

**Transistor (NPN)****13003****HSiN Semiconductor Pte Ltd****www.hsin.com.sg****13003** TRANSISTOR ( NPN )**FEATURES**

Power dissipation

 $P_{CM} : 1.5 \text{ W ( } T_{amb}=25 \text{ )}$ 

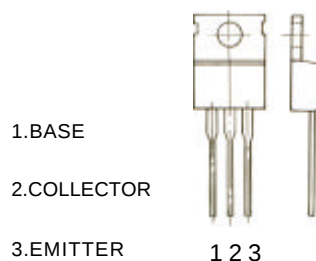
Collector current

 $I_{CM} : 1.5 \text{ A}$ 

Collector-base voltage

 $V_{(BR)CBO} : 700 \text{ V}$ 

Operating and storage junction temperature range

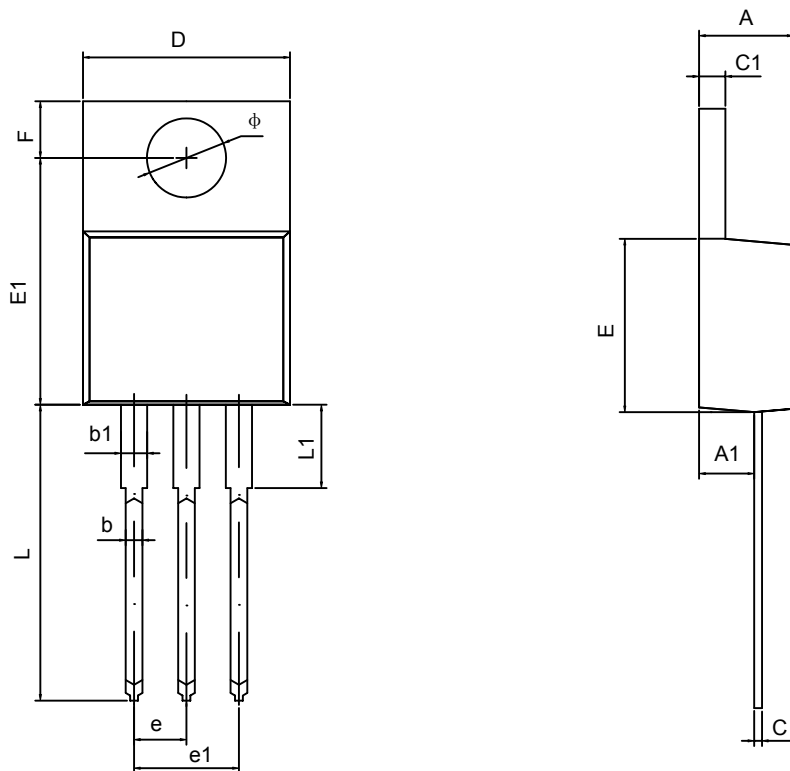
 $T_J, T_{stg} : -55 \text{ to } +150$ **TO—220****ELECTRICAL CHARACTERISTICS (  $T_{amb}=25$  unless otherwise specified )**

| Parameter                            | Symbol        | Test conditions                                                                   | MIN | TYP | MAX  | UNIT    |
|--------------------------------------|---------------|-----------------------------------------------------------------------------------|-----|-----|------|---------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C = 1000 \mu A, I_E = 0$                                                       | 700 |     |      | V       |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C = 10 \text{ mA}, I_B = 0$                                                    | 400 |     |      | V       |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E = 1000 \mu A, I_C = 0$                                                       | 9   |     |      | V       |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 700 \text{ V}, I_E = 0$                                                 |     |     | 1000 | $\mu A$ |
| Collector cut-off current            | $I_{CEO}$     | $V_{CE} = 400 \text{ V}, I_B = 0$                                                 |     |     | 500  | $\mu A$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 9 \text{ V}, I_C = 0$                                                   |     |     | 1000 | $\mu A$ |
| DC current gain                      | $h_{FE(1)}$   | $V_{CE} = 2 \text{ V}, I_C = 0.5 \text{ A}$                                       | 8   |     | 40   |         |
|                                      | $h_{FE(2)}$   | $V_{CE} = 10 \text{ V}, I_C = 0.5 \text{ mA}$                                     | 5   |     |      |         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 1000 \text{ mA}, I_B = 250 \text{ mA}$                                     |     |     | 1    | V       |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C = 1000 \text{ mA}, I_B = 250 \text{ mA}$                                     |     |     | 1.2  | V       |
| Base-emitter voltage                 | $V_{BE}$      | $I_E = 2000 \text{ mA}$                                                           |     |     | 3    | V       |
| Transition frequency                 | $f_T$         | $I_C = 100 \text{ mA}, V_{CE} = 10 \text{ V}$<br>$f = 1 \text{ MHz}$              | 5   |     |      | MHz     |
| Fall time                            | $t_f$         | $V_{CC} = 100 \text{ V}, I_C = 1 \text{ A}$<br>$I_{B1} = -I_{B2} = 0.2 \text{ A}$ |     |     | 0.5  | $\mu S$ |
| Storage time                         | $t_s$         |                                                                                   |     |     | 2.5  | $\mu S$ |

**CLASSIFICATION OF  $h_{FE(1)}$** 

| Rank  |      |       |       |       |       |       |
|-------|------|-------|-------|-------|-------|-------|
| Range | 8-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |

## TO-220-3L PACKAGE OUTLINE DIMENSIONS



| Symbol    | Dimensions In Millimeters |        | Dimensions In Inches |       |
|-----------|---------------------------|--------|----------------------|-------|
|           | Min                       | Max    | Min                  | Max   |
| <b>A</b>  | 4.470                     | 4.670  | 1.176                | 0.184 |
| <b>A1</b> | 2.520                     | 2.820  | 0.099                | 0.111 |
| <b>b</b>  | 0.710                     | 0.910  | 0.028                | 0.036 |
| <b>b1</b> | 1.170                     | 1.370  | 0.046                | 0.054 |
| <b>c</b>  | 0.310                     | 0.530  | 0.012                | 0.021 |
| <b>c1</b> | 1.710                     | 1.370  | 0.046                | 0.054 |
| <b>D</b>  | 10.010                    | 10.310 | 0.394                | 0.406 |
| <b>E</b>  | 8.500                     | 8.900  | 0.335                | 0.350 |
| <b>E1</b> | 12.060                    | 12.460 | 0.475                | 0.491 |
| <b>e</b>  | 2.540TYP                  |        | 0.100TYP             |       |
| <b>e1</b> | 4.980                     | 5.180  | 0.196                | 0.204 |
| <b>F</b>  | 2.590                     | 2.890  | 0.102                | 0.114 |
| <b>L</b>  | 13.400                    | 13.800 | 0.528                | 0.543 |
| <b>L1</b> | 3.560                     | 3.960  | 0.140                | 0.156 |
| $\phi$    | 3.790                     | 3.890  | 0.149                | 0.153 |

