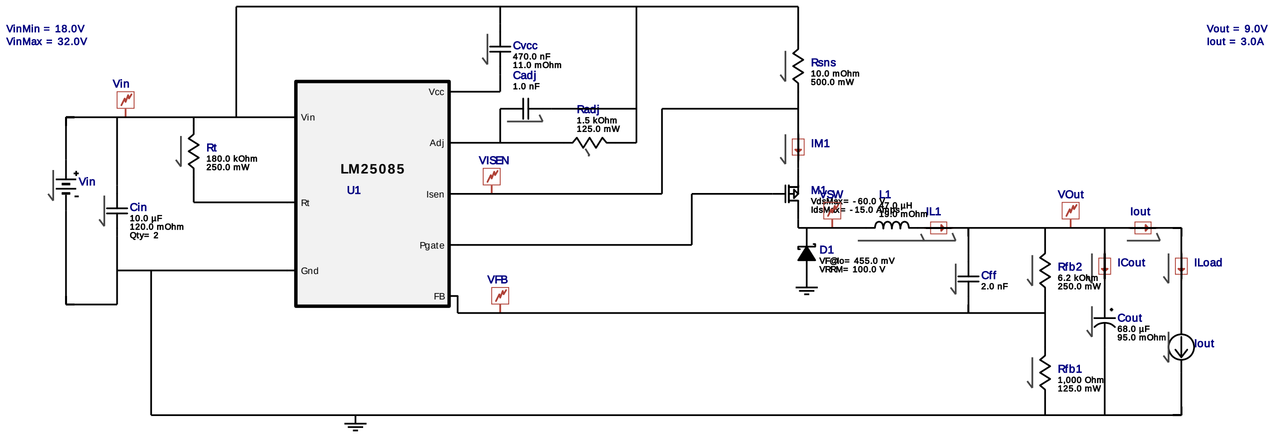
VinMin = 18.0V
VinMax = 32.0V
Vout = 9.0V
Iout = 3.0A

Device = LM25085MY/NOPB
Topology = Buck
Created = 11/18/16 1:45:26 PM
User ID = 4837964
Design Id = 17
eSim Id = 6
Simulation Type = Steady State

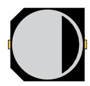
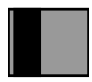
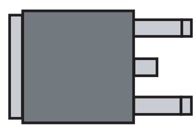
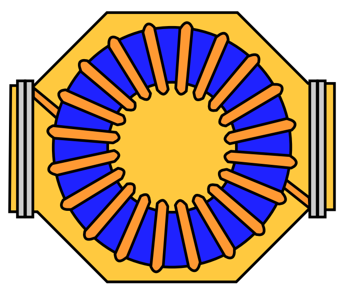
WEBENCH ® Electrical Simulation Report



My Comments

No comments

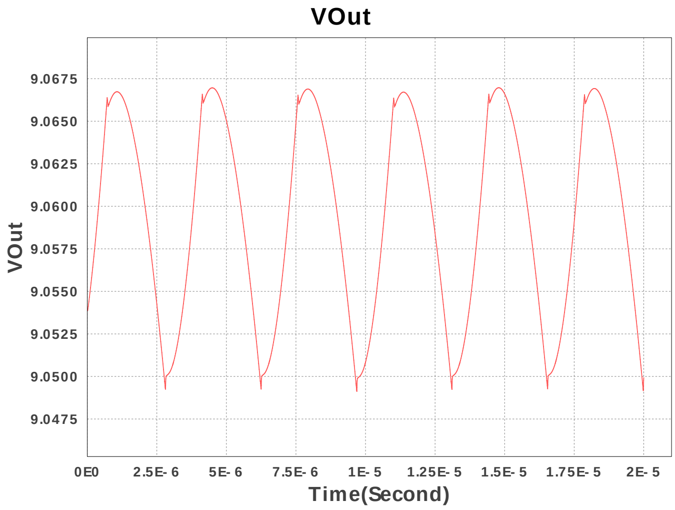
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cadj	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cff	MuRata	GRM1885C1H202JA01D Series= C0G/NP0	Cap= 2.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
3.	Cin	Panasonic	EEHZA1J100P Series= ?	Cap= 10.0 µF ESR= 120.0 mOhm VDC= 63.0 V IRMS= 1.0 A	2	$0.66	 SM_RADIAL_6.3AMM 80 mm²
4.	Cout	AVX	TPSV686M025R0095 Series= TPS	Cap= 68.0 µF ESR= 95.0 mOhm VDC= 25.0 V IRMS= 1.46 A	1	$3.51	 7361-38 75 mm²
5.	Cvcc	AVX	0805YC474KAT2A Series= X7R	Cap= 470.0 nF ESR= 11.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
6.	D1	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	$1.33	 DDPAK 210 mm²
7.	L1	Bourns	PM2120-470K-RC	L= 47.0 µH DCR= 19.0 mOhm	1	$1.33	 PM2120 890 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	M1	Fairchild Semiconductor	FDD5614P	VdsMax= -60.0 V IdsMax= -15.0 Amps	1	$0.24	DPAK 102 mm²
9.	Radj	Panasonic	ERJ-6ENF1501V Series= ERJ-6E	Res= 1.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
10.	Rfb1	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1,000 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
11.	Rfb2	Yageo America	RC1206FR-076K2L Series= ?	Res= 6.2 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
12.	Rsns	Stackpole Electronics Inc	CSR1206FK10L0 Series= ?	Res= 10.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.11	1206 11 mm²
13.	Rt	Yageo America	RC1206FR-07180KL Series= ?	Res= 180.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
14.	U1	Texas Instruments	LM25085MY/NOPB	Switcher	1	$0.70	MUY08A 24 mm²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Iout	I	Load Current	3.0 A



