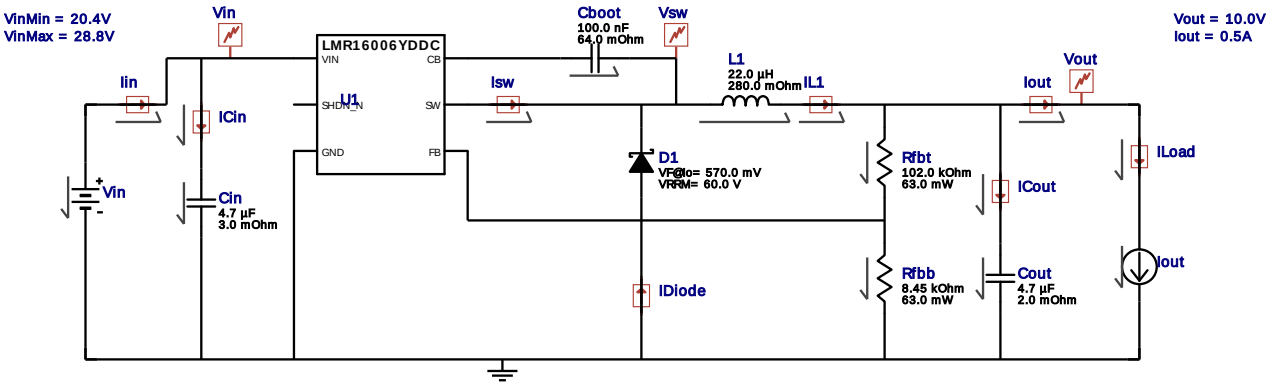
TEXAS INSTRUMENTS

WEBENCH® Electrical Simulation Report

VinMin = 20.4V
VinMax = 28.8V
Vout = 10.0V
Iout = 0.5A

Device = LMR16006YDDCT
Topology = Buck
Created = 1/6/15 6:16:21 PM
User ID = 1014753
Design Id = 18
eSim Id = 1
Simulation Type = Steady State

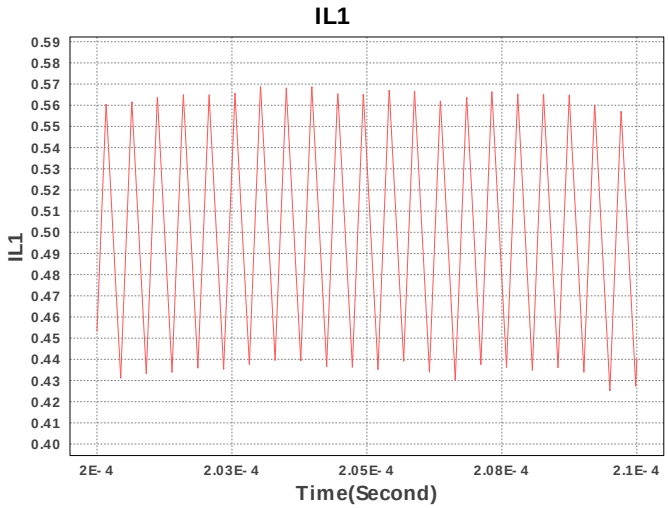


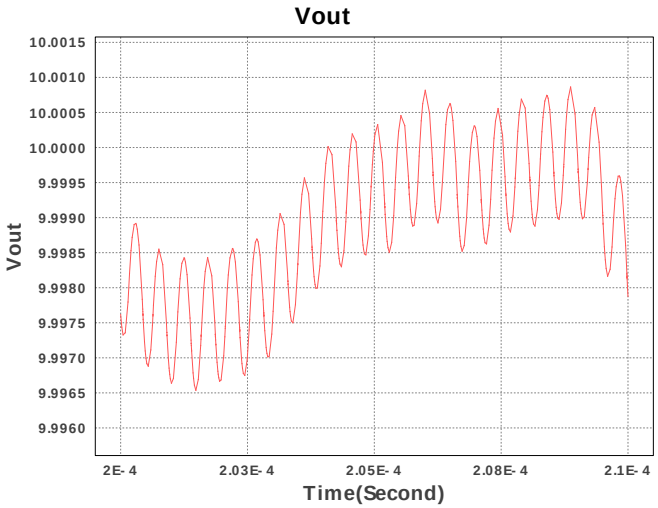
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	$0.22	1206 11 mm²
3.	Cout	MuRata	GRM21BR61E475MA12L Series= X5R	Cap= 4.7 µF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 7.29 A	1	$0.06	0805 7 mm²
4.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	$0.11	SOD-123F 12 mm²
5.	L1	Bourns	SDR0503-220ML	L= 22.0 µH DCR= 280.0 mOhm	1	$0.19	SDR0503 48 mm²
6.	Rfbb	Vishay-Dale	CRCW04028K45FKED Series= CRCW..e3	Res= 8.45 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW0402102KFKED Series= CRCW..e3	Res= 102.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	LMR16006YDDCT	Switcher	1	$1.38	MK06A 11 mm²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cout	IC	Initial Voltage	10.0 V
2.	L1	IC	Initial Current	0.5 A
3.	Iout	I	Load Current	0.5 A





Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	240.35 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	42.129 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	573.06 mA	Current	Peak switch current in IC
4.	Iin Avg	190.61 mA	Current	Average input current
5.	L Ipp	145.94 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	301.202 mA	Current	MOSFET RMS current
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	100.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	2.1 MHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	180.562 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	5.0 W	General	Total output power
14.	Total BOM	$1.99	General	Total BOM Cost
15.	D1 Tj	115.004 degC	Op_Point	D1 junction temperature
16.	Vout OP	10.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	36.383 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	36.212 %	Op_point	Duty cycle
19.	Efficiency	91.08 %	Op_point	Steady state efficiency
20.	IC Tj	77.299 degC	Op_point	IC junction temperature
21.	ICThetaJA	102.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	500.0 mA	Op_point	Iout operating point
23.	Phase Marg	71.488 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	28.8 V	Op_point	Vin operating point
25.	Vout p-p	2.074 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	173.304 µW	Power	Input capacitor power dissipation
27.	Cout Pd	3.55 µW	Power	Output capacitor power dissipation
28.	Diode Pd	181.829 mW	Power	Diode power dissipation
29.	IC Pd	218.616 mW	Power	IC power dissipation
30.	L Pd	88.153 mW	Power	Inductor power dissipation
31.	Total Pd	489.669 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 mA	Maximum Output Current
2.	Iout1	500.0 mAmps	Output Current #1
3.	VinMax	28.8 V	Maximum input voltage
4.	VinMin	20.4 V	Minimum input voltage
5.	Vout	10.0 V	Output Voltage
6.	Vout1	10.0 Volt	Output Voltage #1
7.	base_pn	LMR16006Y	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	55.0 degC	Ambient temperature

Design Assistance

1. LMR16006Y Product Folder : http://www.ti.com/product/LMR16006 : contains the data sheet and other resources.