

MPPTPROTO
L1

Designer Brian Cornell
Program Flyback
Circuit Continuous Buck
Design by
Design for MPPTPROTO

File name for this design is mpptproto-l1-r1

Program name----- = MPPTPROTO
Circuit symbol----- = L1
Input voltage----- = 17.50 volts
Input voltage min----- = 15.00 volts
Input voltage max----- = 22.00 volts

Output voltage----- = 13.80 volts
Diode voltage----- = 0.10 volts
Maximum load current----- = 7.250 amps
Minimum load current----- = 2.000 amps
Output power----- = 100.8 watts
Inductor efficiency----- = 98.0
Regulation----- = 2 %
Flux density----- = 0.100 tesla
Frequency----- = 200,000 hertz
Design goal temperature rise----- = 20.0 degrees C

Inductance----- = 0.000006 henrys
Stored energy----- = 0.000268 watt seconds
Total period----- = 5.0 usec
On time ----- = 4.7 usec
Off time----- = 0.3 usec
High line duty ratio----- = 0.640
Low line duty ratio----- = 0.939
Peak current----- = 9.291 amps
RMS current----- = 7.345 amps
Load power----- = 100.775 watts
Core geometry----- = 0.00307128 cm 5TH
Magnetic material ----- = MPP

Core data

Core configuration----- = MPP Toroidal Core
Core or file number----- = MP-55894
Magnetic path length----- = 6.35 cm
Core weight----- = 35.30 grams
Copper weight----- = 22.94 grams

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Mean length turn----- = 4.13 cm
Iron area----- = 0.65 cm sq
Windows area----- = 1.56 cm sq
Area product----- = 1.02067000 cm 4TH
Core geometry----- = 0.06458000 cm 5TH
Surface area----- = 39.84 cm sq
Core permeability----- = 60.00
Millhenry per 1000 turns----- = 75.00

Permeability required----- = 61.7

Diode peak inverse voltage----- = 22 PIV
Peak current----- = 9.291 amps
Delta current----- = 4.082 amps
RMS current----- = 7.345 amps

Inductor current density----- = 449 amps per cm sq
Inductor window utilization----- = 0.119
Inductor turns----- = 9
Wire gage----- = 24 AWG
Wire diameter----- = 0.5168 millimeters
Number of strands----- = 8
Copper weight----- = 5.41 grams

Winding resistance----- = 0.004 ohms
Winding dissipation----- = 0.212 watts
Regulation----- = 0.21 %
Maximum flux density----- = 0.100 tesla
Maximum ac flux----- = 0.022 tesla
Watts per kilogram----- = 5.924
Core loss----- = 0.209 watts
Total loss----- = 0.421 watts
Efficiency----- = 99.584 %
Watt density----- = 0.011 W/cm sq
Temperature rise----- = 10.5 degrees C
Design goal temperature rise----- = 20.0 degrees C

Inductance at peak current----- = 0.000004 henrys
Inductance is down by 20 % at----- = 44 oersteds
Magnetizing force----- = 16.5 oersteds
Magnetizing force----- = 13.2 AT/cm