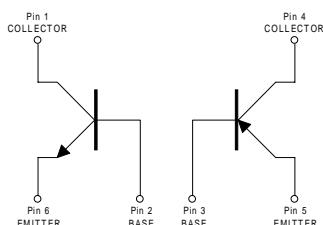
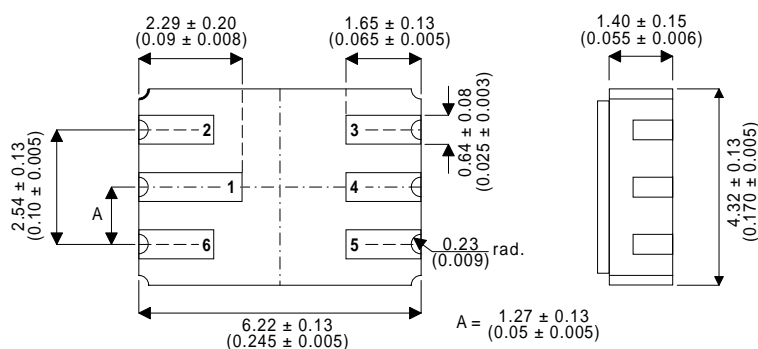
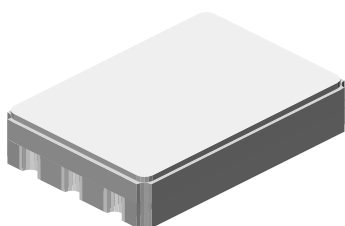


## MECHANICAL DATA

Dimensions in mm (inches)

### LCC2 – Ceramic Surface Mount Package



## COMPLEMENTARY SWITCHING TRANSISTORS IN A HERMETICALLY SEALED CERAMIC SURFACE MOUNT PACKAGE FOR HIGH RELIABILITY APPLICATIONS

### FEATURES

- SILICON PLANAR EPITAXIAL NPN /PNP TRANSISTORS
- HERMETIC CERAMIC SURFACE MOUNT PACKAGE
- CECC SCREENING OPTIONS
- SPACE QUALITY LEVELS OPTIONS
- HIGH SPEED SATURATED SWITCHING

### DESCRIPTION

Hermetically sealed surface mount complementary transistor pair.

The HCT700 transistor die have similar electrical characteristics to the 2N2222A on the NPN side and the 2N2907A on the PNP side.

The HCT700 is ideal for high reliability and space applications requiring small size and low weight devices.

### ABSOLUTE MAXIMUM RATINGS

( $T_{case} = 25^{\circ}C$  unless otherwise stated)

|                |  | NPN                     | PNP   |
|----------------|--|-------------------------|-------|
| $V_{CBO}$      | Collector – Base Voltage                               | 75                      | 60    |
| $V_{CEO}$      | Collector – Emitter Voltage                            | 50                      | 60    |
| $V_{EBO}$      | Emitter – Base Voltage                                 | 6.0                     | 5.0   |
| $I_C$          | Continuous Collector Current                           | 800mA                   | 600mA |
| $P_D$          | Power Dissipation @ $T_{amb} = 25^{\circ}C$            | 0.4W                    |       |
| $P_D$          | Power Dissipation @ $T_{substrate} = 25^{\circ}C$      | 2.0W                    |       |
|                | Derate above $25^{\circ}C$                             | 11.4mW / $^{\circ}C$    |       |
|                | NPN to PNP Isolation Voltage                           | 500V                    |       |
| $T_J, T_{stg}$ | Operating and Storage Temperature Range                | -65 to +200 $^{\circ}C$ |       |
| $T_L$          | Soldering temperature (Vapour phase reflow for 30 sec) | 215 $^{\circ}C$         |       |
| $T_L$          | Soldering temperature (Heated collet for 5 sec)        | 260 $^{\circ}C$         |       |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$  unless otherwise stated)

