

## 830 series

### Silicon 25V hyperabrupt varactor diodes

ZC829, ZDC833, ZMV829, ZMDC830 and ZV831

#### Description

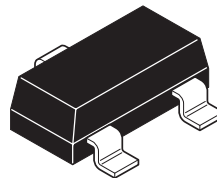
A range of silicon varactor diodes for use in frequency control and filtering. Featuring closely controlled CV characteristics and high Q. Low reverse current ensures very low phase noise performance. Available in single or dual common cathode format in a wide range of miniature surface mount packages.

#### Features

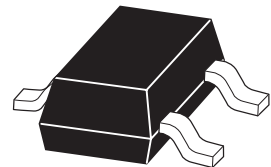
- Close tolerance CV characteristics
- High tuning ratio
- Low  $I_R$  (typically 200pA)
- Excellent phase noise performance
- High Q
- Range of miniature surface mount packages

#### Applications

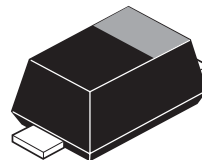
- VCXO and TCXO
- Wireless communications
- Pagers
- Mobile radio



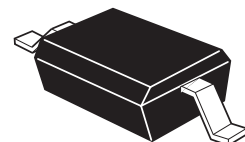
SOT23



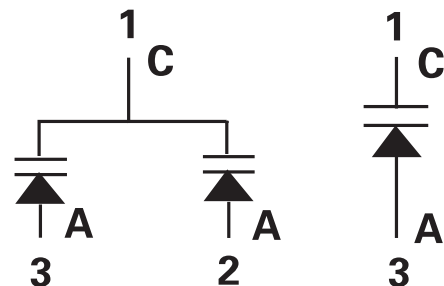
SOT323



SOD523



SOD323

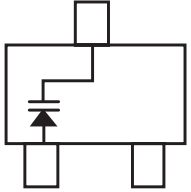
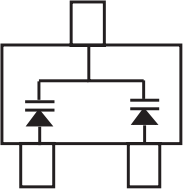
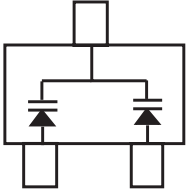


Where steeper CV slopes are required there is the 12V hyperabrupt range:

ZC930, ZMV930, ZV930 and ZV931

# 830 series

## Order codes and device marking

| SOT23                                                                             |      | SOD323                                                                            |      | SOD523                                                                            |      | SOT23                                                                              |      | SOT323                                                                              |      |
|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|
|  |      |  |      |  |      |  |      |  |      |
| Order code                                                                        | Mark | Order code                                                                        | Mark | Order code                                                                        | Mark | Order code                                                                         | Mark | Order code                                                                          | Mark |
| ZC829ATA                                                                          | J9A  | ZMV829ATA                                                                         | AA   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC829BTA                                                                          | J9B  | ZMV829BTA                                                                         | CA   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC830ATA                                                                          | J1A  | ZMV830ATA                                                                         | AB   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC830BTA                                                                          | J1B  | ZMV830BTA                                                                         | CB   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC831ATA                                                                          | J3A  | ZMV831ATA                                                                         | AC   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC831BTA                                                                          | J3B  | ZMV831BTA                                                                         | CC   | ZV831BV2TA                                                                        | 81   |                                                                                    |      | ZMDC831BTA                                                                          | CC   |
| ZC832ATA                                                                          | J4A  | ZMV832ATA                                                                         | AD   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC832BTA                                                                          | J4B  | ZMV832BTA                                                                         | CD   | ZV832BV2TA                                                                        | 82   |                                                                                    |      | ZMDC832BTA                                                                          | CD   |
| ZC833ATA                                                                          | J2A  | ZMV833ATA                                                                         | AE   |                                                                                   |      | ZDC833ATA                                                                          | C2A  |                                                                                     |      |
| ZC833BTA                                                                          | J2B  | ZMV833BTA                                                                         | CE   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC834ATA                                                                          | J5A  | ZMV834ATA                                                                         | AF   |                                                                                   |      | ZDC834ATA                                                                          | C5A  |                                                                                     |      |
| ZC834BTA                                                                          | J5B  | ZMV834BTA                                                                         | CF   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC835ATA                                                                          | J6A  | ZMV835ATA                                                                         | AG   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC835BTA                                                                          | J6B  | ZMV835BTA                                                                         | CG   |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC836ATA                                                                          | J7A  |                                                                                   |      |                                                                                   |      |                                                                                    |      |                                                                                     |      |
| ZC836BTA                                                                          | J7B  |                                                                                   |      |                                                                                   |      |                                                                                    |      |                                                                                     |      |

### Note:

The order codes are shown as TA which is for 7 inch reels. For 13 inch reels substitute TC in place of TA in the order code.

