

KC24RT Series

CONSTANT CURRENT GREAT POWER LED DRIVER



RoHS

FEATURES

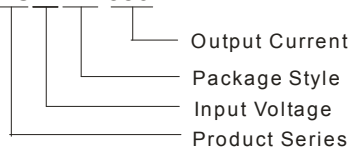
- SMD Package, simple and convenient
- High efficiency up to 96%
- Ultra-wide range voltage input and output
- Constant current mode, great power output
- AC-DC, EMC recommended circuit
- PWM dimming & Analogue dimming
- Remote ON/OFF, Short-circuit protection
- RoHS and UL Compliance

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



SELECTION GUIDE

| Part No. | Input Voltage(V) | | Output | | Dimming Control | Full Load Efficiency(%) Typ. |
|------------|------------------|--------|---------------|--------------|-----------------|---------------------------------|
| | 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 |

PRODUCT SPECIFICATIONS

| Item | Test condition | Min. | Typ. | Max. | Units |
|---|------------------------------|---|------|---------|-------|
| Input Voltage Limit | ≤ 10 seconds | 5 | -- | 55 | VDC |
| Recommended Input Voltage | | 5.5 | 24 | 48 | |
| Input Filter | | Capacitance filter(1 μ F) | | | |
| 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 | ± 5 | % |
| 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 | -- | -- | ± 0.015 | %/°C |
| Efficiency | At full load | -- | -- | 96 | % |
| Ripple & Noise | Vin=24V, 5LEDS | -- | -- | 120 | mV |
| Short-circuit Protection | | Continuous, self-recovery | | | |
| Operating Ambient Temperature Range | 300mA / 350mA | -40 | -- | 85 | °C |
| | 500mA / 600mA / 700mA | -40 | -- | 71 | |
| Storage Temperature | | -55 | -- | 125 | |
| Max. Case Temperature | | -- | -- | 100 | |
| Capacitive Load Max. | | 1000 | | | μ F |
| Operating Frequency | | 320 | 370 | 420 | kHz |
| MTBF | MIL-HDBK-217F(+25°C) | 2,000,000 | | | Hours |
| Case Material | | Black Epoxy resin; flame-retardant and heat-resistant (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 | Vc<0.6V | | | |
| Remote Pin Current | Vc=5V | -- | -- | 1 | mA |
| Quiescent Input Current | Vin=24V, Vc <0.6V (shutdown) | -- | 400 | -- | μ A |
| 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% | | | |

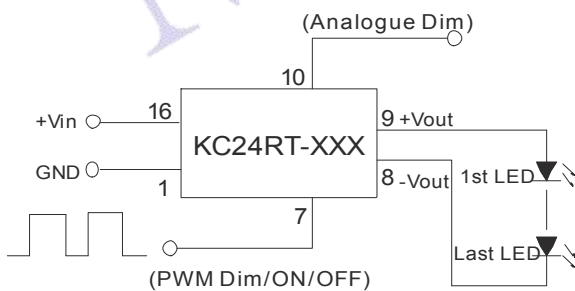
MORNSUN Science & Technology Co.,Ltd.
 Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Huangpu district, Guangzhou,P.R.China.
 Tel: 86-20-38601850
 Fax:86-20-38601272
 E-mail: info@mornsun.cn
 Http://www.mornsun-power.com

| | | |
|-----------------------|---|------------|
| Control Voltage Range | Full On | 0.2V±50mV |
| | Full Off | 4.5V±200mV |
| Driving Current | Vc=5V | 0.6mA(max) |
| EMC | | |
| Emissions | EN55015 power port (Refer to Figure 6) | |
| Immunity | EN55015 CISPR32 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) | |
| CS | IEC/EN 61000-4-6 level 3 (10V.ms) perf. Criteria A | |

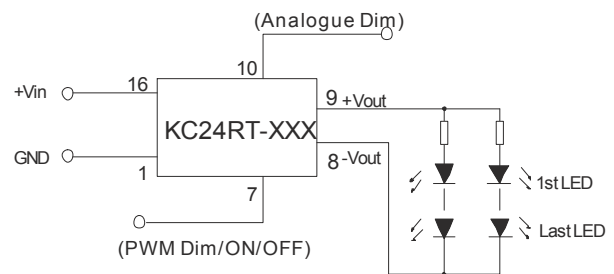
INPUT VS OUTPUT

| Input voltage | Output voltage | Output constant | Output power | Input voltag | Output voltage range(VDC) | Output constant current (mA) | Output power (W Max) |
|---------------|----------------|-----------------|--------------|--------------|---------------------------|------------------------------|----------------------|
| 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/> | | | | | | | |
| 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/> | | | | | | | |
| 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

