

/ Descriptions

Silicon NPN transistor in a DFN1006-3L Plastic Package.

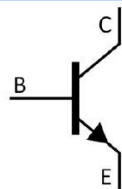
/ Features

Low current, Low voltage, HF Product.

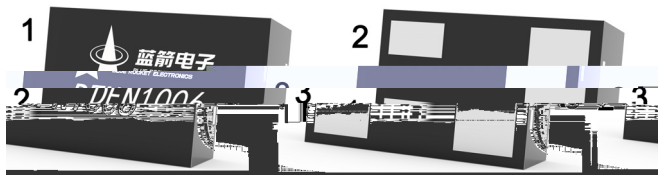
/ Applications

General purpose amplifier and switching.

/ Equivalent Circuit



/ Pinning



PIN 1   Base      PIN 2   Emitter      PIN 3   Collector

/ h<sub>FE</sub> Classifications & Marking

|                       |           |
|-----------------------|-----------|
| h <sub>FE</sub> Range | 100   300 |
| Marking               | · H1AK    |

## / Absolute Maximum Ratings(Ta=25 )

| Parameter                               | Symbol     | Rating  | Unit |
|-----------------------------------------|------------|---------|------|
| Collector to Base Voltage               | $V_{CBO}$  | 60      | V    |
| Collector to Emitter Voltage            | $V_{CEO}$  | 40      | V    |
| Emitter to Base Voltage                 | $V_{EBO}$  | 6.0     | V    |
| Collector Current                       | $I_C$      | 200     | mA   |
| *Collector Power Dissipation            | $P_C$      | 100     | mW   |
| Junction Temperature                    | $T_j$      | 150     |      |
| Storage Temperature Range               | $T_{stg}$  | -55 150 |      |
| Thermal Resistance, Junction to Ambient | $R_{thJA}$ | 310     | /W   |
| Thermal Resistance, Junction to Lead    | $R_{thJL}$ | 120     | /W   |

\* PCB Mount on the PCBA

## / Electrical Characteristics(Ta=25 )

| Parameter                              | Symbol           | Test Conditions                                                                      | Min  | Typ | Max  | Unit |
|----------------------------------------|------------------|--------------------------------------------------------------------------------------|------|-----|------|------|
| Collector to Base Breakdown Voltage    | $V_{CBO}$        | $I_C=10\text{ A}$ $I_E=0$                                                            | 60   |     |      | V    |
| Collector to Emitter Breakdown Voltage | $V_{CEO}$        | $I_C=1.0\text{mA}$ $I_B=0$                                                           | 40   |     |      | V    |
| Emitter to Base Breakdown Voltage      | $V_{EBO}$        | $I_E=10\text{ A}$ $I_C=0$                                                            | 6.0  |     |      | V    |
| Collector Cut-Off Current              | $I_{CBO}$        | $V_{CB}=30\text{V}$ $I_E=0$                                                          |      |     | 0.05 | A    |
| Emitter Cut-Off Current                | $I_{EBO}$        | $V_{EB}=3.0\text{V}$ $I_C=0$                                                         |      |     | 0.05 | A    |
| DC Current Gain                        | $h_{FE(1)}$      | $V_{CE}=1.0\text{V}$ $I_C=10\text{mA}$                                               | 100  |     | 300  |      |
|                                        | $h_{FE(2)}$      | $V_{CE}=1.0\text{V}$ $I_C=100\text{mA}$                                              | 30   |     |      |      |
|                                        | $h_{FE(3)}$      | $V_{CE}=1.0\text{V}$ $I_C=50\text{mA}$                                               | 60   |     |      |      |
|                                        | $h_{FE(4)}$      | $V_{CE}=1.0\text{V}$ $I_C=1.0\text{mA}$                                              | 70   |     |      |      |
|                                        | $h_{FE(5)}$      | $V_{CE}=1.0\text{V}$ $I_C=0.1\text{mA}$                                              | 40   |     |      |      |
| Collector-Emitter Saturation Voltage   | $V_{CE(sat)(1)}$ | $I_C=10\text{mA}$ $I_B=1.0\text{mA}$                                                 |      |     | 0.2  | V    |
|                                        | $V_{CE(sat)(2)}$ | $I_C=50\text{mA}$ $I_B=5.0\text{mA}$                                                 |      |     | 0.3  | V    |
| Base-Emitter Saturation Voltage        | $V_{BE(sat)(1)}$ | $I_C=10\text{mA}$ $I_B=1.0\text{mA}$                                                 | 0.65 |     | 0.85 | V    |
|                                        | $V_{BE(sat)(2)}$ | $I_C=50\text{mA}$ $I_B=5.0\text{mA}$                                                 |      |     | 0.95 | V    |
| Transition Frequency                   | $f_T$            | $V_{CE}=20\text{V}$ $I_C=10\text{mA}$<br>$f=100\text{MHz}$                           | 300  |     |      | MHz  |
| Output Capacitance                     | $C_{ob}$         | $V_{CB}=5.0\text{V}$ $f=1.0\text{MHz}$                                               |      |     | 4.0  | pF   |
| Storage Time                           | $t_{stg}$        | $V_{CC}=3.0\text{V}$ $I_C=10\text{mA}$<br>$I_{B1}=-I_{B2}=1.0\text{mA}$              |      |     | 200  | ns   |
| Fall Time                              | $t_f$            | $V_{CC}=3.0\text{V}$ $I_C=10\text{mA}$<br>$I_{B1}=-I_{B2}=1.0\text{mA}$              |      |     | 50   | ns   |
| Delay Time                             | $t_d$            | $V_{CC}=3.0\text{V}$ $V_{BE}=0.5\text{V}$<br>$I_C=10\text{mA}$ $I_{B1}=1.0\text{mA}$ |      |     | 35   | ns   |
| Rise Time                              | $t_r$            | $V_{CC}=3.0\text{V}$ $V_{BE}=0.5\text{V}$<br>$I_C=10\text{mA}$ $I_{B1}=1.0\text{mA}$ |      |     | 35   | ns   |
| Input Capacitance                      | $C_{ib}$         | $V_{EB}=0.5\text{V}$ $f=1.0\text{MHz}$                                               |      |     | 8.0  | pF   |

