

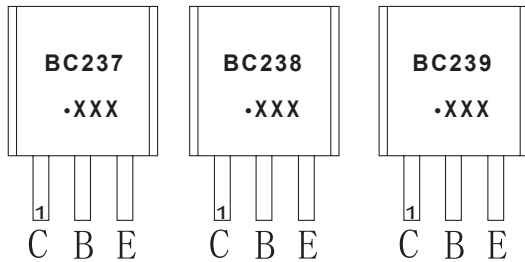
TO-92 Plastic-Encapsulate Transistors

BC237 / BC238 / BD239 TRANSISTOR (NPN)

FEATURES

Amplifier dissipation NPN Silicon

MARKING



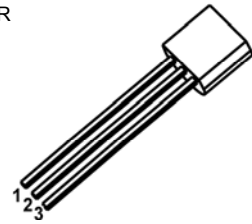
BC237,BC238,BC239=Device code

Solid dot=Green molding compound device,
if none,the normal device

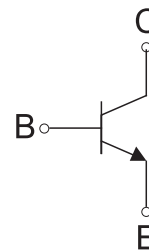
XXX=Code

TO-92

1. COLLECTOR
2. BASE
3. EMITTER



Equivalent Circuit



ORDERING INFORMATION

| Part Number | Package | Packing Method | Pack Quantity |
|-------------|---------|----------------|---------------|
| BC237 | TO-92 | Bulk | 1000pcs/Bag |
| BC237-TA | TO-92 | Tape | 2000pcs/Box |
| BC238 | TO-92 | Bulk | 1000pcs/Bag |
| BC238-TA | TO-92 | Tape | 2000pcs/Box |
| BC239 | TO-92 | Bulk | 1000pcs/Bag |
| BC239-TA | TO-92 | Tape | 2000pcs/Box |

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

| Symbol | Parameter | Value | Unit |
|-----------------|---|-----------|-----------------------------|
| V_{CEO} | Collector-Emitter Voltage | BC237 | 45 |
| | | BC238/239 | 25 |
| V_{EBO} | Emitter-Base Voltage | BC237 | 6 |
| | | BC238/239 | 5 |
| I_C | Collector Current -Continuous | 0.1 | A |
| P_C | Collector Power Dissipation | 350 | mW |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357 | $^{\circ}\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 125 | $^{\circ}\text{C}/\text{W}$ |
| T_J | Junction Temperature | 150 | $^{\circ}\text{C}$ |
| T_{stg} | Storage Temperature | -55~150 | $^{\circ}\text{C}$ |

