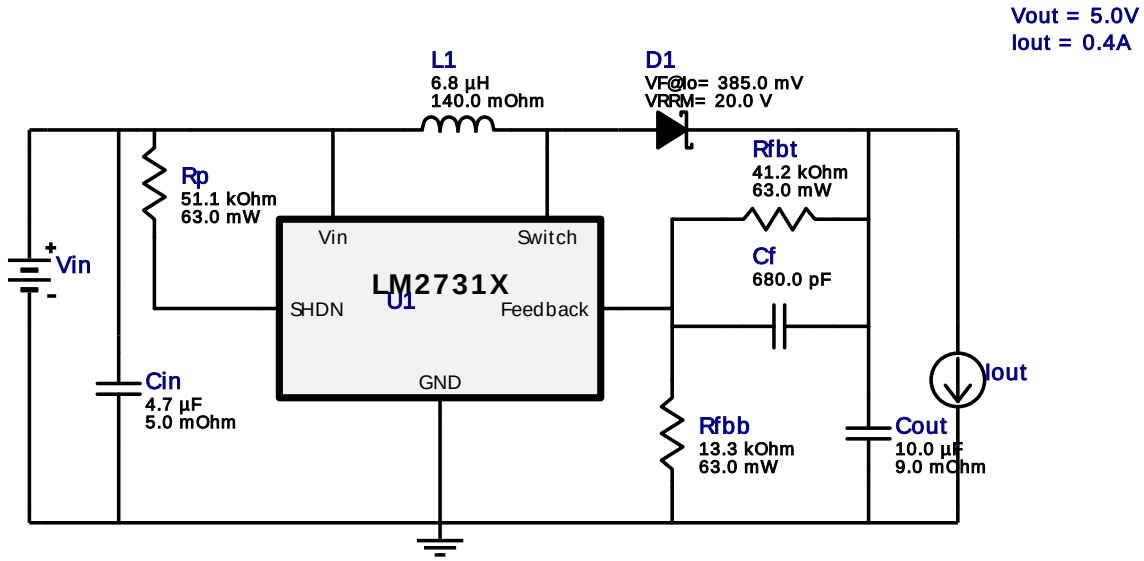
WEBENCH® Design Report

VinMin = 2.7V
VinMax = 4.1V
Vout = 5.0V
Iout = 0.4A

Device = LM2731XMF/NOPB
Topology = Boost
Created = 11/10/16 1:48:03 AM
BOM Cost = $1.11
BOM Count = 9
Total Pd = 0.54W

Design : 3873230/37 LM2731XMF/NOPB
LM2731XMF/NOPB 2.7V-4.1V to 5.00V @ 0.4A



My Comments

No comments

Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cf	Yageo America	CC0805KRX7R9BB681 Series= X7R	Cap= 680.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM188R60J475KE19D Series= X5R	Cap= 4.7 uF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 2.0 A	1	$0.01	0603 5 mm²
3.	Cout	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	$0.02	0603 5 mm²
4.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13 mm²
5.	L1	NIC Components	NPI43C6R8MTRF	L= 6.8 µH DCR= 140.0 mOhm	1	$0.08	IND_NPI43C 31 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	CRCW040241K2FKED Series= CRCW..e3	Res= 41.2 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

