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REPORT

on

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

***SOLUM CO LTD**
***REPUBLIC OF KOREA**

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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 (a) | | |
|-------------|---------------|----------------|------------------------|---------------|----------------|------------------------|
| | Voltage (Vac) | Frequency (Hz) | Current (A), Power (W) | Voltage (Vdc) | Frequency (Hz) | Current (A), Power (W) |
| PSDV600102A | 110-277 | 50/60 | 0.8 A, 60 W | CH1: 50 | N/A | CH1: 1.050 A, 53 W |
| | | | | CH2: 13.2 | | CH2: 0.200 A, 2.5 W |

(a) - CH1 denotes main output intended to connect LED load,
CH2 denotes dimmer control output intended to connect dimmer control.

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 first 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 outputs only have been evaluated as LED Class 2, Annex A.

These products been evaluated for the following characteristics.

| Model No. | Input type | Output type | Product is rated | Type HL (c) | Type TL (d) |
|-------------|------------------------|---|------------------|-------------|-------------|
| PSDV600102A | Branch Circuit (Mains) | Output type- CC Output is Class 2 (a), LED Class 2 (b) | Damp | No | No |

a- As defined in UL 8750, Clause 7.12.1

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

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. Rated output loading for this product was achieved using resistive loads, electronic loads, LED loads. The temperature tests were performed at nominal 50 °C ambient. The need for other consideration should be considered in end-use product.
2. This product utilizes a UL Recognized OBJY2 Class 130 (B) electrical insulation system.
3. During the normal temperature test of the end product, the temperature at the temperature reference point (T_c, case surface above PFC(LP01)) is to be monitored. The absolute value at the temperature reference point cannot exceed 87.4 °C. This value was calculated based on temperatures observed during testing and temperature ratings of the integral components including the electrical insulation system. This value was designated by manufacturer based on calculated values by test.
4. 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.
5. The grounding means shall be considered in each end use application.
6. This product is intended for building in. 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.
7. This product is dimmable using a low voltage 0-10 V interface.
8. 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.

Conditions of Acceptability (CONT'D):

9. The unit employs input surge suppression protection suitable for use in Type 3 or Type 2 SPD application. The suitability of the use shall be determined in the end-product application.
10. The product is 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.
11. The input and output connections have been invested for factory wiring only, connection to supply mains shall be determined in the end product. If the product shall be intended to use in field wiring, the suitability shall be determined in each end-use application.
12. Outer Case has not been invested for final enclosure, the suitable enclosure shall be provided in the end-use product.
13. This product 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.).
14. The input terminal is Use Group D type, its spacing is 1/16 inch through air, and 1/8 inch over surface at 51 - 300 V rating. The suitability of the use shall be determined in the end-product application.
15. Based on maximum voltage restrictions for Class 2 circuits in the Canadian Electrical Code, the 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 | 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, Annex A.
7. Optional - Environmental considerations: see product characteristics table.
8. Optional - Polarity of the Input and Output Connections.
9. Optional - Temperature Measurement Point (Tc).

Model PSDV600102A - FIGS. 1 THRU 5

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 | Top/Sides Case | QMFZ2 | LG CHEM (TIANJIN) ENGINEERING PLASTICS (E302314) | LUPOY ER- 1006F(#) | Polycarbonate (PC), rated 115 °C, V-0, HWI=2, HAI=0, CTI=3, measured approx. 160.0 mm by 46.4 mm by 30.8 mm (L x W x H), min. 1.50 mm thick. Secured together by snap-in fit. | F1 I1 |
| 2 | Bottom Case | QMFZ2 | LG CHEM (TIANJIN) ENGINEERING PLASTICS (E302314) | LUPOY ER- 1006F(#) | Polycarbonate (PC), rated 115 °C, V-0, HWI=2, HAI=0, CTI=3, measured approx. 156.6 mm by 43.0 mm by 5.1 mm (L x W x H), min. 1.50 mm thick. Secured together by snap-in fit. | F2 I2 |
| 3 | Input Push-In Terminal Block (CN01) | XCFR2, CN | DEGSON ELECTRONICS CO LTD (E228872) | DG250-3.5*h | Rated min. 300 V, 7 A, 105 °C, acceptable for factory and/or field wiring 18 AWG, Copper conductor. | |
| 4 | Output Connector (Main /Dimming) (CN21) | ECBT2, CN | Various | Various | Rated max. 2 A, min. 250 Vdc, 12 pins type. | |
| 5 | Printed Wiring Board | ZPMV2, CN | Various | Various | Rated min. 130 °C, V-0. Overall approx. 155.1 mm by 41.5 mm (L x W), 1.6 mm thick. Suitable for support of live parts. | F3,F4 ,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) | TVR10751K | SPD Type 4 for use in Type 3 applications, min. voltage rating 465 Vac. | |
| | Alternate | VZCA2, CN | AMOTECH CO LTD (E332687) | INR10D751S | SPD Type 4 for use in Type 2 applications, min. voltage rating 460 Vac. | |
| 8 | Thermistor (NT01) | XGPU2, CN | Various | Various | Rated 5 ohm at 25 °C. | |
| 9 | Capacitors (CX01, CX02) | FOKY2 or FOWX2, CN | Various | Various | Located across the line, rated min. 305 V, min. 105 °C, max. 150 nF. | |
| 10 | Bridge Diode (BD01) | - | Various | Various | Rated min. 600 V, max. 8.0 A. | |
| 11 | Rectifier Diode (DP92) | - | Various | Various | Rated min. 1000 V, max. 1.0 A. | |
| 12 | Rectifier Diode (DP71) | - | Various | Various | Rated min. 600 V, max. 3.0 A. | |

