

Main Specifications

Input Voltage - Maximum	Vac_max =	253	Vrms
Input Voltage - Typical	Vac_typ =	230	Vrms
Input Voltage - Minimum	Vac_min =	216	Vrms
Input Frequency	Fline_typ =	50	Hz
Maximum Ambient Temperature	Ta_max =	50	°C

	Vout(n)	Vd(n)	Iout(n) - Max	Iout(n) - Min	Pout(n) - Max	Pout(n) - Min
Vcc	12.0 V	1.0 V	2.0 A	0.2 A	24.0 W	2.4 W
1st Output	5.0 V	0.6 V	12.0 A	2.0 A	60.0 W	10.0 W
2nd Output	3.3 V	0.4 V	8.0 A	1.0 A	26.4 W	3.3 W
3rd Output	12.0 V	1.0 V	3.0 A	0.5 A	36.0 W	6.0 W

Transformer Specifications

Switching Frequency	fsw =	100	kHz
Max Duty cycle	Dmax =	0.4	
Estimated Efficiency	η =	98	%
Target Regulation	α =	0.5	%
Optimum Flux Density Swing	ΔB =	115	mT
Target Utilization Factor	Ku =	30	%
Creepage Distance		8	mm
Core Size		PQ32/30	
Effective Core Area	Ae =	161	mm <sup>2</sup>
Window area of core	Aw =	149	mm <sup>2</sup>
Window area of bobbin	Aw' =	104	mm <sup>2</sup>
Width of bobbin	Bw =	18.5	mm
Effective Magnetic Volume	Ve =	10440	mm <sup>3</sup>
Mean Length Turn	Mlt =	62	mm
Core Weight	Wtfe =	55	grams
Surface Area	At =	46.6	cm <sup>2</sup>
Inductance factor	AL =	5140	nH/N <sup>2</sup>
Power Loss Density	Pv =	35	mW/cm <sup>3</sup>
Current Density	J =	252	A/cm <sup>2</sup>
Output Power - Maximum	Pout_max =	161.8	W
Output Power - Minimum	Pout_min =	24.0	W

Input Power - Maximum	<b>Pin_max =</b>	<b>165.1</b>	<b>W</b>
Total Apparent Power	<b>Pt =</b>	<b>326.9</b>	<b>W</b>
Bulk DC Voltage - Maximum	<b>Vbulk_max =</b>	<b>400</b>	<b>Vdc</b>
Bulk DC Voltage - Minimum	<b>Vbulk_min =</b>	<b>380</b>	<b>Vdc</b>

## Winding Calculations

		Primary	Auxiliary	Output 1	Output 2	Output 3	
Number of Turns - Calculated		82.10	7.05	3.04	2.01	7.05	
Number of Turns - Selected	<b>N(x) =</b>	82	7	3	2	7	Turns
Inductance - Calculated	<b>L(x) =</b>	34,561	252	46	21	252	μH
Current	<b>I(x) =</b>	0.69	1.26	7.59	5.06	1.90	A
Bare Wire Area	<b>Aw(x) =</b>	0.0027	0.00501	0.03008	0.02005	0.00752	cm <sup>2</sup>
Wire Size Selected		26	20	20	20	20	AWG
Number of Strands - Calculated		2.12	0.97	5.79	3.86	1.45	
Number of Strands - Selected	<b>Sn(x) =</b>	2	1	6	4	2	Strands
Maximum Turns per Layer		23	12	12	12	12	Turns
Number of layers - Calculated		7.45	0.64	1.64	0.73	1.27	
Number of layers - Selected		8	1	2	1	2	Layers
Winding resistance	<b>R(x) =</b>	342.15	14	1.03	1.03	7.21	mΩ
Copper Loss in Winding	<b>P(x) =</b>	161	23	59	26	26	mW
Utilization Factor	<b>Ku(x) =</b>	14.11	2.44	6.27	2.79	4.88	%
Total Window Utilization	<b>Ku =</b>	30.48	%				

## Loss Calculations

Total Copper Loss in Windings	<b>Pcu =</b>	<b>296</b>	<b>mW</b>
Core Loss	<b>Pfe =</b>	<b>365.40</b>	<b>mW</b>
Total Loss	<b>PΣ =</b>	<b>661.61</b>	<b>mW</b>
Watts per unit area	<b>ψ =</b>	<b>0.014</b>	<b>W/cm<sup>2</sup></b>
Temperature Rise	<b>ΔT =</b>	<b>13.4</b>	<b>°C</b>
Efficiency - Calculated	<b>η =</b>	<b>99.59</b>	<b>%</b>
Regulation - Calculated	<b>α =</b>	<b>0.183</b>	<b>%</b>



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