Design Inputs

#	Name	Value	Description
1.	Iout	3.0 A	Maximum Output Current
2.	VinMax	32.0 V	Maximum input voltage
3.	VinMin	18.0 V	Minimum input voltage
4.	Vout	9.0 V	Output Voltage
5.	base_pn	LM25085	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	45.0 degC	Ambient temperature

Operating Values

#	Name	Value	Category	Description
1.	BOM Count	15		Total Design BOM count
2.	Total BOM	$8.626		Total BOM Cost
3.	Cin IRMS	1.366 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	128.903 mA	Current	Output capacitor RMS ripple current
5.	Iin Avg	908.1 mA	Current	Average input current

#	Name	Value	Category	Description
6.	L Ipp	446.534 mA	Current	Peak-to-peak inductor ripple current
7.	SW Ipk	3.223 A	Current	Peak switch current
8.	FootPrint	1.525 k mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	292.213 kHz	General	Switching frequency
10.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	27.0 W	General	Total output power
13.	D1 Tj	81.476 degC	Op_Point	D1 junction temperature
14.	Vout Actual	9.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	9.0 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	29.338 %	Op_point	Duty cycle
17.	Efficiency	92.914 %	Op_point	Steady state efficiency
18.	IC Tj	54.582 degC	Op_point	IC junction temperature
19.	ICThetaJA	46.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	3.0 A	Op_point	Iout operating point
21.	M1 Tj	65.767 degC	Op_point	M1 MOSFET junction temperature
22.	VIN_OP	32.0 V	Op_point	Vin operating point
23.	Vout p-p	42.514 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	111.946 mW	Power	Input capacitor power dissipation
25.	Cout Pd	1.579 mW	Power	Output capacitor power dissipation
26.	Diode Pd	911.899 mW	Power	Diode power dissipation
27.	IC Pd	208.315 mW	Power	IC power dissipation
28.	L Pd	213.75 mW	Power	Inductor power dissipation
29.	M1 Pd	521.574 mW	Power	M1 MOSFET total power dissipation
30.	M1 PdCond	466.934 mW	Power	M1 MOSFET conduction losses
31.	M1 PdSw	54.64 mW	Power	M1 MOSFET switching losses
32.	Total Pd	2.059 W	Power	Total Power Dissipation
33.	Vout Tolerance	3.774 %	Unknown	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Assistance

1. For a Constant On Time device to be stable, we need to provide a ripple at the feedback comparator. There are various methods to implement the ripple. Depending on the circuit complexity vs. the allowable ripple, we have three options to choose from. The simplest option, 'Low Complexity', would require only a high ESR cap at the output. This means that the BOM count will be small, but the output voltage ripple will be quite large. The 'optimal solution' would require a feed-forward cap in parallel with the upper feedback resistor to AC couple the ripple to the feedback node. This increases the BOM count slightly, but now we have more control over the output voltage ripple. If the output voltage requirement is very tight, then the best option is to go for the 'Low Output Ripple' solution. In this option we can go with very low ESR output caps and have very good control over the output voltage ripple

2. **LM25085** Product Folder : http://www.ti.com/product/LM25085 : contains the data sheet and other resources.