## HORIZONTAL TV DEFLECTORS

## DESCRIPTION

The BU406D. BU407D. and BU408D are silicon planar epitaxial NPN transistors with integrated damper diode, in Jedec TO-220 plastic package. They are fast switching, high voltage devices for use in horizontal deflection output stages of MTV receivers with $110^{\circ}$ CRT.
The BU406D and BU408D are primarily intended for large screen, while the BU407D is for medium and small screens.


## INTERNAL SCHEMATIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value |  |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | BU406D | BU407D | BU408D |  |
| $\mathrm{V}_{\text {CBO }}$ | Collector-base Voltage ( $I_{E}=0$ ) | 400 | 330 | 400 | V |
| $\mathrm{V}_{\text {CEV }}$ | Collector-emitter Voltage ( $\mathrm{V}_{\mathrm{BE}}=-1.5 \mathrm{~V}$ ) | 400 | 330 | 400 | V |
| $\mathrm{V}_{\text {EBO }}$ | Emitter-base Voltage ( $\mathrm{I}_{\mathrm{C}}=0$ ) | 6 |  |  | V |
| $I_{C}$ | Collector Current | 7 |  |  | A |
| ICM | Collector Peak Current (repetitive) | 10 |  |  | A |
| ICM | Collector Peak Current ( $t_{p}=10 \mathrm{~ms}$ ) | 15 |  |  | A |
| $\mathrm{I}_{\mathrm{B}}$ | Base Current | 4 |  |  | A |
| $\mathrm{P}_{101}$ | Total Power Dissipation at $\mathrm{T}_{\text {case }} \leq 25^{\circ} \mathrm{C}$ | 60 |  |  | W |
| $\mathrm{T}_{\text {stg }}$ | Storage Temperature | -65 to 150 |  |  | ${ }^{\circ} \mathrm{C}$ |
| T | Junction Temperature | 150 |  |  | ${ }^{\circ} \mathrm{C}$ |

## THERMAL DATA

| $R_{\text {th j-case }}$ | Thermal Resistance Junction-case | Max | 2.08 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |
| :--- | :--- | :--- | :--- | :--- |
| $R_{\text {th jamb }}$ | Thermal Resistance Junction-ambient | Max | 70 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

ELECTRICAL CHARACTERISTICS ( $T_{\text {case }}=25^{\circ} \mathrm{C}$ unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ICEV | Collector Cutoff Current $\left(\mathrm{V}_{\mathrm{BE}}=-1.5 \mathrm{~V}\right)$ | for BU406D and BU408D <br> $V_{C E}=400 \mathrm{~V}$ <br> for BU407D $V_{C E}=330 \mathrm{~V}$ |  |  | 15 | $\begin{aligned} & \mathrm{mA} \\ & \mathrm{~mA} \end{aligned}$ |
| $I_{\text {EBO }}$ | Emitter Cutoff Current $\left(I_{C}=0\right)$ | $\mathrm{V}_{\mathrm{EB}}=6 \mathrm{~V}$ |  |  | 400 | mA |
| $\mathrm{V}_{C E \text { (sat) }}{ }^{\text {a }}$ | Collector-emitter Saturation Voltage | $\begin{array}{ll} \text { for BU406D and BU407D } \\ I_{C}=5 A & I_{B}=0.65 A \\ \text { for } B U 408 D & \\ I_{C}=6 A & I_{B}=1.2 A \\ \hline \end{array}$ |  |  | $\begin{aligned} & 1 \\ & 1 \end{aligned}$ | V <br> V |
| $V_{B E \text { (sat) }}{ }^{*}$ | Base-emitter Saturation Voltage | for BU406D and BU407D $\mathrm{I}_{\mathrm{C}}=5 \mathrm{~A}$ $I_{B}=0.65 A$ <br> for BU408D $I_{C}=6 A \quad I_{B}=1.2 A$ |  |  | $\begin{array}{r} 1.3 \\ 1.5 \\ \hline \end{array}$ | V <br> V |
| $f_{T}$ | Transition Frequency | $\mathrm{I}_{\mathrm{C}}=0.5 \mathrm{~A} \quad \mathrm{~V}_{C E}=10 \mathrm{~V}$ | 10 |  |  | MHz |
| toll | Turn-off Time | $\begin{array}{ll} \text { for BU406D and BU407D } \\ I_{C}=5 A & \text { Bend }=0.65 \mathrm{~A} \\ \text { for BU408D } & \\ I_{C}=6 A & I_{\text {Bend }}=1.2 \mathrm{~A} \\ \hline \end{array}$ |  |  | $\begin{aligned} & 0.75 \\ & 0.5 \\ & \hline \end{aligned}$ | $\mu \mathrm{s}$ <br> $\mu \mathrm{s}$ |
| $\mathrm{I}_{\mathrm{s} / \mathrm{b}}$ | Second Breakdown Collector Current | $V_{C E}=40 \mathrm{~V} \quad \mathrm{t}=10 \mathrm{~ms}$ |  | 4 |  | A |
| $V_{F}$ | Diode Forward Voltage | $I_{F}=5 \mathrm{~A}$ |  |  | 1.5 | V |

