

KC24H Series

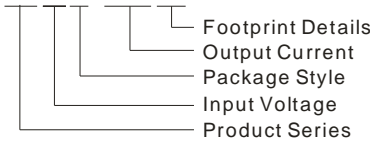
CONSTANT CURRENT HIGH POWER LED DRIVER



RoHS

PART NUMBER SYSTEM

KC24H-1000X3



PRODUCT FEATURES

- | 1,000/1,200mA output current
- | Efficiency up to 97%
- | Ultra-wide range voltage (input and output)
- | Constant current mode, high power output
- | PWM dimming & Analogue dimming
- | Remote ON/OFF, Continuous short circuit protection
- | Meets EN55015 without external circuit

APPLICATIONS

The KC24H Series is a 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. 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.

SELECTION GUIDE

Model Number	Input Voltage(VDC)	Output Voltage (VDC) (Range)	Output Current (mA)	Input Current (mA)(typ.)	Dimming control	Max. Capacitive Load(μF)	Efficiency (% , typ.) @Max. Load	Approval
	Nominal (Range)			@ Vin=24V,Vo=17V				
KC24H-1000(X1/X2/X3)	24(5.5-48)	3.3-36	1000	740	PWM+Analogue	1000	97	RoHS
KC24H-1200(X1/X2/X3)			1200	892	PWM+ Analogue		97	

Note:

1. The types without suffix, such as KC24H-1000 are eight-pin products without analogue dimming+PWM dimming function.
2. The types with suffix X1, such as KC24H-1000X1 are nine-pin products with analogue dimming function only.
3. The types with suffix X2, such as KC24H-1000X2 are nine-pin products with PWM dimming function only.
4. The types with suffix X3, such as KC24H-1000X3 are ten-pin products with analogue dimming+PWM dimming function.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range		5.5	24	48	VDC
Utmost Input Voltage	≤10 seconds	5	--	55	
Minimum Input-Output voltage drop	Input Voltage Range	2	--	4	
Input Filter		π Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power	Io=1000mA	3.3	--	36	W
	Io=1200mA	3.96	--	43.2	
Output Current Accuracy		--	±3	±5	%
Output Current Stability		--	±0.5	±1	
Temperature Drift	Full load	--	--	±0.05	%/°C
Ripple & Noise*	20MHz Bandwidth	--	70	200	mVp-p
Over Temperature Protection		After Cooling, Automatic Recovery			
Short Circuit Protection		Continuous, Automatic Recovery			

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Switching Frequency		--	370	--	KHz
MTBF	MIL-HDBK-217F@25°C	650	--	--	K hours
Case Material		Plastic(UL94-V0)			

Weight		--	13	--	g
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ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Operating Humidity		--	--	95	%
Storage Humidity		--	--	95	
Operating Temperature	Power derating (above 71°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Lead Temperature	1.5mm from case for 10 seconds	--	--	265	
Cooling		Free air convection			

PWM DIMMING AND REMOTE ON/OFF CONTROL

Item	Test Conditions	Min.	Typ.	Max.	Unit	
Remote ON/OFF	ON	Open or $2.8V < V_c < 6V$				
	OFF (shutdown)	$V_c < 0.6V$				
Remote pin	voltage	$V_{in}=24V$, 5LED	--	3.3	--	V
	I_{sink}	$V_c=5V$	--	--	1	mA
	I_{source}	$V_c < 0.6V$	--	1	--	μA
Quiescent input current	$V_{in}=24V$, $V_c < 0.6V$ (shutdown)	--	400	--		
PWM frequency*		--	--	200	Hz	

* Refer to "Digital Dimming Control" at page 4.

