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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)
ILU700N142U1A	120-277	50/60	1.0 A, 77 W	CH1: 59	N/A	1.40 A, 63 W
				CH2: 13.2		0.1 A, 1.5 W
ILU550N102U1A	120-277	50/60	0.8 A, 65 W	CH1: 59	N/A	1.05 A, 48 W
				CH2: 13.2		0.1 A, 1.5 W
*ILU350N701U1A ILU400N701U1A	120-277	50/60	0.6 A, 50 W	CH1: 59	N/A	0.7 A, 35 W
				CH2: 13.2		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.

DIFFERENCE BETWEEN MODELS:

Models ILU700N142U1A, ILU550N102U1A and ILU350N701U1A are identical to each other except model designation, electrical ratings and a few components detailed below table.

Model ILU400N701U1A is identical to ILU350N701U1A except model designation.

Location No.	Specification		
	ILU700N142U1A	ILU550N102U1A	ILU350N701U1A, ILU400N701U1A
CX01, CX02	150 nF	150 nF	100 nF
LX01	1.0 mH	2.0 mH	2.0 mH
CP71	220 nF	100 nF	100 nF
LP01	570 uH	570 uH	900 uH
CP77	100 pF	100 pF	33 pF
CP91	47 uF	33 uF	22 uF
RP08	220 ohm	300 ohm	300 ohm
RP07	7.5 kohm	15 kohm	7.5 kohm
CP06	47 pF	82 pF	150 pF
RS91	0.15 ohm	0.2 ohm	0.3 ohm
CS71	390 uF	270 uF	220 uF

These products been evaluated for the following characteristics.

Model No. applies to all models	Input type	Output type	Product is rated	Type HL (c)	Type TL (d)
ILU700N142U1A, ILU550N102U1A, ILU350N701U1A, ILU400N701U1A	Branch Circuit (Mains)	Output type- CC for CH1, CV for CH2 Output is Class 2 (UL) and LED Class 2 (cUL) (a) for CH1, Class 2 (b) for CH2	Damp	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

Conditions of Acceptability:

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

1. Model ILU700N142U1A tested represents other models due to same construction.
2. Rated output loading for these products was achieved using LED loads. The need for other consideration should be considered in end-use product.
3. During the normal temperature test of the end product, the temperature reference point (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 value by test: 83.6 °C, these values were calculated based on temperatures observed during testing and temperature ratings of the integral components including the electrical insulation system)
4. These products utilize a UL Recognized OBJY2 Class 130 (B) electrical insulation system.
5. These products are intended for building in. The enclosure for these products have 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.
6. This product is provided with push-in terminals for supply connection. This terminal is intended for use with 18 AWG stranded copper conductors with 8.5 mm ~ 9.5 mm strip length, suitable for factory and/or field wiring and type of Use Group (UG) is B and/or D; the type of end-use application for which the specified voltage and spacing level applies. The suitability of the use shall be determined in the end-product application.
7. These products are intended to be operated in a maximum 10 A branch circuit. If used on a branch circuit greater than 10 A, additional testing may be necessary and shall be considered in the end product.
8. The input and output connections have been invested for factory wiring only, connection to supply mains shall be determined in the end product.
9. These products are dimmable using a low voltage 0-10 V proprietary interface.
10. 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.

Conditions of Acceptability (CONT'D):

11. Outer Case has not been invested for final enclosure, the suitable enclosure shall be provided in the end-use product.
12. 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.).
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.
14. 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.

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	Plant	Year	Month	Date	Model Code	Serial No
Digit	2	2	1	2	3	4
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): 55.1 or less °C.
- 11.

Model ILU700N142U1A - FIGS. 1 THRU 5

Models ILU550N102U1A, **ILU400N701U1A** and ILU350N701U1A

General - The general design, shape and arrangement shall be as illustrated except where variations are specifically described. Model ILU700N142U1A represents models ILU550N102U1A, **ILU400N701U1A** and ILU350N701U1A. Detailed differences are presented on page 2.

