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REPORT

on

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

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**\*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		
	Voltage (Vac)	Frequency (Hz)	Current (A)	Voltage (Vdc)	Frequency (Hz)	Current (A)
<b>*PSDV900101U, PSDV900103U, PSDV900106U</b>	<b>120-277</b>	50/60	1.2	34-42	N/A	2.3
*PSDV900102U	<b>120-277</b>	50/60	1.2	30-42	N/A	2.3

## TECHNICAL CONSIDERATIONS (NOT FOR UL FIELD REPRESENTATIVE USE):

USR - Indicates investigation to the U.S. Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750, First Edition. The output has 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, CSA C22.2 No. 250.13-12, First Edition. The output has been evaluated as Low voltage Limited energy, Annex A.

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## DIFFERENCES BETWEEN MODELS:

Models PSDV900101U, PSDV900103U and PSDV900106U have similar construction except model designation and dimming control connector (CN301) but same critical components such as winding devices. Detailed information is as below table.

	PSDV900101U	PSDV900102U	PSDV900103U	PSDV900106U
Dimming control	Dimmable	Non-dimmable	Non-dimmable	Dimmable
Connector (CN301) pin information	Pin #1:N.C; Pin #2:DIM(+); Pin #3:N.C;Pin #4:DIM(-); Pin #5:N.C; N.C	CN301: N.C	Pin #1:N.C; Pin #2:N.C; Pin #3:Rset(+); Pin #4: N.C; Pin #5:Rset(-)	Pin #1:N.C; Pin #2:DIM(+); Pin #3:Rset(+); Pin #4:DIM(-); Pin #5:Rset(-)

Note - N.C: No component.

Model PSDV900102U is similar to model PSDV900101U except model designation and some components in primary and secondary circuit and related PWB pattern for dimming control but same critical components such as winding devices.

## Conditions of Acceptability:

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

1. These products been evaluated for the following characteristics.

Model No. [x] applies to all models			Product is rated	Type HL (c)	Type TL (d)
PSDV900101U, PSDV900102U, PSDV900103U, PSDV900106U,	Input type-  [x] Branch Circuit (Mains)	Output type- [x] CC  Output is [x] Class 2 (a), [x] LVLE (b)	[x] Dry and Damp	[x] No	[x] No

a- As defined in UL 8750, Clause 7.12.1

b- As defined in CAN/CSA-C22.2 No. 250.13-12, Annex A

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

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

2. Rated output loading for these products was achieved using LED loads and a variable resistance for fine adjustment. The need for other consideration should be considered in end-use product.
- \*3. The temperature tests were performed at nominal 50 °C ambient. During the normal temperature test of the end product, the temperature at the temperature reference point (**T<sub>c</sub>**) is to be monitored. The absolute value at the temperature reference point (**T<sub>c</sub>**, Case surface above TM101) cannot exceed **85 °C (designated by manufacturer, calculated value by test is 92.3 °C) for all models.**
4. These products utilize a UL Recognized OBJY2 Class 130 (B) electrical insulation system.
5. These products are 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.
6. These products are provided with minimum 18 AWG, stranded leads, rated 105 °C, 300 V minimum for input connections and minimum 24 AWG, stranded leads, rated 105 °C, 300 V minimum for output connections.
7. The LED driver is provided with an external green grounding lead that is bonded directly to the internal board via metal case by a screw. The need for bonding the dead metal enclosure shall be considered in the end product.
- \*8. **Models PSDV900101U and PSDV900106U are** dimmable using a low voltage 0-10 V interface. This interface is a sink, since the interface circuit operates from an external source of supply.

## Conditions of Acceptability (CONT'D):

9. 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. 250.13-12.
10. The unit employs input surge suppression protection suitable for use in Type 3 SPD application. The suitability of the use shall be determined in the end-product application.
11. The product was tested while connected to a 20 A branch circuit. If used on a branch circuit greater than 20 A, additional testing may be necessary and shall be considered in the end product.
12. 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.
13. The Strain Relief test was not conducted in this evaluation. The need for additional testing may be considered in the end product.
14. Outer Case has not been invested for final enclosure, the suitable enclosure shall be provided in the end-use product.
15. **The product has 44.8 Vdc maximum output voltage during the test. This output complies with the definition of Class 2 per the Canadian Electrical Code (CEC). This output cannot be accessible based on maximum voltage restrictions for Class 2 circuits in the Canadian Electrical Code. The output terminals of the end product should be evaluated to confirm compliance with this accessibility requirement, either based on output terminal design or base on manufacturer specifications for its restricted access areas only. The latter option will require markings on the end product as well as the installation manual.**
16. All test have conducted with Rset pins (+ and -) open position only in this evaluation. Other Rset pins connections shall be considered in end use application.

