

A	B	C	D	E	F
ACDC_TNY-II_020105; Rev.2.4; Copyright Power Integrations Inc. 2005	INPUT	INFO	OUTPUT	UNIT	ACDC_TNYII_020105_Rev2-4.xls; TinySwitch-II Continuous/Discontinuous Flyback Transformer Design Spreadsheet
<b>ENTER APPLICATION VARIABLES</b>					
VACMIN	85			Volts	Customer
VACMAX	265			Volts	Maximum AC Input Voltage
fL	50			Hertz	AC Mains Frequency
VO	30.00			Volts	Output Voltage
PO	9.90			Watts	Output Power
n	0.74				Efficiency Estimate
Z			0.5		Loss Allocation Factor
tC			3	mSeconds	Bridge Rectifier Conduction Time Estimate
CIN	22.00			uFarads	Input Filter Capacitor
<b>ENTER TinySwitch-II VARIABLES</b>					
TinySwitch-II	TTY268			Universal	115 Doubled/230V
Chosen Device		TTY268	Power Out	15W	23W
ILIMITMIN			0.512	Amps	TinySwitch-II Minimum Current Limit
ILIMITMAX			0.588	Amps	TinySwitch-II Maximum Current Limit
fS			132000	Hertz	TinySwitch-II Switching Frequency
fSmin			120000	Hertz	TinySwitch-II Minimum Switching Frequency (inc. jitter)
fSmax			144000	Hertz	TinySwitch-II Maximum Switching Frequency (inc. jitter)
VOR	100.00			Volts	Reflected Output Voltage
VDS			10	Volts	TinySwitch-II on-state Drain to Source Voltage
VD	0.50			Volts	Output Winding Diode Forward Voltage Drop
KP			0.87		Ripple to Peak Current Ratio (0.6<KRP<1.0 : 1.0<KDP<6.0)
<b>ENTER TRANSFORMER CORE/CONSTRUCTION VARIABLES</b>					
Core Type	EF20				
Core		EF20		P/N:	PC40EF20-Z
Bobbin		EF20_BOBBIN		P/N:	*
AE			0.335	cm^2	Core Effective Cross Sectional Area
LE			4.49	cm	Core Effective Path Length
AL			1570	nH/T^2	Ungapped Core Effective Inductance
BW			12.2	mm	Bobbin Physical Winding Width
M	0.00			mm	Safety Margin Width (Half the Primary to Secondary Creepage Distance)
L	2.00				Number of Primary Layers
NS	20.00				Number of Secondary Turns
<b>DC INPUT VOLTAGE PARAMETERS</b>					
VMIN			77	Volts	Minimum DC Input Voltage
VMAX			375	Volts	Maximum DC Input Voltage
<b>CURRENT WAVEFORM SHAPE PARAMETERS</b>					
DMAX			0.60		Maximum Duty Cycle
Iavg			0.17	Amps	Average Primary Current
IP			0.51	Amps	Minimum Peak Primary Current
IR			0.44	Amps	Primary Ripple Current
IRMS			0.25	Amps	Primary RMS Current
<b>TRANSFORMER PRIMARY DESIGN PARAMETERS</b>					
LP			753	uHenries	Primary Inductance
NP			66		Primary Winding Number of Turns
ALG			175	nH/T^2	Gapped Core Effective Inductance
BM			2016	Gauss	Maximum Flux Density, (BP<3100)
BAC			761	Gauss	AC Flux Density for Core Loss Curves (0.5 X Peak to Peak)
ur			1675		Relative Permeability of Ungapped Core
LG			0.21	mm	Gap Length (Lg > 0.1 mm)
BWE			24.4	mm	Effective Bobbin Width
OD			0.37	mm	Maximum Primary Wire Diameter including insulation
INS			0.06	mm	Estimated Total Insulation Thickness (= 2 * film thickness)
DIA			0.31	mm	Bare conductor diameter
AWG			29	AWG	Primary Wire Gauge (Rounded to next smaller standard AWG value)
CM			128	Cmils	Bare conductor effective area in circular mils
CMA		Info	522	Cmils/Amp	CAN DECREASE CMA < 500 (decrease L(primary layers),increase NS,smaller Core)
<b>TRANSFORMER SECONDARY DESIGN PARAMETERS</b>					
