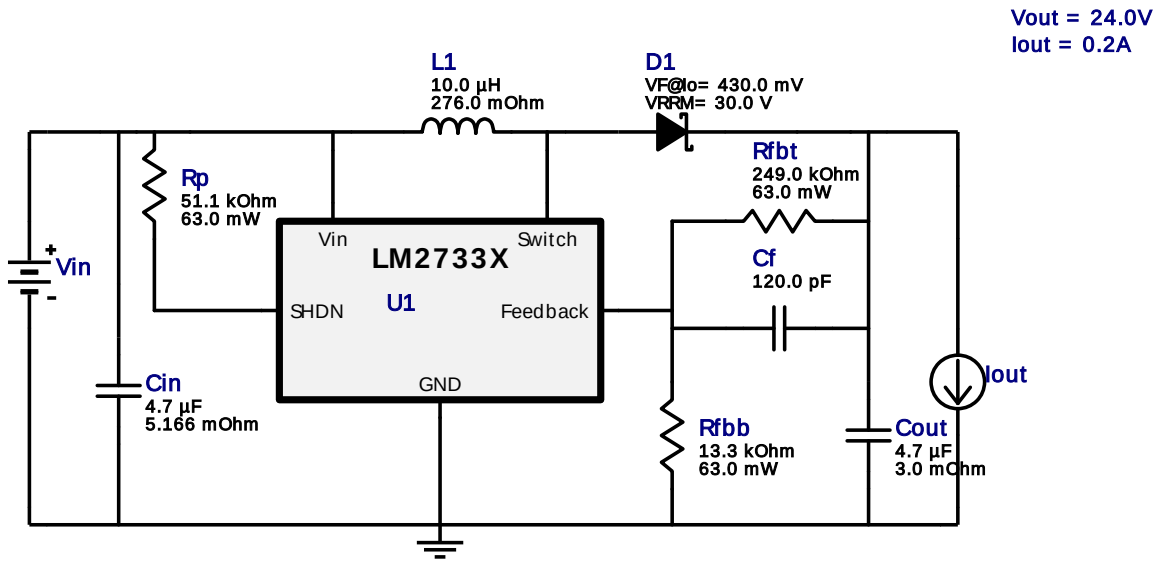
WEBENCH® Design Report

VinMin = 11.0V
VinMax = 13.0V
Vout = 24.0V
Iout = 0.2A

Device = LM2733XMF/NOPB
Topology = Boost
Created = 7/15/16 8:30:19 PM
BOM Cost = $1.18
BOM Count = 9
Total Pd = 0.53W

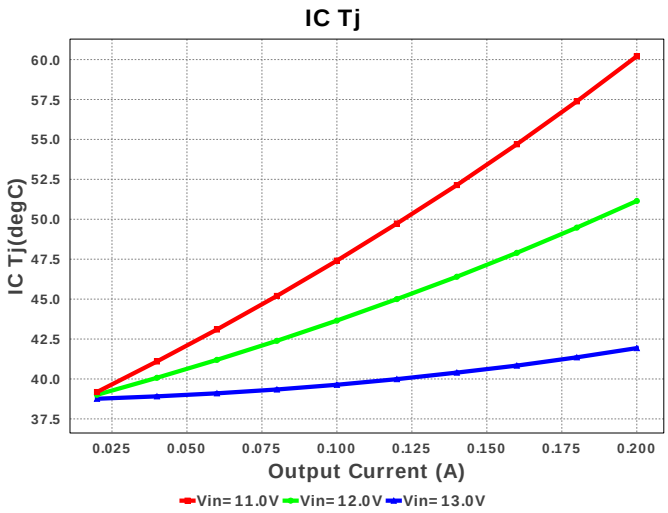
Design : 4742013/32 LM2733XMF/NOPB
LM2733XMF/NOPB 11.0V-13.0V to 24.00V @ 0.2A

