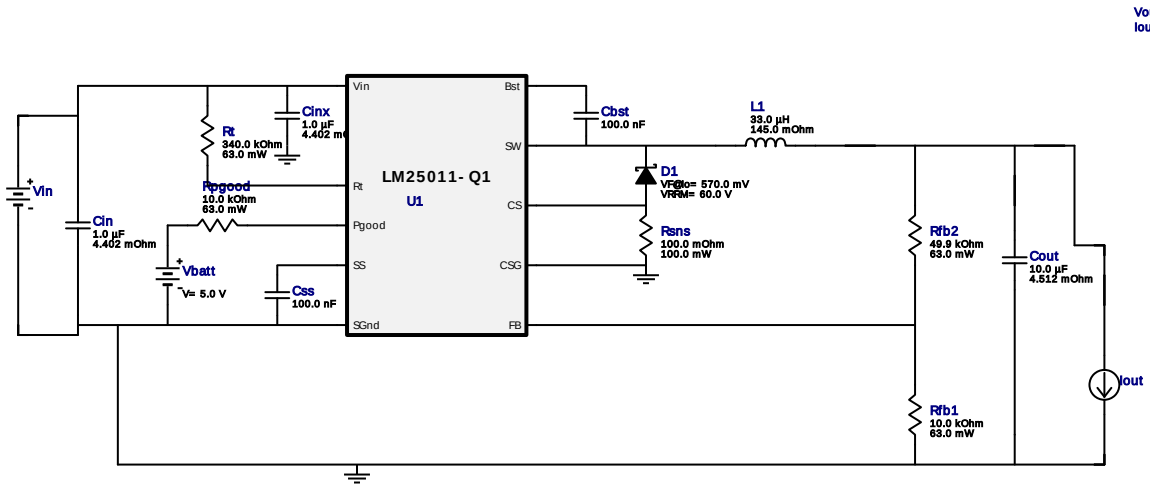
VinMin = 23.2V
VinMax = 29.4V
Vout = 15.0V
Iout = 1.0A

Device = LM25011Q1MYX/NOPB
Topology = Buck
Created = 7/12/16 7:40:07 PM
BOM Cost = $1.90
BOM Count = 13
Total Pd = 1.2W

WEBENCH® Design Report

Design : 4738396/2 LM25011Q1MYX/NOPB
LM25011Q1MYX/NOPB 23.2V-29.4V to 15.00V @ 1.0A

