

# CLE-12-N SERIES

**Constant Current LED Driver**

**DANUBE**

## FEATURES

- EFFICIENCY UP TO 90%
- CONSTANT CURRENT LED DRIVER
- WIDE INPUT AND OUTPUT VOLTAGE RANGE
- INPUT VOLTAGE UP TO 36V
- PWM DIMMING CONTROL
- SHORT CIRCUIT AND OVERTEMPERATURE PROTECTED
- INTERNAL SMD TECHNOLOGY
- FULLY ISOLATED PLASTIC CASE WITH IP67 LEVEL
- UL 94V-0 PACKAGE MATERIAL
- RoHS COMPLIANT
- 5 YEARS WARRANTY

IP67

CE

FC

REACH  
COMPLIANT

RoHS  
COMPLIANT



## DESCRIPTION

**CLE-12-N** series is a high efficiency, constant current and Buck-Boost DC/DC converter. The LED DRIVER operates an input voltage range of 9Vdc to 36Vdc, and provides a selectable output current up to 600mA and output power up to 16 watts. It is able to include the function of Over temperature protection(OTP), Over Voltage protection(OVP), PWM Dimming and ON/OFF.

The device can extensively be used for General Industrial High Power LED Lighting, Desk Lights and Room Lighting, Building and Street Lighting, Industrial Display Backlight etc.

## SELECTION GUIDE

MODEL NUMBER	INPUT NOMINAL VOLTAGE (VDC)	INPUT VOLTAGE RANGE (VDC)	OUTPUT VOLTAGE RANGE (VDC)	OUTPUT CURRENT RANGE (mA)	DIMMING CONTROL	EFF (%, Typ.)
CLE-12-0.30D(W)N	12	9-36	2-40	0-300	PWM	90
CLE-12-0.35D(W)N	12	9-36	2-40	0-350	PWM	90
CLE-12-0.50D(W)N	12	9-30	2-32	0-500	PWM	90
CLE-12-0.60D(W)N	12	9-28	2-30	0-600	PWM	90

## ● PARTNUMBES STRUCTURE

Series	Coding Scheme	
CLE-12-N Series	CLE-x1-x.x2y1zzz	CLE = Series Name x1 = Input Voltage x.x2 = Output Current y1=Package Style(D=PINS)(W=WIRED) Zzz = 0~9 , A~Z or blank for market purpose.

## ● SPECIFICATIONS

( Typical at 25°C, nominal input voltage, rated output current unless otherwise specified )

Project	Working Condition	Min.	Typ.	Max.	Unit
Input Voltage(absolute maximum)				36	VDC
Recommended Input Voltage		9	12	36	VDC
Input Filter		Capacitor			
Output Voltage range	Vin=24V	2		40	VDC
Output Current Accuracy			±4	±6	%
Output Current Stability	Vin=24V, VOUT=2-40V		±4	±8	%
Operating Frequency				1000	KHz
Short Circuit Protection		Continuous			
Temperature Coefficient	-40°C~+71°C ambient			±0.03	%°C
Operating Temperature	300mA/350mA	-40		71	°C
	500mA/600mA	-40		65	°C
Storage Temperature		-55		125	°C
Humidity(D) (W)				95	%
Over Temperature Shutdown (Auto-restart after cool down)	Temperature Rising		150		°C
	Temperature Falling		125		°C
Maximum Case Temperature				115	°C
MTBF (using MIL-HDBK 217F)	Operating Temperature 25°C	350000			Hours
Case Material		Non Conductive plastic			
Potting Material		Epoxy (UL94V-0)			
Case Size(D)(W)		31.8*20.3*12.2			mm
Weight(D)			15.6		g
Weight(W)			18		g
EMI Radiated Emissions		EN55015			
Dust Test & Waterproof Test (D) (W)		IP67			