## 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 - R/C (ZPMV2), rated V-0, suitable for the solder time and temperature used by the manufacturer and having an operating temperature rating of at least 130 °C, and complied with the requirement for direct support of current carrying parts.

"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, if more than one location.
4. Optional - 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 - **"Suitable for Class 2 Wiring Methods" or equivalent.**
7. Optional - Environmental considerations: see product characteristics table.
8. Optional - Polarity of the Input and Output Connections.
9. \* **Optional - Temperature Measurement Point (Tc): 85 °C.**

\*Model PSDV900106U - FIGS. 1 THRU 4

(Model PSDV900106U represents models PSDV900101U, PSDV900103U)

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	Bottom Case	-	-	-	Aluminum alloy, min. 1.2 mm thick, overall measured 207.0 mm by 60.0 mm by 25.9 mm (L x W x H).	F1,I1
1A	Top Case	-	-	-	Aluminum alloy, min. 1.2 mm thick, overall approx. 207.1 mm by 60.0 mm by 8.7 mm (L x W x H).	I1A
*2	Side Cover (Input)	-	-	-	Aluminum alloy, min. 1.5 mm thick overall measured 60.0 mm by 32.0 mm by 16.0 mm (L x W x H), mechanically secured to Case Body by screws.	F2,I2
3	Side Cover (Output)	-	-	-	Same as above.	I3
4	Input Lead Wire	AVLV2, CN	Various	Various	Min. 18 AWG, rated min. 300 V, 105 °C.	
5	Input Cord	ZJ CZ, CN	Various	Various	Min. 18 AWG, rated min. 300 V, 105 °C.	
6	Output Lead Wire (LED)	AVLV2, CN	Various	Various	Min. 24 AWG, rated min. 300 V, 105 °C.	
7	Output Lead Wire (Dimming)	AVLV2, CN	Various	Various	Min. 24 AWG, rated min. 300 V, 105 °C.	
8	Output/Dimming Cord	ZJ CZ, CN	Various	Various	Min. 24 AWG, rated min. 300 V, 105 °C.	
*9	Connector (Output Lead wire for dimming, CN301)	-	Various	Various	Rated min. 300 V, 1 A, 105°C.	
10	Grounding wire	AVLV2, CN	Various	Various	Min. 18 AWG, rated min. 300 V, 105 °C. Green or with yellow strip, bonded directly to the internal board via metal case by a screw.	
*11	Input/Output/D imming Grommet	QMFZ2	Various	Various	Silicone or Silicone rubber (SIR), rated min. 150 °C, 2.0 mm thickness.	
12	Insulation sheet	QMFZ2	TORAY INDUSTRIES INC (E86511)	Lumirror (#)	Polyethylene Terephthalate (PET), Rated 105 °C, VTM-2, double layers, minimum 0.18 mm total thickness, fully wrap internal LED Driver against Case, see ILL 4 for detailed dimension and shape.	I4
*	Alternate	QMFZ2	SKC CO LTD (E74359)	SH71S, Skyrol SG00L/SR50/SR5 3	Same as above.	

## Model PSDV900106U - FIGS. 1 THRU 4 (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
13	Printed Wiring Board for models PSDV900101U, PSDV900103U, PSDV900106U	ZPMV2, CN	Various	Various	Rated minimum 130 °C, V-1. Measured approx. 200.0 mm by 53.5 mm (L x W), 1.5 mm thick.	F3- 4,I5
14	Thermal PAD	QMTR2 or QMFZ2	Various	Various	Silicone or Silicone rubber (SIR), rated minimum 150 °C, V-0.  1. 30.0 mm by 40.0 mm (L x W), min. 2.0 mm thick, located at top of TM101. 2. 22.0 mm by 27.0 mm (L x W), min. 2.5 mm thick, located at top of LP01. 3. 30.0 mm by 40.0 mm (L x W), min. 4.0 mm thick, located at top of TM101. 4. 30.0 mm by 40.0 mm (L x W), min. 3.0 mm thick, two provided, located at bottom of CP151, CM251 and CM252.	