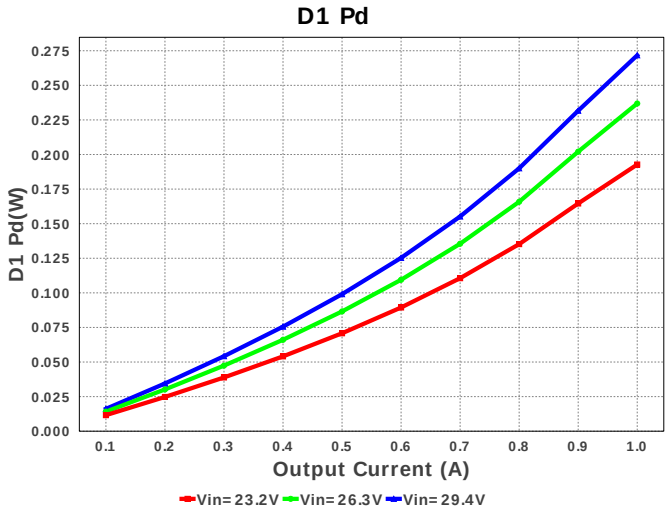


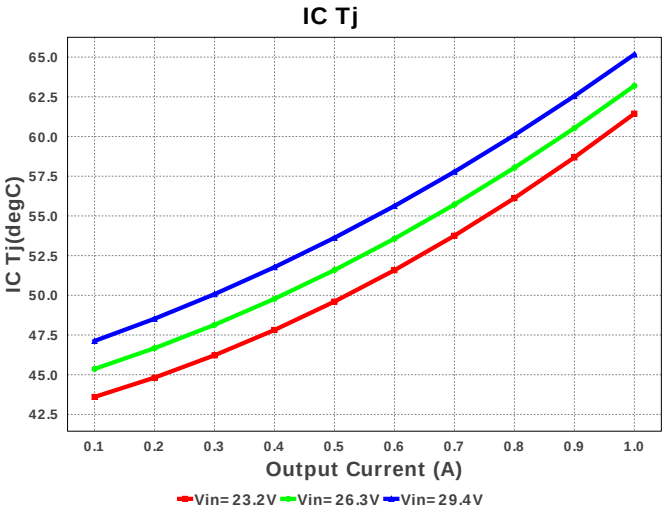
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific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

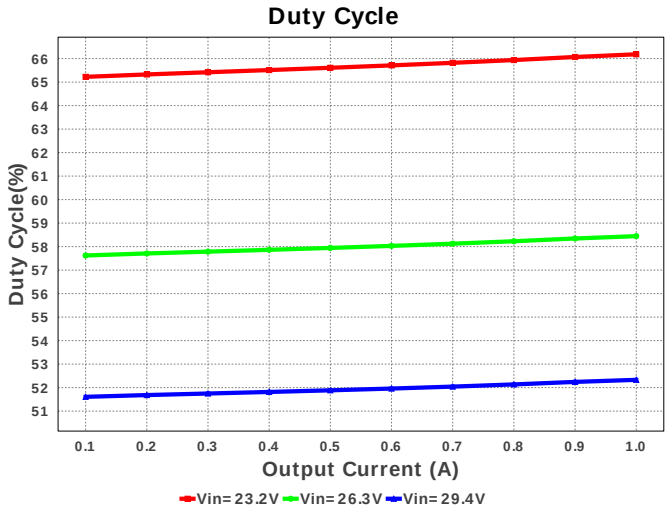
Electrical BOM

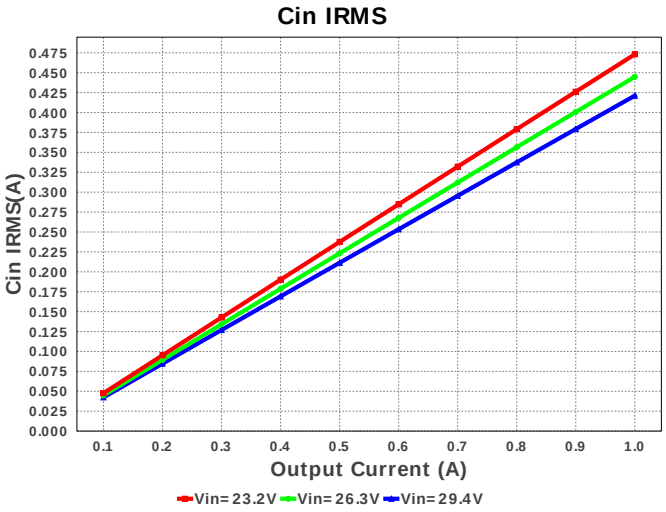
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
2.	Cin	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 uF ESR= 4.402 mOhm VDC= 50.0 V IRMS= 1.677 A	1	$0.05	0805 7 mm^2
3.	Cinx	MuRata	GRM21BR71H105KA12L Series= X7R	Cap= 1.0 uF ESR= 4.402 mOhm VDC= 50.0 V IRMS= 1.677 A	1	$0.05	0805 7 mm^2
4.	Cout	MuRata	GRM31CR61E106KA12L Series= X5R	Cap= 10.0 uF ESR= 4.512 mOhm VDC= 25.0 V IRMS= 2.447 A	1	$0.05	1206_190 11 mm^2
5.	Css	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
6.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	$0.04	SOD-123F 12 mm^2
7.	L1	Bourns	SRN8040-330M	L= 33.0 µH DCR= 145.0 mOhm	1	$0.22	SRN8040 100 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	CRCW040249K9FKED Series= CRCW..e3	Res= 49.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

