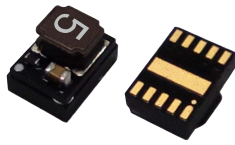


Non-Isolated DC-DC converter DFN package
Wide input and regulated single output



Patent Protection RoHS

SKAE24_T-0.5A series are micro-packaged switching regulator, designed to provide stable output voltage for space-constrained industrial applications. The module provides 3.3V/5V output voltage, with input voltage range of 6.5V to 28V and output current up to 500mA. The module can be used with only two external input / output capacitors and is widely used in space-constrained applications such as sensors, transmitters, and grid infrastructure.

FEATURES

- 6.5V to 28V wide operating input voltage
- 3.3V or 5V fixed output voltage
- 0.5A Output current
- Only input and output capacitors needed for module
- Miniature package 4.00 x 3.00 x 2.68mm

Selection Guide

| Certification | Part No. | Input Voltage (VDC) [®] | Output | | Full Load Efficiency (%) Vin Nominal Min/Typ. | Capacitive Load (µF) Max. |
|---------------|----------------|----------------------------------|---------------|-------------------|---|------------------------------|
| | | Nominal (Range) | Voltage (VDC) | Current (mA) Max. | | |
| -- | SKAE2403T-0.5A | 24 (6.5-28V) | 3.3 | 500 | 73/78 | 220 |
| -- | SKAE2405T-0.5A | 24 (6.5-28V) | 5 | 500 | 79/84 | 220 |

Note: * The number 5 on the surface of the product corresponds to the product model SKAE2405T-0.5A, the number 3 corresponds to the product model SKAE2403T-0.5A.

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---------------------------|------------------------|---|------|------|------|
| Input Current (no-load) | Nominal input voltage | -- | 5 | -- | mA |
| Start-up Voltage | | 6.5 | -- | -- | VDC |
| Reverse Polarity at Input | | Avoid / Not protected | | | |
| Hot Plug | | Unavailable | | | |
| Input Filter | | Capacitance filter | | | |
| EN | Module on | EN pin pulled high(TTL 4.5VDC-Vin) | | | |
| | Module off | EN pin open or pulled low to GND(0-0.5 VDC) | | | |
| | Input current when off | -- | 0.24 | -- | mA |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|---|-----------------------------------|-------|------|-------|
| Voltage Accuracy | Full load, input voltage range | -- | ±2 | ±4 | % |
| Linear Regulation | Full load, input voltage range | -- | ±0.6 | -- | |
| Load Regulation | Nominal input voltage, 10% -100% load | -- | ±0.3 | -- | |
| Ripple & Noise* | 20MHz bandwidth, nominal input voltage, full load | -- | 55 | 100 | mVp-p |
| Temperature Coefficient | Operating temperature -40°C to +85°C | -- | ±0.02 | -- | %/°C |
| Transient Response Deviation | Nominal input voltage, 25% load step change | -- | ±5 | -- | % |
| Transient Recovery Time | | -- | 0.5 | -- | ms |
| Short-circuit Protection | | Hiccup, continuous, self-recovery | | | |

Note: * The "Tip and barrel" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|----------------------------------|----------------------------------|--|------|------|---------|
| Operating Temperature | See Fig. 1 | -40 | -- | 85 | °C |
| Storage Temperature | | -55 | -- | 125 | |
| Storage Humidity | Non-condensing | 5 | -- | 95 | %RH |
| Reflow Soldering Temperature* | | Peak temperature $\leq 245^{\circ}\text{C}$, duration $\leq 60\text{s}$ max. over 217°C . Also refer to IPC/JEDEC J-STD-020D.1. | | | |
| Switching Frequency | Full load, nominal input voltage | -- | 1.1 | -- | MHz |
| MTBF | MIL-HDBK-217F@25°C | 2000 | -- | -- | k hours |
| Operating altitude | | -- | -- | 2000 | m |
| Moisture Sensitivity Level (MSL) | IPC/JEDEC J-STD-020D.1 | Level 3 | | | |
| Pollution Degree | | PD 3 | | | |

Note: * For actual application, please refer to IPC/JEDEC J-STD-020D.1.

Mechanical Specifications

| | |
|----------------|-----------------------|
| Dimensions | 4.00 x 3.00 x 2.68 mm |
| Weight | 0.08 g(Typ.) |
| Cooling Method | Free air convection |

Electromagnetic Compatibility (EMC)

| | | | |
|-----------|----|-----------------|--|
| Emissions | CE | CISPR32/EN55032 | CLASS B (see Fig. 3 for recommended circuit) |
| | RE | CISPR32/EN55032 | CLASS A (see Fig. 3 for recommended circuit) |

