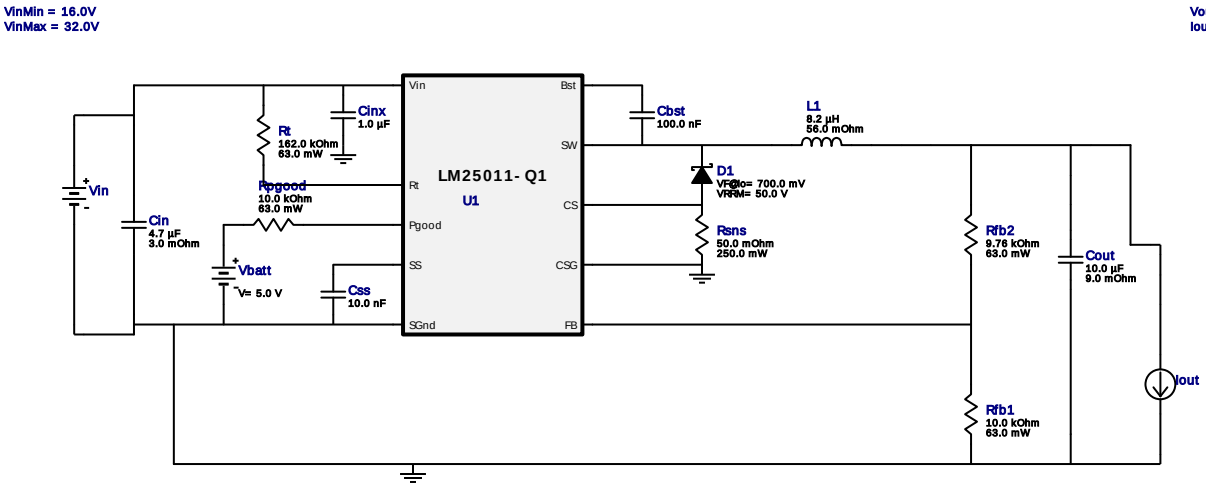
WEBENCH® Design Report

VinMin = 16.0V
VinMax = 32.0V
Vout = 5.0V
Iout = 2.0A

Device = LM25011Q1MY/NOPB
Topology = Buck
Created = 7/15/15 2:46:57 AM
BOM Cost = $3.63
Footprint = 187.0 mm^2
BOM Count = 13
Total Pd = 2.18W

Design : 4425714/39 LM25011Q1MY/NOPB
LM25011Q1MY/NOPB 16.0V-32.0V to 5.00V @ 2.0A