/ Electrical Characteristic Curve

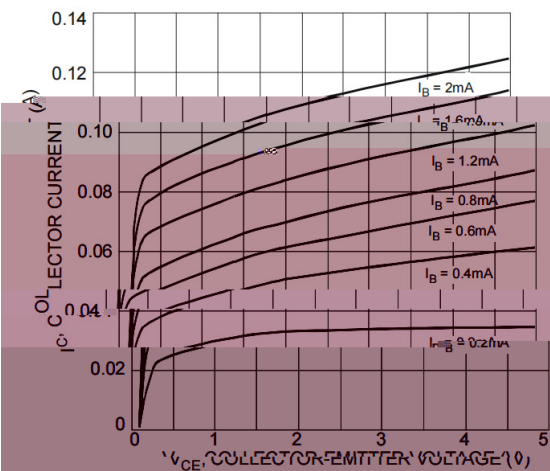


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

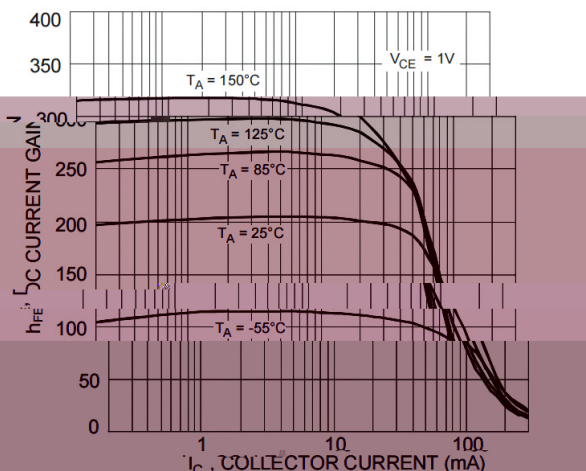
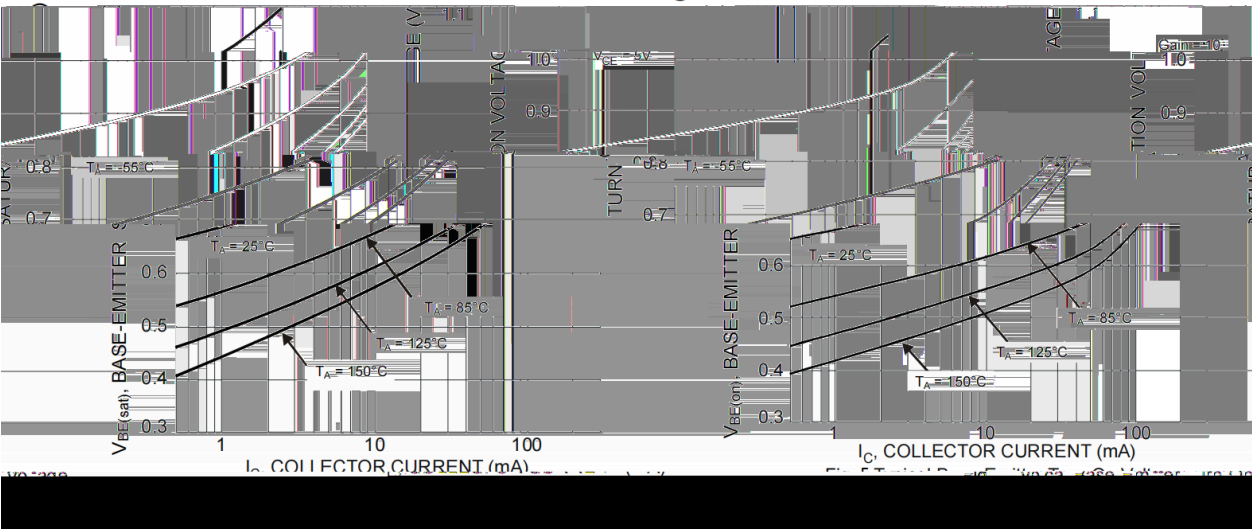


