SKC24RT Series

CONSTANT CURRENT GREAT POWER LED DRIVER

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 SKC24RT 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

SKC24RT-350

- Output Current
- Package Style
- Input Voltage
- Product Series

PRODUCT PROGRAM

Part Number	Input Voltage(V)		Output		Dimming control	Efficiency (%)
	Normal	Range	Voltage (VDC)	Current (mA)		
SKC24RT-300	24	5.5-48	3.3-36	0-300	PWM+Analogue	96
SKC24RT-350	24	5.5-48	3.3-36	0-350	PWM+Analogue	96
SKC24RT-500	24	5.5-48	3.3-36	0-500	PWM+Analogue	96
SKC24RT-600	24	5.5-48	3.3-36	0-600	PWM+Analogue	96
SKC24RT-700	24	5.5-48	3.3-36	0-700	PWM+Analogue	96

SPECIFICATIONS

Item	Test condition	Min.	Typ.	Max.	Units
Utmost input voltage	≤10 seconds	5		55	VDC
Recommended input voltage		5.5	24	48	
Input filter		Capacitor(1μF)			
Output voltage range	Vin=48V	3.3		36	VDC
Input-Output voltage drop	Vin=5.5~48V,1~10LEDs	2		4	
Output current range	See the product program				
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, automatic recovery			
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	4	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	Vin=24V, V_c <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±200mV			
Driving current	Vc=5V	0.6mA(max)			

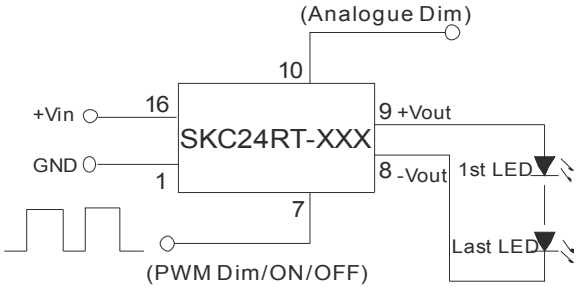
EMC	
EMI conducted	EN55015 power port (Refer to Figure 6)
RFI conducted	EN55015 CISPR22 class B (Refer to Figure 6)
ESD	IEC/EN 61000-4-2 level 2 contact ±4KV perf. Criteria B (Refer to Figure 6)
R/S	IEC/EN 61000-4-3 level 3 (10V/m) perf. Criteria A
EFT	IEC/EN 61000-4-4 level 2 (±1KV) perf. Criteria B (Refer to Figure 6)
Surge	IEC/EN 61000-4-5 level 2 (±1KV) perf. Criteria B (Refer to Figure 6)
C/S	IEC/EN 61000-4-6 level 3 (10Vr.ms) perf. Criteria A

INPUT VS OUTPUT

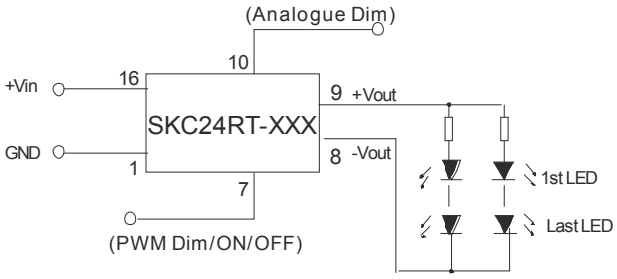
Input voltage	Output voltage range(VDC)	Output constant	Output power
48	3.3-36.0	300	10.80
36	3.3-32.0	300	9.60
24	3.3-21.0	300	6.30
20	3.3-17.0	300	5.10
15	3.3-13.2	300	3.96
12	3.3-10.0	300	3.00
5.5	3.3-4.0	300	1.20
48	3.3-36.0	500	18.00
36	3.3-32.0	500	16.00
24	3.3-21.0	500	10.50
20	3.3-17.0	500	8.50
15	3.3-13.2	500	6.60
12	3.3-10.0	500	5.00
5.5	3.3-4.0	500	2.00
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