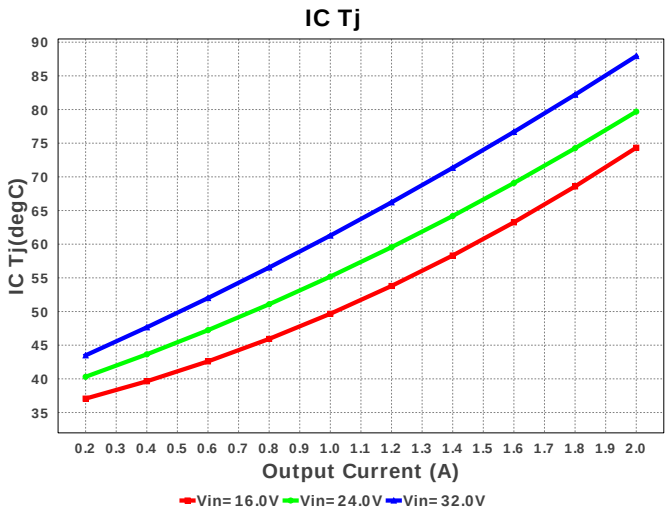


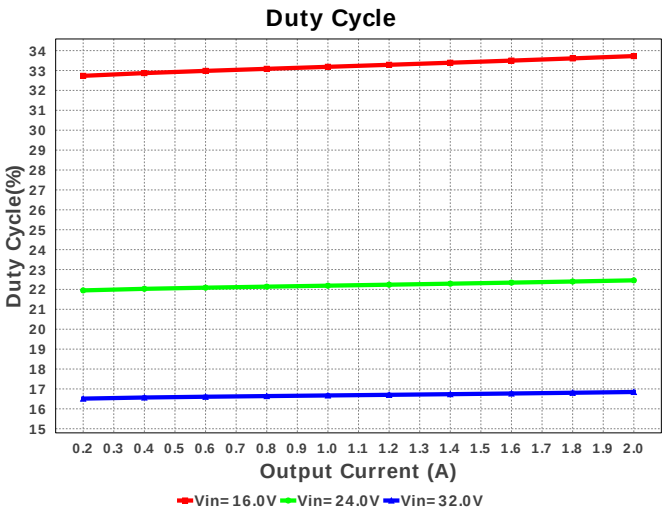
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

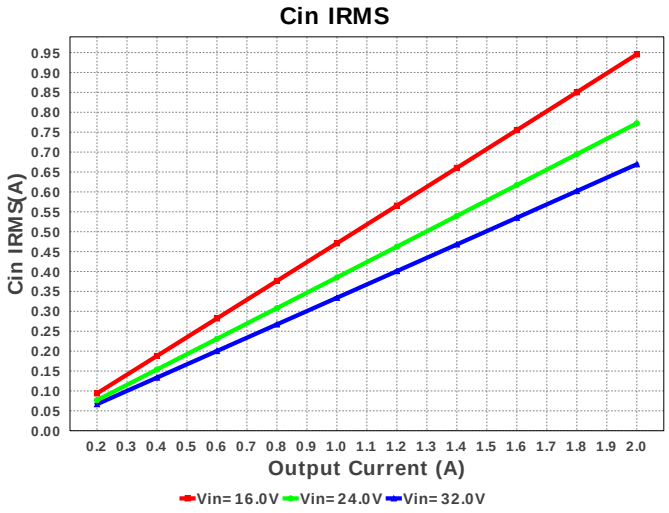
Electrical BOM

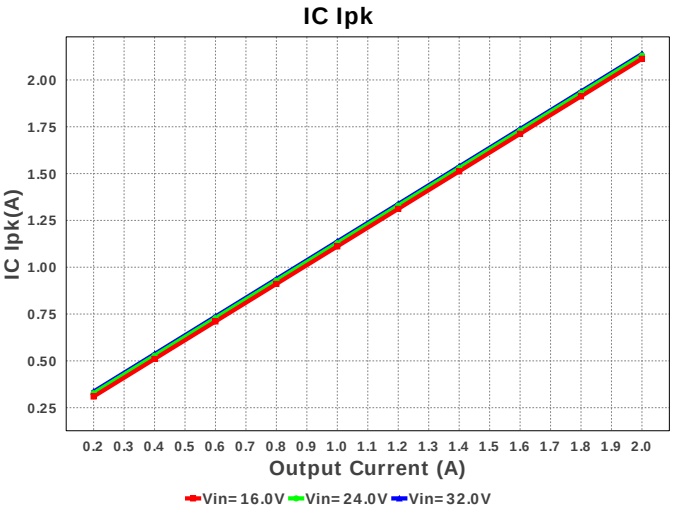
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R60J104KA01D Series= X5R	Cap= 100.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	$0.07	1206 11 mm^2
3.	Cinx	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 uF VDC= 50.0 V IRMS= 0.0 A	1	$0.10	0805 7 mm^2
4.	Cout	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	$0.03	0603 5 mm^2
5.	Css	MuRata	GRM033R60J103KA01D Series= X5R	Cap= 10.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0201 2 mm^2
6.	D1	Diodes Inc.	B350A-13-F	VF@Io= 700.0 mV VRRM= 50.0 V	1	$0.14	SMA 37 mm^2
7.	L1	Wurth Elektronik	74437349082	L= 8.2 µH DCR= 56.0 mOhm	1	$1.73	7343-48 80 mm^2
8.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
9.	Rfb2	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

