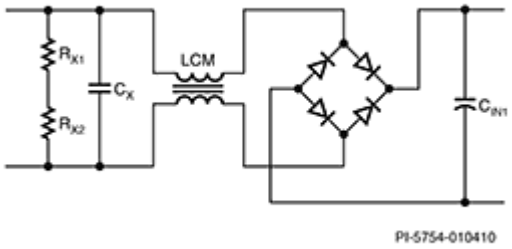
Power Supply Input

Var	*Value*	*Units*	*Description*
VACMIN	195	V	Minimum Input AC Voltage
VACMAX	265	V	Maximum Input AC Voltage
FL	50	Hz	Line Frequency
TC	1,69	ms	Diode Conduction Time
Z	0,63		Loss Allocation Factor
ŋ	81,0	%	Efficiency Estimate
IAVG	1,06	A	Average Diode Bridge Current (DC Input Current)
VMIN	238,5	V	Minimum DC Input Voltage
VMAX	374,8	V	Maximum DC Input Voltage

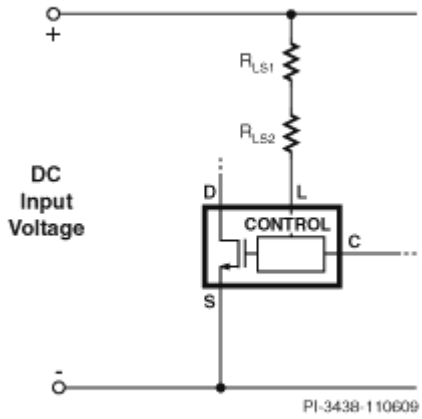
Input Section and EMI Filter

Var	*Value*	*Units*	*Description*
Fuse	1,60	A	Input Fuse Rated Current
Thermistor	10,00	Ω	Input Thermistor
Input Rectifier	2KBP06M		Recommended Input Diodes/Diode Bridge
CIN1	220,0	µF	Input Bulk Capacitor (Manual Input)
LCM	6,0	mH	Common Mode Choke
CX	330,0	nF	X Capacitor
RX1	1,10	MΩ	Input Resistor
RX2	1,10	MΩ	Input Resistor
CY	2,20	nF	Y-Capacitor



Device Variables

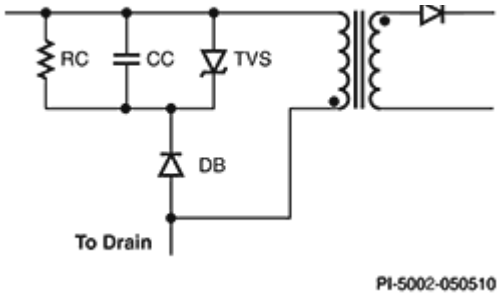
Var	*Value*	*Units*	*Description*
Device	TOP249YN		PI Device Name
PO	110,07	W	Total Continuous Output Power
PO_PEAK	205,57	W	Total Peak Output Power
PO_AVG	138,72	W	Total Average Output Power
VDRAIN Estimated	598,04	V	Actual Estimated Drain Voltage
VDS	13,31	V	On state Drain to Source Voltage
FS	132000	Hz	Switching Frequency
KP	0,70		Continuous/Discontinuous Operating Ratio
KI	1,00		Current Limit Reduction Factor
ILIMITEXT	5,02	A	Programmed Current Limit
ILIMITMIN	5,02	A	Current Limit Minimum
ILIMITMAX	5,78	A	Current Limit Maximum
CBP	0,10	µF	Device bypass capacitor
RLS	2,4	MΩ	Line sense resistor
RLS2	2,4	MΩ	Line sense resistor
IP	4,37	A	Peak Primary Current (at VMIN)
IRMS	1,82	A	Primary RMS Current (at VMIN)
P_NO_LOAD	500	mW	Estimated No Load Input Power
DMAX	0,37		Maximum Duty Cycle
RTH_DEVICE	6,29	℃/W	PI Device Maximum Thermal Resistance
DEV_HSINK_TYPE	Aluminum Extruded		PI Device Heatsink Type
DEV_HSINK_PN	533402B02552G		PI Device (Extruded) Heatsink Part Number