Input voltage	Output voltage range(VDC)	Output constant current (mA)	Output power (W Max)
48	3.3-36.0	350	12.60
36	3.3-32.0	350	11.20
24	3.3-21.0	350	7.35
20	3.3-17.0	350	5.95
15	3.3-13.2	350	4.62
12	3.3-10.0	350	3.50
5.5	3.3-4.0	350	1.40
48	3.3-36.0	600	21.60
36	3.3-32.0	600	19.20
24	3.3-21.0	600	12.60
20	3.3-17.0	600	10.20
15	3.3-13.2	600	7.92
12	3.3-10.0	600	6.00
5.5	3.3-4.0	600	2.40

TYPICAL APPLICATION CIRCUITS



(Figure 1) Series Application

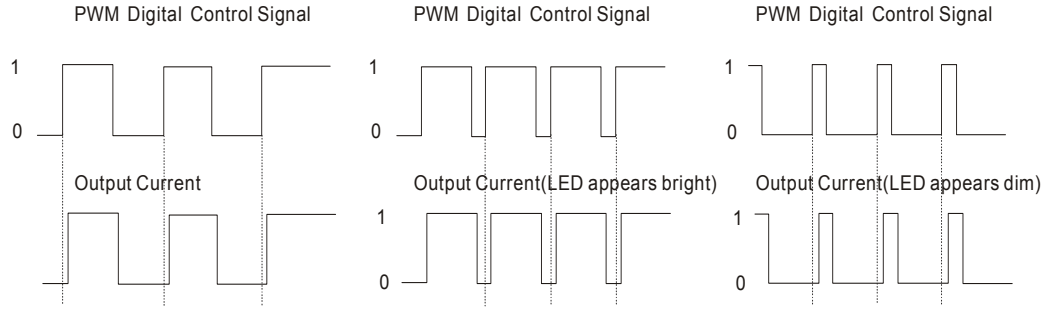


(Figure 2) Parallel-series Application

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:

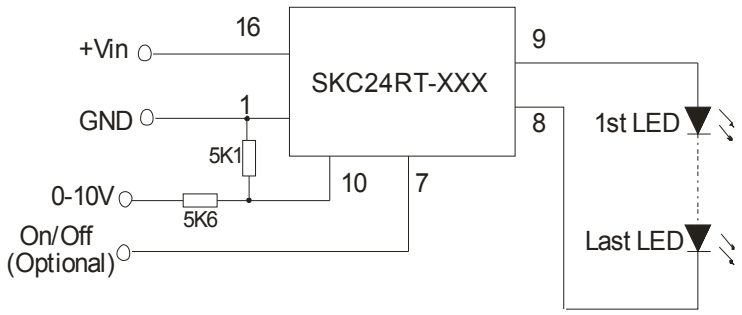
$$I_{o\_set} = \frac{(DT-0.6)}{T} I_{o\_norm}$$

Io_set refers to the expected output current value. Io_norm refers to the rated output current

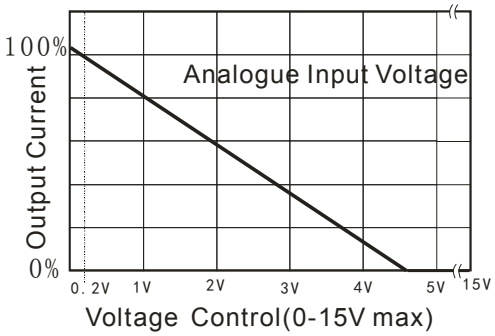
D refers to the pulse width of the PWM signal T refers to the cycle of the PWM signal

Note: The formula only supplies as a reference, and the output current may be a little deviation with different load. The Ton(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). In order to avoid the human eye can observe the LED flashes, the PWM dimming frequency is recommended to set above 100Hz.