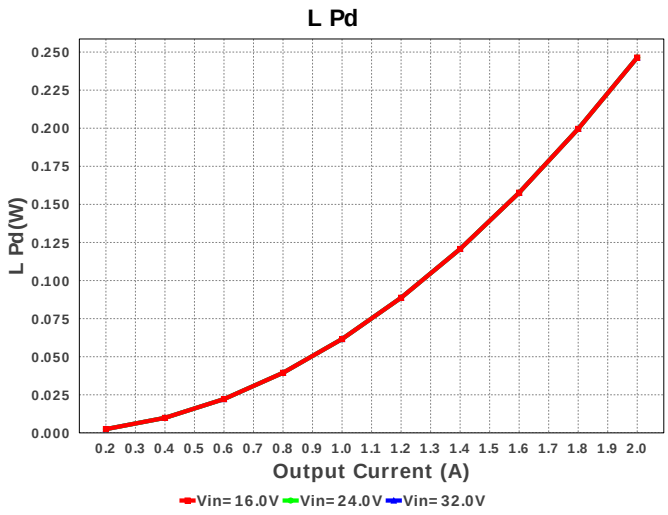
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rpgood	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
11.	Rsns	Bourns	CRM0805-FW-R050ELF Series= ?	Res= 50.0 mOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.10	0805 7 mm^2
12.	Rt	Vishay-Dale	CRCW0402162KFKED Series= CRCW..e3	Res= 162.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
13.	U1	Texas Instruments	LM25011Q1MY/NOPB	Switcher	1	$1.40	MUC10A 24 mm^2

