ACDC_LinkSwitch-HP_050415; Rev.2.1; Copyright Power Integrations 2015	INPUT	INFO	OUTPUT	UNIT	ACDC_LinkSwitchHP_050415 Rev 2-1.xls: LinkSwitch-HP Flyback Continuous/Discontinuous Transformer Design Spreadsheet
ENTER APPLICATION VARIABLES					Customer
VACMIN	90		90	V	Minimum AC Input Voltage
VACMAX			265	V	Maximum AC Input Voltage
fL			50	Hz	AC Mains Frequency
VO			12	V	Output Voltage (main)
PO	60		60	W	Load Power
n			0.80		Efficiency Estimate
Z			0.50		Loss Allocation Factor
VB			10	V	Bias Voltage
tC			3	ms	Bridge Rectifier Conduction Time Estimate
CIN			180	uF	Input Filter Capacitor
Package	E/V		E/V		E and V Package Selected
Enclosure	Open Frame		Open Frame		Open Frame type enclosure
Heatsink	Metal		Metal		Metallic heatsink thermally connected to the exposed metal on the E-package
ENTER LinkSwitch-HP VARIABLES					
LinkSwitch-HP	Auto		LNK6766E		Autopick assumes Enclosure=Adapter for all Packages. In case of K-Package: Heatsink=PCB-R
ILIMITMIN			1.814	A	Minimum Current limit
ILIMITMAX			2.087	A	Maximum current limit
ILIMITMIN_EXT			1.814	A	External Minimum Current limit
ILIMITMAX_EXT			2.087	A	External Maximum current limit
KI	Auto		1		Current limit reduction factor
Rpd			124.00	k-ohm	Program delay Resistor
Cpd			33.00	nF	Program delay Capacitor
Total programmed delay			0.86	sec	Total program delay
fS			132	kHz	LinkSwitch-HP Switching Frequency
fSmin			120	kHz	LinkSwitch-HP Minimum Switching Frequency
fSmax			136	kHz	LinkSwitch-HP Maximum Switching Frequency
KP			0.40		Ripple to Peak Current Ratio (0.4 < KP < 6.0)
VOR			108.40	V	Reflected Output Voltage
Voltage Sense					
VUVON			112.00	V	Undervoltage turn on
VUVOFF			47.15	V	Undervoltage turn off
VOV			508.22	V	Overvoltage threshold
FMAX_FULL_LOAD			133.85	kHz	Maximum switching frequency at full load
FMIN_FULL_LOAD			118.10	kHz	Minimum switching frequency at full load
TSAMPLE_FULL_LOAD			3.50	us	Minimum available Diode conduction time at full load. This should be greater than 2.5 us
TSAMPLE_LIGHT_LOAD			2.42	us	Minimum available Diode conduction time at light load. This should be greater than 1.4 us
VDS			3.23	V	LinkSwitch-HP on-state Drain to Source Voltage.

VD			0.50	V	Output Winding Diode Forward Voltage Drop
VDB			0.70	V	Bias Winding Diode Forward Voltage Drop
FEEDBACK SENSING SECTION					
RFB1			49.90	k-ohms	Feedback divider upper resistor
RFB2			9.31	k-ohms	Feedback divider lowerr resistor
ENTER TRANSFORMER CORE/CONSTRUCTION VARIABLES					
Select Core Size	Auto		Auto		Auto Core Selection
Core			EE30		Selected Core
Custom Core					Enter name of custom core is applicable
AE			1.11	cm^2	Core Effective Cross Sectional Area
LE			5.80	cm	Core Effective Path Length
AL			4690	nH/T^2	Ungapped Core Effective Inductance
BW			13.7	mm	Bobbin Physical Winding Width
M			0.00	mm	Safety Margin Width (Half the Primary to Secondary Creepage Distance)
L			2		Number of Primary Layers
NS			5		Number of Secondary Turns
DC INPUT VOLTAGE PARAMETERS					
VMIN			102	V	Minimum DC Input Voltage
VMAX			375	V	Maximum DC Input Voltage
CURRENT WAVEFORM SHAPE PARAMETERS					
DMAX			0.52		Maximum Duty Cycle
IAVG			0.74	A	Average Primary Current
IP			1.76	A	Peak Primary Current
IR			0.70	A	Primary Ripple Current
IRMS			1.03	A	Primary RMS Current
TRANSFORMER PRIMARY DESIGN PARAMETERS					
LP_TYP			642	uH	Typical Primary Inductance
LP_TOL			10	%	Primary inductance Tolerance
NP			44		Primary Winding Number of Turns
NB			5		Bias Winding Number of Turns
ALG			332	nH/T^2	Gapped Core Effective Inductance
BM			2311	Gauss	Maximum Flux Density at PO, VMIN (BM<3100)
BP			3018	Gauss	Peak Flux Density (BP<3700)
BAC			462	Gauss	AC Flux Density for Core Loss Curves (0.5 X Peak to Peak)
ur			1950		Relative Permeability of Ungapped Core
LG			0.39	mm	Gap Length (Lg > 0.1 mm)
BWE			27.4	mm	Effective Bobbin Width
OD			0.62	mm	Maximum Primary Wire Diameter including insulation

