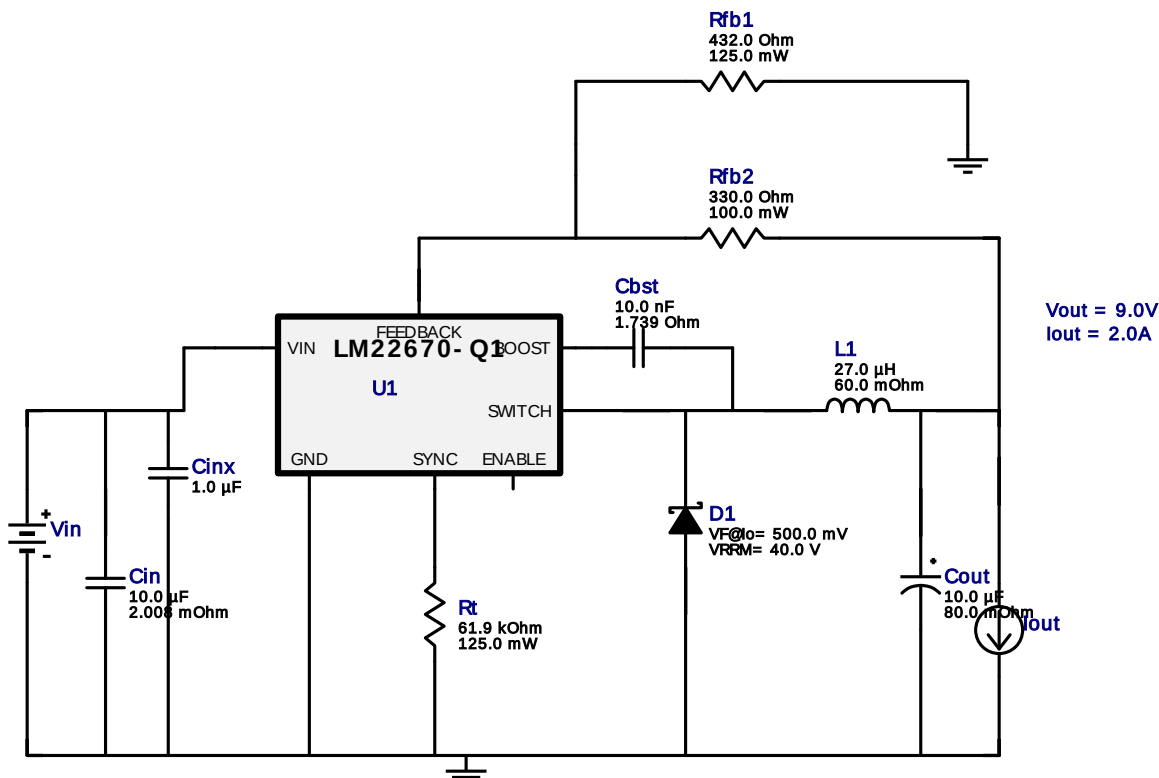


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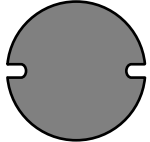
Design : 4742013/20 LM22670QMRE-5.0/NOPB
LM22670QMRE-5.0/NOPB 14.0V-25.0V to 9.00V @ 2.0A

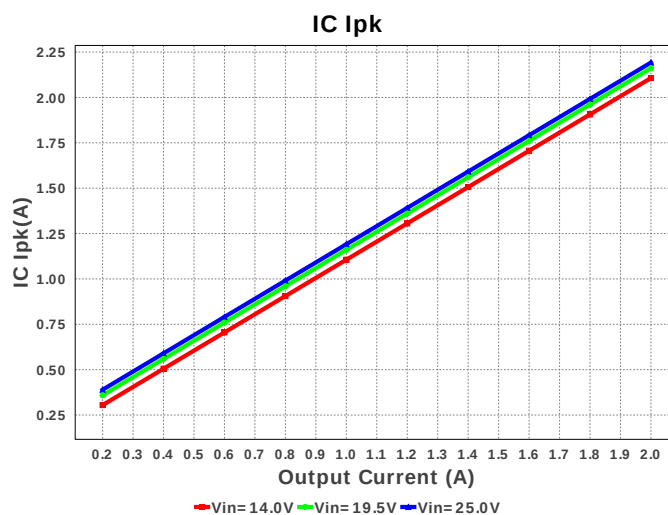
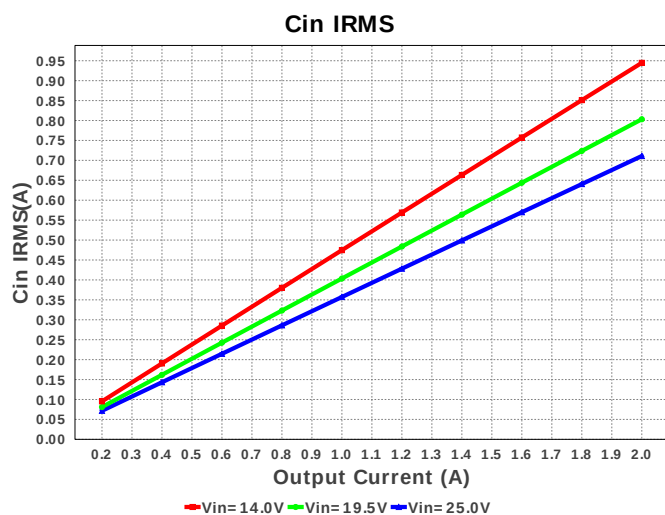
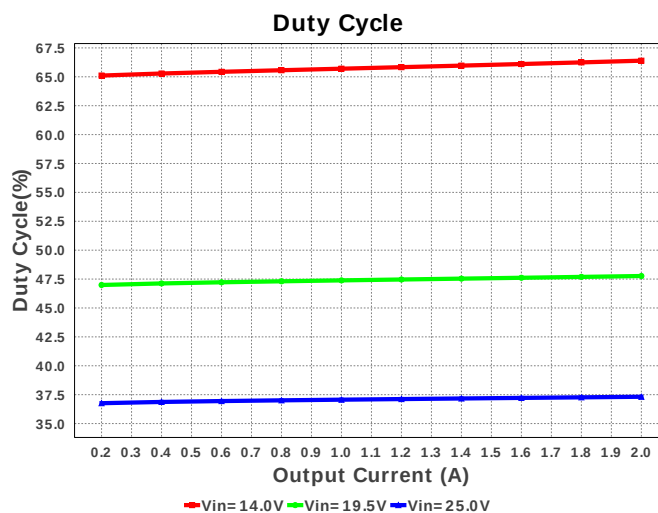
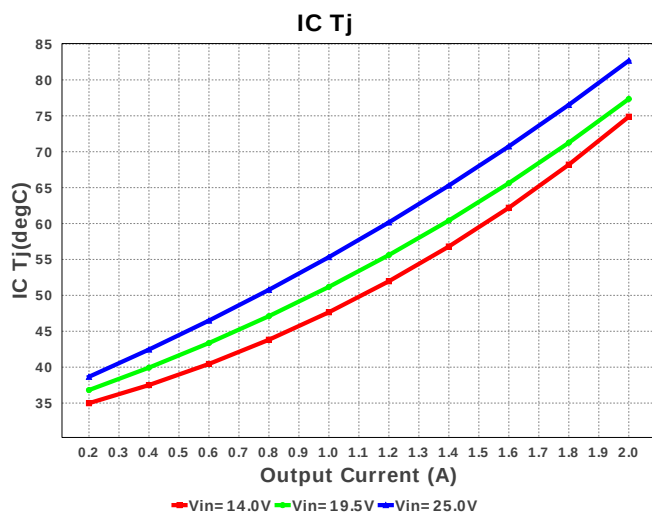


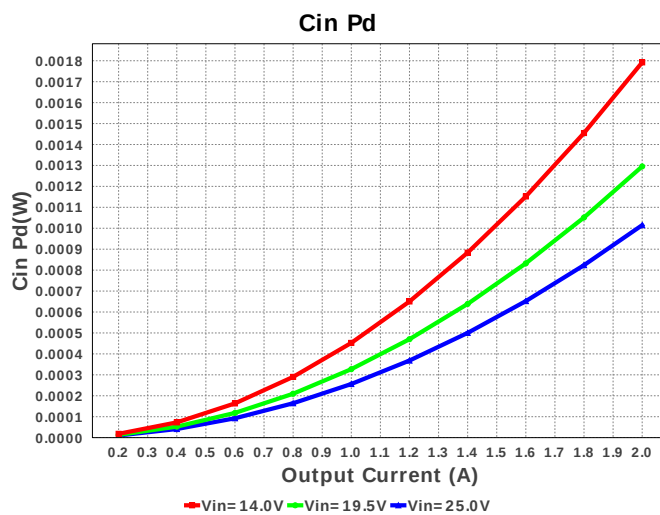
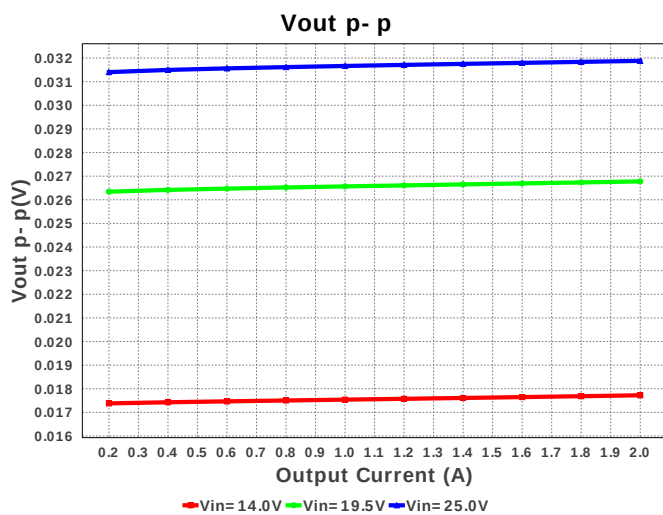
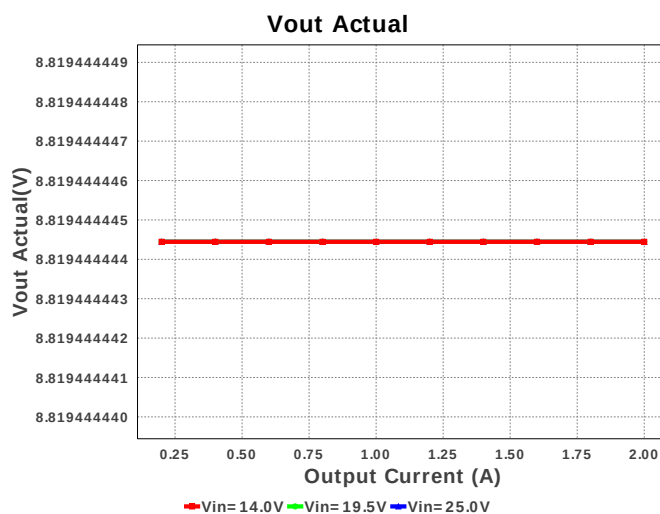
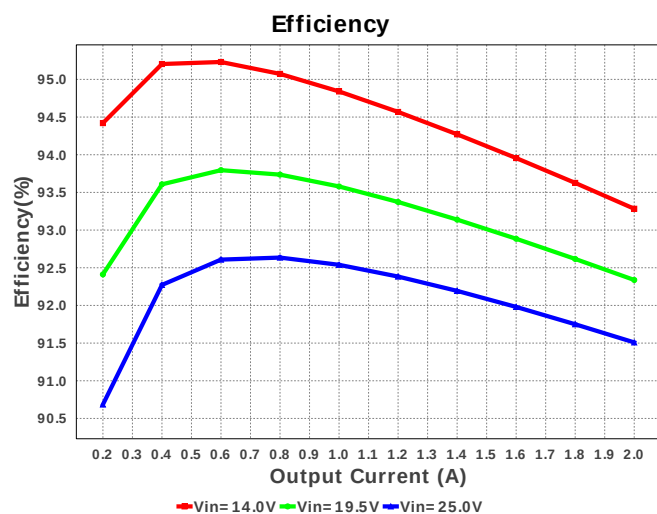
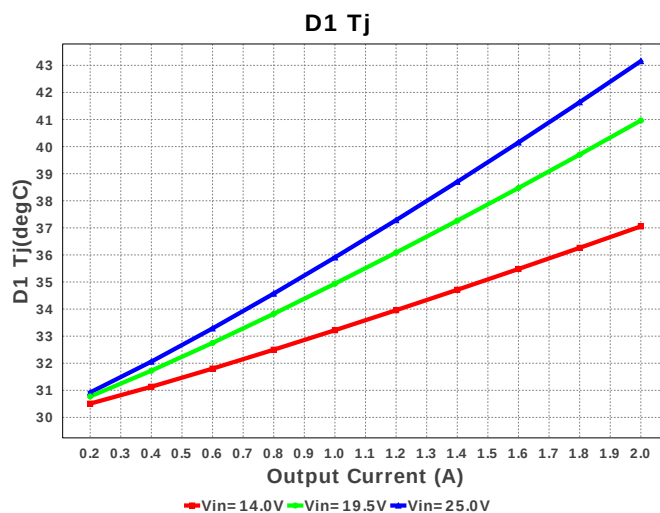
