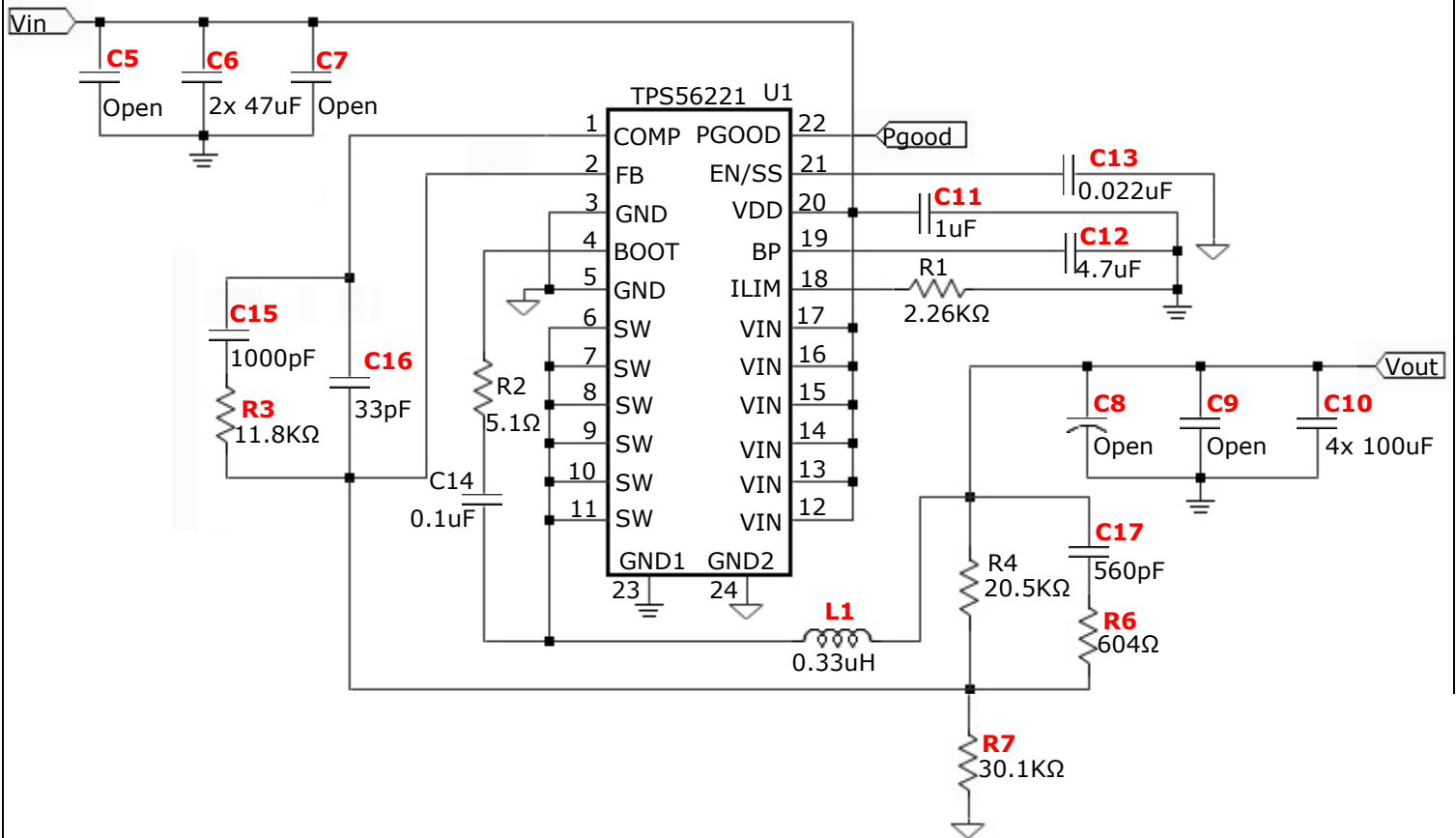


SwitcherPro Design Report Schematic

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A



SwitcherPro Design Report

Analysis - Main

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A

Parameter Units-Symbol	User Input Minimum	User Input Nominal	User Input Maximum	Default Input Minimum	Default Input Nominal	Default Input Maximum	Calculated Minimum	Calculated Nominal	Calculated Maximum
Input Voltage Volts - V	12.00	-	12.00	-	-	-	-	-	-
Input Ripple mVp-p - mVp-p	-	-	-	-	-	240	-	-	87.6
UVLO(Start) Volts - V	-	-	-	-	-	-	-	4.20	-
UVLO(Stop) Volts - V	-	-	-	-	-	-	-	3.60	-
Switching Frequency KHz - KHz	-	-	-	-	500	-	-	-	-
Slow Start ms - ms	-	-	-	-	1.32	-	-	-	-
Estimated PCB Area mm ² - mm ²	-	-	-	-	-	-	-	448	-
Max Component Height mm - mm	-	-	-	-	-	25	-	-	7

SwitcherPro Design Report

Analysis - Output1

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A

Parameter Units-Symbol	User Input Minimum	User Input Nominal	User Input Maximum	Default Input Minimum	Default Input Nominal	Default Input Maximum	Calculated Minimum	Calculated Nominal	Calculated Maximum