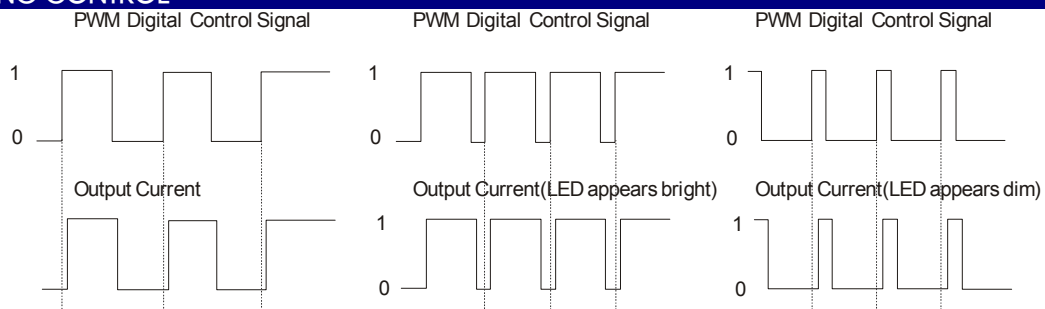


(Figure 2) Parallel-series Application

1. It is recommended adding a PTC(positive) before each channel to protect LED as shown in Figure 2

Note: The negative output cannot be grounded, otherwise the module will be damaged.

DIGITAL DIMMING CONTROL



For a certain frequency of PWM dimming, there is an connection between the output current of the driver and the duty cycle of the PWM signal, please refer to the following formula for calculation:

$$I_{o_set} = \frac{(DT-0.6)}{T} I_{o_norm}$$

I_{o_set} refers to the expected output current value.

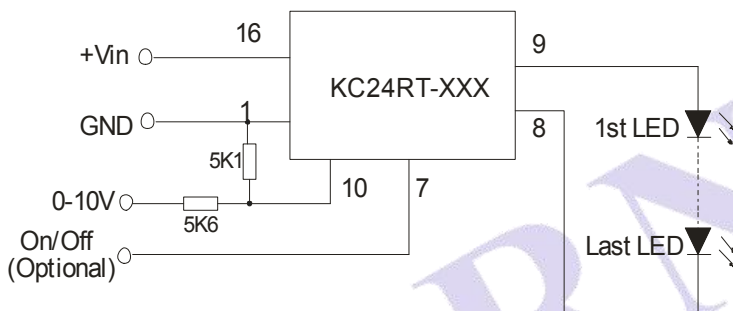
I_{o_norm} refers to the rated output current

D refers to the pulse width of the PWM signal

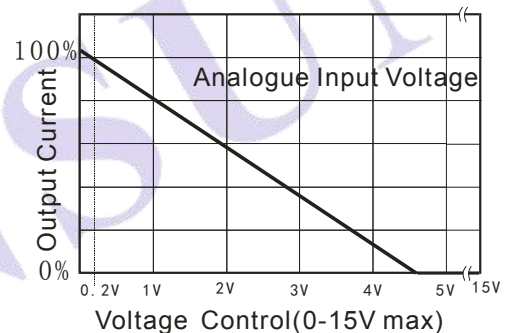
T refers to the cycle of the PWM signal

Note: The above formula for reference only. The output current may vary due to the load. The minimum Ton of the PWM signal cannot be less than 0.7mS, otherwise the product will not work properly. It is normal if hears a slight sound during PWM dimming. This is because the PWM dimming frequency is within the human ear's auditory frequency range (typically 20Hz-20KHz). In order to prevent the LED from being observed by the human eye, it is recommended to set the PWM dimming frequency above 100Hz.