- Pulsed : pulse duration $=300 \mu \mathrm{~s}$, duty cycle $=1.5 \%$.

DC Current Gain.


Collector-emitter Saturation Voltage.


Base-emitter Saturation Voltage


Forward Voltage.


## SWITCHING TIMES

TEST CIRCUIT (FALL, STORAGE AND TURN-OFF TIME)


L1 Horizontal hold coil : Pins $1-2=75$ turns $00.2 \mathrm{~mm} ; R=15 \Omega: \mathrm{L}$ min $=0.62 \mathrm{mH}$ Core $=$ siterrit B $6212025 \times 4 \times 2$
Pins 2-3 $=293$ turns $00.2 \mathrm{~mm}: R=4.8 \Omega: L \max =4.1 \mathrm{mH}$
L2 Horizontal yoke $=200 \mu \mathrm{H}$
T1 Driver transformer : Pins 1-2 = 125 turns $\oslash 0.2 \mathrm{~mm}$
Gap $=0.12 \mathrm{~mm}:$ Core $=3 E 3$ double $E 19 \times 15 \times 5$
Pins 3-4 = 25 turns 00.4 mm
T2 EHT transformer manufacturer ARCO type 249.065/035
$R=270 \Omega$ for BU406D and BU407D
$R=180 \Omega 2$ for BU408D

## Waveforms



Fall and storage time


Turn－off time is the time for the collector current ${ }^{1}$ C to decrease to 100 mA alter the collector to emilter voltage $V_{C E}$ has pisen $3 V$ into its flyback eacursion

Turn－off time

## APPLICATION INFORMATION

Two examples are given of the BU406D and BU407D in conventional MTV horizontal deflection circuits．
BU406D－application circuit for $17^{\prime \prime}$ to $24^{\prime \prime}-110^{\circ}-28 \mathrm{~mm}$ neck picture tubes．


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## APPLICATION INFORMATION (continued)

BU407D - application circuit for $12^{\prime \prime}$ to $17^{\prime \prime}-110^{\circ}-28 \mathrm{~mm}$ neck picture tubes (drive supply voltage $=10.8 \mathrm{~V}$ ).

$\cdot \mathrm{N} 1=90$ turns $00.3 \mathrm{~mm} ; \mathrm{N} 2=30$ turns $00.6 \mathrm{~mm} ; G A P=0.12 \mathrm{~mm}: C O R E=$ DOUBLE $E 19 \times 5 \times 8 \mathrm{~mm} ;$ FERRITE 3E1 TYPE

BU407D - application circuit for $12^{\prime \prime}$ to $17^{\prime \prime}-110^{\circ}-28 \mathrm{~mm}$ neck picture tubes.
(driver supply voltage $=10.8 \mathrm{~V}$ ).


[^1]
[^0]:    － $\mathrm{N} 1=125$ turns $\oslash 0.3 \mathrm{~mm} ; \mathrm{N} 2=25$ turns $\oslash 0.6 \mathrm{~mm} ; G A P=0.12 \mathrm{~mm} ; C O R E=$ DOUBLE E $19 \times 5 \times 8 \mathrm{~mm}:$ FERRITE $3 E 1$ TYPE

[^1]:    $\cdot \mathrm{N} 1=90$ turns $\varnothing 0.3 \mathrm{~mm}: \mathrm{N} 2=30$ turns $00.6 \mathrm{~mm} ; G A P=0.12 \mathrm{~mm}: C O R E=$ DOUBLE $E 19 \times 5 \times 8 \mathrm{~mm}:$ FERRITE 3E1 TVPE

