

# 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 BU407	$V_{CEO}$ 200 150	Vdc
Collector-Emitter Voltage	BU406 BU407	$V_{CEV}$ 400 330	Vdc
Collector-Base Voltage	BU406 BU407	$V_{CBO}$ 400 330	Vdc
Emitter-Base Voltage		$V_{EBO}$ 6	Vdc
Collector Current – Continuous – Peak Repetitive		$I_C$ 7 10	Adc
Collector Current – Peak (10 ms)		$I_{CM}$ 15	Adc
Base Current		$I_B$ 4	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$		$P_D$ 60 0.48	W W/ $^\circ\text{C}$
Operating and Storage Junction 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 Purposes 1/8" from Case for 5 Seconds	$T_L$	260	$^\circ\text{C}$

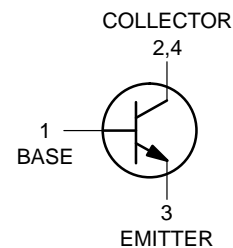


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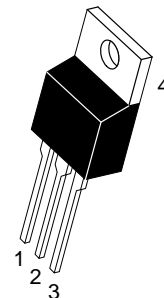
[www.onsemi.com](http://www.onsemi.com)

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

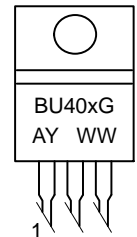
### SCHEMATIC



### 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 (Pb-Free)	50 Units / Rail
BU407G	TO-220AB (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) ( $I_C = 100\text{ mAdc}$ , $I_B = 0$ )	BU406 BU407	$V_{CEO(sus)}$	200 150	- -	- -	Vdc
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEV}$ , $V_{BE} = 0$ ) ( $V_{CE} = \text{Rated } V_{CEO} + 50\text{ Vdc}$ , $V_{BE} = 0$ ) ( $V_{CE} = \text{Rated } V_{CEO} + 50\text{ Vdc}$ , $V_{BE} = 0$ , $T_C = 150^\circ\text{C}$ )		$I_{CES}$	- - -	- - -	5 0.1 1	mAdc
Emitter Cutoff Current ( $V_{EB} = 6\text{ Vdc}$ , $I_C = 0$ )	BU406, BU407	$I_{EBO}$	-	-	1	mAdc
<b>ON CHARACTERISTICS (Note 1)</b>						
Collector-Emitter Saturation Voltage ( $I_C = 5\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )		$V_{CE(sat)}$	-	-	1	Vdc
Base-Emitter Saturation Voltage ( $I_C = 5\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )		$V_{BE(sat)}$	-	-	1.2	Vdc
Forward Diode Voltage ( $I_{EC} = 5\text{ Adc}$ ) "D" only		$V_{EC}$	-	-	2	Volts
<b>DYNAMIC CHARACTERISTICS</b>						
Current-Gain - Bandwidth Product ( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 20\text{ MHz}$ )		$f_T$	10	-	-	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1\text{ MHz}$ )		$C_{ob}$	-	80	-	pF
<b>SWITCHING CHARACTERISTICS</b>						
Inductive Load Crossover Time ( $V_{CC} = 40\text{ Vdc}$ , $I_C = 5\text{ Adc}$ , $I_{B1} = I_{B2} = 0.5\text{ Adc}$ , $L = 150\text{ }\mu\text{H}$ )		$t_c$	-	-	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  $\leq 1\%$ .