ELECTRICAL CHARACTERISTICS

$T_a=25^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|--------------------------------------|---------------|--|---------------------------------|--|---------------------------------|------|
| Collector-base breakdown voltage | $V_{(BR)CBO}$ | $I_C=100\mu\text{A}$, $I_E=0$ BC237 BC238/239 | 50 30 | | | V |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C=2\text{mA}$, $I_B=0$ BC237 BC238/239 | 45 25 | | | V |
| Emitter-base breakdown voltage | $V_{(BR)EBO}$ | $I_E=100\mu\text{A}$, $I_C=0$ BC237 BC238/239 | 6 5 | | | V |
| Collector cut-off current | I_{CBO} | $V_{CE}=50\text{V}$, $V_{BE}=0$ $V_{CB}=30\text{V}$, $I_E=0$ BC237 BC238/239 | | | 15 | nA |
| DC current gain | $h_{FE(1)}$ | $V_{CE}=5\text{V}$, $I_C=10\mu\text{A}$ BC237A BC237B/238B BC237C/238C/239C | | 90 150 270 | | |
| | $h_{FE(2)}$ | $V_{CE}=5\text{V}$, $I_C=2\text{mA}$ BC237 BC239 BC237A BC237B/238B BC237C/238C/239C | 120 120 120 200 380 | | 800 800 220 460 800 | |
| | $h_{FE(3)}$ | $V_{CE}=5\text{V}$, $I_C=100\text{mA}$ BC237A BC237B/238B BC237C/238C/239C | | 120 180 300 | | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=10\text{mA}$, $I_B=0.5\text{mA}$ BC237/238/239 $I_C=100\text{mA}$, $I_B=5\text{mA}$ BC237/239 BC238 | | | 0.2 0.6 0.8 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C=10\text{mA}$, $I_B=0.5\text{mA}$ $I_C=100\text{mA}$, $I_B=5\text{mA}$ | | | 0.83 1.05 | V |
| Base-emitter voltage | V_{BE} | $V_{CE}=5\text{V}$, $I_C=0.1\text{mA}$ $V_{CE}=5\text{V}$, $I_C=2\text{mA}$ $V_{CE}=5\text{V}$, $I_C=100\text{mA}$ | 0.55 | 0.5 0.83 | 0.7 | V |
| Transition frequency | f_T | $V_{CE}=3\text{V}$, $I_C=0.5\text{mA}$, $f=100\text{MHz}$ BC237 BC238 BC239 $V_{CE}=5\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$ BC237 BC238 BC239 | 150 150 150 | 100 120 140 200 240 280 | | MHz |
| Collector output capacitance | C_{ob} | $V_{CB}=10\text{V}$, $I_E=0$, $f=1\text{MHz}$ | | | 4.5 | pF |
| Emitter-base capacitance | C_{ib} | $V_{EB}=0.5\text{V}$, $I_C=0$, $f=1\text{MHz}$ | | 8 | | Pf |
| Noise figure | NF | $V_{CE}=5\text{V}$, $I_C=0.2\text{mA}$, $f=1\text{kHz}$, $R_s=2\text{K}\Omega$ BC239 $V_{CE}=5\text{V}$, $I_C=0.2\text{mA}$, $f=1\text{kHz}$, $R_s=2\text{K}\Omega$, $\Delta f=200\text{Hz}$ BC237 BC238 BC239 | | 2 2 2 | 4 10 10 4 | dB |

TO-92 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 3.300 | 3.700 | 0.130 | 0.146 |
| A1 | 1.100 | 1.400 | 0.043 | 0.055 |
| b | 0.380 | 0.550 | 0.015 | 0.022 |
| c | 0.360 | 0.510 | 0.014 | 0.020 |
| D | 4.300 | 4.700 | 0.169 | 0.185 |
| D1 | 3.430 | | 0.135 | |
| E | 4.300 | 4.700 | 0.169 | 0.185 |
| e | 1.270 TYP | | 0.050 TYP | |
| e1 | 2.440 | 2.640 | 0.096 | 0.104 |
| L | 14.100 | 14.500 | 0.555 | 0.571 |
| Φ | | 1.600 | | 0.063 |
| h | 0.000 | 0.380 | 0.000 | 0.015 |