## ● PWM DIMMING AND ON/OFF CONTROL (Leave open if not use)

Project	Working Condition	Min.	Typ.	Max.	Unit
Input Voltage Range			5	10	VDC
ON/OFF Control	ON (DIM ~ -VIN)	2			VDC
	OFF (DIM ~ -VIN)			0.4	VDC
Quiescent Input Current in Shutdown Mode	Vin=24			1	mA
PWM Frequency <sup>1</sup>	For Linear Operation	100		1K	Hz
	(measured 1%~100% Dimming)				
<b>Note: 1 PWM dimming input that allows a wide-dimming frequency range from 100Hz to 1kHz with up to 1000:1 resolution; however, higher dimming frequencies can be used at the expense of dimming dynamic range and accuracy.</b>					

## ● PWM DIMMING AND ON/OFF CONTROL (measured 1%~100% Dimming)

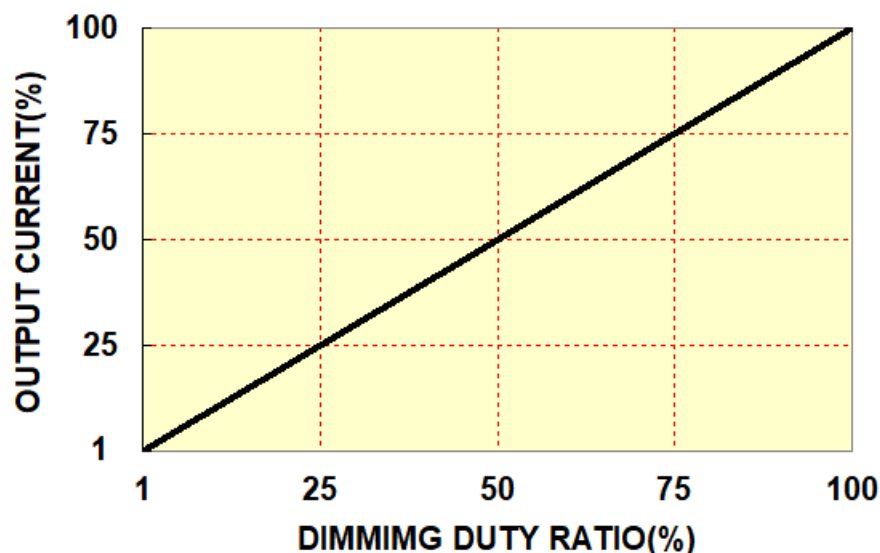
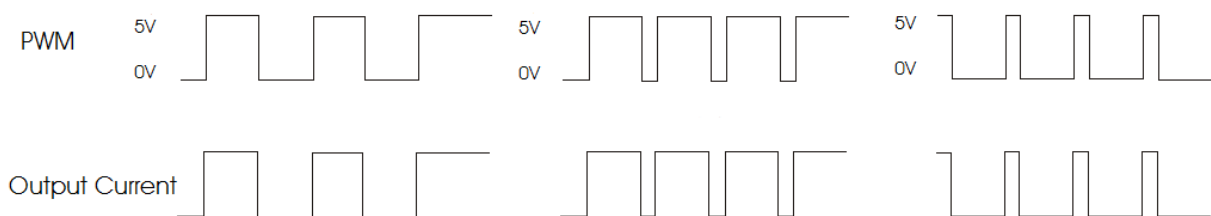


