

# MORNSUN

## KC24RT Series

### CONSTANT CURRENT GREAT POWER LED DRIVER



RoHS

#### FEATURES

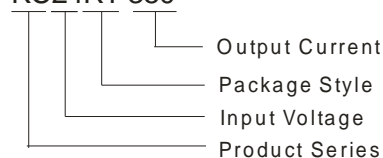
- SMD Package, simple and convenient
- High efficiency up to 96%
- Ultra wide range voltage input and output
- Constant current mode, great power output
- AC-DC, EMC recommended circuit
- PWM dimming & Analogue dimming
- Remote ON/OFF, Continuous short circuit protection
- RoHS and UL Compliance

#### APPLICATIONS

The KC24RT is a series of step-down constant current source designed for driving high power LEDs. It features high efficiency, wide input voltage range, high operating temperature, PWM and analogue dimming, remote ON/OFF control, and SMD package which facilitates the installation. It is widely used in LED illumination areas such as decorative light, special control light, backlight, commercial light, streetlight, in-house light and car light, etc.

#### MODEL SELECTION

##### KC24RT-350



#### PRODUCT ITEM

Part Number	Input Voltage(V)		Output		Dimming control	Efficiency (%)
	Normal	Range	Voltage (VDC)	Current (mA)		
KC24RT -300	24	5.5-48	3.3-36	0-300	PWM+Analogue	96
KC24RT -350	24	5.5-48	3.3-36	0-350	PWM+Analogue	96
KC24RT-500	24	5.5-48	3.3-36	0-500	PWM+Analogue	96
KC24RT -600	24	5.5-48	3.3-36	0-600	PWM+Analogue	96
KC24RT -700	24	5.5-48	3.3-36	0-700	PWM+Analogue	96

#### SPECIFICATIONS

Item	Test condition	Min.	Typ.	Max.	Units
Utmost input voltage	absolute maximum	5		55	VDC
Recommended input voltage		5.5	24	48	
Input filter		Capacitor			
Output voltage range	Vin=48V	3.3		36	VDC
Output current range	See the product item				
Output current accuracy			± 2	±3	%
Output current stability	Vin=48V, Vo=3.3V~36V			±1	%
Internal power dissipation	Vin=24V,5LEDS			700	mW
Temperature coefficient	-40 °C to+71 °C ambient			± 0.015	%/°C
Efficiency at full load				96	%
Ripple & Noise (Vp-p)				120	mV
Short circuit protection		Continuous			
Operating temperature range	300mA / 350mA	-40		85	°C
	500mA/ 600mA/ 700mA	-40		71	
Storage temperature range		-55		125	
Maximum case temperature				100	
Maximum capacitive Load		1000			µF
Operating frequency range		320	370	420	kHz
MTBF	MIL-HDBK-217F(+25°C)	2,000,000			Hours
Case Material		Epoxy Resin (UL94-V0)			
Dimensions		23.86*18.10*8.00			mm
Weight		6			g

#### PWM Dimming and ON/OFF Control (leave open if not used)

Remote ON/OFF	ON	Open or 2.8V<Vc<6V			
	OFF(shutdown)	Vc<0.6V			
Remote pin current	Vc=5V		1		mA
Quiescent input current in Shutdown mode	Vin=24V, Vc <0.6V	400			µA
PWM frequency			200		Hz

#### Analogue dimming (leave open if not used)

Input voltage range	Vin=5.5-48V	0-15V
Output current range	Vin=5.5-48V	0%-100%
Control voltage range	Full on	0.2V±50mV
	Full off	4.5V±50mV
Driving current	Vc=5V	0.2mA(max)

#### EMC( Refer to Figure 5)

Conducted/Radiated	EN55022, CLASS B		
ESD	IEC/EN 61000-4-2 level 3 (6kV/8kV)	CLASS B	
Radiated Immunity	IEC/EN 61000-4-3 (10V/m)	CLASS B	
EFT	IEC/EN 61000-4-4 level 3 (±2kV)	CLASS B	
Surge	IEC/EN 61000-4-5 level 3 (±1kV)	CLASS B	
Conducted Immunity	IEC/EN 61000-4-6 (10Vr.ms)	CLASS B	

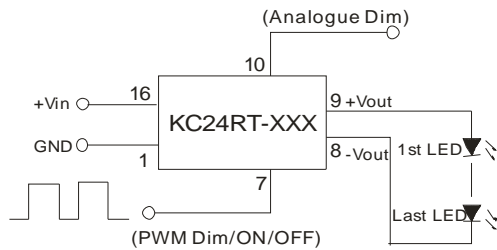
#### MORNSUN Science & Technology Co.,Ltd.

