

LED Stabilization CRD (Current Regulative Diode)

CURRENT REGULATIVE DIODE

CRD

Current regulative diodes (below: "CRD") are diodes that, as the name implies, keep the value of electrical currents steady even if the voltage changes. For a wide range of voltage values from 1V up to 100V our CRDs can steady a current at a fixed value. With SEMITEC's CRDs voltage changes, load resistance changes and ripple voltage effects don't change the fixed current value. Normally, creating a current stabilizing circuit is complicated and requires complicated parts. With SEMITEC CRDs you only need one simple part for the same result.

Applications

- LED luminance / rated current stabilization
- LED streetlights, fluorescent lamps, light bulbs, downlights
- Voltage stabilization circuits that deliver stabilized currents to Zener diodes
- Current stabilization for close proximity and other sensors
- Battery charge / discharge circuits
- Electrolytic condenser aging equipment
- Current stabilized measurement devices for semiconductors
- Telecommunication circuit interfaces
- Earth leakage breakers
- Current supply to piezoelectric actuators
- Stabilized power circuits

Part number

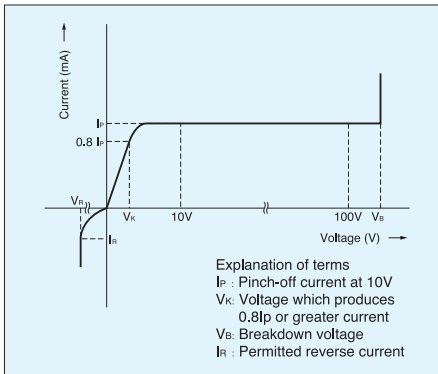
| | |
|------------|--|
| 102 | |
|------------|--|

Packing method
 None: Loose parts in plastic bag
 26Z : 26mm (width) axial taping; Z folding
 26R : 26mm (width) axial taping; reel
 52Z : 52mm (width) axial taping; Z folding
 RE : Radial taping; Z folding
 T : S series; reel taping

Pinch-off current
 e.g.: 301⇒30×10¹μA=0.3mA
 102⇒10×10²μA=1.0mA
 452⇒45×10²μA=4.5mA

E : Lead wire type
 S : SMD type

Basic characteristics

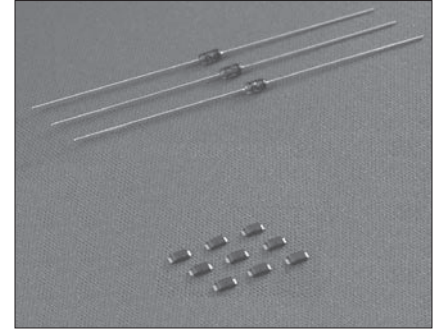
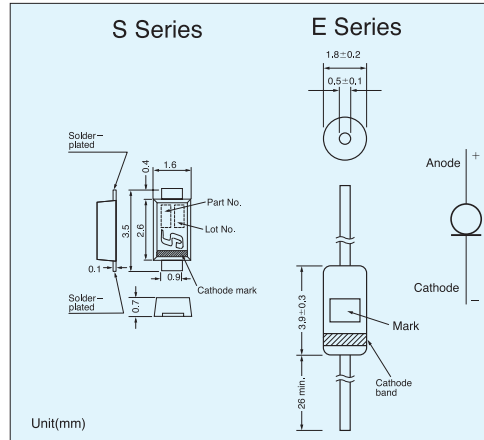


Ratings

| | E series | S series |
|----------------------------|--------------------|----------------------|
| Rating power | 300mW | 500mW |
| Rated voltage (Pulse wave) | 100V (E-101~E-562) | 100V (S-101T~S-562T) |
| Reverse current | 50V (E-822~E-183) | 50V (S-822T~S-183T) |
| Junction temp | 150°C | |
| Operating temp | -30°C~150°C | -40°C~150°C |

