

File E322469
Project 4786125262

December 11, 2013

REPORT

On

DRIVERS FOR LIGHT-EMITTING DIODES ARRAYS
MODULES AND CONTROLLERS

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Coopersburg, Pa

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DESCRIPTION

PRODUCT COVERED:

USR, CNR - Class 2 LED Driver,

Cat Nos. LDEz1U1UK, LDEz2U1UK, LDEz3U1UK or LDEz4U1UK where z can be any number 0-9, followed by S or N, followed by a single letter A-S, followed by A022 through A140 or BLK, may be followed by suffix CPBXXXX where X can be any number 0 to 9 for commercial reasons.

Cat Nos. L2Hz1U1RK, L2Hz2U1RK, L2Hz3U1RK, L2Hz4U1RK, where z can be any number 0 - 9, followed by S or N, followed by a single letter C, followed by A046 through A093 or BLK, may be followed by suffix CPBXXXX where X can be any number 0 to 9 for commercial reasons.

GENERAL:

The units tested are electronic optionally TL marked LED Drivers operating at Class 2 constant current output and are designed for building into a luminaire. The unit is provided with terminal blocks for connection within the luminaire to mains and also a dimming interface for connection to DALI or Lutron's ECO system controller. The unit is also marked with a warranty Tc value that is not to be confused with the TL marked values generated via testing within a 40°C ambient.

TECHNICAL CONSIDERATIONS (NOT FOR UL FIELD REPRESENTATIVE USE):

This component has been judged on the basis of the spacing required in the Standard for Light Emitting Diode (LED) Light Sources for Use In Lighting Products, UL 8750, which would cover the component itself if submitted for Listing. This product complies with NEC Class 2 output limits only.

USR - Indicates investigation to the United States requirements for the standard for Light Emitting Diode (LED) Light Sources for Use In Lighting Products, UL 8750, and the Standard for Class 2 Power Units, UL 1310.

CNR - Indicates investigation to the Canadian Standard Power Supplies with Extra-Low-Voltage Class 2 Outputs, CAN/CSA-C22.2 No. 223. The models indicated below have also been evaluated to CSA Standard for Light Emitting Diode (LED) Equipment For Lighting Applications, CAN/CSA-C22.2 No. 250.13.

These products have been evaluated for the following characteristics:

Applies to all models	Input type	Output type (b)	Product is rated	Type HL (c)	Type TL (d) - (Y=Yes, N=No) *
LDEzwU1UKy-AAyyy; 0.22 through 0.45A LDE14U1UKy-AABLK (0.45 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-BAyyy; 0.33 through 0.70A LDE14U1UKy-BABLK (0.70 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-CAyyy; 0.46 through 0.93A LDE14U1UKy-CABLK (0.93 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-DAyyy; 0.38 through 0.75A LDE14U1UKy-DABLK (0.75 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-EAyyy; 0.71 through 1.05A LDE14U1UKy-EABLK (1.05 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-FAyyy; 0.71 through 1.40A LDE14U1UKy-FABLK (1.40 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-GAyyy; 0.94 through 1.40A LDE14U1UKy-GABLK (1.40 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEzwU1UKy-HAyyy; 0.63 through 1.05A LDE14U1UKy-HABLK (1.05 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
L2HzwU1RKy-CAyyy; 0.46 through 0.93A L2Hz4U1RKy-CABLK (0.93 max. output)	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified

Note: *- These models may have a lower marked Tref refer to labels ILL. 7.

a- As defined in [] UL 8750, Clause 7.12.1 and CAN/CSA-C22.2 No. 250.13-12, Clause 8.12.1.

b- As defined in [x] UL 8750, Section 8.14 and 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.