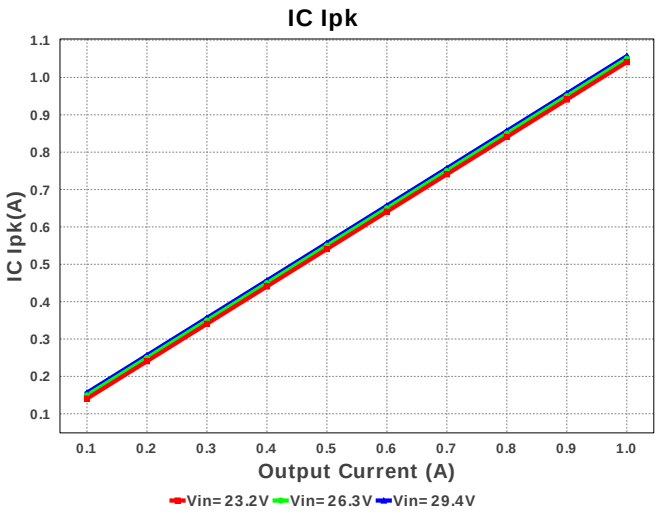
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Rpgood	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
11.	Rsns	Panasonic	ERJ-3RSFR10V Series= ERJ-3R	Res= 100.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.03	0603 5 mm^2
12.	Rt	Vishay-Dale	CRCW0402340KFKED Series= CRCW..e3	Res= 340.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
13.	U1	Texas Instruments	LM25011Q1MYX/NOPB	Switcher	1	$1.40	MUC10A 24 mm^2