Typical Characteristic Curves

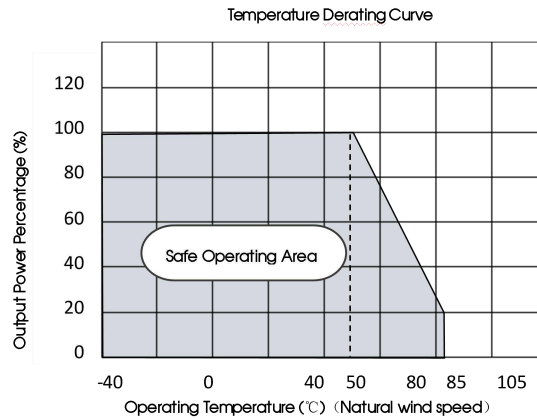
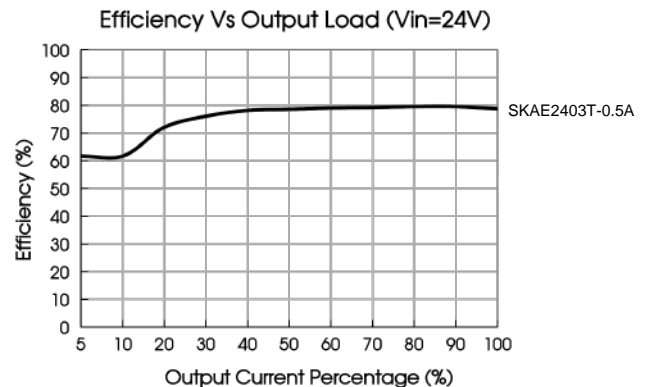
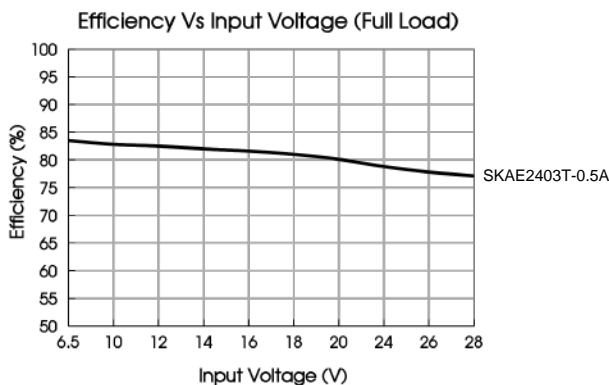
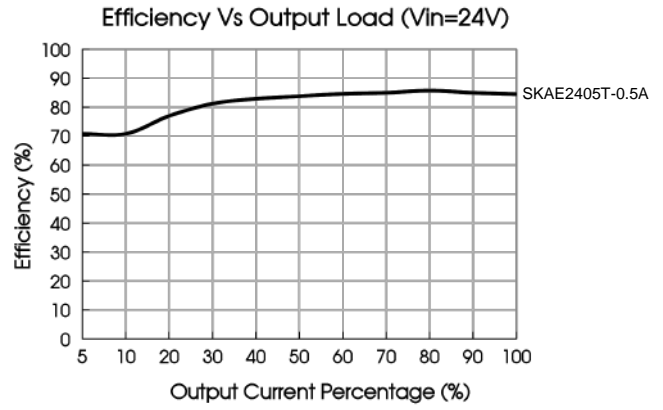
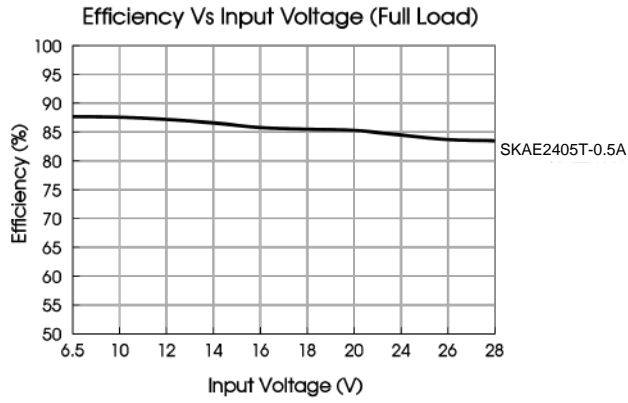


Fig. 1





Design Reference

1. Typical application

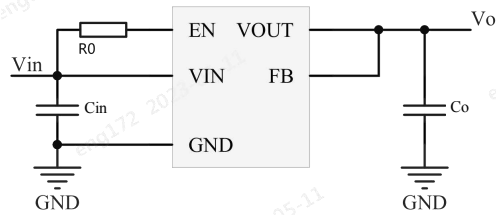


Fig. 2 Typical application circuit

Table 1

| Cin | Co | R0 |
|----------|----------|-------|
| 10uF/50V | 10uF/25V | 100kΩ |

Notes:

1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module, use ceramic capacitor;
2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. Converter cannot be used for hot swap and with output in parallel.