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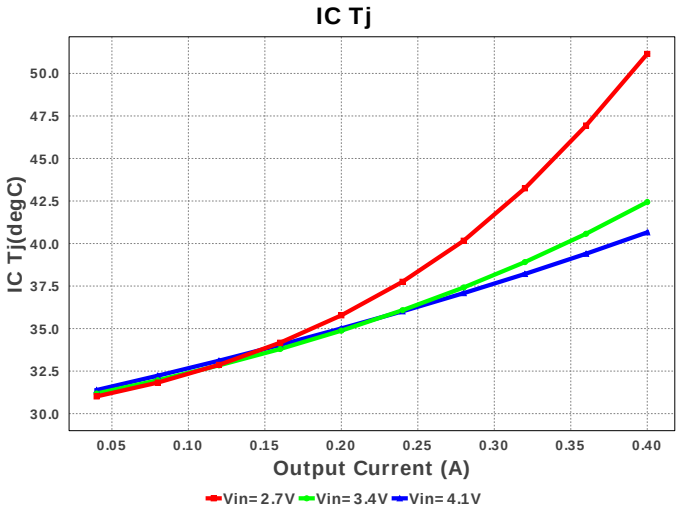
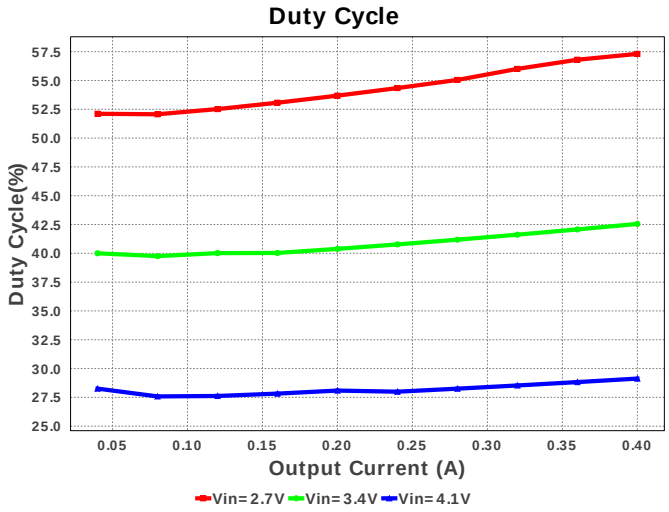
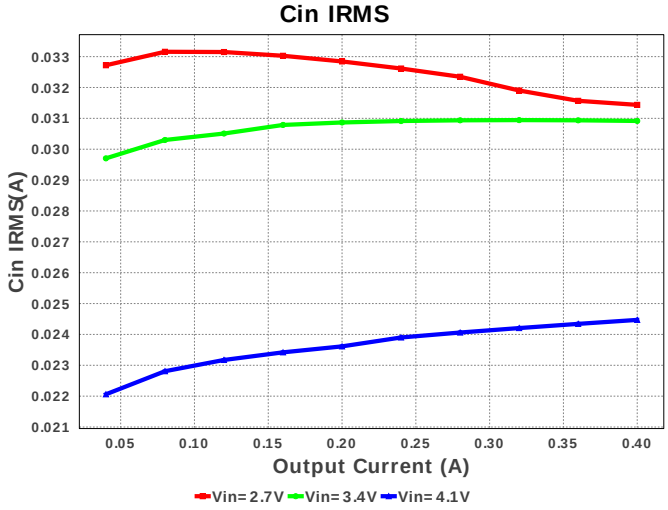
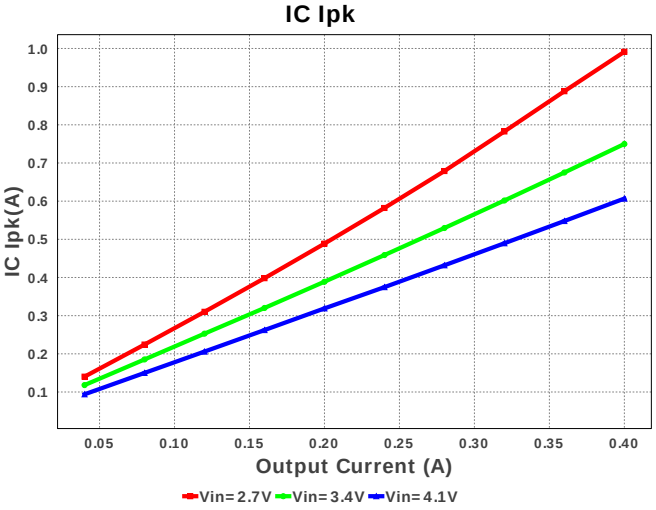
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	LM2731XMF/NOPB	Switcher	1	$0.90	DBV0005A 15 mm²









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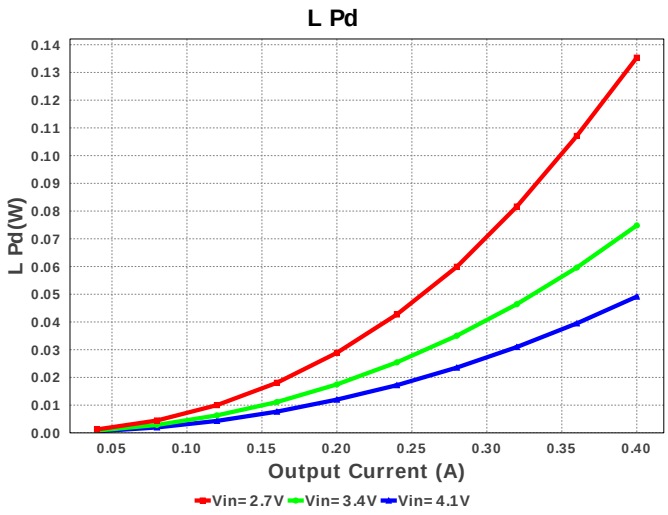

