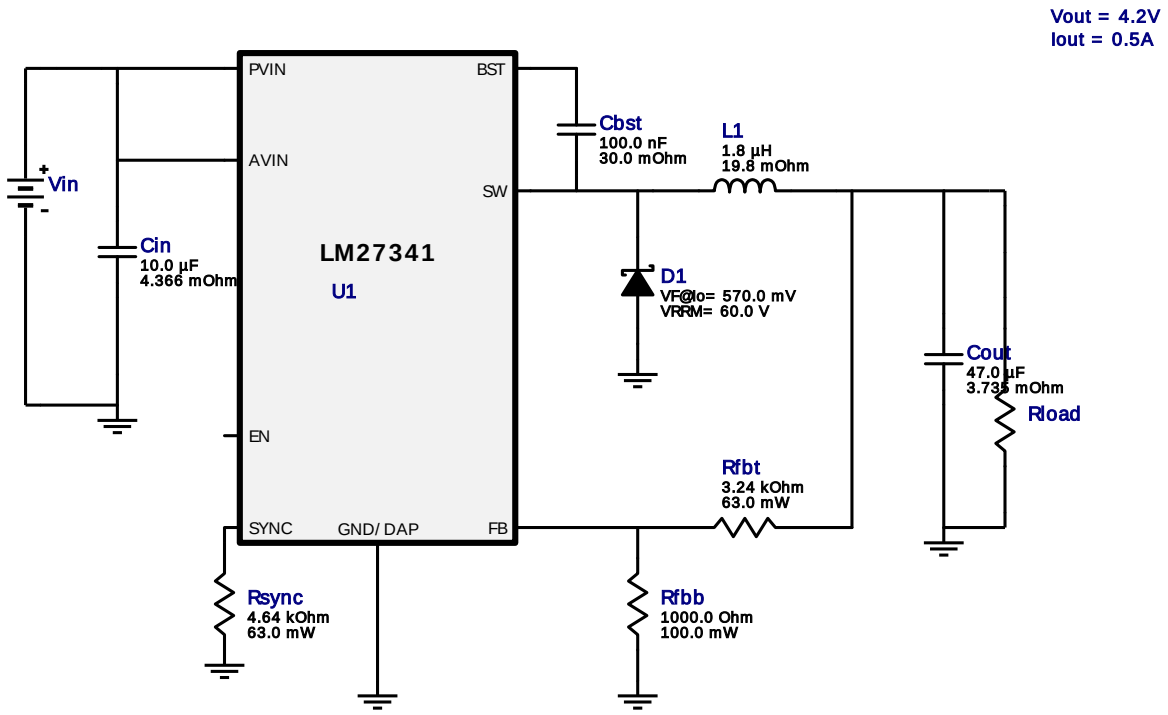
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 14.0V
Vout = 4.2V
Iout = 0.5A

Device = LM27341MY/NOPB
Topology = Buck
Created = 9/4/16 8:00:45 AM
BOM Cost = $1.49
BOM Count = 9
Total Pd = 0.44W

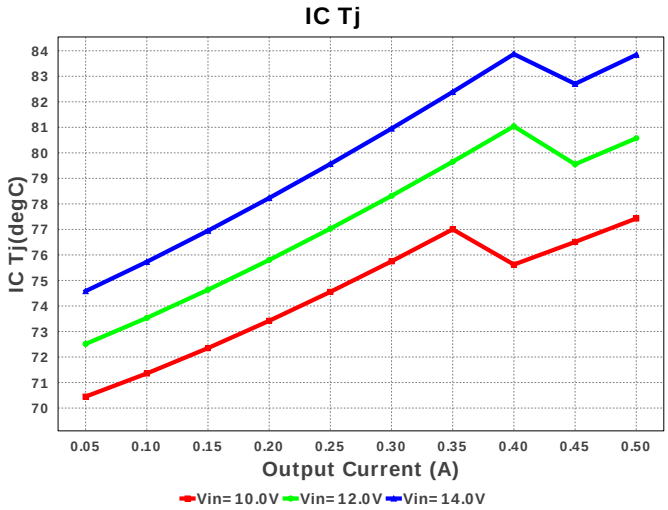
Design : 4009018/153 LM27341MY/NOPB
LM27341MY/NOPB 10.0V-14.0V to 4.20V @ 0.5A

