



# STC05IE150HP

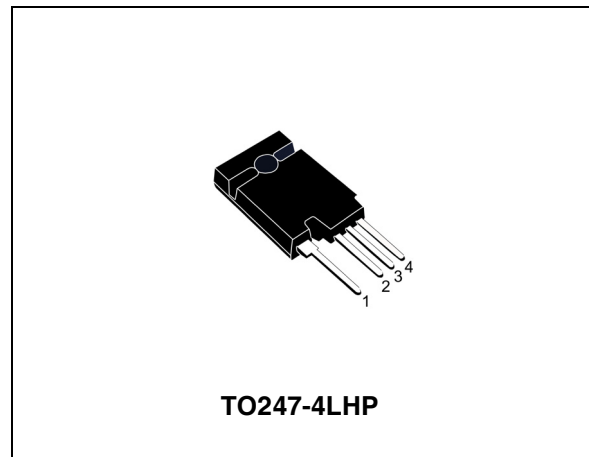
Emitter Switched Bipolar Transistor  
ESBT® 1500 V - 5 A - 0.12  $\Omega$

## Features

| $V_{CS(ON)}$ | $I_C$ | $R_{CS(ON)}$  |
|--------------|-------|---------------|
| 0.6 V        | 5 A   | 0.12 $\Omega$ |

- High voltage / high current Cascode configuration
- Low equivalent on resistance
- Very fast-switch, up to 150 kHz
- Squared rbsoa, up to 1500 V
- Very low  $C_{ISS}$  driven by  $R_G = 47 \Omega$
- Very low turn-off cross over time
- In compliance with the 2002/93/EC European Directive

PRELIMINARY DATA



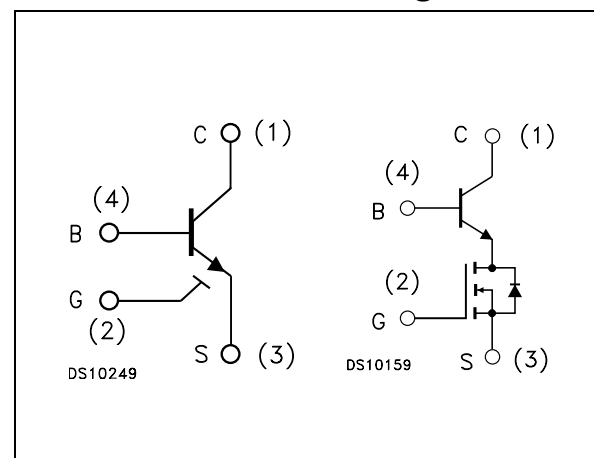
## Applications

- Aux SMPS for three phase mains
- Sepic PFC

## Description

The STC05IE150HP is manufactured in Monolithic ESBT Technology, aimed to provide best performance in high frequency / high voltage applications. it is designed for use in Gate Driven based topologies.

## Internal Schematic Diagram



## Order Codes

| Part Number  | Marking    | Package    | Packaging |
|--------------|------------|------------|-----------|
| STC05IE150HP | C05IE150HP | TO247-4LHP | TUBE      |

# 1 Absolute Maximum Ratings

**Table 1. Absolute Maximum Ratings**

| Symbol       | Parameter                                                   | Value      | Unit             |
|--------------|-------------------------------------------------------------|------------|------------------|
| $V_{CS(SS)}$ | Collector-source voltage ( $V_{BS} = V_{GS} = 0\text{ V}$ ) | 1500       | V                |
| $V_{BS(OS)}$ | Base-source voltage ( $I_C = 0$ , $V_{GS} = 0\text{ V}$ )   | 30         | V                |
| $V_{SB(OS)}$ | source-base voltage ( $i_C = 0$ , $v_{GS} = 0\text{ v}$ )   | 29         | V                |
| $V_{GS}$     | Gate-source Voltage                                         | $\pm 17$   | V                |
| $I_C$        | Collector Current                                           | 5          | A                |
| $I_{CM}$     | Collector peak current ( $t_P < 5\text{ms}$ )               | 15         | A                |
| $I_B$        | Base current                                                | 4          | A                |
| $I_{BM}$     | Base peak current ( $t_P < 1\text{ms}$ )                    | 8          | A                |
| $P_{tot}$    | Total dissipation at $T_c = 25^\circ\text{C}$               | 208        | W                |
| $T_{stg}$    | Storage temperature                                         | -40 to 150 | $^\circ\text{C}$ |
| $T_J$        | Max. operating junction temperature                         | 150        | $^\circ\text{C}$ |

