

# CRD

CRD is used for current stabilization and current limiting.

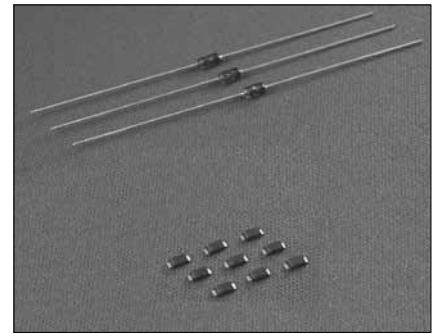
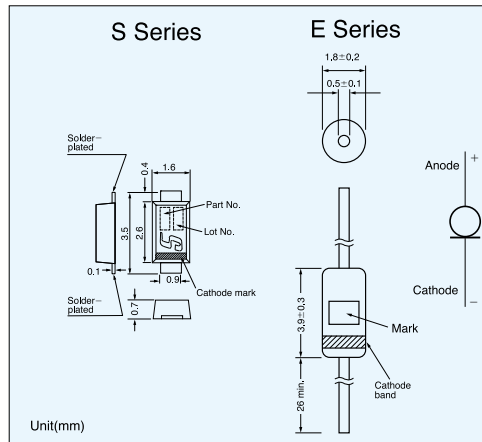
102

- E : Lead wire type
- S : SMD type

Graph of Current (mA) vs Voltage (V) for an n-channel JFET. The curve shows the relationship between gate-source voltage and drain current. Key points marked include  $V_P$  (Pinch-off voltage),  $V_K$  (Voltage which produces  $0.8I_P$  or greater current), and  $V_B$  (Breakdown voltage). The current levels  $I_P$  (Pinch-off current at 10V),  $0.8I_P$ , and  $I_R$  (Permitted reverse current) are also indicated.

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

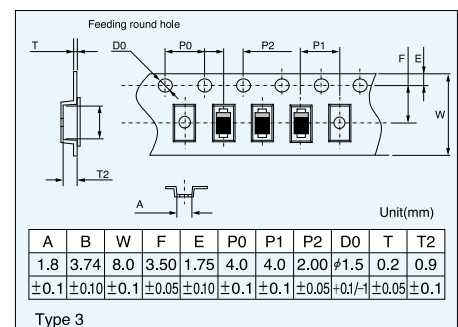
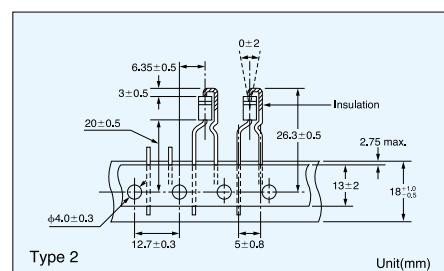
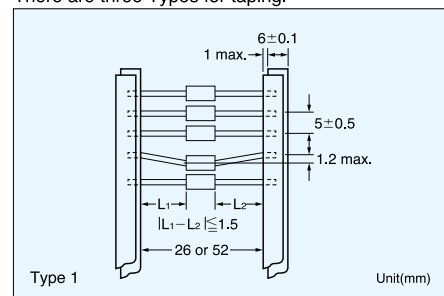
| Part No.   | Voltage | Part No.      | Voltage |
|------------|---------|---------------|---------|
| E101~E-562 | 100V    | S-101T~S-562T | 100V    |
| E-822      | 30      | S-822T        | 50      |
| E-103      |         | S-103T        |         |
| E-123      |         | S-123T        |     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



| Part No. |           | Pinch-off current* <sup>1</sup> |                                |           | Limiting current* <sup>2</sup> |                       | Limiting current ratio<br>I <sub>100V</sub> /I <sub>p</sub> * I <sub>30V</sub> /I <sub>p</sub> | Temperature* <sup>3</sup><br>Coefficient<br>(%/°C) |
|----------|-----------|---------------------------------|--------------------------------|-----------|--------------------------------|-----------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------|
| SMD      | With Lead | Test Voltage                    | I <sub>p</sub> (mA)<br>Typical | min~max   | V <sub>k</sub> (V)             | I <sub>k</sub> (mA)   |                                                                                                |                                                    |
| S-101T   | E-101     | 10V                             | 0.10                           | 0.05~0.21 | 0.5                            | 0.8 I <sub>pmin</sub> | 1.1max                                                                                         | +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                            |                       | *1.0max                                                                                        | -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                                                                                    |                                                    |

