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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)
OLU900P212U1 U	120-277	50/60	1.0 A, 100 W	CH1: 20-38	N/A	2.1 A, 84 W
				CH2: 12		0.1 A, 1.5 W
OLU900P212N1 U	120-277	50/60	1.0 A, 100 W	20-38	N/A	2.1 A, 84 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.

DIFFERENCES BETWEEN MODELS:

Model OLU900P212U1U is identical to model OLU900P212N1U except model designation and CH2 Output/Control Signal/Dimming Connection Lead Wire.

- Dimming connection

	CH2 Output/Control Signal/Dimming Connection Lead Wire	Reference Figure
OLU900P212U1U	Provided	Fig. 4
OLU900P212N1U	N/A	Fig. 6, 7

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)
OLU900P212U1U	Branch Circuit (Mains)	CH1 output: CC, CH2 output: CV Output is CH1: Class 2 (a) for UL, LED Class 2 for cUL (b1) CH2: Class 2 (b2) for UL and cUL	Damp	No	No	No
OLU900P212N1U	Branch Circuit (Mains)	Output: CC Output is Class 2 (a) for UL, LED Class 2 for cUL (b1)	Damp	No	No	No

a- As defined in UL 8750, Clause 7.12.1

b1- As defined in CAN/CSA-C22.2 No. 250.13, Annex A

b2- 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 90.8 °C. This value was calculated based on temperatures observed during testing and temperature ratings of the integral components including the electrical insulation system. See Ill. 16 for the location of the Tc point.
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. Model OLU900P212U1U is provided with minimum 18 AWG, stranded or solid leads, rated 105 °C, 300 V minimum for input connections and 22 AWG minimum for CH1 / 24 AWG minimum for CH2, stranded or solid leads, rated 105 °C, 300 V minimum for each output connection. Model OLU900P212N1U is provided with same connections as model OLU900P212U1U except CH2 Output/Control Signal/Dimming connection. Acceptability of the input lead wire being smaller than 18 AWG is to be determined as part of the end product evaluation.
7. Model OLU900P212U1U has 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. Model OLU900P212U1U is dimmable using a low voltage 0-10 V interface.
9. A potting compound inside the enclosure was used to embed all internal parts and input/output leads fully. The Strain Relief test was not considered necessary in the evaluation.
10. Outer Case has not been invested for final enclosure, the suitable enclosure shall be provided in the end-use product.

Conditions of Acceptability (CONT'D):

11. The grounding means shall be considered in each end use application.

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. These products have 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.

14. 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.
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): 66.1 °C or less.

Model OLU900P212U1U - FIGS. 1 THRU 5

Model OLU900P212N1U - FIGS. 6 AND 7

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 (Body)	-	Various	Various	Aluminum alloy, 0.9 mm thick min., overall approximately 168.6 mm by 52.0 mm by 32.4 mm (L x W x H). Two-part construction, secured together by screws as shown.	F1, I1
2	Case (Side, Input)	-	Various	Various	Aluminum alloy, 1.45 mm thick min., overall approximately 53.6 mm by 33.9 mm by 11.5 mm (L x W x H).	F2, I2
3	Case (Side, Output) - Dimmable product only	-	Various	Various	Aluminum alloy, 1.45 mm thick min., overall approximately 53.6 mm by 33.9 mm by 11.5 mm (L x W x H).	I3
4	Case (Side, Output)	-	Various	Various	Same as above, except the number of holes.	I4
5	Input Lead Wire	AVLV2, CN	Various	Various	18 AWG min., rated 300 V min., 105 °C min.	
6	CH1 Output Lead Wire	AVLV2, CN	Various	Various	22 AWG min., rated 300 V min., 105 °C min.	
7	CH2 Output/Control Signal/Dimming Lead Wire (Dimmable product only)	AVLV2, CN	Various	Various	24 AWG min., rated 300 V min., 105 °C min.	
8	Output connector body (CON1) for CH2 output/Control Signal/Dimming (Dimmable product only)	QMFZ2	Various	Various	0.45 mm thick min., rated 105 °C min., located in Class 2/LED Class 2 circuits.	
9	Input/Output Grommet	QMFZ2	Various	Various	Rated min. 130 °C, min. 1.2 mm thickness.	
10	Insulation sheet	QMFZ2	SABIC JAPAN L L C (E207780)	FR700	Polycarbonate (PC), rated V-0, 125 °C, 0.38 mm thick min., provided as insulation between PWB assembly and metal case. See Ill. 5 for detailed dimension and shape.	I5
11	Printed Wiring Board	ZPMV2, CN	Various	Various	Rated min. V-0, 130 °C. Overall approximately 167.5 mm by 42.0 mm (L x W), 1.6 mm thick. Suitable for support of live parts.	I6
12	Fuse (FS01)	JDYX2, CN	LITTELFUSE WICKMANN WERKE (E67006)	369 +	Rated 5.0 A, 300 V, connected in series with ungrounded supply.	

