

# NPN Silicon Planar High Voltage Transistor

## TO-92



## Pin Definition:

1. Emitter
2. Collector
3. Base

## SOT-223



## Pin Definition:

1. Base
2. Collector
3. Emitter

## PRODUCT SUMMARY

|                            |                                                     |
|----------------------------|-----------------------------------------------------|
| <b>BV<sub>CBO</sub></b>    | 600V                                                |
| <b>BV<sub>CEO</sub></b>    | 400V                                                |
| <b>I<sub>C</sub></b>       | 300mA                                               |
| <b>V<sub>CE(SAT)</sub></b> | 0.5V @ I <sub>C</sub> / I <sub>B</sub> = 50mA / 5mA |

## Features

- High BV<sub>ceo</sub>, BV<sub>cbo</sub>
- High current gain

## Structure

- Epitaxial Planar Type

## Ordering Information

| Part No.     | Package | Packing             |
|--------------|---------|---------------------|
| TSC966CT B0G | TO-92   | 1,000pcs / Bulk     |
| TSC966CT A3G | TO-92   | 2,000pcs / Ammo     |
| TSC966CW R0G | SOT-223 | 2,500pcs / 13" Reel |

Note: "G" denote for Halogen Free Product

## Absolute Maximum Rating (T<sub>A</sub>=25°C unless otherwise noted)

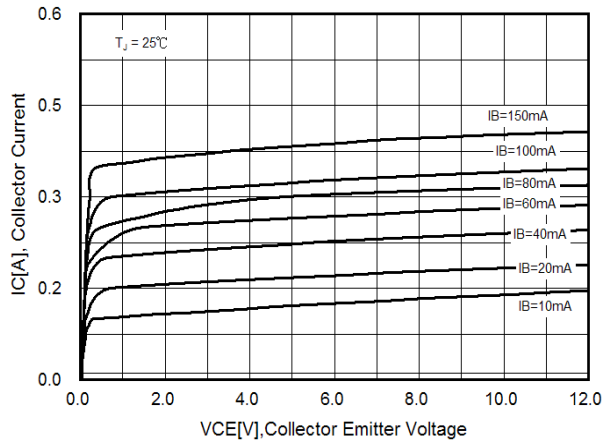
| Parameter                                        | Symbol           | Limit        | Unit |
|--------------------------------------------------|------------------|--------------|------|
| Collector-Base Voltage                           | V <sub>CBO</sub> | 600          | V    |
| Collector-Emitter Voltage                        | V <sub>CES</sub> | 600          | V    |
| Collector-Emitter Voltage                        | V <sub>CEO</sub> | 400          | V    |
| Emitter-Base Voltage                             | V <sub>EBO</sub> | 7            | V    |
| Collector Current                                | DC               | 0.3          | A    |
|                                                  | Pulse            | 1            |      |
| Total Power Dissipation @ T <sub>A</sub> =25°C   | TO-92            | 0.9          | W    |
|                                                  | SOT-223          | 1            |      |
| Operating Junction Temperature                   | T <sub>J</sub>   | +150         | °C   |
| Operating Junction and Storage Temperature Range | T <sub>STG</sub> | - 55 to +150 | °C   |

