

File E322469  
Project 4786345427

May 21, 2014

REPORT

On

COMPONENT - DRIVERS FOR LIGHT-EMITTING-DIODE ARRAYS, MODULES AND CONTROLLERS

LUTRON ELECTRONICS CO INC  
Coopersburg, PA

Copyright © 2014 UL LLC

UL LLC authorizes the above named company to reproduce this Report only for purposes as described in the Conclusion. The Report should be reproduced in its entirety; however to protect confidential product information, the Construction Details Descriptive pages may be excluded.

## DESCRIPTION

## PRODUCT COVERED:

USR, CNR - Class 2, optionally Type TL LED Drivers (Series LDEz1U1UMN-, LDEz2U1UMN-, LDEz3U1UMN-, LDEz5U1UMN-, LDEz7U1UMN-) See table below for complete model numbers:

\*

## MODEL NUMBERS:

Category No. z can be any number 0 - 9	Model Letter Designation (followed by)	Output Range (followed by)	Custom Characters X is any number 0 - 9 (may be followed by)
LDEz1U1UMN-	J	A015 - A030	CPBXXXX
	L	A015 - A032	CPBXXXX
	M	A025 - A050	CPBXXXX
LDEz2U1UMN-	K	A024 - A050	CPBXXXX
	N	A035 - A075	CPBXXXX
LDEz3U1UMN-	B	A050 - A125	CPBXXXX
	T	A040 - A083	CPBXXXX
LDEz5U1UMN-	C	A088 - A175	CPBXXXX
	U	A070 - A133	CPBXXXX
LDEz7U1UMN-	D	A120 - A210	CPBXXXX
	V	A100 - A188	CPBXXXX

## 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 spacings 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 Class 2 output limits.

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.

CNR - Indicates investigation to the Canadian Standard 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 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)*
LDEz7U1UMN-DAyyy LDEz7U1UMN-DABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz5U1UMN-CAyyy LDEz5U1UMN-CABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz3U1UMN-BAyyy LDEz3U1UMN-BABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz1U1UMN-JAyyy LDEz1U1UMN-JABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz1U1UMN-LAyyy LDEz1U1UMN-LABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz1U1UMN-MAyyy LDEz1U1UMN-MABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz2U1UMN-KAyyy LDEz2U1UMN-KABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz2U1UMN-NAyyy LDEz2U1UMN-NABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz7U1UMN-VAyyy LDEz7U1UMN-VABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz5U1UMN-UAyyy LDEz5U1UMN-UABLK	Branch Circuit (Mains)	CC- Constant Current; Output is Isolated Class 2	Dry, Damp	No	(Y), Specified
LDEz3U1UMN-TAyyy LDEz3U1UMN-TABLK	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.

## \*Model Nomenclature:

LDE	z	7	U	1	U	M	N	D	A	210	CPBXXXX
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII

- I. LED Driver, Control  
LDE - LED Driver, Digital Ecosystem Dimming Control
- II. Dimming Range  
z Can be any number 0 to 9 or H to denote low end dimming
- III. Maximum Wattage  
1 - 15W  
2 - 25W  
3 - 35W  
5 - 50W  
7 - 75W
- IV. Standards  
U - Applicable UL Standards UL8750/ CSA C22.2 No. 250.13-12.
- V. Number of Outputs  
1 - Single Channel Output
- VI. Line Voltage  
U - Universal 120-277VAC
- VII. Enclosure Style  
M - Stick Enclosure
- VIII. Mechanical Options  
N - No mounting studs provided
- IX. Hardware Construction  
B - 0.50A - 1.25A Construction  
C - 0.88A - 1.75A Construction  
D - 1.20A - 2.10A Construction  
J - 0.15A - 0.30A Construction  
K - 0.24A - 0.50A Construction  
L - 0.15A - 0.32A Construction  
M - 0.25A - 0.50A Construction  
N - 0.35A - 0.75A Construction  
V - 1.00A - 1.88A Construction  
U - 0.70A - 1.33A Construction  
T - 0.40A - 0.83A Construction
- X. Output Type  
A - Constant current, with analog dimming
- XI. Output Rating  
015-210 - Amps for constant current dimming (0.15A-2.10A)  
BLK - Bulk LED driver
- XII. X can be any number 0 to 9 for commercial reasons.

