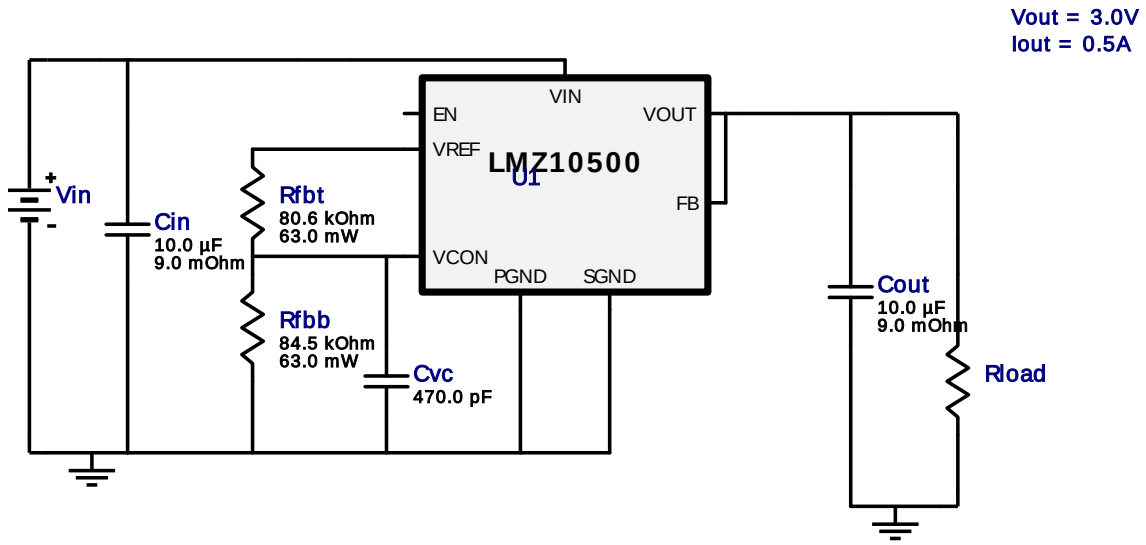
WEBENCH® Design Report

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

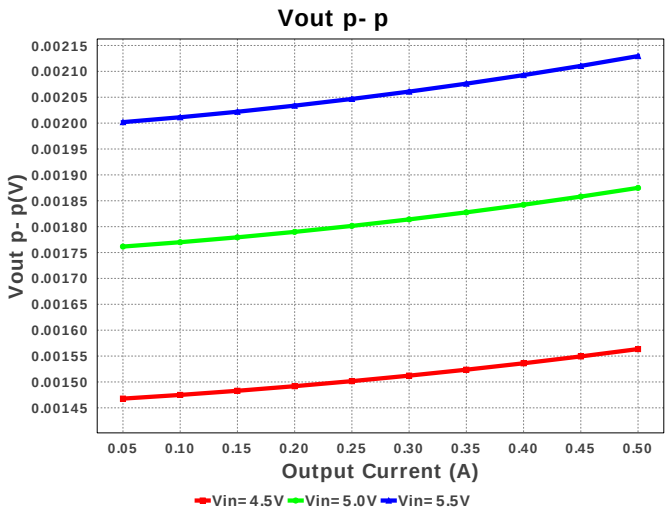
Device = LMZ10500SILR
Topology = Buck
Created = 7/19/16 5:38:42 AM
BOM Cost = $1.37
BOM Count = 6
Total Pd = 0.12W

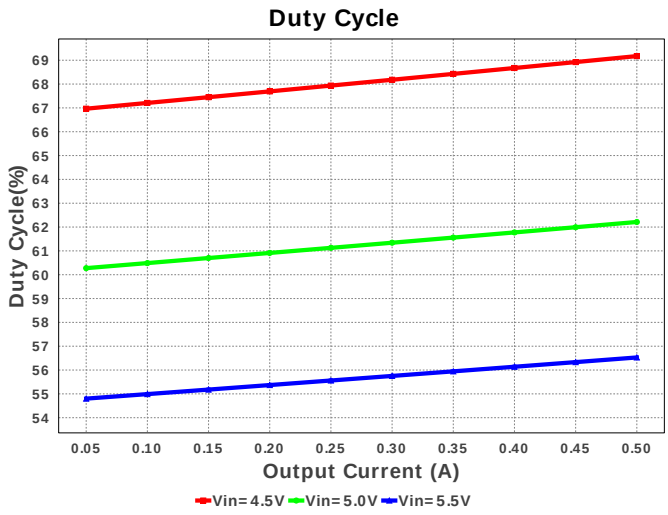
Design : 4742013/134 LMZ10500SILR
LMZ10500SILR 4.5V-5.5V to 3.00V @ 0.5A