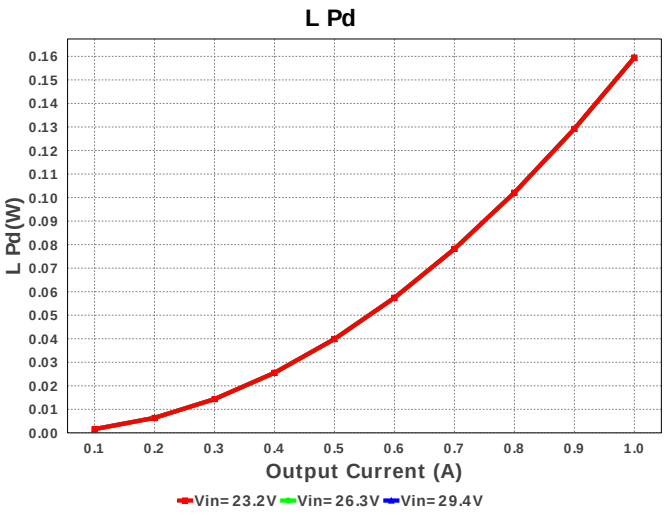


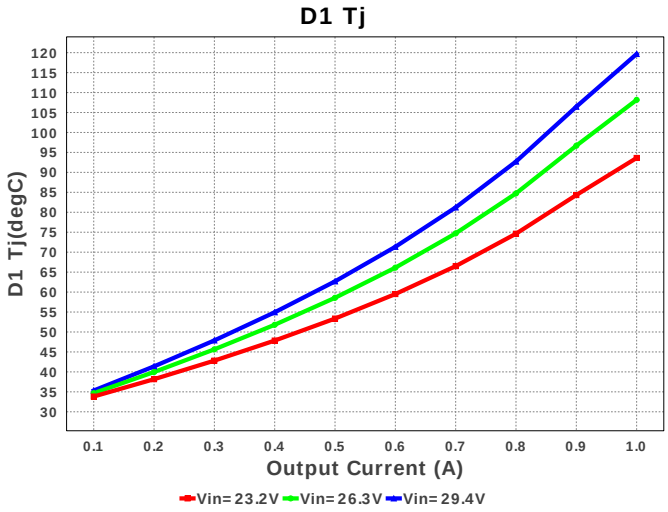


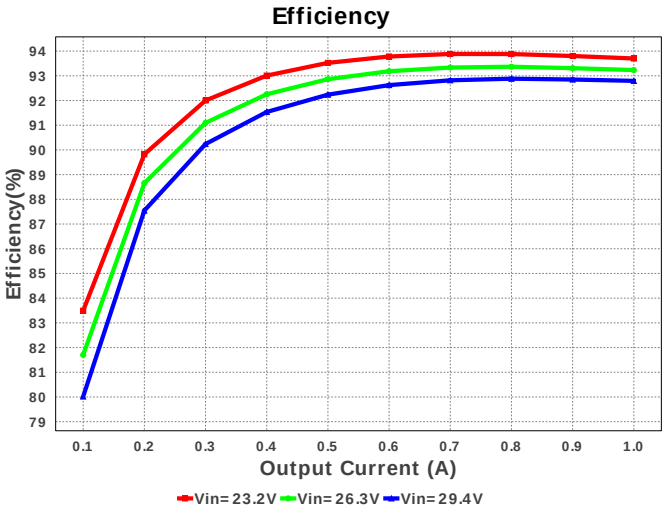


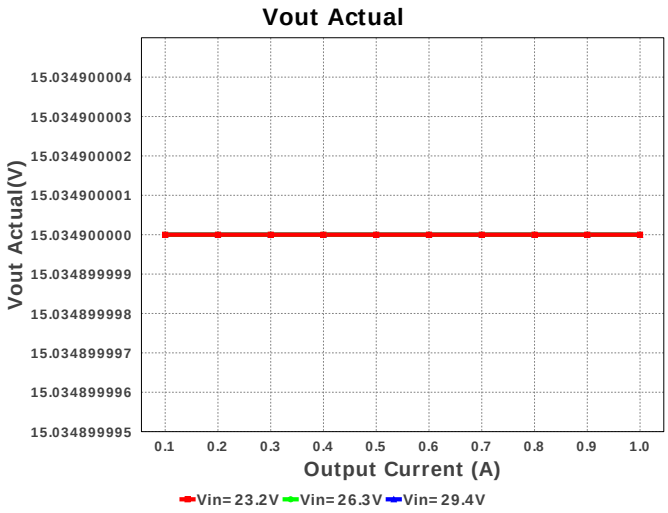


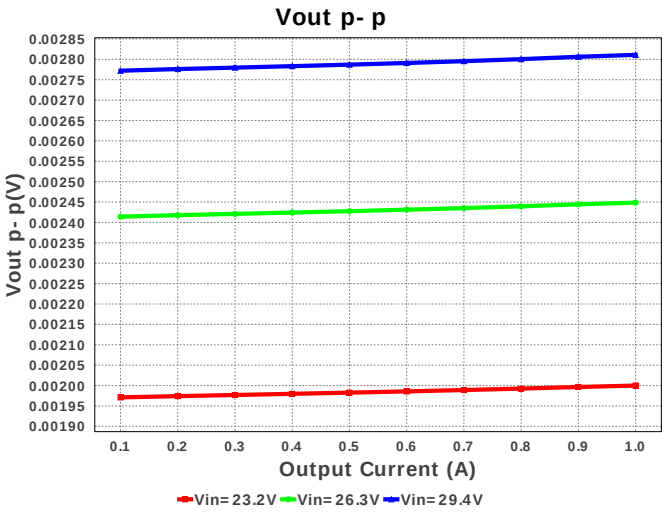


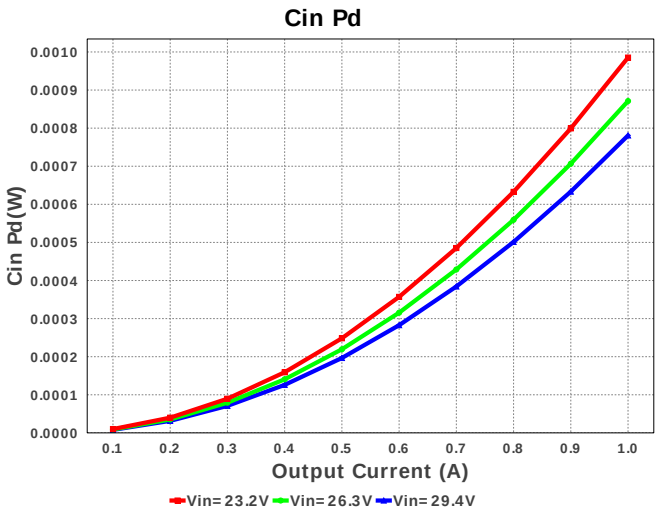


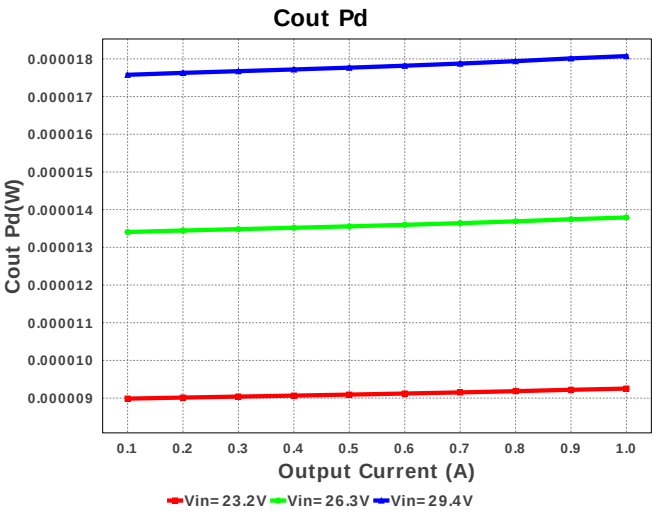


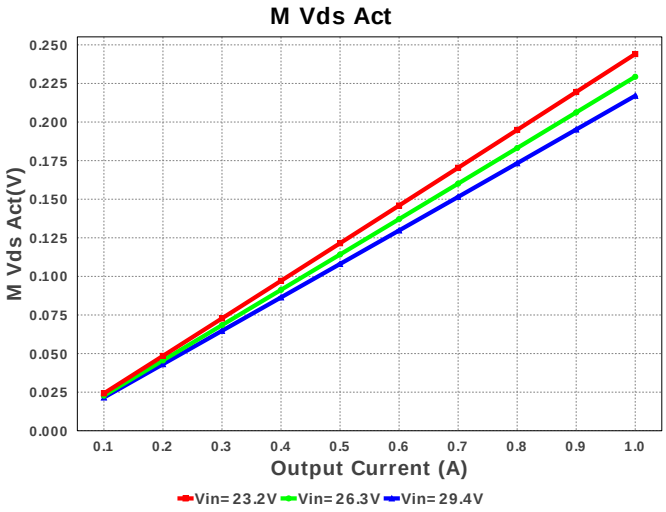


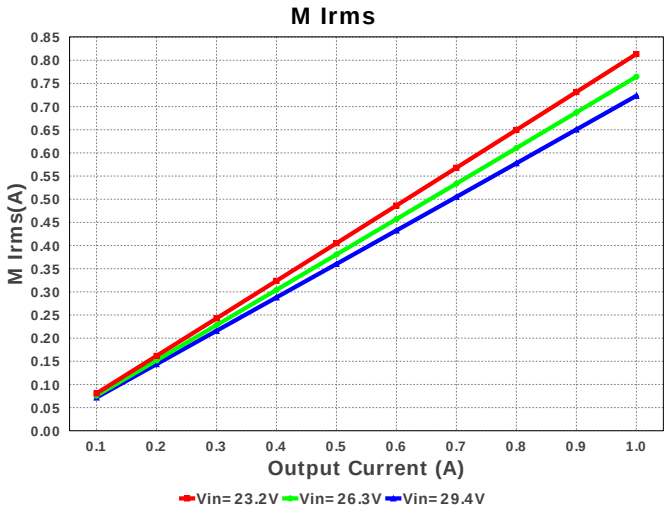


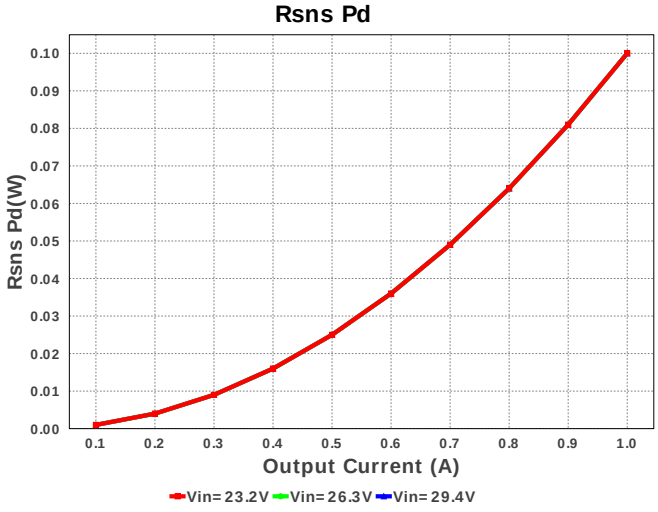


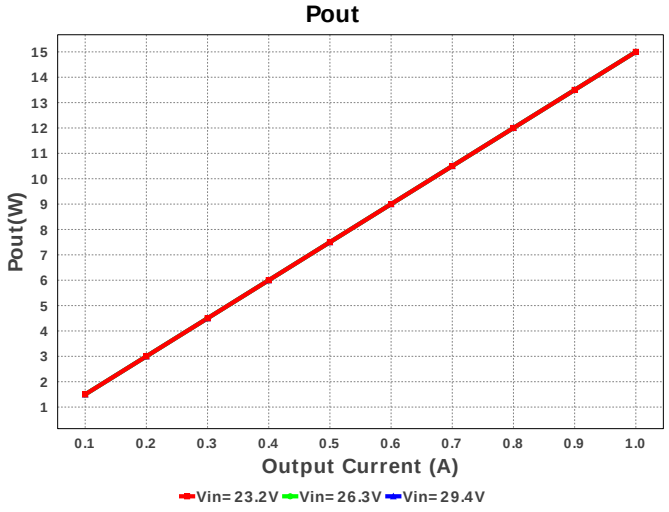


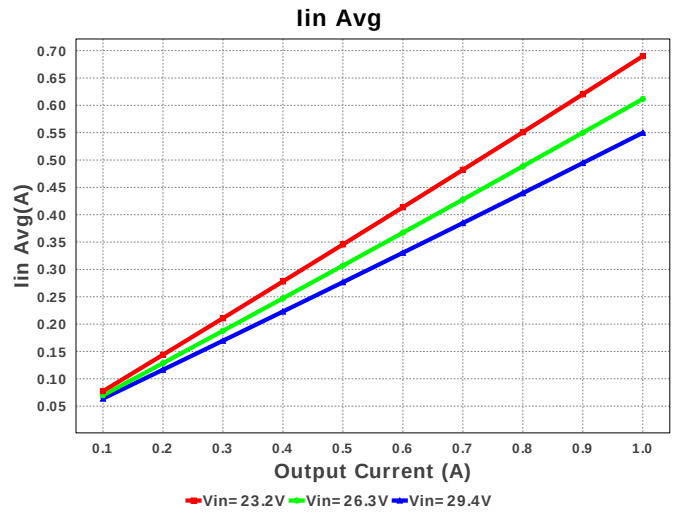


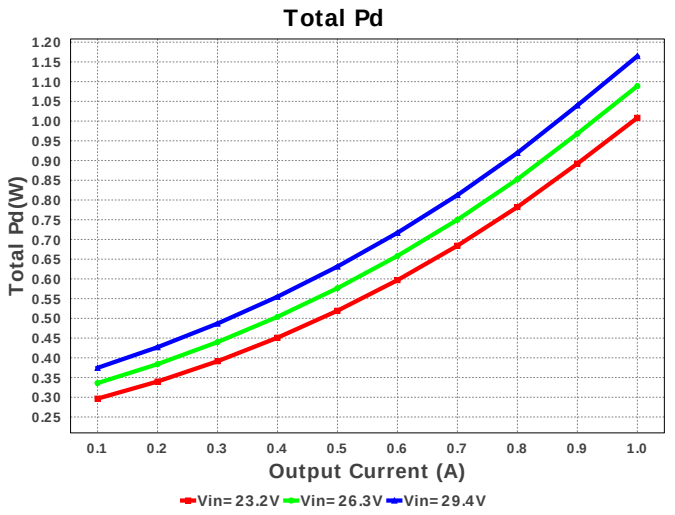