Clamp Components

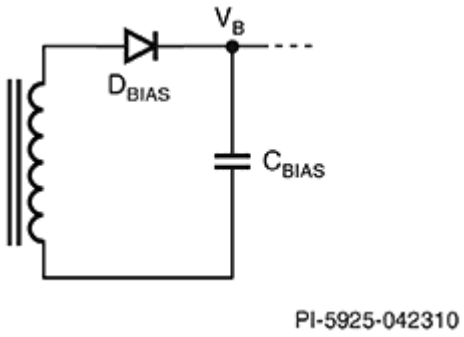
Var	*Value*	*Units*	*Description*

DB	FR257		Recommended Blocking Diode
RCLAMP	27,00	kΩ	Clamping resistor (Manual Input)
RC_NUM	3		Number of parallel Clamping resistors (Manual Input)
CCLAMP	10,000	nF	Clamp Capacitor (Manual Input)
VCLAMP	186	V	Estimated average clamping voltage
VRZ	P6KE200A		Recommended Zener Clamp
Estimated Clamp Loss	3,84	W	Clamp Dissipation



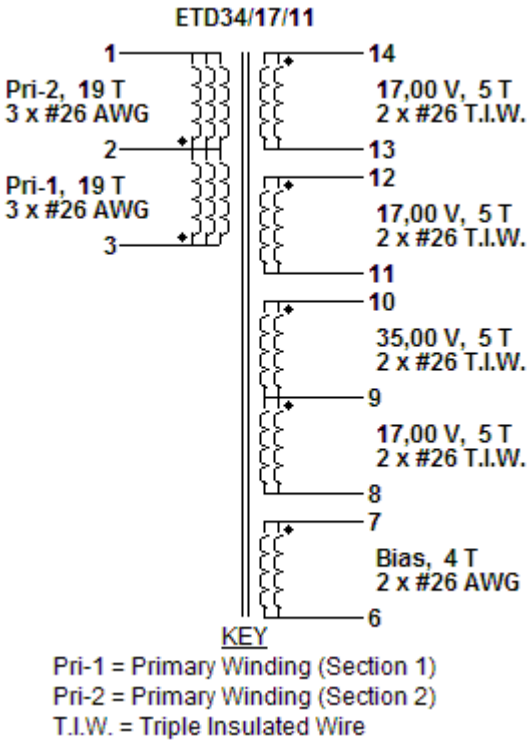
Bias Variables

Var	*Value*	*Units*	*Description*
VB	12,0	V	Bias Voltage
IB	0,006	A	Bias Current
VDB	1,00	V	Bias Diode Forward Voltage Drop
PIVB	52	V	Bias Rectifier Max Peak Inverse Voltage
CBIAS	1,0	µF	Bias Capacitor
NB	4		Bias Winding Number of Turns
Wire Size	26	AWG	Wire size of Bias windings (Manual Input)
Winding Type	Bifilar (x2)		Wire type of Bias windings (Manual Input)
Layers	0,17		Bias Winding Layers
Start Pin(s)	7		Starting pin(s) for Bias winding (Manual Input)
Termination Pin(s)	6		Termination pin(s) for Bias winding (Manual Input)



Transformer Construction Parameters

Var	*Value*	*Units*	*Description*
Core Type	ETD34/17/11		Core Type
Core Material	NC-2H (Nicera) or Equivalent		Core Material
Bobbin Reference	Generic, 7 pri. + 7 sec.		Bobbin Reference
Bobbin Orientation	Horizontal		Bobbin type
Primary Pins	7		Number of Primary pins used
Secondary Pins	7		Number of Secondary pins used
LP	206	µH	Primary Inductance
LP_Tol	10,0	%	Primary Inductance Tolerance
LP_nom	229	µH	Nominal Primary Inductance
NP	37,7		Calculated Primary Winding Total Number of Turns
NSM	5		Secondary Main Number of Turns (Manual Input)
CMA	446	Cmils/A	Primary Winding Current Capacity
VOR	135,0	V	Reflected Output Voltage
BW	20,90	mm	Bobbin Winding Width
ML	0,00	mm	Safety Margin on Left Width
MR	0,00	mm	Safety Margin on Right Width
FF	110	%	Actual Transformer Fit Factor. 100% signifies fully utilized winding window
AE	97,10	mm²	Core Cross Sectional Area
ALG	145	nH/T²	Gapped Core Effective Inductance
BM	2456	Gauss	Maximum Flux Density
BP	3249	Gauss	Peak Flux Density
BAC	860	Gauss	AC Flux Density for Core Loss