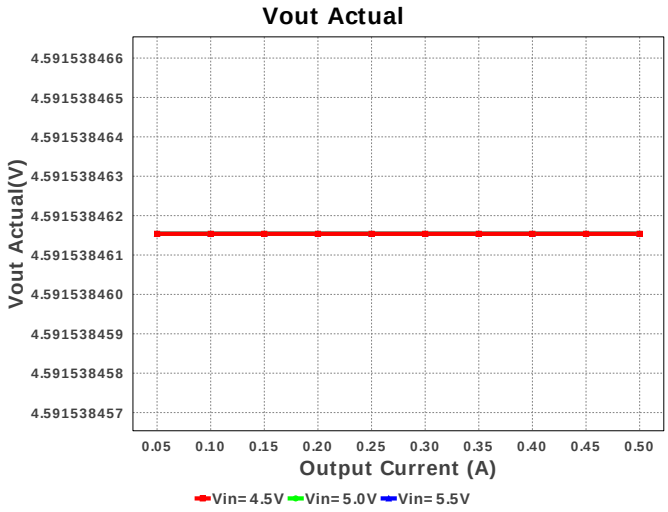


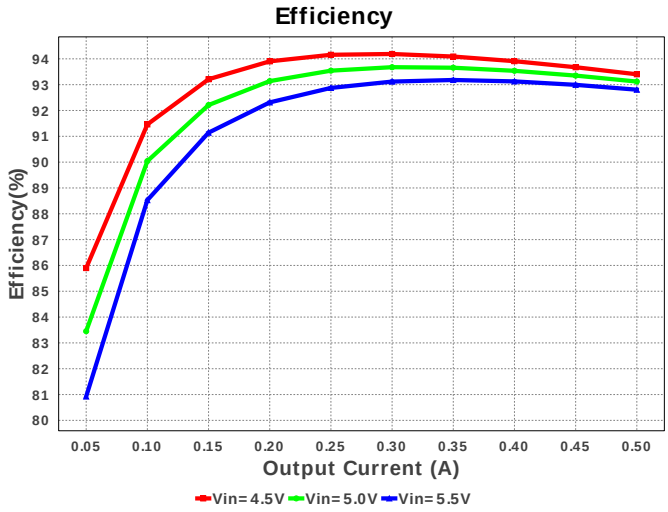
Electrical BOM

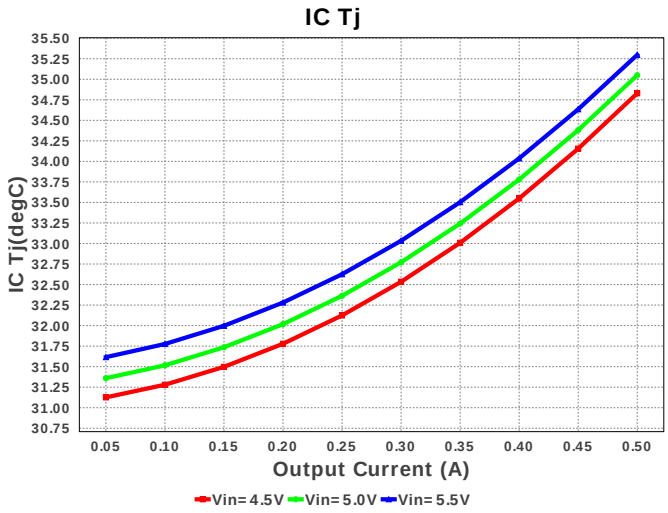
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	$0.02	0603 5 mm²
2.	Cout	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	$0.02	0603 5 mm²
3.	Cvc	MuRata	GCM1555C1H471JA16D Series= C0G/NP0	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
4.	Rfbb	Vishay-Dale	CRCW040284K5FKED Series= CRCW..e3	Res= 84.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
5.	Rfbt	Vishay-Dale	CRCW040280K6FKED Series= CRCW..e3	Res= 80.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	U1	Texas Instruments	LMZ10500SILR	Switcher	1	$1.30	SIL0008A 14 mm²