\*Model **PSDV900106U** - FIGS. 1 THRU 4 (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
15	Fuse (FS101)	JDYX2, CN	LITTELFUSE WICKMANN WERKE (E67006)	369 +	Rated 3.15 A, 300 Vac, connected in series with ungrounded supply.	
16	Varistor (VX101S)	VZCA2, CN	Various	Various	Rated min. 300 Vac, intended use type 3 SPD applications.	
17	Thermistor (NT101S)	XGPU2, CN	Various	Various	Rated 2.5 ohms at 25°C.	
18	Capacitors (CX101S, CX102S)	FOKY2 or FOWX2, CN	Various	Various	Located across the line, rated min. 305 Vac, min. 110 °C, 150 nF. max.	
19	Bridge Diode (BD101)	-	Various	Various	Rated 600 V min., 8.0 A max.	
20	Electrolytic Capacitor (CP151)	-	Various	Various	Rated min. 500 V, 47 uF, 105 °C.	
*21	FET (QP101)	-	Various	Various	Rated 600V min., 9.7 A max, located on primary circuit.	
22	Rectifier Diode (DP172)	-	Various	Various	Rated 600 V Min., 10 A Max, located on primary circuit.	
*23	FETs (QM102, QM103)	-	Various	Various	Rated 600 V Min., 9.7 A Max, located on primary circuit.	
24	Diodes (DM261, DM262)	-	Various	Various	Rated 150 V Min., 20 A Max, located on secondary circuit.	
*25	Electrolytic Capacitor (CM251, CM252)	-	Various	Various	Rated 150 uF, min. 63 V, min. 105 °C, located on secondary circuit.	
*26	Electrolytic Capacitor (CM220)	-	Various	Various	Rated 47 uF, min. 50 V, min. 105 °C.	
27	Capacitor (CY106S)	FOWX2, CN	Various	Various	Bridging primary to secondary, rated 3.3 nF, min. 400 Vac, min. 125 °C. Class Y1.	
28	Capacitor (CY201S)	FOWX2, CN	Various	Various	Located secondary to Ground, rated 3.3 nF, min. 400 Vac, min. 125 °C. Class Y1.	
29	Optical Isolators (PC101S)	FPQU2, CN	Various	Various	Rated minimum 3000 Vac isolation min., 110 °C max. operatingtemperature.	

\*Model **PSDV900106U** - FIGS. 1 THRU 4 (CONT'D)

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
*30	Heat Sink for BD101 (HS1)	-	Various	Various	Aluminum, secured to PWB by soldering for models. <b>Overall approx. 51.6 mm by 20.0 mm by 7.8 mm(L x H x W), 2.0 mm thick minimum.</b>	
*31	Heat Sink for DP172, QP101 (HS2)	-	Various	Various	Aluminum, secured to PWB by soldering for models. <b>Overall approx. 51.0 mm by 52.1 mm by 21.0 mm (L x W x H), 2.0 mm thick minimum.</b>	
*32	Heat Sink for QM201, DM261, DM262 (HS3)	-	Various	Various	Aluminum, secured to PWB by soldering for models. <b>Overall approx. 52.1 mm by 31.7 mm by 20.0 mm (W x L x H), 2.0 mm thick minimum.</b>	
33	Components	-	-	-	See ILL. 6 for complete list and electrical listing of all other components <b>for model PSDV900106U.</b>	I6
33A	Components	-	-	-	See ILL. 6A for complete list and electrical listing of all other components <b>for model PSDV900101U.</b>	I6A
33B	Components	-	-	-	See ILL. 6B for complete list and electrical listing of all other components <b>for model PSDV900103U.</b>	I6B

Winding devices - See below for details.

