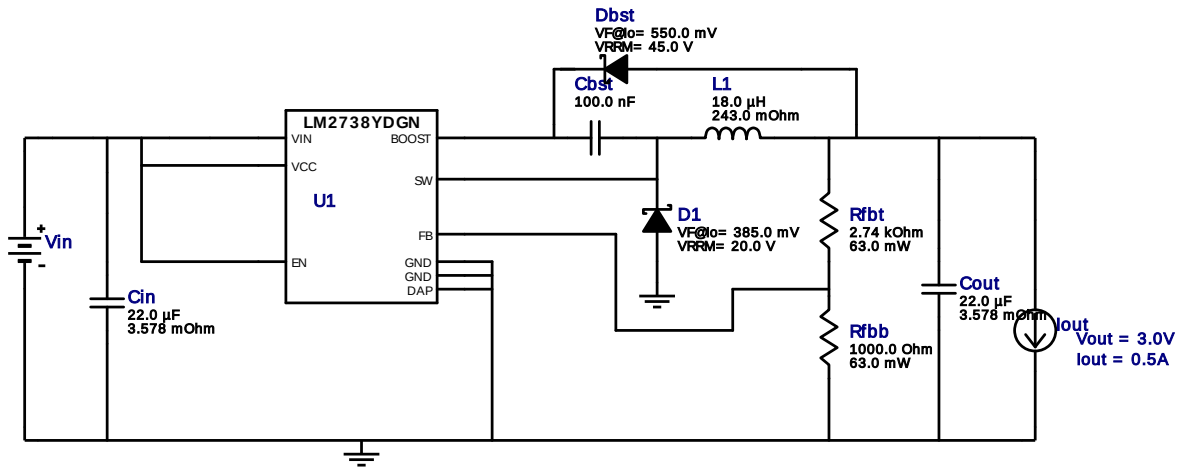
WEBENCH® Design Report

VinMin = 4.5V
VinMax = 5.5V
Vout = 3.0V
Iout = 0.5A

Device = LM2738YMY/NOPB
Topology = Buck
Created = 7/19/16 5:56:12 AM
BOM Cost = $1.82
BOM Count = 9
Total Pd = 0.21W