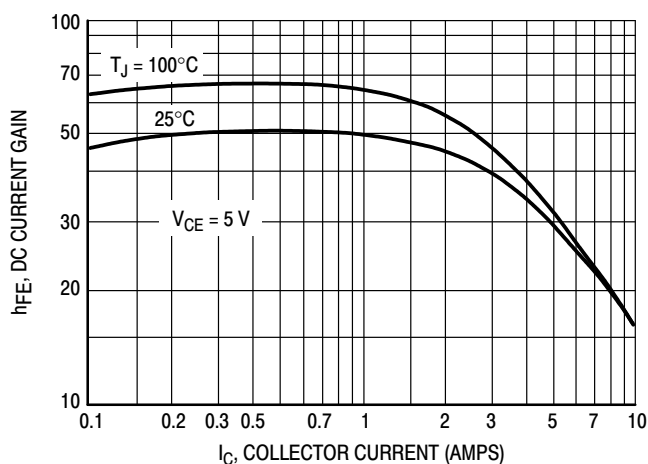


Figure 1. DC Current Gain

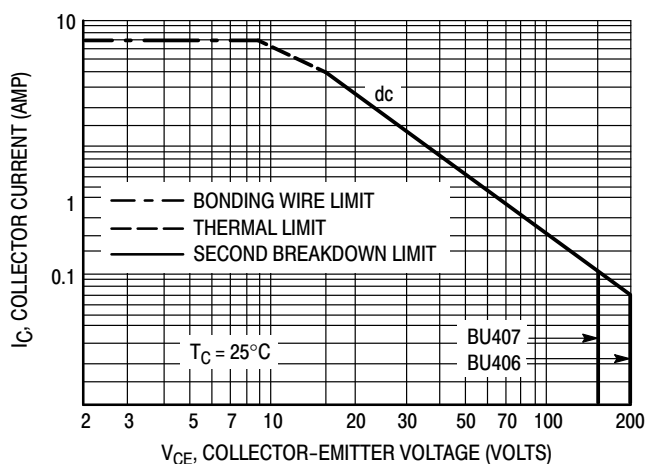
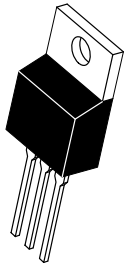


Figure 2. Maximum Rated Forward Bias Safe Operating Area

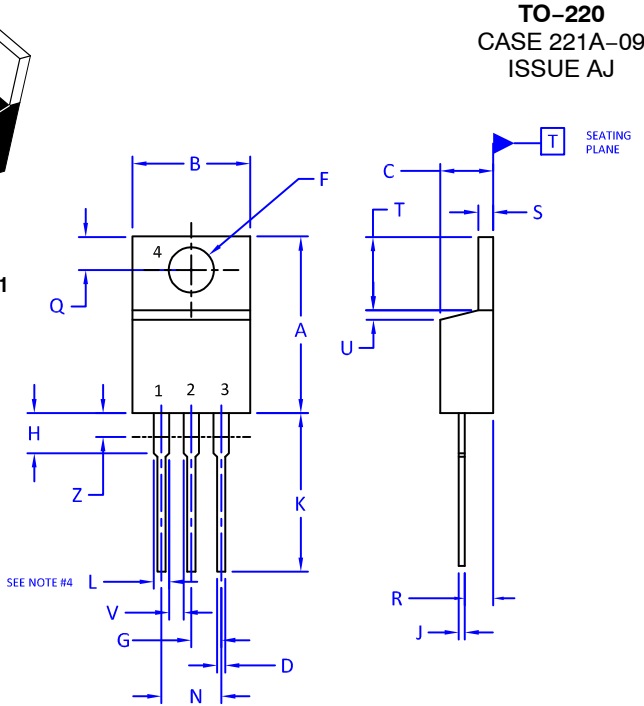
# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 1:1



**TO-220**  
CASE 221A-09  
ISSUE AJ

DATE 05 NOV 2019

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

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	3.60	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	1.41
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

**STYLE 2:**

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

**STYLE 3:**

- PIN 1. CATHODE
- 2. ANODE
- 3. GATE
- 4. ANODE

**STYLE 4:**

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. MAIN TERMINAL 2

**STYLE 5:**

- PIN 1. GATE
- 2. DRAIN
- 3. SOURCE
- 4. DRAIN

**STYLE 6:**

- PIN 1. ANODE
- 2. CATHODE
- 3. ANODE
- 4. CATHODE

**STYLE 7:**

- PIN 1. CATHODE
- 2. ANODE
- 3. CATHODE
- 4. ANODE

**STYLE 8:**

- PIN 1. CATHODE
- 2. ANODE
- 3. EXTERNAL TRIP/DELAY
- 4. ANODE

**STYLE 9:**

- PIN 1. GATE
- 2. COLLECTOR
- 3. EMITTER
- 4. COLLECTOR

**STYLE 10:**

- PIN 1. GATE
- 2. SOURCE
- 3. DRAIN
- 4. SOURCE

**STYLE 11:**

- PIN 1. DRAIN
- 2. SOURCE
- 3. GATE
- 4. SOURCE

**STYLE 12:**

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. NOT CONNECTED

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