## Electrical Specifications (T<sub>a</sub> = 25°C unless otherwise noted)

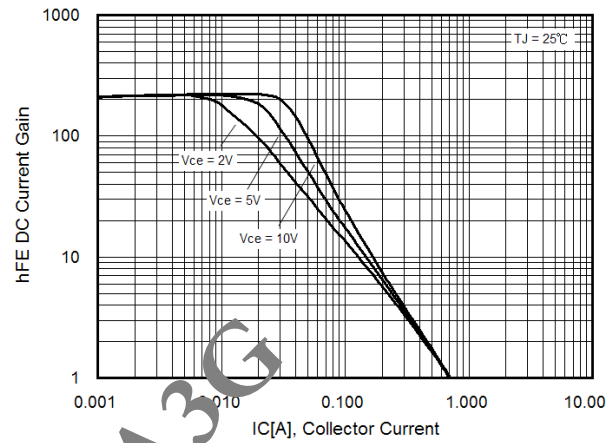
| Parameter                            | Conditions                                   | Symbol               | Min | Typ | Max | Unit |
|--------------------------------------|----------------------------------------------|----------------------|-----|-----|-----|------|
| Collector-Base Breakdown Voltage     | I <sub>C</sub> = 50uA                        | BV <sub>CBO</sub>    | 600 | --  | --  | V    |
| Collector-Emitter Saturation Voltage | I <sub>C</sub> = 100uA, V <sub>BE</sub> = 0  | BV <sub>CES</sub>    | 600 | --  | --  | V    |
| Collector-Emitter Breakdown Voltage  | I <sub>C</sub> = 1mA                         | BV <sub>CEO</sub>    | 400 | --  | --  | V    |
| Emitter-Base Breakdown Voltage       | I <sub>E</sub> = 50uA                        | BV <sub>EBO</sub>    | 7   | --  | --  | V    |
| Collector-Base Cutoff Current        | V <sub>CB</sub> = 600V                       | I <sub>CBO</sub>     | --  | --  | 0.5 | uA   |
| Collector-Emitter Cutoff Current     | V <sub>CE</sub> = 400V                       | I <sub>CEO</sub>     | --  | --  | 1   | uA   |
| Emitter-Base Cutoff Current          | V <sub>EB</sub> = 7V                         | I <sub>EBO</sub>     | --  | --  | 1.5 | uA   |
| Collector-Emitter Saturation Voltage | I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA  | V <sub>CE(SAT)</sub> | --  | --  | 0.5 | V    |
| Base-Emitter Saturation Voltage      | I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA  | V <sub>BE(SAT)</sub> | --  | --  | 1   | V    |
| DC Current Transfer Ratio            | V <sub>CE</sub> = 5V, I <sub>C</sub> = 1mA   | h <sub>FE</sub> 1    | 100 | --  | --  |      |
|                                      | V <sub>CE</sub> = 5V, I <sub>C</sub> = 20mA  | h <sub>FE</sub> 2    | 90  | --  | 300 |      |
| Transition Frequency                 | V <sub>CE</sub> = 10V, I <sub>E</sub> = 20mA | f <sub>T</sub>       | 50  | --  | --  | MHz  |
| Output Capacitance                   | V <sub>CB</sub> = 20V, f = 1MHz              | Cob                  | --  | --  | 7   | pF   |