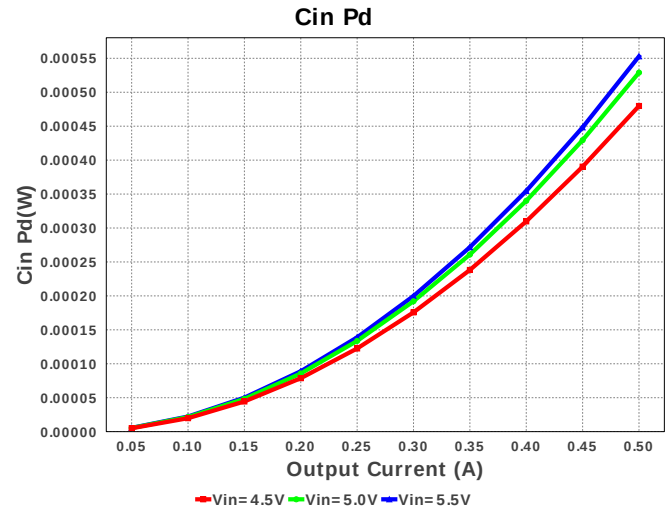




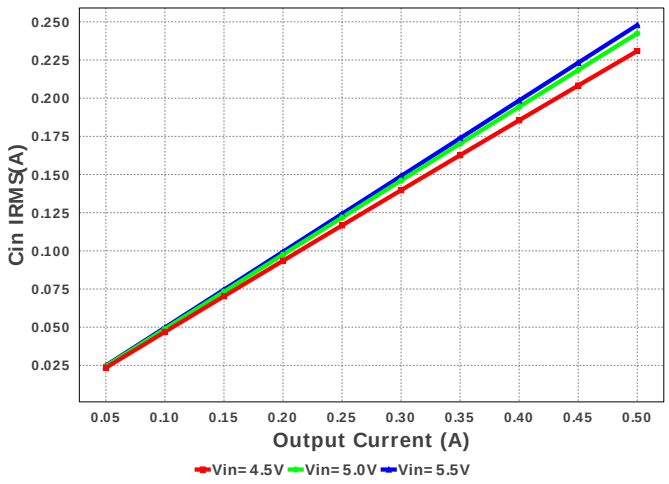




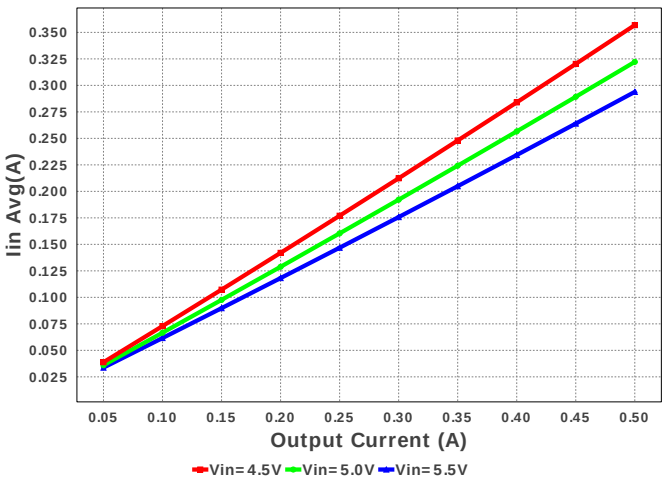




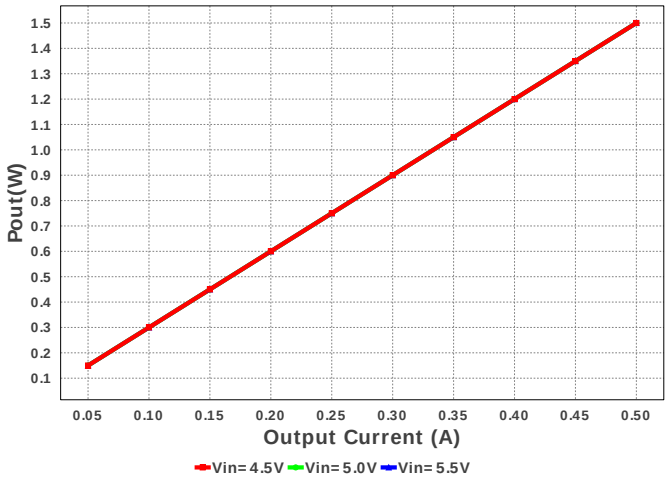
Cin IRMS



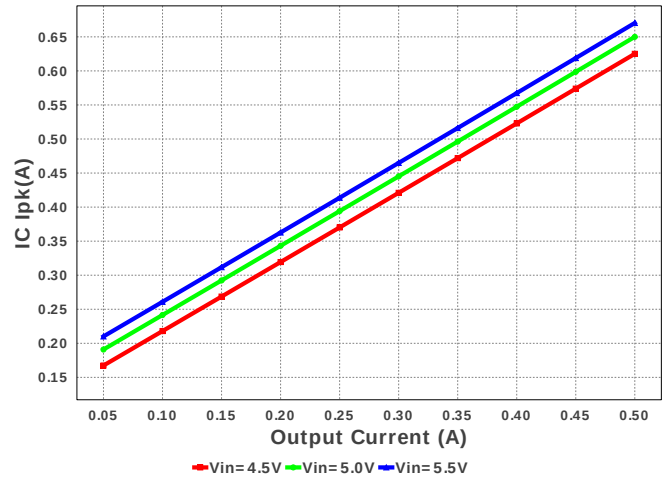
Iin Avg



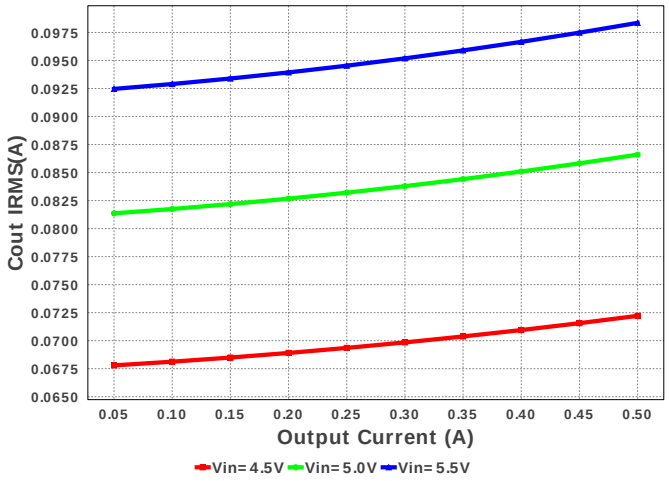
Pout



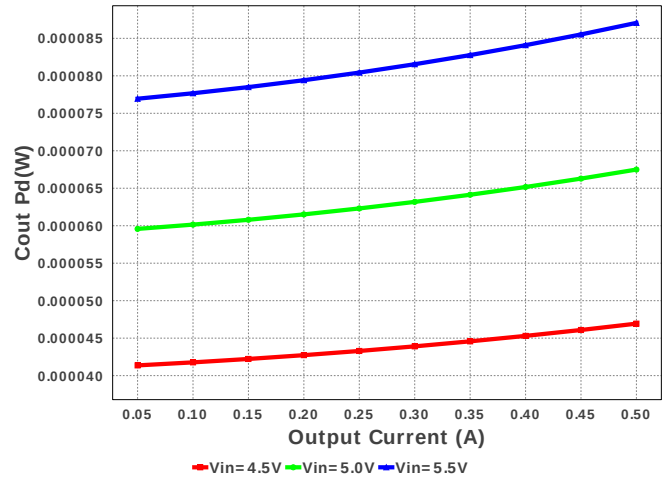
IC Ipk

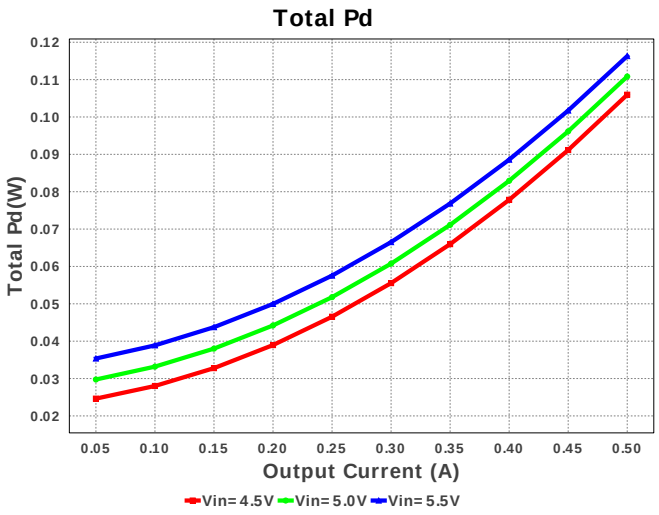


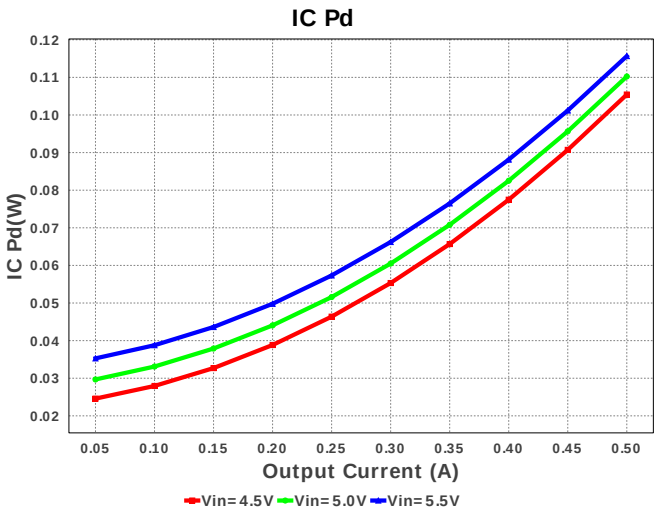
Cout IRMS



Cout Pd







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	247.86 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	98.356 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	670.358 mA	Current	Peak switch current in IC
4.	Iin Avg	293.87 mA	Current	Average input current
5.	BOM Count	6	General	Total Design BOM count