\*130/lp

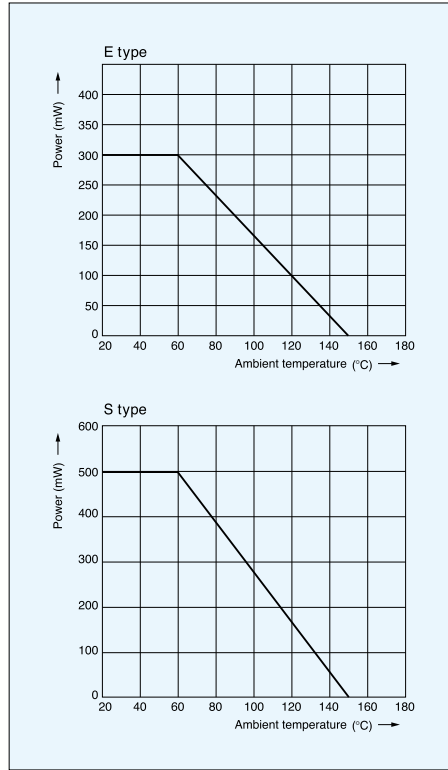
There are three Types for taping.



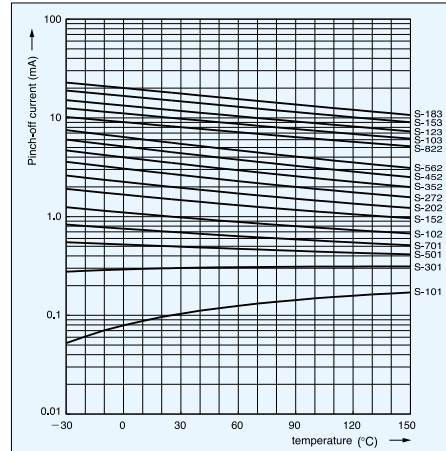
### Minimum taping quantity for

|        |         |
|--------|---------|
| Type 2 | 4000pcs |
| Type 3 | 3000pcs |

## Power derating



## Pinch-off current Temperature

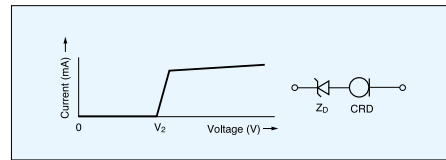


## CRD in parallel

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

## Increasing the voltage range using a zener diode

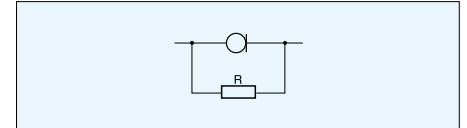
Connecting zener diodes in series with the line ensures that the current is constant in high-voltage area.



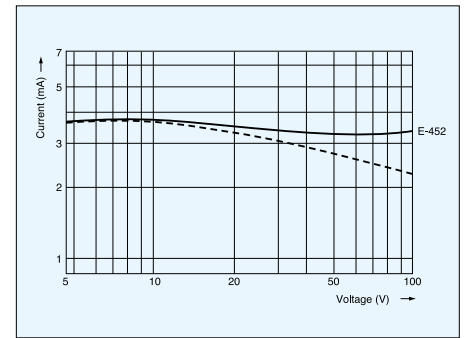
## The compensation of current reduction due to self heating

Placing resistors in parallel with CRD can correct any current decrease when the applied voltage increases. The following values are typical for correction resistors.