Output Voltage Volts - V	-	1.000	-	-	-	-	0.991	-	1.027
Output Ripple mVp-p - mVp-p	-	-	-	-	-	20	-	-	5.3
Output Current Amps - A	-	-	22.000	0.001	-	-	-	-	-
Inductor Peak to Peak Current Amps - A	-	-	-	-	-	-	6.528	-	6.528
Current Limit Threshold Amps - A	-	-	-	-	33.000	-	-	-	-
Gain Margin dB - dB	-	-	-	-10	-	-	-	-74	-
Phase Margin Deg. - Deg.	-	-	-	60	-	-	-	61	-
Upper FET RDSon mOhms - mΩ	-	-	-	-	-	-	5	-	5
Lower FET RDSon mOhms - mΩ	-	-	-	-	-	-	2	-	2
Duty Cycle % - %	-	-	-	-	-	-	8.9	-	8.9
On Time Min (switch) ns - ns	-	-	-	-	-	-	161.1	-	196.9
Cross Over Frequency KHz - KHz	-	-	-	-	-	-	-	71	-

SwitcherPro Design Report

Stress Results

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A

Device	Rated Voltage	Calculated Voltage	Rated Current (RMS)	Calculated Current (RMS)	Error Message	Power	Calculated Max Temp
C6 (High Freq. Input Cap)	16V	12.1V	4.16A	3.14A	-	32mW	-
C10 (Bulk Output Cap)	6.3V	1V	3A	0.47A	-	888uW	-
L1 (Output Inductor)	-	-	27A	22.1A	-	195mW	-
U1 (Converter)	25V	12.1V	40A	22.1A	-	2.4W	55°C

