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REPORT

on

Drivers for Light-emitting-diode Arrays, Modules and Controllers

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DESCRIPTION

PRODUCT COVERED:

USR, CNR- Component LED Driver, see electrical ratings table for models.

USR - United States Recognized Component
CNR - Canada Recognized Component

ELECTRICAL RATINGS:

Model No.	Input			Output		
	Voltage (Vac)	Frequency (Hz)	Current (A), Power (W)	Voltage (Vdc)	Frequency (Hz)	Current (A), Power (W)
ILU400M701U1 U	110-277	50/60	0.6 A, 50 W	CH1: 25-50	N/A	0.7 A, 35 W
				CH2: 12		0.1 A, 1.5 W

TECHNICAL CONSIDERATIONS (NOT FOR UL FIELD REPRESENTATIVE USE):

USR - Indicates investigation to the United States Standards for Light Emitting Diode (LED) Light Equipment for Use in Lighting Products, UL 8750, the second edition. The outputs have been evaluated as Class 2, Clause 7.12.1.

CNR - Indicates investigation to the Canadian Standard for Light emitting Diode (LED) Equipment for Lighting Applications, CAN/CSA-C22.2 No. 250.13, the second edition.

The CH1 output has been evaluated as LED Class 2, Annex A.

The CH2 output has been evaluated as Extra-Low-Voltage Class 2, Clause 8.12.

These products been evaluated for the following characteristics.

Model No. [x] applies to all models	Input type	Output type	Rated for	Type HL (c)	Type TL (d)	Class P (e)
ILU400M701U1U	Branch Circuit (Mains)	CH1 output: CC, CH2 output: CV Output is Class 2 (UL) and LED Class 2 (cUL) (a) for CH1, Class 2 (b) for CH2	Damp	No	No	No

a- As defined in UL 8750, Clause 7.12.1 and CAN/CSA-C22.2 No. 250.13, Annex A

b- As defined in UL 8750, Clause 7.12.1 and CAN/CSA-C22.2 No. 250.13, Clause 8.12

c- Evaluated per UL 8750 requirements for Type HL LED drivers

d- Evaluated per UL 8750 requirements for Type TL LED drivers

e- Evaluated per UL 8750 requirements for Class P LED drivers

Conditions of Acceptability:

Use - For use only in (or with) complete equipment where the acceptability of the combination is determined by UL LLC.

1. Rated output loading for these products was achieved using LED loads for CH1 output and electronic loads for CH2 output. The temperature tests were performed at nominal 50 °C ambient.
2. During the temperature test of the end product, the temperature at Tc (Tc, Case surface above transformer (TM01)) is to be monitored. The absolute value at Tc cannot exceed 80 °C, this value was designated by manufacturer based on calculated values. (Calculated values by test: 83.2 °C, this value was calculated based on temperatures observed during testing and temperature ratings of the integral components including the electrical insulation system.)
3. These products utilize a UL Recognized OBJY2 Class 130 (B) electrical insulation system.
4. These products are intended for building in. The enclosure for these products has no openings. Acceptability of the LED driver with respect to mounting, spacing, casualty, temperature and segregation is to be determined as part of the end device evaluation.
5. The Leakage Current test was conducted for these models. Based on end use requirements and the construction presented, this test may need to be performed as part of the end product evaluation.
6. These products are provided with minimum 18 AWG, stranded or solid leads, rated 105 °C, 300 V minimum for input connections and minimum 22 AWG, stranded or solid leads, rated 105 °C, 300 V minimum for CH1 output connection. Acceptability of the input lead wire being smaller than 18 AWG is to be determined as part of the end product evaluation. Acceptability of the leads relative to strain relief and secureness, is to be determined as part of the end device evaluation.
7. These products have multiple outputs. Interconnection of these outputs has not been evaluated. Acceptability of interconnection of these outputs (and the associated circuits) is to be considered as part of the end product evaluation.
8. These products are dimmable using a low voltage 0-10 V interface.
9. Outer Case has not been invested for final enclosure, the suitable enclosure shall be provided in the end-use product.
10. The grounding means shall be considered in each end use application.

