

# BU406, BU407

## NPN Power Transistors

These devices are high voltage, high speed transistors for horizontal deflection output stages of TV's and CRT's.

### Features

- High Voltage
- Fast Switching Speed
- Low Saturation Voltage
- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

| Rating                                                                                 | Symbol                      | Value      | Unit                     |
|----------------------------------------------------------------------------------------|-----------------------------|------------|--------------------------|
| Collector-Emitter Voltage                                                              | BU406<br>BU407<br>$V_{CEO}$ | 200<br>150 | Vdc                      |
| Collector-Emitter Voltage                                                              | BU406<br>BU407<br>$V_{CEV}$ | 400<br>330 | Vdc                      |
| Collector-Base Voltage                                                                 | BU406<br>BU407<br>$V_{CBO}$ | 400<br>330 | Vdc                      |
| Emitter-Base Voltage                                                                   | $V_{EBO}$                   | 6          | Vdc                      |
| Collector Current – Continuous<br>– Peak Repetitive                                    | $I_C$                       | 7<br>10    | Adc                      |
| Collector Current – Peak (10 ms)                                                       | $I_{CM}$                    | 15         | Adc                      |
| Base Current                                                                           | $I_B$                       | 4          | Adc                      |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$                       | 60<br>0.48 | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Storage                                  | $T_J, T_{stg}$              | -65 to 150 | $^\circ\text{C}$         |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

| Characteristics                                                                 | Symbol          | Max  | Unit               |
|---------------------------------------------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance, Junction-to-Case                                            | $R_{\theta JC}$ | 2.08 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient                                         | $R_{\theta JA}$ | 70   | $^\circ\text{C/W}$ |
| Maximum Lead Temperature for Soldering<br>Purposes 1/8" from Case for 5 Seconds | $T_L$           | 260  | $^\circ\text{C}$   |

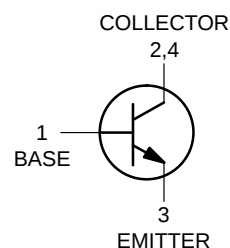


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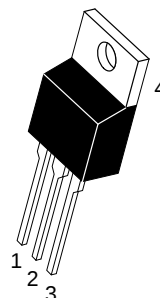
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## NPN SILICON POWER TRANSISTORS 7 AMPERES – 60 WATTS 150 AND 200 VOLTS

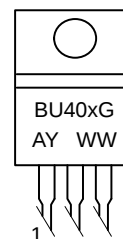
### SCHEMATIC



### MARKING DIAGRAM



TO-220  
CASE 221A  
STYLE 1



BU40x = Specific Device Code  
x = 6 or 7  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

### ORDERING INFORMATION

| Device | Package               | Shipping        |
|--------|-----------------------|-----------------|
| BU406G | TO-220AB<br>(Pb-Free) | 50 Units / Rail |
| BU407G | TO-220AB<br>(Pb-Free) | 50 Units / Rail |

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# BU406, BU407

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

| Characteristic                                                                                                                                                                                                                                            | Symbol                           | Min         | Typ         | Max           | Unit          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------|-------------|---------------|---------------|
| <b>OFF CHARACTERISTICS</b>                                                                                                                                                                                                                                |                                  |             |             |               |               |
| Collector-Emitter Sustaining Voltage (Note 1)<br>( $I_C = 100\text{ mAdc}$ , $I_B = 0$ )                                                                                                                                                                  | BU406<br>BU407<br>$V_{CEO(sus)}$ | 200<br>150  | –<br>–      | –<br>–        | Vdc           |
| Collector Cutoff Current<br>( $V_{CE} = \text{Rated } V_{CEV}$ , $V_{BE} = 0$ )<br>( $V_{CE} = \text{Rated } V_{CEO} + 50\text{ Vdc}$ , $V_{BE} = 0$ )<br>( $V_{CE} = \text{Rated } V_{CEO} + 50\text{ Vdc}$ , $V_{BE} = 0$ , $T_C = 150^\circ\text{C}$ ) | $I_{CES}$                        | –<br>–<br>– | –<br>–<br>– | 5<br>0.1<br>1 | mAdc          |
| Emitter Cutoff Current<br>( $V_{EB} = 6\text{ Vdc}$ , $I_C = 0$ )                                                                                                                                                                                         | BU406, BU407<br>$I_{EBO}$        | –           | –           | 1             | mAdc          |
| <b>ON CHARACTERISTICS (Note 1)</b>                                                                                                                                                                                                                        |                                  |             |             |               |               |
| Collector-Emitter Saturation Voltage<br>( $I_C = 5\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )                                                                                                                                                                 | $V_{CE(sat)}$                    | –           | –           | 1             | Vdc           |
| Base-Emitter Saturation Voltage<br>( $I_C = 5\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )                                                                                                                                                                      | $V_{BE(sat)}$                    | –           | –           | 1.2           | Vdc           |
| Forward Diode Voltage<br>( $I_{EC} = 5\text{ Adc}$ ) "D" only                                                                                                                                                                                             | $V_{EC}$                         | –           | –           | 2             | Volts         |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                                                                                                                                            |                                  |             |             |               |               |
| Current-Gain – Bandwidth Product<br>( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 20\text{ MHz}$ )                                                                                                                                    | $f_T$                            | 10          | –           | –             | MHz           |
| Output Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1\text{ MHz}$ )                                                                                                                                                                       | $C_{ob}$                         | –           | 80          | –             | pF            |
| <b>SWITCHING CHARACTERISTICS</b>                                                                                                                                                                                                                          |                                  |             |             |               |               |
| Inductive Load Crossover Time<br>( $V_{CC} = 40\text{ Vdc}$ , $I_C = 5\text{ Adc}$ , $I_{B1} = I_{B2} = 0.5\text{ Adc}$ , $L = 150\text{ }\mu\text{H}$ )                                                                                                  | $t_c$                            | –           | –           | 0.75          | $\mu\text{s}$ |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