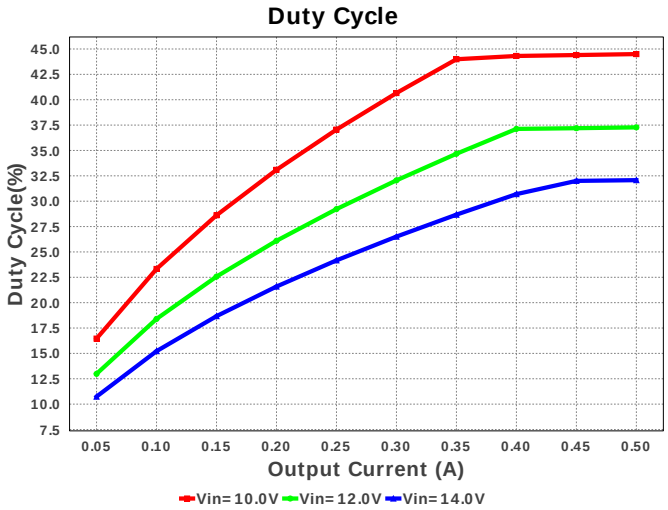


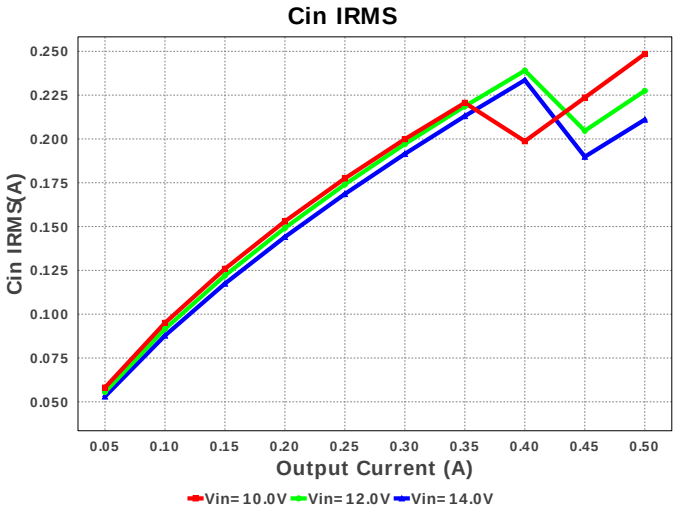
Electrical BOM

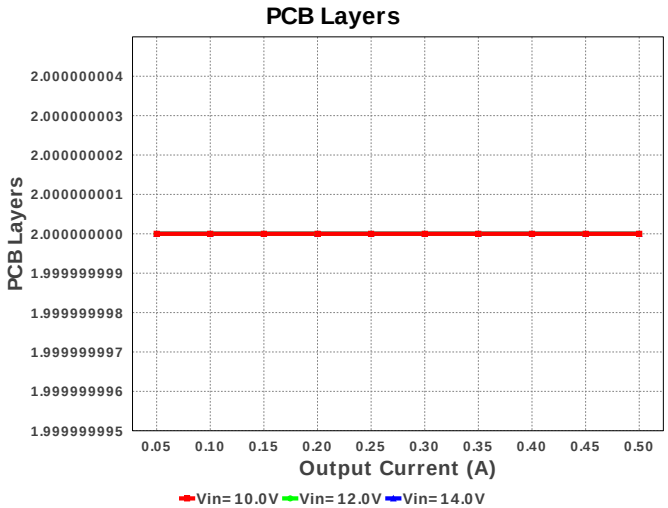
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM188R71C104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 16.0 V IRMS= 1.7 A	1	$0.01	0603 5 mm²
2.	Cin	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.366 mOhm VDC= 25.0 V IRMS= 2.8022 A	1	$0.05	1206_190 11 mm²
3.	Cout	MuRata	GRM31CC80J476KE18L Series= X6S	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.0522 A	1	$0.10	1206_190 11 mm²
4.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	$0.04	SOD-123F 12 mm²
5.	L1	Bourns	SRN6045-1R8Y	L= 1.8 µH DCR= 19.8 mOhm	1	$0.16	SRN6045 64 mm²
6.	Rfbb	Vishay-Dale	CRCW06031K00FKEA Series= CRCW..e3	Res= 1000.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
7.	Rfbt	Vishay-Dale	CRCW04023K24FKED Series= CRCW..e3	Res= 3.24 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