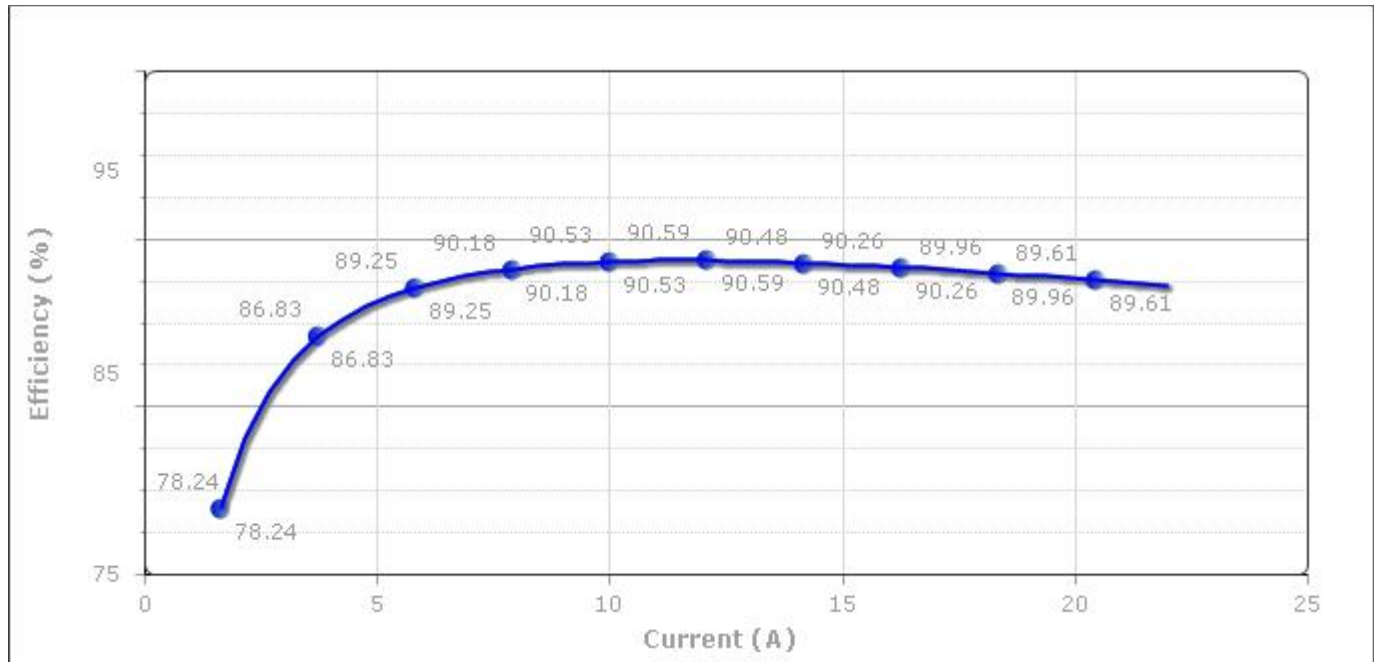
SwitcherPro Design Report

Efficiency

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A



— Efficiency For Vin Max
— Efficiency For Vin Min

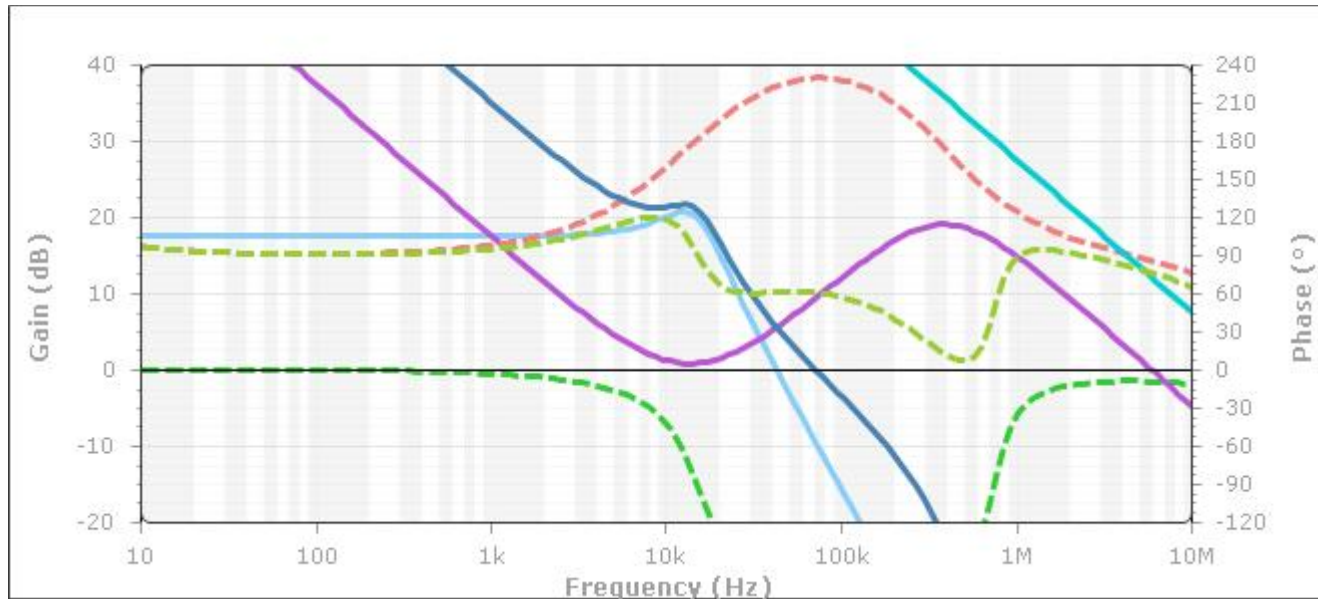
SwitcherPro Design Report

Loop Response

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A



- Power Stage Gain
- Power Stage Phase
- Compensation Gain
- Compensation Phase
- Error Amp Gain
- Total Gain
- Total Phase

SwitcherPro Design Report

Bill of Materials

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A

Name	Quantity	Part Number	Description	Manufacturer	Package	Area(mm ²)	Height(mm)
C10	4	GRM32ER60J107ME20L	Capacitor, Ceramic, 100uF, 6.3V, 20%	Murata Manufacturing	1210	10	2
C11	1	Standard	Capacitor, Ceramic, 1uF, 25V, 10%	Standard	0805	3	1
C12	1	Standard	Capacitor, Ceramic, 4.7uF, 16V, 20%	Standard	0805	3	1
C13	1	Standard	Capacitor, Ceramic, 0.022uF, 4V, 20%	Standard	0603	2	1
C14	1	Standard	Capacitor, Ceramic, 0.1uF, 16V, 20%	Standard	0603	2	1
C15	1	Standard	Capacitor, Ceramic, 1000pF, 4V, 20%	Standard	0603	2	1
