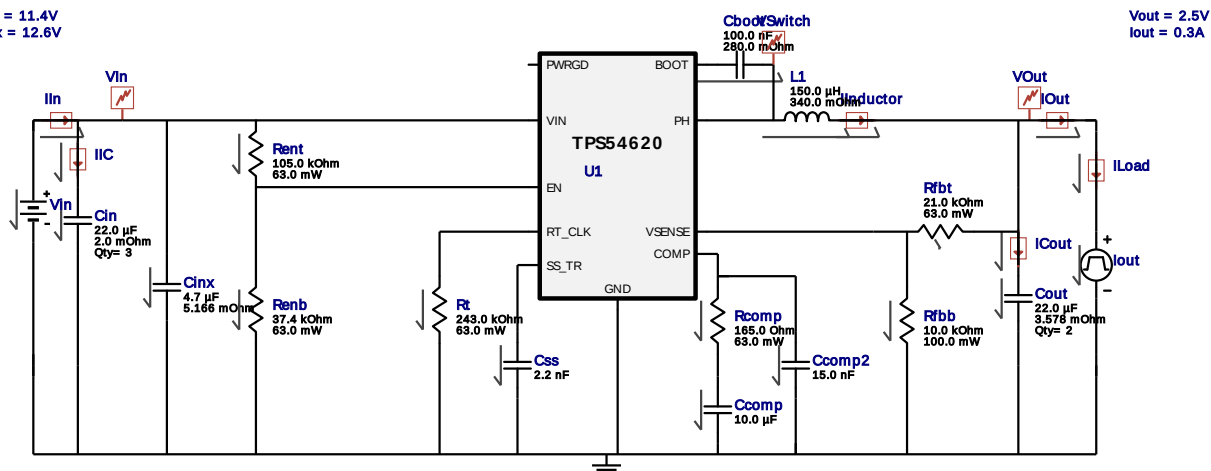




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Topology = Buck
Created = 2018-02-28 18:28:03.328
User ID = 4748671
Design Id = 315
eSim Id = 2
Simulation Type = Load Transient



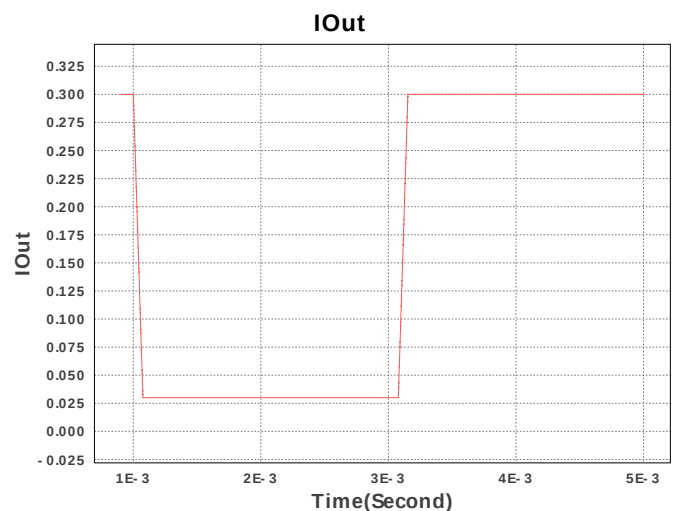
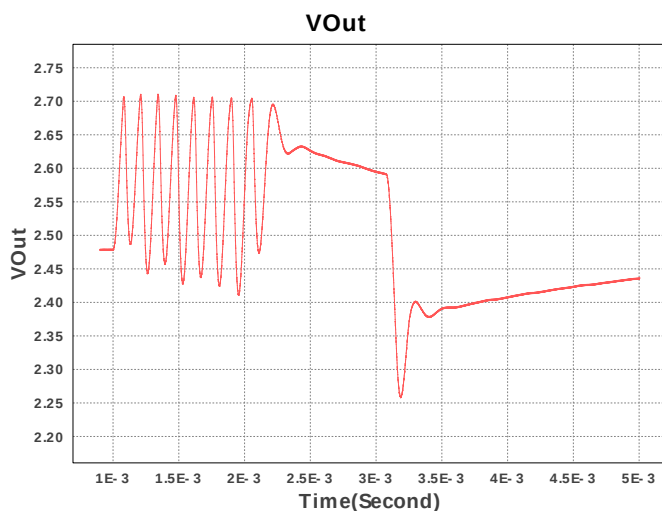
No comments