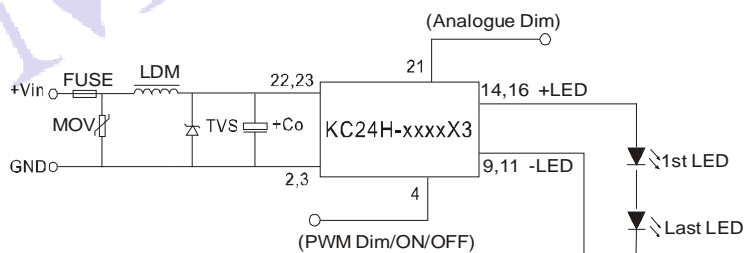
ANALOG DIMMING

Input voltage range	$V_{in}=5.5-48V$	0-15V
Output current range	$V_{in}=5.5-48V$	0%-100%
Control voltage range	Full on	$0.2V \pm 50mV$
	Full off	$4.5V \pm 200mV$
Driving current	$V_c=5V$	0.6mA(max)

EMC

EMI	CE	CISPR22/EN55022	CLASS B	EN55015 power port
	RE	CISPR22/EN55022	CLASS B	
EMS	ESD	IEC/EN 61000-4-2	Contact $\pm 4KV$	perf. Criteria B
	RS	IEC/EN 61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4	$\pm 2KV$	perf. Criteria B (Refer to Figure 1)
	Surge	IEC/EN 61000-4-5	$\pm 2KV$	perf. Criteria B (Refer to Figure 1)
	CS	IEC/EN 61000-4-6	$3V_r.ms$	perf. Criteria B
	Voltage dips, short and interruptions immunity	IEC/EN 61000-4-29	0%-70%	perf. Criteria B

EMC RECOMMENDED CIRCUIT

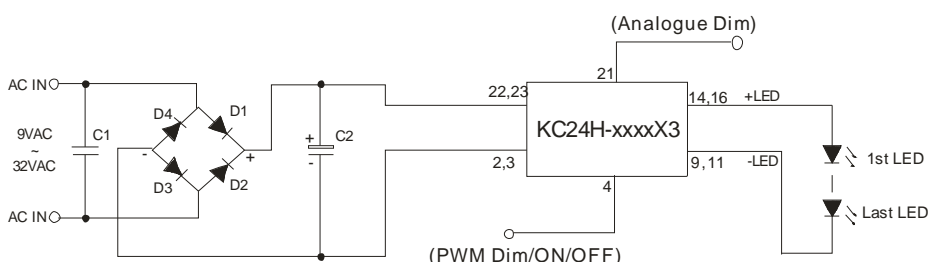


(Figure 1) EMC recommended circuit

Recommended parameter (Table 1)

Components	Specifications
FUSE	Choose according to practical input current
MOV	10D560
TVS	SMC54A
LDM	56 μH
C0	120 $\mu F/63V$

AC INPUT RECOMMENDED CIRCUIT



(Figure 2) AC input recommended circuit

Recommended parameter (Table 2)

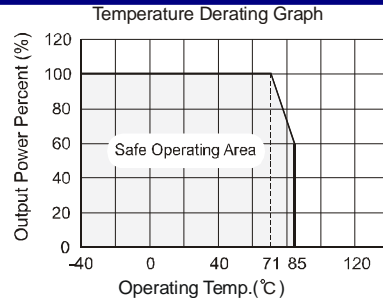
Components	Specifications
C1	X1 Safety capacitor, 0.1 $\mu F/3000VAC$
C2	100 $\mu F/100V$ Electrolytic capacitor
D1, D2, D3, D4	Rectifier diode 2A/200V

INPUT VS OUTPUT

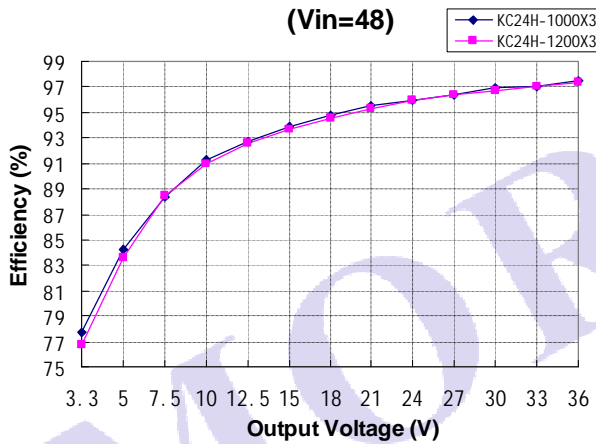
Input voltage (VDC)	Output voltage range(VDC)	Output constant current (mA)	Maximum Output power (W, Max.)
48	3.3-36.0	1000	36
36	3.3-32.0	1000	32
24	3.3-21.0	1000	21
20	3.3-17.0	1000	17
15	3.3-13.2	1000	13.2
12	3.3-10.0	1000	10
5.5	3.3-4.0	1000	4