<b>Lumped parameters</b>					
ISP			1.68	Amps	Peak Secondary Current
ISRMS			0.66	Amps	Secondary RMS Current
IO			0.33	Amps	Power Supply Output Current
IRIPPLE			0.57	Amps	Output Capacitor RMS Ripple Current
CMS			132	Cmils	Secondary Bare Conductor minimum circular mils
AWGS			28	AWG	Secondary Wire Gauge (Rounded up to next larger standard AWG value)
DIAS			0.32	mm	Secondary Minimum Bare Conductor Diameter
ODS			0.61	mm	Secondary Maximum Outside Diameter for Triple Insulated Wire
INSS			0.14	mm	Maximum Secondary Insulation Wall Thickness
<b>VOLTAGE STRESS PARAMETERS</b>					
VDRAIN			605	Volts	Maximum Drain Voltage Estimate (Includes Effect of Leakage Inductance)
PIVS			144	Volts	Output Rectifier Maximum Peak Inverse Voltage
<b>TRANSFORMER SECONDARY DESIGN PARAMETERS (MULTIPLE OUTPUTS)</b>					
<b>1st output</b>					
VO1			30	Volts	Output Voltage (if unused, defaults to single output design)
IO1			0.330	Amps	Output DC Current
PO1			9.90	Watts	Output Power
VD1	0.50		0.5	Volts	Output Diode Forward Voltage Drop
NS1			20.00		Output Winding Number of Turns
ISRMS1			0.659	Amps	Output Winding RMS Current
IRIPPLE1			0.57	Amps	Output Capacitor RMS Ripple Current
PIVS1			144	Volts	Output Rectifier Maximum Peak Inverse Voltage
CMS1			132	Cmils	Output Winding Bare Conductor minimum circular mils
AWGS1			28	AWG	Wire Gauge (Rounded up to next larger standard AWG value)
DIAS1			0.32	mm	Minimum Bare Conductor Diameter
ODS1			0.61	mm	Maximum Outside Diameter for Triple Insulated Wire
<b>2nd output</b>					
VO2				Volts	Output Voltage
IO2				Amps	Output DC Current
PO2			0.00	Watts	Output Power
VD2				Volts	Output Diode Forward Voltage Drop
NS2			0.00		Output Winding Number of Turns
ISRMS2			0.000	Amps	Output Winding RMS Current
IRIPPLE2			0.00	Amps	Output Capacitor RMS Ripple Current
PIVS2			0	Volts	Output Rectifier Maximum Peak Inverse Voltage

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CMS2			0	Cmils	Output Winding Bare Conductor minimum circular mils
AWGS2			N/A	AWG	Wire Gauge (Rounded up to next larger standard AWG value)
DIAS2			N/A	mm	Minimum Bare Conductor Diameter
ODS2			N/A	mm	Maximum Outside Diameter for Triple Insulated Wire
<b>3rd output</b>					
VO3				Volts	Output Voltage
IO3				Amps	Output DC Current
PO3			0.00	Watts	Output Power
VD3				Volts	Output Diode Forward Voltage Drop
NS3			0.00		Output Winding Number of Turns
ISRMS3			0.000	Amps	Output Winding RMS Current
IRIPPLE3			0.00	Amps	Output Capacitor RMS Ripple Current
PIVS3			0	Volts	Output Rectifier Maximum Peak Inverse Voltage
CMS3			0	Cmils	Output Winding Bare Conductor minimum circular mils
AWGS3			N/A	AWG	Wire Gauge (Rounded up to next larger standard AWG value)
DIAS3			N/A	mm	Minimum Bare Conductor Diameter
ODS3			N/A	mm	Maximum Outside Diameter for Triple Insulated Wire
<b>Total power</b>					
			9.9	Watts	Total Output Power
Negative Output					
			N/A		If negative output exists enter Output number; eg: If VO2 is negative output, enter 2