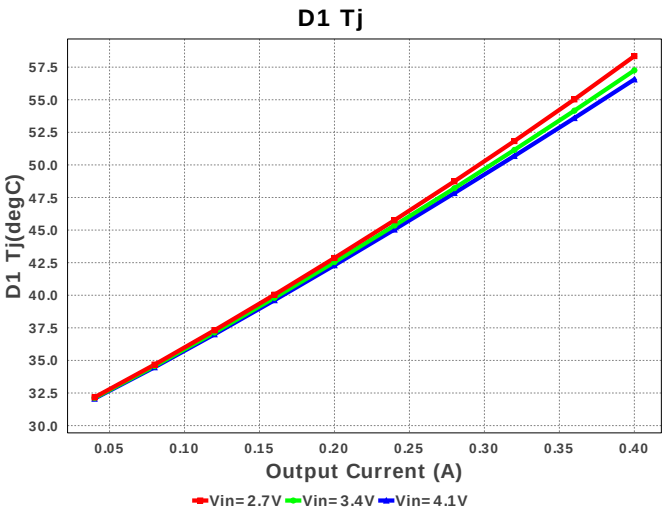

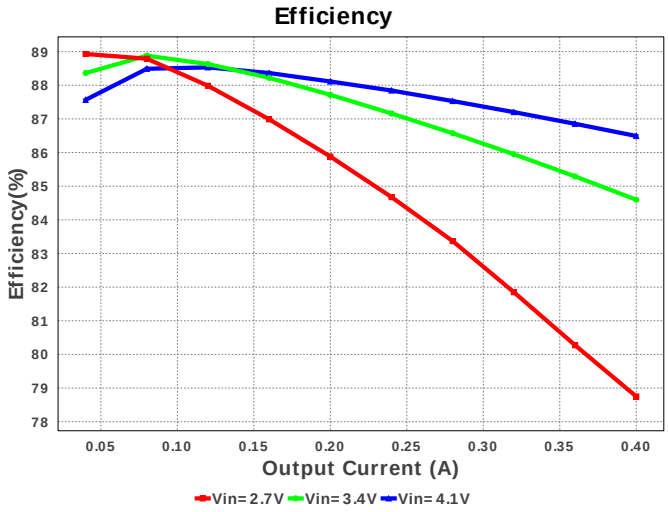

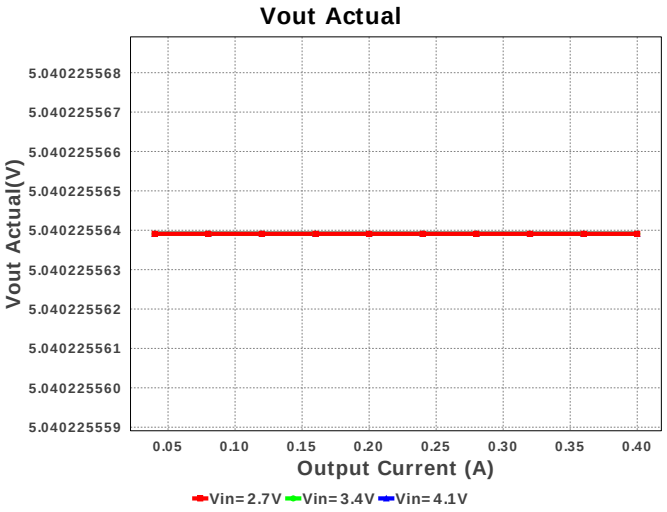

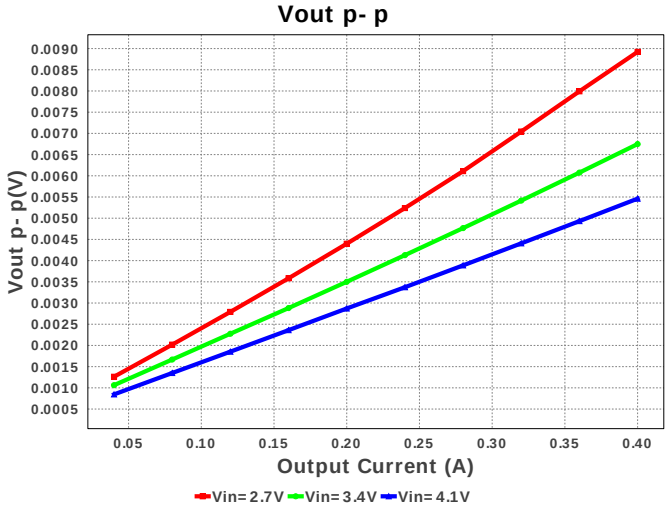

