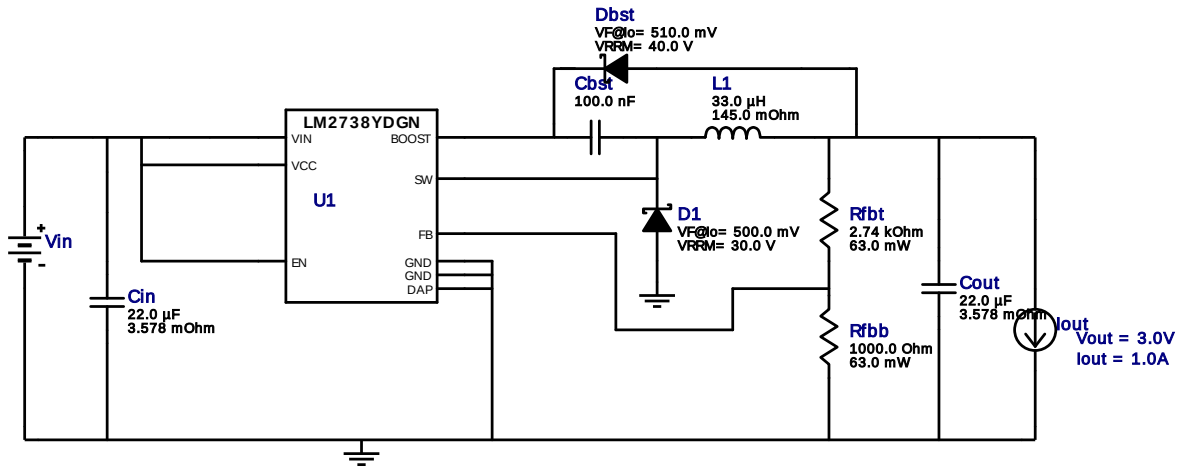
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 19.0V
Vout = 3.0V
Iout = 1.0A

Device = LM2738YMY/NOPB
Topology = Buck
Created = 7/19/16 5:48:59 AM
BOM Cost = $1.68
BOM Count = 9
Total Pd = 0.67W