Address: 2th floor 6th building, Huangzhou Industrial District, Guangzhou, China  
 Tel: 86-20-38601850  
 Fax:86-20-38601272  
[Http://www.mornsun-power.com](http://www.mornsun-power.com)

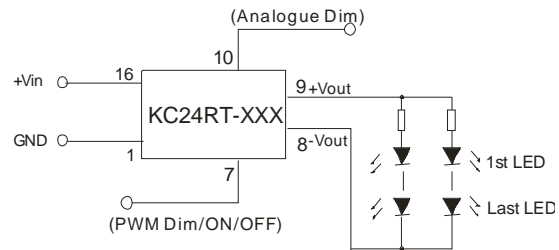
## INPUT VS OUTPUT

Input voltage (VDC)	Output voltage range(VDC)	Output constant current (mA)	Output power (W Max)	Input voltage (VDC)	Output voltage range(VDC)	Output constant current (mA)	Output power
48	3.3-36.0	300	10.80	48	3.3-36.0	350	12.60
36	3.3-32.0	300	9.60	36	3.3-32.0	350	11.20
24	3.3-21.0	300	6.30	24	3.3-21.0	350	7.35
20	3.3-17.0	300	5.10	20	3.3-17.0	350	5.95
15	3.3-13.2	300	3.96	15	3.3-13.2	350	4.62
12	3.3-10.0	300	3.00	12	3.3-10.0	350	3.50
5.5	3.3-4.0	300	1.20	5.5	3.3-4.0	350	1.40
<hr/>				<hr/>			
48	3.3-36.0	500	18.00	48	3.3-36.0	600	21.60
36	3.3-32.0	500	16.00	36	3.3-32.0	600	19.20
24	3.3-21.0	500	10.50	24	3.3-21.0	600	12.60
20	3.3-17.0	500	8.50	20	3.3-17.0	600	10.20
15	3.3-13.2	500	6.60	15	3.3-13.2	600	7.92
12	3.3-10.0	500	5.00	12	3.3-10.0	600	6.00
5.5	3.3-4.0	500	2.00	5.5	3.3-4.0	600	2.40
<hr/>				<hr/>			
48	3.3-36.0	700	25.20				
36	3.3-32.0	700	22.40				
24	3.3-21.0	700	14.70				
20	3.3-17.0	700	11.90				
15	3.3-13.2	700	9.24				
12	3.3-10.0	700	7.00				
5.5	3.3-4.0	700	2.80				

## TYPICAL APPLICATION CIRCUITS



(Figure 1) Series Application

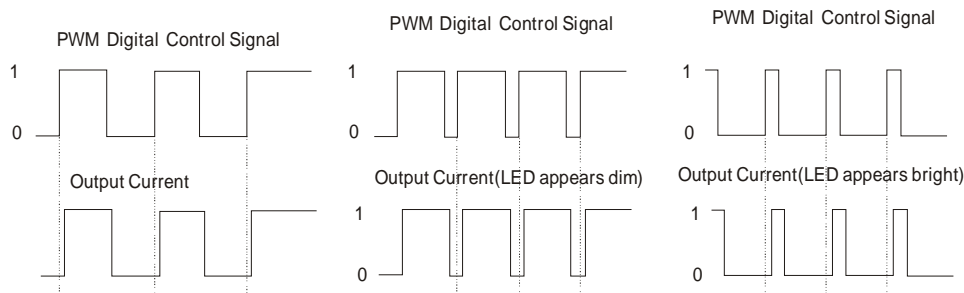


(Figure 2) Parallel-series Application

If it is necessary to protect LED in actual application, you could connect a PTC to the input of every channel or all channels, as shown in Figure 2.

Note: The negative output terminal can't connect GND, or the module may be damaged.

## DIGITAL DIMMING CONTROL



For the rated frequency PWM dimming, the output current of driver matters to the pulse width of the PWM signal, and the numerate please refer to the following formula:

$$I_{o\_set} = \frac{(DT-0.6)}{T} I_{o\_norm}$$

$I_{o\_set}$  refers to the expected output current value.

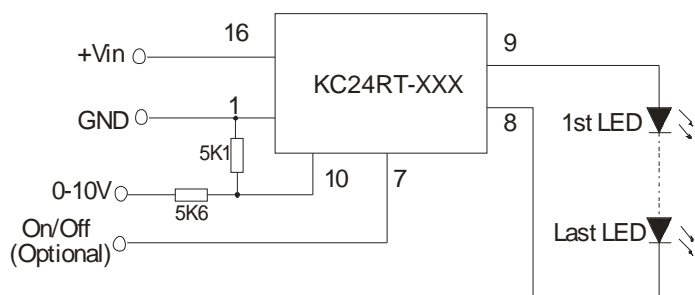
$I_{o\_norm}$  refers to the rated output current