ANALOGUE DIMMING CONTROL AND APPLICATION EXAMPLE

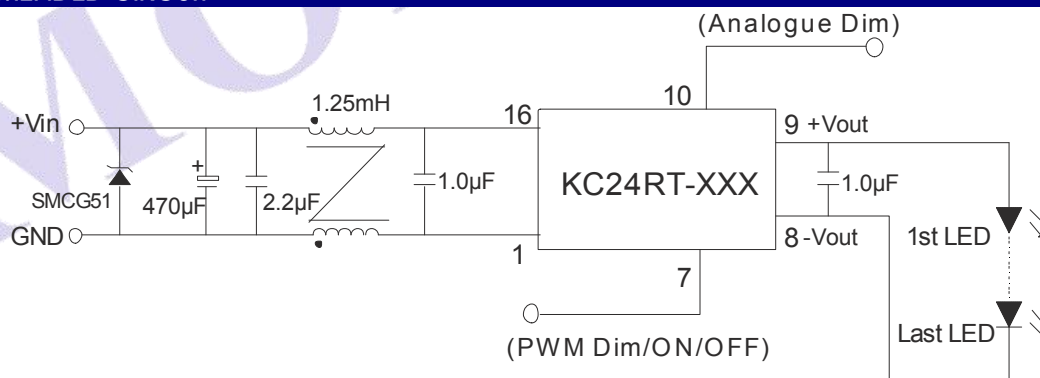


(Figure 3) Analogue dimming circuit

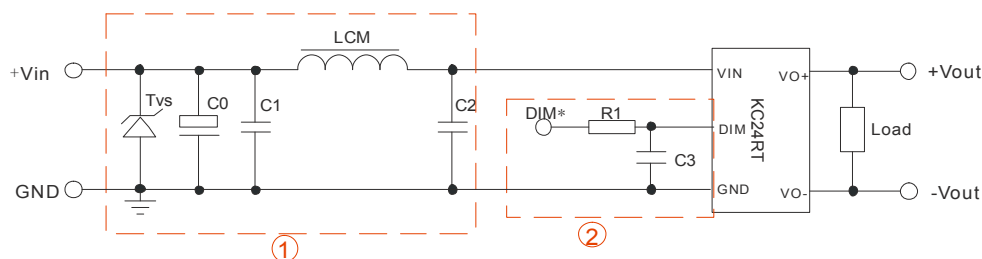


(Figure 4) Analogue input voltage VS output

EMC RECOMMENDED CIRCUIT



(Figure 5) EN55032(emissions) recommended circuit



(Figure 6) EMC recommended circuit

Note:

1. DIM pin is the module's PWM dimming pin as shown in Figure 6.
2. The output response time of PWM dimming may be prolonged if add part ②.

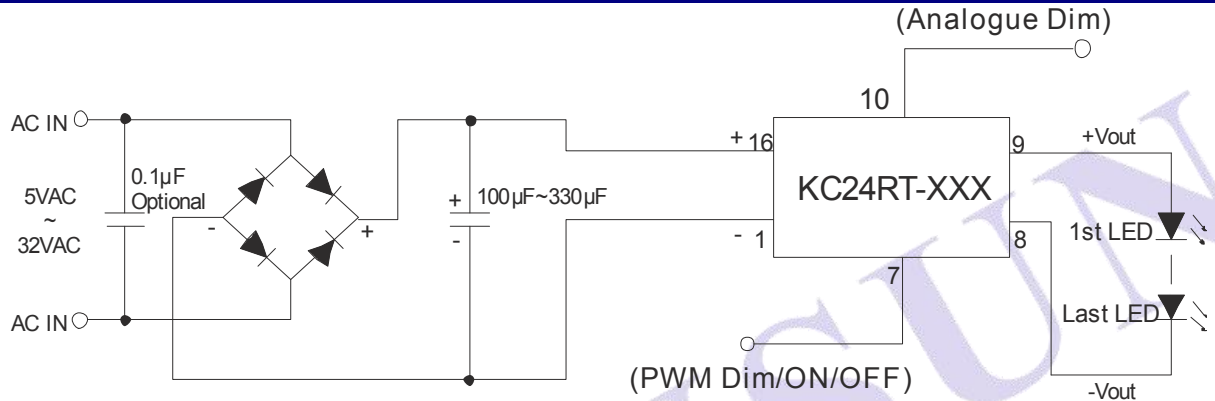
EMI/EMC standard:

| Item | Standard | Level | Predicate | Remark |
|-----------|--------------------|------------|---------------|--------------------------------|
| Emissions | EN 55032 | 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 | 6.8 μH CD43 (CEAIA) |
| C0 | 470 μF/50V (CapXon) |
| C1 | 4.7 μF/50V 1210 (TORCH) |
| C2 | 2.2 μF/50V 1210 (TORCH) |
| C3 | 470pF/100V 0805 (TORCH) |
| R1 | 680 Ω 0805(can replaced by inductance or magnetic bead) |

