![Texas Instruments logo] **TEXAS INSTRUMENTS**

WEBENCH ® Transformer Report

Design : 31 UCC28740DR
UCC28740DR 90V-265V to 20.00V @ 4A

#	Name	Value
1.	Core Part Number	150-2305
2.	Core Manufacturer	Wurth Elektronik
3.	Coil Former Part Number	070-2710
4.	Coil Former Manufacturer	Wurth Elektronik

Transformer Electrical Diagram

Primary

Turns	38.0
AWG	30.0
Layers	3.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire

Auxiliary

Turns	6.0
AWG	28.0
Layers	1.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire

PRI   SEC   AUX
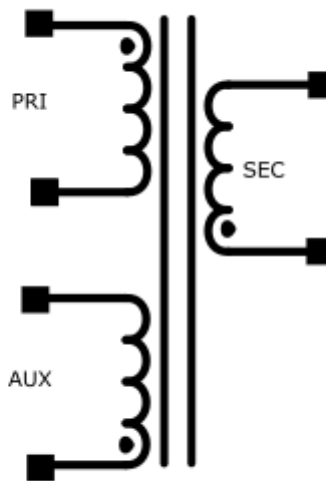
Secondary

Turns	6.0
AWG	24.0
Layers	1.0
Strands	3.0
Insulation Type	Triple Insulated

Transformer Construction Diagram
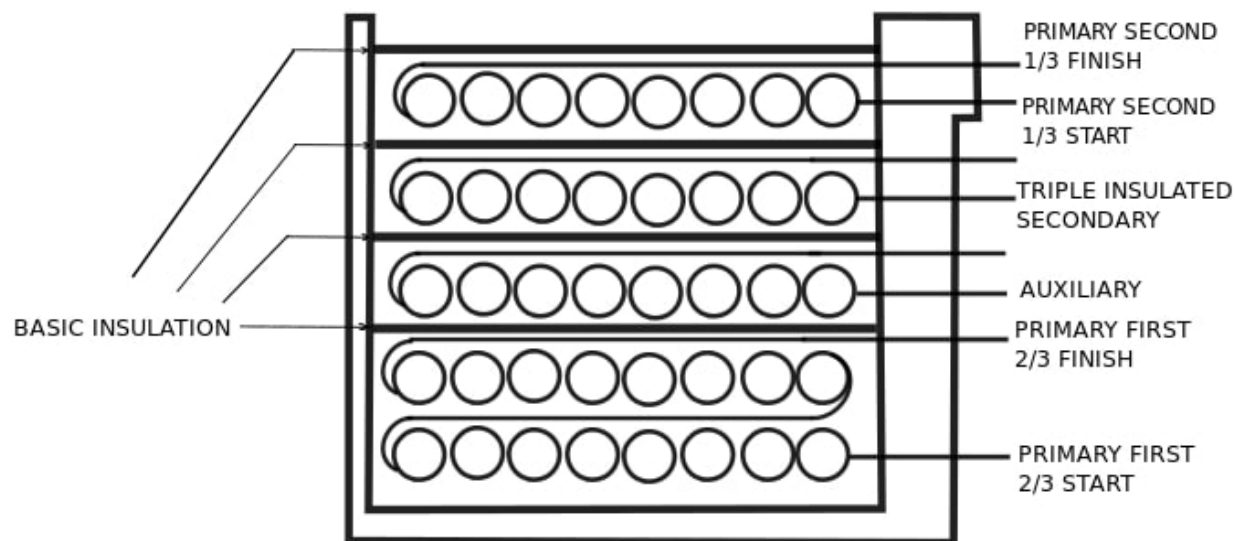
Winding Instruction

Winding	AWG	Turns	Winding Orientation
Primary First 2/3.0	30.0	26	Clockwise
Auxiliary	28.0	6.0	Counter Clockwise
Triple Insulated Secondary	24.0	6.0	Counter Clockwise
Primary Second 1/3.0	30.0	12	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	1.06E-4H
2.	Inductance Factor(Al)	74.0nH
3.	Npri	38.0
4.	Nsec	6.0
5.	Naux	6.0
6.	Core Type	EFD25
7.	Core Material	TP4A
8.	Bmax	0.25T
9.	Switching Frequency	63.00kHz
10.	DMax	0.51
11.	Ipk(Primary)	5.15A
12.	Irms(Primary)	2.13A
13.	Ipk(Secondary)	32.6A
14.	Irms(Secondary)	12.3A

Design Assistance

1. Application Hints Rlc Rlc provides the function of feed-forward line compensation to eliminate change in IPP due to change in di/dt and the propagation delay of the internal comparator and MOSFET turn-off time. For best results the chosen value may need to be adjusted based on board, FET and transformer parasitics. Rpl: Rpl 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. Rtl Rtl is added to prevent excessive diode current and limit Iopt to the maximum value necessary for regulationThe Rtl value may be adjusted for optimal limiting later during the porotype evaluation process. Rfbt & Rfbb The feedback resistors will set the output voltage of the circuit. The values chosen may need to be fined tuned based on the final Transformer turns ratios and the voltage across the output diode at close to zero current. Rfb3 & Cfb3 Rfb3 is necessary to limit the current into FB and to avoid excess draining of Cvdd during this type of transient situation.The value of Rfb3 is chosen to limit the excess Ifb and Rfb4 current to an acceptable level when the optocoupler is saturatedCfb3 helps improve the transient response and is estimated initially by equating the time constant to 1ms. This can later beadjusted for optimal performance during prototype evaluation Rfb4 Rfb4 speeds up the turnoff time of the optocoupler in the case of a heavy load-step transient condition. This value tends to fallwithin the range of 10k and 100k. A tradeoff must be made between a lower value for faster transient response and a higher value forlower standby power. Rfb4 also serves to set a minimum bias current for the optocoupler and to drain dark current Part Description The UCC28740 isolated-flyback controller provides Constant-Voltage (CV) using an optical coupler toimprove transient response. Constant-Current (CC) regulation is accomplished through Primary Side Regulation (PSR) techniques. The UCC24636 Sychronous Rectifier is a compact, secondary-side MOSFET controller for high efficiency Flyback controllers operating in DCM and Trasition mode. It enables maximum SR conduction time and provides high rectifier efficiency for a given MOSFET. Please see the datasheet for further design guidance. http://www.ti.com/lit/ds/symlink/ucc28740.pdf http://www.ti.com/lit/ds/symlink/ucc24636.pdf

2. **UCC28740** Product Folder : http://www.ti.com/product/UCC28740 : contains the data sheet and other resources.