Input voltage (VDC)	Output voltage range(VDC)	Output constant current (mA)	Maximum Output power (W, Max.)
48	3.3-36.0	1200	43.2
36	3.3-32.0	1200	38.4
24	3.3-21.0	1200	25.2
20	3.3-17.0	1200	20.4
15	3.3-13.2	1200	15.84
12	3.3-10.0	1200	12
5.5	3.3-4.0	1200	4.8

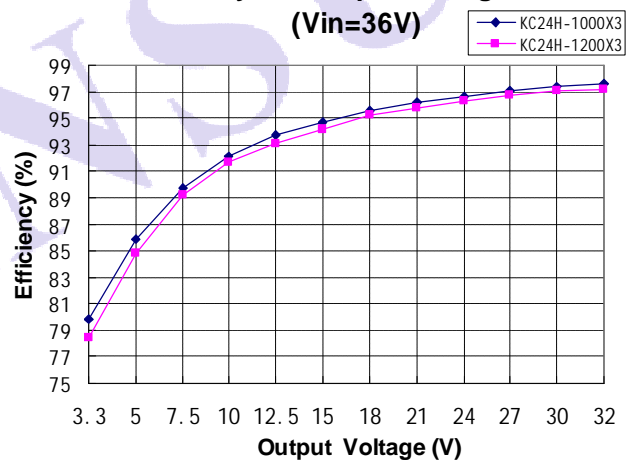
TYPICAL TEMPERATURE CURVE



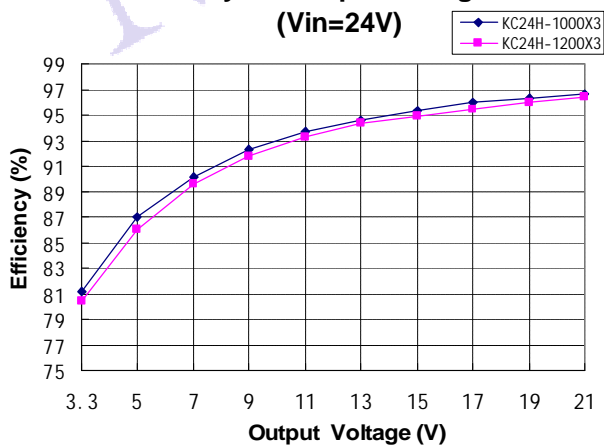
Efficiency VS Output Voltage curve
(Vin=48)



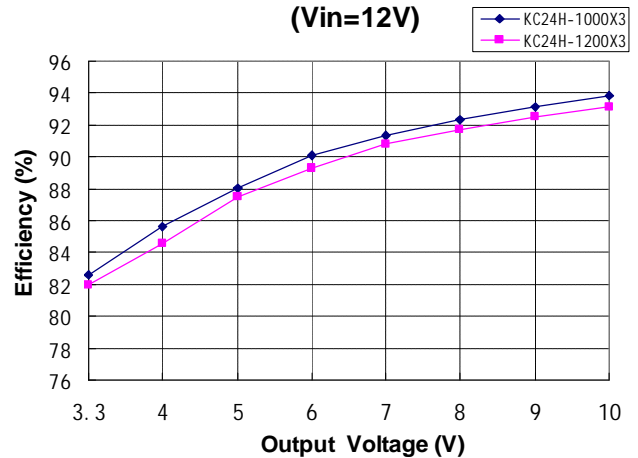
Efficiency VS Output Voltage curve
(Vin=36V)



Efficiency VS Output Voltage curve
(Vin=24V)



Efficiency VS Output Voltage curve
(Vin=12V)



OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS

(Front View)
 Dimensions: 12.65 [0.500] (height), 4.10 [0.160] (pin height), $\varnothing 0.50$ [0.020] (pin diameter).