$D$  refers to the pulse width of the PWM signal

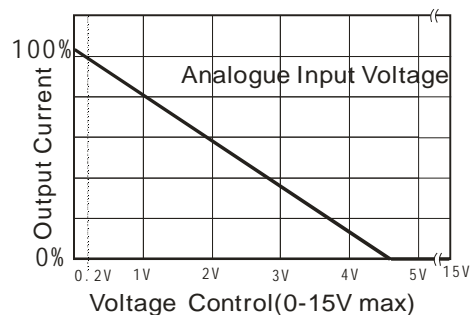
$T$  refers to the cycle of the PWM signal

Note: The formula only supplies as a reference, and the output current may be a little deviation with different load. The  $T_{on}(min)$  of PWM signal must be greater than 0.7ms, or the driver can't be operated normally. It is natural for the driver to generate an audibly noise in dimming process, because the frequency of the control circuit is within human audibly range (20Hz~20KHz).

## ANALOGUE DIMMING CONTROL AND APPLICATION EXAMPLE

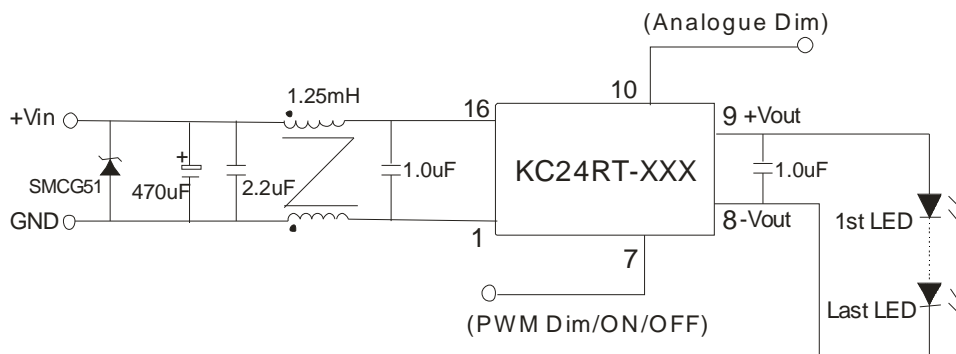


(Figure 3) Analogue dimming circuit



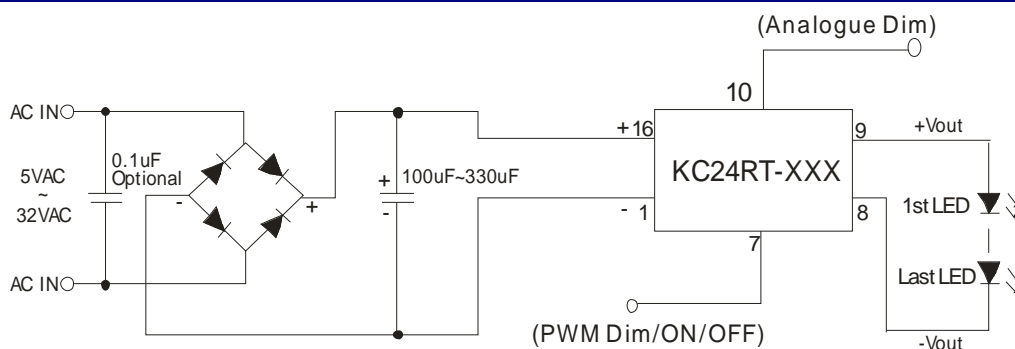
(Figure 4) Analogue input voltage VS output

## EMC RECOMMENDED CIRCUIT



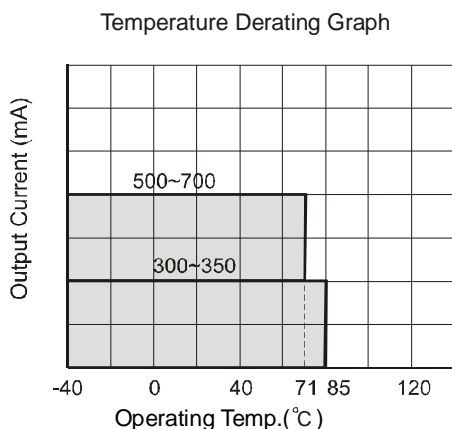
(Figure 5)

## AC INPUT RECOMMENDED CIRCUIT

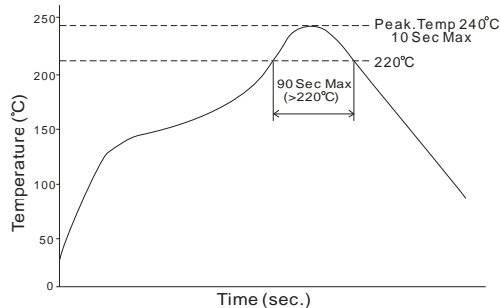


(Figure 6)

