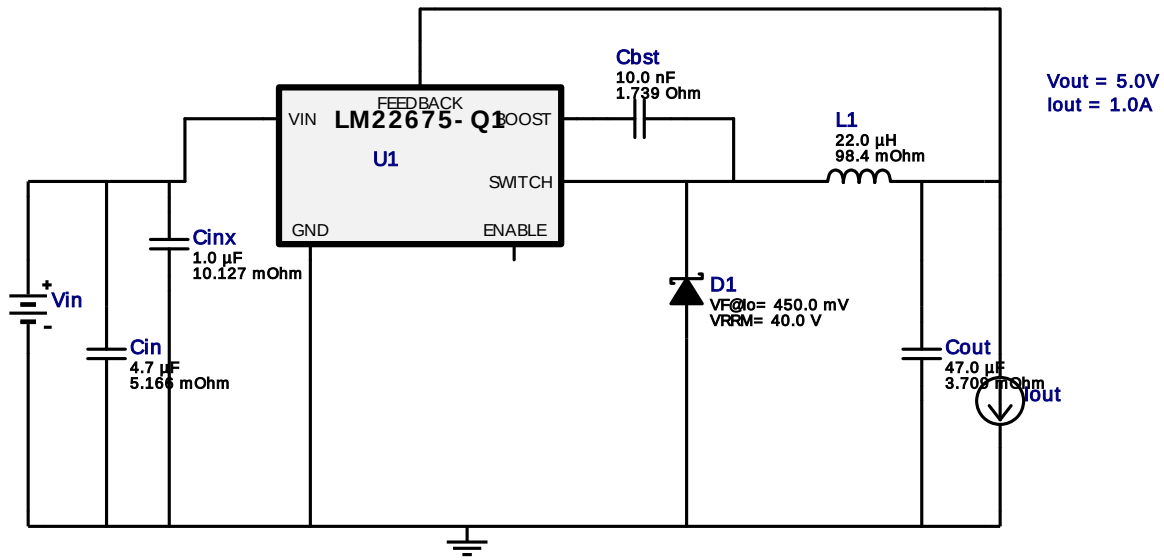
WEBENCH® Design Report

VinMin = 9.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 1.0A

Device = LM22675QMRE-5.0/NOPB
Topology = Buck
Created = 7/21/16 4:13:09 AM
BOM Cost = $2.66
BOM Count = 7
Total Pd = 0.61W

Design : 4372614/41 LM22675QMRE-5.0/NOPB
LM22675QMRE-5.0/NOPB 9.0V-12.0V to 5.00V @ 1.0A

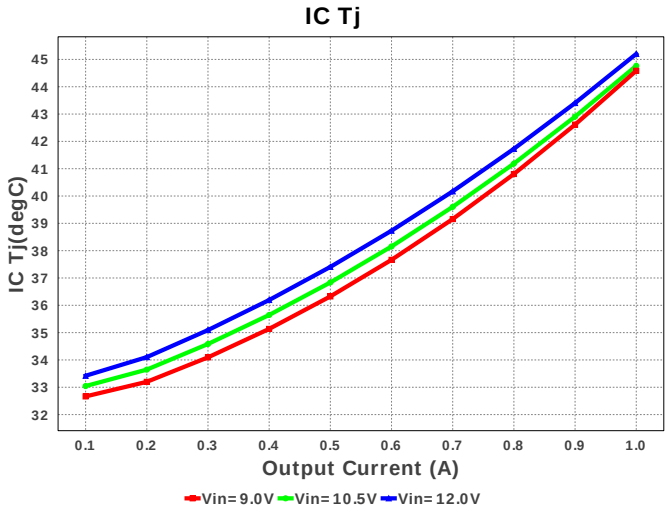


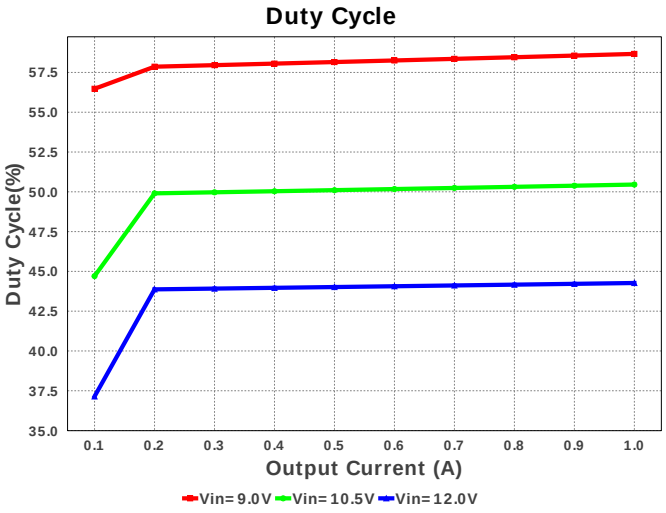
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