No.	Item	CCN	Manufacturer (File Number)	Part Number	Description / Technical Data	(F)IG (I)LL
1	Line Filter (LX101S, LX102S)	-	-	-	Refer to Ill. 7 for details	I7
1.1	Core	-	-	-	Ferrite, toroidal type, overall 16.0 mm by 10.0 mm by 7.0 mm (OD x ID x H).	
1.2	Coil	OBMW2	Various	Various	Enameled copper wire, rated minimum 130 °C.	
1.3	Core Cover	QMFZ2	Various	Various	Rated minimum 130 °C, minimum 0.4 mm thick.	
1.4	Coil Separator	QMFZ2	Various	Various	Rated minimum 130 °C, minimum 0.75 mm thick.	
1.5	Base	QMFZ2	Various	Various	Phenolic, rated minimum 130 °C, minimum 0.43 mm thick.	
1.6	Tube	YDPU2	Various	Various	Rated minimum 125 °C, Minimum 300 V, VW-1, located at pins #3 and #4.	
2	Choke coil (LQ01) - primary	-	-	-	Refer to Ill. 8 for details	I8
2.1	Core	-	-	-	Ferrite, drum type, measured overall 6.5 mm by 3.1 mm by 7.5 mm (OD x ID x H).	
2.2	Coil	OBMW2	Various	Various	Enameled copper wire, rated minimum 130 °C.	
2.3	Base	QMFZ2	Various	Various	Phenolic, rated minimum 130 °C, minimum 0.43 mm thick.	
2.4	Tube	YDPU2	Various	Various	Rated minimum 125 °C, 300 V, VW-1, intended to wrap round a body.	
3	Choke coil (L01) - secondary	-	-	-	Refer to Ill. 9 for details	I9
*3.1	Core	-	-	-	Ferrite, toroidal type, overall 10.0 mm by 6.0 mm by 4.0 mm (OD x ID x H).	
3.2	Coil	OBMW2	Various	Various	Enameled Copper wire, rated minimum 130 °C.	
*	<b>Alternate</b>	OBJT2	Various	Various	Triple insulated wire, rated minimum 130 °C.	
	<b>Alternate</b>	AVLV2, CN	Various	Various	<b>Teflon wire, rated minimum 130 °C.</b>	
3.3	Base	QMFZ2	Various	Various	Phenolic, rated minimum 130 °C, minimum 0.43 mm thick.	
*3.4	Tube	YDPU2	Various	Various	Rated minimum 130 °C, Minimum 300 V, VW-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
4	PFC (LP01)	-	-	-	Refer to Ill. 10 for details	I10
4.1	Core	-	-	-	Ferrite, PQ type, measured overall 26.5 mm by 19.0 mm by 19.0 mm (L x H x W).	
4.2	Bobbin	QMFZ2	Various	Various	Phenolic (PF), rated minimum 130 °C, 0.51 mm thick minimum.	
4.3	Coil	OBMW2	Various	Various	Enameled copper wire, rated minimum 130 °C.	
	Alternate	OBJT2	Various	Various	Triple insulated wire, rated minimum 130 °C.	
4.4	Insulation Tape	OANZ2	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111)	CT	Polyethylene terephthalate film tape, rated minimum 130 °C.	
	Alternate	OANZ2	SYMBIO INC (E50292)	35660*®	Polyethylene terephthalate film tape, rated minimum 130 °C.	
4.5	Barrier Tape	OANZ2	Various	Various	Rated minimum 130 °C.	
4.6	Varnish	OBOR2	Various	Various	Rated minimum 130 °C.	
5	Transformer (PM101)	-	-	-	Refer to Ill. 11 for details	I11
5.1	Core	-	-	-	Ferrite, EE type, measured overall 10.3 mm by 11.5 mm by 4.75 mm (L x W x H).	
5.2	Bobbin	QMFZ2	Various	Various	Phenolic (PF), rated minimum 130 °C, 0.46 mm thick minimum.	
5.3	Coil	OBMW2	Various	Various	Enameled copper wire, rated minimum 130 °C.	
5.4	Insulation Tape	OANZ2	DUCK SUNG HITECH CO LTD (E105147)	DTS-204	Polyester Film tape, rated 130 °C, Overall 0.025 mm thick per layer.	
	Alternate	OANZ2	METAL LINE CO LTD (E162848)	800, 800BT	Same as above except PET Film tape.	
	Alternate	OANZ2	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111)	PZ	Same as above except PET Film tape.	
5.5	Varnish	OBOR2	Various	Various	Rated minimum 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
6	Transformer (TM101)- isolated primary to secondary	-	-	-	Refer to Ill. 12 and 13 for detailed construction and insulation system (Class 130 (B) information).	
6.1	Electrical insulation system	OBJY2	LI SHIN INTERNATIONAL ENTERPRISE CORP (E140167)	LSE-B10	Rated Class 130 (Class B).	I12
*	Alternate	OBJY2	CLOVER HI-TECH CO LTD (E167514)	<b>SC-05B</b>	Same as above.	I13
*6. 2	Core	-	-	-	Ferrite, EER type, measured overall 38.0 mm by 30.9 mm by <b>11.6</b> mm (L x W x H).	
*6. 3	Bobbin	QMFZ2	SUMITOMO BAKELITE CO LTD (E41429)	<b>PM-9820</b>	Phenolic (PF), rated minimum 130 °C, <b>0.65</b> mm thick minimum.	
*6. 4	Cap	QMFZ2	Various	Various	Polybutylene Terephthalate (PBT), rated minimum 130 °C, 0.75 mm thick minimum.	
*6. 5	Coil	OBMW2	Various	Various	Enameled copper wire, rated minimum 130 °C.	
*6. 6	Insulation Tape	OANZ2	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD (E165111)	CT, PZ	Polyethylene terephthalate film tape, Minimum 0.025 mm thick. 130 °C min.	
	Alternate	OANZ2	SYMBIO INC (E50292)	35660*@	Same as above.	
6.7	Varnish	OBOR2	Various	Various	<b>Rated minimum 130 °C.</b>	

