A	B	C	D	E	F
ACDC_LinkSwitch-II_103108; Rev.1.9; Copyright Power Integrations 2008	**INPUT**	**INFO**	**OUTPUT**	**UNIT**	**ACDC_LinkSwitch-II_103108_Rev1-9.xls; LinkSwitch-II Discontinuous Flyback Transformer Design Spreadsheet**
ENTER APPLICATION VARIABLES					**Design Title**
VACMIN	85			V	Minimum AC Input Voltage
VACMAX	265			V	Maximum AC Input Voltage
fL	50			Hz	AC Mains Frequency
VO	7.50			V	Output Voltage (at continuous power)
IO	0.40			A	Power Supply Output Current (corresponding to peak power)
Power			3.00	W	Continuous Output Power
n			0.70		Efficiency Estimate at output terminals. Under 0.7 if no better data available
Z			0.50		Z Factor. Ratio of secondary side losses to the total losses in the power supply. Use 0.5 if no better data available
tC			3.00	ms	Bridge Rectifier Conduction Time Estimate
Add Bias Winding	YES		YES		Choose Yes to add a Bias winding to power the LinkSwitch-II.
CIN	9.40			uF	Input Capacitance
ENTER LinkSwitch-II VARIABLES					
Chosen Device	**LNK604**		LNK604		Chosen LinkSwitch-II device
Package	**PG**		PG		Select package (PG, GG or DG)
ILIMITMIN			0.24	A	Minimum Current Limit
ILIMITTYP			0.25	A	Typical Current Limit
ILIMITMAX			0.28	A	Maximum Current Limit
FS			66.00	kHz	Typical Device Switching Frequency at maximum power
VOR			82.67	V	Reflected Output Voltage (VOR < 135 V Recommended)
VDS			10.00	V	LinkSwitch-II on-state Drain to Source Voltage
VD			0.50	V	Output Winding Diode Forward Voltage Drop
KP			2.40		Ensure KDP > 1.3 for discontinuous mode operation
FEEDBACK WINDING PARAMETERS					
NFB			8.00		Feedback winding turns
VFLY			7.11	V	Flyback Voltage - Voltage on Feedback Winding during switch off time
VFOR			7.73	V	Forward voltage - Voltage on Feedback Winding during switch on time
BIAS WINDING PARAMETERS					
VB			10.00	V	Bias Winding Voltage. Ensure that VB > VFLY. Bias winding is assumed to be AC-STACKED on top of Feedback winding
NB			4.00		Bias Winding number of turns
DESIGN PARAMETERS					
DCON			4.50	us	Output diode conduction time
TON			4.20	us	LinkSwitch-II On-time (calculated at minimum inductance)
RUPPER			18.87	k-ohm	Upper resistor in Feedback resistor divider
RLOWER			6.59	k-ohm	Lower resistor in resistor divider
ENTER TRANSFORMER CORE/CONSTRUCTION VARIABLES					
Core Type					
Core	**EE16**		EE16		Enter Transformer Core. Based on the output power the recommended core sizes are EE13 or EE16
Bobbin			EE16_BOBBIN		Generic EE16_BOBBIN
AE			19.20	mm^2	Core Effective Cross Sectional Area
LE			35.00	mm^2	Core Effective Path Length
AL			1140.00	nH/turn^2	Ungapped Core Effective Inductance
BW			8.60	mm	Bobbin Physical Winding Width
M			0.00	mm	Safety Margin Width (Half the Primary to Secondary Creepage Distance)
L	2.00		2.00		Number of Primary Layers
NS			9.00		Number of Secondary Turns. To adjust Secondary number of turns change DCON
DC INPUT VOLTAGE PARAMETERS					
VMIN			89.82	V	Minimum DC bus voltage
VMAX			374.77	V	Maximum DC bus voltage
CURRENT WAVEFORM SHAPE PARAMETERS					
DMAX			0.28		Maximum duty cycle measured at VMIN
IAVG			0.05	A	Input Average current
IP			0.24	A	Peak primary current
IR			0.24	A	Primary ripple current
IRMS			0.08	A	Primary RMS current
TRANSFORMER PRIMARY DESIGN PARAMETERS					
LPMIN			1589.61	uH	Minimum Primary Inductance
LPTYP			1766.23	uH	Typical Primary inductance
LP_TOLERANCE			10.00		Tolerance in primary inductance
NP			93.00		Primary number of turns. To adjust Primary number of turns change BM_TARGET
ALG			204.21	nH/turn^2	Gapped Core Effective Inductance
BM_TARGET			2500.00	Gauss	Target Flux Density
BM			2472.89	Gauss	Maximum Operating Flux Density (calculated at nominal inductance), BM < 2500 is recommended
BP			2992.19	Gauss	Peak Operating Flux Density (calculated at maximum inducatnce and max current limit), BP < 3000 is recommended
BAC			1236.44	Gauss	AC Flux Density for Core Loss Curves (0.5 X Peak to Peak)
ur			165.37		Relative Permeability of Ungapped Core
LG			0.11	mm	Gap Length (LG > 0.1 mm)
BWE			17.20	mm	Effective Bobbin Width
OD			0.18	mm	Maximum Primary Wire Diameter including insulation
INS			0.04		Estimated Total Insulation Thickness (= 2 * film thickness)
DIA			0.15	mm	Bare conductor diameter
AWG			35.00		Primary Wire Gauge (Rounded to next smaller standard AWG value)
CM			32.00		Bare conductor effective area in circular mils
CMA			382.65		Primary Winding Current Capacity (200 < CMA < 500)
TRANSFORMER SECONDARY DESIGN PARAMETERS					
Lumped parameters					
ISP			2.45	A	Peak Secondary Current
ISRMS			0.90	A	Secondary RMS Current

A	B	C	D	E	F
IRIPPLE			0.81	A	Output Capacitor RMS Ripple Current
CMS			180.15		Secondary Bare Conductor minimum circular mils
AWGS			27.00		Secondary Wire Gauge (Rounded up to next larger standard AWG value)
VOLTAGE STRESS PARAMETERS					
VDRAIN			568.37	V	Maximum Drain Voltage Estimate (Assumes 20% clamping voltage tolerance and an additional 10% temperature tolerance)
PIVS			43.77	V	Output Rectifier Maximum Peak Inverse Voltage
FINE TUNING					
RUPPER_ACTUAL				k-ohm	Actual Value of upper resistor (RUPPER) used on PCB
RLOWER_ACTUAL				k-ohm	Actual Value of lower resistor (RLOWER) used on PCB
Actual (Measued) Output Voltage (VDC)				V	Measured Output voltage from first prototype
Actual (Measured) Output Current (ADC)				Amps	Measured Output current from first prototype
RUPPER_FINE			18.87	k-ohm	New value of Upper resistor (RUPPER) in Feedback resistor divider. Nearest standard value is 18.7 k-ohms
RLOWER_FINE			6.59	k-ohm	New value of Lower resistor (RLOWER) in Feedback resistor divider. Nearest standard value is 6.65 k-ohms