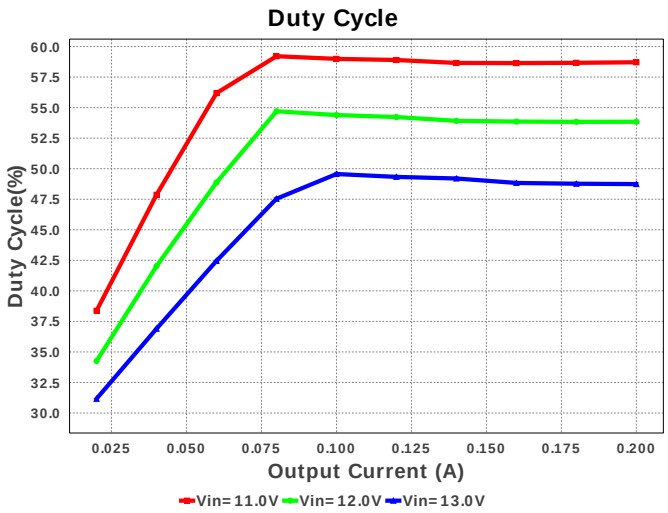


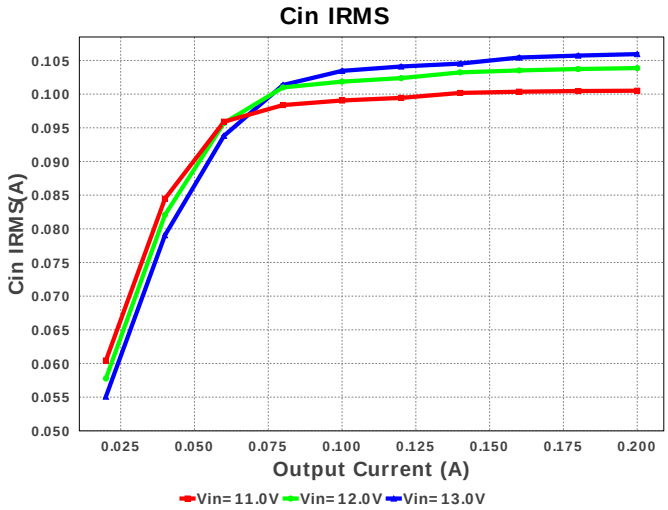
Electrical BOM

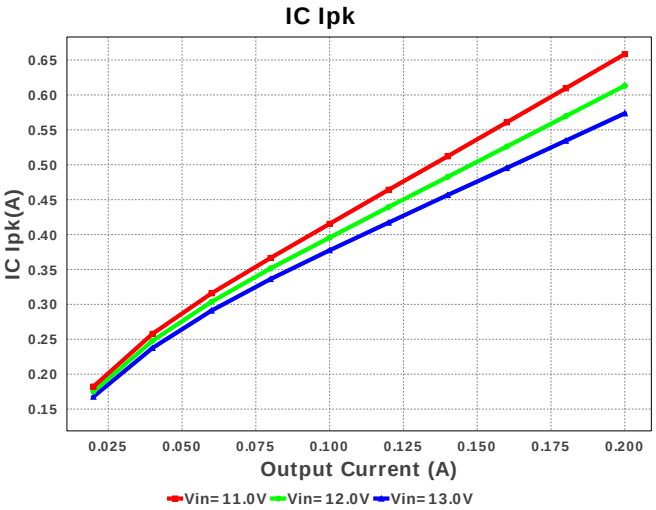
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cf	Samsung Electro-Mechanics	CL21C121JB61PNC Series= C0G/NP0	Cap= 120.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
3.	Cout	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 mm²
4.	D1	ON Semiconductor	MBR0530T1G	VF@Io= 430.0 mV VRRM= 30.0 V	1	$0.06	SOD-123 13 mm²
5.	L1	Bourns	SRN3015-100M	L= 10.0 µH DCR= 276.0 mOhm	1	$0.14	SRN3015 16 mm²
6.	Rfbb	Vishay-Dale	CRCW040213K3FKED Series= CRCW..e3	Res= 13.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW0402249KFKED Series= CRCW..e3	Res= 249.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rp	Vishay-Dale	CRCW040251K1FKED Series= CRCW..e3	Res= 51.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	LM2733XMF/NOPB	Switcher	1	$0.85	MF05A 15 mm²

