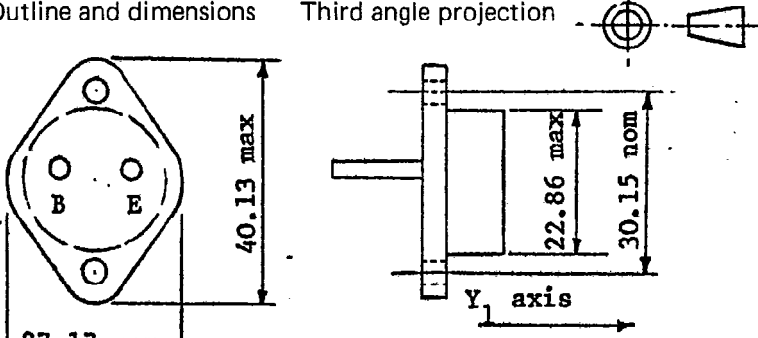


|                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>BRITISH STANDARDS INSTITUTION</b><br/>                 2, PARK STREET, LONDON, W1A 2BS</p> <p>Specification available from:— AS SHOWN IN PD 9002<br/>                 CECC 00200 AND</p> <p>TEXAS INSTRUMENTS LIMITED,<br/>                 MANTON LANE, BEDFORD, MK41 7PA</p> <p>TELEPHONE : BEDFORD 67466      TELEX : 82178</p>                               | <p>BS CECC 50 004-118<br/>                 ISSUE 1<br/>                 SEPTEMBER 1982</p> <p>Page 1 of 23 Pages</p>                                                                                                                                                                                                                                  |
| <p><b>ELECTRONIC COMPONENTS OF ASSESSED QUALITY</b><br/>                 DETAIL SPECIFICATION IN ACCORDANCE WITH<br/>                 BS CECC 50 000 : 1981</p>                                                                                                                                                                                                        | <p>MANUFACTURER'S TYPE NUMBER<br/>                 TIPL 755, TIPL 755A</p>                                                                                                                                                                                                                                                                            |
| <p>1. Outline and dimensions      Third angle projection</p>  <p>The collector is in electrical contact with the case.</p> <p>Outline BS 3934 S0-127A<br/>                 IEC 191-2 C14A B18. Dimensions in millimetres.<br/>                 Marking information - See Clause 6</p> | <p>SEE PD 9002 AND CECC 00200<br/>                 For ordering information<br/>                 see Clause 7</p> <p>2. CASE RATED BIPOLAR POWER TRANSISTORS FOR HIGH VOLTAGE SWITCHING APPLICATIONS.</p> <p>NPN TRIPLE DIFFUSED SILICON PLANAR TRANSISTORS IN HERMETICALLY SEALED METAL CASE.</p> <p>3. ASSESSMENT LEVEL F PLUS ADDITIONAL TESTS</p> |

4. LIMITING VALUES (absolute maximum system)

These apply over the operating temperature range unless otherwise stated.

|      |            |                                  |                   |
|------|------------|----------------------------------|-------------------|
| 4.1. | $T_{case}$ | Case operating temperature range | -65 °C to +200 °C |
| 4.2. | $T_{stg}$  | Storage temperature range        | -65 °C to +200 °C |

Voltage Ratings ( $T_{case} = -65\text{ °C to }+125\text{ °C}$ . See Fig. 1)

|      |                                                                       | TIPL 755 | TIPL 755A |
|------|-----------------------------------------------------------------------|----------|-----------|
| 4.3. | $V_{CBO}$ Collector-base continuous (direct) voltage. $I_E = 0$       | 800V     | 1000V     |
| 4.4. | $V_{CES}$ Collector-emitter continuous (direct) voltage. $V_{BE} = 0$ | 800V     | 1000V     |
|      | $V_{CEO}$ Collector-emitter continuous (direct) voltage. $I_B = 0$    | 375V     | 420V      |
| 4.5. | $V_{EBO}$ Emitter-base continuous (direct) voltage. $I_C = 0$         | 10V      | 10V       |

Refer to Qualified Products List PD 9002 and/or CECC 00200 for details of manufacturers approved to this specification.