Design : 4742013/169 LM2738YMY/NOPB
LM2738YMY/NOPB 4.5V-5.5V to 3.00V @ 0.5A

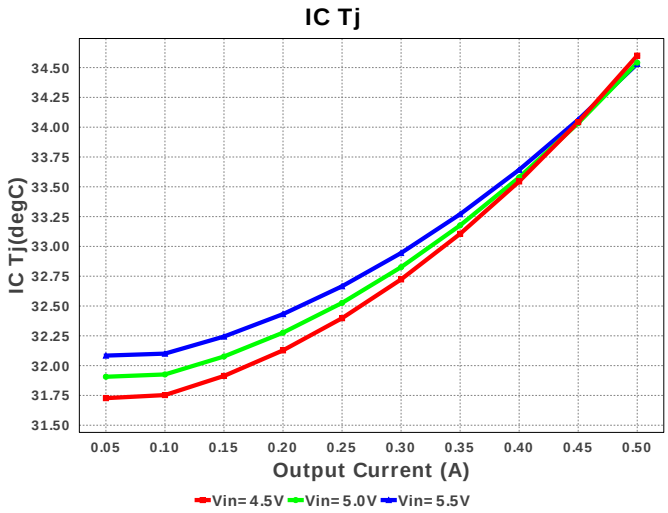


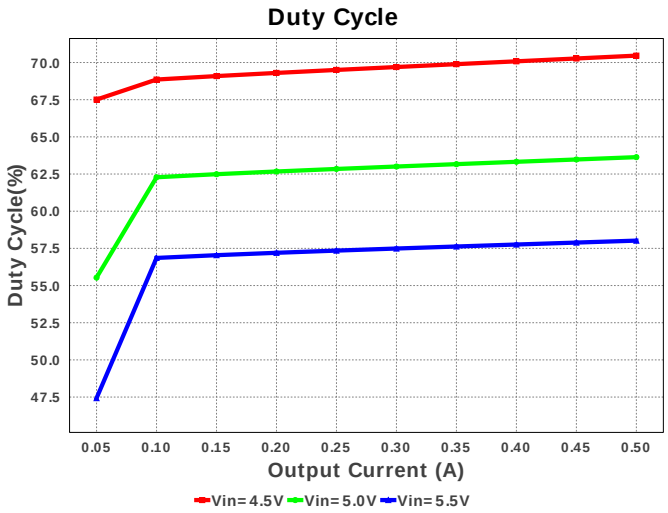
1. The Boost pin voltage must be supplied from a source of less than 5.5V. Recommended methods are described in the LM2734 datasheet Application Information.

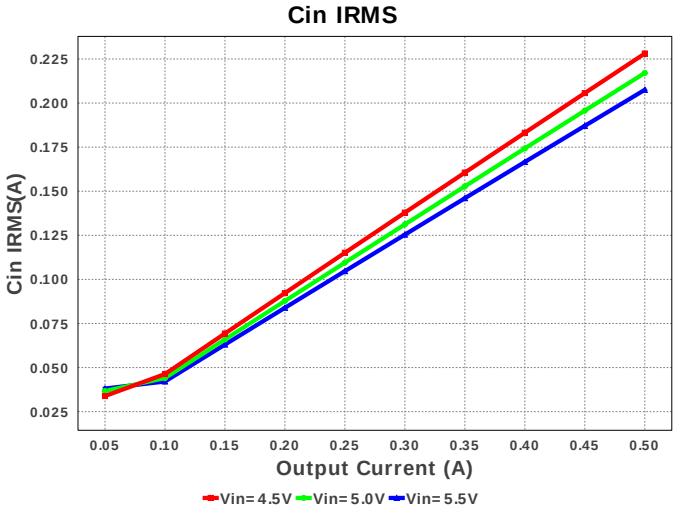
Electrical BOM

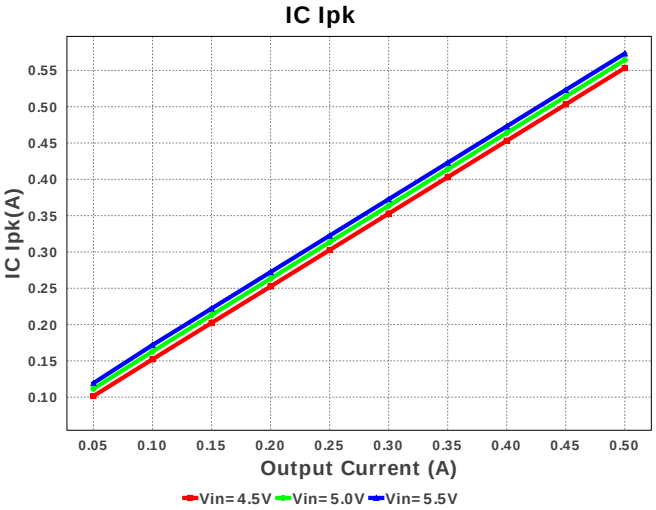
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM155R60J104KA01D Series= X5R	Cap= 100.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cin	MuRata	GRM21BC80G226ME39L Series= X6S	Cap= 22.0 uF ESR= 3.578 mOhm VDC= 4.0 V IRMS= 3.29633 A	1	$0.04	0805 7 mm²
3.	Cout	MuRata	GRM21BC80G226ME39L 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	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13 mm²
5.	Dbst	Bourns	CD0603-B0240	VF@Io= 550.0 mV VRRM= 45.0 V	1	$0.10	Diode_0603 5 mm²
6.	L1	Coilcraft	LPS4018-183MRB	L= 18.0 µH DCR= 243.0 mOhm	1	$0.35	LPS4018 24 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