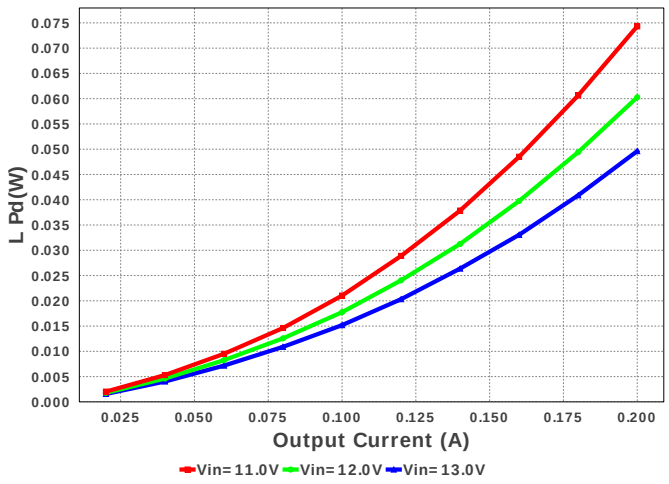




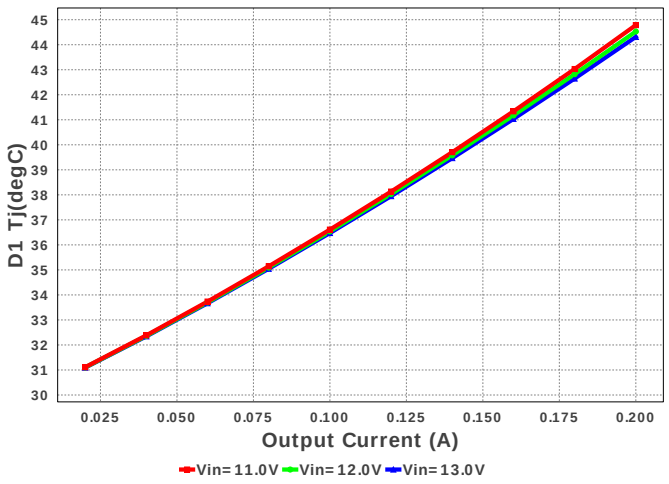




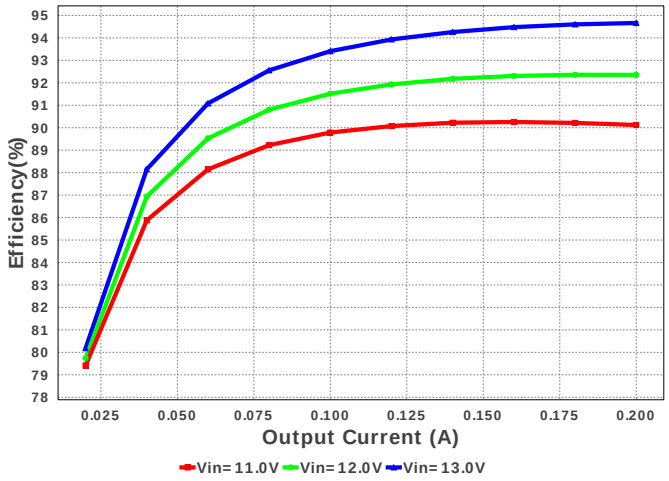
L Pd



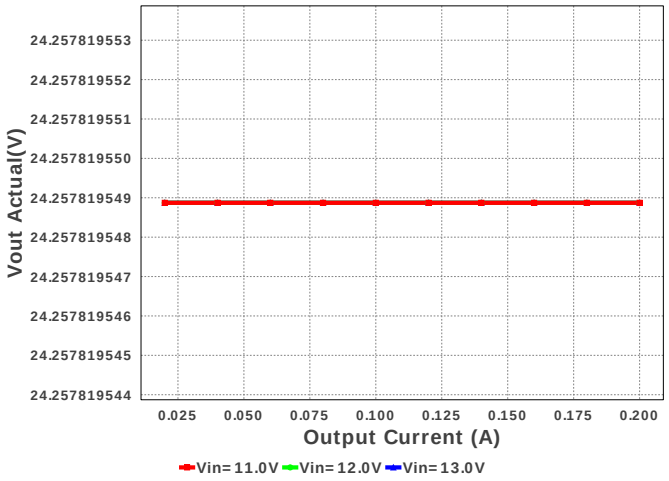
D1 Tj



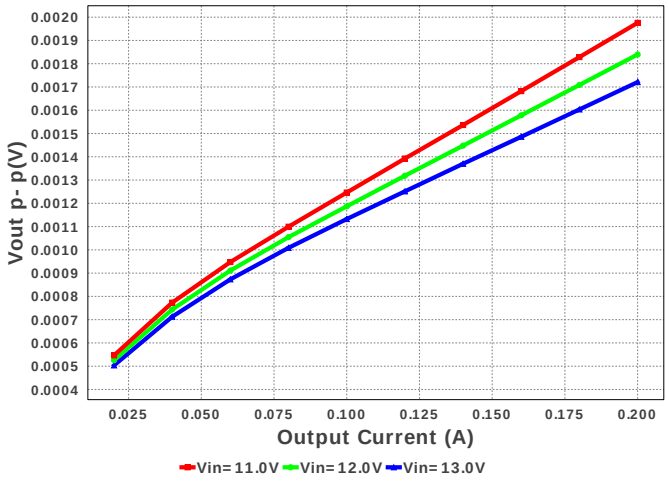
Efficiency



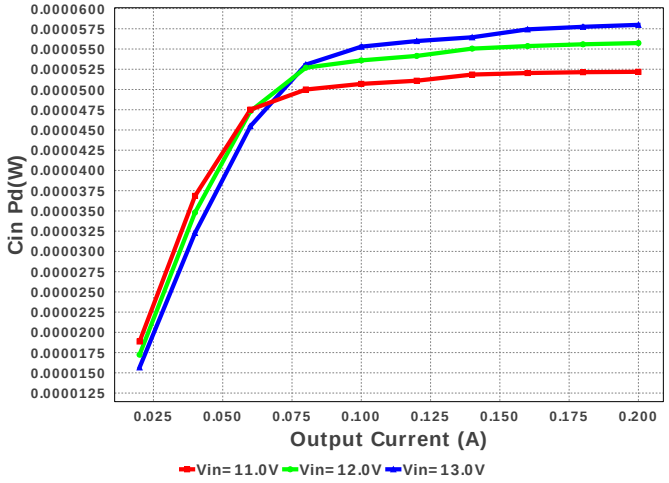
Vout Actual

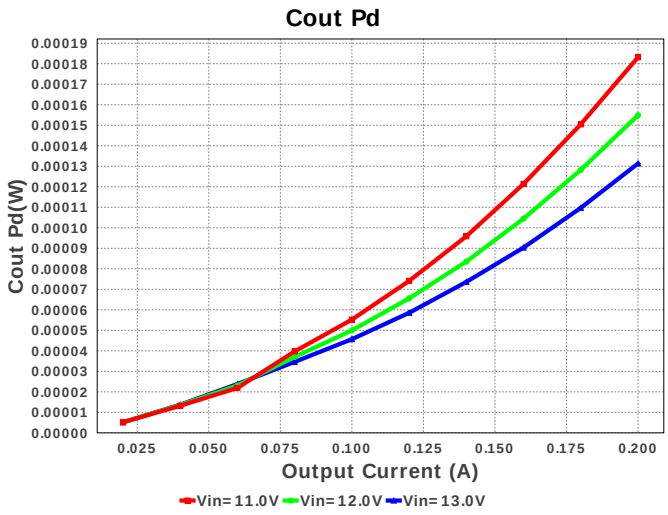


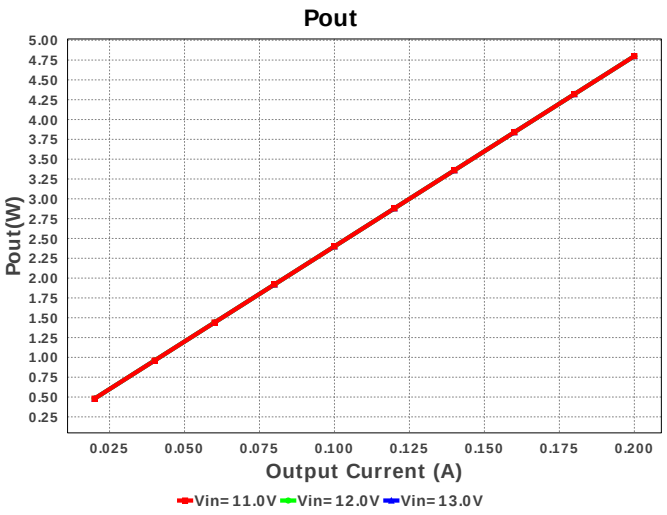
Vout p- p

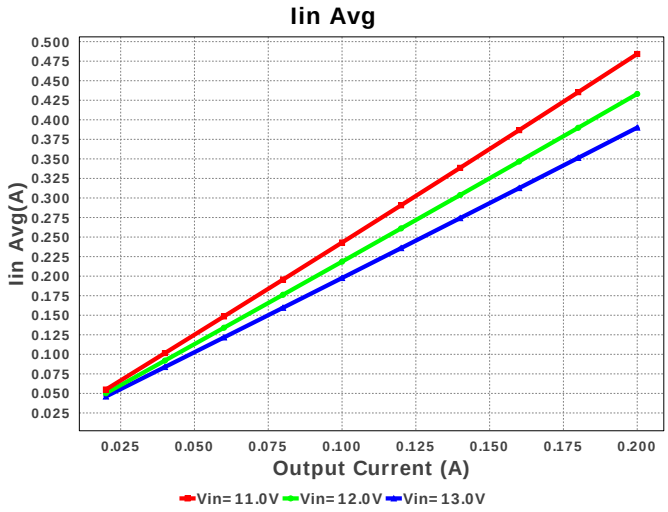


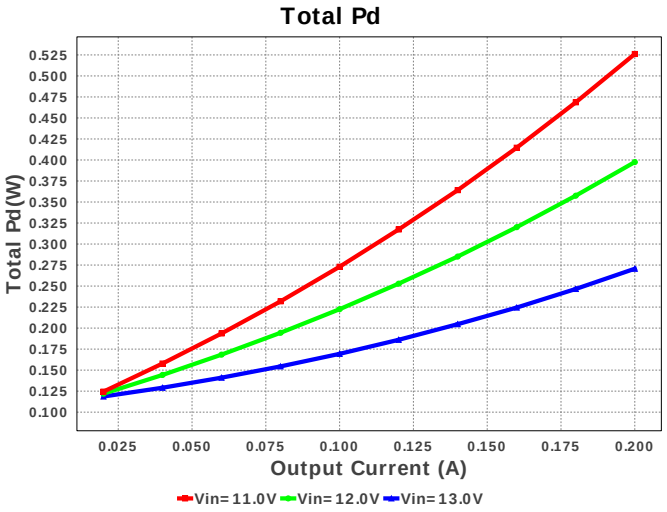
Cin Pd

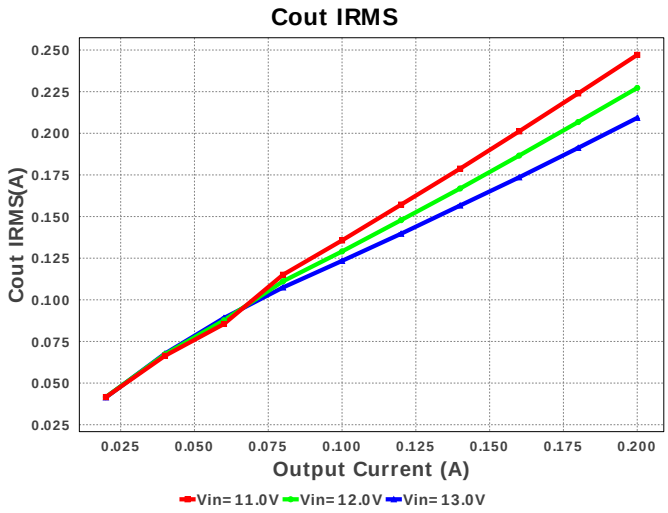


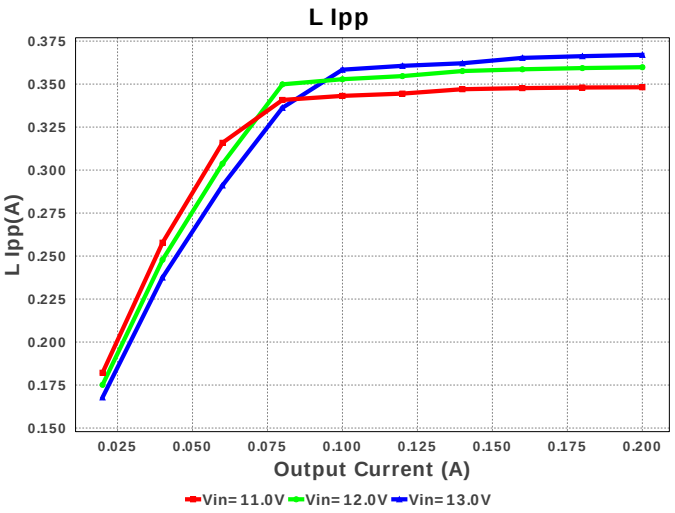


