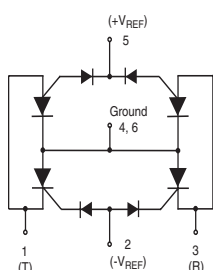


## Battrax® Single Port Positive/Negative SLIC Protector



This six-pin surface mount package contains programmable protection devices for both negative and positive voltage references.

It is constructed using four SCRs and four gate diodes. The SCRs conduct when a voltage that is more negative than  $-V_{REF}$  or more positive than  $+V_{REF}$  is applied to Pin 1 or 3 of the SCR. During conduction, the SCRs appear as a low-resistive path which forces all transients to be shorted to ground.

For a diagram of a *Battrax* application, see Figure 6.49 in Section 6, “Reference Designs” of this *Telecom Design Guide*.

SIDACtor Devices

### Electrical Parameters

| Part Number *   | $V_{DRM}$<br>Volts        | $V_S$<br>Volts           | $V_T$<br>Volts | $I_{DRM}$<br>$\mu$ Amps | $I_{GT}$<br>mAmps | $I_T$<br>Amps | $I_H$<br>mAmps |
|-----------------|---------------------------|--------------------------|----------------|-------------------------|-------------------|---------------|----------------|
| <b>B3104U_L</b> | $ -V_{REF}  +  \pm 1.2V $ | $ -V_{REF}  +  \pm 10V $ | 4              | 5                       | 100               | 2.2           | 100            |
| <b>B3164U_L</b> | $ -V_{REF}  +  \pm 1.2V $ | $ -V_{REF}  +  \pm 10V $ | 4              | 5                       | 100               | 2.2           | 160            |
| <b>B3204U_L</b> | $ -V_{REF}  +  \pm 1.2V $ | $ -V_{REF}  +  \pm 10V $ | 4              | 5                       | 100               | 2.2           | 200            |

\* “L” in part number indicates RoHS compliance. For non-RoHS compliant device, delete “L” from part number.

For individual “UA” and “UC” surge ratings, see table below.

#### General Notes:

- All measurements are made at an ambient temperature of 25 °C.  $I_{PP}$  applies to -40 °C through +85 °C temperature range.
- $I_{PP}$  is a repetitive surge rating and is guaranteed for the life of the product.
- $I_{PP}$  ratings assume a  $V_{REF} = \pm 48$  V.
- $V_{DRM}$  is measured at  $I_{DRM}$ .
- $V_S$  is measured at 100 V/ $\mu$ s.
- Positive *Battrax* information is preliminary data.
- $V_{REF}$  maximum value for the negative *Battrax* is -200 V.
- $V_{REF}$  maximum value for the positive *Battrax* is 110 V.

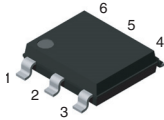
### Surge Ratings in Amps

| Series | $I_{PP}$   |         |           |           |           |          |           |            |           | $I_{TSM}$<br>50 / 60 Hz | di/dt         |
|--------|------------|---------|-----------|-----------|-----------|----------|-----------|------------|-----------|-------------------------|---------------|
|        | 0.2x310 *  | 2x10 *  | 8x20 *    | 10x160 *  | 10x560 *  | 5x320 *  | 10x360 *  | 10x1000 *  | 5x310 *   |                         |               |
|        | 0.5x700 ** | 2x10 ** | 1.2x50 ** | 10x160 ** | 10x560 ** | 9x720 ** | 10x360 ** | 10x1000 ** | 10x700 ** |                         |               |
|        | Amps       | Amps    | Amps      | Amps      | Amps      | Amps     | Amps      | Amps       | Amps      | Amps                    | Amps/ $\mu$ s |
| A      | 20         | 150     | 150       | 90        | 50        | 75       | 75        | 45         | 75        | 20                      | 500           |
| C      | 50         | 500     | 400       | 200       | 150       | 200      | 175       | 100        | 200       | 50                      | 500           |