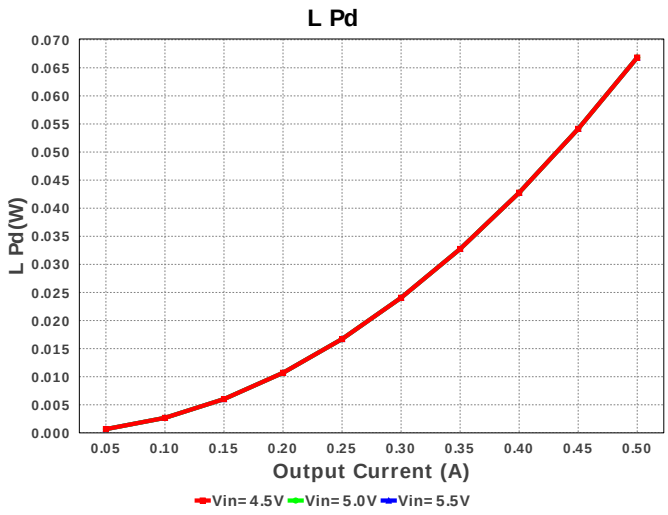
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	U1	Texas Instruments	LM2738YMY/NOPB	Switcher	1	$1.20	DGN0008A_N 24 mm^2