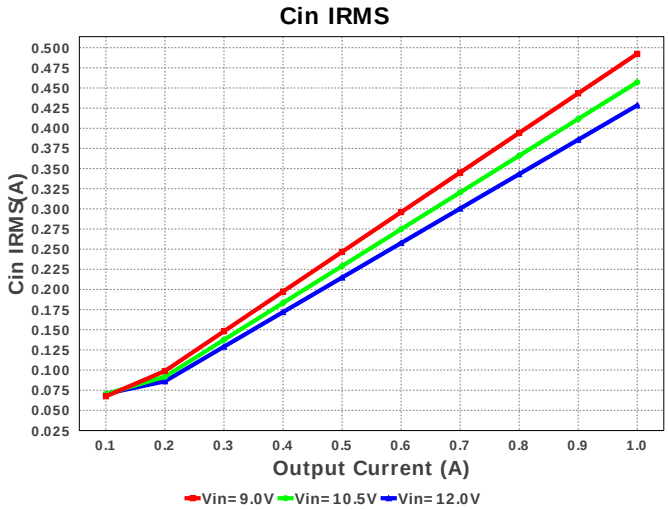
Electrical BOM

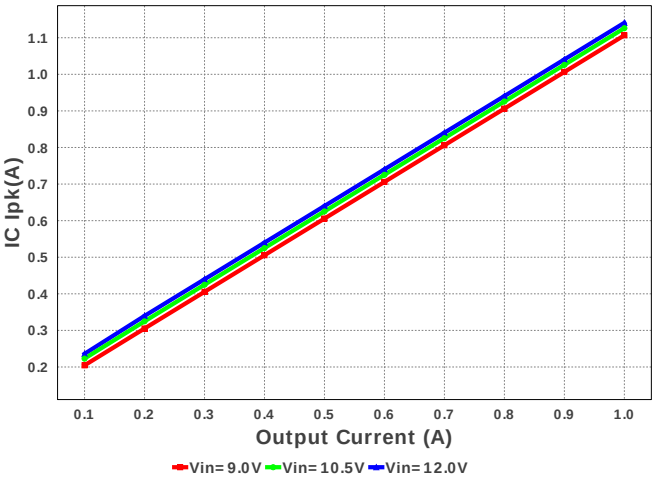
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
3.	Cinx	MuRata	GRM188R61C105KA93D Series= X5R	Cap= 1.0 uF ESR= 10.127 mOhm VDC= 16.0 V IRMS= 994.63 mA	1	$0.01	0603 5 mm²
4.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	$0.15	1206_190 11 mm²
5.	D1	Diodes Inc.	1N5819HW-7-F	VF@Io= 450.0 mV VRRM= 40.0 V	1	$0.08	SOD-123 13 mm²
6.	L1	TDK	SLF6045T-220M1R1-3PF	L= 22.0 µH DCR= 98.4 mOhm	1	$0.43	SLF6045 64 mm²

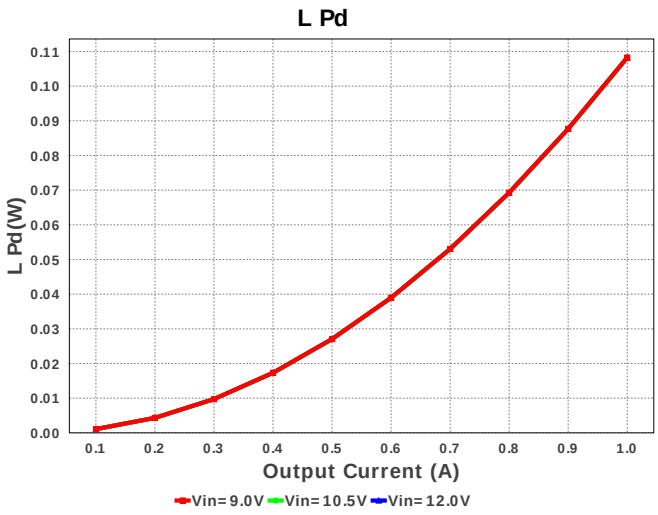
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	U1	Texas Instruments	LM22675QMRE-5.0/NOPB	Switcher	1	$1.96	 MRA08B 56 mm^2