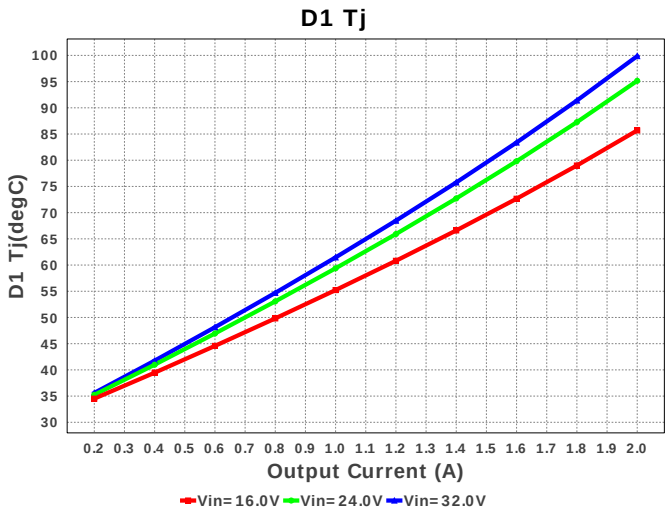


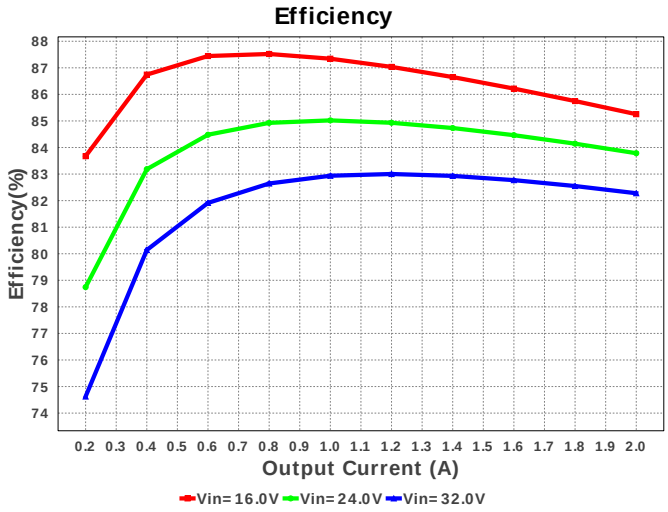


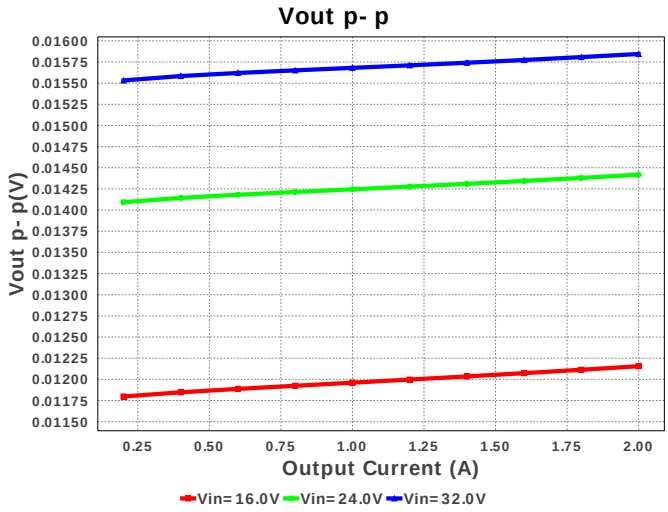


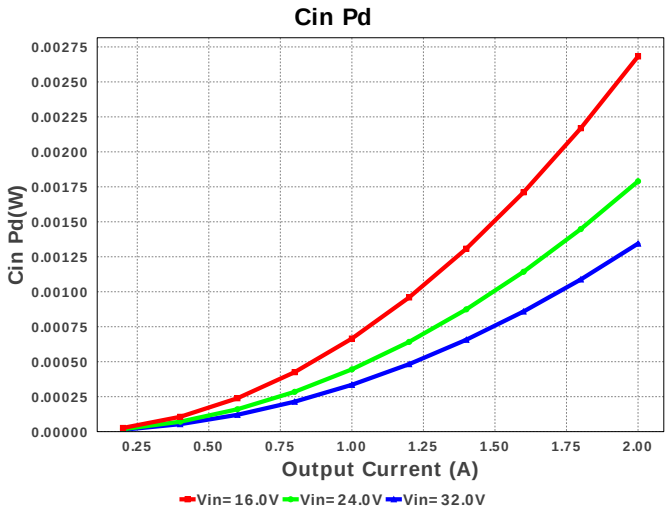


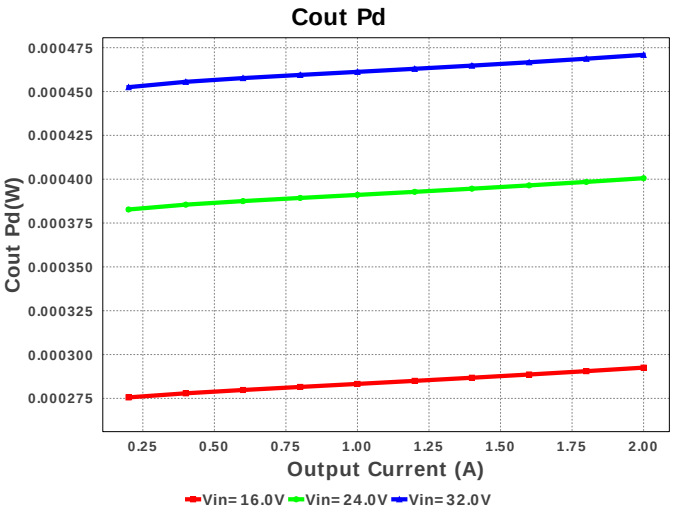


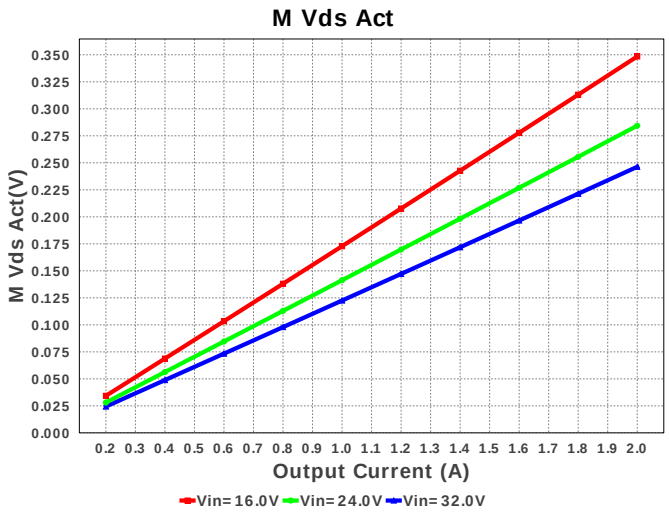


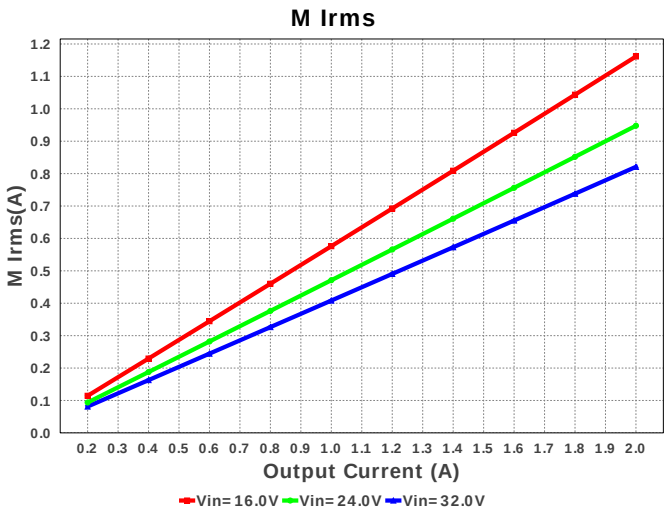


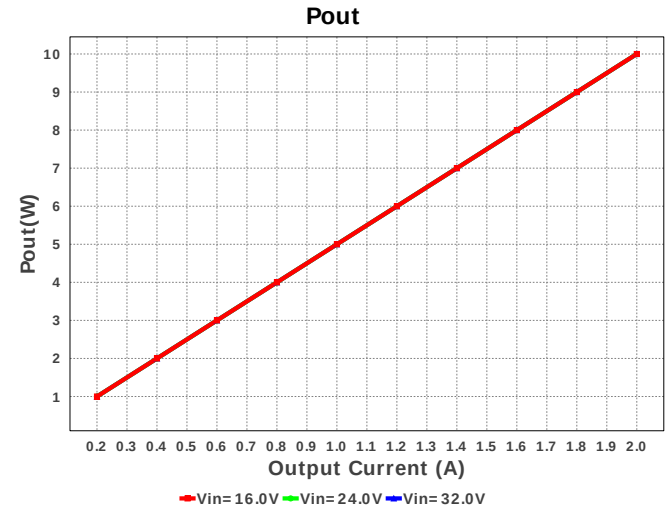


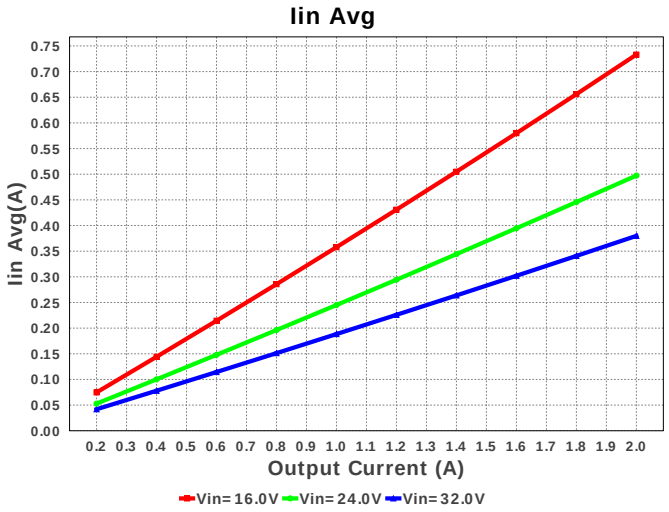


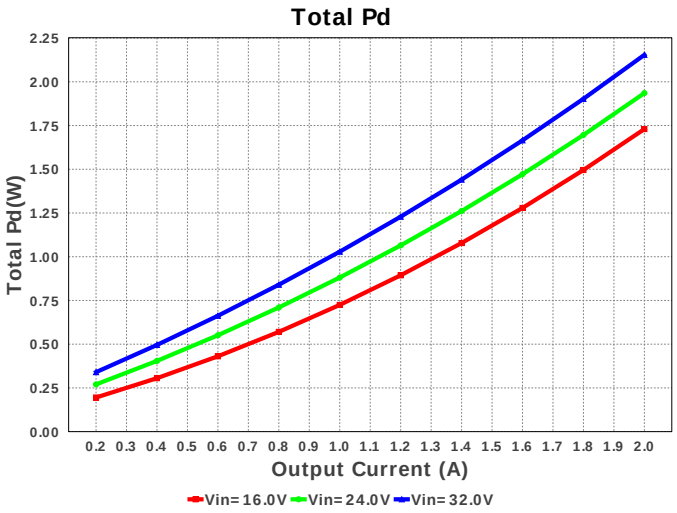


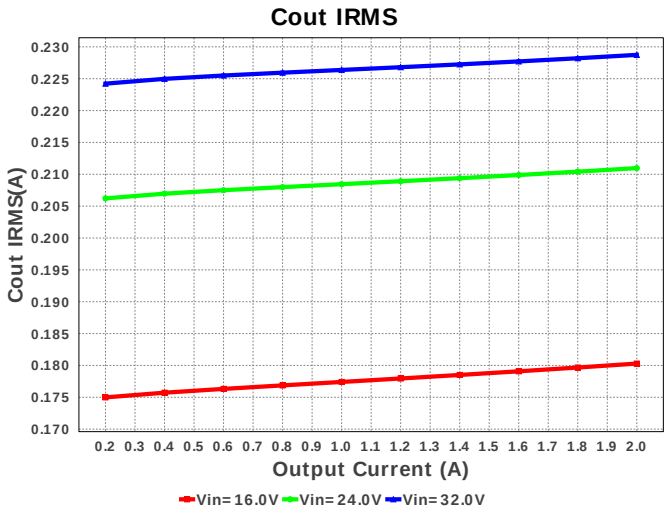


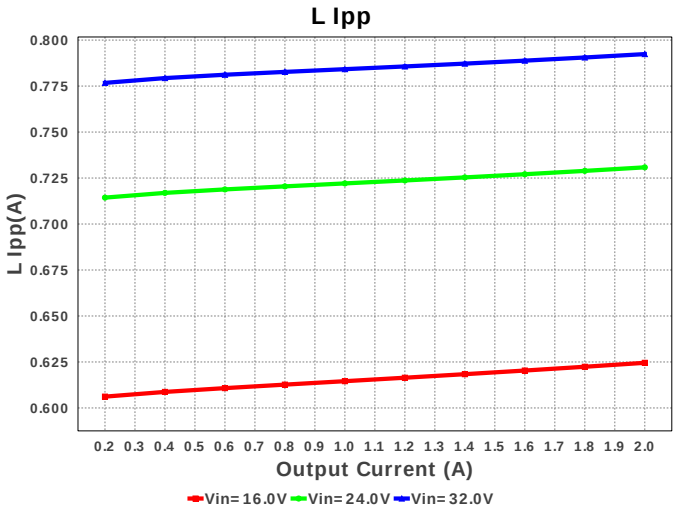


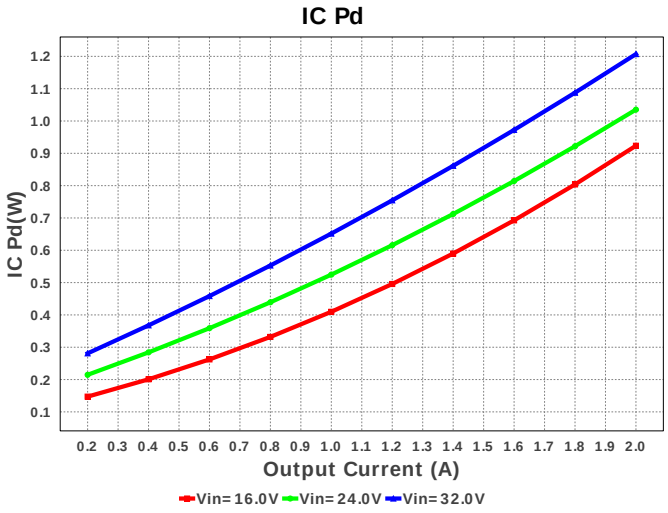


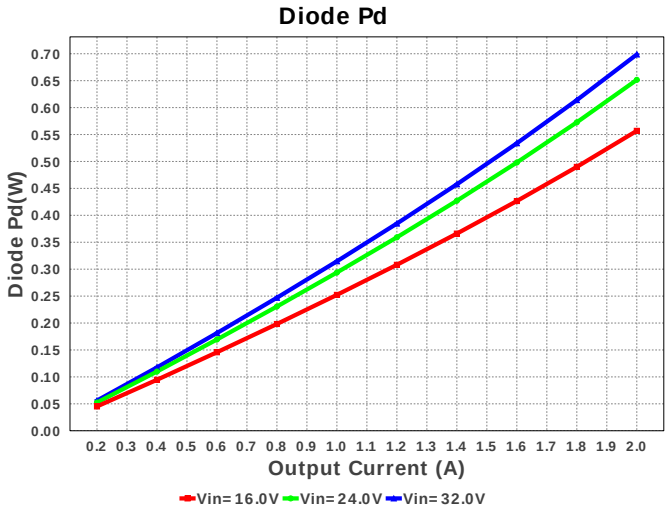