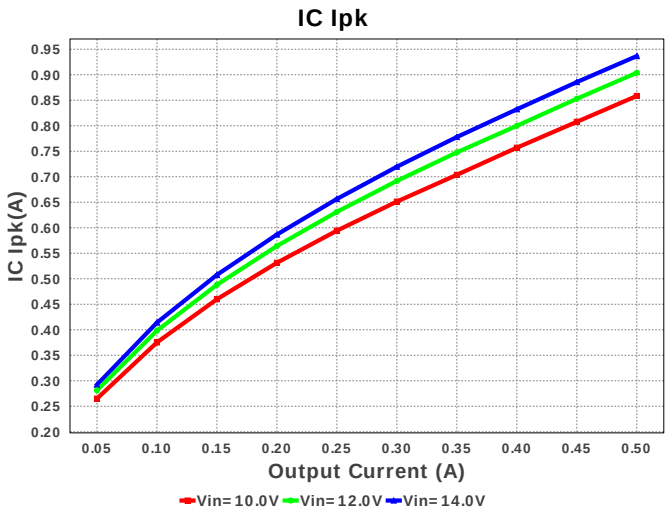
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Rsync	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4.64 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
9.	U1	Texas Instruments	LM27341MY/NOPB	Switcher	1	$1.10	MUC10A 24 mm^2