(Bottom View)
 Dimensions: 31.70 [1.250] (total width), 22.86 [0.90] (pin pitch), 12.7 [0.50] (pin offset), 20.30 [0.800] (total height), 15.24 [0.600] (pin pitch), 2.54 [0.100] (pin offset).

FOOTPRINT DETAILS		
Pin	Function	Comments
2,3	GND	Do not connect to -LED
4	ON/OFF/PWM	Leave open if not use
9,11	-LED	LED Cathode connection
14,16	+LED	LED Anode connection
21	ANALOGUE DIMMING	Leave open if not use
22,23	+Vin	DC Supply

Note:
 Unit: mm[inch]
 Pin diameter tolerances: $\pm 0.10\text{mm}$ [$\pm 0.004\text{inch}$]
 General tolerances: $\pm 0.25\text{mm}$ [$\pm 0.010\text{inch}$]

RECOMMENDED FOOTPRINT

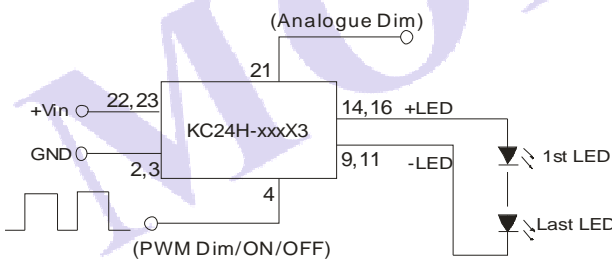
Note: Grid 2.54*2.54mm.

TUBE OUTLINE DIMENSIONS

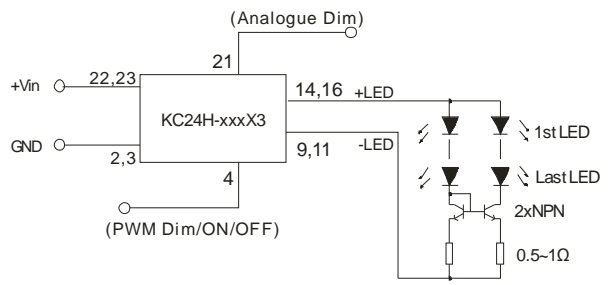
Note:
 Unit: mm[inch]
 General tolerances: $\pm 0.50\text{mm}$ [$\pm 0.020\text{inch}$]
 L=530mm[20.866inch] Tube Quantity: 16pcs
 L=220mm[8.661inch] Tube Quantity: 6pcs
 Short tube inner packaging dimensions: L*W*H=255*170*80mm;
 Short tube outer packaging dimensions(with six inner packaging boxes): L*W*H=375*280*270mm;
 Long tube inner packaging dimensions: L*W*H=580*200*100mm;
 Long tube outer packaging dimensions(with two inner packaging boxes): L*W*H=600*215*220mm;
 Long tube outer packaging dimensions(with three inner packaging boxes): L*W*H=600*215*325mm.

DESIGN & APPLY CONSIDERATIONS

1) Typical Application Circuits



(Figure 3) Series Application

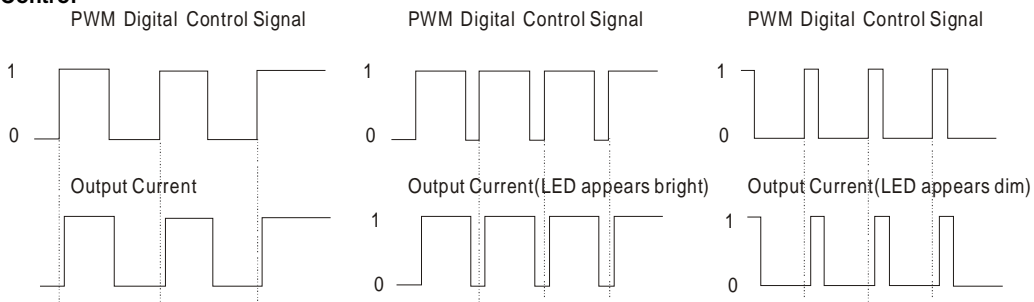


(Figure 4) Parallel-series Application

Note:

1. If input > 40V, the input port must add an external capacitor ($\geq 47\mu\text{F}/100\text{V}$), to protect the module from damaged by voltage spikes.
2. "-LED" can't connect GND, or the module may be damaged.
3. The module is a step-down driver, please refer to "Input VS Output" at page 3.
4. When the mode works in the high-voltage input-area and 1LED load, it is normal about Frequency hopping because of small duty cycle. Output current is constant. Not affect the normal use.