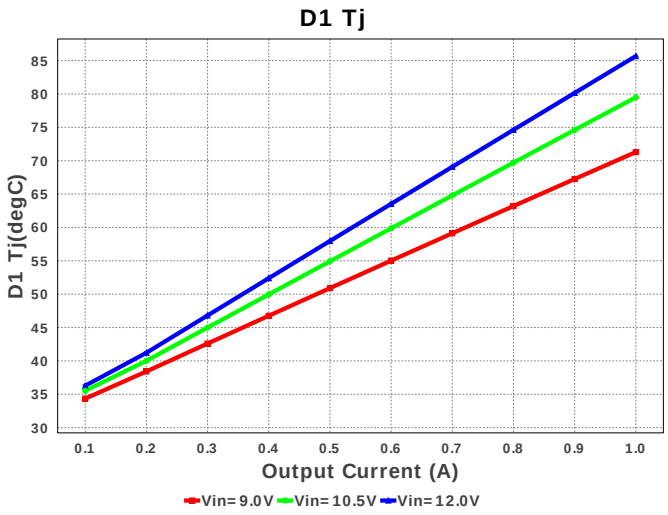


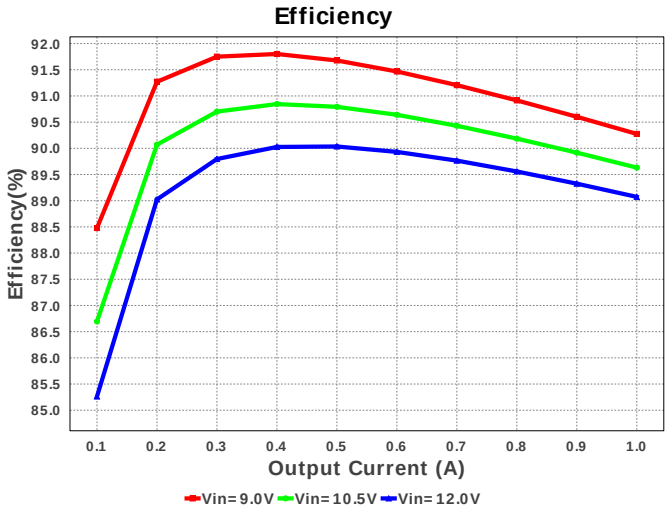


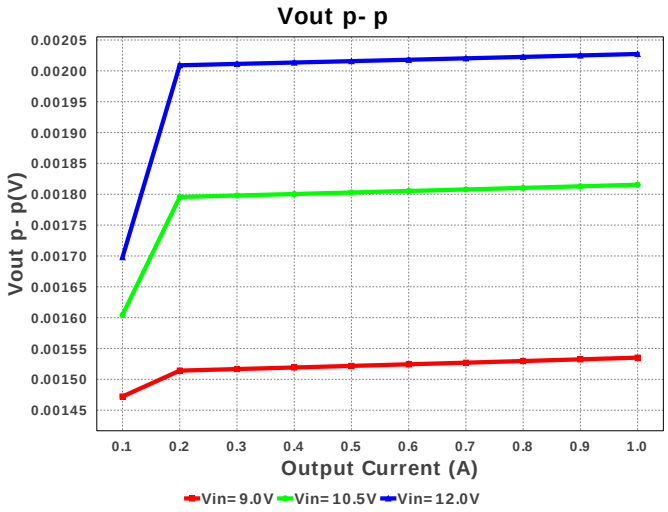


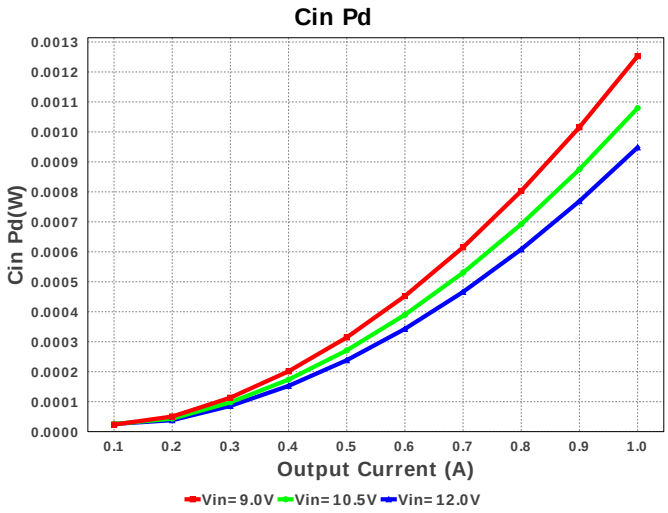


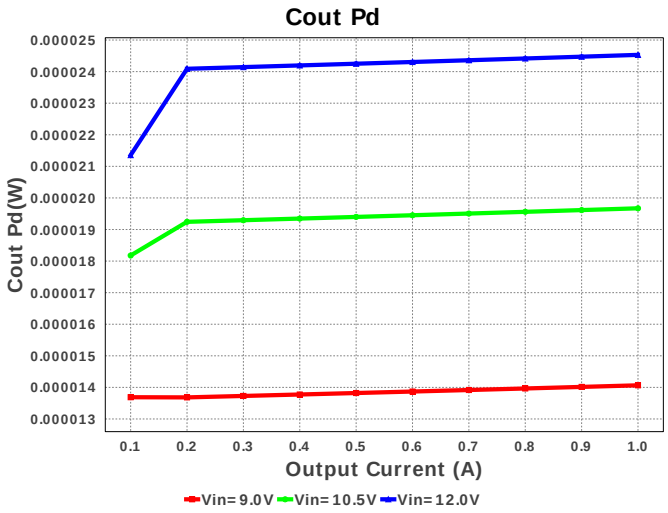


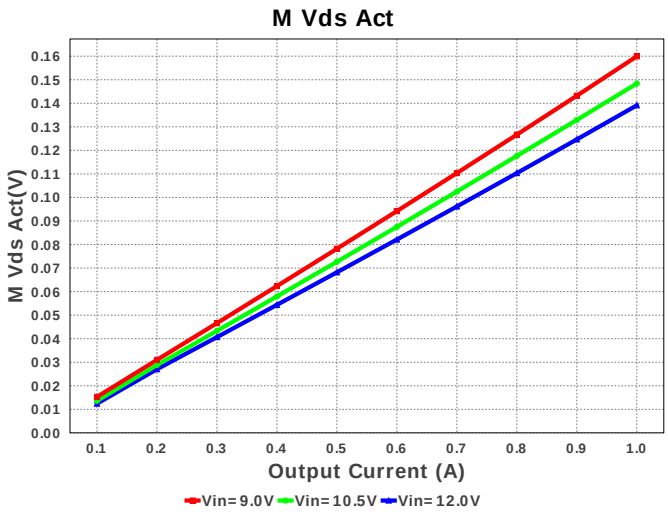


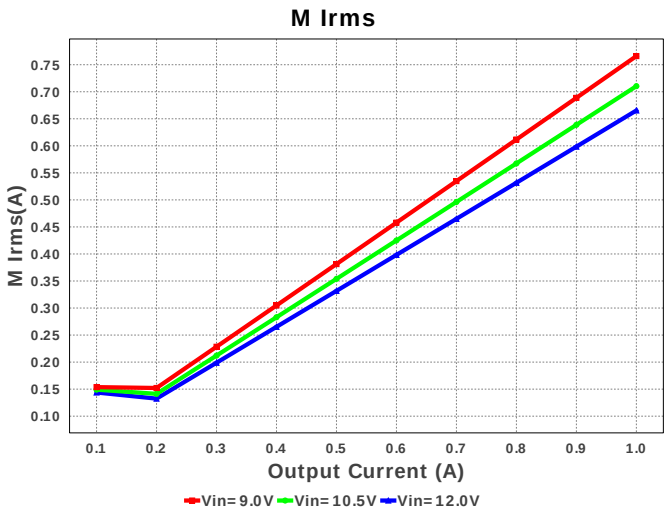


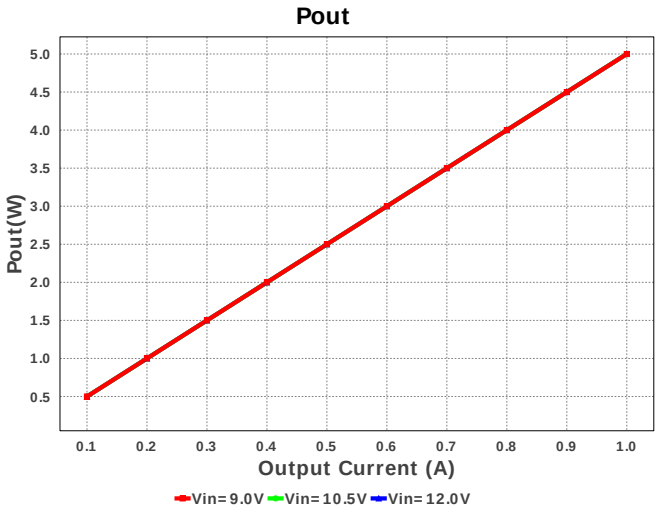


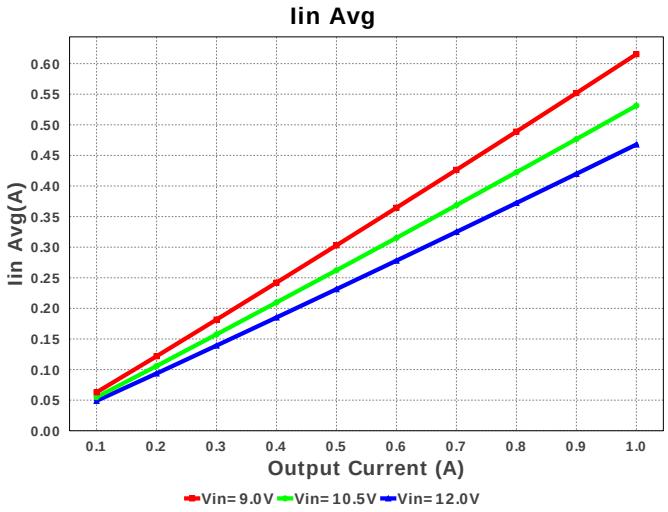


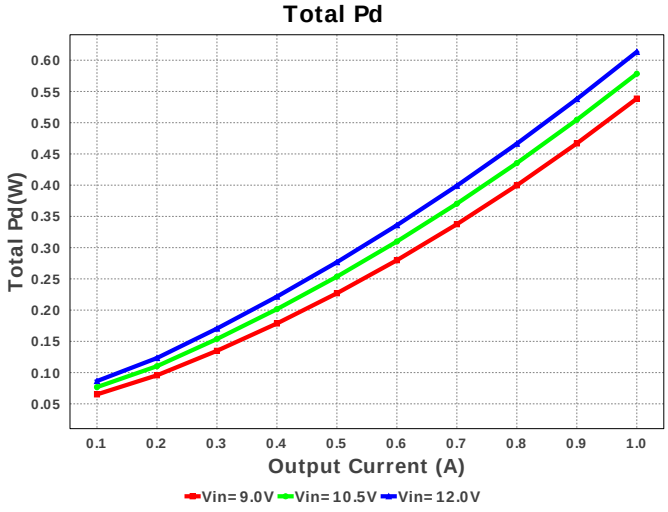


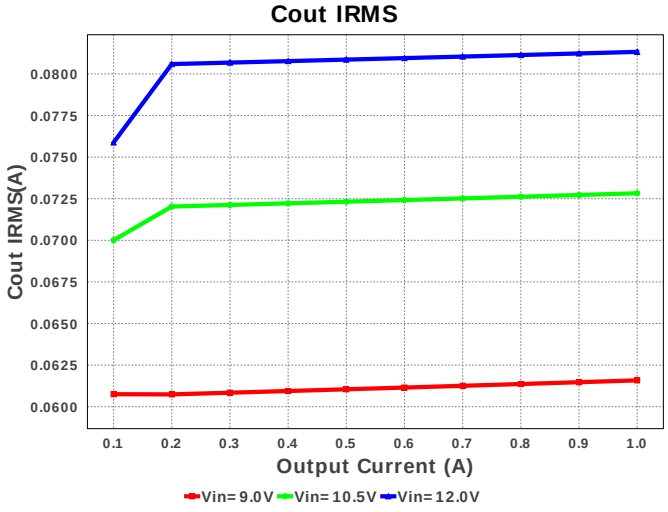


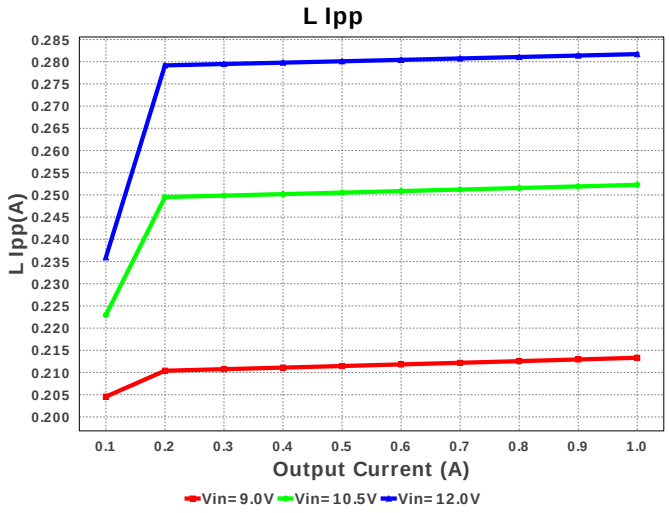


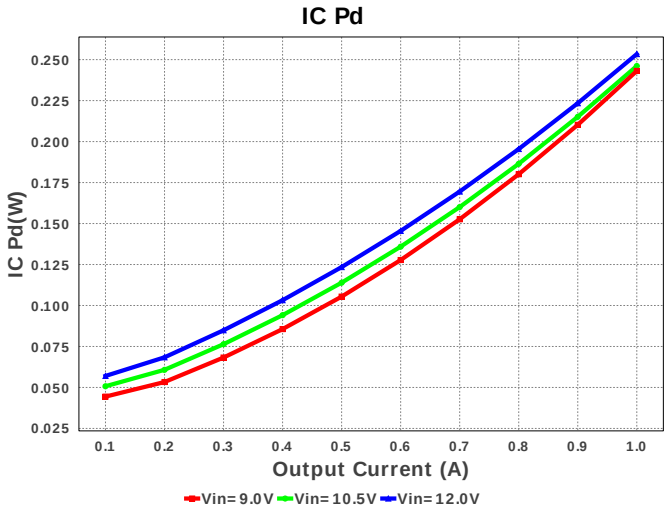


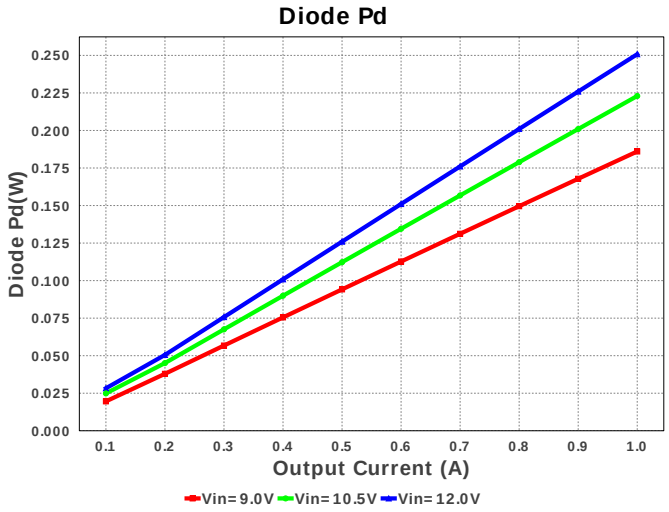