Conditions of Acceptability (CONT'D):

11. These products marked suitable for dry and damp locations. Additional considerations will be necessary as these LED drivers are integrated into wet rated end devices (i.e. input and output supply connection means, accessibility of the output based on maximum voltage restrictions for wet rated Class 2 circuits, acceptability of markings, etc.).

12. The product has been judged on the basis of the required spacings as indicated in the standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750 in addition to the standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840, and Light Emitting Diode (LED) Equipment for Lighting Applications, CSA C22.2 No. 250.13-14.

13. Based on maximum voltage restrictions for Class 2 circuits in the Canadian Electrical Code, the CH1 output cannot be accessible. The output terminals of the end product should be evaluated to confirm compliance with this accessibility requirement, either based on output terminal design or based on manufacturer specifications for its use in restricted access areas only. The latter option will require markings on the end product as well as the installation manual.

CONSTRUCTION DETAILS:

Corrosion Protection - Ferrous metal parts are protected against corrosion by plating or painting.

Soldered Connections - All soldered connections are mechanically secured before soldering.

Printed Wiring Boards - Suitable for the solder time and temperature used by the manufacturer.

"CN" indicates the component has been evaluated to Canadian requirements and the component shall have a Canadian UL certification Mark (C-UL) or UL certification Mark and CSA certification Mark when the Applicant's basic product bearing C-UL certification Mark.

Product markings-

1. Recognized company name, File number or trademark (If authorized).
2. Model designation.
3. Factory ID or code, when more than one factory.
4. Date Code: see below table,

Mean Digit	Plant	Year	Month	Date	Model Code	Serial No
Example	C1 or C2	00~99	1..9, A, B, C	01, 02, ..31	1~9, A~Z:	0001~9999

5. Optional - Electrical Ratings- see electrical ratings table.
6. Optional - Output Type- see product characteristics table.
Product is marked Class 2 based on compliance with UL 8750, Clause 7.12.1 and
 - CAN/CSA-C22.2 No. 250.13, Clause 8.12 for CH2 output only
 - CAN/CSA-C22.2 No. 250.13, Annex A for CH1 output only
7. Optional - Environmental considerations- see product characteristics table.
8. Optional - Polarity of the Input and Output Connections.
9. Optional - Temperature Measurement Point (Tc).
10. Optional - Maximum ambient temperature (Tma): 67.7 °C or less.

Model ILU400M701U1U - FIGS. 1 THRU 6

General - The general design, shape and arrangement shall be as illustrated except where variations are specifically described.

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
1	Case (Cover)	-	Various	Various	Aluminum alloy, min. 0.35 mm thick, overall measured 102.2 mm by 75.2 mm by 28.4 mm (L x W x H). Two-part construction, secured together by snap-fit. Rolling the edge of the metal: Refer to Figure 2 and Illustration 1.	F1, F2, I1
2	Case (Bottom)	-	Various	Various	Aluminum alloy, min. 0.45 mm thick, overall measured 101.4 mm by 75.4 mm by 12.5 mm (L x W x H).	F3, I2
3	Input Lead Wire	AVLV2, CN	Various	Various	18 AWG min., rated 300 V min., 105 °C min.	
4	Output Lead Wire (CH1)	AVLV2, CN	Various	Various	22 AWG min., rated 300 V min., 105 °C min.	
5	Output connector (CON2) for CH2 and control signal	-	Various	Various	Located in a class 2 circuit.	
6	Insulation sheet	QMFZ2	TORAY INDUSTRIES INC (E86511)	Lumirror (#)	Polyethylene Terephthalate (PET), rated VTM-2, 105 °C, 0.23 mm thick, see Ill. 3 for detailed dimension and shape.	I3
7	Printed Wiring Board	ZPMV2, CN	Various	Various	Rated min. V-1, 105 °C. Overall approx. 100.0 mm by 72.0 mm (L x W), 1.6 mm thick. Suitable for support of live parts.	I4
8	Fuse (FS01)	JDYX2, CN	LITTELFUSE WICKMANN WERKE (E67006)	369 +	Rated 3.15 A, 300 V, connected in series with ungrounded supply.	
9	Varistor (VX01)	VZCA2, CN	AMOTECH CO LTD (E332687)	INR14D751 (a)	SPD Type 5, rated operating voltage 460 Vac, 460 V MCOV, 3 kA In, 1710 Vpk MLV.	
10	Thermistor (NT01)	XGPU2, CN	Various	Various	Limiting NTC Device, rated 240 V min., 5.0 A max.	
11	Capacitor (CX01)	FOKY2 or FOWX2, CN	Various	Various	Rated 305 Vac min., 105 °C min., 150 nF max., Located across the line.	
12	Bridge Diode (BD01)	-	Various	Various	Rated 600 V min., 8 A max.	
13	Rectifier Diode (DP92)	-	Various	Various	Rated 1000 V min., 1.0 A max.	

