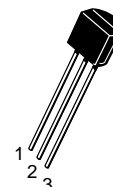
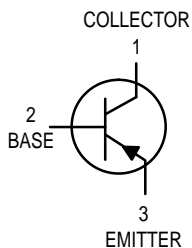


# High Voltage Transistors

## PNP Silicon

**BC450,A**



CASE 29-04, STYLE 17  
TO-92 (TO-226AA)

### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                         |
|--|----------------|-------------|------------------------------|
| Collector–Emitter Voltage  | $V_{CEO}$      | –100        | Vdc                          |
| Collector–Base Voltage   | $V_{CBO}$      | –100        | Vdc                          |
| Emitter–Base Voltage   | $V_{EBO}$      | –5.0        | Vdc                          |
| Collector Current — Continuous   | $I_C$          | –300        | mAdc                         |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  | mW<br>mW/ $^\circ\text{C}$   |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   | Watt<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | –55 to +150 | $^\circ\text{C}$             |

### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max  | Unit                      |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|   |               |      |   |      |      |
|---|---------------|------|---|------|------|
| Collector–Emitter Breakdown Voltage <sup>(1)</sup><br>( $I_C = -1.0 \text{ mAdc}$ , $I_E = 0$ ) | $V_{(BR)CEO}$ | –100 | — | —    | Vdc  |
| Collector–Base Breakdown Voltage<br>( $I_C = -100 \mu\text{A}$ , $I_E = 0$ )                    | $V_{(BR)CBO}$ | –100 | — | —    | Vdc  |
| Emitter–Base Breakdown Voltage<br>( $I_E = -10 \mu\text{Adc}$ , $I_C = 0$ )                     | $V_{(BR)EBO}$ | –5.0 | — | —    | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = -80 \text{ Vdc}$ , $I_E = 0$ )                          | $I_{CBO}$     | —    | — | –100 | nAdc |

### ON CHARACTERISTICS\*

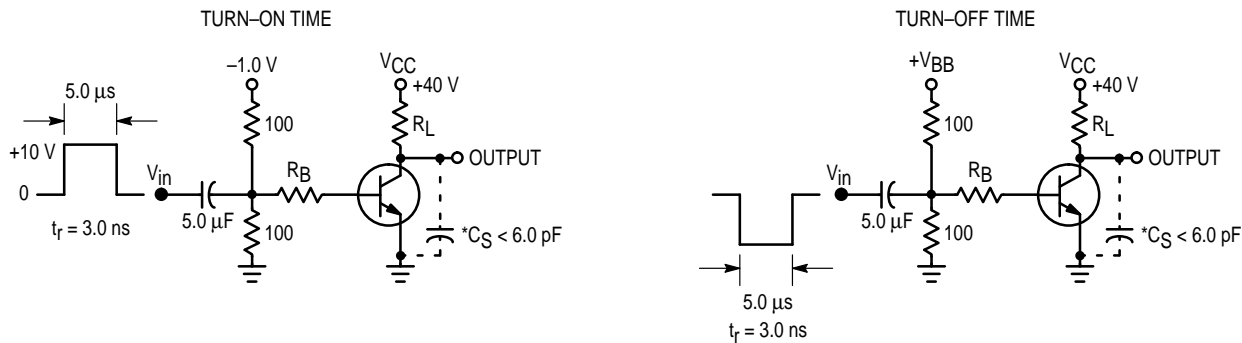
|  |        |          |     |   |     |   |
|--|--------|----------|-----|---|-----|---|
| DC Current Gain<br>( $I_C = -2.0 \text{ mA}$ , $V_{CE} = -5.0 \text{ V}$ ) | BC450  | $h_{FE}$ | 50  | — | 460 | — |
|  | BC450A |          | 120 | — | 220 |   |
| ( $I_C = -10 \text{ mA}$ , $V_{CE} = -5.0 \text{ V}$ )                     | BC450  |          | 50  | — | —   |   |
|  | BC450A |          | 100 | — | —   |   |
| ( $I_C = -100 \text{ mA}$ , $V_{CE} = -5.0 \text{ V}$ )                    | BC450  |          | 50  | — | —   |   |
|  | BC450A |          | 60  | — | —   |   |

1. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle 2.0%.

ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

| Characteristic   | Symbol               | Min        | Typ        | Max          | Unit |
|--|----------------------|------------|------------|--------------|------|
| <b>ON CHARACTERISTICS<sup>(1)</sup></b> (Continued)  |                      |            |            |              |      |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = –100 mAdc, I <sub>B</sub> = –10 mAdc)  | V <sub>CE(sat)</sub> | —          | –0.125     | –0.25        | Vdc  |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = –100 mAdc, I <sub>B</sub> = –10 mAdc)   | V <sub>BE(sat)</sub> | —          | –0.85      | —            | Vdc  |
| Base–Emitter On Voltage<br>(I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V)<br>(I <sub>C</sub> = –100 mA, V <sub>CE</sub> = –5.0 V)* | V <sub>BE(on)</sub>  | –0.55<br>— | —<br>–0.76 | –0.7<br>–1.2 | Vdc  |
| <b>DYNAMIC CHARACTERISTICS</b>   |                      |            |            |              |      |
| Current–Gain — Bandwidth Product<br>(I <sub>C</sub> = –50 mAdc, V <sub>CE</sub> = –5.0 Vdc, f = 100 MHz)                                 | f <sub>T</sub>       | 100        | 200        | —            | MHz  |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle 2.0%.



\* Total Shunt Capacitance of Test Jig and Connectors  
For PNP Test Circuits, Reverse All Voltage Polarities