Current Ratings

|      |          |                                                                 |     |
|------|----------|-----------------------------------------------------------------|-----|
| 4.6. | $I_C$    | Continuous collector current                                    | 10A |
|      | $I_{CM}$ | Peak collector current<br>(pulse width 10ms)<br>(duty cycle 2%) | 15A |

4.9. Power Ratings

|        |           |                                          |      |
|--------|-----------|------------------------------------------|------|
| 4.9.1. | $P_{tot}$ | Total power dissipation (see Figs 2 & 3) | 180W |
|--------|-----------|------------------------------------------|------|

5. CHARACTERISTICS (not for inspection purposes) at  $T_{case} = 25^\circ C$  unless otherwise stated.

|      |                          |                                                                                                                                          |                        |
|------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|      | $V_{CEQ(sus)}$           | Collector-emitter sustaining voltage<br>Inductive loop switching measurement<br>$I_C = 100mA, L = 25\text{ mH}$<br>TIPL 755<br>TIPL 755A | 375V min.<br>420V min. |
| 5.1. | $\dagger h_{21E}$        | Static forward current transfer ratio<br>$V_{CE} = 5V, I_C = 500mA^*$                                                                    | 15 min. 60 max.        |
| 5.2. | $\dagger V_{CE(sat)}(1)$ | Collector-emitter saturation voltage<br>$I_C = 10A, I_B = 2A^*$                                                                          | 2.5V max.              |
|      | $\dagger V_{CE(sat)}(3)$ | Collector-emitter saturation voltage<br>$I_C = 5A, I_B = 1A$                                                                             | 1V max.                |
|      | $\dagger V_{CE(sat)}(4)$ | Collector-emitter saturation voltage<br>$I_C = 2A, I_B = 400mA^*$                                                                        | 0.5V max.              |
|      | $V_{CE(sat)}(5)$         | Collector-emitter saturation voltage<br>$I_C = 10A, I_B = 2A^* T_{case} = 100^\circ C$                                                   | 5V max.                |
| 5.4. | $\dagger V_{BE(sat)}(1)$ | Base-emitter saturation voltage<br>$I_C = 10A, I_B = 2A^*$                                                                               | 1.8V max.              |
|      | $\dagger V_{BE(sat)}(3)$ | Base-emitter saturation voltage<br>$I_C = 5A, I_B = 1A^*$                                                                                | 1.3V max.              |
|      | $\dagger V_{BE(sat)}(4)$ | Base-emitter saturation voltage<br>$I_C = 2A, I_B = 400mA^*$                                                                             | 1.1V max.              |
|      | $V_{BE(sat)}(5)$         | Base-emitter saturation voltage<br>$I_C = 10A, I_B = 2A^*$<br>@ $T_{case} = 100^\circ C$                                                 | 1.7V max.              |

\* These parameters are measured under pulsed conditions. Pulse width = 300 $\mu$ S  
Duty Cycle = 2%

$\dagger$  Measured in Groups A or C

- 2 -

|      |                      |                                   |           |             |      |
|------|----------------------|-----------------------------------|-----------|-------------|------|
| 5.5. | $\dagger I_{CES(1)}$ | Collector-emitter cut-off current |           |             |      |
|      |                      | $V_{CE} = 800V$                   | TIPL 755  | 1 $\mu A$   | max. |
|      |                      | $V_{CE} = 1000V$                  | TIPL 755A | 1 $\mu A$   | max. |
|      | $\dagger I_{CEO(1)}$ | Collector-emitter cut-off current |           |             |      |
|      |                      | $V_{CE} = 375V$                   | TIPL 755  | 1 $\mu A$   | max. |
|      |                      | $V_{CE} = 420V$                   | TIPL 755A | 1 $\mu A$   | max. |
| 5.6. | $\dagger I_{CES(2)}$ | Collector-emitter leakage current |           |             |      |
|      |                      | @ $T_{case} = 100^{\circ}C$       |           |             |      |
|      |                      | $V_{CE} = 800V$                   | TIPL 755  | 100 $\mu A$ | max. |
|      |                      | $V_{CE} = 1000V$                  | TIPL 755A | 100 $\mu A$ | max. |
|      | $I_{EBO}$            | Emitter-base cut-off current      |           |             |      |
|      |                      | $V_{EB} = 10V$                    | $I_C = 0$ | 1 mA        | max. |