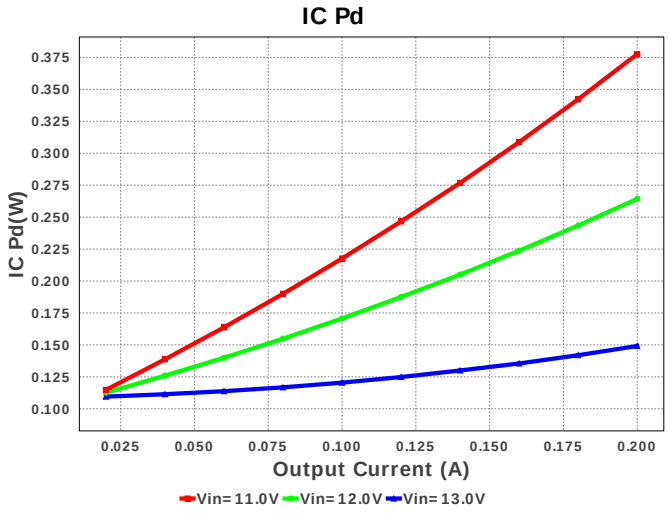


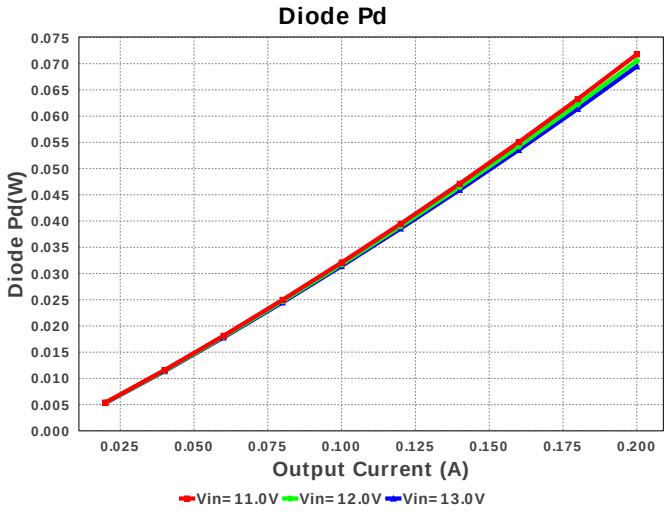












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	100.506 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	247.092 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	658.502 mA	Current	Peak switch current in IC
4.	Iin Avg	484.19 mA	Current	Average input current
5.	L Ipp	348.16 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	78.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	1.6 MHz	General	Switching frequency
9.	Pout	4.8 W	General	Total output power