Maximum rating voltage

| Part No. | Voltage | Part No. | Voltage |
|------------|---------|---------------|---------|
| E101~E-562 | 100V | S-101T~S-562T | 100V |
| E-822 | 30 | S-822T | 50 |
| E-103 | | S-103T | |
| E-123 | | S-123T | |
| E-153 | 25 | S-153T | 40 |
| E-183 | | S-183T | |



Specifications

| Part No. | | Pinch-off current*1 | | Limiting current**2 | | Limiting current ratio I100V/Ip*I30V/Ip | Temperature*3 Coefficient (%/°C) |
|----------|-----------|---------------------|------------------------|---------------------|--------|---|----------------------------------|
| SMD | With Lead | Test Voltage | Ip(mA) Typical min~max | Vk(V) | Ik(mA) | | |
| S-101T | E-101 | 10V | 0.10 | 0.05~0.21 | 0.5 | 0.8 Ipmin | +2.10~+0.10 |
| S-301T | E-301 | | 0.30 | 0.20~0.42 | 0.8 | | +0.40~+0.20 |
| S-501T | E-501 | | 0.50 | 0.40~0.63 | 1.1 | | +0.15~+0.25 |
| S-701T | E-701 | | 0.70 | 0.60~0.92 | 1.4 | | 0.00~+0.32 |
| S-102T | E-102 | | 1.00 | 0.88~1.32 | 1.7 | | -0.10~-0.37 |
| S-152T | E-152 | | 1.50 | 1.28~1.72 | 2.0 | | -0.13~-0.40 |
| S-202T | E-202 | | 2.00 | 1.68~2.32 | 2.3 | | -0.15~-0.42 |
| S-272T | E-272 | | 2.70 | 2.28~3.10 | 2.7 | | -0.18~-0.45 |
| S-352T | E-352 | | 3.50 | 3.00~4.10 | 3.2 | | -0.20~-0.47 |
| S-452T | E-452 | | 4.50 | 3.90~5.10 | 3.7 | | -0.22~-0.50 |
| S-562T | E-562 | | 5.60 | 5.00~6.50 | 4.5 | | -0.25~-0.53 |
| S-822T | E-822 | | 8.20 | 6.56~9.84 | 3.1 | | -0.25~-0.45 |
| S-103T | E-103 | | 10.0 | 8.00~12.0 | 3.5 | | -0.25~-0.45 |
| S-123T | E-123 | | 12.0 | 9.60~14.4 | 3.8 | | -0.25~-0.45 |
| S-153T | E-153 | | 15.0 | 12.0~18.0 | 4.3 | | -0.25~-0.45 |
| S-183T | E-183 | | 18.0 | 16.0~20.0 | 4.6 | | -0.25~-0.45 |

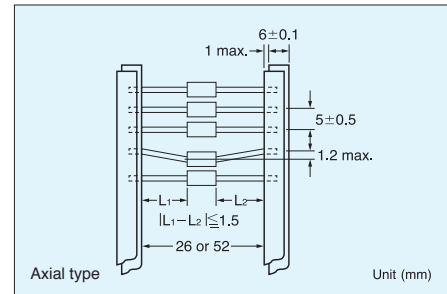
*1,2 Pinch-off current, limiting current are measured by impulse wave at 25°C

*3 Temperature coefficient is measured between 25°C and 50°C.

*Ip/Ip

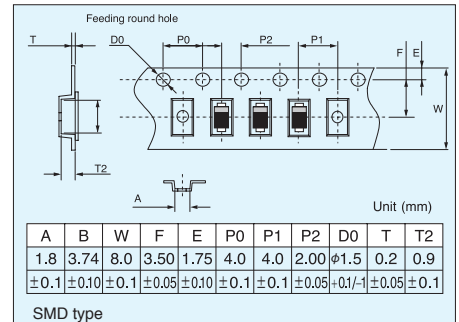
Taping

SEMITEC offers two different taping types.