## 5.7. SWITCHING CHARACTERISTICS

### 5.7.1. $\dagger$ Resistive Load (see Figs. 5 & 6)

|                                           |              |              |      |
|-------------------------------------------|--------------|--------------|------|
| $t_{on}$                                  | Turn on time | 0.75 $\mu s$ | max. |
| $t_s$                                     | Storage time | 2.0 $\mu s$  | max. |
| $t_f$                                     | Fall time    | 0.50 $\mu s$ | max. |
| $I_C = 10A, V_{CC} = 250V, I_{BON} = 2A$  |              |              |      |
| $I_{BOFF} = 2.5A, T_{case} = 25^{\circ}C$ |              |              |      |

$\dagger$  Measured in Groups A or C

BS CECC 50 004-118  
ISSUE 1  
SEPTEMBER 1982

5.7.1. Inductive Load (see Figs. 7 & 8)

|                  |                                       |                                     |         |                        |
|------------------|---------------------------------------|-------------------------------------|---------|------------------------|
| $t_{sv}$         | Voltage storage time                  | 3.00                                | $\mu s$ | max.                   |
| $t_{rv}$         | Voltage rise time                     | 0.30                                | $\mu s$ | max.                   |
| $t_{fc}$         | Current fall time                     | 0.20                                | $\mu s$ | max.                   |
| $t_{ti}$         | Current tail time                     | 0.05                                | $\mu s$ | max.                   |
| $t_{xo}$         | Crossover time                        |                                     |         |                        |
|                  | $I_C = 10A, I_{Bon} = 2A,$            | 0.40                                | $\mu s$ | max                    |
|                  | $V_{BB} = 5V, T_{case} = 25^\circ C$  |                                     |         |                        |
| $\dagger t_{sv}$ | Voltage storage time                  | 3.50                                | $\mu s$ | max.                   |
| $t_{rv}$         | Voltage rise time                     | 0.40                                | $\mu s$ | max.                   |
| $\dagger t_{fi}$ | Current fall time                     | 0.30                                | $\mu s$ | max.                   |
| $t_{ti}$         | Current fail time                     | 0.08                                | $\mu s$ | max.                   |
| $\dagger t_{xo}$ | Crossover time                        | 0.50                                | $\mu s$ | max.                   |
|                  | $I_C = 10A, I_{Bon} = 2A,$            |                                     |         |                        |
|                  | $V_{BB} = 5V, T_{case} = 100^\circ C$ |                                     |         |                        |
| 5.9.             | $R_{th(j,case)}$                      | Thermal resistance junction to case | 0.97    | $^{\circ}CW^{-1}$ max. |

$\dagger$  Measured in Groups A or C

## 6.0 MARKING

6.1. Each device shall bear the following markings:-

- (a) Terminal identification
- (b) Type Number
- (c) Date Code
- (d) Manufacturer's trade mark or factory identification code.
- (e) Mark of conformity unless a Certificate of Conformity is used.

6.2. Each package containing one or more of these transistors shall bear the above markings b, c and d, and in addition, this detail specification number BS CECC 50 004-118.

## 7.0 ORDERING INFORMATION

The following minimum information is necessary to order a specific device, unless otherwise specified.

- precise type number
- CECC reference of detail specification with issue number and/or date when relevant.
- level of quality assessment as defined in Appendix IIA of CECC 50 000, and, if required, screening sequence as defined in Appendix VI of CECC 50 000.
- any other particulars

Example:- Type number-Detail specification number-Issue number-Level

## RELATED DOCUMENTS

|                                    |                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------|
| BS 2011/IEC 68                     | Methods for the environmental testing of electronic components and electronic equipment. |
| BS 3934/IEC 191                    | Dimensions of semiconductor devices.                                                     |
| BS E9000/<br>CECC 00 100 to 00 113 | General requirements for electronic components of assessed quality.                      |
| BS E9007/CECC 00 007               | Sampling plans and procedures for inspection by attributes.                              |
| BS/CECC 50 000                     | Harmonised generic specification for discrete semiconductor devices.                     |
| IEC 147-2                          | General principles of measuring methods.                                                 |
| PD 9002/CECC 00 200                | Component selection guide.                                                               |