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F) IG (I) LL
1	Top Case	QMFZ2	LG CHEM (TIANJIN) ENGINEERING PLASTICS (E302314)	LUPOY ER- 1006F(#)	Polycarbonate (PC), measured approx. 160.0 mm by 46.4 mm by 30.8 mm (L x W x H), 1.5 mm thick min., rated 115 °C, V=0, HWI=2, HAI=0, CTI=3. Secured together by snap-in fit.	I1
2	Bottom Case	QMFZ2	LG CHEM (TIANJIN) ENGINEERING PLASTICS (E302314)	LUPOY ER- 1006F(#)	Polycarbonate (PC), measured approx. 156.6 mm by 43.0 mm by 5.1 mm (L x W x H), 1.5 mm thick min., rated 115 °C, V=0, HWI=2, HAI=0, CTI=3. Secured together by snap-in fit.	I2
3	Input Push-In Terminal Block (CN01)	XCFR2, CN	DEGSON ELECTRONICS CO LTD (E228872)	DG250-3.5*h	Rated 300 V, 7 A, 105 °C, acceptable for factory and/or field wiring 18 AWG, Copper conductor.	
	Alternate	XCFR2, CN	WAGO KONTAKTECHNIK GMBH & CO KG (E45172)	250-202	Same as above except for 8 A.	
4	Output connector - Wafer type (CN21)	ECBT2, CN	Various	Various	Rated 250 Vdc min., 2 A max., located in class 2 circuits, 12 pins type.	
5	Printed Wiring Board	ZPMV2, CN	Various	Various	Rated min. V=0, 130 °C. Overall approx. 162.0 mm by 42.4 mm (L x W), 1.5 mm thick. Suitable for support of live parts.	I3
6	Fuse (FS01)	JDYX2, CN	LITTELFUSE WICKMANN WERKE (E67006)	369 +	Rated 3.15 A, 300 V, connected in series with ungrounded supply.	
7	Varistor (VX01)	VZCA2, CN	THINKING ELECTRONIC INDUSTRIAL CO LTD (E314979)	TVR10751&	SPD Type 5, rated operating voltage 465 Vac, 465 V MCOV, 2 kA In, 1720 Vpk MLV.	
	Alternate	VZCA2, CN	AMOTECH CO LTD (E332687)	INR10D751, INR10D751S	SPD Type 5, rated operating voltage 460 Vac, 460 V MCOV, 3 kA In, 1830 Vpk MLV.	
8	Thermistor (NT01)	XGPU2, CN	Various	Various	Inrush-current limiting NTC Device, rated 240 V min., 4.5 A max.	

Model ILU700N142U1A - FIGS. 1 THRU 5

Models ILU550N102U1A, **ILU400N701U1A** and ILU350N701U1A (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
9	Capacitors (CX01, CX02)	FOKY2 or FOWX2, CN	Various	Various	Rated 305 Vac min., 105 °C min., 150 nF max., Located across the line.	
10	Bridge Diode (BD01)	-	Various	Various	Rated 600 V min., 8 A max.	
11	Rectifier Diode (DP92)	-	Various	Various	Rated 1000 V min., 1.0 A max.	
12	Rectifier Diode (DP71)	-	Various	Various	Rated 600 V min., 3.0 A max.	
13	Film Capacitor (CP71)	-	Various	Various	Rated 630 V min., 105 °C min., 220 nF max.	
14	FET (QP91)	-	Various	Various	Rated 600 V min., 9.0 A max.	
15	Electrolytic capacitor (CP91)	-	Various	Various	Rated 500 V min., 105 °C min., 47 uF max.	
16	IC (UM01)	-	Various	Various	Type LCS700HG.	
17	IC (UP01)	-	Various	Various	Type SEM3040.	
18	Film capacitor (CM91)	-	Various	Various	Rated 1000 V min., 105 °C min., 1.2 nF max.	
19	Electrolytic capacitors (CA92, CS31)	-	Various	Various	Rated 25 V min., 105 °C min., 150 uF max.	
20	Capacitor (CY01)	FOWX2, CN	Various	Various	Rated 400 V min., 125 °C min., 2.2 nF max. Class Y1. Bridging Primary to secondary.	
21	Optical Isolators (PC01, PC02)	FPQU2, CN	Various	Various	Rated 3000 V min., 110 °C min. operating temperature.	
22	Rectifier Diode (DS11)	-	Various	Various	Rated 150 V min., 3 A max.	
23	Rectifier Diode (DS05)	-	Various	Various	Rated 150 V min., 20 A max.	
24	Thermal pad	QMTR2 or QMFZ2	Various	Various	Silicone (SIR), 1 provided, rated 150 °C min., 10 mm by 25 mm (L x W), 1.0 mm thickness min., located above LP01.	
25	Internal Heat sink for UM01, BD01, PQ91 (HS #1)	-	Various	Various	Aluminum, overall approx. 49.5 mm by 39.5 mm by 21.8 mm (L x W x H), mechanically secured to PWB by soldering.	
26	Internal Heat sink for DS05. (HS #2)	-	Various	Various	Aluminum, overall approx. 34.5 mm by 22.0 mm by 21.8 mm mechanically secured to PWB by soldering.	