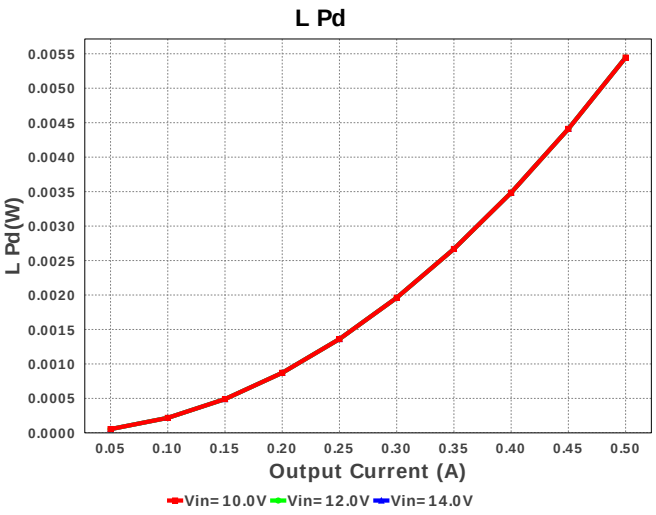


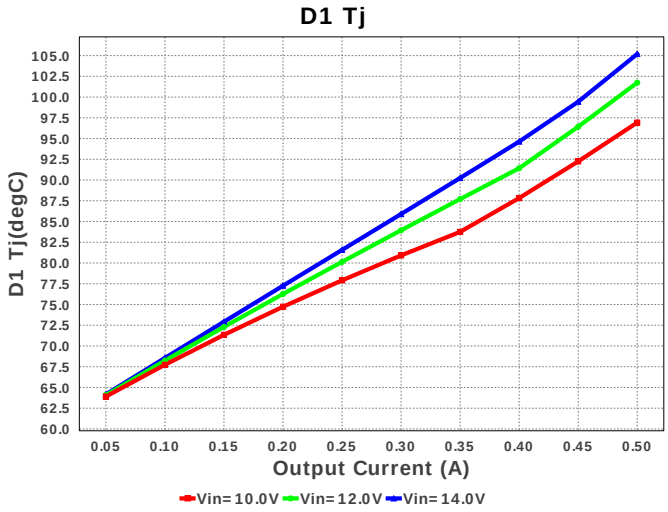


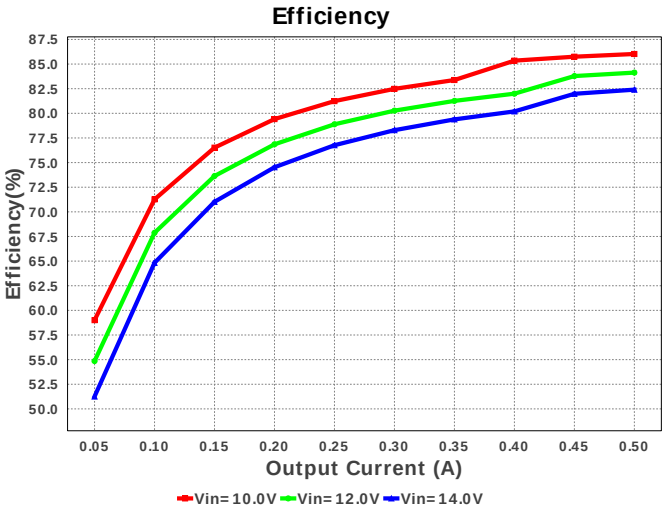


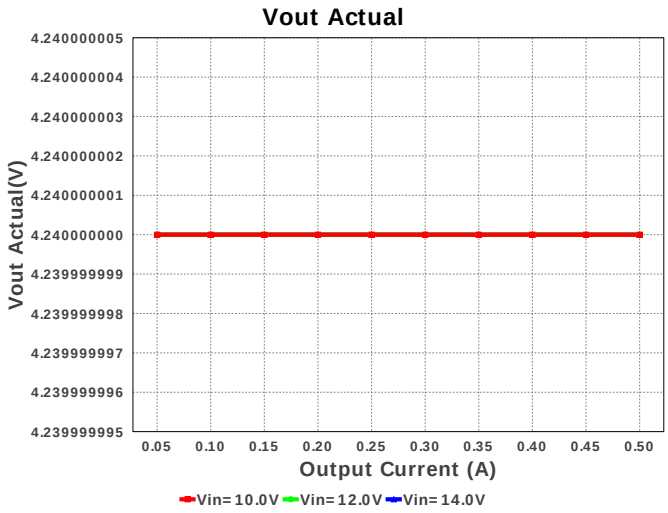


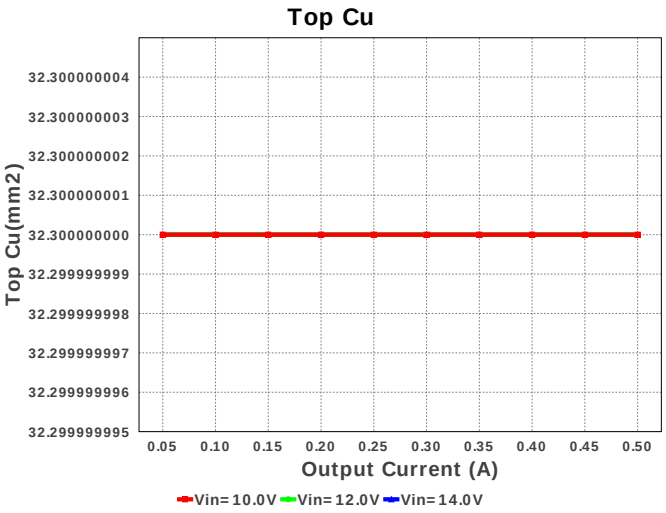


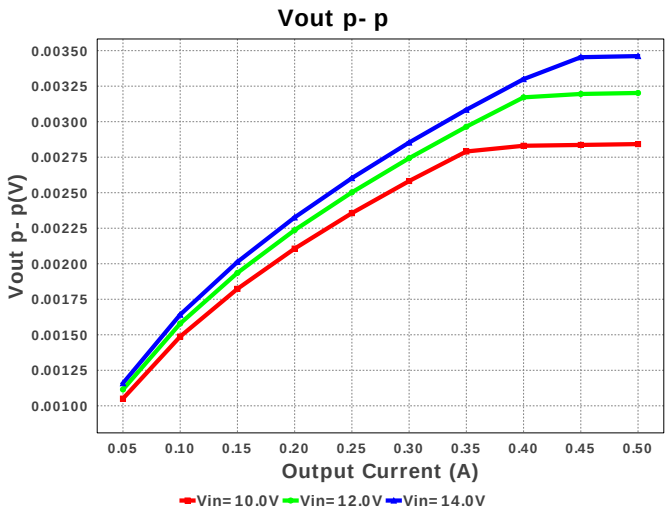


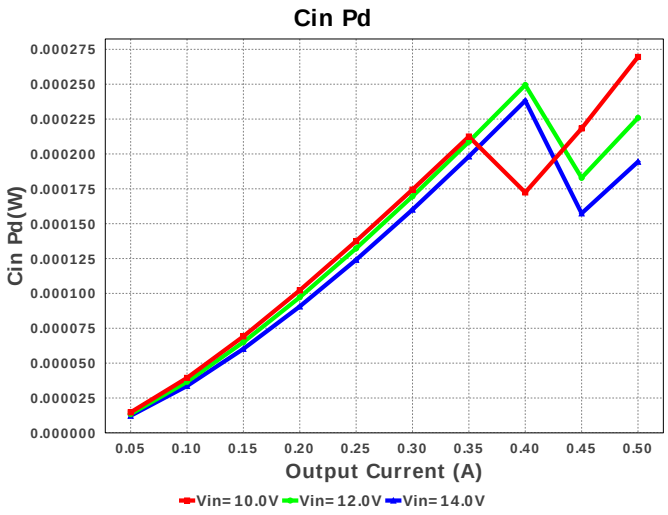


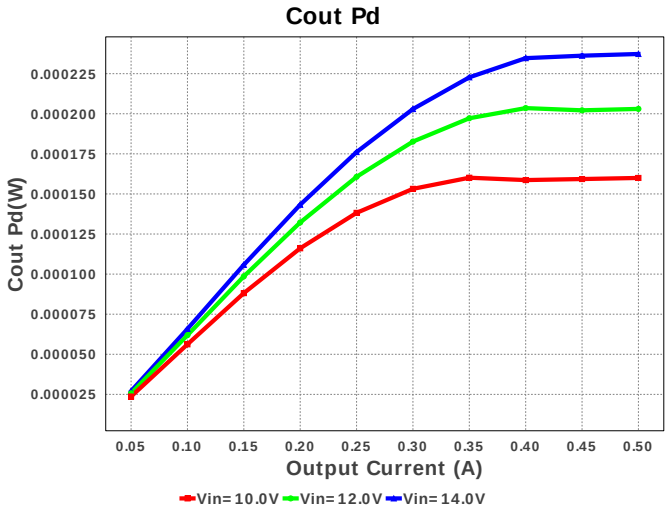


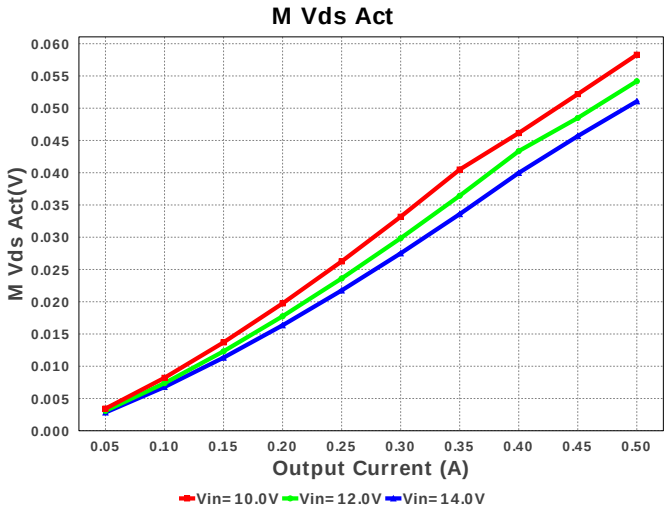


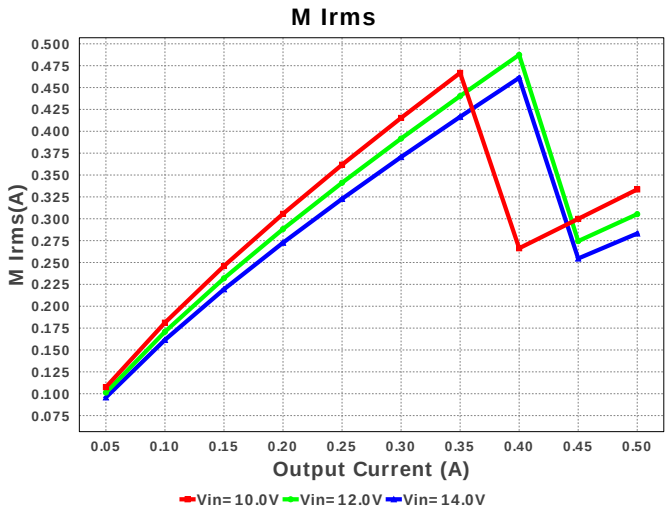


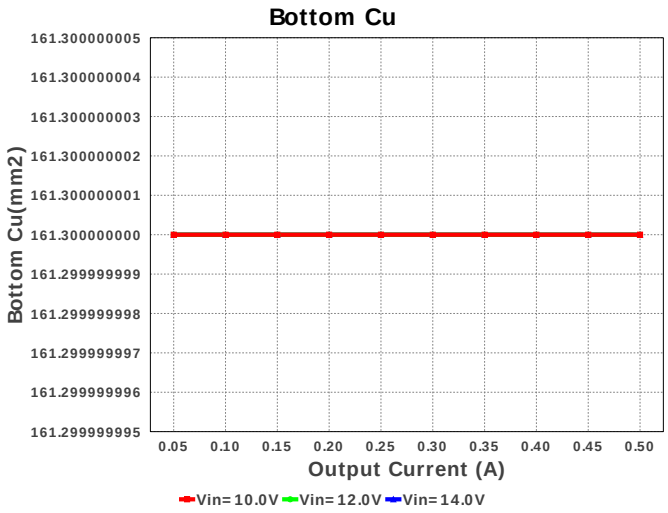


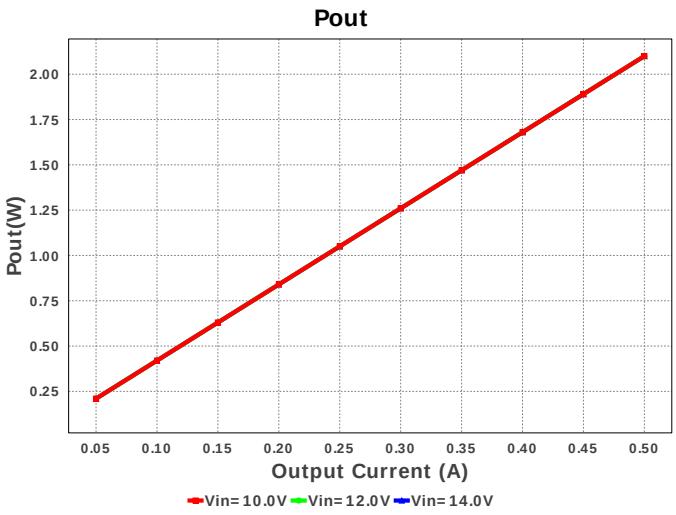


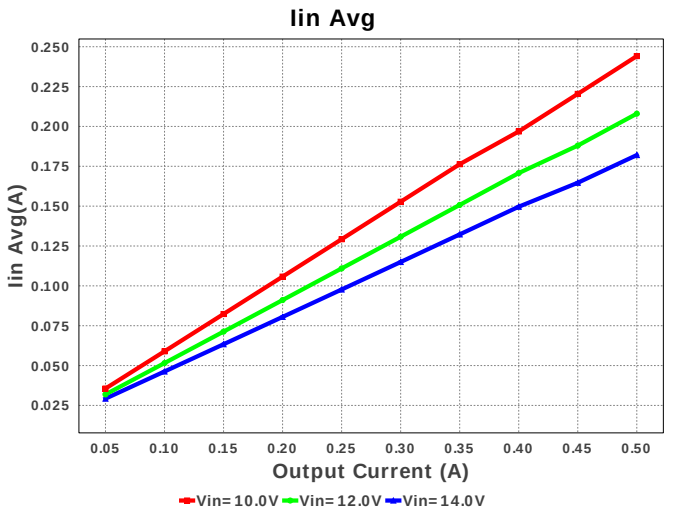


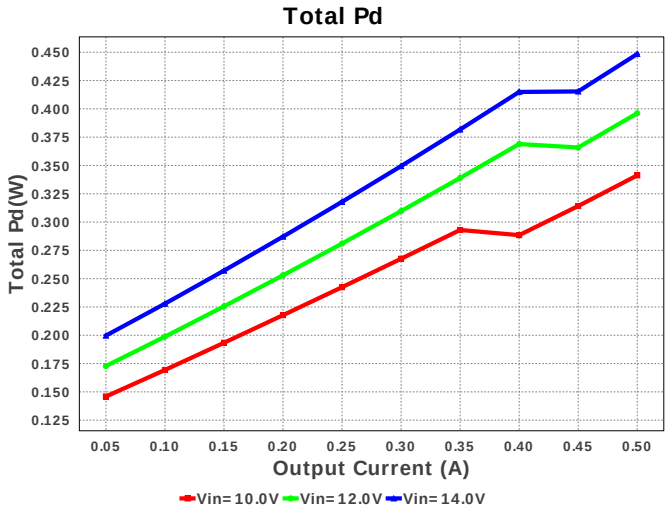


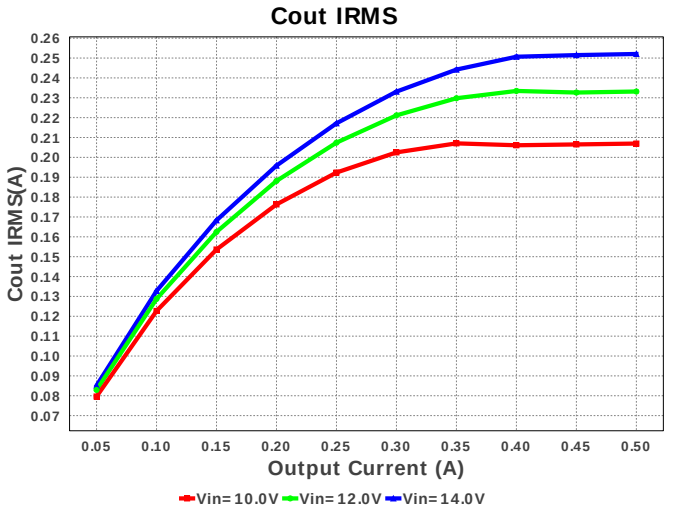


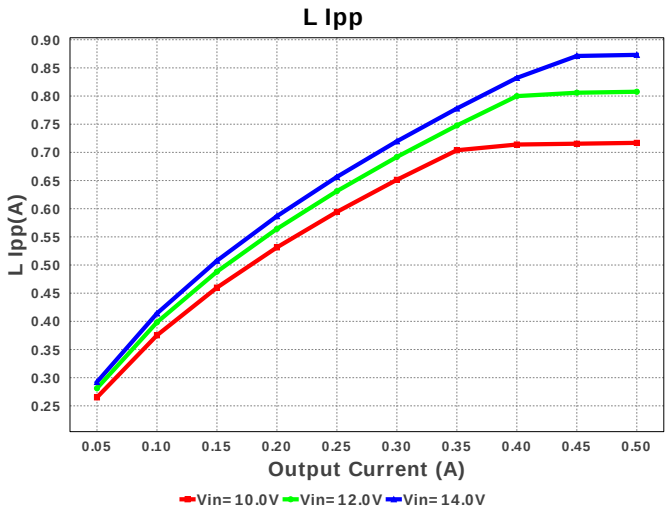