## 8. INSPECTION REQUIREMENTS

ALL TESTS ARE NON-DESTRUCTIVE

GROUP A  
LOT BY LOT

| EXAMINATION<br>OR<br>TEST                                                                                                                                                                     | BS<br>CECC<br>50000<br>REF            | CONDITIONS<br>at $T_{amb} = 25^{\circ}C$<br>unless otherwise stated                                                                                             | INSPECTION REQUIREMENTS       |                                         |                                                       |                     |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------|-------------------------------------------------------|---------------------|-------|
|                                                                                                                                                                                               |                                       |                                                                                                                                                                 | LIMITS                        |                                         |                                                       | LEVEL OF<br>ASSMT F |       |
|                                                                                                                                                                                               |                                       |                                                                                                                                                                 | MIN                           | MAX                                     | UNIT                                                  | IL                  | AQL   |
| <u>SUBGROUP A1</u><br>Visual Inspection                                                                                                                                                       | 4.2.1.                                |                                                                                                                                                                 |                               |                                         |                                                       | I                   | 0.65% |
| <u>SUBGROUP A2a</u><br>Non-Operatives                                                                                                                                                         | 4.3.4.                                | Device considered to be open circuit if $h_{21E} < 5$ .<br><br>Device considered to be short circuit if $I_{CES(1)} > 100mA$ .                                  |                               |                                         |                                                       | II                  | .15%  |
| <u>SUBGROUP A2b</u><br><br>Collector-emitter cut-off current<br>$I_{CES(1)}$<br><br>Collector cut-off current<br>$I_{CEO(1)}$<br><br>Collector-emitter saturation voltage<br>$V_{CE(sat)(1)}$ | 4.3.4.<br><br><br><br>4.3.4.<br>T.009 | $V_{CE} = 800V$ TIPL 755<br>$= 1000V$ TIPL 755A<br>$V_{BE} = 0$<br><br>$V_{CE} = 375V$ TIPL 755<br>$= 420V$ TIPL 755A<br>$I_B = 0$<br>$I_C = 10A$<br>$I_B = 2A$ | -<br>-<br><br>-<br>-<br><br>- | 1.0<br>1.0<br><br>1.0<br>1.0<br><br>2.5 | $\mu A$<br>$\mu A$<br><br>$\mu A$<br>$\mu A$<br><br>V | II                  | 0.65% |

## 8. INSPECTION REQUIREMENTS

ALL TESTS ARE NON-DESTRUCTIVE

GROUP A  
LOT BY LOT

| EXAMINATION<br>OR<br>TEST                             | BS<br>CECC<br>50000<br>REF | CONDITIONS<br><br>at T <sub>amb</sub> = 25 °C<br><br>unless otherwise stated | INSPECTION REQUIREMENTS |      |      |                     |      |
|-------------------------------------------------------|----------------------------|------------------------------------------------------------------------------|-------------------------|------|------|---------------------|------|
|                                                       |                            |                                                                              | LIMITS                  |      |      | LEVEL OF<br>ASSMT F |      |
|                                                       |                            |                                                                              | MIN                     | MAX  | UNIT | IL                  | AQL  |
| <u>SUBGROUP A3</u>                                    |                            |                                                                              |                         |      |      | I                   | 4.0% |
| Forward current<br>transfer ratio<br>h <sub>21E</sub> | 4.3.4.<br>T.006            | V <sub>CE</sub> = 5V<br>I <sub>C</sub> = 500mA                               | 15.0                    | 60.0 |      |                     |      |
| Collector-<br>emitter<br>saturation<br>voltage        | 4.3.4.<br>T.003            |                                                                              |                         |      |      |                     |      |
| V <sub>CE(sat)</sub> (3)                              |                            | I <sub>C</sub> = 5A, I <sub>B</sub> = 1A                                     | -                       | 1.0  | V    |                     |      |
| V <sub>CE(sat)</sub> (4)                              |                            | I <sub>C</sub> = 2A, I <sub>B</sub> = 400mA                                  | -                       | 0.5  | V    |                     |      |
| Base-emitter<br>saturation<br>voltage                 | 4.3.4.<br>T.004            |                                                                              |                         |      |      |                     |      |
| V <sub>BE(sat)</sub> (1)                              |                            | I <sub>C</sub> = 10A<br>I <sub>B</sub> = 2A                                  | -                       | 1.8  | V    |                     |      |
| V <sub>BE(sat)</sub> (3)                              |                            | I <sub>C</sub> = 5A<br>I <sub>B</sub> = 1A                                   | -                       | 1.3  | V    |                     |      |
| V <sub>BE(sat)</sub> (4)                              |                            | I <sub>C</sub> = 2A<br>I <sub>B</sub> = 400mA                                | -                       | 1.1  | V    |                     |      |