



## NPN BD239 – A – B – C

### MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS.

The BD239, A, B, C are mounted in Jedec TO-220 plastic package.  
 They are the silicon epitaxial-base Power Transistors for use in medium power linear and switching applications.  
 The PNP complements are BD240, A, B, C.  
 Compliance to RoHS.

#### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Ratings   |                           | Value       | Unit |
|-----------|---|---------------------------|-------------|------|
| $V_{CEO}$ | Collector-Emitter Voltage                           | BD239                     | 45          | V    |
|           |   | BD239A                    | 60          |      |
|           |   | BD239B                    | 80          |      |
|           |   | BD239C                    | 100         |      |
| $V_{CER}$ | Collector-Emitter Voltage ( $R_{BE} = 100 \Omega$ ) | BD239                     | 55          | V    |
|           |   | BD239A                    | 70          |      |
|           |   | BD239B                    | 90          |      |
|           |   | BD239C                    | 115         |      |
| $V_{CBO}$ | Collector-Base Voltage                              | BD239                     | 45          | V    |
|           |   | BD239A                    | 60          |      |
|           |   | BD239B                    | 80          |      |
|           |   | BD239C                    | 100         |      |
| $V_{EBO}$ | Emitter-Base Voltage                                |                           | 5.0         | V    |
| $I_C$     | Collector Current                                   | $I_C$                     | 3           | A    |
|           |   | $I_{CM}$                  | 7           |      |
| $I_B$     | Base Current  |                           | 0.5         | A    |
| $P_T$     | Power Dissipation                                   | @ $T_{amb} = 25^\circ C$  | 30          | W    |
|           |   | @ $T_{case} = 25^\circ C$ | 30          | W    |
| $T_J$     | Junction Temperature                                |                           | 150         | °C   |
| $T_S$     | Storage Temperature                                 |                           | -65 to +150 |      |

#### THERMAL CHARACTERISTICS

| Symbol         | Ratings                              | Value | Unit |
|----------------|--------------------------------------|-------|------|
| $R_{thJ-amb}$  | Thermal Resistance, Junction-ambient | 70    | °C/W |
| $R_{thJ-case}$ | Thermal Resistance, Junction-case    | 4.17  | °C/W |

## NPN BD239 – A – B – C

### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

| Symbol         | Ratings  | Test Condition(s)   |        | Min | Typ | Max | Unit |
|----------------|--|---|--------|-----|-----|-----|------|
| $I_{CEO}$      | Collector Cutoff Current                                     | $V_{CE}=30\text{ V}$  | BD239  | -   | -   | 0.3 | mA   |
|                |  | $V_{CE}=30\text{ V}$  | BD239A | -   | -   |     |      |
|                |  | $V_{CE}=60\text{ V}$  | BD239B | -   | -   |     |      |
|                |  | $V_{CE}=60\text{ V}$  | BD239C | -   | -   |     |      |
| $I_{EBO}$      | Emitter Cutoff Current                                       | $V_{BE}=5\text{ V}$   | BD239  | -   | -   | 1.0 | mA   |
|                |  |   | BD239A | -   | -   |     |      |
|                |  |   | BD239B | -   | -   |     |      |
|                |  |   | BD239C | -   | -   |     |      |
| $I_{CES}$      | Collector Cutoff Current<br>( $V_{BE} = 0$ )                 | $V_{CE}=45\text{ V}$  | BD239  | -   | -   | 0.2 | mA   |
|                |  | $V_{CE}=60\text{ V}$  | BD239A | -   | -   |     |      |
|                |  | $V_{CE}=80\text{ V}$  | BD239B | -   | -   |     |      |
|                |  | $V_{CE}=100\text{ V}$   | BD239C | -   | -   |     |      |
| $V_{CEO(sus)}$ | Collector-Emitter<br>Sustaining Voltage ( $I_B = 0$ )<br>(*) | $I_C = 30\text{mA}$   | BD239  | 45  |     |     | V    |
|                |  |   | BD239A | 60  |     |     |      |
|                |  |   | BD239B | 80  |     |     |      |
|                |  |   | BD239C | 100 |     |     |      |
| $h_{FE}$       | DC Current Gain (*)  | $V_{CE}=4\text{ V}$<br>$I_C=0.2\text{ A}$                       | BD239  | 40  | -   | -   | -    |
|                |  |   | BD239A |     |     |     |      |
|                |  |   | BD239B |     |     |     |      |
|                |  |   | BD239C |     |     |     |      |
|                |  | $V_{CE}=4\text{ V}$<br>$I_C=1\text{ A}$                         | BD239  | 15  | -   | -   |      |
|                |  |   | BD239A |     |     |     |      |
|                |  |   | BD239B |     |     |     |      |
|                |  |   | BD239C |     |     |     |      |
| $V_{CE(SAT)}$  | Collector-Emitter saturation<br>Voltage (*)                  | $I_C=1\text{ A}$<br>$I_B=200\text{ mA}$                         | BD239  | -   | -   | 0.6 | V    |
|                |  |   | BD239A |     |     |     |      |
|                |  |   | BD239B |     |     |     |      |
|                |  |   | BD239C |     |     |     |      |
| $V_{BE(on)}$   | Base-Emitter Voltage (*)                                     | $V_{CE}=4\text{ V}$<br>$I_C=1\text{ A}$                         | BD239  | -   | -   | 1.3 | V    |
|                |  |   | BD239A |     |     |     |      |
|                |  |   | BD239B |     |     |     |      |
|                |  |   | BD239C |     |     |     |      |
| $h_{fe}$       | Small Signal Current Gain                                    | $V_{CE}=10\text{ V}$<br>$I_C=0.2\text{ A}$<br>$f = 1\text{KHz}$ | BD239  | 20  | -   | -   | -    |
|                |  |   | BD239A |     |     |     |      |
|                |  |   | BD239B |     |     |     |      |
|                |  |   | BD239C |     |     |     |      |
|                |  | $V_{CE}=10\text{ V}$<br>$I_C=0.2\text{ A}$<br>$f = 1\text{MHz}$ | BD239  | 3   | -   | -   |      |
|                |  |   | BD239A |     |     |     |      |
|                |  |   | BD239B |     |     |     |      |
|                |  |   | BD239C |     |     |     |      |
| $f_T$          | Transistor frequency   | $V_{CE}=10\text{ V}, I_C=0.2\text{ A}, f = 1\text{MHz}$         |        | 3   | -   | -   | MHz  |