## Tape and reel information

| Reel code | Reel size (inches) | Tape width (millimeters) | Quantity per reel |
|-----------|--------------------|--------------------------|-------------------|
| TA        | 7                  | 8                        | 3,000             |
| TC        | 13                 | 8                        | 10,000            |

## 830 series

### Tuning characteristics at $T_{amb} = 25^{\circ}\text{C}$

| Part | Capacitance (pF)<br>$V_R=2\text{V}$ , $f=1\text{MHz}$ |       |       | Min Q<br>$V_R = 3\text{V}$<br>$f = 50\text{MHz}$ | Capacitance ratio<br>$C_2 / C_{20}$<br>@ $f = 1\text{MHz}$ |      |
|------|-------------------------------------------------------|-------|-------|--------------------------------------------------|------------------------------------------------------------|------|
|      | Min.                                                  | Nom.  | Max.  |                                                  | Min.                                                       | Max. |
| 829A | 7.38                                                  | 8.2   | 9.02  | 250                                              | 4.3                                                        | 5.8  |
| 829B | 7.79                                                  | 8.2   | 8.61  | 250                                              | 4.3                                                        | 5.8  |
| 830A | 9.0                                                   | 10.0  | 11.0  | 300                                              | 4.5                                                        | 6.0  |
| 830B | 9.5                                                   | 10.0  | 10.5  | 300                                              | 4.5                                                        | 6.0  |
| 831A | 13.5                                                  | 15.0  | 16.5  | 300                                              | 4.5                                                        | 6.0  |
| 831B | 14.25                                                 | 15.0  | 15.75 | 300                                              | 4.5                                                        | 6.0  |
| 832A | 19.8                                                  | 22.0  | 24.2  | 200                                              | 5.0                                                        | 6.5  |
| 832B | 20.9                                                  | 22.0  | 23.1  | 200                                              | 5.0                                                        | 6.5  |
| 833A | 29.7                                                  | 33.0  | 36.3  | 200                                              | 5.0                                                        | 6.5  |
| 833B | 31.35                                                 | 33.0  | 34.65 | 200                                              | 5.0                                                        | 6.5  |
| 834A | 42.3                                                  | 47.0  | 51.7  | 200                                              | 5.0                                                        | 6.5  |
| 834B | 44.65                                                 | 47.0  | 49.35 | 200                                              | 5.0                                                        | 6.5  |
| 835A | 61.2                                                  | 68.0  | 74.8  | 100                                              | 5.0                                                        | 6.5  |
| 835B | 64.6                                                  | 68.0  | 71.4  | 100                                              | 5.0                                                        | 6.5  |
| 836A | 90.0                                                  | 100.0 | 110.0 | 100                                              | 5.0                                                        | 6.5  |
| 836B | 95.0                                                  | 100.0 | 105.0 | 100                                              | 5.0                                                        | 6.5  |

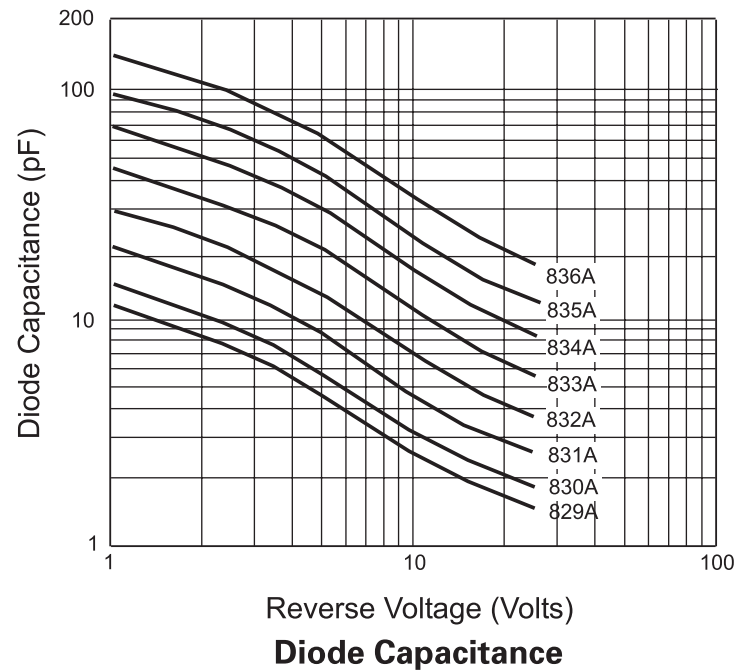
### Absolute maximum ratings

| Parameter                                                  | Symbol    | Max.        | Unit               |
|------------------------------------------------------------|-----------|-------------|--------------------|
| Forward current                                            | $I_F$     | 200         | mA                 |
| Power dissipation at $T_{amb} = 25^{\circ}\text{C}$ SOT23  | $P_{tot}$ | 330         | mW                 |
| Power dissipation at $T_{amb} = 25^{\circ}\text{C}$ SOD323 | $P_{tot}$ | 330         | mW                 |
| Power dissipation at $T_{amb} = 25^{\circ}\text{C}$ SOD523 | $P_{tot}$ | 250         | mW                 |
| Operating and storage temperature range                    |           | -55 to +150 | $^{\circ}\text{C}$ |