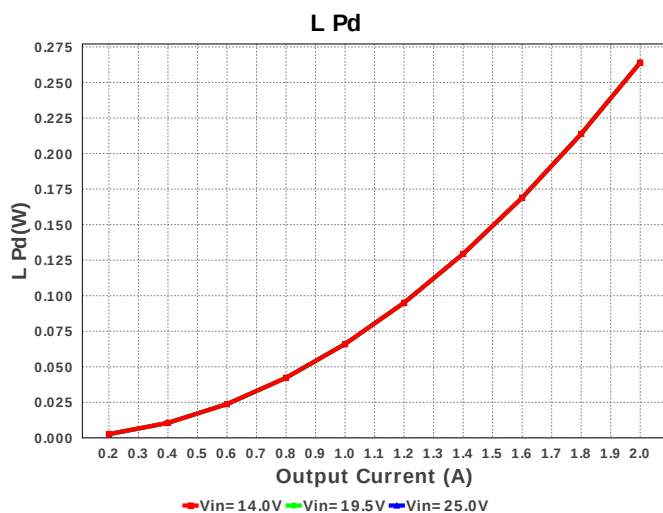
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

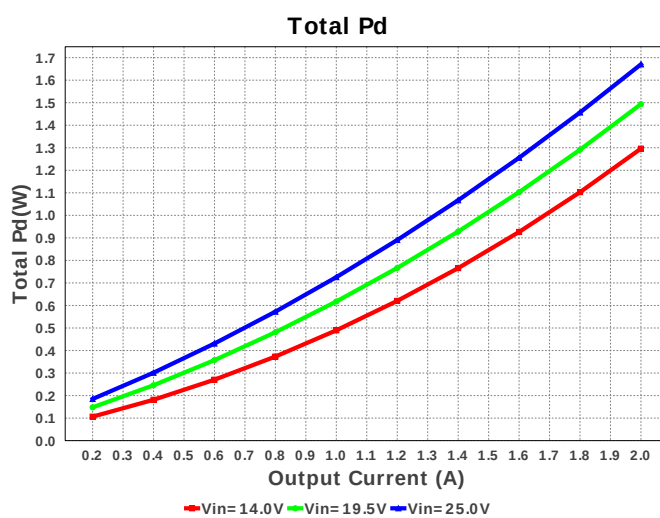
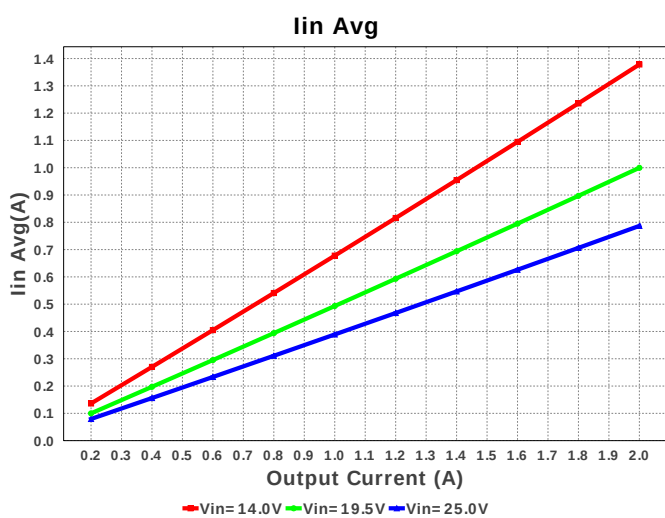
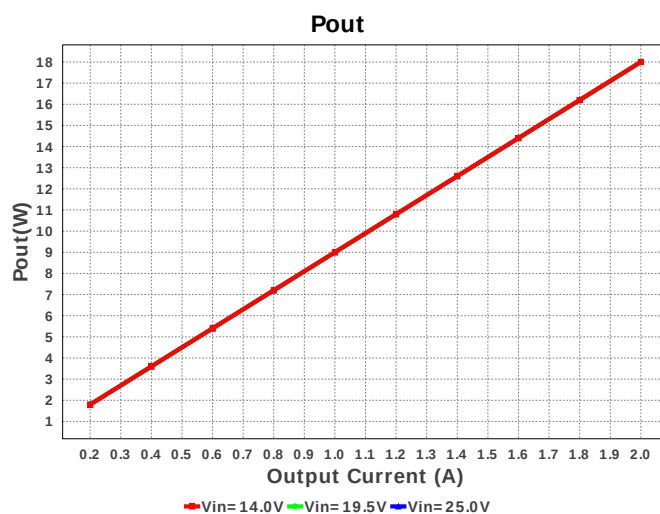
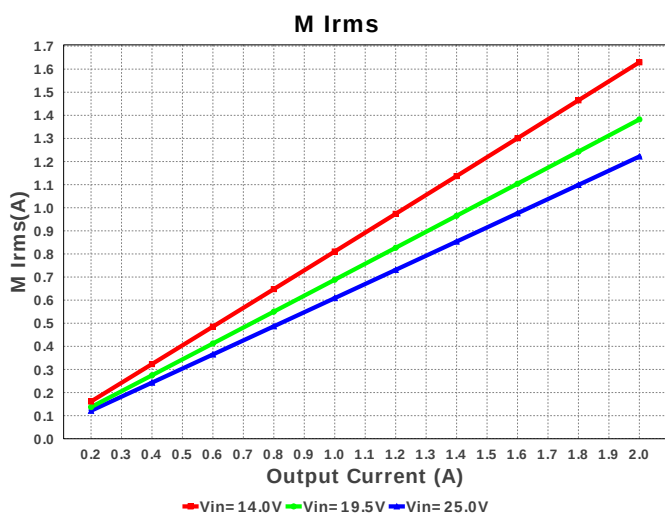
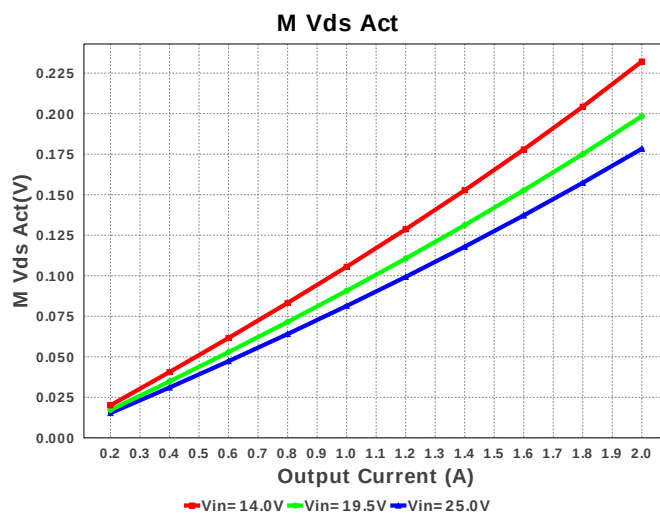
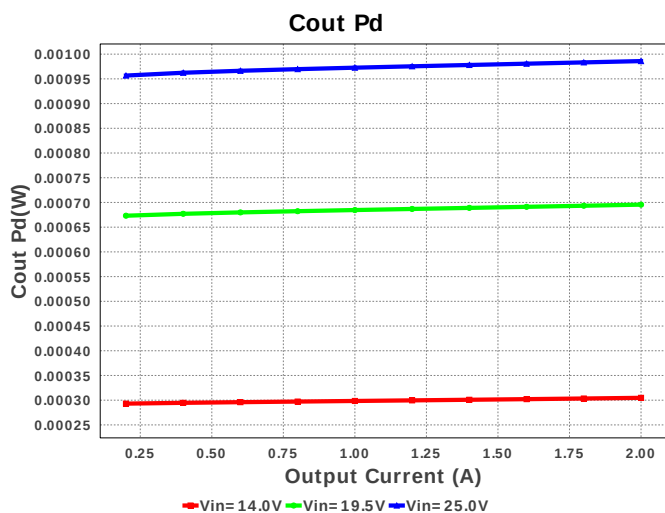
Electrical BOM

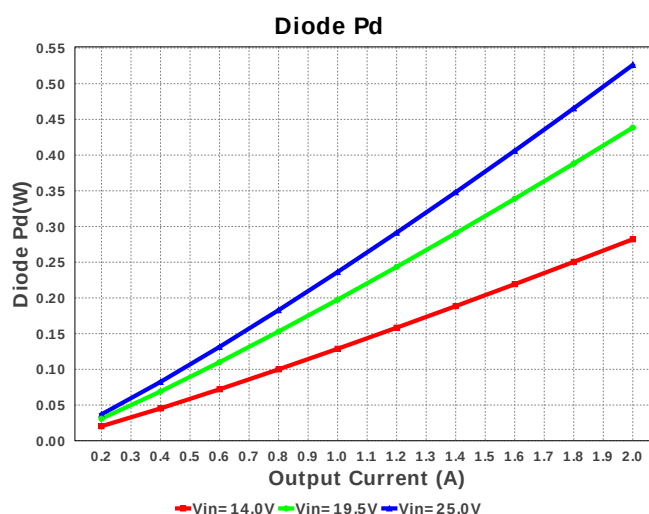
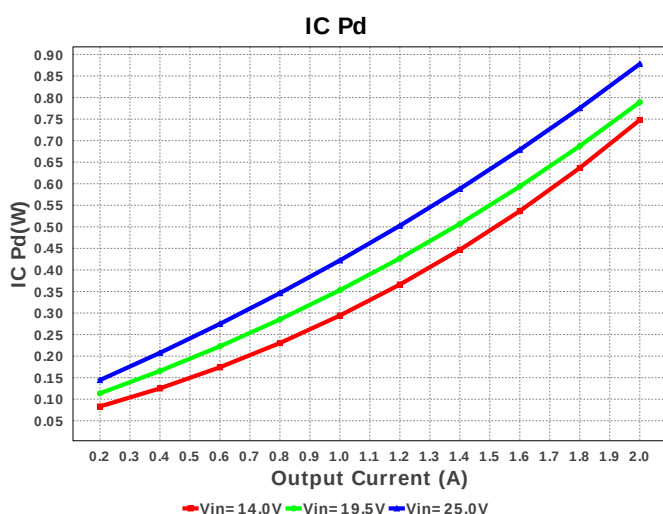
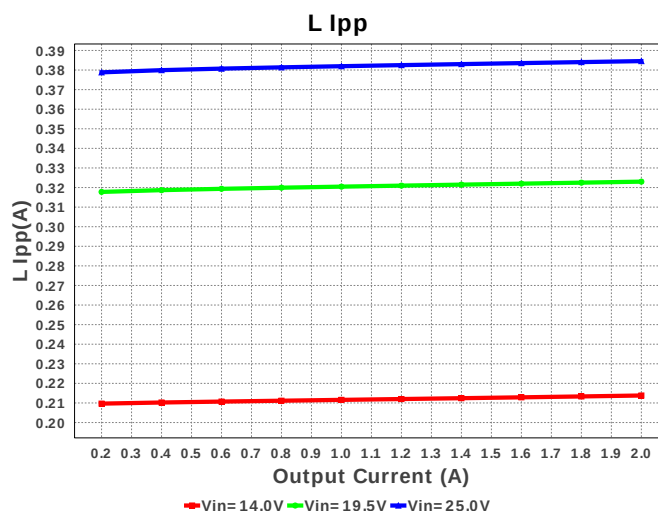
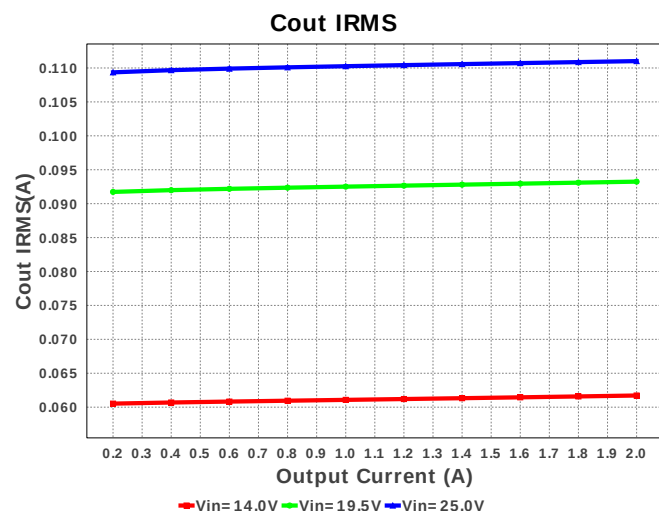
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	0805 7 mm ²
2.	Cin	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	1	\$0.22	1210_280 15 mm ²