BREAKDOWN:LDE	z	3	U	1	U	K	S	L	A	140 CPBXXXX
I	II	III	IV	V	VI	VII	VIII	IX	X	XI XII

- I. LED Driver, Control
LDE - LED Driver, Digital Ecosystem Dimming Control
L2H - LED Driver, 2 Wire, Hi-Lume
- II. Dimming Range
z - Can be any number 0-9 to denote low end dimming
- III. Maximum Wattage (may be indicated by "w" where w equals)
1 - 19W
2 - 29W
3 - 39W
4 - 49W
- IV. Standards
U - UL/cUL
- V. Number of Outputs
1 - Single Channel Outputs
- VI. Line Voltage
U - Universal 120-277VAC
R - Residential 120VAC
- VII. Enclosure Style
K - Compact Enclosure
- VIII. Mechanical Options, represented as an "x" or a "y".
S - Enclosure provided with mounting studs
N - No mounting studs provided
- IX. Safety Rating
Example: Where followed by A and a number (example A140) as indicated below:
A-S - A single letter A-S for commercial purposes only.
Where followed by ABLK and a number
A - 0.22A - 0.45A Construction
B - 0.33A - 0.70A Construction
C - 0.46A - 0.93A Construction
D - 0.38A - 0.75A Construction
E - 0.71A - 1.05A Construction
F - 0.71A - 1.40A Construction
G - 0.94A - 1.40A Construction
H - 0.63A - 1.05A Construction
- X. Output Type
A - Constant current, with analog dimming
- XI. Output Rating
022-140 - Amps for constant current dimming (0.22A-1.40A)
BLK - Bulk LED Driver
yyy - specific rating (example: A followed by yyy representing and number for amperage A045).
- XII. X can be any number 0 to 9 for commercial reasons.

*ELECTRICAL RATINGS:

LDEz1 Cat. No.	Input (AC)			Output (DC)		Max. Output Power (W)
	Voltage (V)	Current (A)	Frequency (Hz)	Max Voltage (Vdc)	Max Current (A)	
LDEz1U1UKx-GA035	120-277	0.19-0.08	50/60	50	0.35	17.8
LDEz1U1UKx-NA042	120-277	0.14-0.06	50/60	30	0.42	12.6
LDEz1U1UKx-NA044	120-277	0.14-0.06	50/60	30	0.44	13.2
LDEz1U1UKx-NA046	120-277	0.15-0.07	50/60	30	0.46	13.8
LDEz1U1UKx-NA050	120-277	0.16-0.07	50/60	30	0.5	15
LDEz1U1UKx-QA070	120-277	0.16-0.07	50/60	21.4	0.7	15
LDEz2 Cat. No.	Input (AC)			Output (DC)		Max. Output Power (W)
	Voltage (V)	Current (A)	Frequency (Hz)	Max Voltage (Vdc)	Max Current (A)	
LDEz2U1UKx-FA060	120-277	0.23-0.10	50/60	35.7	0.60	21.4
LDEz2U1UKx-FA063	120-277	0.24-0.10	50/60	35.7	0.63	22.5
LDEz2U1UKx-FA066	120-277	0.25-0.11	50/60	35.7	0.66	23.6
LDEz2U1UKx-FA070	120-277	0.26-0.11	50/60	35.7	0.7	25
LDEz2U1UKx-KA140	120-277	0.26-0.11	50/60	17.9	1.4	25
LDEz2U1UKx-MA085	120-277	0.20-0.09	50/60	23.8	0.85	20.2
LDEz2U1UKx-MA089	120-277	0.21-0.09	50/60	23.8	0.89	21.2
LDEz2U1UKx-MA093	120-277	0.22-0.10	50/60	23.8	0.93	22.1
LDEz2U1UKx-MA105	120-277	0.25-0.11	50/60	23.8	1.05	25
LDEz2U1UKx-PA050	120-277	0.26-0.11	50/60	50	0.5	25

LDEz3 Cat. No.	Input (AC)			Output (DC)		Max. Output Power (W)
	Voltage (V)	Current (A)	Frequency (Hz)	Max Voltage (Vdc)	Max Current (A)	
LDEz3U1UKx-RA070	120-277	0.35-0.15	50/60	50	0.7	35
LDEz3U1UKx-JA105	120-277	0.35-0.15	50/60	33.3	1.05	35
LDEz3U1UKx-LA140	120-277	0.35-0.15	50/60	25	1.4	35

Note - In the tables, "x" or "y" represents S or N.

Note - In the tables, "yyy" represents 022 - 140.

Note - In the tables, "z" represents 0 - 9.