Design : 4728729/12 LM2738YMY/NOPB
LM2738YMY/NOPB 10.0V-19.0V to 3.00V @ 1.0A

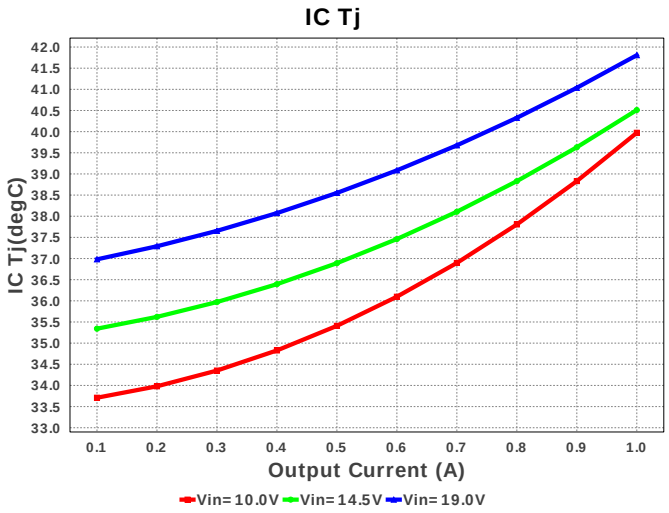


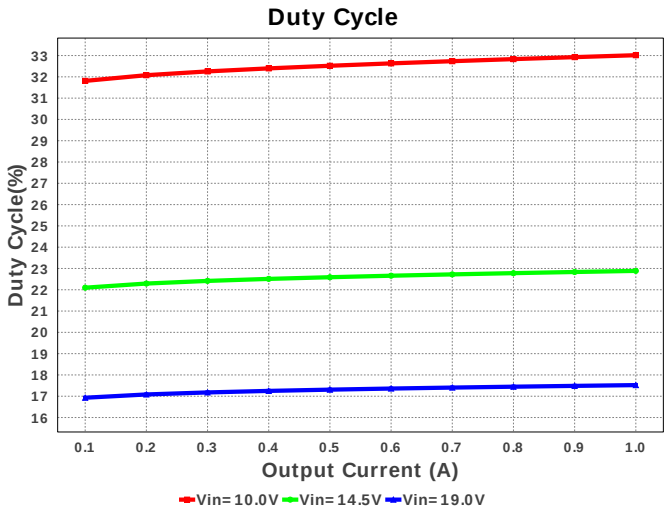
1. The Boost pin voltage must be supplied from a source of less than 5.5V. Recommended methods are described in the LM2734 datasheet Application Information.

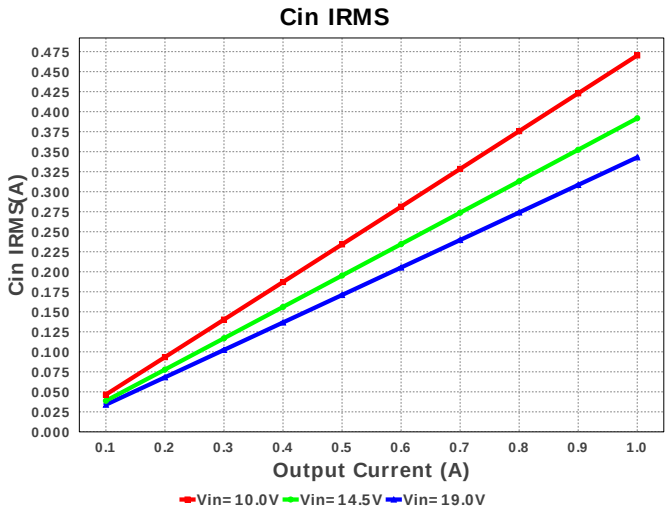
Electrical BOM

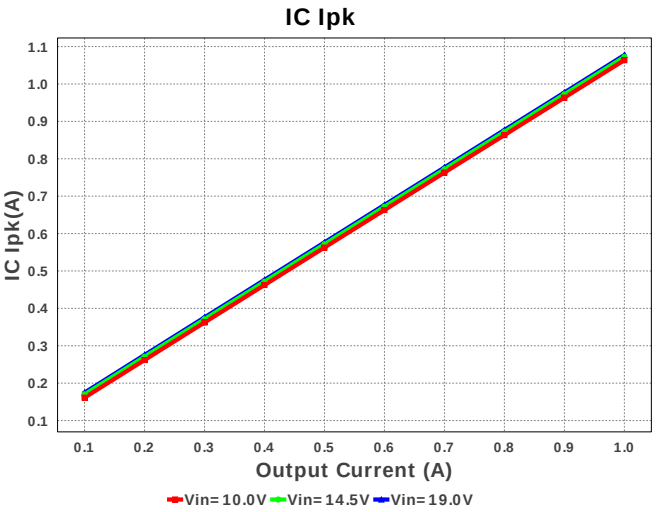
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R60J104KA01D Series= X5R	Cap= 100.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cin	MuRata	GRM21BC80G226ME39L Series= X6S	Cap= 22.0 uF ESR= 3.578 mOhm VDC= 4.0 V IRMS= 3.29633 A	1	$0.04	0805 7 mm²
3.	Cout	MuRata	GRM21BC80G226ME39L Series= X6S	Cap= 22.0 uF ESR= 3.578 mOhm VDC= 4.0 V IRMS= 3.29633 A	1	$0.04	0805 7 mm²
4.	D1	Diodes Inc.	B230A-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	$0.09	SMA 37 mm²
5.	Dbst	ON Semiconductor	MBR0540T1G	VF@Io= 510.0 mV VRRM= 40.0 V	1	$0.06	SOD-123 13 mm²
6.	L1	Bourns	SRN8040-330M	L= 33.0 µH DCR= 145.0 mOhm	1	$0.22	SRN8040 100 mm²
7.	Rfbb	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rfbt	Vishay-Dale	CRCW04022K74FKED Series= CRCW..e3	Res= 2.74 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