Fig.1 Dimming Duty Cycle:1%-100%

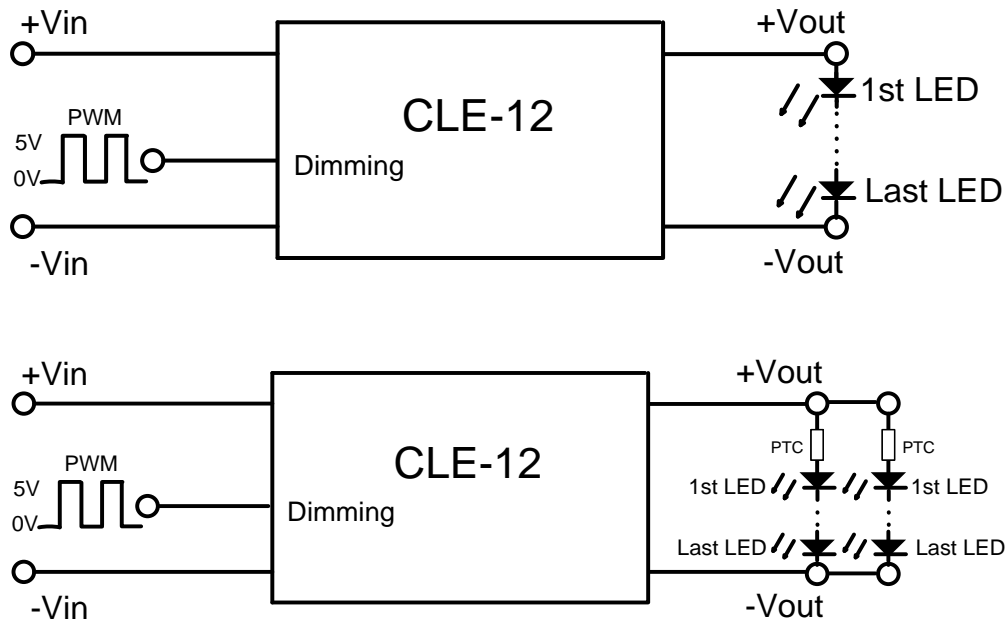
The dimming of LEDs can be performed by applying PWM signals to DIM pin.

The above Fig.1 show good linearity in dimming application of **CLE-N Series**

A logic low (below 0.2) at DIM PIN will disable the device and shut off the current flow to the LED array.

## ● TYPICAL APPLICATIONS

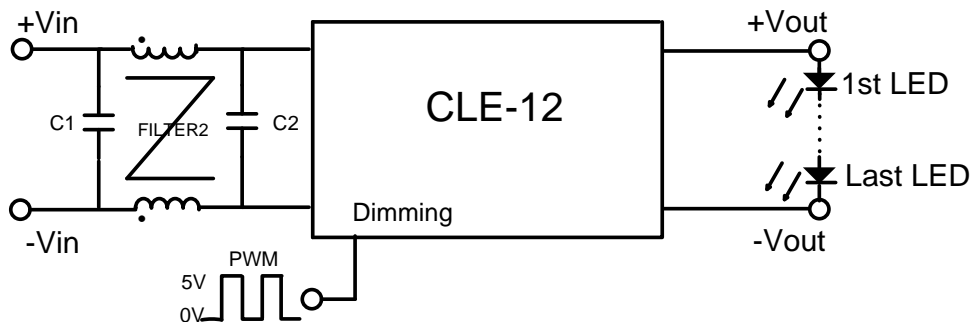
### PWM Dimming control circuit



**Fig.2**

In actual use, if necessary to protect LED, a PTC of positive temperature coefficient may be connect to the input end of every channel or all channels, as shown in Fig.2.