## TYPICAL TEMPERATURE CURVE

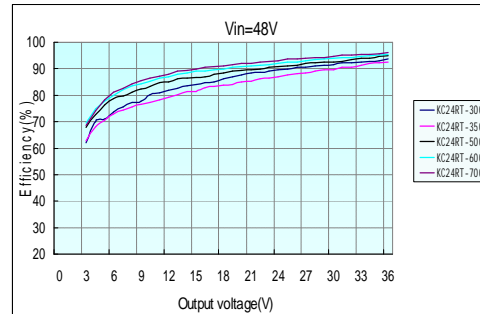
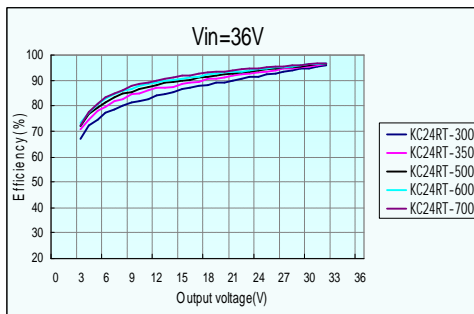
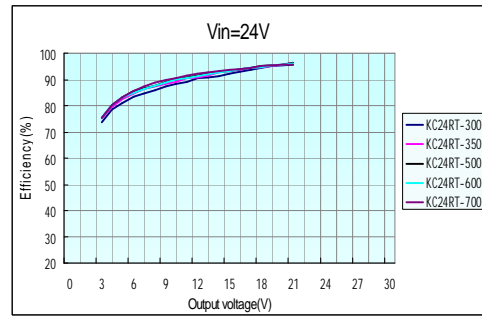
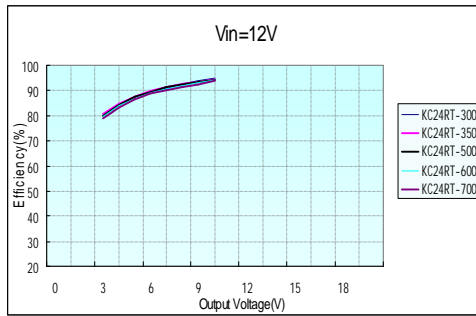


## RECOMMENDED REFLOW SOLDERING PROFILE



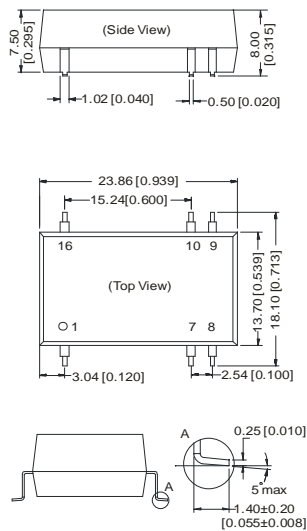
Remark: The curve applies only to the hot air reflow soldering.

## CHARACTERISTICS CURVE



## OUTLINE DIMENSIONS & PIN CONNECTIONS

### MECHANICAL DIMENSIONS

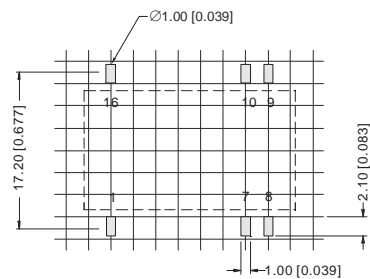


FOOTPRINT DETAILS	
Pin	Function
1	GND
7	ON/OFF/PWM
8	-V <sub>out</sub>
9	+V <sub>out</sub>
10	ANALOGUE DIMMING
16	V <sub>in</sub>

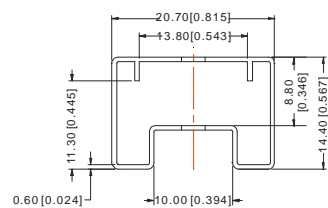
NC: No Connection

Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10\text{mm}$  [ $\pm 0.039\text{inch}$ ]  
General tolerances:  $\pm 0.25\text{mm}$  [ $\pm 0.010\text{inch}$ ]

### RECOMMENDED FOOTPRINT



### TUBE OUTLINE DIMENSIONS



Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.5\text{mm}$  [ $\pm 0.020\text{inch}$ ]  
L=530mm[208.66inch] Tube Quantity: 21pcs  
L=220mm[86.61inch] Tube Quantity: 8pcs

### Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. All specifications measured at  $T_a=25^\circ\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
3. Only typical models listed, other models may be different, please contact our technical person for more details.
4. In this datasheet, all the test methods of indications are based on corporate standards.