## 1.1 Thermal Data

**Table 2. Thermal Data**

| Symbol         | Parameter                               | Value | Unit               |
|----------------|-----------------------------------------|-------|--------------------|
| $R_{thj-case}$ | Thermal resistance junction-case<br>Max | 0.6   | $^\circ\text{C/W}$ |

## 2 Electrical Characteristics

**Table 3. Electrical Characteristics** ( $T_{CASE} = 25^{\circ}C$ ; unless otherwise specified)

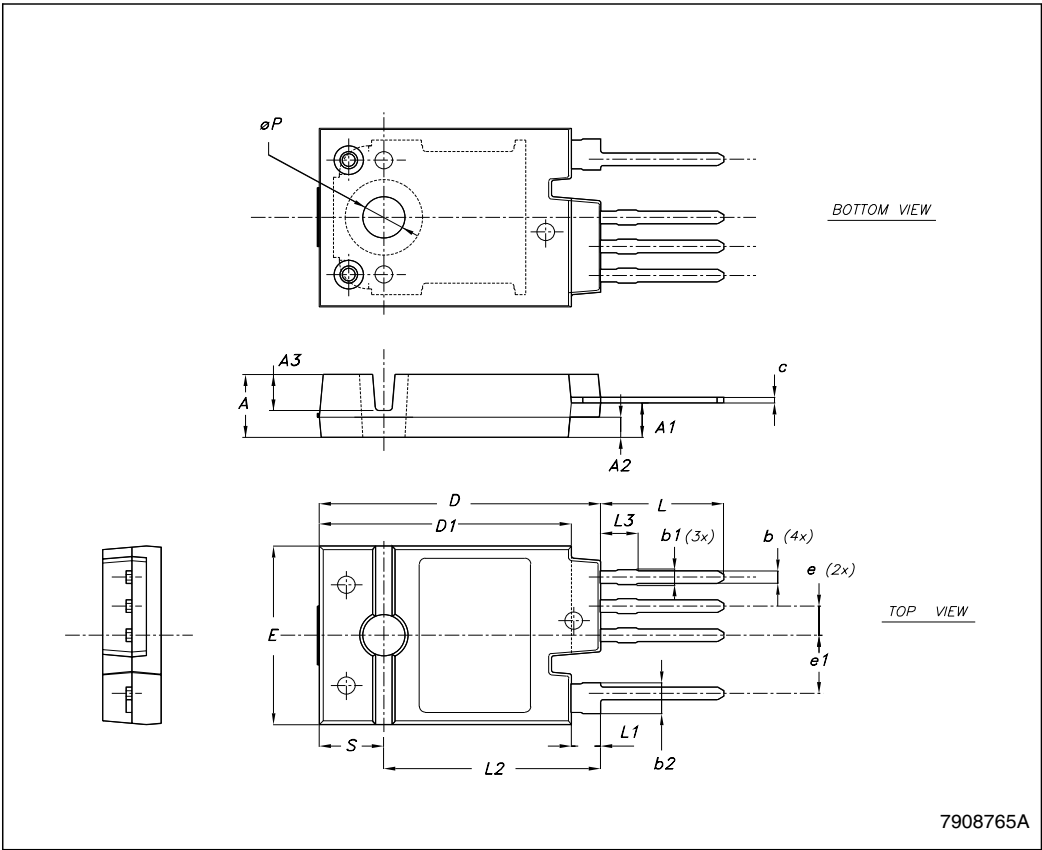
| Symbol         | Parameter                                             | Test Conditions                                                                                          | Min.   | Typ.       | Max.       | Unit     |
|----------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------|------------|------------|----------|
| $I_{CS(SS)}$   | Collector-source current<br>( $V_{BS} = V_{GS} = 0$ ) | $V_{CE} = 1500V$                                                                                         |        |            | 100        | $\mu A$  |
| $I_{BS(OS)}$   | Base-source current<br>( $I_C = 0, V_{GS} = 0 V$ )    | $V_{BS(OS)} = 30 V$                                                                                      |        |            | 10         | $\mu A$  |
| $I_{SB(OS)}$   | Source-base current<br>( $I_C = 0, V_{GS} = 0$ )      | $V_{SB(OS)} = 20 V$                                                                                      |        |            | 100        | $\mu A$  |
| $I_{GS(OS)}$   | Gate-source leakage                                   | $V_{GS} = \pm 17 V$                                                                                      |        |            | 100        | nA       |
| $V_{CS(ON)}$   | Collector-source ON voltage                           | $V_{GS} = 10 V \quad I_C = 5 A \quad I_B = 1.0 A$<br>$V_{GS} = 10 V \quad I_C = 2 A \quad I_B = 0.2 A$   |        | 0.6<br>0.8 | 1.2<br>1.5 | V<br>V   |
| $h_{FE}$       | DC current gain                                       | $V_{GS} = 10 V \quad V_{CS} = 1 V \quad I_C = 5 A$<br>$V_{GS} = 10 V \quad V_{CS} = 1 V \quad I_C = 2 A$ | 4<br>8 | 6<br>11    |            |          |
| $V_{BS(ON)}$   | Base-source ON voltage                                | $V_{GS} = 10 V \quad I_C = 5 A \quad I_B = 1 A$<br>$V_{GS} = 10 V \quad I_C = 2 A \quad I_B = 0.2 A$     |        | 1.3<br>1.0 | 1.5<br>1.2 | V<br>V   |
| $V_{GS(th)}$   | Gate threshold voltage                                | $V_{BS} = V_{GS} \quad I_B = 250 \mu A$                                                                  | 2      | 3          | 4          | V        |
| $C_{ISS}$      | Input capacitance                                     | TBD                                                                                                      |        | TBD        |            | pF       |
| $Q_{GS(tot)}$  | Gate-source charge                                    | TBD                                                                                                      |        | TBD        |            | nC       |
| $t_s$<br>$t_f$ | INDUCTIVE LOAD<br>Storage time<br>Fall time           | TBD                                                                                                      |        | TBD<br>TBD |            | ns<br>ns |

### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com)

TO247-4LHP MECHANICAL DATA

| DIM. | mm.   |       |       |
|------|-------|-------|-------|
|      | MIN.  | TYP   | MAX.  |
| A    | 5.50  | 5.65  | 5.80  |
| A1   | 2.85  | 3.15  | 3.25  |
| A2   |       | 1.92  |       |
| A3   |       | 3.18  |       |
| b    | 0.95  | 1.10  | 1.30  |
| b1   | 1.10  |       | 1.50  |
| b2   | 2.50  |       | 2.90  |
| c    | 0.40  |       | 0.80  |
| D    | 23.85 | 24    | 24.15 |
| D1   |       | 21.50 |       |
| E    | 15.45 | 15.60 | 15.75 |
| e    | 2.54  |       |       |
| e1   |       | 5.08  |       |
| L    | 10.20 |       | 10.80 |
| L1   | 2.20  | 2.50  | 2.80  |
| L2   |       | 18.50 |       |
| L3   |       | 3     |       |
| øP   | 3.55  |       | 3.65  |
| S    |       | 5.50  |       |



## 4 Revision History

| Date        | Revision | Changes                           |
|-------------|----------|-----------------------------------|
| 10-Mar-2006 | 1        | Initial release.                  |
| 29-Nov-2006 | 2        | The document has been reformatted |

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