Model OLU900P212U1U - FIGS. 1 THRU 5

Model OLU900P212N1U - FIGS. 6 AND 7 (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F) IG (I) LL
13	Potting Compound	QMFZ2	DOW CORNING CORP (E40195)	170#	Rated 170 °C, potting silicone material, furnished as two liquid components. Completely surrounds circuit board in Case.	
	Alternate	QMFZ2	DOW CORNING CORP (E40195)	CN-8760	Same as above except 150 °C.	
14	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, 105 °C.	
15	Thermistor (NT01)	XGPU2, CN	Various	Various	Limiting NTC Device, rated 240 V min., 5.0 A max.	
16	Capacitors (CX01, CX02)	FOKY2 or FOWX2, CN	Various	Various	Rated 305 Vac min., 105 °C min., 150 nF max., Located across the line.	
17	Capacitor (CY01)	FOWX2, CN	Various	Various	Rated 400 V min., 125 °C min., 3.3 nF max. Class Y1. Bridging Primary to secondary.	
18	Capacitor (CY02)	FOWX2, CN	Various	Various	Rated 400 V min., 125 °C min., 2.2 nF max. Class Y1. Located Secondary to Ground.	
19	Bridge Diode (BD01)	-	Various	Various	Rated 600 V min., 8 A max.	
20	Capacitor (CP71)	-	Various	Various	Rated 630 V min., 105 °C min., 330 nF max.	
21	Electrolytic Capacitor (CP91)	-	Various	Various	Rated 500 V min., 105 °C min., 47 uF max.	
22	Capacitor (CM91)	-	Various	Various	Rated 1000 V min., 105 °C min., 2.0 nF max.	
23	Electrolytic capacitor (CA92)	-	Various	Various	Rated 25 V min., 105 °C min., 150 uF max.	
24	Electrolytic capacitor (CS31)	-	Various	Various	Rated 25 V min., 105 °C min., 220 uF max.	
25	Electrolytic capacitor (CS71)	-	Various	Various	Rated 50 V min., 105 °C min., 560 uF max.	
26	Rectifier Diode (DP92)	-	Various	Various	Rated 1000 V min., 1 A max.	
27	Rectifier Diode (DP71)	-	Various	Various	Rated 600 V min., 3 A max.	
28	FET (QP91)	-	Various	Various	Rated 600 V min., 11 A max.	
29	IC (UM01)	-	Various	Various	Type LCS701HG.	

Model OLU900P212U1U - FIGS. 1 THRU 5

Model OLU900P212N1U - FIGS. 6 AND 7 (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F) IG (I) LL
30	IC (UP01)	-	Various	Various	Type SEM3040.	
31	IC (UA01)	-	Various	Various	Type LNK624DG.	
32	Rectifier Diodes (DS71, DS72)	-	Various	Various	Rated 100 V min., 20 A max.	
33	Optical Isolators (PC01, PC02)	FPQU2, CN	Various	Various	Rated 3000 V min., 110 °C min. operating temperature.	