2) Digital Dimming Control



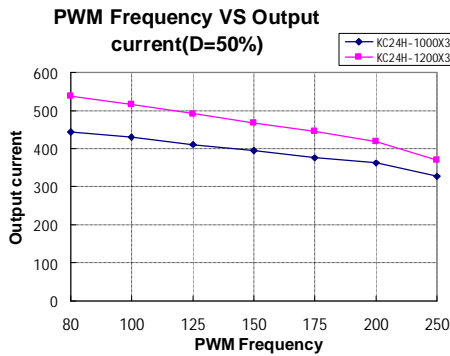
For the rated frequency PWM dimming, the output current of driver matters to the pulse width of the PWM signal. and the numerate please refer to the following formula:

$$I_{o_set} = \frac{(DT-0.75)}{T} I_{o_norm}$$

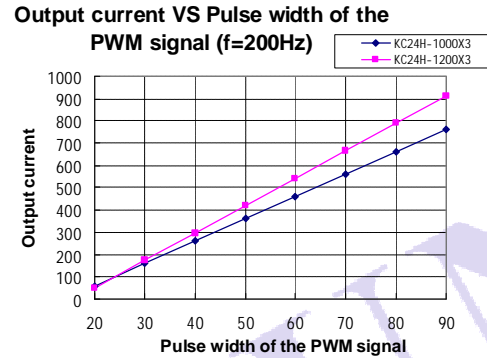
I_{o_set} refers to the expected output current value (mA) , I_{o_norm} refers to the rated output current (mA) , D refers to the pulse width of the PWM signal (%), T refers to the cycle of the PWM signal (ms).

Note: The formula only supplies as a reference, and the output current may be a little deviation with different load. The Ton(min) of PWM signal must be greater than 0.75ms, or the driver can't operate 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). In order to avoid the human eye can observe the LED flashes, the PWM dimming frequency is recommended to set above 100Hz.

PWM curve(Vin=24V,5LEDs):

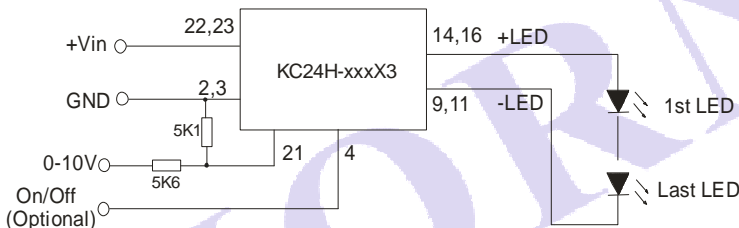


(Figure 5) PWM Frequency VS Output current(D=50%)

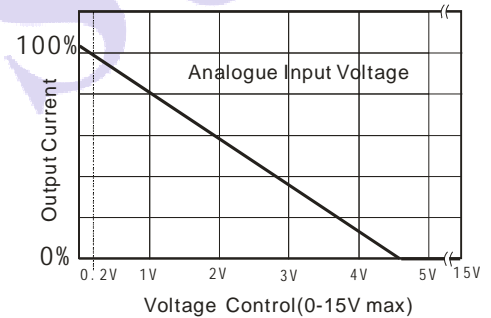


(Figure 6) Output current VS Pulse width of the PWM signal (f=200Hz)

3) Analogue Dimming Control And Application Example



(Figure 7) Analogue dimming circuit



(Figure 8) Output current VS analogue input voltage

4) No parallel connection(output) or plug and play

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.
5. Our company offer custom products.
6. Specifications subject to change without notice.

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