

A	B	C	D	E	F
ACDC_TOPSwitchGX_022306; Rev.2.9; Copyright Power Integrations 2006					TOP_GX_FX_022306: TOPSwitch-GX/FX Continuous/Discontinuous Flyback Transformer Design Spreadsheet
ENTER APPLICATION VARIABLES					
VACMIN	85			Volts	Minimum AC Input Voltage
VACMAX	265			Volts	Maximum AC Input Voltage
fL	50			Hertz	AC Mains Frequency
VO	5.00			Volts	Output Voltage (main)
PO	15.00			Watts	Output Power
n	0.75				Efficiency Estimate
Z	0.50				Loss Allocation Factor
VB	15			Volts	Bias Voltage
tC	3.00			mSeconds	Bridge Rectifier Conduction Time Estimate
CIN	33.00			uFarads	Input Filter Capacitor
ENTER TOPSWITCH-GX VARIABLES					
TOP-GX	TOP244			Universal	115 Doubled/230V
Chosen Device		TOP244	Power Out	45W	65W
KI	0.80				External Ilimit reduction factor (KI=1.0 for default ILIMIT, KI <1.0 for lower ILIMIT)
ILIMITMIN			0.972	Amps	Use 1% resistor in setting external ILIMIT
ILIMITMAX			1.188	Amps	Use 1% resistor in setting external ILIMIT
Frequency (F)=132kHz, (H)=66kHz	F				Full (F) frequency option - 132kHz
fS			132000	Hertz	TOPSwitch-GX Switching Frequency: Choose between 132 kHz and 66 kHz
fSmin			124000	Hertz	TOPSwitch-GX Minimum Switching Frequency
fSmax			140000	Hertz	TOPSwitch-GX Maximum Switching Frequency
VOR	110.00			Volts	Reflected Output Voltage
VDS	10.00			Volts	TOPSwitch on-state Drain to Source Voltage
VD	0.50			Volts	Output Winding Diode Forward Voltage Drop
VDB	0.70			Volts	Bias Winding Diode Forward Voltage Drop
KP	0.60				Ripple to Peak Current Ratio (0.4 < KRP < 1.0 : 1.0 < KDP < 6.0)
ENTER TRANSFORMER CORE/CONSTRUCTION VARIABLES					
Core Type	EI25				
Core		EI25		P/N:	PC40EI25-Z
Bobbin		EI25_BOBBIN		P/N:	BE-25-118CP
AE			0.41	cm^2	Core Effective Cross Sectional Area
LE			4.7	cm	Core Effective Path Length
AL			2140	nH/T^2	Ungapped Core Effective Inductance
BW			9.8	mm	Bobbin Physical Winding Width
M	0.00			mm	Safety Margin Width (Half the Primary to Secondary Creepage Distance)
L	3.00				Number of Primary Layers
NS	4				Number of Secondary Turns
DC INPUT VOLTAGE PARAMETERS					
VMIN			77	Volts	Minimum DC Input Voltage
VMAX			375	Volts	Maximum DC Input Voltage
CURRENT WAVEFORM SHAPE PARAMETERS					
DMAX			0.62		Maximum Duty Cycle
IAVG			0.26	Amps	Average Primary Current
IP			0.60	Amps	Peak Primary Current
IR			0.36	Amps	Primary Ripple Current
IRMS			0.34	Amps	Primary RMS Current
TRANSFORMER PRIMARY DESIGN PARAMETERS					
LP			946	uHenries	Primary Inductance
NP			80		Primary Winding Number of Turns
NB			11		Bias Winding Number of Turns
ALG			148	nH/T^2	Gapped Core Effective Inductance
BM			1719	Gauss	Maximum Flux Density at PO, VMIN (BM<3000)
BP			3426	Gauss	Peak Flux Density (BP<4200)
BAC			516	Gauss	AC Flux Density for Core Loss Curves (0.5 X Peak to Peak)
ur			1952		Relative Permeability of Ungapped Core
LG			0.32	mm	Gap Length (Lg > 0.1 mm)
BWE			29.4	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			378	Cmils/Amp	Primary Winding Current Capacity (200 < CMA < 500)
TRANSFORMER SECONDARY DESIGN PARAMETERS (SINGLE OUTPUT EQUIVALENT)					
Lumped parameters					
ISP			11.92	Amps	Peak Secondary Current
ISRMS			5.29	Amps	Secondary RMS Current
IO			3.00	Amps	Power Supply Output Current
IRIPPLE			4.36	Amps	Output Capacitor RMS Ripple Current
CMS			1059	Cmils	Secondary Bare Conductor minimum circular mils
AWGS			19	AWG	Secondary Wire Gauge (Rounded up to next larger standard AWG value)
DIAS			0.91	mm	Secondary Minimum Bare Conductor Diameter
ODS			2.45	mm	Secondary Maximum Outside Diameter for Triple Insulated Wire
INSS			0.77	mm	Maximum Secondary Insulation Wall Thickness
VOLTAGE STRESS PARAMETERS					
VDRAIN			626	Volts	Maximum Drain Voltage Estimate (Includes Effect of Leakage Inductance)

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PIVS			24	Volts	Output Rectifier Maximum Peak Inverse Voltage
PIVB			68	Volts	Bias Rectifier Maximum Peak Inverse Voltage
TRANSFORMER SECONDARY DESIGN PARAMETERS (MULTIPLE OUTPUTS)					
1st output					
VO1			5	Volts	Output Voltage
IO1			3	Amps	Output DC Current
PO1			15.00	Watts	Output Power
VD1			0.5	Volts	Output Diode Forward Voltage Drop
NS1			4.00		Output Winding Number of Turns
ISRMS1			5.295	Amps	Output Winding RMS Current
IRIPPLE1			4.36	Amps	Output Capacitor RMS Ripple Current
PIVS1			24	Volts	Output Rectifier Maximum Peak Inverse Voltage
CMS1			1059	Cmils	Output Winding Bare Conductor minimum circular mils
AWGS1			19	AWG	Wire Gauge (Rounded up to next larger standard AWG value)
DIAS1			0.91	mm	Minimum Bare Conductor Diameter
ODS1			2.45	mm	Maximum Outside Diameter for Triple Insulated Wire
2nd output					
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
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
3rd output					
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
Total power			15	Watts	Total Power for Multi-output section
Negative Output			N/A		If negative output exists enter Output number; eg: If VO2 is negative output, enter 2