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. 7 for details.	I7
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. 8 details.	I8
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	Coil	OBMW2	Various	Various	Two provided, enameled copper wire, each rated 130 °C min.	
2.3	Core Cover	QMFZ2	Various	Various	Rated 105 °C min., 0.75 mm thick min.	
2.4	Coil Separator	QMFZ2	Various	Various	Rated 105 °C min., 0.4 mm thick min.	
2.5	Base	QMFZ2	CHANG CHUN PLASTICS CO LTD (E59481)	T375HF	Phenolic Molding Compound (PMC), 0.43 mm thick min., rated V-0, 150 °C.	
	Alternate	QMFZ2	HEXION GMBH (E61040)	PF2736(a) (b)	Phenolic (PF), 0.46 mm thick min., rated V-0, 150 °C.	
2.6	Teflon Tube	YDPU2	Various	Various	Rated 125 °C min., 300 V min., VW-1, located at pins #3 and #4.	
2.7	Rubber Tube	YDPU2	Various	Various	Rated 125 °C min., 300 V min., VW-1, intended to wrap around a body.	
3	Line Filter (LX03)- Primary	-	-	-	Refer to Ill. 9 for details.	I9
3.1	Core	N/A	N/A	N/A	Ferrite, toroidal type, overall approx. 10.0 mm by 6.0 mm by 4.0 mm (OD x ID x H).	
3.2	Coil	OBMW2	Various	Various	Two provided, enameled copper wire, each rated 130 °C min.	
3.3	Coil Separator	QMFZ2	Various	Various	Rated 130 °C min., 0.38 mm thick min.	
3.4	Base	QMFZ2	CHANG CHUN PLASTICS CO LTD (E59481)	T375HF	Phenolic Molding Compound (PMC), 0.43 mm thick min., rated V-0, 150 °C.	
3.5	Tube	YDPU2	Various	Various	Rated 125 °C min., 300 V min., VW-1, intended to wrap around a body.	

Winding devices - See below for details.

No.	Item	CCN	Manufacturer (File Number)	Part Number	Description / Technical Data	(F) IG (I) LL
4	PFC (LP01)- Primary	-	-	-	Refer to Ill. 10 for details.	I10
4.1	Bobbin	QMFZ2	HEXION GMBH (E61040)	PF2736(a) (b)	Phenolic (PF), 0.46 mm thick min., rated V-0, 150 °C.	
	Alternate	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820	Phenolic (PF), 0.51 mm thick min., rated 150 °C.	
4.2	Coil (8-2)	OBMW2	Various	Various	Enameled copper wire, rated 130 °C min.	
4.3	Coil (4-3)	OBJT2	Various	Various	Triple insulated wire, rated 130 °C min.	
4.4	Insulation Tape / Core Fixing Tape	OANZ2	Various	Various	Rated min. 130 °C.	
4.5	Barrier Tape	OANZ2	Various	Various	Rated min. 130 °C.	
4.6	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	-	-	-	Refer to Ills. 11 and 12 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).	I11
	Alternate	OBJY2	YAO SHENG ELECTRONIC CO LTD (E173643)	YCI-130	Same as above.	I12
	Alternate	OBJY2	TRANSON CO LTD (E348380)	TO-01B	Same as above.	I13
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	Primary 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	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.	
5.6	Varnish	OBOR2	Belong to electrical insulation system	Belong to electrical insulation system	Rated 130 °C min.	
5.7	Tube	YDPU2	Belong to electrical insulation system	Belong to electrical insulation system	Rated 130 °C min., 150 V min., VW- 1, located at pins #S and #F.	
5.8	Core fixing tape / Barrier tape	OANZ2	Belong to electrical insulation system	Belong to electrical insulation system	Rated 130 °C min.	

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	-	-	-	Refer to Ills. 13 and 14 detailed construction and insulation system (Class 130 (B) information).	
	Electrical insulation system	OBJY2	CLOVER HI-TECH CO LTD (E167514)	SC-04B	Rated Class 130 (Class B).	I14
	Alternate	OBJY2	LITE-ON TECHNOLOGY CORP (E140167)	LSE-B11	Rated Class 130 (Class B).	I15
6.1	Core	-	-	-	Ferrite, EER type, measured overall approx. 29.0 mm by 27.5 mm by 11.4 mm (L x W x H).	
6.2	Bobbin	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	PM-9820	Phenolic (PF), 0.65 mm thick min., rated V-0, 150 °C, three flange type.	
6.3	Cap	QMFZ2	Belong to electrical insulation system	Belong to electrical insulation system	Rated 130 °C min., 0.75 mm thick min.	
6.4	Coil	OBMW2	Belong to electrical insulation system	Belong to electrical insulation system	Three provided, enameled copper wire, each rated 130 °C min.	
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 130 °C min.	
6.7	(Optional) Mummy Lap Tape	OANZ2	Belong to electrical insulation system	Belong to electrical insulation system	Rated 130 °C min., located at pins #10 and #11.	