LDEz4 Cat. No.	Input (AC)			Output (DC)		Max. Output Power (W)
	Voltage (V)	Current (A)	Frequency (Hz)	Max Voltage (Vdc)	Max Current (A)	
LDEz4U1UKx-AAyyy	120-277	0.12-0.19 0.06-0.09	50/60	50	0.45	17.5
LDEz4U1UKx-BAyyy	120-277	0.17-0.34 0.08-0.15	50/60	50	0.70	35.0
LDEz4U1UKx-CAyyy	120-277	0.18-0.27 0.08-0.12	50/60	37.1	0.93	26.0
LDEz4U1UKx-DAyyy	120-277	0.14-0.18 0.06-0.08	50/60	30.2	0.75	16.0
LDEz4U1UKx- EAyyy	120- 277	0.35- 0.39 0.15- 0.17	50/60	50	1.05	40.0
*LDEz4U1UKx- FAyyy	120- 277	0.27- 0.40; 0.12 - 0.17	50/60	38	1.40	40.0
*LDEz4U1UKx- GAyyy	120- 277	0.28- 0.32; 0.12 - 0.14	50/60	30	1.40	32.0
*LDEz4U1UKx- HAyyy	120- 277	0.15- 0.19; 0.07 - 0.09	50/60	21	1.05	18.0
LDEz4U1UKx-AABLK	120-277	0.19-.09	50/60	21.0-50.0	0.22-0.45	17.5
LDEz4U1UKx-BABLK	120-277	0.34-.15	50/60	30.0-50.0	0.33-0.70	35
LDEz4U1UKx-CABLK	120-277	0.27-.12	50/60	16.0-37.1	0.46-0.93	26
LDEz4U1UKx-DABLK	120-277	0.18-.08	50/60	12.0-30.2	0.38-0.75	16.0
LDEz4U1UKx-EABLK	120-277	0.39-.17	50/60	31.0-50.0	0.71-1.05	40
LDEz4U1UKx-FABLK	120-277	0.40-0.17	50/60	19.0-38.0	0.71-1.40	40
LDEz4U1UKx-GABLK	120-277	0.32-0.14	50/60	13.0-30.0	0.94-1.40	32
LDEz4U1UKx-HABLK	120-277	0.19-0.09	50/60	10.0-21.0	0.63-1.05	18

Note - In the tables, "x" or "y" represents S or N.

Note - In the tables, "yyy" represents 022 - 140.

Note - In the tables, "z" represents 0 - 9.

L2Hz4 Model No.	INPUT			OUTPUT		Max. Output Power (W)
	Voltage (V)	Current (A)	Frequency (Hz)	Max Voltage (Vdc)	Max Current (A)	
L2HzwU1RKx-CAyyy	120	0.29	50/60	37.1	0.93	26
L2Hz4U1RKx-CABLK	120	0.29	50/60	37.1	0.93	26

Note - In the tables, "x" or "y" represents S or N.

Note - In the tables, "yyy" represents 046 - 093.

Note - In the tables, "z" represents 0 - 9.

Note - In above table, "w" represents 1, 2, 3, or 4.

SPACING OF ELECTRICAL PARTS:

The spacing between uninsulated live parts of opposite polarity, including magnet wire, and between those parts and exposed metal parts that can be contacted shall not be less than the clearance (through-air) and the creepage distance (over an insulating surface) as described:

Locations of live electrical parts and conditions	Minimum spacing, mm		
	Clearance	Creepage Distance for printed wiring boards (CTI < 175)	Creepage Distance for ceramic and other materials (CTI => 600)
Between parts within drivers for indoor (dry), and outdoor (damp or wet) locations (125v)	0.5	1.5	0.75
Between parts within drivers for indoor (dry), and outdoor (damp or wet) locations (300v)	1.5	3.0	1.5
Between parts on a printed wiring board that are soldered in place but can move in production prior to soldering to fixed parts; or between parts on a printed wiring board to the enclosure.	3.0 (for 125v) 3.9 (for 300v)	-	-
Components on a printed wiring board buried in potting compound	-	0.8	0.8

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE)

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

Conditions of Acceptability -

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

1. These power supplies have maximum of one Class 2 output. The output of these power supplies has been evaluated to Class 2 output requirements for dc circuits.
2. These products are suitable for use in dry and damp locations only.
3. The fuse (F1) type MRT 3.15 has a dual rating, it can be rated 250V/3.15A or 277V/3.15A and can be used at either voltage regardless of the mark. Refer to the C of A's for the fuse report dated 1995-01-09. Refer to the description in the following pages of this report for fuse description type MRT 3.15 and note that this fuse marked 250V can be used in a 277V application.
- *4. Certain Models indicated in **the Electrical Ratings table** may have an output **voltage greater than 42.4 Vdc max. The output of these LED drivers** shall not be accessible based on maximum voltage restrictions for Class 2 circuits in the Canadian Electrical Code. The output **circuits of these LED drivers shall be rendered inaccessible in accordance with end-product requirements.**
5. These products were tested in an elevated ambient oven with the maximum tc point temperatures as detailed below. These products are required to be temperature tested in the end product with maximum temperature on the enclosure not to exceed the values shown in the table below when installed in the end product and the ambient temperature as shown.