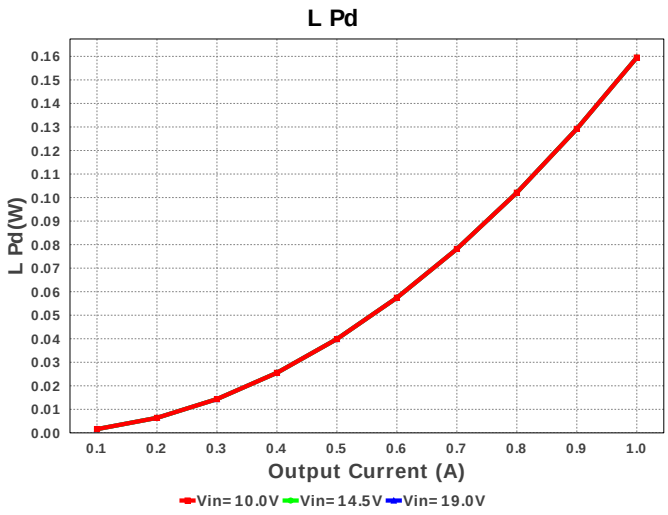
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	LM2738YMY/NOPB	Switcher	1	$1.20	DGN0008A_N 24 mm^2

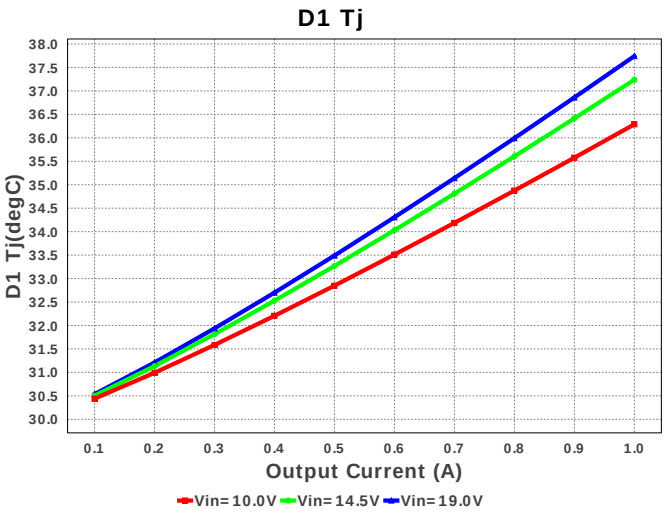


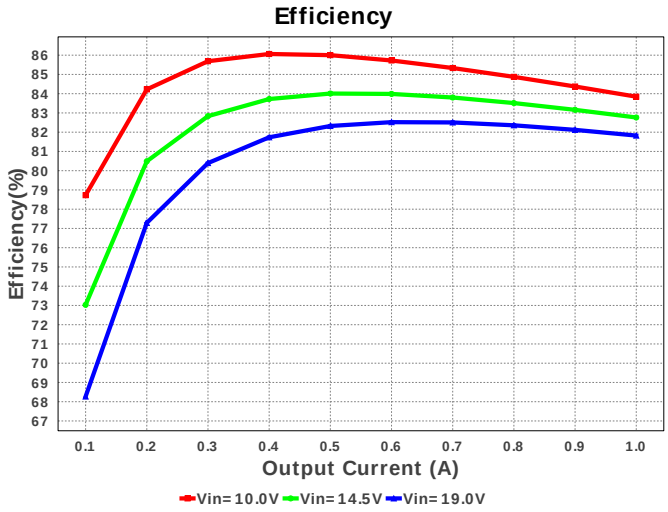


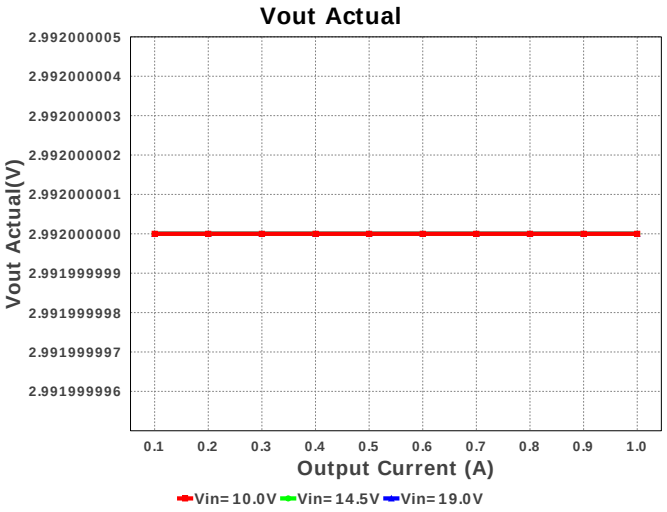


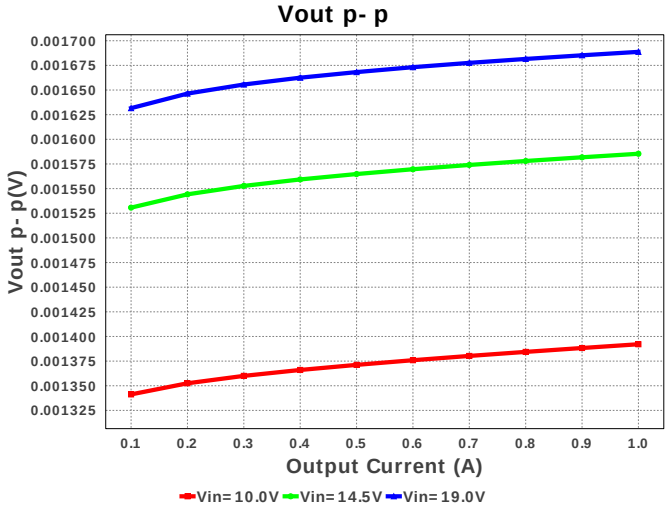


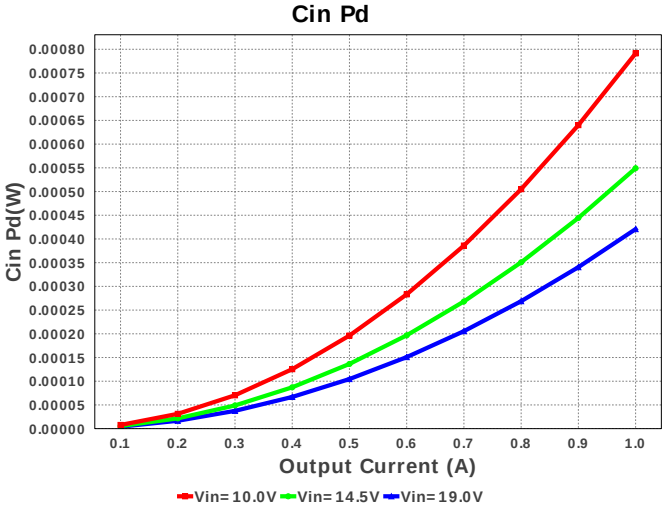


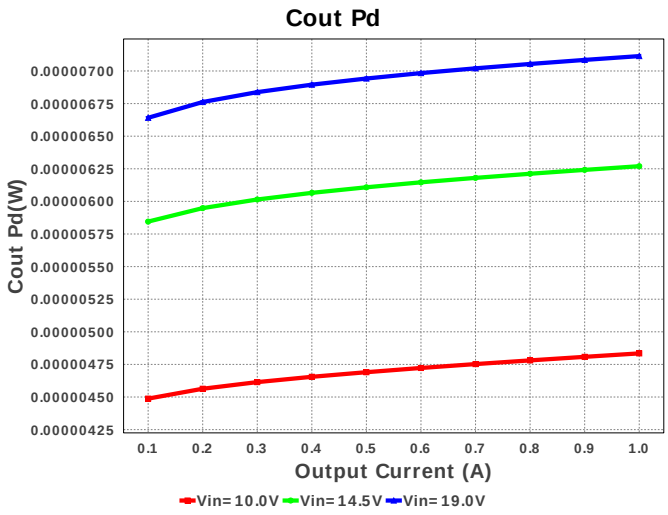


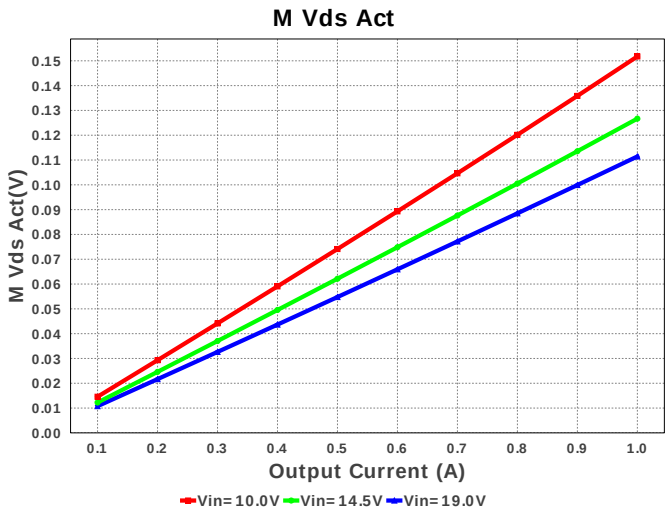


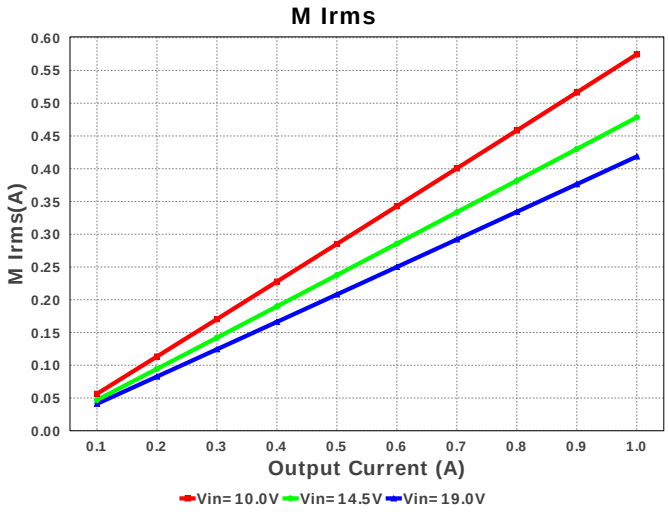


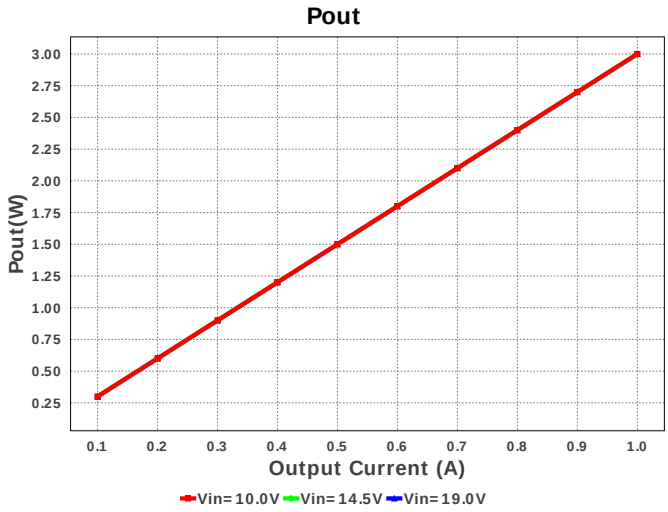