TO-92 Suggested Pad Layout



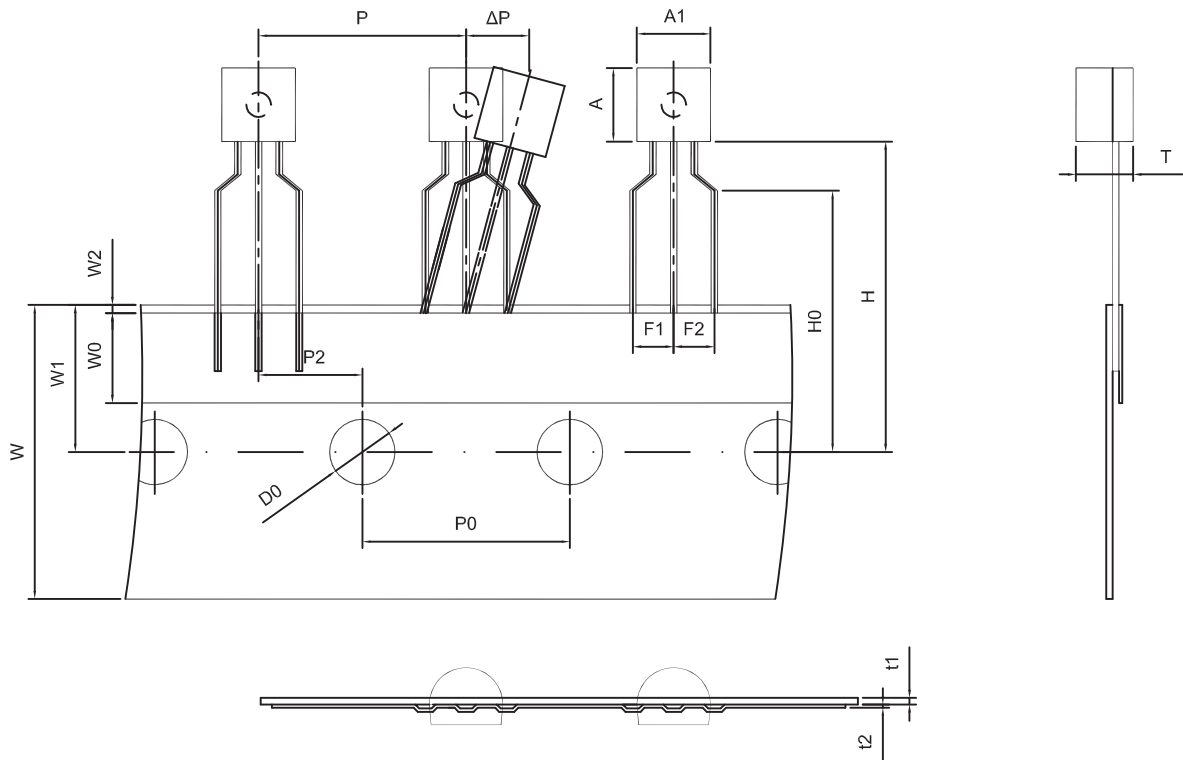
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

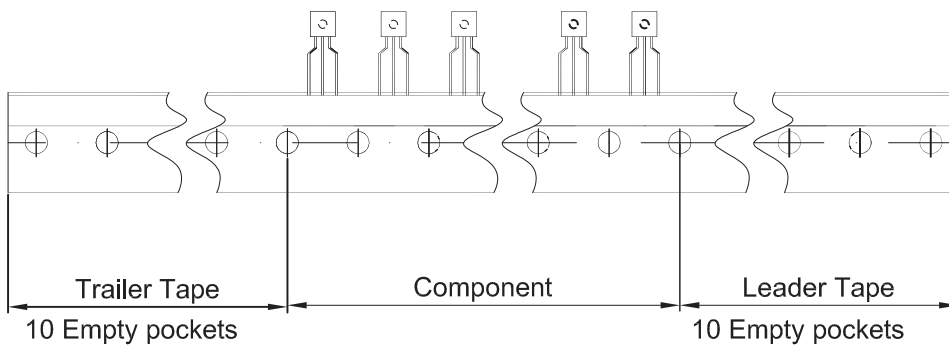
NOTICE

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TO-92 PACKAGE TAPEING DIMENSION



| Dimiensions are in millimeter | | | | | | | | |
|-------------------------------|-----|----------|------|------|------|-----|-----|------|
| A1 | A | T | P | P0 | P2 | F1 | F2 | W |
| 4.5 | 4.5 | 3.5 | 12.7 | 12.7 | 6.35 | 2.5 | 2.5 | 18.0 |
| W0 | W1 | W2 | H | H0 | D0 | t1 | t2 | ΔP |
| 6.0 | 9.0 | 1.0 MAX. | 19.0 | 16.0 | 4.0 | 0.4 | 0.2 | 0 |



| Package | Box | Box Size(mm) | Carton | Carton Size(mm) |
|---------|----------|--------------|------------|-----------------|
| TO-92 | 2000 pcs | 333×162×43 | 20,000 pcs | 350×340×250 |