3.	Cinx	Taiyo Yuden	GMK212B7105KG-T Series= X7R	Cap= 1.0 uF VDC= 35.0 V IRMS= 0.0 A	1	\$0.05	0805 7 mm ²
4.	Cout	Panasonic	12TPC10M Series= ?	Cap= 10.0 uF ESR= 80.0 mOhm VDC= 12.5 V IRMS= 800.0 mA	1	\$0.35	CAPSMT_6_B1G 17 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

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	L1	Bourns	SDR1307-270ML	L= 27.0 μ H DCR= 60.0 mOhm	1	\$0.35	 SDR1307 227 mm ²
7.	Rfb1	Vishay-Dale	CRCW0805432RFKEA Series= CRCW..e3	Res= 432.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
8.	Rfb2	Yageo America	RC0603FR-07330RL Series= ?	Res= 330.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
9.	Rt	Panasonic	ERJ-6ENF6192V Series= ERJ-6E	Res= 61.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
10.	U1	Texas Instruments	LM22670QMRE-5.0/NOPB	Switcher	1	\$2.24	 MRA08B 56 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	710.911 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	111.014 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.192 A	Current	Peak switch current in IC
4.	Iin Avg	786.81 mA	Current	Average input current
5.	L Ipp	384.56 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.222 A	Current	Q Iavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	383.