

# Current Regulator Diode



## CA500 Series / SST500 Series

### FEATURES

- Simple Two Lead Current Sources
- 1 to 100 Volt Operation
- Zero Temperature Coefficient
- Simplifies Floating Current Sources
- No Power Supplies Required

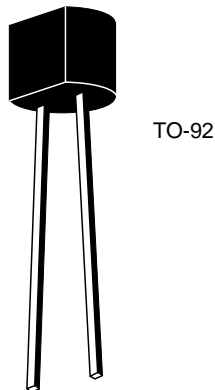
### GENERAL DESCRIPTION

Calogic's current regulator diode is available in plastic TO-92 and surface mount SOT-23. The devices are selected for narrow current ranges and are excellent choices for test instrumentation and medical applications. With nominal current ranges from 0.24mA to 4.7mA, all in 20% bands. The devices allow the designer a cost effective method of providing a current regulator with no power supply requirements and lower part count. The lower current devices operate at 1 volt.

### ORDERING INFORMATION

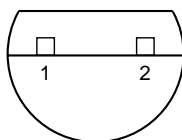
| Part No. | Package | Part No. | Package | I <sub>F</sub> (mA) |
|----------|---------|----------|---------|---------------------|
| CA500    | TO-92   | SST500   | SOT-23  | 0.24                |
| CA501    | TO-92   | SST501   | SOT-23  | 0.33                |
| CA502    | TO-92   | SST502   | SOT-23  | 0.43                |
| CA503    | TO-92   | SST503   | SOT-23  | 0.56                |
| CA504    | TO-92   | SST504   | SOT-23  | 0.75                |
| CA505    | TO-92   | SST505   | SOT-23  | 1.00                |
| CA506    | TO-92   | SST506   | SOT-23  | 1.40                |
| CA507    | TO-92   | SST507   | SOT-23  | 1.80                |
| CA508    | TO-92   | SST508   | SOT-23  | 2.40                |
| CA509    | TO-92   | SST509   | SOT-23  | 3.00                |
| CA510    | TO-92   | SST510   | SOT-23  | 3.60                |
| CA511    | TO-92   | SST511   | SOT-23  | 4.70                |

### PIN CONFIGURATION



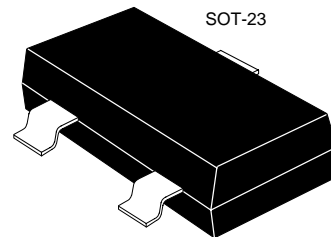
TO-92

#### BOTTOM VIEW



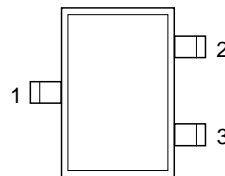
1 ANODE  
2 CATHODE

5010



SOT-23

#### TOP VIEW



3 ANODE  
2 CATHODE

Externally connect  
pin 1 to pin2.

#### PRODUCT MARKING (SOT-23)

|        |     |
|--------|-----|
| SST500 | 500 |
| SST501 | 501 |
| SST502 | 502 |
| SST503 | 503 |
| SST504 | 504 |
| SST505 | 505 |
| SST506 | 506 |
| SST507 | 507 |
| SST508 | 508 |
| SST509 | 509 |
| SST510 | 510 |
| SST511 | 511 |

**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| PARAMETERS/TEST CONDITIONS     | SYMBOL    | LIMIT      | UNITS                |
|--------------------------------|-----------|------------|----------------------|
| Peak Operating Voltage         | $P_{OV}$  | 50         | V                    |
| Forward Current                | $I_F$     | 20         | mA                   |
| Reverse Current                | $I_R$     | 50         |                      |
| Power Dissipation              | $P_D$     | 360        | mW                   |
| Power Derating                 |           | 3.27       | mW/ $^\circ\text{C}$ |
| Operating Junction Temperature | $T_J$     | -55 to 150 | $^\circ\text{C}$     |
| Storage Temperature            | $T_{stg}$ | -55 to 200 |                      |