Fig. 2 Typical DC Current Gain vs. Collector Current

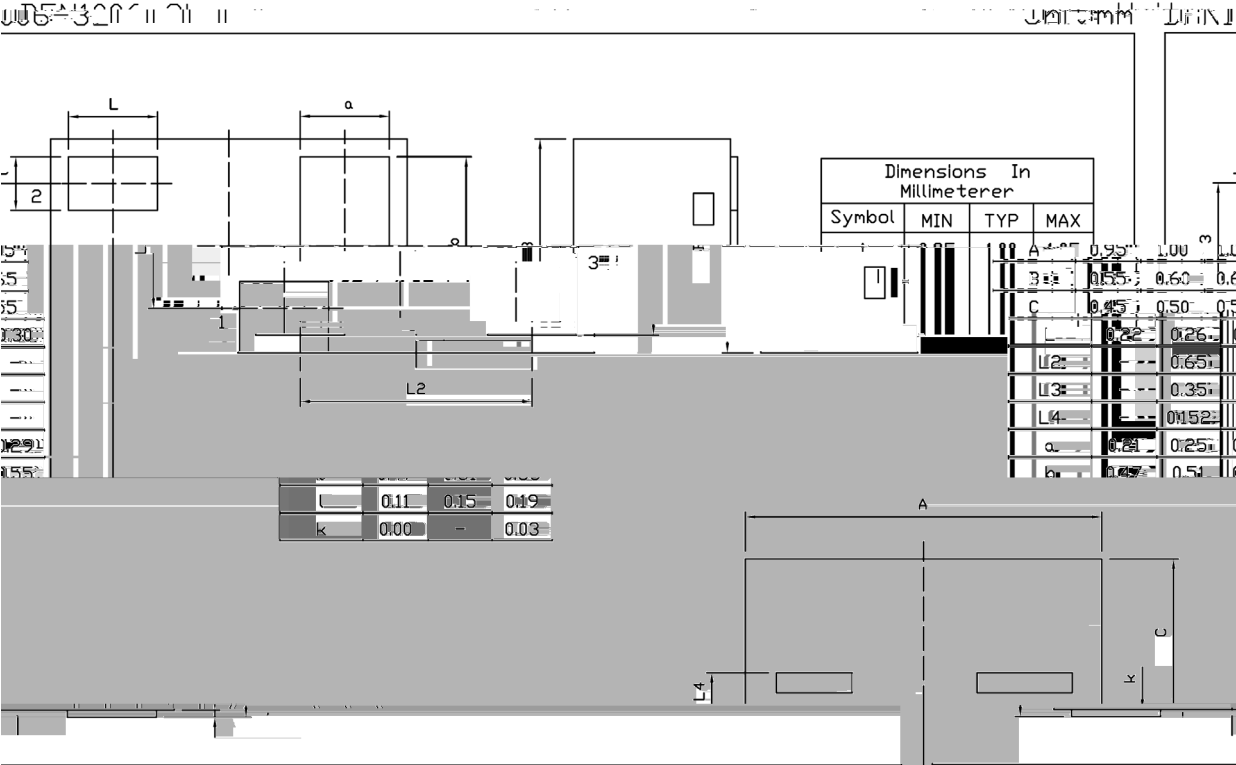


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

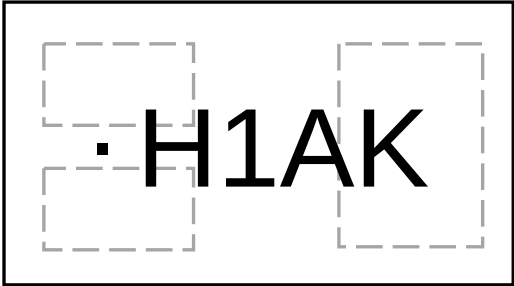


/ Package Dimensions



Rev.03 202108

/ Marking Instructions



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1AK

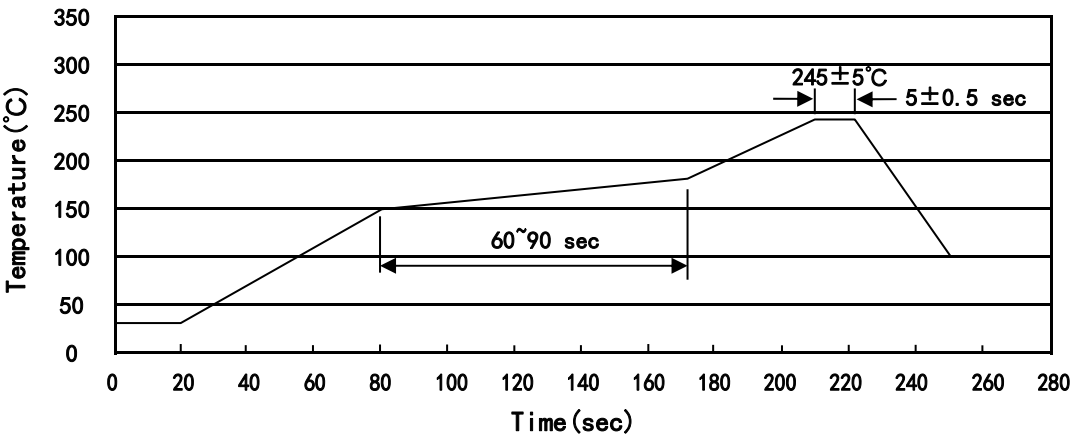
Note:

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Identify  
Company Code  
Product Type Code

1AK

( ) / Temperature Profile for IR Reflow Soldering(Pb-Free)



Note:

- 1

150 180

60 90sec;

1.Preheating:150~180 , Time:60~90sec.
- 2

245 5

5 0.5sec;

2.Peak Temp.:245 5 , Duration:5 0.5sec.
- 3

2 10 /sec.

3. Cooling Speed: 2~10 /sec.

/ Resistance to Soldering Heat Test Conditions

260 5                      10 1 sec.                      Temp.:260±5                      Time:10±1 sec

/ Packaging SPEC.

/ REEL

| Package Type | Units      |                 |                 |                       |                 | Dimension (unit mm <sup>3</sup> ) |             |             |
|--------------|------------|-----------------|-----------------|-----------------------|-----------------|-----------------------------------|-------------|-------------|
|              | Units/Reel | Reels/Inner Box | Units/Inner Box | Inner Boxes/Outer Box | Units/Outer Box | Reel                              | Inner Box   | Outer Box   |
| DFN1006-3L   | 10,000     | 10              | 100,000         | 6                     | 600,000         | 7 ×8                              | 180×120×180 | 390×385×205 |

/ Notices