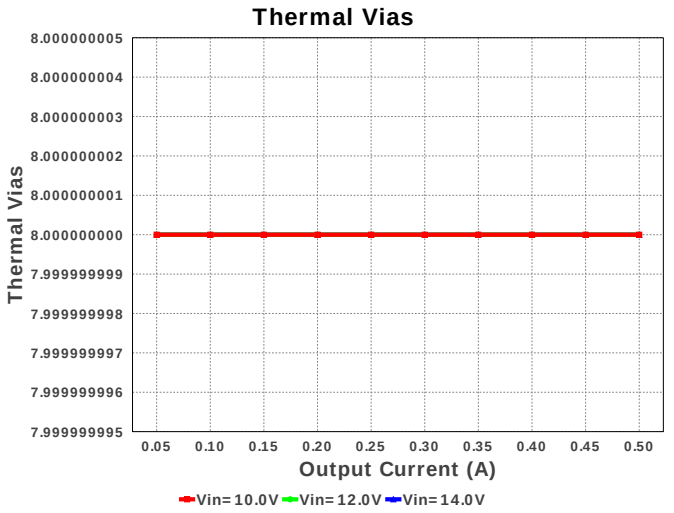


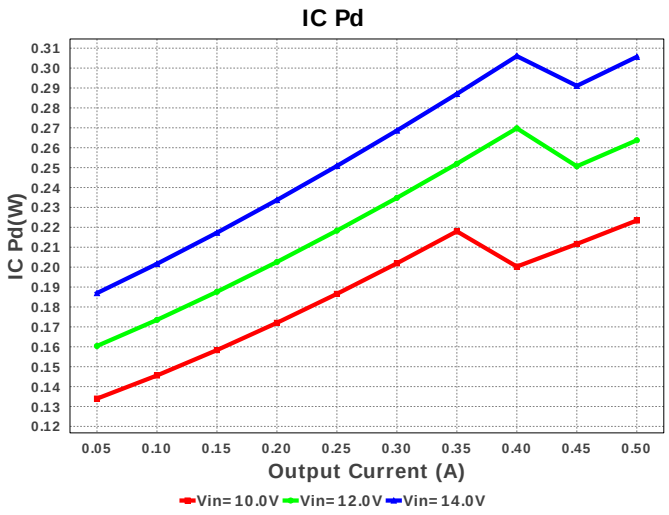


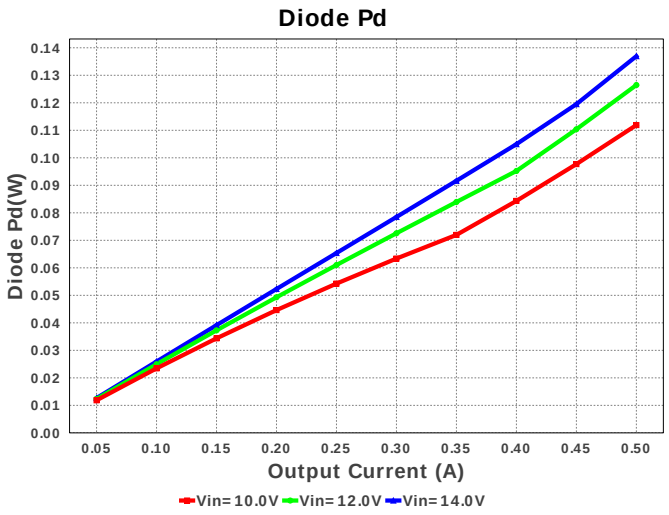












Operating Values

#	Name	Value	Category	Description
1.	Bottom Cu	161.3 mm^2	Board_Layout	Recommended minimum area of bottom layer copper connected to DAP
2.	PCB Layers	2.0	Board_Layout	Recommended number of PCB layers for the necessary IC Thermal Resistance
3.	Thermal Vias	8.0	Board_Layout	Recommended number of 10 mil thermal vias under the IC
4.	Top Cu	32.3 mm^2	Board_Layout	Recommended minimum area of top layer copper connected to DAP
5.	Cin IRMS	210.975 mA	Current	Input capacitor RMS ripple current