\* Current waveform in  $\mu$ s

\*\* Voltage waveform in  $\mu$ s

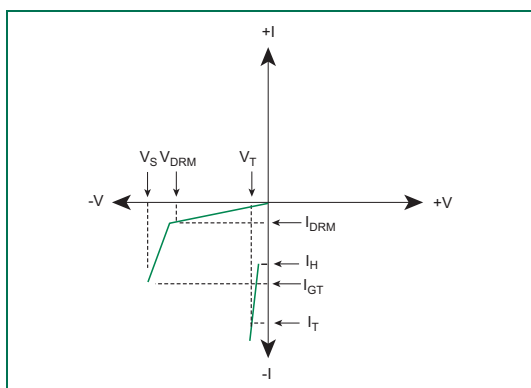
### Thermal Considerations

| Package                                                                           | Symbol          | Parameter                               | Value       | Unit |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------|-------------|------|
|  | $T_J$           | Operating Junction Temperature Range    | -40 to +125 | °C   |
|                                                                                   | $T_S$           | Storage Temperature Range               | -65 to +150 | °C   |
|                                                                                   | $R_{\theta JA}$ | Thermal Resistance: Junction to Ambient | 60          | °C/W |

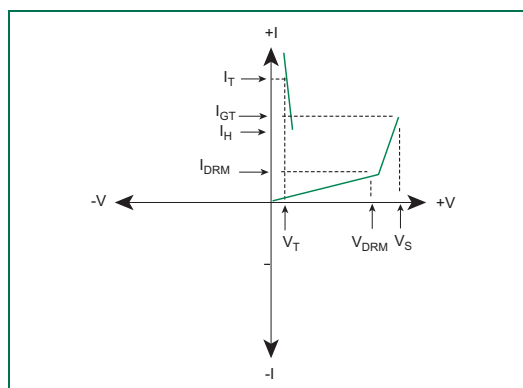
### Capacitance Values

| Part Number | pF  |     |
|-------------|-----|-----|
|             | MIN | MAX |
| B3104UAL    | 50  | 200 |
| B3104UCL    | 50  | 200 |
| B3164UAL    | 50  | 200 |
| B3164UCL    | 50  | 200 |
| B3204UAL    | 50  | 200 |
| B3204UCL    | 50  | 200 |

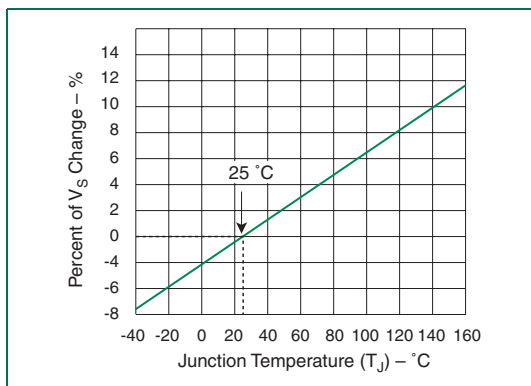
Note: Off-state capacitance ( $C_O$ ) is measured at 1 MHz with a 2 V bias.



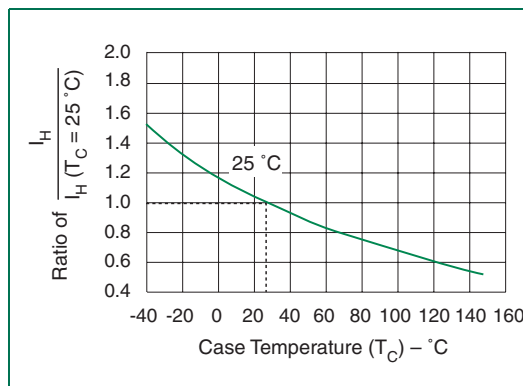
V-I Characteristics for Negative Battrax



$t_r \times t_d$  Pulse Waveform



Normalized  $V_S$  Change versus Junction Temperature



Normalized DC Holding Current versus Case Temperature