### Electrical characteristics at $T_{amb} = 25^{\circ}\text{C}$

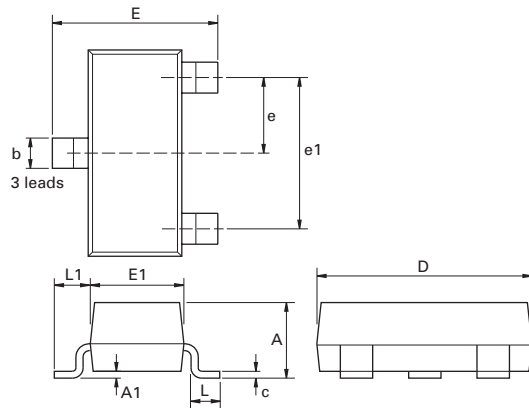
| Parameter                              | Conditions                            | Min. | Typ. | Max. | Unit                     |
|----------------------------------------|---------------------------------------|------|------|------|--------------------------|
| Reverse breakdown voltage              | $I_R = 10\mu\text{A}$                 | 25   |      |      | V                        |
| Reverse voltage leakage                | $V_R = 20\text{V}$                    |      | 0.2  | 20   | nA                       |
| Temperature coefficient of capacitance | $V_R = 3\text{V}$ , $f = 1\text{MHz}$ |      | 300  | 400  | ppCm/ $^{\circ}\text{C}$ |

Typical characteristics



# 830 series

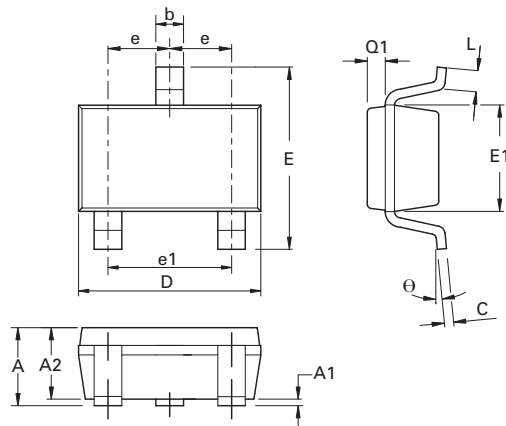
## Package outline - SOT23



| Dim. | Millimeters |      | Inches    |        | Dim. | Millimeters |      | Inches     |        |
|------|-------------|------|-----------|--------|------|-------------|------|------------|--------|
|      | Min.        | Max. | Min.      | Max.   |      | Min.        | Max. | Max.       | Max.   |
| A    | 2.67        | 3.05 | 0.105     | 0.120  | H    | 0.33        | 0.51 | 0.013      | 0.020  |
| B    | 1.20        | 1.40 | 0.047     | 0.055  | K    | 0.01        | 0.10 | 0.0004     | 0.004  |
| C    | -           | 1.10 | -         | 0.043  | L    | 2.10        | 2.50 | 0.083      | 0.0985 |
| D    | 0.37        | 0.53 | 0.015     | 0.021  | M    | 0.45        | 0.64 | 0.018      | 0.025  |
| F    | 0.085       | 0.15 | 0.0034    | 0.0059 | N    | 0.95 NOM    |      | 0.0375 NOM |        |
| G    | 1.90 NOM    |      | 0.075 NOM |        | -    | -           | -    | -          | -      |