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	575.061 kHz	General	Switching frequency
10.	IC Tolerance	0.0 V	General	IC Feedback Tolerance
11.	M Vds Act	178.324 mV	General	Voltage drop across the MosFET
12.	Pout	18.0 W	General	Total output power
13.	Total BOM	\$3.34	General	Total BOM Cost
14.	D1 Tj	43.157 degC	Op_Point	D1 junction temperature
15.	Vout Actual	8.819 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	79.979 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	37.319 %	Op_point	Duty cycle
19.	Efficiency	91.509 %	Op_point	Steady state efficiency
20.	IC Tj	82.676 degC	Op_point	IC junction temperature
21.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	Phase Marg	57.826 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	25.0 V	Op_point	Vin operating point
25.	Vout p-p	31.881 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	1.015 mW	Power	Input capacitor power dissipation
27.	Cout Pd	985.932 μ W	Power	Output capacitor power dissipation
28.	Diode Pd	526.281 mW	Power	Diode power dissipation
29.	IC Pd	877.935 mW	Power	IC power dissipation
30.	L Pd	264.0 mW	Power	Inductor power dissipation
31.	Total Pd	1.67 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	874.891 m%		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	25.0	Maximum input voltage
3.	VinMin	14.0	Minimum input voltage
4.	Vout	9.0	Output Voltage
5.	base_pn	LM22670-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: Automotive Qualified 4.5V to 18V Vin, 3A Synchronous DCAP2 Mode Buck Converter
2. The LM22670-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
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4. **LM22670-Q1 Product Folder** : <http://www.ti.com/product/LM22670%2DQ1> : contains the data sheet and other resources.

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