Figure 1. Switching Time Test Circuits

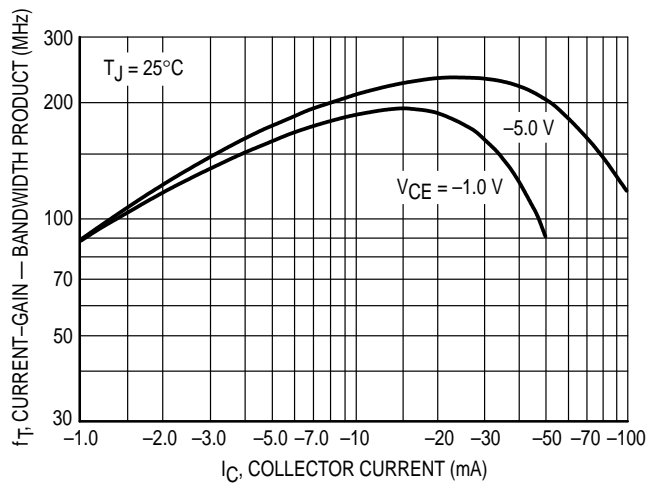


Figure 2. Current-Gain — Bandwidth Product

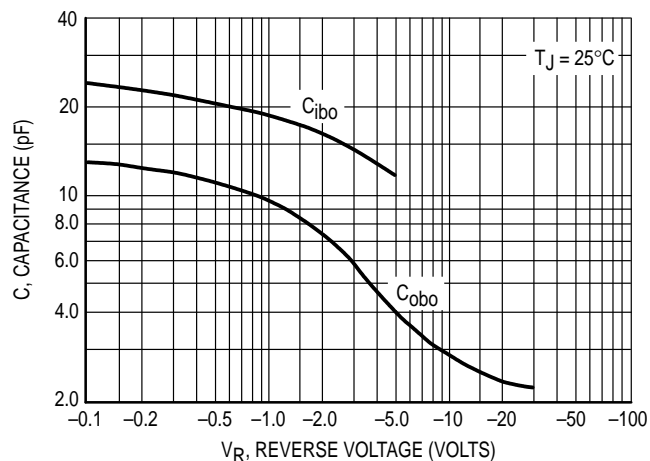


Figure 3. Capacitance

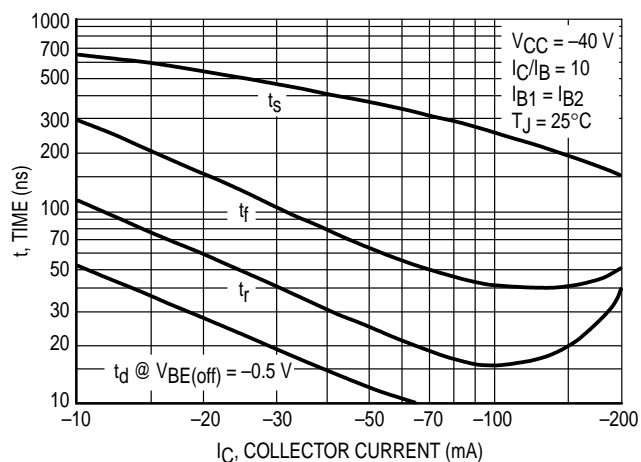


Figure 4. Switching Times

