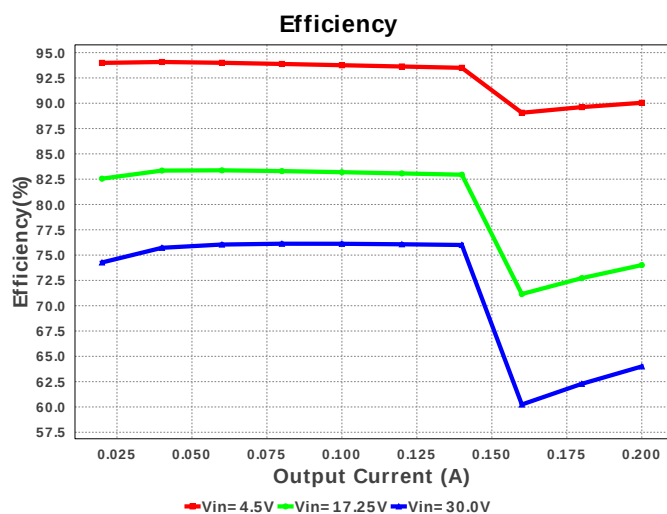
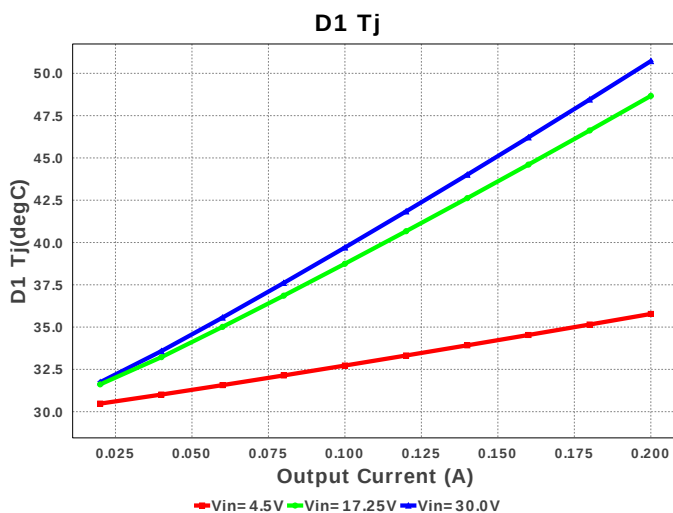
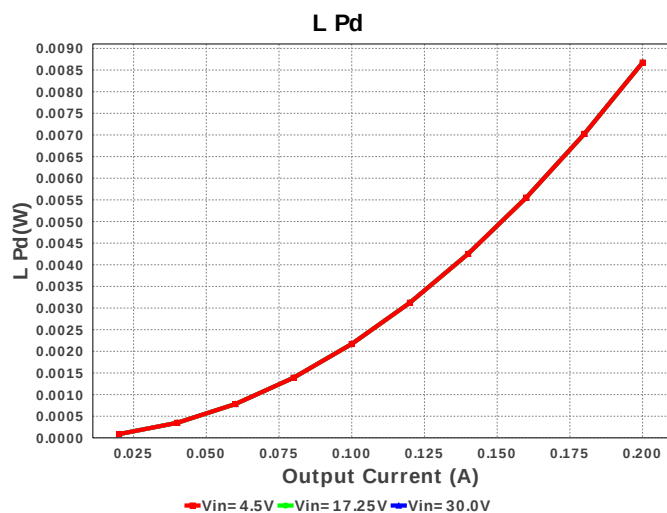
No comments

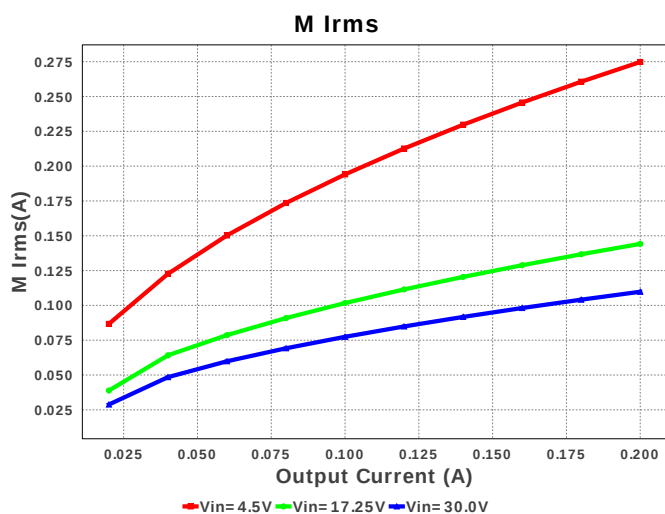
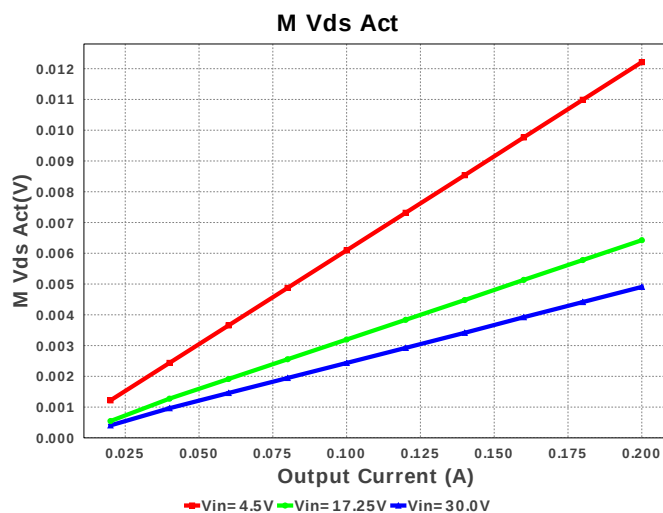
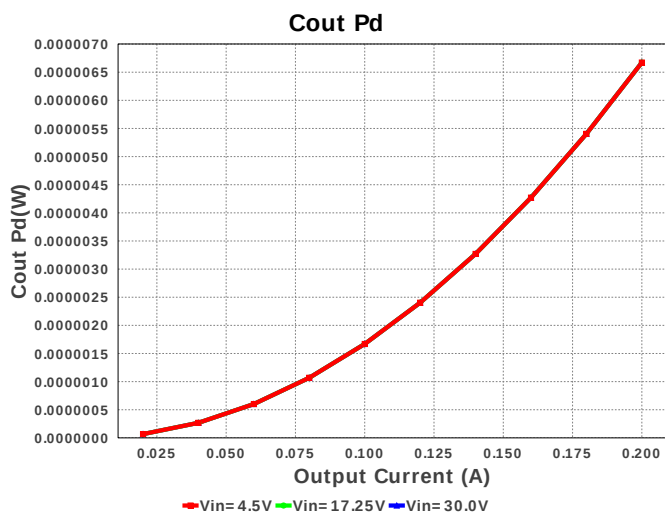
Electrical BOM

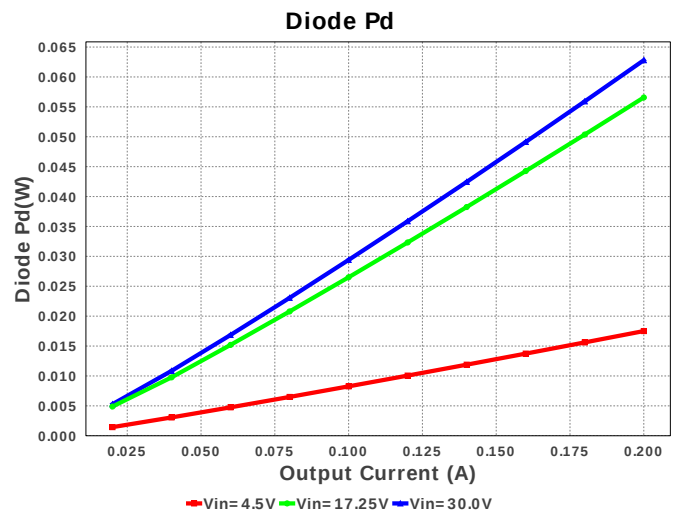
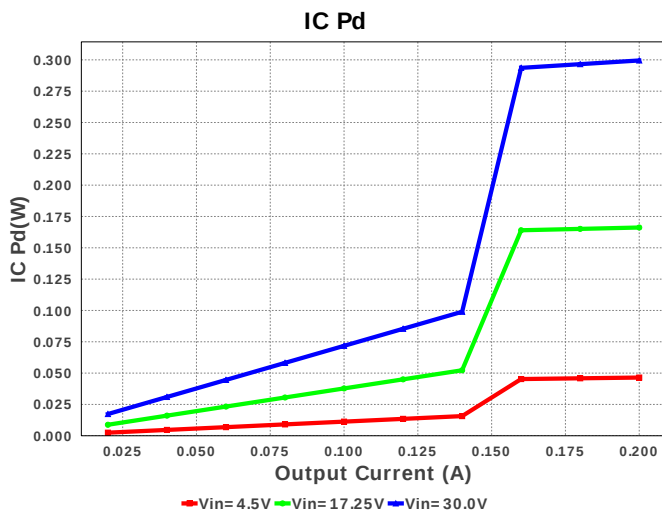
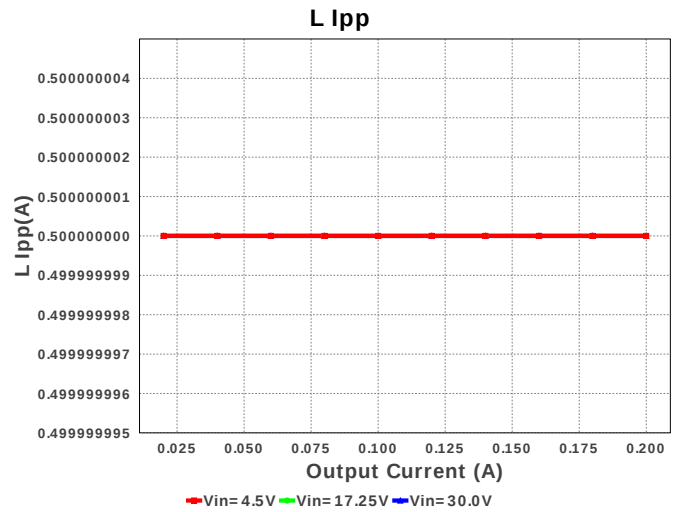
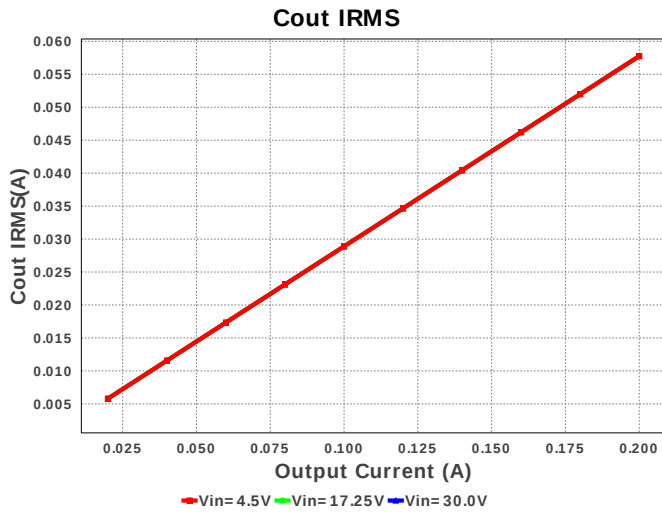
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7 mm ²
2.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	\$0.05	 1206_190 11 mm ²
3.	Cout	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	1	\$0.02	 0805 7 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	NXP Semiconductor	PMEG6010CEH,115	VF@Io=			

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10. U1		Texas Instruments	LMR14020SQDDARQ1	Switcher	1	\$1.72	 DDA0008E_N 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	165.372 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	57.757 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	450.075 mA	Current	Peak switch current in IC
4.	Iin Avg	34.387 mA	Current	Average input current
5.	L Ipp	500.0 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	109.785 mA	Current	Q lavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	173.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	818.366 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	4.906 mV	General	Voltage drop across the MosFET
12.	Pout	660.0 mW	General	Total output power
13.	Total BOM	\$2.16	General	Total BOM Cost
14.	D1 Tj	50.724 degC	Op_Point	D1 junction temperature
15.	Vout Actual	3.3 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
17.	Duty Cycle	12.048 %	Op_point	Duty cycle
18.	Efficiency	64.002 %	Op_point	Steady state efficiency

#	Name	Value	Category	Description
30.	Vout Tolerance	3.999 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	30.0	Maximum input voltage
3.	VinMin	4.5	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LMR14020S-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR14020S-Q1** Product Folder : <http://www.ti.com/product/LMR14020%2DQ1> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).