Model ILU400M701U1U - FIGS. 1 THRU 6 (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
14	Rectifier Diode (DP71)	-	Various	Various	Rated 600 V min., 3.0 A max.	
15	Film Capacitor (CP71)	-	Various	Various	Rated 630 V min., 105 °C min., 220 nF max.	
16	FET (QP91)	-	Various	Various	Rated 600 V min., 9 A max.	
17	Electrolytic capacitor (CP91)	-	Various	Various	Rated 500 V min., 105 °C min., 22 uF max.	
18	IC (UM01)	-	Various	Various	Type LCS700HG.	
19	IC (UP01)	-	Various	Various	Type SEM3040.	
20	Film capacitor (CM91)	-	Various	Various	Rated 1000 V min., 105 °C min., 1.2 nF max.	
21	Electrolytic capacitors (CA92, CS31)	-	Various	Various	Rated 25 V min., 105 °C min., 150 uF max.	
22	Electrolytic capacitor (CS71)	-	Various	Various	Rated 63 V min., 105 °C min., 220 uF max.	
23	Capacitor (CY01)	FOWX2, CN	Various	Various	Rated 400 V min., 125 °C min., 2.2 nF max. Class Y1. Bridging Primary to secondary.	
24	Capacitor (CY02)	FOWX2, CN	Various	Various	Rated 400 V min., 125 °C min., 1.5 nF max. Class Y1. Located Secondary to Ground.	
25	Optical Isolators (PC01, PC02)	FPQU2, CN	Various	Various	Rated 3000 V min., 110 °C min. operating temperature.	
26	Rectifier Diode (DS05)	-	Various	Various	Rated 150 V min., 20 A max.	
27	Internal Heat sink (H/S #2) for UM01	-	Various	Various	Aluminum, overall approx. 27.0 mm by 20.0 mm by 4.8 mm (L x W x H), mechanically secured by soldering.	
28	Thermal Pad for Transformer (TM01)	QMFZ2	HNS CO LTD (E307398)	HS01	Two provided, rated V-0, 150 °C, Measured approx. 14.0 mm by 24.0 mm (L x W), 2.0 mm thick. Located at above TM01.	

Winding devices - See below for details.