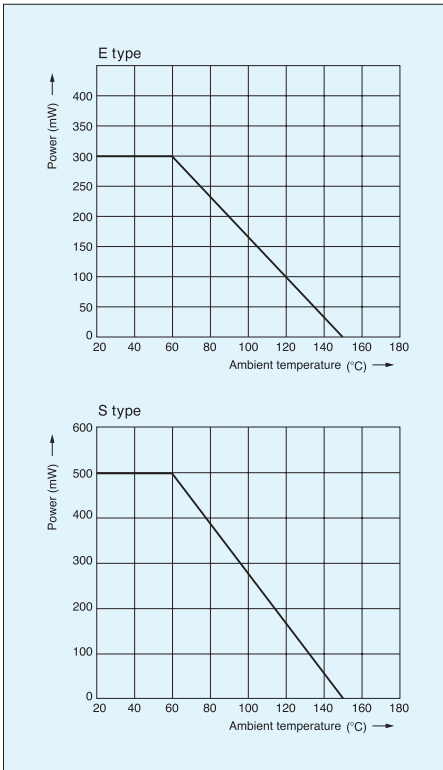
Minimum taping quantity for

- Axial type Reel.....5000pcs
- Box.....2500pcs
- SMD type 3000pcs

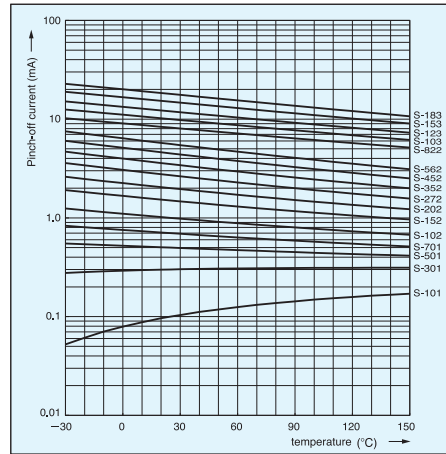


In general elements are set with the cathode side on the round hole side.

Power derating



Pinch-off current Temperature

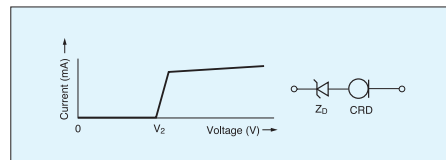


CRD in parallel formation

The use of CRD in parallel formation increases their current handling capabilities.

Increasing the voltage range using a zener diode

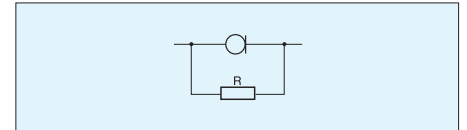
Connecting zener diodes in series ensures that the current is constant for high-voltage values.



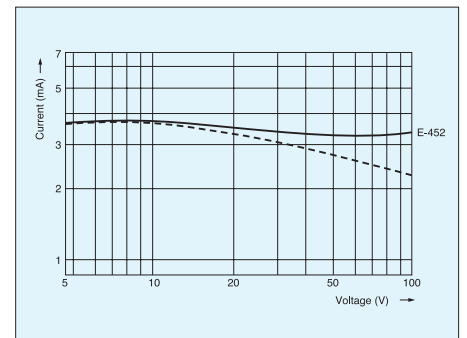
Compensating current reduction due to heat up of the CRD

Placing resistors in parallel with CRDs can correct current decreases for increased voltages. The following values are typical for correction resistors.

| | | | |
|-------|-------|-------|------|
| E-102 | 1MΩ | E-352 | 82kΩ |
| E-152 | 390kΩ | E-452 | 56kΩ |
| E-202 | 240kΩ | E-562 | 39kΩ |
| E-272 | 120kΩ | | |



Compensation resistors are not necessary if the current value is less than 1 mA.



Dynamic characteristics (saturation characteristics)