LG	0,793	mm	Estimated Gap Length
L_LKG	3,4	µH	Estimated primary leakage inductance
LSEC	20	nH	Secondary Trace Inductance

Primary Winding Section 1

Var	*Value*	*Units*	*Description*
NP1	19		Rounded (Integer) Number of Primary winding turns in the first section of primary
Wire Size	26	AWG	Wire size of primary winding (Manual Input)
Winding Type	Trifilar (x3)		Primary winding number of parallel wire strands (Manual Input)
L	1,23		Primary Number of Layers
DC Copper Loss	0,13	W	Primary 1 DC Losses
PIN_S	3		Starting pin(s) for first section of primary winding (Manual Input)
PIN_T	2		Termination pin(s) for first section of primary winding (Manual Input)

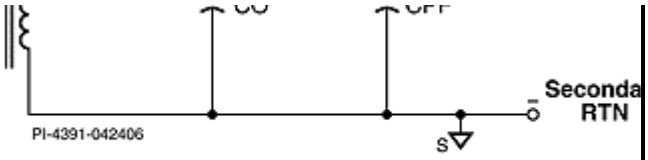
Primary Winding Section 2

Var	*Value*	*Units*	*Description*
NP2	19		Rounded (Integer) Number of Primary winding turns in the second section of primary
Wire Size	26	AWG	Wire size of primary winding (Manual Input)
Winding Type	Trifilar (x3)		Primary winding number of parallel wire strands (Manual Input)
L2	1,23		Primary Number of Layers in 2nd split winding
DC Copper Loss	0,25	W	Primary 2 DC Losses
PIN_S2	2		Starting pin(s) for the second section of primary winding (Manual Input)
PIN_T2	1		Termination pin(s) for the second section of primary winding (Manual Input)

Output 1

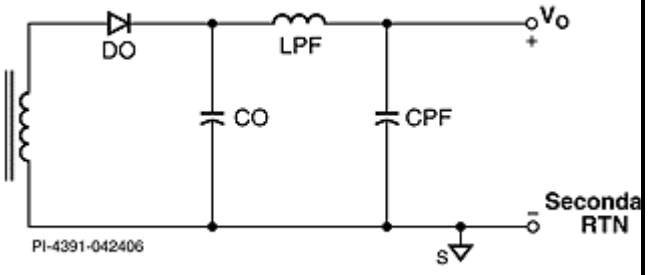
Var	*Value*	*Units*	*Description*
VO	17,00	V	Output Voltage
IO	2,00	A	Output Current (Continuous Load)
IO_PEAK	3,00	A	Output Current at Peak Load
VOUT_ACTUAL	17,00	V	Actual Output Voltage
NS	5		Secondary Number of Turns
Wire Size	26	AWG	Wire size of secondary winding (Manual Input)
Winding Type	Bifilar (x2)		Output winding number of parallel strands (Manual Input)
L_S_OUT	0,29		Secondary Output Winding Layers
DC Copper Loss	0,34	W	Secondary DC Losses
Start Pin(s)	14		Starting pin(s) for Output winding (Manual Input)
Termination Pin(s)	13		Termination pin(s) for Output winding (Manual Input)
VD	0,90	V	Output Winding Diode Forward Voltage Drop (Manual Input)

PIVS	66	V	Output Rectifier Maximum Peak Inverse Voltage
ISP	6,27	A	Peak Secondary Current
ISRMS	3,37	A	Secondary RMS Current
DO	BYW29-200		Recommended Output Diode (Manual Input)
RTH_DIODE	24,84	℃/W	Output Diode Maximum Thermal Resistance
OD_HSINK_TYPE	Custom Aluminum		Output Diode Heatsink Type
OD_HSINK_AREA	2003	mm²	Output Diode Heatsink Area
RSNUB	360,0	Ω	Snubber Resistor
CSNUB	30	pF	Snubber Capacitor
CO	1500 x 1	µF	Output Capacitor
IRIPPLE	2,47	A	Output Capacitor RMS Ripple Current
Expected Lifetime	46181	hr	Expected Lifetime of Output Capacitor
LPF	3,30	µH	Post Filter Inductor
CPF	100,00	µF	Post Filter Capacitor