No.	Item	CCN	Manufacturer (File Number)	Part Number	Description / Technical Data	(F)IG (I)LL
1	Line Filters (LX01, LX03)- Primary	-	-	-	Refer to Ill. 5 for details.	I5
1.1	Core	N/A	N/A	N/A	Ferrite, drum type, overall approx. 12.0 mm by 6.5 mm by 13.5 mm (OD x ID x H).	
1.2	Coil	OBMW2	Various	Various	Enameled copper wire, rated 130 °C min.	
1.3	Varnish	OBOR2	Various	Various	Rated 130 °C min.	
2	Line Filter (LX02)- Primary	-	-	-	Refer to Ill. 6 details.	I6
2.1	Core	N/A	N/A	N/A	Ferrite, toroidal type, overall approx. 14.0 mm by 8.0 mm by 7.0 mm (OD x ID x H).	
2.2	Core Cover	QMFZ2	Various	Various	Rated 105 °C min., 0.75 mm thick min.	
2.3	Base	QMFZ2	CHANG CHUN PLASTICS CO LTD (E59481)	T375HF	Phenolic Molding Compound (PMC), 0.43 mm thick min., rated V-0, 150 °C.	
2.4	Coil	OBMW2	Various	Various	Two provided, enameled copper wire, rated 130 °C min.	
2.5	Tube	YDPU2	Various	Various	Rated 125 °C min., 300 V min., VW-1 min., intended to wrap around a body.	
3	PFC (LP01)- Primary	-	-	-	Refer to Ill. 7 for details.	I7
3.1	Core	N/A	N/A	N/A	Ferrite, EE type, overall approx. 24.5 mm by 19.0 mm by 12.9 mm (L x W x H).	
3.2	Coil (8-1)	OBMW2	Various	Various	Enameled copper wire, rated min. 130 °C.	
3.3	Coil (3-4)	OBJT2	Various	Various	Triple insulated wire, rated min. 130 °C.	
3.4	Bobbin	QMFZ2	HEXION GMBH (E61040)	PF2736(a) (b)	Phenolic (PF), 0.46 mm thick min., rated V-0, 150 °C.	
3.5	Insulation Tape / Core Fixing Tape	OANZ2	Various	Various	Rated min. 130 °C.	
3.6	Barrier Tape	OANZ2	Various	Various	Rated min. 130 °C.	
3.7	Varnish	OBOR2	Various	Various	Rated min. 130 °C.	

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Winding devices - See below for details. (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F) IG (I) LL
4	Transformer (TA01)- isolated primary to secondary (For CH2 output)	-	-	-	Refer to Ills. 8 and 9 for details.	
	Electrical insulation system	OBJY2	LITE-ON TECHNOLOGY CORP (E140167)	LSE-B11	Rated Class 130 (Class B).	I8
	Alternate	OBJY2	YAO SHENG ELECTRONIC CO LTD (E173643)	YCI-130	Same as above.	I9
4.1	Core	-	N/A	N/A	Ferrite, EE type, overall approx. 14.4 mm by 14.0 mm by 7.0 mm (L x W x H).	
4.2	Primary Coil	OBMW2	Belong to electrical insulation system	Belong to electrical insulation system	Two provided, Enameled copper wire, each rated min. 130 °C.	
4.3	Secondary Coil (S-F)	OBJT2	YOUNG CHANG SILICONE CO LTD (E242198)	STW-B	Triple insulated wire, rated 130 °C.	
4.4	Bobbin / Base	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820	Phenolic (PF), min. 0.65 mm, thick, rated 150 °C.	
4.5	Insulation tape	OANZ2	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111)	CT* (b) (g)	Polyethylene terephthalate film tape, rated 130 °C, min. 0.025 mm thick per layer.	
	Alternate	OANZ2	SYMBIO INC (E50292)	35660 (a)	Same as above.	
4.6	Varnish	OBOR2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C.	
4.7	Tube	YDPU2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C, 150 V, VW-1, located at pins #S and #F.	
4.8	Core fixing tape	OANZ2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C.	

Winding devices - See below for details. (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
5	Transformer (TM01)- isolated primary to secondary (For CH1 output)	-	-	-	Refer to Ills. 10 and 11 detailed construction and insulation system (Class 130 (B) information).	
	Electrical insulation system	OBJY2	LITE-ON TECHNOLOGY CORP (E140167)	LSE-B11	Rated Class 130 (Class B).	I10
	Alternate	OBJY2	CLOVER HI-TECH CO LTD (E167514)	SC-05B	Same as above.	I11
5.1	Core	-	-	-	Ferrite, EER type, measured overall approx. 29.0 mm by 27.6 mm by 11.4 mm (L x W x H).	
5.2	Bobbin	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820	Phenolic (PF), min. 0.65 mm thick, rated 150 °C, three flange type.	
5.3	Cap	QMFZ2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C.	
5.4	Coil	OBMW2	Belong to electrical insulation system	Belong to electrical insulation system	Three provided, enameled copper wire, each rated min. 130 °C.	
5.5	Core fixing tape	OANZ2	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111)	CT* (b)(g)	Polyethylene terephthalate film tape, rated 130 °C, min. 0.025 mm thick per layer, min. 2 layers provided.	