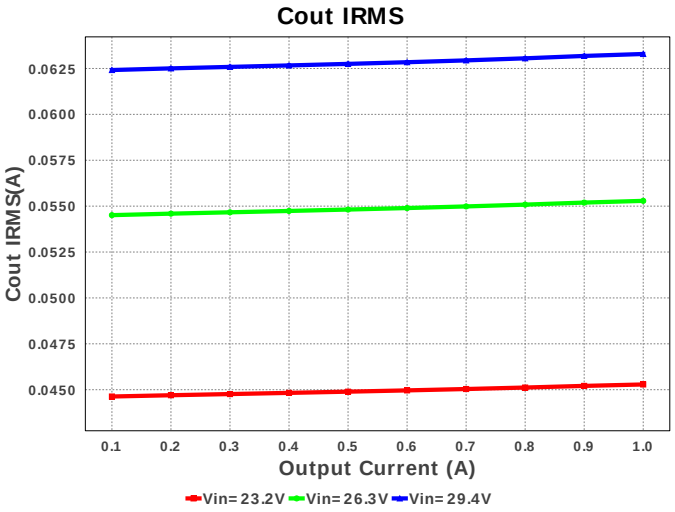


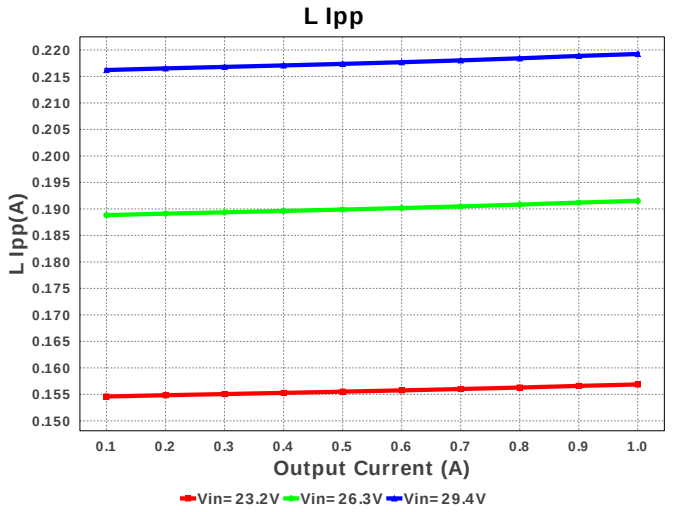


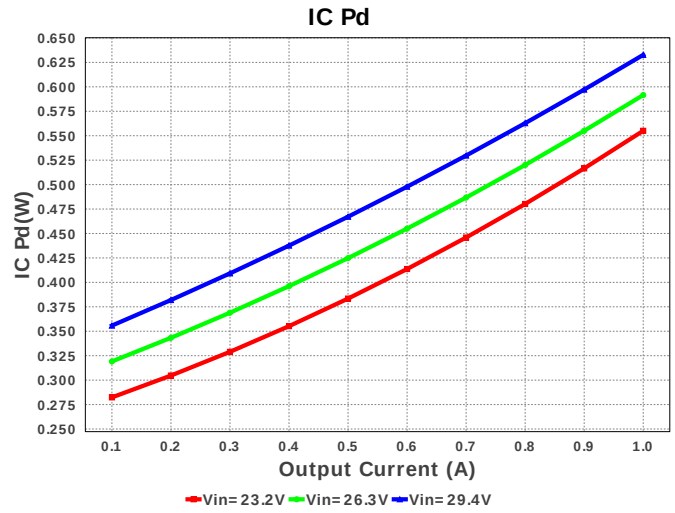


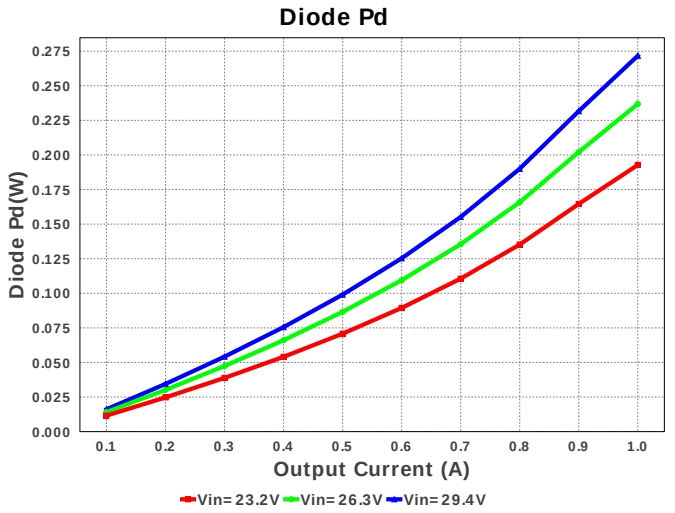












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	421.152 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	63.29 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.11 A	Current	Peak switch current in IC
4.	Iin Avg	549.82 mA	Current	Average input current
5.	L Ipp	219.24 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	723.401 mA	Current	Q Iavg