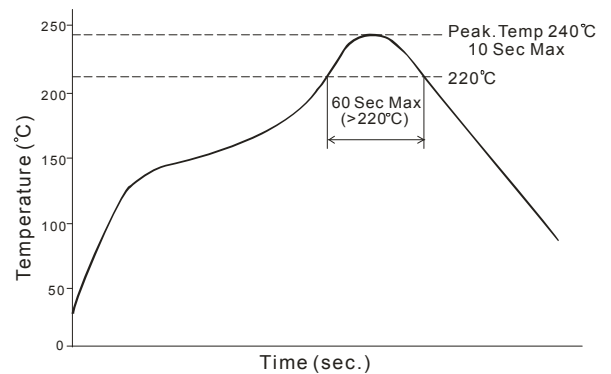
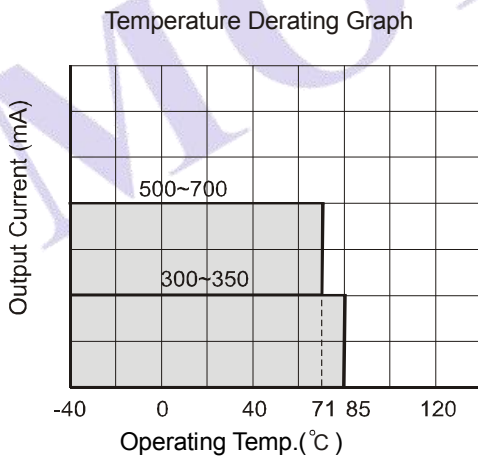
AC INPUT RECOMMENDED CIRCUIT



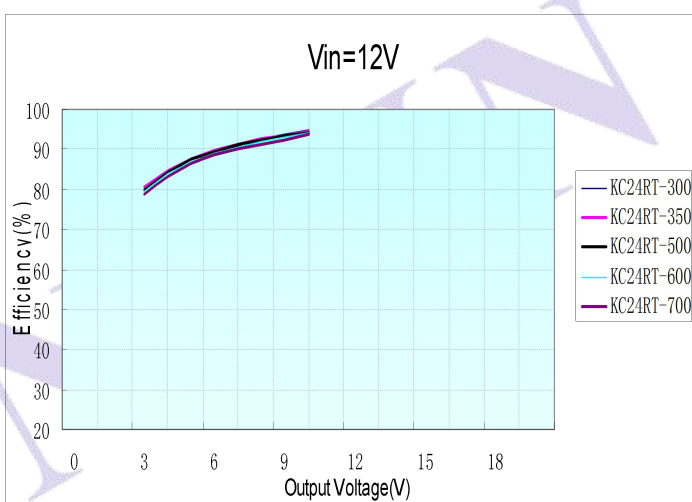
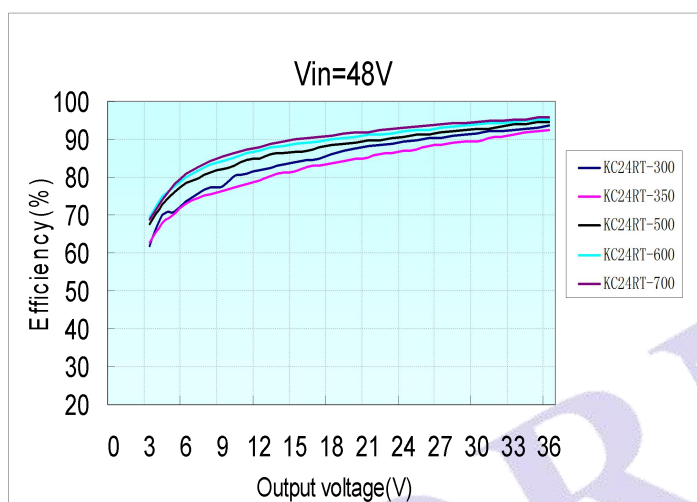
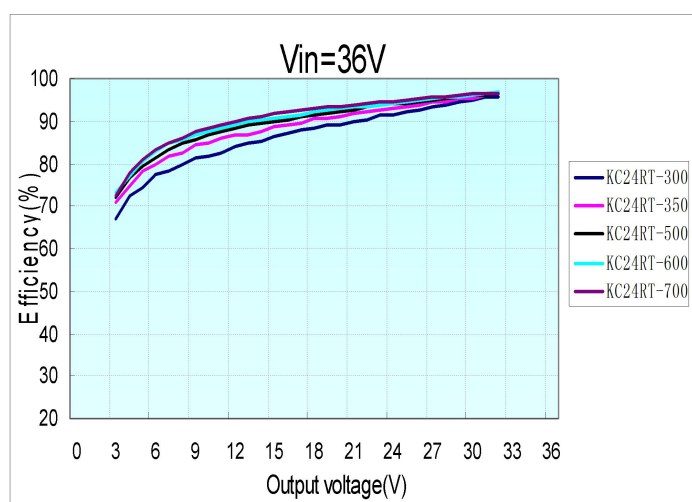
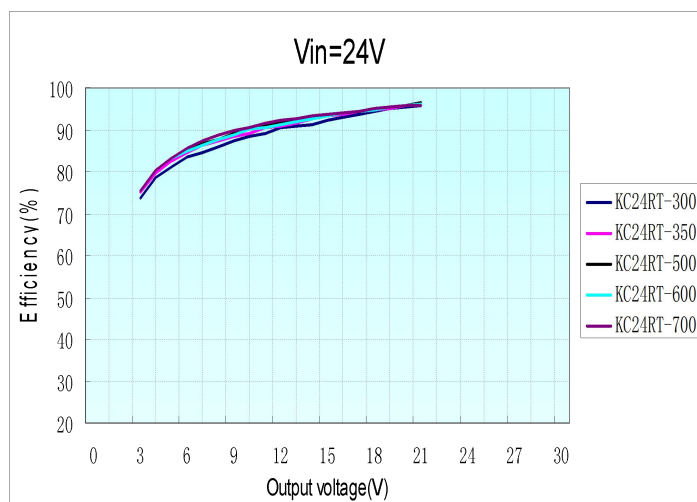
(Figure 7) AC input recommended circuit