2. EMC compliance circuit

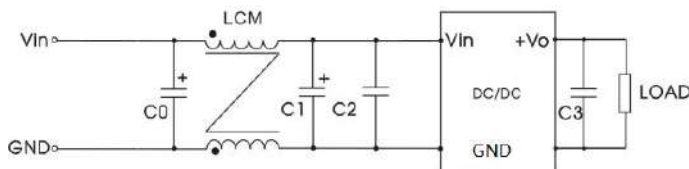
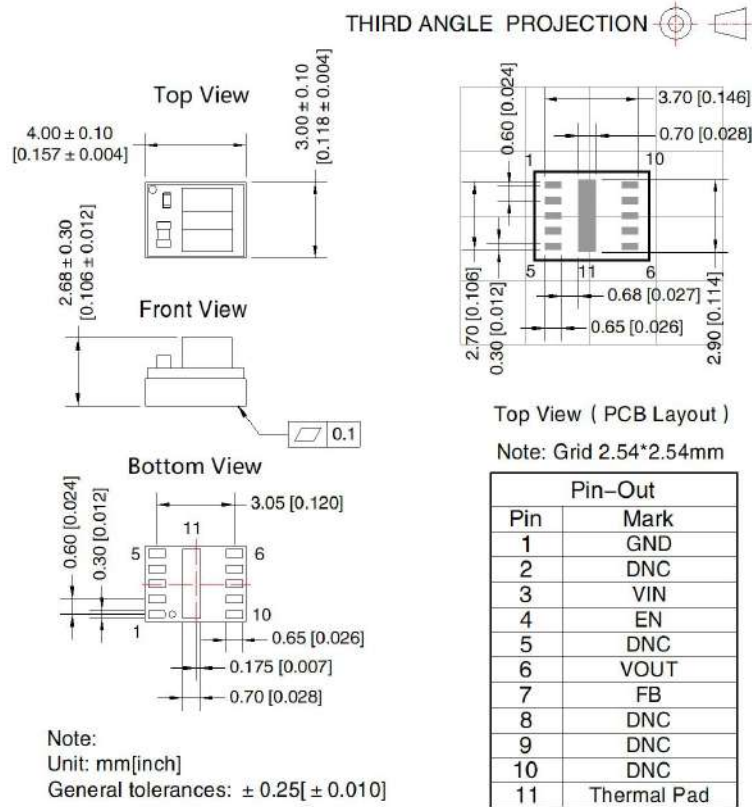


Fig 3

Parameter explanation:

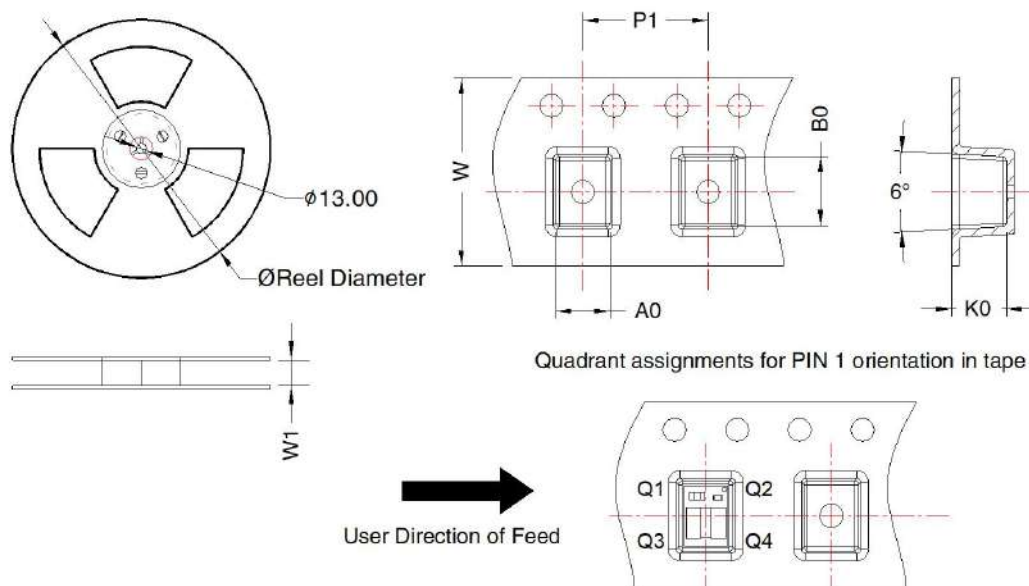
| Symbol | Specifications |
|--------|----------------|
| C0 | 100μF/50V |
| LCM | 9uH |
| C1 | 100μF/50V |
| C2 | 10μF/50V |
| C3 | 10μF/25V |

Dimensions and Recommended Layout



- Notes:
1. DNC: Do Not Connect. Leave open.
 2. Thermal Pad: This terminal is internally connected to GND and provides a wide thermal connection from the IC to the PCB. Connect this pin to PCB power ground.
 3. FB: Refer to Typical application.

Tape/Reel packaging



| Device | MPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|-----|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SKAE24xxT-0.5A | 600 | 180.0 | 12.5 | 3.48 | 4.41 | 3.5 | 8.0 | 12.0 | Q2 |

Notes:

1. The maximum capacitive load offered were tested at nominal input voltage and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.