7.	BOM Count	13	General	Total Design BOM count
8.	FootPrint	190.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	1.042 MHz	General	Switching frequency
10.	IC Tolerance	50.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	217.02 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	15.0 W	General	Total output power
13.	Total BOM	$1.9	General	Total BOM Cost
14.	D1 Tj	119.666 degC	Op_Point	D1 junction temperature
15.	Vout Actual	15.035 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	15.0 V	Op_Point	Operational Output Voltage
17.	Duty Cycle	52.331 %	Op_point	Duty cycle
18.	Efficiency	92.795 %	Op_point	Steady state efficiency
19.	IC Tj	65.17 degC	Op_point	IC junction temperature
20.	ICThetaJA	48.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	1.0 A	Op_point	Iout operating point
22.	VIN_OP	29.4 V	Op_point	Vin operating point
23.	Vout p-p	2.811 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	780.778 µW	Power	Input capacitor power dissipation
25.	Cout Pd	18.073 µW	Power	Output capacitor power dissipation
26.	D1 Pd	271.714 mW	Power	Output Diode Power Dissipation
27.	Diode Pd	271.714 mW	Power	Diode power dissipation
28.	IC Pd	732.698 mW	Power	IC power dissipation
29.	L Pd	159.5 mW	Power	Inductor power dissipation
30.	Rsns Pd	33.66 mW	Power	Current Limit Sense Resistor Power Dissipation
31.	Total Pd	1.198 W	Power	Total Power Dissipation
32.	Vout Tolerance	3.708 %		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	29.4	Maximum input voltage
3.	VinMin	23.2	Minimum input voltage
4.	Vout	15.0	Output Voltage
5.	base_pn	LM25011-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	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.