6.	Cout IRMS	251.683 mA	Current	Output capacitor RMS ripple current
7.	IC Ipk	935.928 mA	Current	Peak switch current in IC
8.	Iin Avg	181.78 mA	Current	Average input current
9.	L Ipp	871.86 mA	Current	Peak-to-peak inductor ripple current
10.	M Irms	282.964 mA	Current	MOSFET RMS current
11.	BOM Count	9	General	Total Design BOM count
12.	FootPrint	137.0 mm^2	General	Total Foot Print Area of BOM components
13.	Frequency	2.0 MHz	General	Switching frequency
14.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
15.	M Vds Act	48.553 mV	General	Voltage drop across the MosFET
16.	Mode	CCM	General	Conduction Mode
17.	Pout	2.1 W	General	Total output power
18.	Total BOM	$1.49	General	Total BOM Cost
19.	D1 Tj	104.266 degC	Op_Point	D1 junction temperature
20.	Vout Actual	4.24 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
21.	Vout OP	4.2 V	Op_Point	Operational Output Voltage
22.	Duty Cycle	32.027 %	Op_point	Duty cycle
23.	Efficiency	82.516 %	Op_point	Steady state efficiency
24.	IC Tj	73.722 degC	Op_point	IC junction temperature
25.	ICThetaJA	45.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
26.	IOUT_OP	500.0 mA	Op_point	Iout operating point
27.	VIN_OP	14.0 V	Op_point	Vin operating point
28.	Vout Act	4.24 V	Op_point	Achieved Vout with feedback resistor pair
29.	Vout p-p	3.457 mV	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	194.332 µW	Power	Input capacitor power dissipation
31.	Cout Pd	236.591 µW	Power	Output capacitor power dissipation
32.	Diode Pd	134.14 mW	Power	Diode power dissipation
33.	IC Pd	304.939 mW	Power	IC power dissipation
34.	L Pd	5.445 mW	Power	Inductor power dissipation
35.	Total Pd	444.954 mW	Power	Total Power Dissipation
36.	Vout Tolerance	2.559 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	14.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	4.2	Output Voltage
5.	base_pn	LM27341	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	60.0	Ambient temperature

Design Assistance

1. LM27341 Product Folder : http://www.ti.com/product/LM27341 : contains the data sheet and other resources.