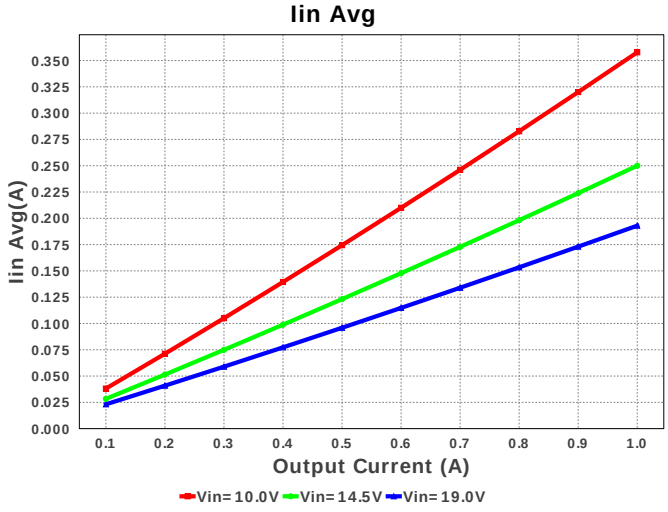


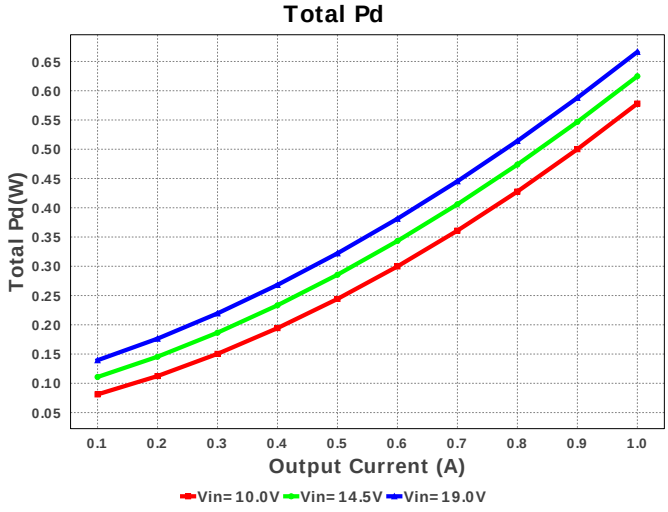


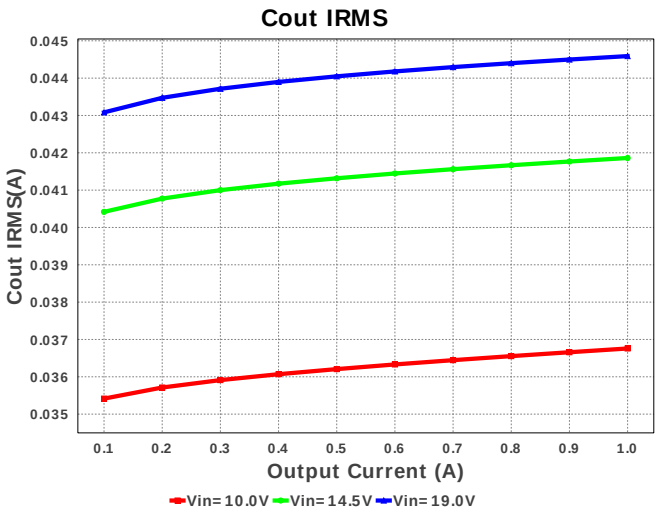


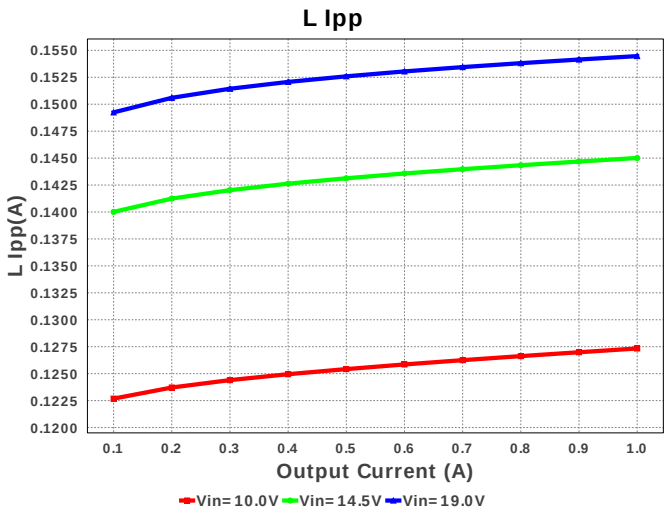


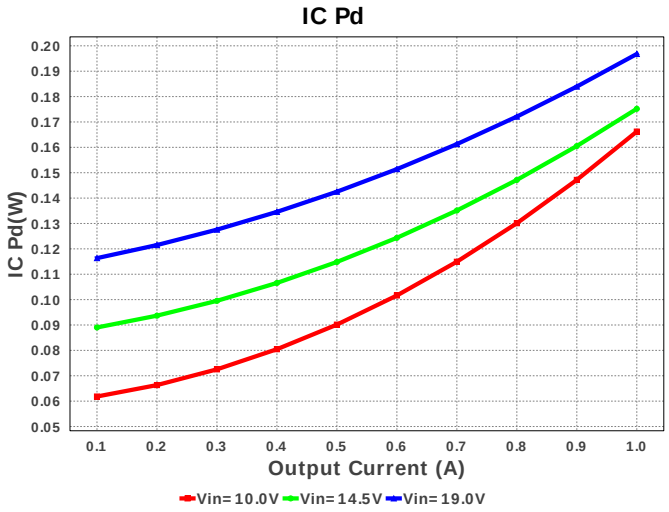


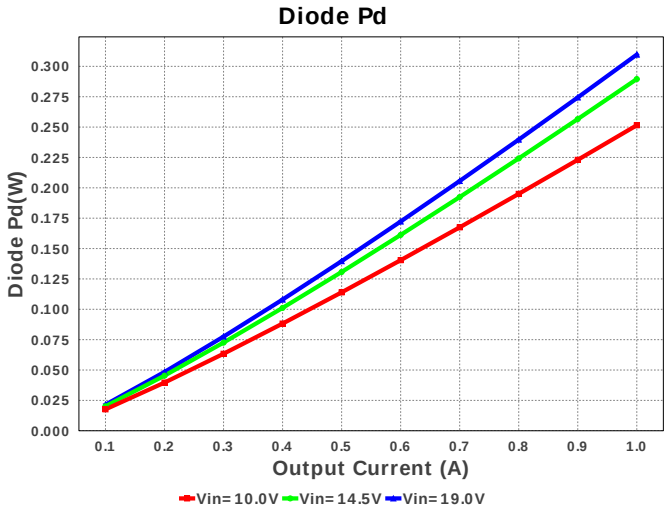












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	342.925 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	44.59 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.077 A	Current	Peak switch current in IC
4.	Iin Avg	192.95 mA	Current	Average input current