TYPICAL TEMPERATURE CURVE

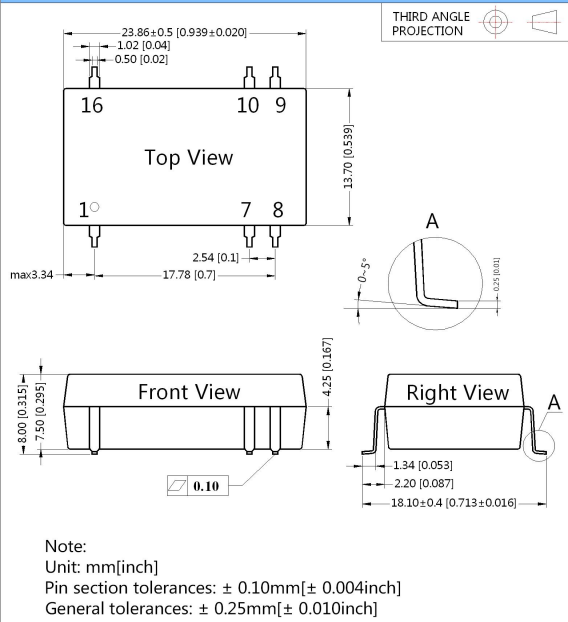
RECOMMENDED REFLOW SOLDERING PROFILE



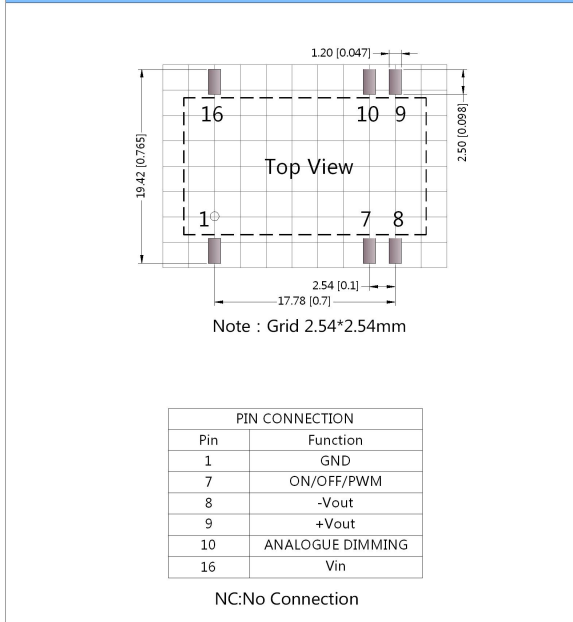
TYPICAL CHARACTERISTIC CURVES



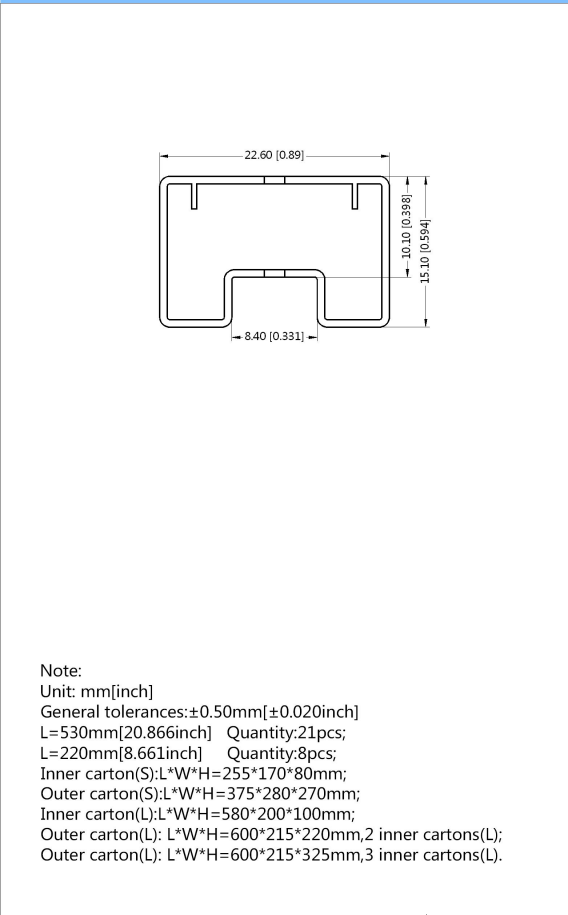
MECHANICAL DIMENSIONS



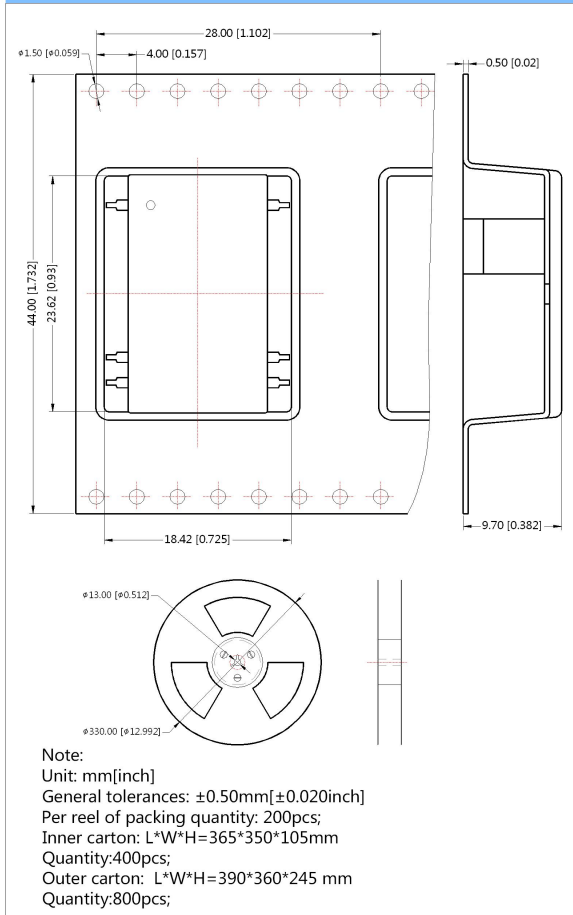
RECOMMENDED FOOTPRINT DETAILS



TUBE PACKAGING DIMENSIONS



REEL PACKAGING DIMENSIONS



Note:

1. The module will not be damaged if works below the minimum output voltage, but it is not guaranteed to meet all the parameters in datasheet;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
3. The above are the parameters of the product models listed in datasheet. Some parameters of non-standard models will exceed the above requirements. For details, please contact our technical staff;
4. All index testing methods in this datasheet are based on company corporate standards.