Output 2

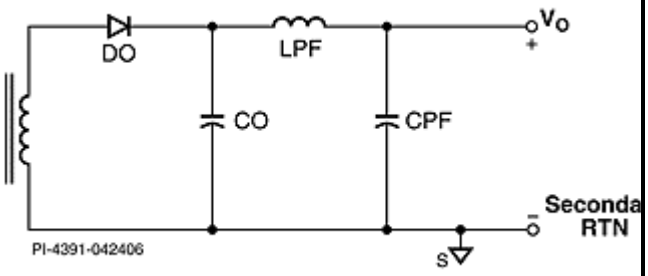
Var	*Value*	*Units*	*Description*
VO	35,00	V	Output Voltage
IO	1,00	A	Output Current (Continuous Load)
IO_PEAK	1,50	A	Output Current at Peak Load
VOUT_ACTUAL	34,90	V	Actual Output Voltage
NS	5		Secondary Number of Turns
Wire Size	26	AWG	Wire size of secondary winding (Manual Input)
Winding Type	Bifilar (x2)		Output winding number of parallel strands (Manual Input)
L_S_OUT	0,29		Secondary Output Winding Layers
DC Copper Loss	0,07	W	Secondary DC Losses
Start Pin(s)	10		Starting pin(s) for Output winding (Manual Input)
Termination Pin(s)	9		Termination pin(s) for Output winding (Manual Input)
VD	0,90	V	Output Winding Diode Forward Voltage Drop (Manual Input)
PIVS	134	V	Output Rectifier Maximum Peak Inverse Voltage
ISP	3,13	A	Peak Secondary Current
ISRMS	1,69	A	Secondary RMS Current
DO	BYW29-200		Recommended Output Diode (Manual Input)
RTH_DIODE	41,31	℃/W	Output Diode Maximum Thermal Resistance
OD_HSINK_TYPE	Custom Aluminum		Output Diode Heatsink Type
OD_HSINK_AREA	671	mm²	Output Diode Heatsink Area
RSNUB	470,0	Ω	Snubber Resistor
CSNUB	22	pF	Snubber Capacitor
CO	220 x 1	µF	Output Capacitor
IRIPPLE	1,23	A	Output Capacitor RMS Ripple Current
Expected Lifetime	36501	hr	Expected Lifetime of Output Capacitor



LPF	3,30	µH	Post Filter Inductor
CPF	100,00	µF	Post Filter Capacitor

Output 3

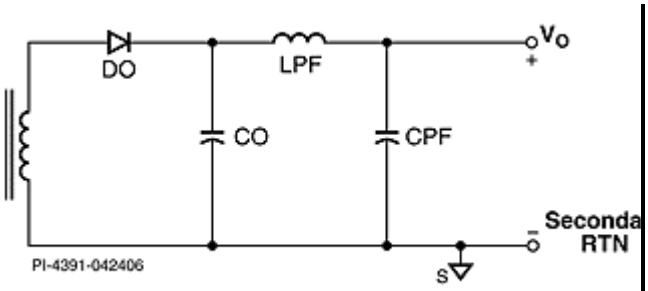
Var	*Value*	*Units*	*Description*
VO	17,00	V	Output Voltage
IO	1,50	A	Output Current (Continuous Load)
IO_PEAK	3,00	A	Output Current at Peak Load
VOUT_ACTUAL	17,00	V	Actual Output Voltage
NS	5		Secondary Number of Turns
Wire Size	26	AWG	Wire size of secondary winding (Manual Input)
Winding Type	Bifilar (x2)		Output winding number of parallel strands (Manual Input)
L_S_OUT	0,29		Secondary Output Winding Layers
DC Copper Loss	0,22	W	Secondary DC Losses
Start Pin(s)	12		Starting pin(s) for Output winding
Termination Pin(s)	11		Termination pin(s) for Output winding
VD	0,90	V	Output Winding Diode Forward Voltage Drop (Manual Input)
PIVS	66	V	Output Rectifier Maximum Peak Inverse Voltage
ISP	5,31	A	Peak Secondary Current
ISRMS	2,86	A	Secondary RMS Current
DO	BYW29-200		Recommended Output Diode (Manual Input)
RTH_DIODE	29,39	℃/W	Output Diode Maximum Thermal Resistance
OD_HSINK_TYPE	Custom Aluminum		Output Diode Heatsink Type
OD_HSINK_AREA	1395	mm²	Output Diode Heatsink Area
RSNUB	360,0	Ω	Snubber Resistor
CSNUB	30	pF	Snubber Capacitor
CO	820 x 1	µF	Output Capacitor
IRIPPLE	2,09	A	Output Capacitor RMS Ripple Current
Expected Lifetime	33225	hr	Expected Lifetime of Output Capacitor
LPF	3,30	µH	Post Filter Inductor
CPF	100,00	µF	Post Filter Capacitor