10.	Total BOM	$1.18	General	Total BOM Cost
11.	D1 Tj	44.784 degC	Op_Point	D1 junction temperature
12.	Vout Actual	24.258 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Duty Cycle	58.714 %	Op_point	Duty cycle
14.	Efficiency	90.122 %	Op_point	Steady state efficiency
15.	IC Tj	60.209 degC	Op_point	IC junction temperature
16.	IOUT_OP	200.0 mA	Op_point	Iout operating point
17.	VIN_OP	11.0 V	Op_point	Vin operating point
18.	Vout p-p	1.976 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	52.184 µW	Power	Input capacitor power dissipation
20.	Cout Pd	183.164 µW	Power	Output capacitor power dissipation
21.	Diode Pd	71.769 mW	Power	Diode power dissipation
22.	IC Pd	377.616 mW	Power	IC power dissipation
23.	L Pd	74.311 mW	Power	Inductor power dissipation
24.	Total Pd	526.111 mW	Power	Total Power Dissipation
25.	Vout Tolerance	3.989 %		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	13.0	Maximum input voltage
3.	VinMin	11.0	Minimum input voltage
4.	Vout	24.0	Output Voltage
5.	base_pn	LM2733X	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM2733X** Product Folder : http://www.ti.com/product/LM2733 : contains the data sheet and other resources.