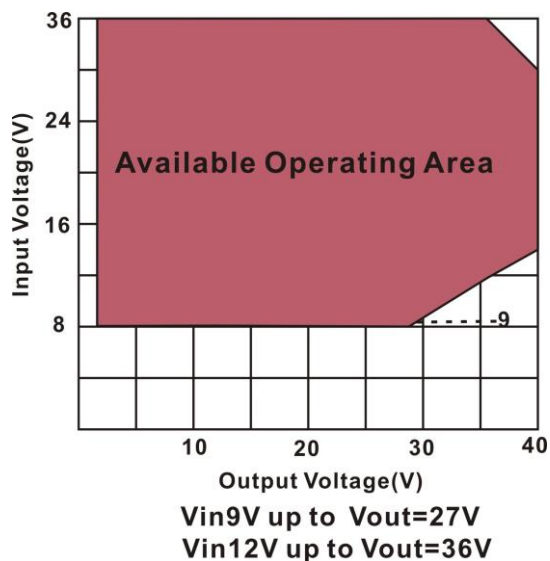
### EMI filter circuit



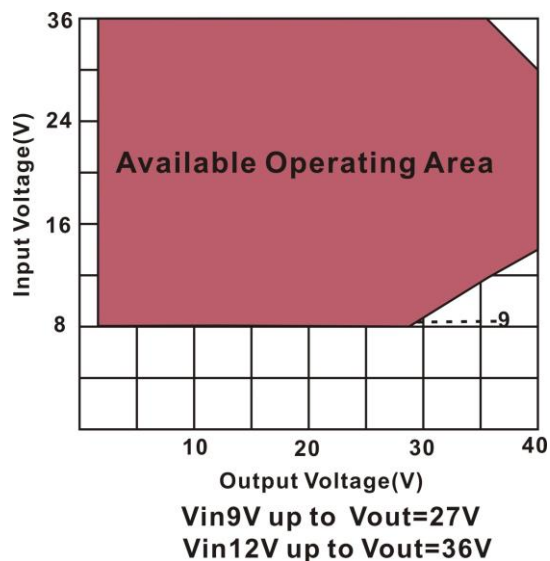
**Note:** Do not connect -Vin to -Vout

# SAFE OPERATING AREA

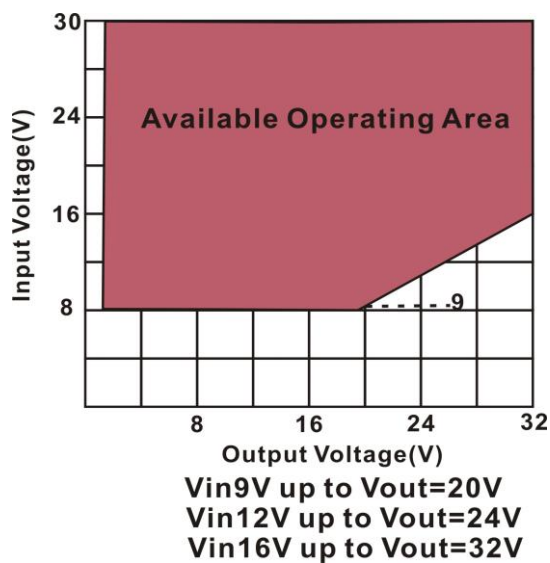
**OUTPUT CURRENT 0.30A**



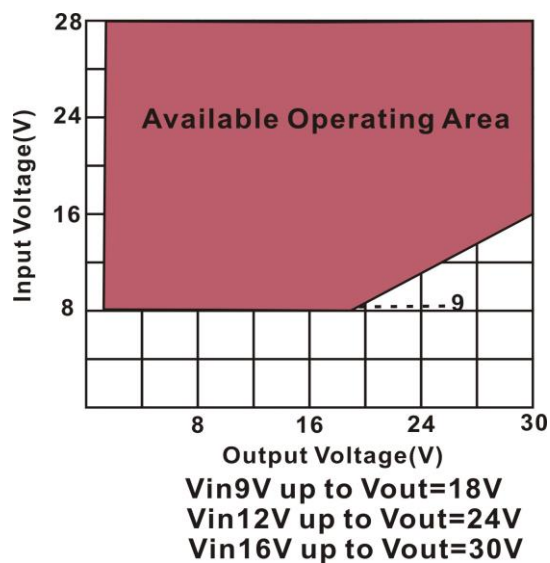
**OUTPUT CURRENT 0.35A**



**OUTPUT CURRENT 0.50A**



**OUTPUT CURRENT 0.60A**

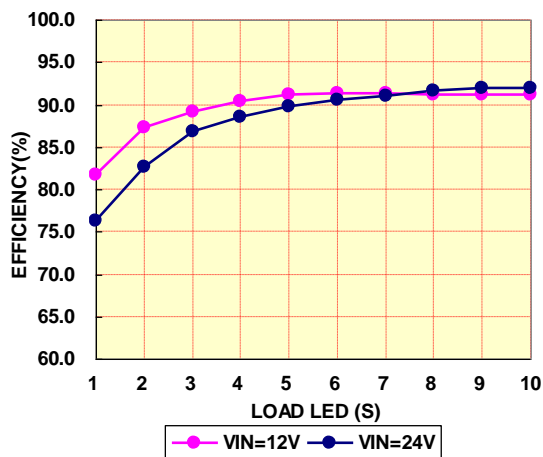


## ● EFFICIENCY VS. LOAD

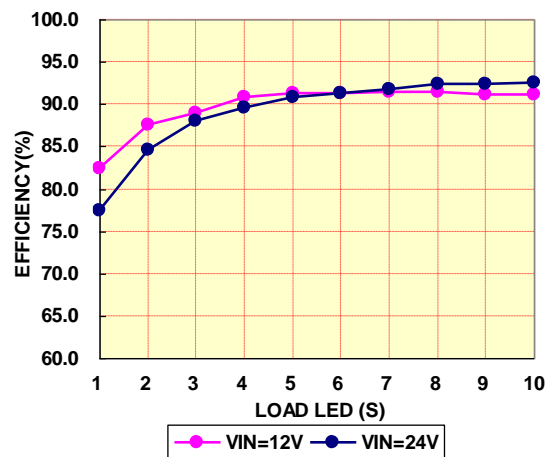
$T_A=25^{\circ}\text{C}$

1-LED  $V_F=3.6\text{V}$ ; 2-LED  $V_F=7.2\text{V}$ ; 3-LED  $V_F=10.8\text{V}$ ; 4-LED  $V_F=14.4\text{V}$ ; 5-LED  $V_F=18\text{V}$ ;

