A	B	C	D	E	F
ACDC_TOP-2_030206; Rev.2.9; Copyright Power Integrations 2006	**INPUT**	**INFO**	**OUTPUT**	**UNITS**	**ACDC_TOP-2_030206_Rev2-9.xls; TinySwitch-II Continuous/Discontinuous Flyback Transformer Design Spreadsheet**
ENTER APPLICATION VARIABLES					**Note: TOP22X Family is not recommended for new Users. A Later generation TOPSwitch-GX (TOP24X family) is now available from Power Integrations**
VACMIN	230			Volts	Minimum AC Input Voltage
VACMAX	265			Volts	Maximum AC Input Voltage
fL	50			Hertz	AC Mains Frequency
fS		100000		Hertz	TOPSwitch Switching Frequency
VO	5.00			Volts	Output Voltage (main)
PO	23.00			Watts	Output Power
n	0.70				Efficiency Estimate
Z	0.50				Loss Allocation Factor
VB	10			Volts	Bias Voltage
tC	3.00			mSeconds	Bridge Rectifier Conduction Time Estimate
CIN	22.00			uFarads	Input Filter Capacitor
ENTER TOPSWITCH VARIABLES					
TOPSwitch	**TOP223**			*Universal*	*115/230V*
Chosen Device		*TOP223*	*Power Out*	*30W*	*50W*
VOR	100.00			Volts	Reflected Output Voltage
ILIMITMAX		*0.9*	*1.1*	Amps	From TOPSwitch Data Sheet
VDS	5.00			Volts	TOPSwitch on-state Drain to Source Voltage
VD	0.40			Volts	Output Winding Diode Forward Voltage Drop
VDB	0.70			Volts	Bias Winding Diode Forward Voltage Drop
KRP/KDP	0.75				Ripple to Peak Current Ratio (0.4 < KRP < 1.0 : 1.0< KDP<6.0)
ENTER TRANSFORMER CORE/CONSTRUCTION VARIABLES					
Core Type	**eel22**				
Core Manuf					
Bobbin Manuf					
Core		*EEL22*		*P/N:*	*PC40EE22/29/6-Z*
Bobbin		*EEL22_BOBBIN*		*P/N:*	*
AE			0.358	cm^2	Core Effective Cross Sectional Area
LE			6.32	cm	Core Effective Path Length
AL			1400	nH/T^2	Ungapped Core Effective Inductance
BW			18	mm	Bobbin Physical Winding Width
M	3.00			mm	Safety Margin Width (Half the Primary to Secondary Creepage Distance)
L	2.00				Number of Primary Layers
NS	5				Number of Secondary Turns
DC INPUT VOLTAGE PARAMETERS					
VMIN			291	Volts	Minimum DC Input Voltage
VMAX			375	Volts	Maximum DC Input Voltage
CURRENT WAVEFORM SHAPE PARAMETERS					
DMAX			0.26		Maximum Duty Cycle
IAVG			0.11	Amps	Average Primary Current
IP			0.70	Amps	Peak Primary Current
IR			0.52	Amps	Primary Ripple Current
IRMS			0.23	Amps	Primary RMS Current
TRANSFORMER PRIMARY DESIGN PARAMETERS					
LP			1226	uHenries	Primary Inductance
NP			93		Primary Winding Number of Turns
NB			10		Bias Winding Number of Turns
ALG			143	nH/T^2	Gapped Core Effective Inductance
BM			2578	Gauss	Flux Density at PO, VMIN
BP			4068	Gauss	Peak Flux Density (BP<4200)
BAC			967	Gauss	AC Flux Density for Core Loss Curves (0.5 X Peak to Peak)
ur			1967		Relative Permeability of Ungapped Core
LG			0.28	mm	Gap Length (Lg >> 0.051 mm)
BWE			24	mm	Effective Bobbin Width
OD			0.26	mm	Maximum Primary Wire Diameter including insulation
INS			0.05	mm	Estimated Total Insulation Thickness (= 2 * film thickness)
DIA			0.21	mm	Bare conductor diameter
AWG			32	AWG	Primary Wire Gauge (Rounded to next smaller standard AWG value)
CM			64	Cmils	Bare conductor effective area in circular mils
CMA			273	Cmils/Amp	Primary Winding Current Capacity (200 < CMA < 500)
TRANSFORMER SECONDARY DESIGN PARAMETERS					
ISP			12.91	Amps	Peak Secondary Current
ISRMS			7.35	Amps	Secondary RMS Current
IO			4.60	Amps	Power Supply Output Current
IRIPPLE			5.73	Amps	Output Capacitor RMS Ripple Current
CMS			2006	Cmils	Secondary Bare Conductor minimum circular mils
AWGS			17	AWG	Secondary Wire Gauge (Rounded up to next larger standard AWG value)

A	B	C	D	E	F
DIAS			1.15	mm	Secondary Minimum Bare Conductor Diameter
ODS			2.40	mm	Secondary Maximum Insulated Wire Outside Diameter
INSS			0.62	mm	Maximum Secondary Insulation Wall Thickness
VOLTAGE STRESS PARAMETERS					
VDRAIN			605	Volts	Maximum Drain Voltage Estimate (Includes Effect of Leakage Inductance)
PIVS			25	Volts	Output Rectifier Maximum Peak Inverse Voltage
PIVB			50	Volts	Bias Rectifier Maximum Peak Inverse Voltage
ADDITIONAL OUTPUTS					
VO2	15.00			Volts	Output 2 - Output Voltage
VD2	0.65			Volts	Output 2 - Diode Forward Voltage Drop
NS2			14.49		Output 2 - Number of Turns
PIVS2			74	Volts	Output 2 - Rectifier Maximum Peak Inverse Voltage
VO3				Volts	Output 3 - Output Voltage
VD3				Volts	Output 3 - Diode Forward Voltage Drop
NS3			0.00		Output 3 - Number of Turns
PIVS3			0	Volts	Output 3 - Rectifier Maximum Peak Inverse Voltage
VO4				Volts	Output 4 - Output Voltage
VD4				Volts	Output 4 - Diode Forward Voltage Drop
NS4			0.00		Output 4 - Number of Turns
PIVS4			0	Volts	Output 4 - Rectifier Maximum Peak Inverse Voltage
VO5				Volts	Output 5 - Output Voltage
VD5				Volts	Output 5 - Diode Forward Voltage Drop
NS5			0.00		Output 5 - Number of Turns
PIVS5			0	Volts	Output 5 - Rectifier Maximum Peak Inverse Voltage
I_OUT2				Amps	Output -2 Output Current
I_OUT3				Amps	Output -3 Output Current
I_OUT4				Amps	Output -4 Output Current
I_OUT5				Amps	Output -5 Output Current
Negative Output			N/A		If negative output exists enter Output number; eg: If VO2 is negative output, enter 2