INS			0.07	mm	Estimated Total Insulation Thickness (= 2 * film thickness)
DIA			0.55	mm	Bare conductor diameter
AWG			24	AWG	Primary Wire Gauge (Rounded to next smaller standard AWG value)
CM			406	Cmils	Bare conductor effective area in circular mils
CMA			395	Cmils/Amp	Primary Winding Current Capacity (200 < CMA < 500)
TRANSFORMER SECONDARY DESIGN PARAMETERS (SINGLE OUTPUT EQUIVALENT)					
Lumped parameters					
ISP			15.47	A	Peak Secondary Current
ISRMS			8.63	A	Secondary RMS Current
IO			5.00	A	Power Supply Output Current
IRIPPLE			7.03	A	Output Capacitor RMS Ripple Current
CMS			1726	Cmils	Secondary Bare Conductor minimum circular mils
AWGS			17	AWG	Secondary Wire Gauge (Rounded up to next larger standard AWG value)
DIAS			1.15	mm	Secondary Minimum Bare Conductor Diameter
ODS			2.74	mm	Secondary Maximum Outside Diameter for Triple Insulated Wire
INSS			0.79	mm	Maximum Secondary Insulation Wall Thickness
VOLTAGE STRESS PARAMETERS					
VDRAIN			622	V	Peak voltage across drain to source of Linkswitch-HP
PIVS			55	V	Output Rectifier Maximum Peak Inverse Voltage
PIVB			53	V	Bias Rectifier Maximum Peak Inverse Voltage
TRANSFORMER SECONDARY DESIGN PARAMETERS (MULTIPLE OUTPUTS)					
1st output					
VO1			12.00	V	Output Voltage
IO1			5.00	A	Output DC Current
PO1			60	W	Output Power
VD1			0.5	V	Output Diode Forward Voltage Drop
NS1			5.00		Output Winding Number of Turns
ISRMS1			8.631	A	Output Winding RMS Current
IRIPPLE1			7.03	A	Output Capacitor RMS Ripple Current
PIVS1			55	V	Output Rectifier Maximum Peak Inverse Voltage
CMS1			1726	Cmils	Output Winding Bare Conductor minimum circular mils
AWGS1			17	AWG	Wire Gauge (Rounded up to next larger standard AWG value)
DIAS1			1.15	mm	Minimum Bare Conductor Diameter

ODS1			2.74	mm	Maximum Outside Diameter for Triple Insulated Wire
2nd output					
VO2			0.00	V	Output Voltage
IO2			0.00	A	Output DC Current
PO2			0	W	Output Power
VD2			0.7	V	Output Diode Forward Voltage Drop
NS2			1.00		Output Winding Number of Turns
ISRMS2			0	A	Output Winding RMS Current
IRIPPLE2			0.00	A	Output Capacitor RMS Ripple Current
PIVS2			9	V	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			0.00	V	Output Voltage
IO3			0.00	A	Output DC Current
PO3			0	W	Output Power
VD3			0.7	V	Output Diode Forward Voltage Drop
NS3			1.00		Output Winding Number of Turns
ISRMS3			0	A	Output Winding RMS Current
IRIPPLE3			0.00	A	Output Capacitor RMS Ripple Current
PIVS3			9	V	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			60	W	Total Power for Multi-output section
Negative Output	N/A		N/A		If negative output exists enter Output number; e.g. If VO2 is negative output, select 2