ANALOGUE DIMMING CONTROL AND APPLICATION EXAMPLE

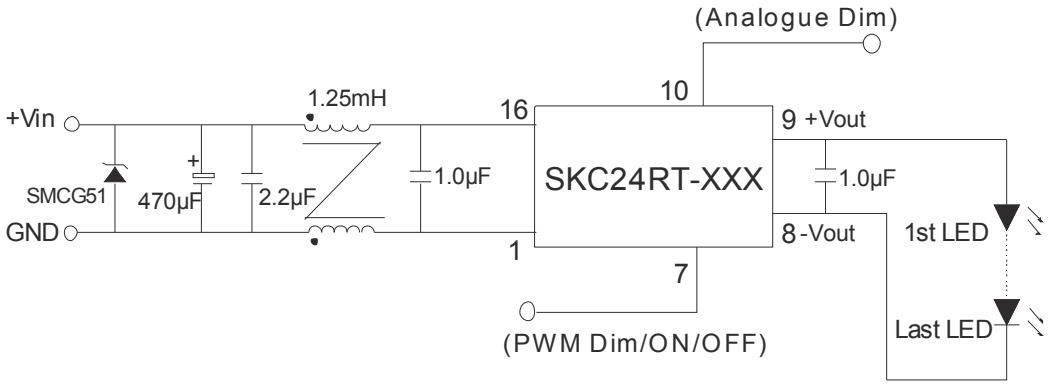


(Figure 3) Analogue dimming circuit

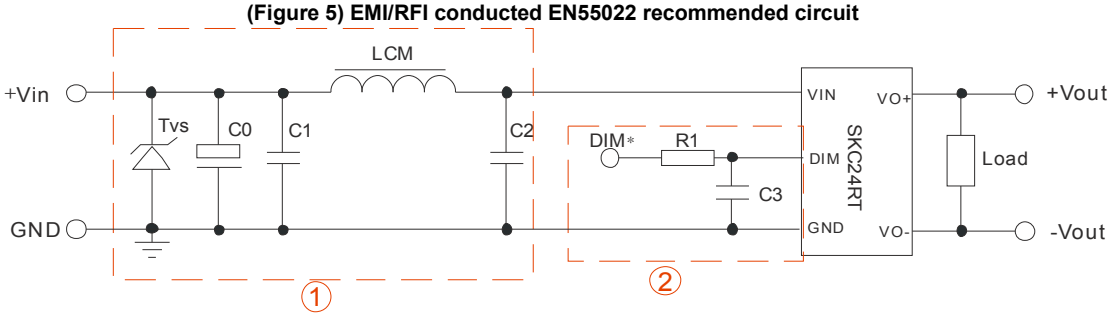


(Figure 4) Analogue input voltage VS output

EMC RECOMMENDED CIRCUIT



(Figure 5) EMI/RFI conducted EN55022 recommended circuit



(Figure 6) EMI/EMC recommended circuit

Note:
1. DIM pin is the module's PWM dimming pin as shown in Figure 6.
2. While adding circuit ②,it may extend the PWM dimming output reaction time.

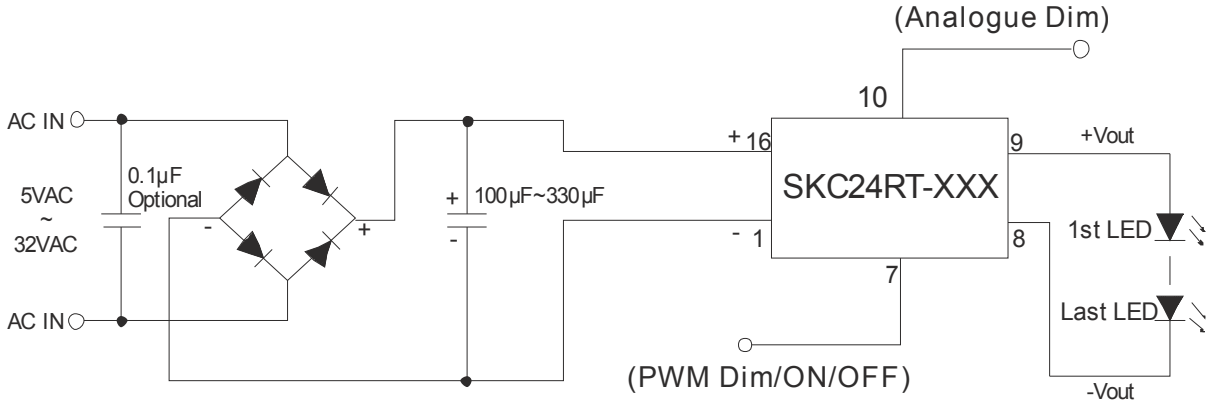
EMI/EMC standard：

Item	Standard	Level	Predicate	Remark
EMI conducted	EN 55015	Power port	Qualification	Add external circuit ①
ESD	IEC 61000-4-2:2001	Level 2	B	±4KV Add external circuit ②
Surge	IEC 61000-4-5:2004	Level 2	B	±1KV Add external circuit ①
EFT	IEC 61000-4-4:2004	Level 2	B	±1KV Add external circuit ①

