WEBENCH® Transformer Report

Design : 21 UCC28630DR
UCC28630DR 160V-260V to 22.00V @ 5A

#	Name	Value
1.	Core Part Number	150-2239
2.	Core Manufacturer	Wurth Elektronik
3.	Coil Former Part Number	070-5649
4.	Coil Former Manufacturer	Wurth Elektronik

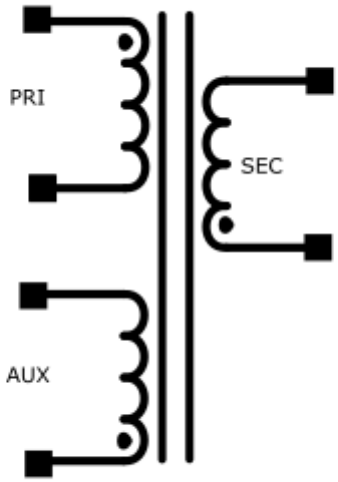
Transformer Electrical Diagram

Primary

Turns	39
AWG	34
Layers	2
Strands	3
Insulation Type	Heavy Insulated Magnet Wire

Auxiliary

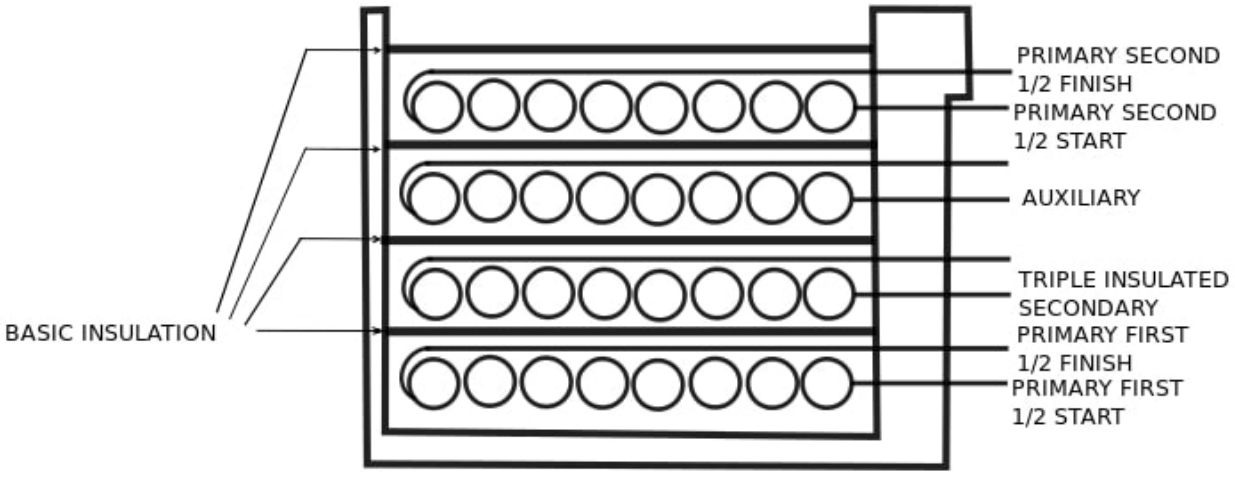
Turns	5
AWG	28
Layers	1
Strands	4
Insulation Type	Heavy Insulated Magnet Wire



Secondary

Turns	8
AWG	25
Layers	1
Strands	2
Insulation Type	Triple Insulated

Transformer Construction Diagram



Winding Instruction

Winding	AWG	Turns	Winding Orientation
Primary First 1/2	34	20	Clockwise
Triple Insulated Secondary	25	8	Counter Clockwise
Auxiliary	28	5	Counter Clockwise
Primary Second 1/2	34	19	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	2.69E-4H
2.	Inductance Factor(Al)	177nH
3.	Npri	39
4.	Nsec	8
5.	Naux	5
6.	Core Type	PQ2625
7.	Core Material	TP4A
8.	Bmax	0.25T
9.	Switching Frequency	60.00kHz
10.	DMax	0.42
11.	Ipk(Primary)	4.27A
12.	Irms(Primary)	1.59A
13.	Ipk(Secondary)	20.80A
14.	Irms(Secondary)	9.15A

Design Assistance

1. Leakage inductance is considered as 2% of Primary inductance

2. Application Hints High Power Operation The UCC28630 allows a peak power delivery up to 200% the nominal rating with only a modest increase in peak current. The combination of up to 2x frequency increase and 1.25x peak current increase in CCM allows up to 2x peak power delivery capability for a given transformer size. Rbld Rbld is used to to set a minimum load for the circuit, so that in standby the output voltage does not float up. The value chosen by WEBENCH should be a good starting point but may need to be adjusted to achieve minimum power dissipation at standby as well. Active X-Cap Discharge The X-capacitor discharge function discharges the X-capacitor to the SELV 60V level in 1 sec. When adjusting the components for the design, ensure that the bulk capacitance value is not too large for the power level desired, which ensures that the bulk capacitor discharge rate is fast enough to discharge the X-capacitor to meet the 1-second discharge target. The VSENSE terminal In order to protect the VSENSE terminal from excessive negative current, an additional series limiting resistor and clamping diode can be added on the VSENSE terminal. The DRV pull up diode can be combined with the clamping diode in a single package common-cathode diode to reduce the component count of the circuit (see Figure 24 in the datasheet for illustration). Magnetic Sense Resistor Network When adjusting components for the design, check that the equivalent Thevenin resistance (Rth) of the R1/R2 falls within the required range of 10kOhm and 20kOhm. If the Rth is outside of this range, it triggers the VSENSE terminal open or short terminal check at start-up. Peak Current Mode Control and the CS Terminal Depending on the PCB layout, an additional RC filter may be required on the CS terminal, as show in Figure 30 of the datasheet. The capacitor, Ccs, should be positioned as close as possible to terminals 3 and 4 and tracked directly to the terminals. Rcs2 should also be located close to terminal 3 to minimize noise, and should not exceed 20kOhms since larger values could be detected as a possible open circuit on the CS terminal during the start-up terminal checks. The time constant for this RC filter should no be excessive so that the filter does not reduce the measured peak current. Typical time values would fall between 100ns and 200ns. Primary-Side Overload Timer An internal overload timer tracks the power stage thermal stress and protects the power stage against output overload. The overload timer trip level and time constant are both selectable from a defined list of combinations (See Table 1 in datasheet for combinations), and is set using a pull-down resistance, Rprog, on the DRV terminal. The values of the Rprog resistor that corresponds to specific trip levels and time constants can also be seen in Table 1 in the datasheet. Please see the datasheet for further design guidance and recommendations. http://www.ti.com/lit/ds/symlink/ucc28630.pdf

3. **UCC28630** Product Folder : http://www.ti.com/product/UCC28630 : contains the data sheet and other resources.