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| SYMBOL          | $I_F$                       |       |       | $Z_d$                       |      | $Z_k$             | $V_L$                           |     | $P_{OV}$                        |     | $C_F$                                   | $\theta_1$  |
|-----------------|-----------------------------|-------|-------|-----------------------------|------|-------------------|---------------------------------|-----|---------------------------------|-----|---|---|
| PARAMETER       | REGULATOR CURRENT           |       |       | DYNAMIC IMPEDANCE           |      | KNEE IMPEDANCE    | LIMITING VOLTAGE                |     | PEAK OPERATING VOLTAGE          |     | CAPACITANCE                             | TEMPERATURE COEFFICIENT (TYPICALS)                                      |
| TEST CONDITIONS | $V_F = 25\text{V}$ (Note 1) |       |       | $V_F = 25\text{V}$ (Note 2) |      | $V_F = 6\text{V}$ | $I_F = 0.8 I_{F(MIN)}$ (Note 3) |     | $I_F = 1.1 I_{F(MAX)}$ (Note 4) |     | $V_F = 25\text{V}$<br>$f = 1\text{MHz}$ | $V_F = 25\text{V}$<br>$0^\circ\text{C} \leq T_A \leq 100^\circ\text{C}$ |
| UNITS           | mA                          |       |       | $M\Omega$                   |      | $M\Omega$         | V                               |     | V                               |     | $\mu\text{F}$                           | $\text{ppm}/^\circ\text{C}$   |
|                 | NOM                         | MIN   | MAX   | MIN                         | TYP  | TYP               | MAX                             | TYP | MIN                             | TYP | TYP                                     | TYP   |
| 500             | 0.24                        | 0.192 | 0.288 | 4.00                        | 40.0 | 2.50              | 1.20                            | 0.4 | 50                              | 100 | 2.2                                     | 1300  |
| 501             | 0.33                        | 0.264 | 0.396 | 2.20                        | 25.0 | 1.60              | 1.30                            | 0.5 | 50                              | 100 | 2.2                                     | 600   |
| 502             | 0.43                        | 0.344 | 0.516 | 1.50                        | 15.0 | 1.10              | 1.50                            | 0.6 | 50                              | 100 | 2.2                                     | 0   |
| 503             | 0.56                        | 0.448 | 0.672 | 1.20                        | 12.0 | 0.80              | 1.70                            | 0.7 | 50                              | 100 | 2.2                                     | -400  |
| 504             | 0.75                        | 0.600 | 0.900 | 0.80                        | 7.0  | 0.55              | 1.90                            | 0.8 | 50                              | 100 | 2.2                                     | -1000   |
| 505             | 1.00                        | 0.800 | 1.200 | 0.50                        | 5.0  | 0.40              | 2.10                            | 0.9 | 50                              | 100 | 2.2                                     | -1300   |
| 506             | 1.40                        | 1.120 | 1.680 | 0.33                        | 3.0  | 0.25              | 2.50                            | 1.1 | 50                              | 100 | 2.2                                     | -1900   |
| 507             | 1.80                        | 1.440 | 2.160 | 0.20                        | 2.0  | 0.19              | 2.80                            | 1.3 | 50                              | 100 | 2.2                                     | -2200   |
| 508             | 2.40                        | 1.900 | 2.900 | 0.20                        | 1.5  | 0.13              | 3.10                            | 1.5 | 50                              | 100 | 2.2                                     | -2600   |
| 509             | 3.00                        | 2.400 | 3.600 | 0.15                        | 1.0  | 0.09              | 3.50                            | 1.7 | 50                              | 100 | 2.2                                     | -2800   |
| 510             | 3.60                        | 2.900 | 4.300 | 0.15                        | 0.8  | 0.07              | 3.90                            | 1.9 | 50                              | 100 | 2.2                                     | -3000   |
| 511             | 4.70                        | 3.800 | 5.600 | 0.12                        | 0.6  | 0.05              | 4.20                            | 2.1 | 50                              | 100 | 2.2                                     | -3000   |

- Notes: 1. Pulse test - steady state currents may vary.  
 2. Pulse test - steady state impedances may vary.  
 3. Min  $V_F$  required to insure  $I_F > 0.8 I_{F(MIN)}$ .  
 4. Max  $V_F$  where  $I_F > 1.1 I_{F(MAX)}$  is guaranteed.