Recommended parameter：

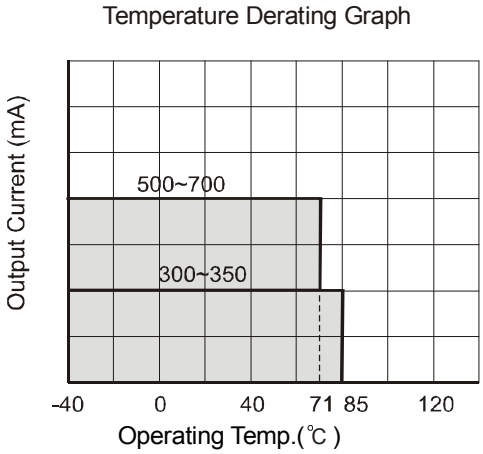
Components	Specifications
Tvs	SMCJ48A,1500W（Bringtking）
LCM	6.8μH CD43（CEAIYA）
C0	470μF/50V（CapXon）
C1	4.7μF/50V 1210 (TORCH)
C2	2.2μF/50V 1210 (TORCH)
C3	470pF/100V 0805 (TORCH)
R1	680Ω 0805(can replaced by inductance or magnetic bead)

AC INPUT RECOMMENDED CIRCUIT

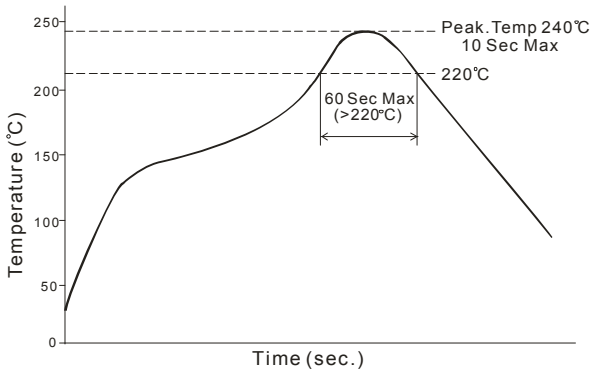


(Figure 7) AC input recommended circuit

TYPICAL TEMPERATURE CURVE

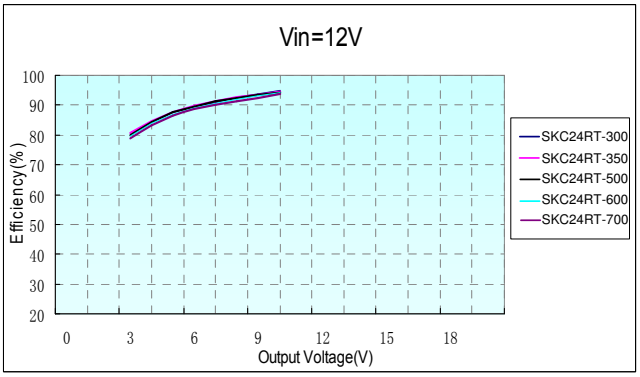


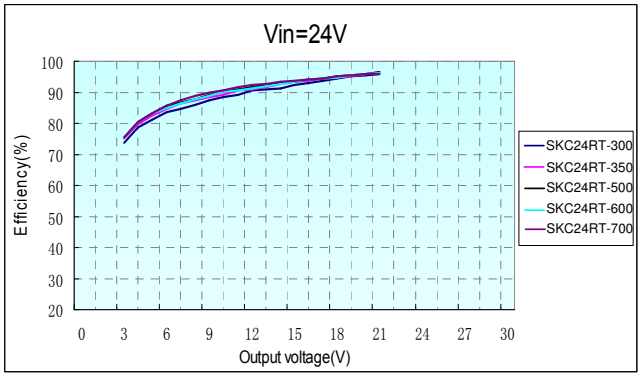
RECOMMENDED REFLOW SOLDERING PROFILE

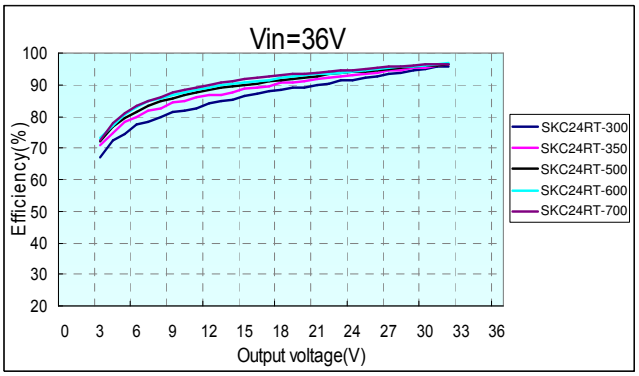


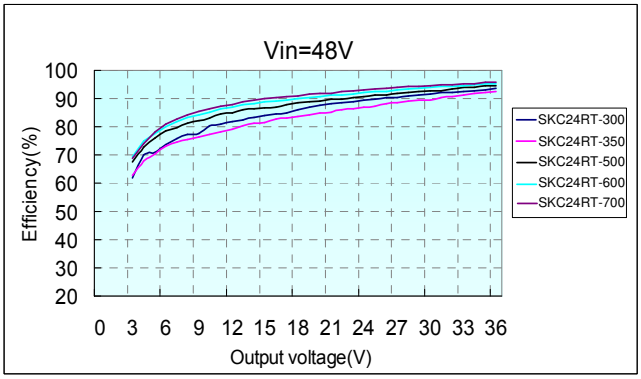
Remark: The curve applies only to the hot air reflow soldering.

CHARACTERISTICS CURVE



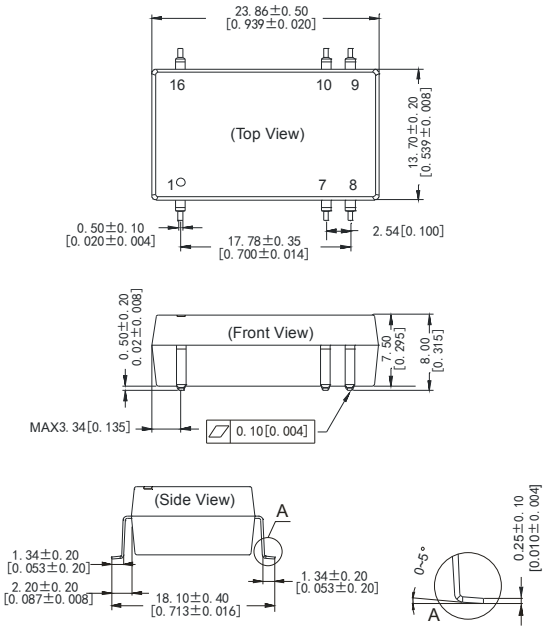