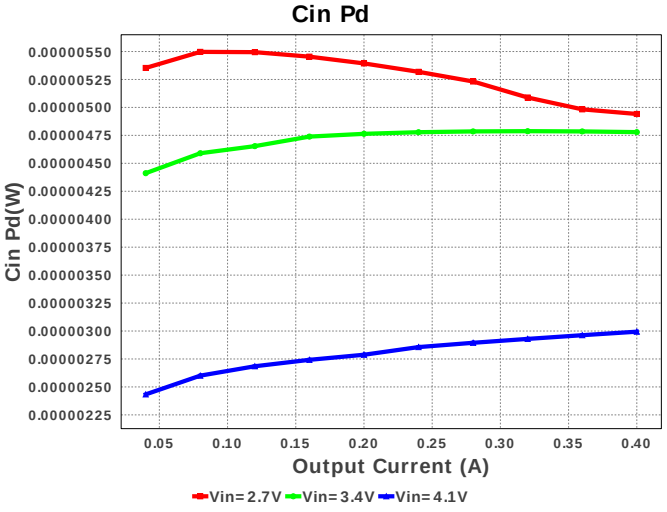

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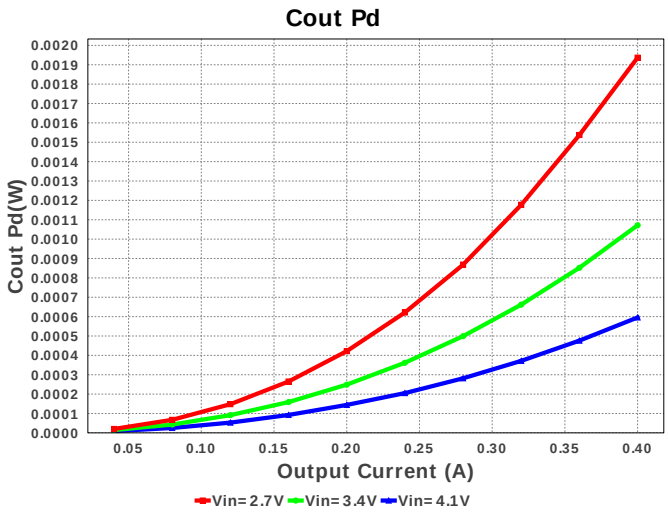