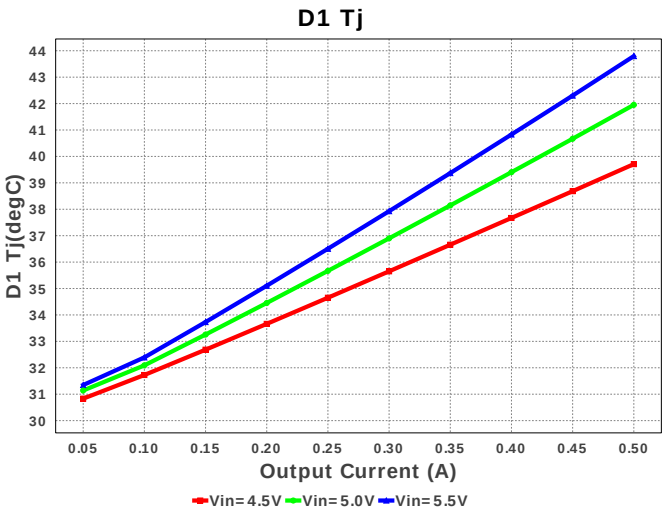


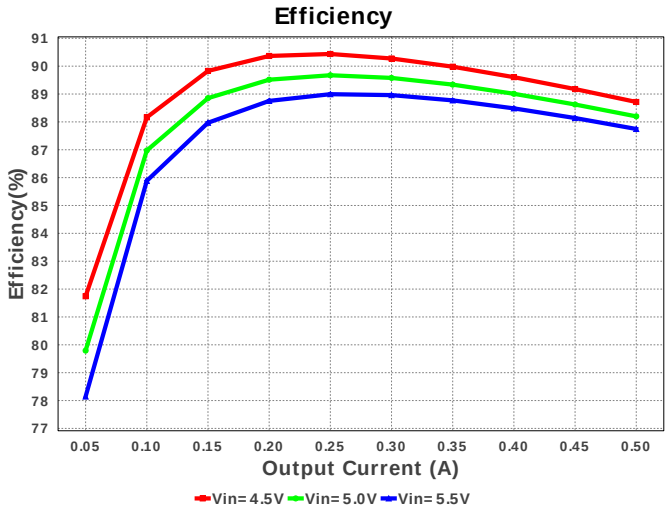


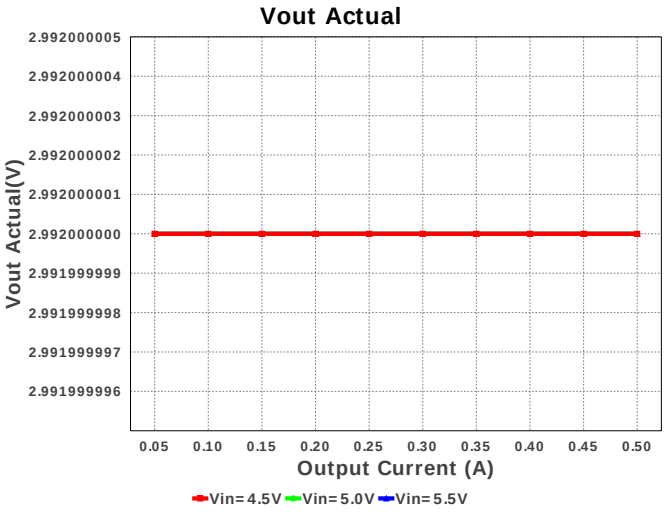


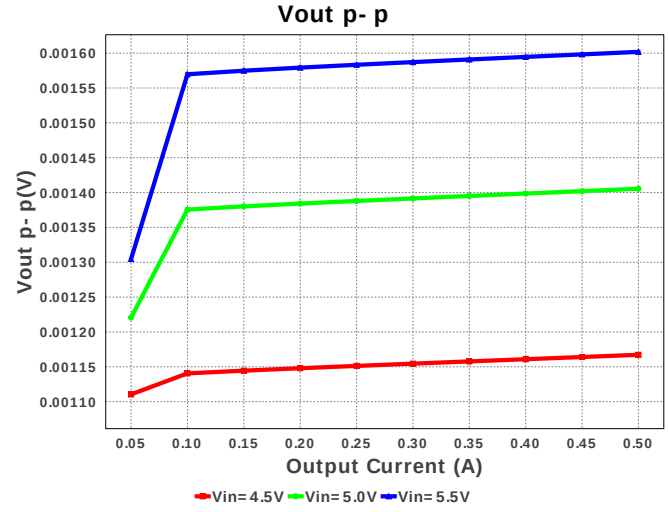


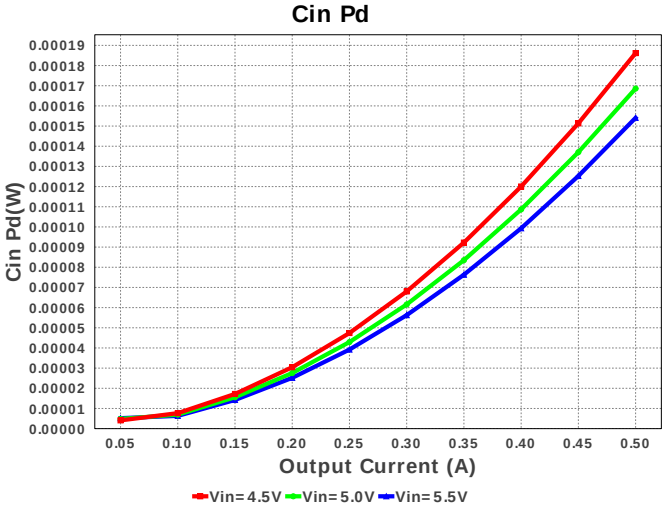


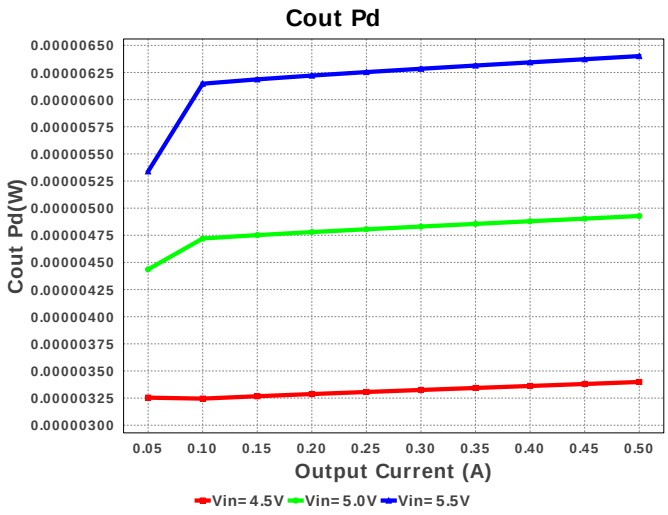


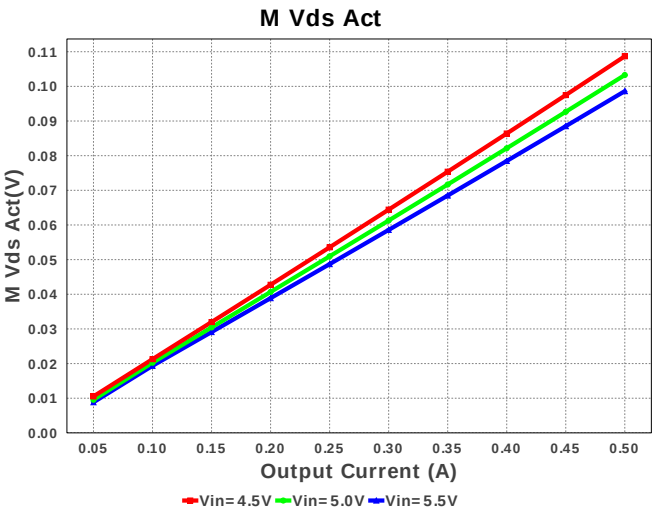


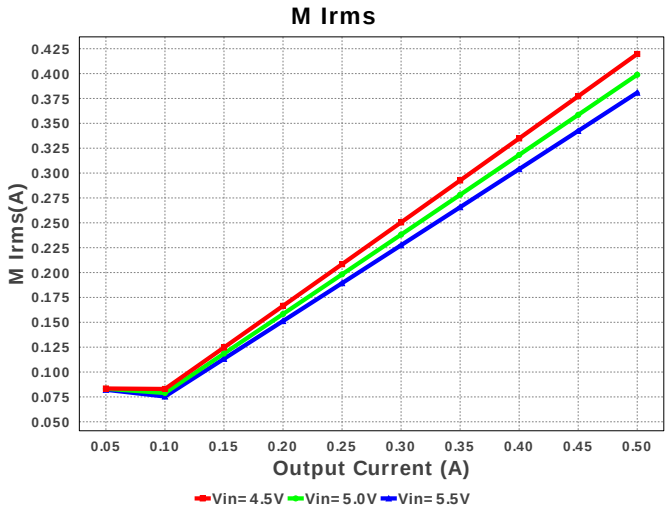


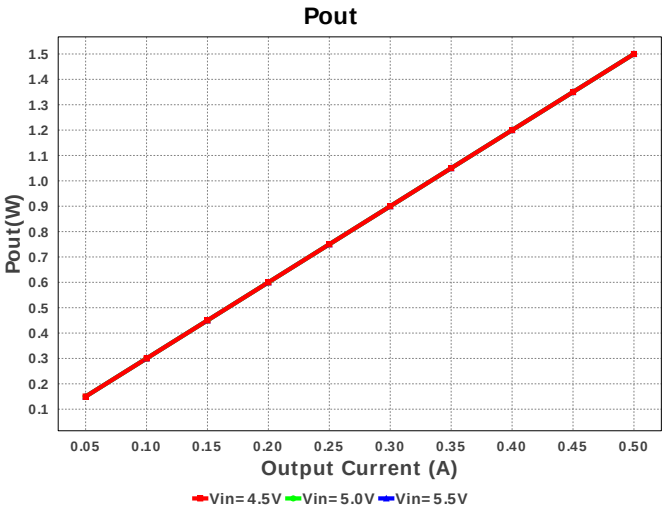


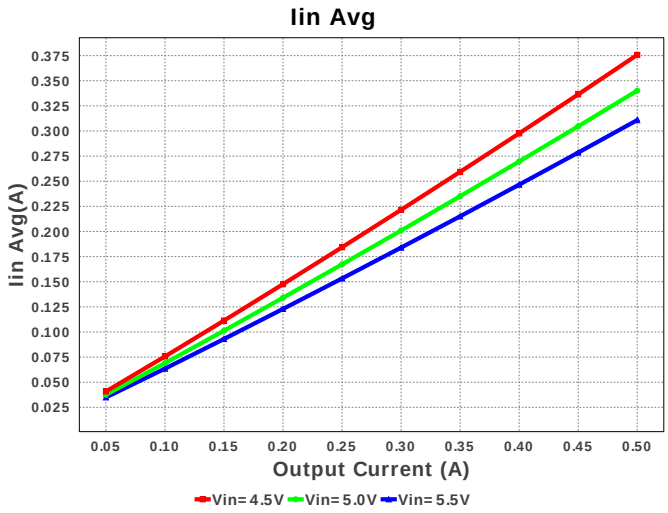


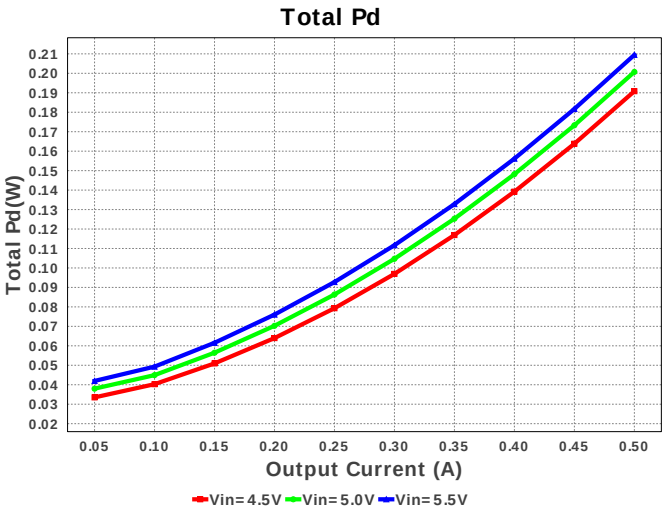


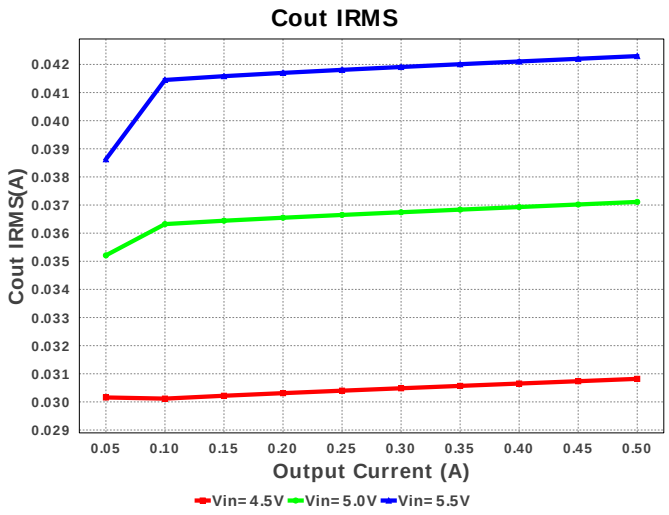


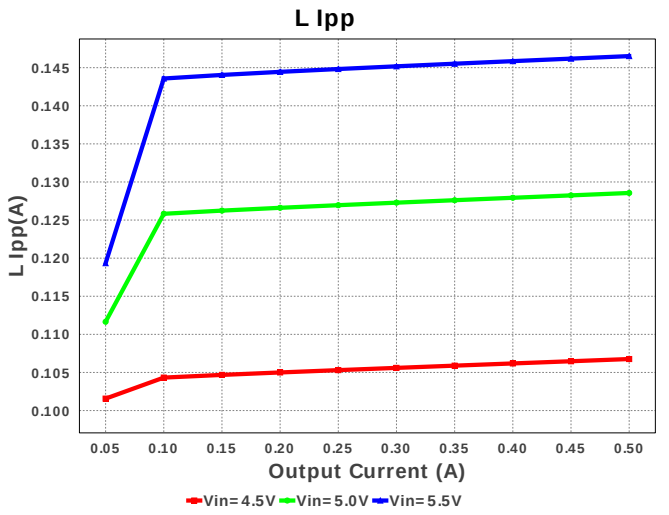