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

7	Line Filter (LX103S) - primary circuit	-	-	-	Refer to Ill. 14 for details	I14
7.1	Core	-	-	-	Ferrite, toroidal type, overall 8.1 mm by 4.1 mm by 3.1 mm (OD x ID x H).	
7.2	Coil	OBMW2	Various	Various	Enameled copper wire, rated minimum 130 °C.	
	Alternate	OBJT2	Various	Various	Triple insulated wire, rated minimum 130 °C.	
	Alternate	AVLV2, CN	Various	Various	Teflon wire, rated minimum 130 °C.	
7.3	Base	QMFZ2	CHANG CHUN PLASTICS CO LTD (E59481)	T375HF	Phenolic Molding Compound (PMC), rated 150 °C, minimum 0.43 mm thick.	
7.4	Tube	YDPU2	Various	Various	Rated 200 °C, 600 V rms, VW-1, located at pins #2 and #4.	

## Model PSDV900102U - FIGS. 5 THRU 6

General - The design, shape and arrangement shall be as illustrated.  
Model PSDV900102U is identical to Model PSDV900101U except for model designation and components, detailed differences described below:

No.	Item	CCN	Manufacturer (File Number)	Part/Model Number	Description / Technical Data	(F)IG (I)LL
*1	Printed Wiring Board	ZPMV2, CN	Various	Various	Rated minimum 130 °C, V-1. Measured approx. 200.0 mm by 53.5 mm (L x W), 1.5 mm thick.	<b>F5-6,I15</b>
2	Output Lead Wire (Dimming)	N/A	N/A	N/A	No component.	
3	Dimming Cord	N/A	N/A	N/A	No component.	
*4	Connector (Output Lead wire for <b>dimming,CN301</b> )	N/A	N/A	N/A	No component.	
5	Heat Sink for QM201, DM201, DM202 (HS3)	-	Various	Various	Aluminum, secured to PWB by soldering for models. Measured overall 52.0 mm by 31.0 mm by 21.6 mm (W x L x H), 2.0 mm thick minimum.	
*6	Electrolytic Capacitor (CM201, CM202)	-	Various	Various	Rated <b>150</b> uF, min. <b>63</b> V, min. 105 °C, located on secondary circuit.	
7	Diodes (DM201, DM202)	-	Various	Various	Rated min. 150 V, 20 A Max, located on secondary circuit.	
*8	Components	-	-	-	See ILL. <b>16</b> for complete list and electrical listing of all other components.	<b>I16</b>