OUTLINE DIMENSIONS & PIN CONNECTIONS

MECHANICAL DIMENSIONS

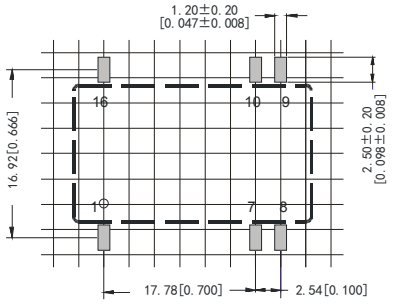


FOOTPRINT DETAILS	
Pin	Function
1	GND
7	ON/OFF/PWM
8	-Vout
9	+Vout
10	ANALOGUE DIMMING
16	Vin

NC:No Connection

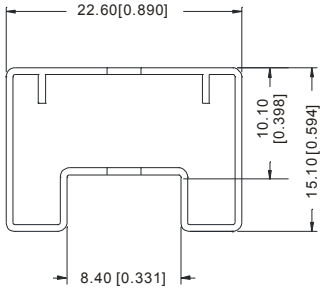
Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10mm[± 0.039inch]
General tolerances: ±0.25mm[± 0.010inch]

RECOMMENDED FOOTPRINT



Note:
grid:2.54*2.54mm

TUBE OUTLINE DIMENSIONS



Note:
Unit :mm(inch)
General tolerances: ± 0.5mm[±0.020inch]
L=530mm[208.66inch] Tube Quantity: 21pcs
L=220mm[86.61inch] Tube Quantity: 8pcs
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.

Note:
1. Operation under minimum output voltage 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. 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.