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	428.451 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	81.325 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.141 A	Current	Peak switch current in IC
4.	Iin Avg	467.78 mA	Current	Average input current
5.	L Ipp	281.72 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	665.355 mA	Current	Q Iavg
7.	BOM Count	7	General	Total Design BOM count
8.	FootPrint	162.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	IC Tolerance	75.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	139.12 mV	General	Voltage drop across the MosFET
12.	Pout	5.0 W	General	Total output power
13.	Total BOM	$2.66	General	Total BOM Cost
14.	D1 Tj	85.674 degC	Op_Point	D1 junction temperature
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Cross Freq	46.816 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	44.27 %	Op_point	Duty cycle
18.	Efficiency	89.073 %	Op_point	Steady state efficiency
19.	IC Tj	45.202 degC	Op_point	IC junction temperature
20.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	1.0 A	Op_point	Iout operating point
22.	Phase Marg	47.854 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	12.0 V	Op_point	Vin operating point
24.	Vout p-p	2.027 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	948.325 µW	Power	Input capacitor power dissipation
26.	Cout Pd	24.53 µW	Power	Output capacitor power dissipation
27.	Diode Pd	250.786 mW	Power	Diode power dissipation
28.	IC Pd	253.364 mW	Power	IC power dissipation
29.	L Pd	108.24 mW	Power	Inductor power dissipation
30.	Total Pd	613.372 mW	Power	Total Power Dissipation

#	Name	Value	Category	Description
31.	Vout Tolerance	1.5 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	9.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LM22675-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 LM22675-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. The LM22675-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

4. **LM22675-Q1** Product Folder : http://www.ti.com/product/LM22675%2DQ1 : contains the data sheet and other resources.