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	669.792 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	229.246 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.397 A	Current	Peak switch current in IC
4.	Iin Avg	380.56 mA	Current	Average input current
5.	L Ipp	794.13 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	821.791 mA	Current	MOSFET RMS current
7.	BOM Count	13	General	Total Design BOM count
8.	FootPrint	187.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	700.035 kHz	General	Switching frequency
10.	IC Tolerance	50.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	246.537 mV	General	Voltage drop across the MosFET
12.	Pout	10.0 W	General	Total output power
13.	Total BOM	$3.63	General	Total BOM Cost
14.	D1 Tj	102.22 degC	Op_Point	D1 junction temperature
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	16.884 %	Op_point	Duty cycle
17.	Efficiency	82.116 %	Op_point	Steady state efficiency
18.	IC Tj	87.958 degC	Op_point	IC junction temperature
19.	ICThetaJA	48.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	VIN_OP	32.0 V	Op_point	Vin operating point
22.	Vout p-p	15.88 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.346 mW	Power	Input capacitor power dissipation
24.	Cout Pd	472.984 µW	Power	Output capacitor power dissipation
25.	Diode Pd	722.196 mW	Power	Diode power dissipation
26.	IC Pd	1.207 W	Power	IC power dissipation
27.	L Pd	246.4 mW	Power	Inductor power dissipation
28.	Total Pd	2.178 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	Iout1	2.0	Output Current #1
3.	VinMax	32.0	Maximum input voltage
4.	VinMin	16.0	Minimum input voltage
5.	Vout	5.0	Output Voltage
6.	Vout1	5.0	Output Voltage #1
7.	base_pn	LM25011-Q1	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: Automotive Qualified 12V to 14V Vin, 2A Constant On-Time Buck Regulator

2. The LM25011-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. LM25011-Q1 Product Folder : http://www.ti.com/product/LM25011%2DQ1 : contains the data sheet and other resources.