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
2.	Ccomp	Samsung Electro-Mechanics	CL10A106MQ8NNNC Series= X5R	Cap= 10.0 µF VDC= 6.3 V IRMS= 0.0 A	1	\$0.03	 0603 5 mm ²
3.	Ccomp2	TDK	C2012C0G1H153J085AA Series= C0G/NP0	Cap= 15.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.07	 0805 7 mm ²
4.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 µF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	3	\$0.18	 1210 15 mm ²
5.	Cinx	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 µF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.035 A	1	\$0.03	 0805 7 mm ²
6.	Cout	MuRata	GRM21BC80G226ME39L Series= X6S	Cap= 22.0 µF ESR= 3.578 mOhm VDC= 4.0 V IRMS= 3.296 A	2	\$0.04	 0805 7 mm ²
7.	Css	MuRata	GRM1885C1H222JA01J Series= C0G/NP0	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm ²
8.	L1	TDK	SLF7045T-151MR40-PF	L= 150.0 µH DCR= 340.0 mOhm	1	\$0.45	 SLF7045 81 mm ²
9.	Rcomp	Vishay-Dale	CRCW0402165RFKED Series= CRCW..e3	Res= 165.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Renb	Vishay-Dale	CRCW040237K4FKED Series= CRCW..e3	Res= 37.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	Rent	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rfbb	Susumu Co Ltd	RR1220P-103-D Series= RR12	Res= 10.0 kOhm Power= 100.0 mW Tolerance= 0.5%	1	\$0.01	0805 7 mm ²
13.	Rfbt	Vishay-Dale	CRCW040221K0FKED Series= CRCW..e3	Res= 21.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
14.	Rt	Vishay-Dale	CRCW0402243KFKED Series= CRCW..e3	Res= 243.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
15.	U1	Texas Instruments	TPS54620RHLR	Switcher	1	\$1.99	S-PVQFN-N14 22 mm ²

Simulation Parameters

#	Name	Parameter Name	Description	Values
1.	Cboot	IC	Initial Voltage	12.0 V
2.	Cout	IC	Initial Voltage	2.5 V
3.	Css	IC	Initial Voltage	1.5 V
4.	L1	IC	Initial Current	0.3 A
5.	Iout	signal_type	Signal Type	PULSE
		I1	Initial Current	0.3 A
		I2	Peak Current	0.03 A
		Td	Initial Delay Time	0.001000612863054541 Sec
		Tr	Rise Time	75u Sec
		Tf	Fall Time	75u Sec
		Pw	Pulse Width	0.0020022518281878716 Sec



Design Inputs

#	Name	Value	Description
1.	Iout	300.0 mA	Maximum Output Current
2.	VinMax	12.6 V	Maximum input voltage
3.	VinMin	11.4 V	Minimum input voltage
4.	Vout	2.5 V	Output Voltage
5.	base_pn	TPS54620	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0 degC	Ambient temperature

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	121.647 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	20.259 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	335.089 mA	Current	Peak switch current in IC
4.	Iin Avg	69.235 mA	Current	Average input current
5.	L Ipp	70.178 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	136.645 mA	Current	Q lavg
7.	BOM Count	18	General	Total Design BOM count
8.	FootPrint	212.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	199.055 kHz	General	Switching frequency
10.	IC Tolerance	8.0 mV	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	750.0 mW	General	Total output power
13.	Total BOM	\$3.27	General	Total BOM Cost
14.	Cross Freq	3.282 kHz	Op Point	Bode plot crossover frequency
15.	Duty Cycle	20.746 %	Op Point	Duty cycle
16.	Efficiency	85.973 %	Op Point	Steady state efficiency
17.	Gain Marg	-25.181 dB	Op Point	Bode Plot Gain Margin
18.	IC Tj	32.691 degC	Op Point	IC junction temperature
19.	ICThetaJA	32.0 degC/W	Op Point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	300.0 mA	Op Point	Iout operating point
21.	Low Freq Gain	40.945 dB	Op Point	Gain at 1Hz
22.	Phase Marg	61.529 deg	Op Point	Bode Plot Phase Margin
23.	VIN_OP	12.6 V	Op Point	Vin operating point
24.	Vout Actual	2.48 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
25.	Vout OP	2.5 V	Op Point	Operational Output Voltage
26.	Vout Tolerance	2.031 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
27.	Vout p-p	1.663 mV	Op Point	Peak-to-peak output ripple voltage
28.	Cin Pd	9.865 μW	Power	Input capacitor power dissipation
29.	Cout Pd	734.228 nW	Power	Output capacitor power dissipation
30.	IC Iq Pd	7.56 mW	Power	IC Iq Pd
31.	IC Pd	84.104 mW	Power	IC power dissipation
32.	L Pd	38.25 mW	Power	Inductor power dissipation
33.	Total Pd	122.366 mW	Power	Total Power Dissipation

Design Assistance

1. **TPS54620** Product Folder : <http://www.ti.com/product/TPS54620> : contains the data sheet and other resources.

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