

# 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:  $V_{CEV} = 330$  or  $400$  V
- Fast Switching Speed:  $t_f = 750$  ns (max)
- Low Saturation Voltage:  $V_{CE(sat)} = 1$  V (max) @ 5 A
- Pb-Free Packages are Available\*

### 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<br>– Peak (10 ms)                  | $I_C$                       | 7<br>10<br>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    | $^\circ\text{C}$         |

### 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 | $T_L$           | 2675 | $^\circ\text{C}$   |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

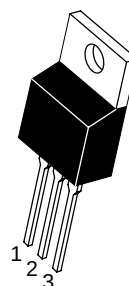
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

<http://onsemi.com>

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



TO-220AB  
CASE 221A-09  
STYLE 1

### MARKING DIAGRAM



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        |
|--------|-----------------------|-----------------|
| BU406  | TO-220AB              | 50 Units / Rail |
| BU406G | TO-220AB<br>(Pb-Free) | 50 Units / Rail |
| BU407  | TO-220AB              | 50 Units / Rail |
| BU407G | TO-220AB<br>(Pb-Free) | 50 Units / Rail |

# 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 | $V_{CEO(sus)}$ | 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   | $I_{EBO}$      | —           | —           | 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          | $\mu\text{s}$ |

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

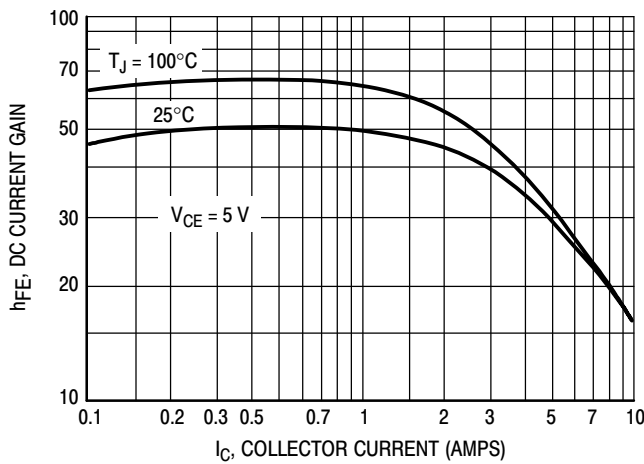


Figure 1. DC Current Gain

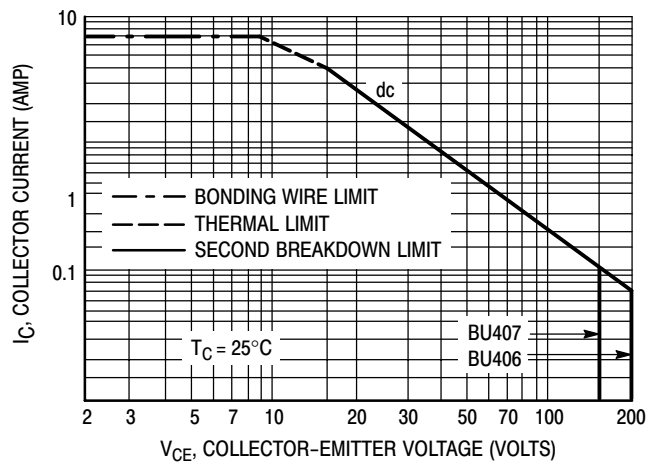
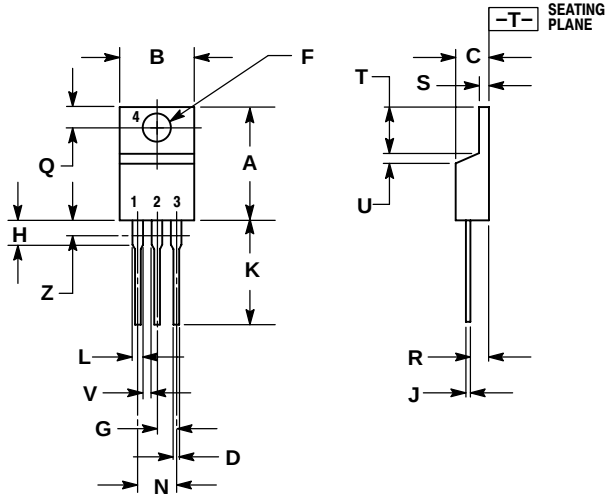


Figure 2. Maximum Rated Forward Bias Safe Operating Area

# BU406, BU407

## PACKAGE DIMENSIONS

### TO-220AB CASE 221A-09 ISSUE AA



#### 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  | 0.405 | 9.66        | 10.28 |
| C   | 0.160  | 0.190 | 4.07        | 4.82  |
| D   | 0.025  | 0.035 | 0.64        | 0.88  |
| F   | 0.142  | 0.147 | 3.61        | 3.73  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.155 | 2.80        | 3.93  |
| J   | 0.018  | 0.025 | 0.46        | 0.64  |
| 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:

- PIN 1: BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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 special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC 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 SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

#### PUBLICATION ORDERING INFORMATION

##### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA  
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada  
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your  
local Sales Representative.