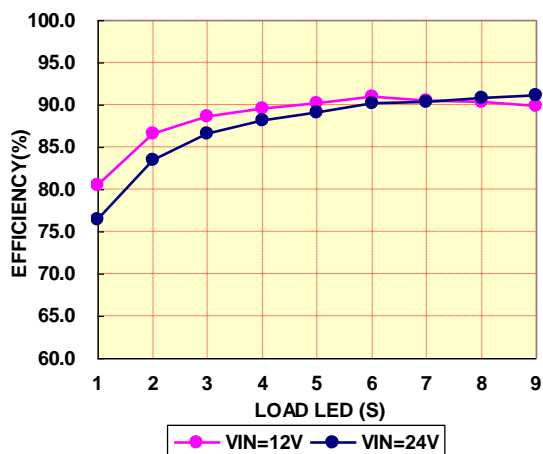
**OUTPUT CURRENT 0.30A**



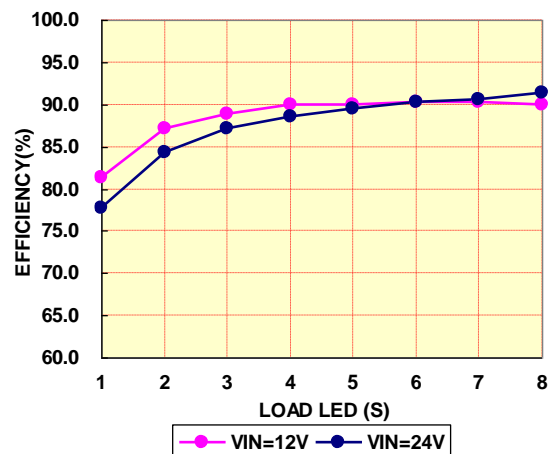
**OUTPUT CURRENT 0.35A**



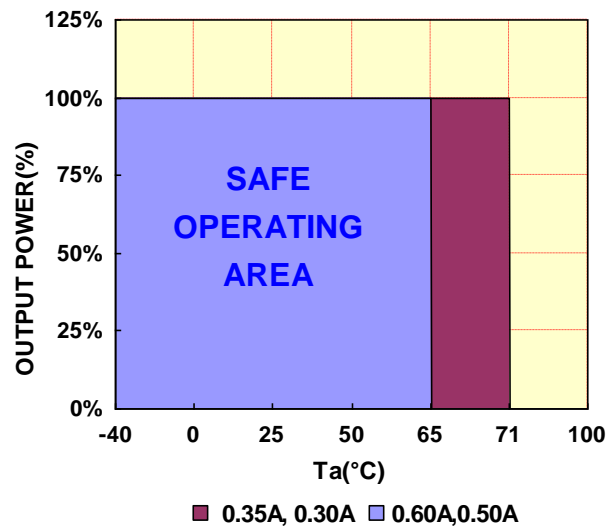
**OUTPUT CURRENT 0.50A**



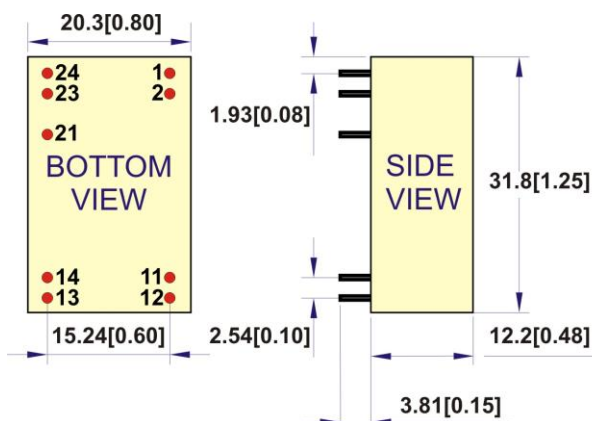
**OUTPUT CURRENT 0.60A**



## ● DERATING CURVE



## ● MECHANICAL DIMENSIONS RECOMMENDED FOOTPRINT DETAILS PACKAGE "D"



PINOUT		COMMENT
1 & 2	-Vin	Don't connect to -Vout
11 & 12	-Vout	LED - Connection
13 & 14	+Vout	LED + Connection
21	PWM DIM	ON/OFF/PWM Dimming Leave open if not used
23 & 24	+Vin	DC Supply

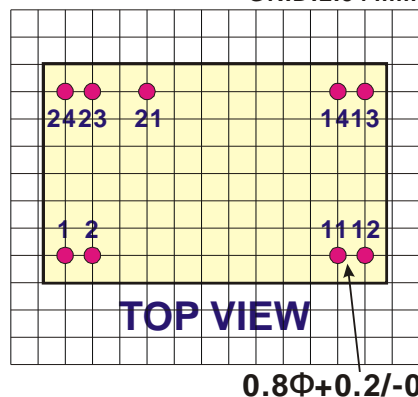
NOTE :

Pin Size is Tolerance  $0.60\Phi \pm 0.05\text{mm}$