**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

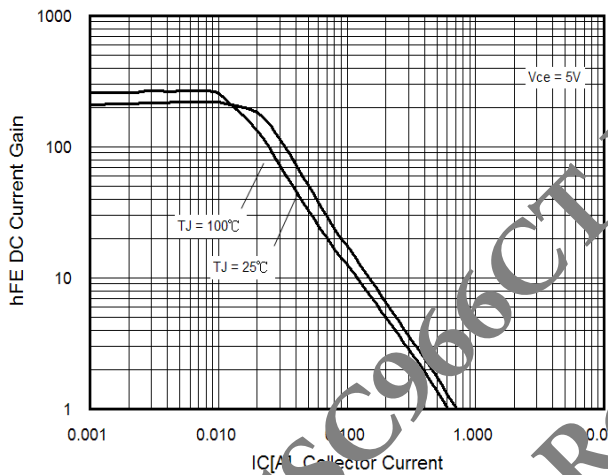
**Figure 1. Static Characteristics**



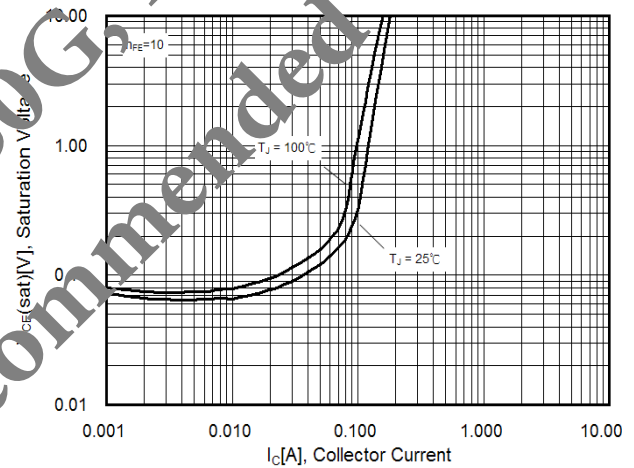
**Figure 2. DC Current Gain**



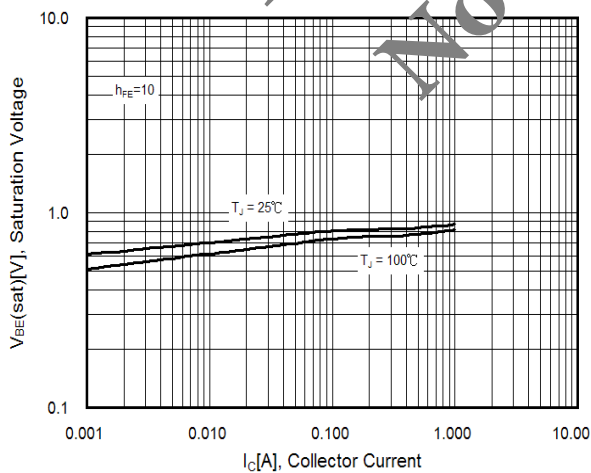
**Figure 3. VCE(SAT) v.s. IC**



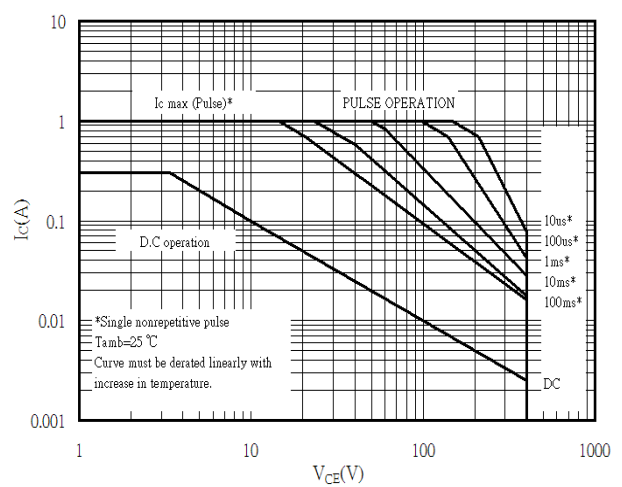
**Figure 4. VBE(sat) vs IC**



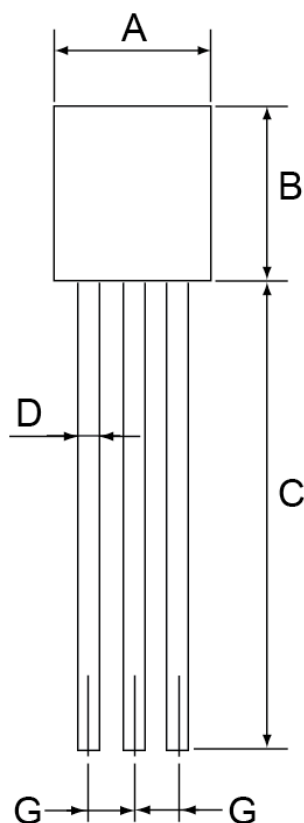
**Figure 5. VBE(on) vs IC**



**Figure 6. Safety Operation Area**



## TO-92 Mechanical Drawing



| TO-92 DIMENSION |             |      |            |       |
|-----------------|-------------|------|------------|-------|
| DIM             | MILLIMETERS |      | INCHES     |       |
|                 | MIN         | MAX  | MIN        | MAX   |
| A               | 4.30        | 4.70 | 0.169      | 0.185 |
| B               | 4.30        | 4.70 | 0.169      | 0.185 |
| C               | 14.30(typ)  |      | 0.563(typ) |       |
| D               | 0.43        | 0.49 | 0.017      | 0.019 |
| E               | 1.18        | 1.28 | 0.046      | 0.050 |
| F               | 3.30        | 3.70 | 0.130      | 0.146 |
| G               | 1.27        | 1.31 | 0.05       | 0.051 |
| H               | 0.37        | 0.43 | 0.015      | 0.017 |

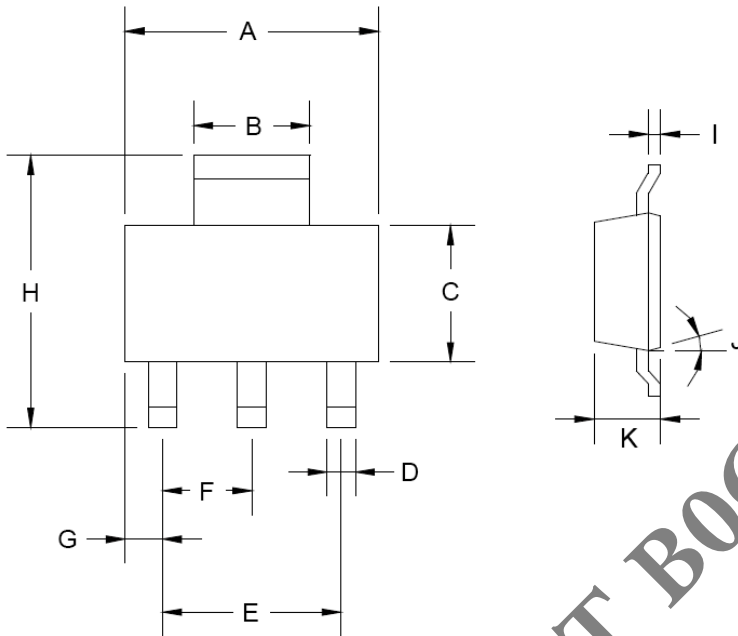
## Marking Diagram



#1