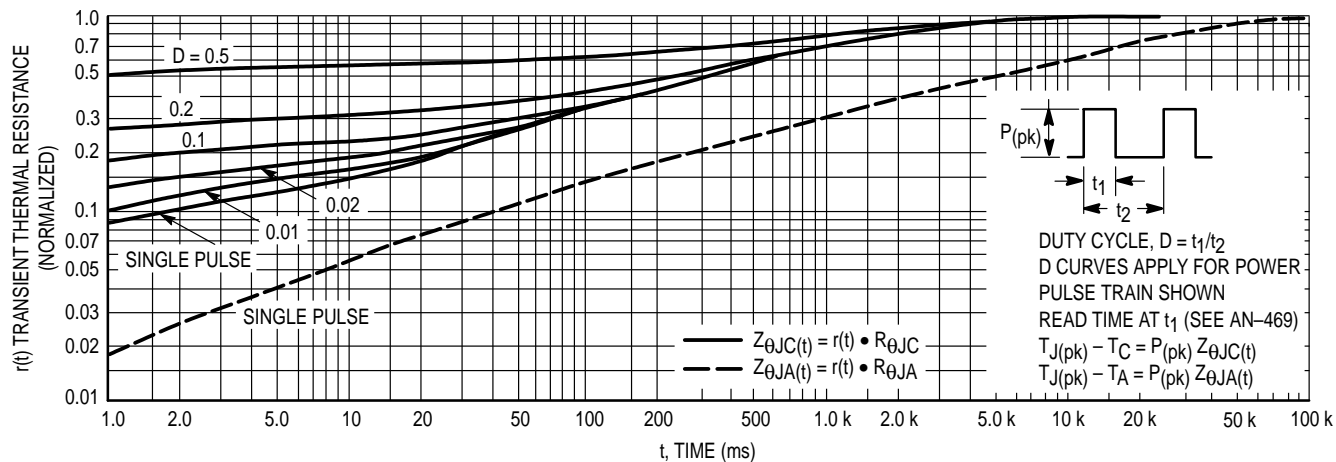
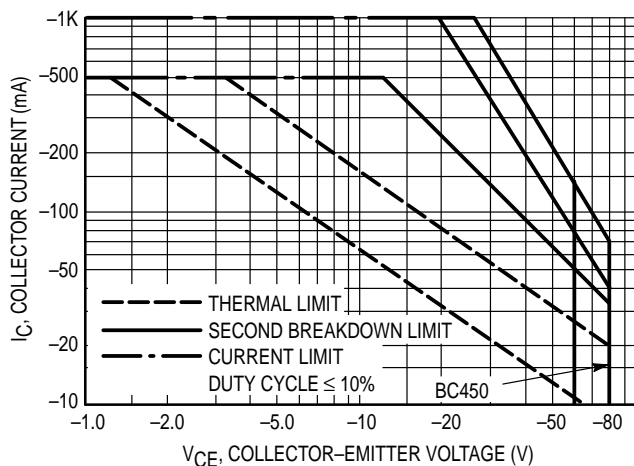
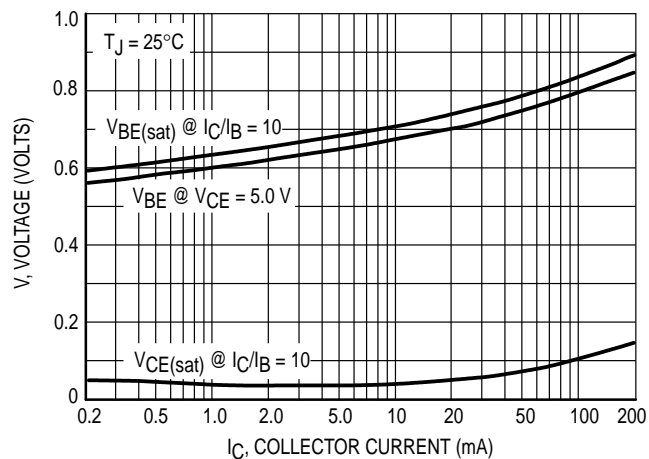
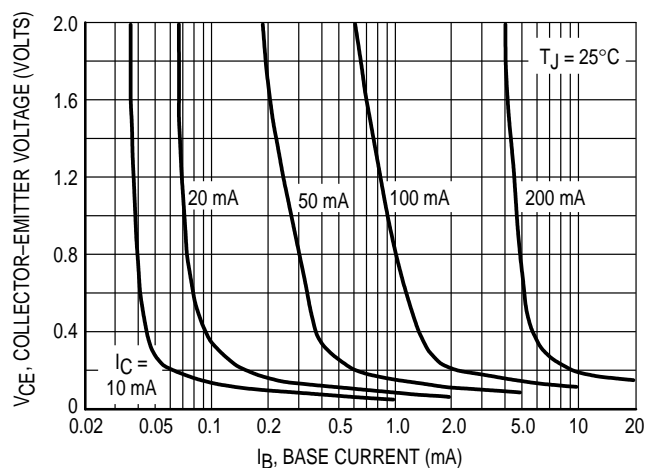
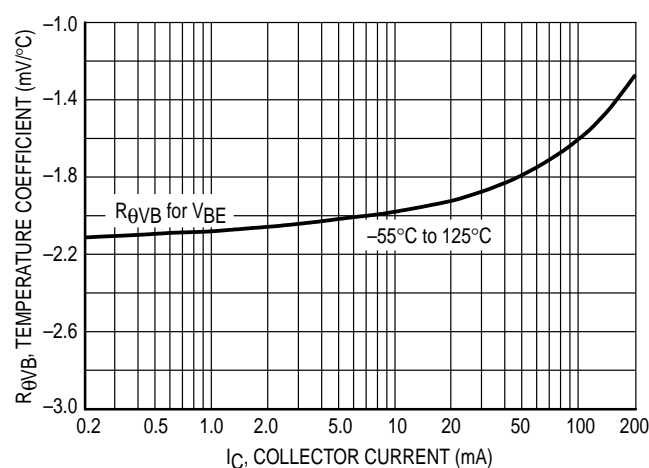
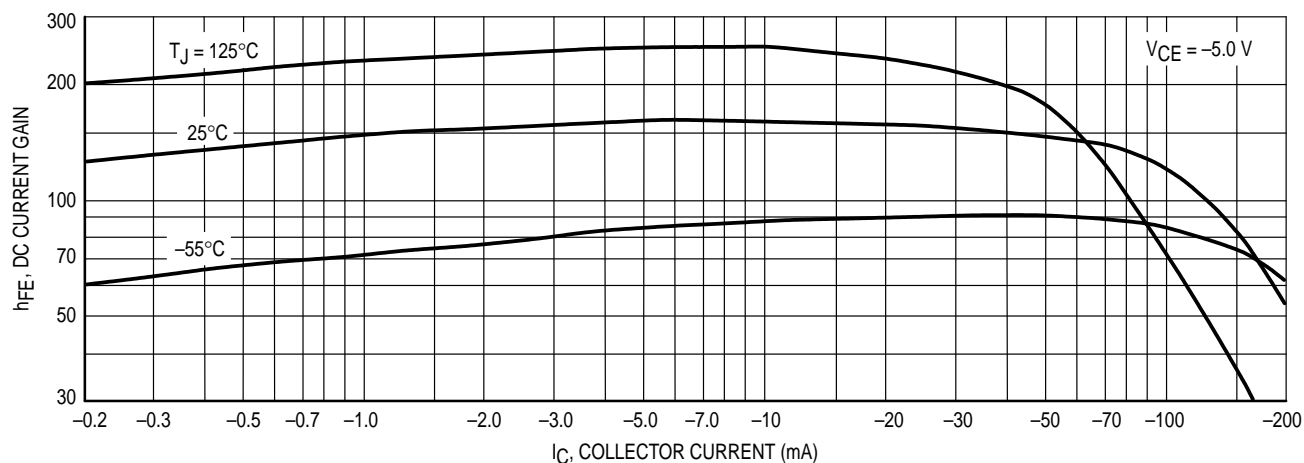