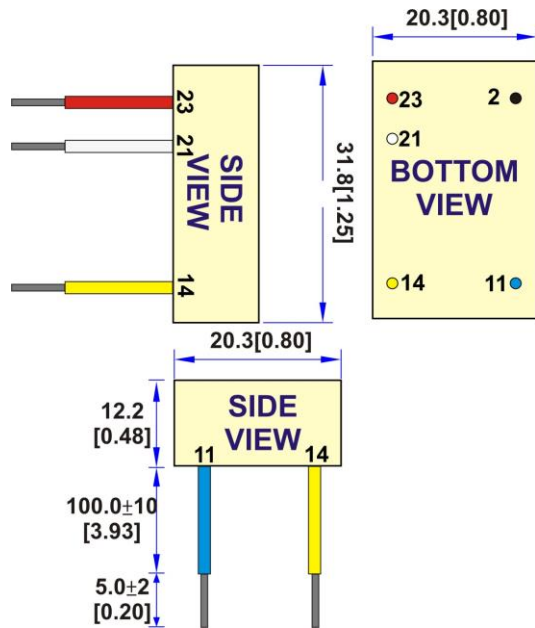
All dimensions are in mm [inches]

Tolerance .X or .XX=  $\pm 0.5\text{mm}$

GRID:2.54 mm



## PACKAGE "W"



PINOUT		COMMENT
2 (Black)	-Vin	Don't connect to -Vout
11 (Blue)	-Vout	LED - Connection
14 (Yellow)	+Vout	LED + Connection
21 (White)	PWM DIM	ON/OFF/PWM Dimming Leave open if not used
23 (Red)	+Vin	DC Supply

### NOTE:

All dimensions are in mm [inches]

1. Case Tolerance .x or .xx  $\pm 0.5$ mm

2. Wire outside diameter = 1.6mm  $\pm 0.1$

3. Wire core diameter = 0.75mm  $\pm 0.1$

4. Wire is UL 3385/CAS TEM listed #22AWG /300V /105°C Rated

## FOR MORE INFORMATION CALL:

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