| Parameter                           |  | Test Conditions   |  | NPN  |      | PNP  |      | Unit          |               |
|-------------------------------------|--|---|--|------|------|------|------|---------------|---------------|
|                                     |  |   |  | Min. | Max. | Min. | Max. |               |               |
| <b>Off Characteristics</b>          |  |   |  |      |      |      |      |               |               |
| $V_{(BR)CBO}$                       | Collector – Base Breakdown Voltage     | $I_C = 10\mu\text{A}$                                       | $I_E = 0$                                      | 75   |      | 60   |      | V             |               |
| $V_{(BR)CEO}$                       | Collector – Emitter Breakdown Voltage  | $I_C = 10\text{mA}$   | $I_B = 0$                                      | 50   |      | 60   |      | V             |               |
| $V_{(BR)EBO}$                       | Emitter – Base Breakdown Voltage       | $I_E = 10\mu\text{A}$                                       | $I_C = 0$                                      | 6.0  |      | 5.0  |      | V             |               |
| $I_{CBO}$                           | Collector – Base<br>Cut-off Current    | $I_E = 0$<br>$T_{amb} = 25^{\circ}\text{C}$                 | $V_{CB} = 60\text{V}$                          |      | 10   |      |      | nA            |               |
|                                     |  |   | $V_{CB} = 50\text{V}$                          |      |      |      | 10   | nA            |               |
|                                     |  | $I_E = 0$<br>$T_{amb} = 150^{\circ}\text{C}$                | $V_{CB} = 60\text{V}$                          |      | 10   |      |      |               | $\mu\text{A}$ |
|                                     |  |   | $V_{CB} = 50\text{V}$                          |      |      |      | 10   |               | $\mu\text{A}$ |
| $I_{EBO}$                           | Emitter – Base Cut-off Current         | $I_C = 0$<br>$T_{amb} = 25^{\circ}\text{C}$                 | $V_{EB} = 4\text{V}$<br>$V_{EB} = 3.5\text{V}$ |      | 10   |      | 50   | nA            |               |
| $I_{CES}$                           | Collector – Emitter Cut-off Current    | $V_{CE} = 50\text{V}$                                       |  |      | 1.0  |      |      | $\mu\text{A}$ |               |
| <b>On Characteristics</b>           |  |   |  |      |      |      |      |               |               |
| $h_{FE}$                            | DC Current Gain                        | $V_{CE} = 10\text{V}$                                       | $I_C = 0.1\text{mA}$                           | 50   |      | 75   |      |               |               |
|                                     |  | $V_{CE} = 10\text{V}$                                       | $I_C = 1\text{mA}$                             | 75   | 325  | 100  | 450  |               |               |
|                                     |  | $V_{CE} = 10\text{V}$                                       | $I_C = 10\text{mA}$                            | 100  |      | 100  |      |               |               |
|                                     |  | $V_{CE} = 10\text{V}$                                       | $I_C = 150\text{mA}^1$                         | 100  | 300  | 100  | 300  | —             |               |
|                                     |  | $V_{CE} = 10\text{V}$                                       | $I_C = 500\text{mA}^1$                         | 30   |      | 50   |      |               |               |
|                                     |  | $V_{CE} = 10\text{V}$<br>$T_{amb} = -55^{\circ}\text{C}$    | $I_C = 10\text{mA}$<br>$I_C = 1\text{mA}$      | 35   |      |      | 50   |               |               |
| $V_{CE(SAT)}$                       | Collector – Emitter Saturation Voltage | $I_C = 150\text{mA}$  | $I_B = 15\text{mA}^1$                          |      | 0.30 |      | 0.40 | V             |               |
|                                     |  | $I_C = 500\text{mA}$  | $I_B = 50\text{mA}^1$                          |      | 1.00 |      | 1.60 | V             |               |
| $V_{BE(SAT)}$                       | Base – Emitter Saturation Voltage      | $I_C = 150\text{mA}$  | $I_B = 15\text{mA}^1$                          | 0.60 | 1.20 |      | 1.30 | V             |               |
|                                     |  | $I_C = 500\text{mA}$  | $I_B = 50\text{mA}^1$                          |      | 2.00 |      | 2.60 | V             |               |
| <b>Small Signal Characteristics</b> |  |   |  |      |      |      |      |               |               |
| $h_{fe}$                            | Small Signal Current Gain              | $V_{CE} = 10\text{V}$<br>$f = 1\text{kHz}$                  | $I_C = 1\text{mA}$                             | 50   |      | 100  |      | —             |               |
| $ h_{fe} $                          | Small Signal Current Gain              | $V_{CE} = 20\text{V}$<br>$f = 100\text{MHz}$                | $I_C = 20\text{mA}$                            | 2.5  |      |      |      | —             |               |
|                                     |  |   | $I_C = 50\text{mA}$                            |      |      | 2.0  |      |               |               |
| $C_{obo}$                           | Output Capacitance                     | $V_{CE} = 10\text{V}$ $f = 100\text{kHz}$ to $1\text{MHz}$  |  |      | 8.0  |      | 8.0  | pF            |               |
| $C_{ibo}$                           | Input Capacitance                      | $V_{EB} = 2\text{V}$ $f = 100\text{kHz}$ to $1\text{MHz}$   |  |      | 25   |      |      | pF            |               |
|                                     |  | $V_{EB} = 0.5\text{V}$ $f = 100\text{kHz}$ to $1\text{MHz}$ |  |      |      |      | 30   | pF            |               |
| <b>Small Signal Characteristics</b> |  |   |  |      |      |      |      |               |               |
| $t_{on}$                            | Turn On Time                           | $V_{CC} = 30\text{V}$<br>$I_{B1} = 15\text{mA}$             | $I_C = 150\text{mA}$                           |      | 35   |      | 45   | ns            |               |
| $t_{off}$                           | Turn Off Time                          | $V_{CC} = 30\text{V}$<br>$I_{B1} = I_{B2} = 15\text{mA}$    | $I_C = 150\text{mA}$                           |      | 300  |      | 300  | ns            |               |

<sup>1</sup> Pulse Test: Pulse Width  $\leq 300\text{ms}$ ,  $\delta \leq 2\%$