Model PSDV600102A - FIGS. 1 THRU 5 (CONT'D)

| No. | Item | CCN | Manufacturer (File Number) | Part/Model Number | Description / Technical Data | (F)IG (I)LL |
|-----|--------------------------------------|--------------|-------------------------------|----------------------|---|----------------|
| 13 | FET (QP91) | - | Various | Various | Rated min. 600 V, max. 6.5 A. | |
| 14 | Electrolytic Capacitor (CA91) | - | Various | Various | Rated min. 500 V, min. 105 °C, max. 6.8 uF. | |
| 15 | Capacitor (CY01) | FOWX2, CN | Various | Various | Rated 1.5 nF, min. 400 Vac, min. 125 °C. Class Y1. Located primary to secondary. | |
| 16 | Optical Isolators (PC01, PC02) | FPQU2, CN | Various | Various | Rated min. 3000 Vac isolation, 110 °C max. operating temperature. | |
| 17 | Electrolytic Capacitor (CP91) | - | Various | Various | Rated min. 500 V, min. 105 °C, max. 47 uF. | |
| 18 | Film Capacitor (CM91) | - | Various | Various | Rated min. 800 V, min. 105 °C, max. 2.2 nF. | |
| 19 | Electrolytic Capacitor (CS71) | - | Various | Various | Rated min. 63 V, min. 105 °C, max. 390 uF, located on secondary circuit. | |
| 20 | Electrolytic Capacitor (CS31) | - | Various | Various | Rated min. 35 V, min. 105 °C, max. 100 uF, located on secondary circuit. | |
| 21 | Rectifier Diode (DS05) | - | Various | Various | Rated min. 150 V, max. 10 A, located on secondary circuit. | |
| 22 | Heat Sink for QP91, UM01 | - | Various | Various | Aluminum, secured to PWB by soldering for models. Measured overall 52.7 mm by 39.5 mm by 22.5 mm (L x W x H), 1.0 mm thick min.. | |
| 23 | Heat Sink for DS05 | - | Various | Various | Aluminum, secured to PWB by soldering for models. Measured overall 28.8 mm by 9.0 mm by 21.8 mm (L x W x H), 1.0 mm thick min.. | |

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) - primary | - | - | - | Refer to Ill. 4 for details. | I4 |
| 1.1 | Core | - | - | - | Ferrite, drum type, overall 12.0 mm by 6.5 mm by 13.5 mm (OD x ID x H). | |
| 1.2 | Coil | OBMW2 | Various | Various | Two provided, enameled copper wire, rated min. 130 °C. | |
| 1.3 | Varnish | OBOR2 | Various | Various | Rated min. 130 °C. | |
| 2 | Line Filter (LX02) - primary | - | - | - | Refer to Ill. 5 for details. | I5 |
| 2.1 | Core | - | - | - | 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 min. 130 °C, overall 0.3 mm diameter, 70±3 turns. | |
| 2.3 | Core Cover / Coil Separator | QMFZ2 | SOLVAY ENGINEERING PLASTICS GBU (E44716) | A 50H1 (r3)(f2) | Polyamide 66 (PA66), rated V-0, 105 °C, min. 0.4 mm thick. | |
| | Alternate | QMFZ2 | SAMSUNG FINE CHEMICALS CO LTD (E309188) | KB40BM | Liquid Crystal Polymer (LCP), rated V-0, rated 130 °C, min. 0.29 mm thick. | |
| 2.4 | Tube | QMFZ2 | DYNEON GMBH (E188957) | TF 2021(a) | Polytetrafluorethylene (PTFE), Rated 180 °C, min. 1.5 mm, located at pins #3 and #4. | |
| 2.5 | Base | QMFZ2 | MOMENTIVE SPECIALTY CHEMICALS GMBH (E61040) | PF2736(a)(b) | Phenolic (PF), min. 0.46 mm thick, rated V-0, 150 °C. | |
| | Alternate | QMFZ2 | CHANG CHUN PLASTICS CO LTD (E59481) | T375HF | Phenolic Molding Compound (PMC), min. 0.43 mm thick, rated V-0, 150 °C. | |