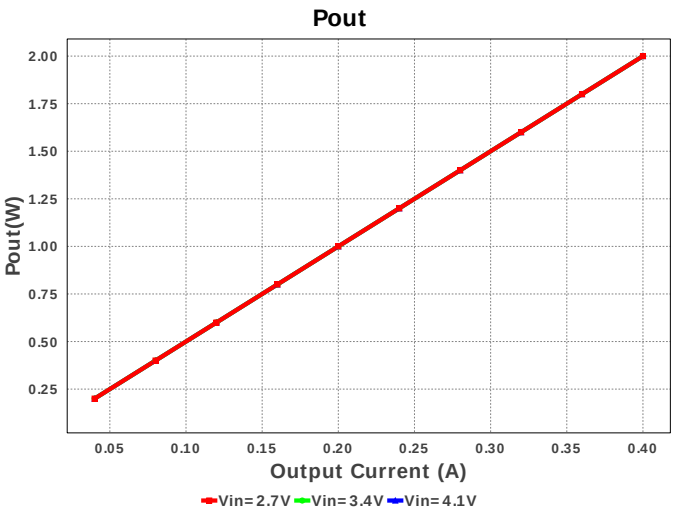

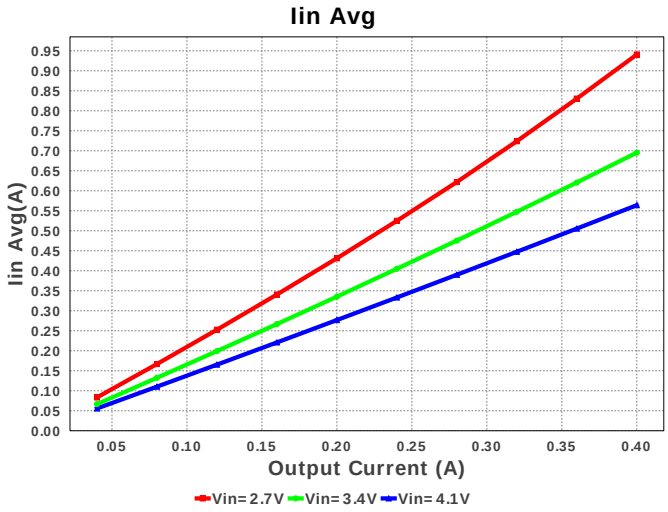

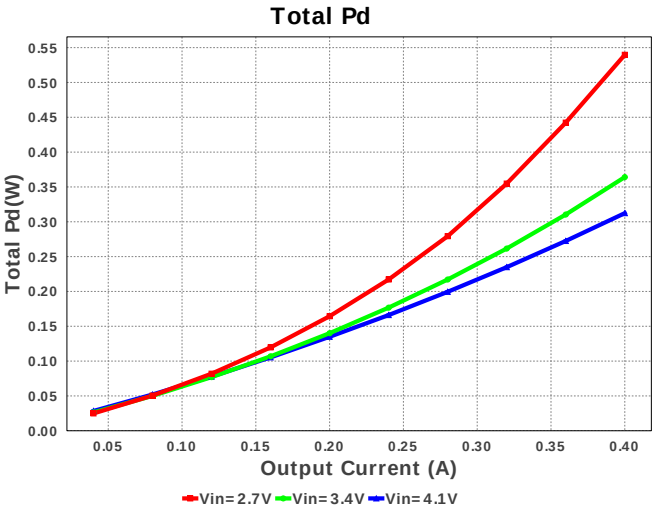

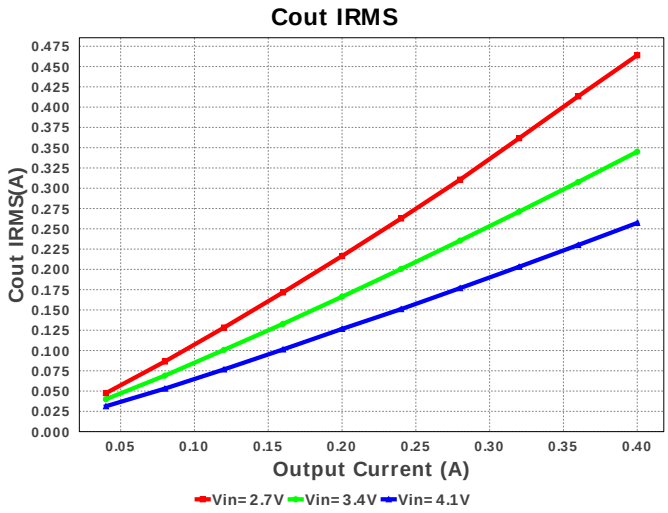

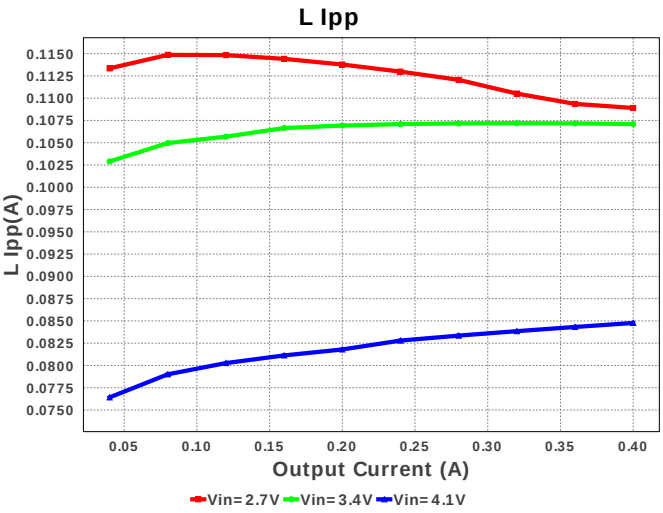

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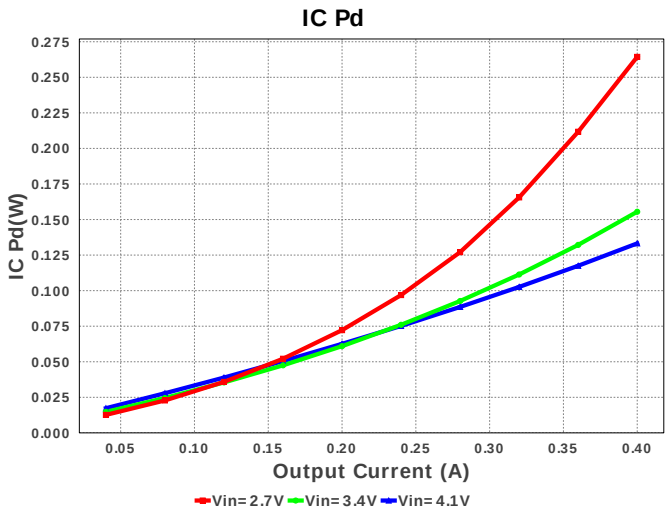

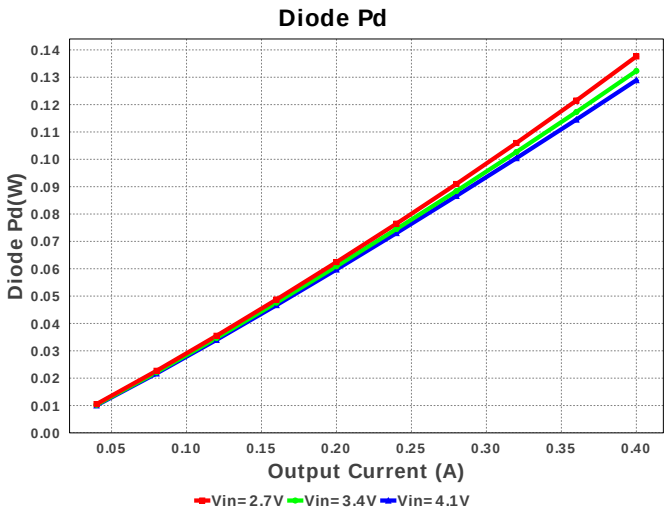

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	31.437 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	463.88 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	991.356 mA	Current	Peak switch current in IC
4.	Iin Avg	940.63 mA	Current	Average input current
5.	L Ipp	108.9 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	84.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	1.6 MHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	2.0 W	General	Total output power
11.	Total BOM	$1.11	General	Total BOM Cost
12.	D1 Tj	58.348 degC	Op_Point	D1 junction temperature
13.	Vout Actual	5.04 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
14.	Duty Cycle	57.306 %	Op_point	Duty cycle
15.	Efficiency	78.749 %	Op_point	Steady state efficiency
16.	IC Tj	51.149 degC	Op_point	IC junction temperature
17.	IOUT_OP	400.0 mA	Op_point	Iout operating point
18.	VIN_OP	2.7 V	Op_point	Vin operating point
19.	Vout p-p	8.922 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	4.941 µW	Power	Input capacitor power dissipation
21.	Cout Pd	1.937 mW	Power	Output capacitor power dissipation
22.	Diode Pd	137.614 mW	Power	Diode power dissipation
23.	IC Pd	264.363 mW	Power	IC power dissipation
24.	L Pd	135.332 mW	Power	Inductor power dissipation
25.	Total Pd	539.712 mW	Power	Total Power Dissipation
26.	Vout Tolerance	3.591 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	400.0 m	Maximum Output Current
2.	VinMax	4.1	Maximum input voltage
3.	VinMin	2.7	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LM2731X	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM2731X** Product Folder : http://www.ti.com/product/LM2731 : contains the data sheet and other resources.

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