C16	1	Standard	Capacitor, Ceramic, 33pF, 4V, 20%	Standard	0603	2	1
C17	1	Standard	Capacitor, Ceramic, 560pF, 4V, 20%	Standard	0603	2	1
C6	2	C5750X5R1C476M	Capacitor, Ceramic, 47uF, 16V, 20%	TDK	C5750 2220	31	2
L1	1	744308033	Inductor, 0.33uH, 27A, 400uΩ	Würth Electronics	10x7	79	7
R1	1	Standard	Resistor, SurfaceMount, 2.26KΩ, 100mW, 1%	Standard	0603	2	1
R2	1	Standard	Resistor, SurfaceMount, 5.1Ω, 100mW, 10%	Standard	0603	2	1
R3	1	Standard	Resistor, SurfaceMount, 11.8KΩ, 100mW, 1%	Standard	0603	2	1
R4	1	Standard	Resistor, SurfaceMount, 20.5KΩ, 100mW, 1%	Standard	0603	2	1
R6	1	Standard	Resistor, SurfaceMount, 604Ω, 100mW, 1%	Standard	0603	2	1
R7	1	Standard	Resistor, SurfaceMount, 30.1KΩ, 100mW, 1%	Standard	0603	2	1
U1	1	TPS56221	IC, Converter, 22 pins	Texas Instruments, Inc.	PQFN PowerPAD	30	1

SwitcherPro Design Report

Layout

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A

TBD

SwitcherPro Design Report

Layout Notes

Design Name: U94_1V_22A

Part: TPS56221

VinMin: 12V **VinMax:** 12V **Vout:** 1V **Iout:** 22A

TPS56221