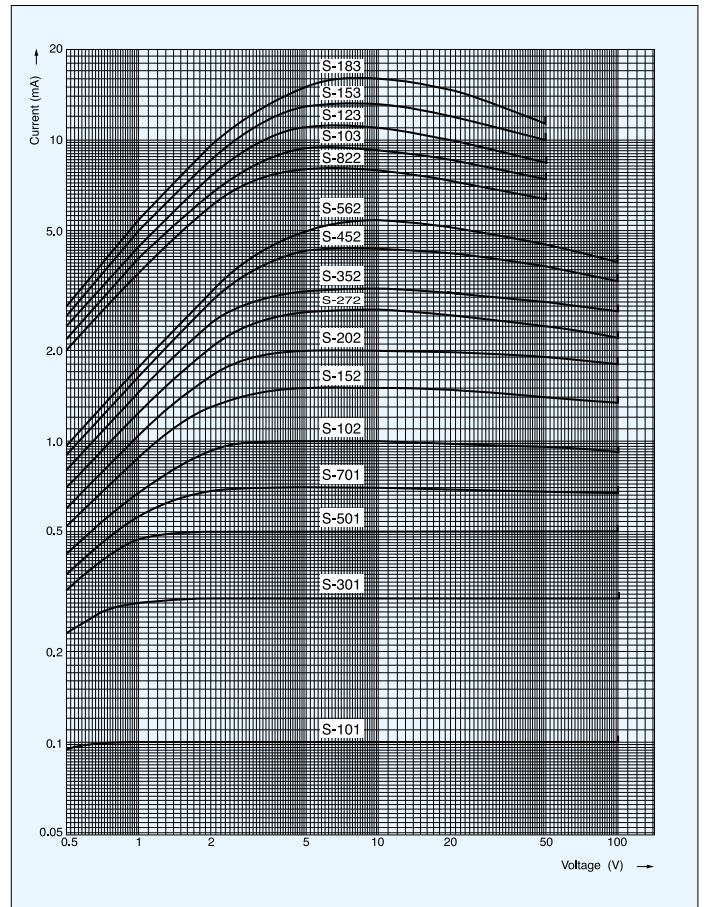
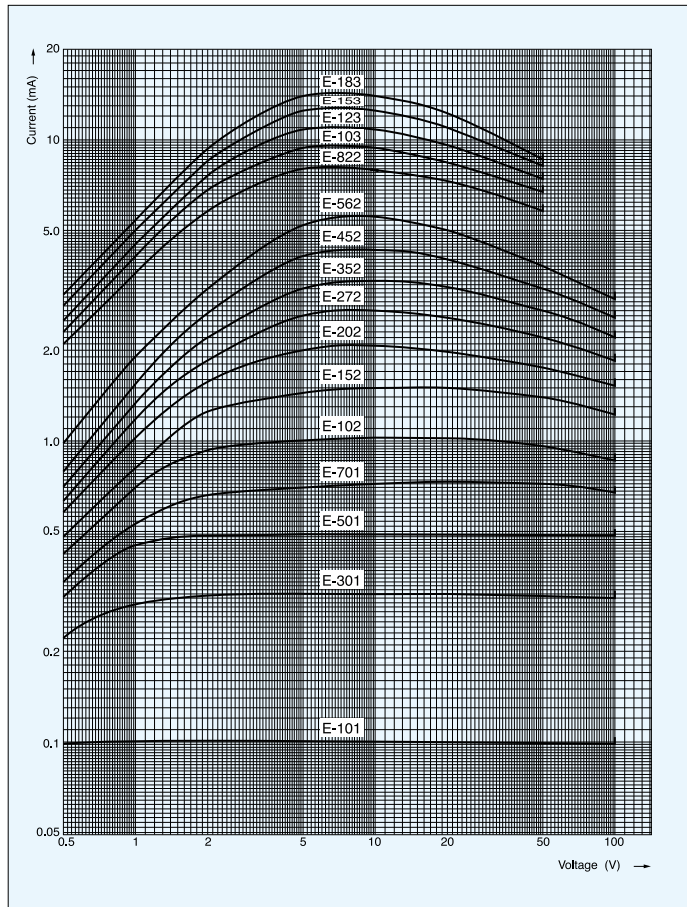
|       |               |       |              |
|-------|---------------|-------|--------------|
| E-102 | 1M $\Omega$   | E-352 | 82k $\Omega$ |
| E-152 | 390k $\Omega$ | E-452 | 56k $\Omega$ |
| E-202 | 240k $\Omega$ | E-562 | 39k $\Omega$ |
| E-272 | 120k $\Omega$ |       |              |



Compensative resistor is not necessary if the current value is less than 1 mA.



## Dynamic characteristics (saturation characteristics)



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[S-101T](#) [S-102T](#) [S-103T](#) [S-123T](#) [S-152T](#) [S-153T](#) [S-183T](#) [S-202T](#) [S-272T](#) [S-301T](#) [S-352T](#) [S-452T](#) [S-501T](#) [S-562T](#) [S-701T](#) [S-822T](#)