Figure 5. Thermal Response


**Figure 6. Active Region — Safe Operating Area**

**Figure 7. "On" Voltages**

**Figure 8. Collector Saturation Region**

**Figure 9. Base-Emitter Temperature Coefficient**

**Figure 10. DC Current Gain**

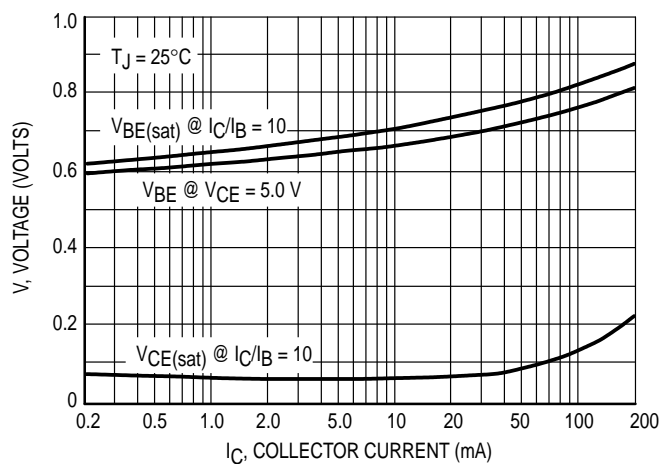


Figure 11. "On" Voltages

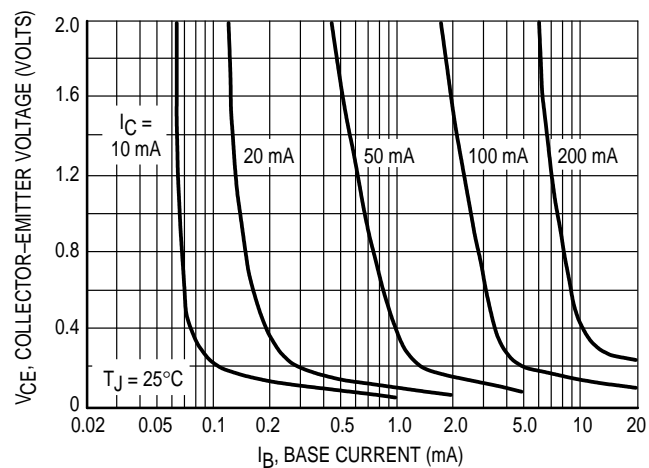


Figure 12. Collector Saturation Region

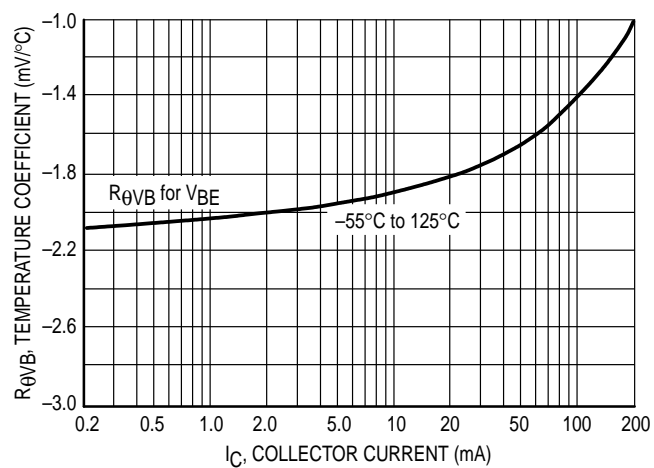
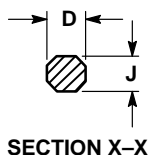
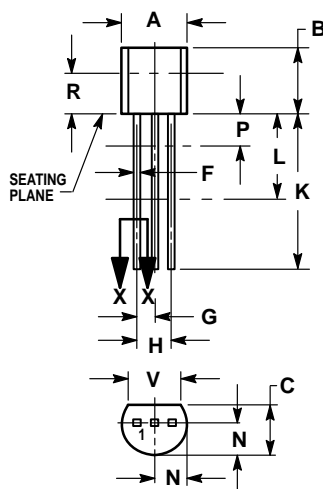


Figure 13. Base-Emitter Temperature Coefficient

## PACKAGE DIMENSIONS



**CASE 029-04  
(TO-226AA)  
ISSUE AD**


## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K. MINIMUM LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.45        | 5.20 |
| B   | 0.170  | 0.210 | 4.32        | 5.33 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.016  | 0.022 | 0.41        | 0.55 |
| F   | 0.016  | 0.019 | 0.41        | 0.48 |
| G   | 0.045  | 0.055 | 1.15        | 1.39 |
| H   | 0.095  | 0.105 | 2.42        | 2.66 |
| J   | 0.015  | 0.020 | 0.39        | 0.50 |
| K   | 0.500  | —     | 12.70       | —    |
| L   | 0.250  | —     | 6.35        | —    |
| N   | 0.080  | 0.105 | 2.04        | 2.66 |
| P   | —      | 0.100 | —           | 2.54 |
| R   | 0.115  | —     | 2.93        | —    |
| V   | 0.135  | —     | 3.43        | —    |

## STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

## How to reach us:

**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609  
**INTERNET:** <http://Design-NET.com>

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,  
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



**MOTOROLA**



BC450/D



This datasheet has been download from:

[www.datasheetcatalog.com](http://www.datasheetcatalog.com)

Datasheets for electronics components.