Output 4

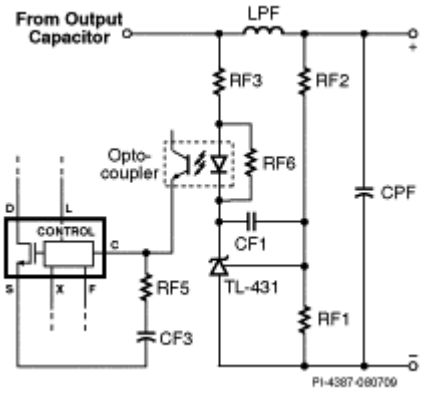
Var	*Value*	*Units*	*Description*
VO	17,00	V	Output Voltage
IO	1,50	A	Output Current (Continuous Load)
IO_PEAK	3,00	A	Output Current at Peak Load
VOUT_ACTUAL	17,00	V	Actual Output Voltage
NS	5		Secondary Number of Turns
Wire Size	26	AWG	Wire size of secondary winding (Manual Input)
Winding Type	Bifilar (x2)		Output winding number of parallel strands (Manual Input)
L_S_OUT	0,29		Secondary Output Winding Layers
DC Copper Loss	0,48	W	Secondary DC Losses
Start Pin(s)	9		Starting pin(s) for Output winding (Manual Input)

Termination Pin(s)	8		Termination pin(s) for Output winding (Manual Input)
VD	0,90	V	Output Winding Diode Forward Voltage Drop (Manual Input)
PIVS	66	V	Output Rectifier Maximum Peak Inverse Voltage
ISP	5,31	A	Peak Secondary Current
ISRMS	2,86	A	Secondary RMS Current
DO	BYW29-200		Recommended Output Diode (Manual Input)
RTH_DIODE	29,39	℃/W	Output Diode Maximum Thermal Resistance
OD_HSINK_TYPE	Custom Aluminum		Output Diode Heatsink Type
OD_HSINK_AREA	1395	mm²	Output Diode Heatsink Area
RSNUB	360,0	Ω	Snubber Resistor
CSNUB	30	pF	Snubber Capacitor
CO	820 x 1	µF	Output Capacitor
IRIPPLE	2,09	A	Output Capacitor RMS Ripple Current
Expected Lifetime	33225	hr	Expected Lifetime of Output Capacitor
LPF	3,30	µH	Post Filter Inductor
CPF	100,00	µF	Post Filter Capacitor



Feedback Circuit

Var	*Value*	*Units*	*Description*
Optocoupler	LTV817A		Feedback Optocoupler Part number
Opto CTR	80	%	Feedback Optocoupler Current Minimum Transfer Rate
Shunt Regulator	TL431		Shunt Regulator IC
Error Amp Gain	55,00	dB	Error Amplifier Open Loop Gain
RF1	10,70	kΩ	Feedback Resistor to bias the error Amplifier
RF2	61,90	kΩ	Compensation resistor
RF3	590,00	Ω	Gain limiting Resistor
RF5	6,80	Ω	PI Device Control Pin Resistor
RF6	1,00	kΩ	Shunt Regulator Bias Resistor
CF1	68,00	nF	Compensation Capacitor
CF3	47	µF	PI Device Control Pin Capacitor
PM	89,66	°	Estimated Phase Margin
FC_ACTUAL	1017,4	Hz	Estimated Crossover Frequency



The regulation and tolerances do not account for thermal drifting and component tolerance of the output diode forward voltage drop and voltage drops across the LC post filter. The actual voltage values are estimated at full load only.

Please verify cross regulation performance on the bench.