

WEBENCH[®] Transformer Report

Design : 32 UCC28740QDRQ1
UCC28740QDRQ1 35V-600V to 12.00V @ 2A

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

Transformer Electrical Diagram

Primary

Turns	25.0
AWG	30.0
Layers	2.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire

Secondary

Turns	8.0
AWG	28.0
Layers	1.0
Strands	3.0
Insulation Type	Triple Insulated

Auxiliary

Turns	12.0
AWG	28.0
Layers	1.0
Strands	3.0
Insulation Type	Heavy Insulated Magnet Wire

Transformer Construction Diagram

Winding Instruction

Winding	AWG	Turns	Winding Orientation
Primary First 1/2.0	30.0	13	Clockwise
Auxiliary	28.0	12.0	Counter Clockwise
Triple Insulated Secondary	28.0	8.0	Counter Clockwise
Primary Second 1/2.0	30.0	12	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	9.4E-5H
2.	Inductance Factor(Al)	150.0nH
3.	Npri	25.0
4.	Nsec	8.0
5.	Naux	12.0

#	Name	Value
6.	Core Type	EFD25
7.	Core Material	TP4A
8.	Bmax	0.20T
9.	Switching Frequency	63.00kHz
10.	DMax	0.51
11.	Ipk(Primary)	3.09A
12.	Irms(Primary)	1.28A
13.	Ipk(Secondary)	9.66A
14.	Irms(Secondary)	3.64A

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. Rtl Rtl is added to prevent excessive diode current and limit Iopt to the maximum value necessary for regulation. The Rtl value may be adjusted for optimal limiting later during the prototype evaluation process. Rfbt & Rfbb The feedback resistors will set the output voltage of the circuit. The values chosen may need to be fine 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 saturated. Cfb3 helps improve the transient response and is estimated initially by equating the time constant to 1ms. This can later be adjusted 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 fall within the range of 10k and 100k. A tradeoff must be made between a lower value for faster transient response and a higher value for lower standby power. Rfb4 also serves to set a minimum bias current for the optocoupler and to drain dark current. Part Description The UCC28740-Q1 isolated-flyback controller provides Constant-Voltage (CV) using an optical coupler to improve transient response. Constant-Current (CC) regulation is accomplished through Primary Side Regulation (PSR) techniques. Please see the datasheet for further design guidance. <http://www.ti.com/lit/ds/symlink/ucc28740-Q1.pdf>

2. **UCC28740-Q1** Product Folder : <http://www.ti.com/product/UCC28740%2DQ1> : contains the data sheet and other resources.

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