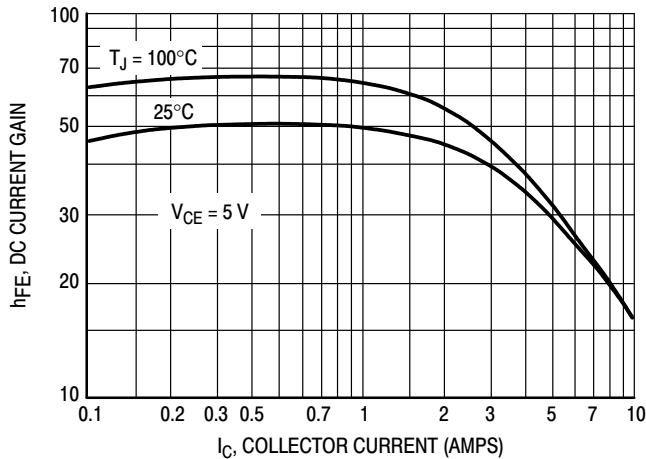


Figure 1. DC Current Gain

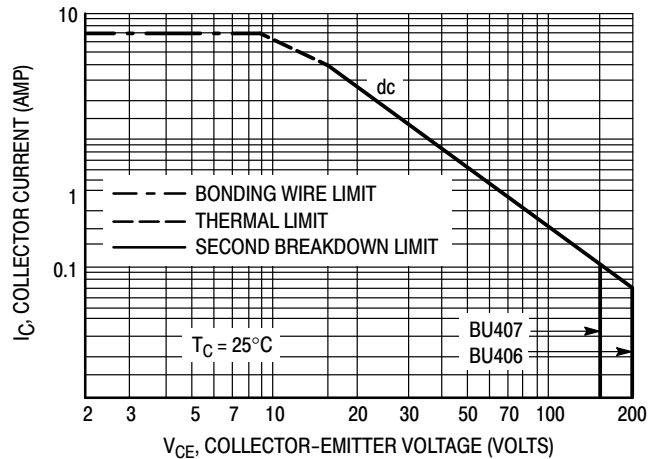
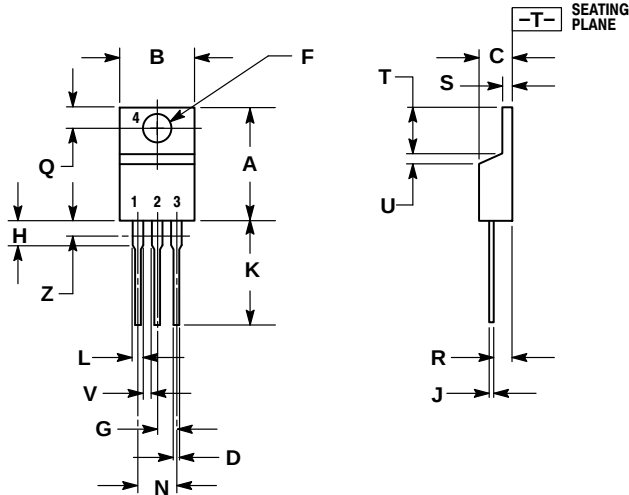


Figure 2. Maximum Rated Forward Bias Safe Operating Area

# BU406, BU407

## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AH



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.570  | 0.620 | 14.48       | 15.75 |
| B   | 0.380  | 0.415 | 9.66        | 10.53 |
| C   | 0.160  | 0.190 | 4.07        | 4.83  |
| D   | 0.025  | 0.038 | 0.64        | 0.96  |
| F   | 0.142  | 0.161 | 3.61        | 4.09  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.161 | 2.80        | 4.10  |
| J   | 0.014  | 0.024 | 0.36        | 0.61  |
| K   | 0.500  | 0.562 | 12.70       | 14.27 |
| L   | 0.045  | 0.060 | 1.15        | 1.52  |
| N   | 0.190  | 0.210 | 4.83        | 5.33  |
| Q   | 0.100  | 0.120 | 2.54        | 3.04  |
| R   | 0.080  | 0.110 | 2.04        | 2.79  |
| S   | 0.045  | 0.055 | 1.15        | 1.39  |
| T   | 0.235  | 0.255 | 5.97        | 6.47  |
| U   | 0.000  | 0.050 | 0.00        | 1.27  |
| V   | 0.045  | ---   | 1.15        | ---   |
| Z   | ---    | 0.080 | ---         | 2.04  |

### STYLE 1:

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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