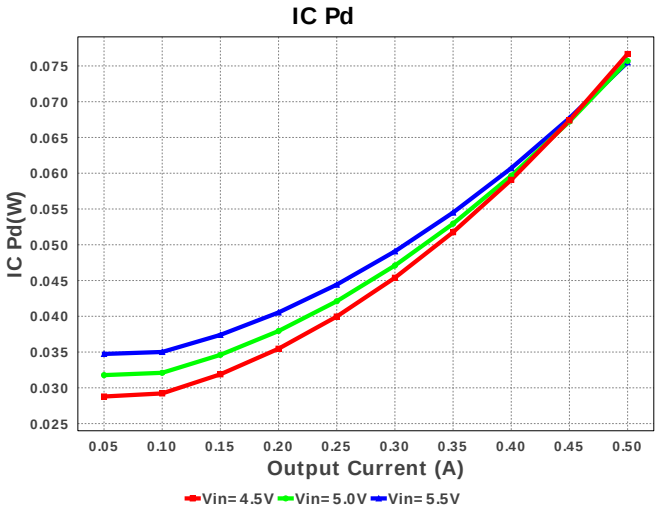


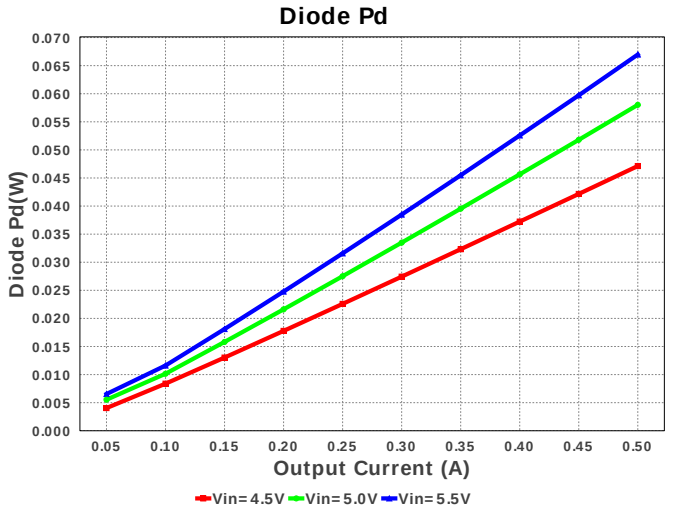












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	207.515 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	42.296 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	573.259 mA	Current	Peak switch current in IC
4.	Iin Avg	310.79 mA	Current	Average input current
5.	L Ipp	146.52 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	380.859 mA	Current	Q Iavg
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	88.0 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	98.619 mV	General	Voltage drop across the MosFET
12.	Pout	1.5 W	General	Total output power
13.	Total BOM	$1.82	General	Total BOM Cost
14.	D1 Tj	43.797 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	58.021 %	Op_point	Duty cycle
18.	Efficiency	87.754 %	Op_point	Steady state efficiency
19.	IC Tj	34.531 degC	Op_point	IC junction temperature
20.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	500.0 mA	Op_point	Iout operating point
22.	VIN_OP	5.5 V	Op_point	Vin operating point
23.	Vout p-p	1.602 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
25.	Cout Pd	6.401 µW	Power	Output capacitor power dissipation
26.	Diode Pd	66.976 mW	Power	Diode power dissipation
27.	IC Pd	75.515 mW	Power	IC power dissipation
28.	L Pd	66.825 mW	Power	Inductor power dissipation
29.	Total Pd	209.326 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	500.0 m	Maximum Output Current
2.	VinMax	5.5	Maximum input voltage
3.	VinMin	4.5	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	LM2738Y	Base Product 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.