MODEL	AMBIENT, °C	TC MAX, °C
LDEz1U1UKx-GA035	76.6	90.2
LDEz2U1UKx-PA050	71.8	90.7
LDEz3U1UKx-LA140	64.8	87.4
LDEz3U1UKx-RA070	62.0	82.7

- 5a. LED models evaluated for TL Type rating and tested in a 40°C ambient are indicated on the label Type TL XX/YY whereby XX is the maximum calculated temperature and YY is the measured temperature at the T_c location.

TL Type rated models marking:

MODEL	T _{ref max} °C (Calculated)	T _{ref} °C (Measured)
LDEzwU1UKy-AAyyy - 0.22 through 0.45A, LDE14U1UKy-AABLK (0.45 output)	90	56
LDEzwU1UKy-BAyyy - 0.33 through 0.70A, LDE14U1UKy-BABLK (0.70)	90	58
LDEzwU1UKy-CAyyy - 0.46 through 0.93A, LDE14U1UKy-CABLK (0.93)	90	61
LDEzwU1UKy-DAyyy - 0.38 through 0.75A, LDE14U1UKy-DABLK (0.75)	90	60
LDEzwU1UKy-EAyyy - 0.71 through 1.05A, LDE14U1UKy-EABLK (1.05)	90	63
LDEzwU1UKy-FAyyy - 0.71 through 1.40A, LDE14U1UKy-FABLK (1.40)	87	61
LDEzwU1UKy-GAyyy - 0.94 through 1.40A, LDE14U1UKy-GABLK (1.40)	90	60
LDEzwU1UKy-HAyyy - 0.63 through 1.05A, LDE14U1UKy-HABLK (1.05)	90	57

MODEL	T _{ref max} °C (Calculated)	T _{ref} °C (Measured)
L2HzwU1RKx-CAyyy - 0.46 through 0.93A, L2Hz4U1RKy-CABLK (0.93 output)	85	60

6. The input/output wiring shall be enclosed in the end product in a suitable electrical enclosure.
7. Consideration for connecting the metal enclosure to a suitable grounding point shall be considered in the end product.
8. The products are to be connected to max. 20 A branch circuit.
9. The leads on these products are for factory connection only, not for field wiring.

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10. Products evaluated for use with Lutron EcoSystem controls only shall be marked as such. The "Ecosystem" logo will appear on these models. Use with any other controls shall be evaluated in the end product.
11. The Leakage Current Test was performed on these units. The results showed currents greater than 0.5mA but less than 0.75mA. The suitability of this leakage level shall be determined in the end product. Adequate grounding shall be provided in the end product. Models LDEzwU1UKy-FAyyy, LDEzwU1UKy-FBLK, LDEzwU1UKy-GAyyy, LDEzwU1UKy-GABLK, LDEzwU1UKy-HAyyy, LDEzwU1UKy-HABLK, L2HzwU1Rky-CAyyy, and L2Hz4U1Rky-CABLK shall be mounted in a suitably grounded enclosure or in a fixed wired luminaire in the end-product.
12. The following models have Maximum Open Circuit Output Voltages over 42.4 Vdc, and can be marked "Class 2" provided they include an identifier such as "LED Driver", or "LED Power Supply" for US (FKSZ2) and Canadian (FKSZ8) use. The output circuit of these LED drivers shall be rendered inaccessible in accordance with end-product requirements:

Cat. No.	Cat. No.	Cat. No.	Cat. No.
LDEz1U1UKx-GA035	LDEz4U1UKx-AAyyy	LDEz4U1UKx-AABLK	L2Hz4U1Rky-Cyyy
LDEz2U1UKx-PA050	LDEz4U1UKx-BAyyy	LDEz4U1UKx-BABLK	L2Hz4U1Rky-CABLK
LDEz3U1UKx-RA070	LDEz4U1UKx-CAyyy	LDEz4U1UKx-CABLK	
LDEz3U1UKx-JA105	LDEz4U1UKx-EAyyy	LDEz4U1UKx-EABLK	
LDEz2U1UKx-FA070	LDEz4U1UKx-AABLK LDEz4U1UKx-FAyyy	LDEz4U1UKx-FABLK	

- Note - "x" or "y" represents S or N.
 - "yyy" represents 022 - 140.
 - "z" represents 0 - 9.