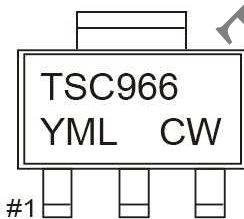
Y = Year Code  
M = Month Code for Halogen Free Product  
O =Jan P =Feb Q =Mar R =Apr  
S =May T =Jun U =Jul V =Aug  
W =Sep X =Oct Y =Nov Z =Dec  
L = Lot Code

## SOT-223 Mechanical Drawing



| SOT-223 DIMENSION |             |       |        |       |
|-------------------|-------------|-------|--------|-------|
| DIM               | MILLIMETERS |       | INCHES |       |
|                   | MIN         | MAX   | MIN    | MAX   |
| A                 | 6.350       | 6.850 | 0.250  | 0.270 |
| B                 | 2.900       | 3.100 | 0.114  | 0.122 |
| C                 | 3.450       | 3.750 | 0.136  | 0.148 |
| D                 | 0.595       | 0.635 | 0.023  | 0.025 |
| E                 | 4.550       | 4.650 | 0.179  | 0.183 |
| F                 | 2.250       | 2.350 | 0.088  | 0.093 |
| G                 | 0.635       | 1.035 | 0.032  | 0.041 |
| H                 | 6.700       | 7.300 | 0.263  | 0.287 |
| I                 | 0.250       | 0.355 | 0.010  | 0.014 |
| J                 | 10°         | 16°   | 10°    | 16°   |
| K                 | 1.550       | 1.800 | 0.061  | 0.071 |

## Marking Diagram



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TSC966CT B0G, A3G  
Not Recommended

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