5.	L Ipp	154.47 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	418.594 mA	Current	MOSFET RMS current
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	197.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	550.0 kHz	General	Switching frequency
10.	IC Tolerance	16.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	111.433 mV	General	Voltage drop across the MosFET
12.	Pout	3.0 W	General	Total output power
13.	Total BOM	$1.68	General	Total BOM Cost
14.	D1 Tj	37.742 degC	Op_Point	D1 junction temperature
15.	Vout Actual	2.992 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
17.	Duty Cycle	17.522 %	Op_point	Duty cycle
18.	Efficiency	81.834 %	Op_point	Steady state efficiency
19.	IC Tj	41.807 degC	Op_point	IC junction temperature
20.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	1.0 A	Op_point	Iout operating point
22.	VIN_OP	19.0 V	Op_point	Vin operating point
23.	Vout p-p	1.689 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
25.	Cout Pd	7.114 µW	Power	Output capacitor power dissipation
26.	Diode Pd	309.68 mW	Power	Diode power dissipation
27.	IC Pd	196.783 mW	Power	IC power dissipation
28.	L Pd	159.5 mW	Power	Inductor power dissipation
29.	Total Pd	665.975 mW	Power	Total Power Dissipation
30.	Vout Tolerance	3.51 %		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	19.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	LM2738Y	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. LM2738Y Product Folder : http://www.ti.com/product/LM2738 : contains the data sheet and other resources.