## \*ELECTRICAL RATINGS:

Cat. No.	Input (AC)			Output		Max. Output Power (W)	Type
	Voltage (Vac)	Current (A)	Freq. (Hz)	Max Voltage (Vdc)	Max Current (A)		TL; (Yes=Y, No=N)**
LDEz7U1UMN-DAyyy	120-277	0.72-0.46 0.31-0.20	50/60	40V	2.1	75.0	(Y)
LDEz5U1UMN-CAyyy	120-277	0.50-0.33 0.21-0.14	50/60	40V	1.75	50.0	(Y)
LDEz3U1UMN-BAyyy	120-277	0.35-0.21 0.15-0.10	50/60	40V	1.25	35.0	(Y)
LDEz7U1UMN-VAyyy	120-277	0.72-0.48 0.31-0.22	50/60	50V	1.88	75.0	(Y)
LDEz5U1UMN-UAyyy	120-277	0.49-0.33 0.20-0.15	50/60	50V	1.33	50.0	(Y)
LDEz3U1UMN-TAyyy	120-277	0.34-0.22 0.15-0.10	50/60	50V	0.83	35.0	(Y)
LDEz1U1UMN-JAyyy	120-277	0.14-0.10 0.06-0.04	50/60	50V	0.30	12.0	(Y)
LDEz1U1UMN-LAyyy	120-277	0.12-0.08 0.06-0.04	50/60	40V	0.32	10.0	(Y)
LDEz1U1UMN-MAyyy	120-277	0.15-0.11 0.07-0.05	50/60	40V	0.50	14.0	(Y)
LDEz2U1UMN-KAyyy	120-277	0.21-0.13 0.09-0.06	50/60	50V	0.50	20.0	(Y)
LDEz2U1UMN-NAyyy	120-277	0.22-0.15 0.09-0.07	50/60	40V	0.75	20.0	(Y)
LDEz7U1UMN-DABLK	120-277	0.72 0.31	50/60	20-40V	1.2-2.1	75.0	(Y)
LDEz5U1UMN-CABLK	120-277	0.50 0.21	50/60	20-40V	0.88-1.75	50.0	(Y)
LDEz3U1UMN-BABLK	120-277	0.35 0.15	50/60	20-40V	0.5-1.25	35.0	(Y)
LDEz7U1UMN-VABLK	120-277	0.72 0.31	50/60	30-50V	1.0-1.88	75.0	(Y)
LDEz5U1UMN-UABLK	120-277	0.49 0.20	50/60	30-50V	0.7-1.33	50.0	(Y)
LDEz3U1UMN-TABLK	120-277	0.34 0.15	50/60	30-50V	0.4-0.83	35.0	(Y)
LDEz1U1UMN-JABLK	120-277	0.14 0.06	50/60	50V	0.30	12.0	(Y)
LDEz1U1UMN-LABLK	120-277	0.12 0.06	50/60	40V	0.32	10.0	(Y)
LDEz1U1UMN-MABLK	120-277	0.15 0.07	50/60	40V	0.50	14.0	(Y)
LDEz2U1UMN-KABLK	120-277	0.21 0.09	50/60	50V	0.50	20.0	(Y)
LDEz2U1UMN-NABLK	120-277	0.22 0.09	50/60	40V	0.75	20.0	(Y)

\*Note - In the tables, "yyy" represents 015 through 210.

Note - In the tables, "z" represents any number 0 through 9 or H.

Note - See *E322469 Appendix Section B* for formulas to calculate input current for factory configured LED drivers.

Note - \*\*- Models have been tested for TL Type rating, marking is optional and labels may indicate manufacturer's warranty temperature rating at the Tc point . The Tref/measured TC may be provided in packaging literature or may be included on the label if label is marked Type TL.

## \*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



\*TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

CONDITIONS OF ACCEPTABILITY:

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

1. The output of these power supplies has been evaluated as Class 2 for dc outputs.
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 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 model differences may have an output rated at equal to or less than 60 Vdc max. This output complies with the definition of Class 2 per the Canadian Electrical Code. This output shall not be accessible based on maximum voltage restrictions for Class 2 circuits in the Canadian Electrical Code. The output terminals of the end product shall be evaluated to confirm compliance with this accessibility requirement.

- \*5. 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<sub>c</sub> location.

TL Type rated models marking:

MODEL	T <sub>ref max</sub> °C (Calculated)	T <sub>ref</sub> °C (Measured)
LDEz7U1UMN-DA120 through -DA210 LDEz7U1UMN-DABLK	82	82
LDEz5U1UMN-CA088 through -CA175 LDEz5U1UMN-CABLK	87	76
LDEz3U1UMN-BA050 through -BA125 LDEz3U1UMN-BABLK	90	65
LDEz1U1UMN-JA015 through -JA030 LDEz1U1UMN-JABLK	90	51
LDEz1U1UMN-LA015 through -LA032 LDEz1U1UMN-LABLK	90	50
LDEz1U1UMN-MA025 through -MA050 LDEz1U1UMN-MABLK	90	54
LDEz2U1UMN-KA024 through -KA050 LDEz2U1UMN-KABLK	90	54
LDEz2U1UMN-NA035 through -NA075 LDEz2U1UMN-NABLK	90	60
LDEz7U1UMN-VA100 through -VA188 LDEz7U1UMN-VABLK	89	88
LDEz5U1UMN-UA070 through -UA133 LDEz5U1UMN-UABLK	89	64
LDEz3U1UMN-TA040 through -TA083 LDEz3U1UMN-TABLK	90	64

- \*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.
10. These products have been evaluated for use with Lutron EcoSystem controls only. 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 for models tested at 120Vac input but less than 0.75mA for models tested at 277Vac input. The suitability of this leakage level shall be determined in the end product. Adequate grounding shall be provided 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:

LDEz7U1UMN-DA120 through -DA210, LDEz7U1UMN-DABLK  
LDEz5U1UMN-CA088 through -CA175, LDEz5U1UMN-CABLK  
LDEz3U1UMN-BA050 through -BA125, LDEz3U1UMN-BABLK  
LDEz7U1UMN-VA133 through -VA188, LDEz7U1UMN-VABLK  
LDEz5U1UMN-UA070 through -UA133, LDEz5U1UMN-UABLK  
LDEz3U1UMN-TA040 through -TA083, LDEz3U1UMN-TABLK  
LDEz1U1UMN-JA015 through -JA030, LDEz1U1UMN-JABLK  
LDEz2U1UMN-KA024 through -KA050, LDEz2U1UMN-KABLK  
LDEz1U1UMN-LA015 through -LA032, LDEz1U1UMN-LABLK  
LDEz1U1UMN-MA025 through -MA050, LDEz1U1UMN-MABLK  
LDEz2U1UMN-NA035 through -NA075, LDEz2U1UMN-NABLK