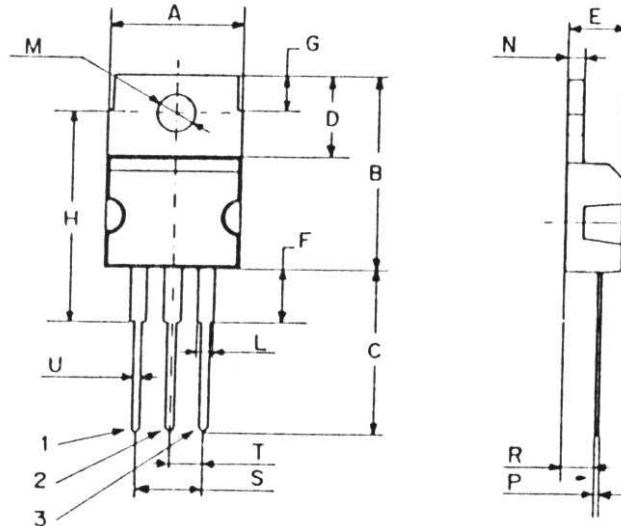
(\*) Pulse Width  $\approx 300\ \mu\text{s}$ , Duty Cycle  $\angle 2.0\%$



## NPN BD239 – A – B – C

### MECHANICAL DATA CASE TO-220

| DIMENSIONS (mm) |       |       |
|-----------------|-------|-------|
|                 | Min.  | Max.  |
| A               | 9,90  | 10,30 |
| B               | 15,65 | 15,90 |
| C               | 13,20 | 13,40 |
| D               | 6,45  | 6,65  |
| E               | 4,30  | 4,50  |
| F               | 2,70  | 3,15  |
| G               | 2,60  | 3,00  |
| H               | 15,75 | 17,15 |
| L               | 1,15  | 1,40  |
| M               | 3,50  | 3,70  |
| N               | -     | 1,37  |
| P               | 0,46  | 0,55  |
| R               | 2,50  | 2,70  |
| S               | 4,98  | 5,08  |
| T               | 2,49  | 2,54  |
| U               | 0,70  | 0,90  |



|         |           |
|---------|-----------|
| Pin 1 : | Base      |
| Pin 2 : | Collector |
| Pin 3 : | Emitter   |
| Case :  | Collector |

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