Winding devices - See below for details.

No.	Item	CCN	Manufacturer (File Number)	Part Number	Description / Technical Data	(F) IG (I) LL
1	Line Filter (LX01)- Primary				Refer to Ill. 4 for details for model ILU700N142U1A. Refer to Ill. 5 for details for models ILU550N102U1A, ILU400N701U1A and ILU350N701U1A.	I4, 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 for details for all models.	I6
2.1	Core	N/A	N/A	N/A	Ferrite, toroidal type, overall approx. 16.0 mm by 10.0 mm by 7.0 mm (OD x ID x H).	
2.2	Core Cover / Coil Separator	QMFZ2	Various	Various	Rated min. 105 °C, min. 0.4 mm thick.	
2.3	Base	QMFZ2	HEXION GMBH (E61040)	PF2736(a) (b)	Phenolic (PF), 0.46 mm thick min., rated V-0, 150 °C.	
	Alternate	QMFZ2	CHANG CHUN PLASTICS CO LTD (E59481)	T375HF	Phenolic Molding Compound (PMC), 0.43 mm thick min., rated V-0, 150 °C.	
	Alternate	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820, PM- 9630	Phenolic (PF), 0.51 mm thick min., rated V-0, 150 °C,	
2.4	Coil	OBMW2	Various	Various	Enameled copper wire, rated 130 °C min.	
2.5	Tube	YDPU2	Various	Various	Rated 200 °C min., 300 V min., VW- 1 min., located at pins #3 and #4.	

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

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F) IG (I) LL
3	PFC (LP01)- Primary				Refer to Ill. 7 for details for models ILU550N102U1A and ILU700N142U1A. Refer to Ill. 8 for details for models ILU400N701U1A and ILU350N701U1A.	I7, I8
3.1	Core	N/A	N/A	N/A	Ferrite, EE type, overall approx. 25.1 mm by 18.1 mm 10.8 by mm (L x W x H).	
3.2	Coil (8-2)	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.	
4	Line Filter (LS01)- Secondary				Refer to Ill. 9 for details for all models.	I9
4.1	Core	-	N/A	N/A	Ferrite, UU type, overall approx. 4.6 mm by 6.8 mm by 2.6 mm (L x W x H).	
4.2	Coil	OBMW2	Various	Various	Two provided, Enameled copper wire, each rated min. 130 °C.	
4.3	Bobbin	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9630	Phenolic (PF), min. 0.51 mm thick, rated 150 °C.	
4.4	Varnish	OBOR2	Various	Various	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 (TA01)- isolated primary to secondary (For CH2 output)				Refer to Ill. 10 for details for all models.	I10
	Electrical insulation system	OBJY2	LITE-ON TECHNOLOGY CORP (E140167)	LSE-B11	Rated Class 130 (Class B).	
5.1	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).	
5.2	Coil	OBMW2	Belong to electrical insulation system	Belong to electrical insulation system	Two provided, Enameled copper wire, each rated min. 130 °C.	
5.3	Secondary Coil (S-F)	OBJT2	YOUNG CHANG SILICONE CO LTD (E242198)	STW-B	Triple insulated wire, rated 130 °C.	
5.4	Bobbin / Base	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820	Phenolic (PF), min. 0.65 mm, thick, rated 150 °C.	
5.5	Insulation tape / 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.	
5.6	Varnish	OBOR2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C.	
5.7	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.	

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

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
6	Transformer (TM01)- isolated primary to secondary (For CH1 output)				Refer to Ills. 11 and 12 detailed construction and insulation system (Class 130 (B) information) for all models.	
	Electrical insulation system	OBJY2	LITE-ON TECHNOLOGY CORP (E140167)	LSE-B11	Rated Class 130 (Class B).	I11
	Alternate	OBJY2	CLOVER HI-TECH CO LTD (E167514)	SC-05B	Same as above.	I12
6.1	Core	-	-	-	Ferrite, EER type, measured overall approx. 29.0 mm by 27.6 mm by 11.2 mm (L x W x H).	
6.2	Bobbin	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820	Phenolic (PF), min. 0.65 mm thick, rated 150 °C, three flange type.	
6.3	Cap	OANZ2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C.	
6.4	Coil	OBMW2	Belong to electrical insulation system	Belong to electrical insulation system	Three provided, enameled copper wire, each rated min. 130 °C.	
6.5	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.	
6.6	Varnish	OBOR2	Belong to electrical insulation system	Belong to electrical insulation system	Rated min. 130 °C.	