6.	FootPrint	33.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	2.0 MHz	General	Switching frequency
8.	Pout	1.5 W	General	Total output power
9.	Total BOM	$1.37	General	Total BOM Cost
10.	Vout Actual	4.592 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
11.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
12.	Duty Cycle	56.528 %	Op_point	Duty cycle
13.	Efficiency	92.805 %	Op_point	Steady state efficiency
14.	IC Tj	35.297 degC	Op_point	IC junction temperature
15.	ICThetaJA	45.8 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	500.0 mA	Op_point	Iout operating point
17.	VIN_OP	5.5 V	Op_point	Vin operating point
18.	Vout p-p	2.129 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	552.912 µW	Power	Input capacitor power dissipation
20.	Cout Pd	87.065 µW	Power	Output capacitor power dissipation
21.	IC Pd	115.657 mW	Power	IC power dissipation
22.	Total Pd	116.292 mW	Power	Total Power Dissipation
23.	Vout Tolerance	986.24 m%		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	LMZ10500	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. The LMZ10500 SIMPLE SWITCHER nano module is an easy-to-use step-down DC-DC solution capable of driving up to 0.65A load in space-constrained applications. Only an input capacitor, an output capacitor, a small VCON filter capacitor, and two resistors are required for basic operation. The nano module comes in 8-pin LLP footprint package with an integrated inductor.

2. **LMZ10500** Product Folder : http://www.ti.com/product/LMZ10500 : contains the data sheet and other resources.