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

## Package outline - SOT323

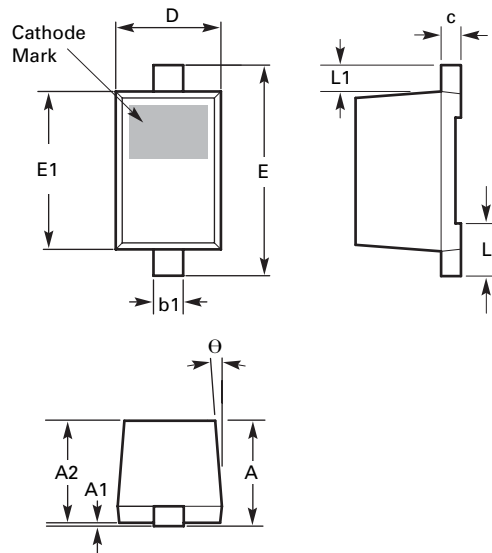


| Dim. | Millimeters |      | Inches |        | Dim. | Millimeters |      | Inches     |        |
|------|-------------|------|--------|--------|------|-------------|------|------------|--------|
|      | Min.        | Max. | Min.   | Max.   |      | Min.        | Max. | Max.       | Max.   |
| A    | 0.80        | 1.10 | 0.0315 | 0.0433 | E1   | 1.15        | 1.35 | 0.0453     | 0.0532 |
| A1   | 0           | 0.10 | 0      | 0.0039 | e    | 0.65 BSC    |      | 0.0256 BSC |        |
| A2   | 0.80        | 1.00 | 0.0315 | 0.394  | e1   | 1.30 BSC    |      | 0.0512 BSC |        |
| b    | 0.25        | 0.40 | 0.0098 | 0.0158 | L    | 0.10        | 0.30 | 0.0039     | 0.0118 |
| C    | 0.10        | 0.26 | 0.0039 | 0.0102 | Q1   | 0.10        | 0.40 | 0.0039     | 0.0158 |
| D    | 1.80        | 2.20 | 0.0709 | 0.0866 | Θ    | 0°          | 30°  | 0°         | 30°    |
| E    | 1.80        | 2.40 | 0.0709 | 0.0945 | -    | -           | -    | -          | -      |

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

# 830 series

## Package outline - SOD523



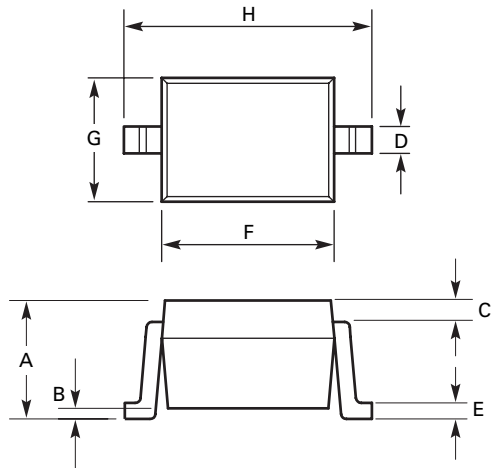
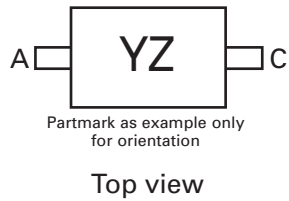
| DIM | Millimeters |       | Inches |        | DIM | Millimeters |       | Inches |        |
|-----|-------------|-------|--------|--------|-----|-------------|-------|--------|--------|
|     | Min.        | Max.  | Min.   | Max.   |     | Min.        | Max.  | Min.   | Max.   |
| A   | —           | 0.800 | —      | 0.0314 | E   | 1.500       | 1.700 | 0.0590 | 0.0669 |
| A1  | 0.000       | 0.100 | 0.000  | 0.0039 | E1  | 1.100       | 1.300 | 0.0433 | 0.0511 |
| A2  | 0.600       | 0.800 | 0.0236 | 0.0314 | L   | 0.200       | 0.400 | 0.0078 | 0.0157 |
| b1  | 0.160       | 0.300 | 0.0062 | 0.0118 | L1  | 0.170       | 0.230 | 0.0066 | 0.0090 |
| c   | 0.080       | 0.220 | 0.0031 | 0.0086 | U   | 4°          | 10°   | 4°     | 10°    |
| D   | 0.700       | 0.900 | 0.0275 | 0.0354 | -   | -           | -     | -      | -      |

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

# 830 series

## Package outline - SOD323

## Top mark



| DIM | Millimeters |      | DIM | Millimeters |       |
|-----|-------------|------|-----|-------------|-------|
|     | Min.        | Max. |     | Min.        | Max.  |
| A   | 0.91        | 1.16 | E   | 0.127       | 0.200 |
| B   | 0.00        | 0.10 | F   | 1.52        | 1.77  |
| C   | -           | -    | G   | 1.11        | 1.37  |
| D   | 0.33        | 0.40 | H   | 2.46        | 2.71  |

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|                                   |                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------|
| "Preview"                         | Future device intended for production at some point. Samples may be available  |
| "Active"                          | Product status recommended for new designs                                     |
| "Last time buy (LTB)"             | Device will be discontinued and last time buy period and delivery is in effect |
| "Not recommended for new designs" | Device is still in production to support existing designs and production       |
| "Obsolete"                        | Production has been discontinued                                               |

### Datasheet status key:

|                       |                                                                                                                                                                                                             |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "Draft version"       | This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.                                                                |
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