Winding devices - See below for details. (CON'T)

| No. | Item | CCN | Manufacturer (File Number) | Part/Model Number | Description / Technical Data | (F)IG (I)LL |
|-----|---|-----------------------|--|----------------------|--|----------------|
| 3 | PFC (LP01) - primary | - | - | - | Refer to Ill. 6 for details. | I6 |
| 3.1 | Core | - | - | - | Ferrite, EE type, overall approx. 25.05 mm by 18.30 mm by 10.75 mm (L x W x H). | |
| 3.2 | Coil | OBMW2 and OBJT2 | Various | Various | Two provided, one is enameled copper wire and another is triple insulated wire, each rated min. 130 °C. | |
| 3.3 | Bobbin | QMFZ2 | MOMENTIVE SPECIALTY CHEMICALS GMBH (E61040) | PF2736(a) (b) | Phenolic (PF), 0.46 mm thick min., rated V-0, 150 °C. | |
| 3.4 | Insulation Tape / Core Fixing Tape | OANZ2 | Various | Various | Rated min. 130 °C. | |
| 3.5 | Barrier Tape | OANZ2 | Various | Various | Rated min. 130 °C. | |
| 3.6 | Varnish | OBOR2 | Various | Various | Rated min. 130 °C. | |
| 4 | Line Filter (LS01) - secondary | - | - | - | Refer to Ill. 7 for details. | I7 |
| 4.1 | Core | - | - | - | Ferrite, UU type, overall approx. 4.60 mm by 6.80 mm by 2.60 mm (L x W x H). | |
| 4.2 | Bobbin | QMFZ2 | Various | Various | Phenolic (PF), rated min. 150 °C, min. 0.32 mm thick. | |
| 4.3 | Coil | OBMW2 | Various | Various | Two provided, enameled copper wire, rated min. 130 °C. | |
| 4.4 | Varnish | OBOR2 | Various | Various | Rated min. 130 °C. | |

Winding devices - See below for details. (CON'T)

| 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. 8 and 9 detailed construction and insulation system (Class 130 (B) information). | |
| 5.1 | Electrical insulation system | OBJY2 | CLOVER HI-TECH CO LTD (E167514) | SC-05B | Rated Class 130 (Class B). | I8 |
| | Alternate | OBJY2 | LITE-ON TECHNOLOGY CORP (E140167) | LSE-B11 | Same as above. | I9 |
| 5.2 | Core | - | - | - | Ferrite, EER type, measured overall approx. 28.5 mm by 28.0 mm by 11.4 mm (L x W x H). | |
| 5.3 | Bobbin | QMFZ2 | SUMITOMO BAKELITE CO LTD (E41429) | PM-9820 | Phenolic (PF), rated min. 150 °C, min. 0.65 mm thick. | |
| 5.4 | Cap | QMFZ2 | Belong to electrical insulation system | Belong to electrical insulation system | Polybutylene Terephthalate (PBT), rated min. 130 °C, min. 0.75 mm thick. | |
| 5.5 | Coil | OBMW2 | Belong to electrical insulation system | Belong to electrical insulation system | Three provided, enameled copper wire, each rated min. 130 °C. | |
| 5.6 | Insulation Tape | OANZ2 | JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111) | CT | Polyethylene terephthalate film tape, rated 130 °C, min. 0.025 mm thick. | |
| 5.7 | Core fixing tape | OANZ2 | Belong to electrical insulation system | Belong to electrical insulation system | Rated min. 130 °C. | |
| 5.8 | Varnish | OBOR2 | Belong to electrical insulation system | Belong to electrical insulation system | Rated min. 130 °C. | |
| 5.9 | Tube | YDPU2 | Belong to electrical insulation system | Belong to electrical insulation system | Rated min. 200 °C, located at pin #1. | |

Winding devices - See below for details. (CON'T)

| No. | Item | CCN | Manufacturer (File Number) | Part/Model Number | Description / Technical Data | (F) IG (I) LL |
|-----|---|-----------------------|--|---|---|------------------|
| 6 | Transformer (TA01)- isolated primary to secondary for CH2 output | - | - | - | Refer to Ills. 10 and 11 detailed construction and insulation system (Class 130 (B) information). | |
| 6.1 | Electrical insulation system | OBJY2 | LITE-ON TECHNOLOGY CORP (E140167) | LSE-B11 | Rated Class 130 (Class B). | I10 |
| 6.2 | Core | - | - | - | Ferrite, EE type, measured overall approx. 14.4 mm by 14.0 mm by 7.0 mm (L x W x H). | |
| 6.3 | Bobbin / Base | QMFZ2 | SUMITOMO BAKELITE CO LTD (E41429) | PM-9820 | Phenolic (PF), rated min. 150 °C, min. 0.65 mm thick. | |
| 6.4 | Coil | OBMW2 and OBJT2 | Belong to electrical insulation system | Belong to electrical insulation system | Enamel copper wire for primary coil and triple insulated wire for secondary coil, min. 130 °C. | |
| 6.5 | Insulation Tape | OANZ2 | JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111) | CT | Polyethylene terephthalate film tape, rated 130 °C, min. 0.025 mm thick. | |
| 6.6 | Core fixing tape | OANZ2 | Belong to electrical insulation system | Belong to electrical insulation system | Rated min. 130 °C. | |
| 6.7 | Varnish | OBOR2 | Belong to electrical insulation system | Belong to electrical insulation system | Rated min. 130 °C. | |
| 6.8 | Tube | YDPU2 | Belong to electrical insulation system | Belong to electrical insulation system | Rated min. 125 °C, located at pins #S and #F. | |