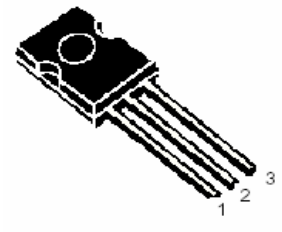
## NPN SILICON POWER TRANSISTOR

**CFD13003**




PIN 1: BASE
PIN 2: COLLECTOR
PIN 3: EMITTER

**TO-126FP**
**Plastic Package**



## Applications

**Suitable for Lighting, Switching Regulator and Motor Control**

### ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Collector Base Voltage | $V_{CBO}$ | 600 | V |
| Collector Emitter (sus) Voltage | $V_{CEO}$ | 400 | V |
| Emitter Base Voltage | $V_{EBO}$ | 9.0 | V |
| Collector Current Continuous | $I_C$ | 2.5 | A |
| Peak (1) | $I_{CM}$ | 4.0 | A |
| Base Current Continuous | $I_B$ | 0.75 | A |
| Peak (1) | $I_{BM}$ | 1.5 | A |
| Emitter Current Continuous | $I_E$ | 2.25 | A |
| Peak (1) | $I_{EM}$ | 4.5 | A |
| Power Dissipation at $T_a$=25 ºC | $P_D$ | 1.4 | W |
| Derate Above 25ºC | | 11.2 | mW/ ºC |
| Power Dissipation at $T_c$=25 ºC | $P_D$ | 45 | W |
| Derate Above 25ºC | | 360 | mW/ ºC |
| Operating and Storage Junction Temperature Range | $T_j$, $T_{stg}$ | - 65 to+150 | ºC |

### THERMAL RESISTANCE

| | | | |
|---|---|---|---|
| Junction to Case | $R_{th\ (j-c)}$ | 2.77 | ºC/W |
| Junction to Ambient | $R_{th\ (j-a)}$ | 89 | ºC/W |
| Maximum Lead Temperature for Soldering Purpose: 1/8" from Case for 5 Seconds | $T_L$ | 275 | ºC |

**(1) Pulse Test: Pulse Width=5ms, Duty Cycle=10%**

### ELECTRICAL CHARACTERISTICS ($T_a$=25ºC Unless Specified Otherwise)

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Collector Base Voltage | $V_{CBO}$ | $I_C$=1mA, $I_E$=0 | 600 | - | - | V |
| Collector Emitter (sus) Voltage | *$V_{CEO(sus)}$ | $I_C$=10mA, $I_B$=0 | 400 | - | - | V |
| Collector Cut-Off Current | $I_{CBO}$ | $V_{CB}$=600V, $I_E$=0 | - | - | 1.0 | mA |
| | | $V_{CB}$=600V, $I_E$=0, $T_c$=100ºC | | | 5.0 | mA |
| Emitter Cut-Off Current | $I_{EBO}$ | $V_{EB}$=9V, $I_C$=0 | - | - | 1.0 | mA |

***Pulse Test: PW=300µs, Duty Cycle=2%**

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**ELECTRICAL CHARACTERISTICS ($T_a$=25ºC Unless Specified Otherwise)**

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **DC Current Gain** | *$h_{FE}$ | **$I_C$=0.5A, $V_{CE}$=5V | 11 | - | 30 | |
| | | $I_C$=1A, $V_{CE}$=5V | 5 | - | 25 | |
| **Collector Emitter Saturation Voltage** | *$V_{CE\ (sat)}$ | $I_C$=0.5A, $I_B$=0.1A | - | - | 0.5 | V |
| | | $I_C$=1A, $I_B$=0.25A | - | - | 1.0 | V |
| | | $I_C$=1.5A, $I_B$=0.5A | - | - | 2.5 | V |
| | | $I_C$=1A, $I_B$=0.25A,$T_c$=100ºC | - | - | 1.0 | V |
| **Base Emitter Saturation Voltage** | *$V_{BE\ (sat)}$ | $I_C$=0.5A, $I_B$=0.1A | - | - | 1.0 | V |
| | | $I_C$=1A, $I_B$=0.25A | - | - | 1.2 | V |
| | | $I_C$=1A, $I_B$=0.25A,$T_c$=100ºC | - | - | 1.1 | V |



**DYNAMIC CHARACTERISTICS**

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **Current Gain Bandwidth Product** | $f_T$ | $I_C$=100mA, $V_{CE}$=10V, f=1MHz | 4.0 | - | - | MHz |
| **Output Capacitance** | $C_{ob}$ | $V_{CB}$=10V, f=0.1MHz | - | 21 | - | pF |

**SWITCHING TIME**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Turn On Time** | $t_{on}$ | $V_{CC}$=125V, $I_C$=1A, $I_{B1}$=0.2A, $I_{B2}$=0.2A | | | 1.1 | µs |
| **Storage Time** | $t_{stg}$ | | | | 4.0 | µs |
| **Fall Time** | $t_s$ | | | | 0.7 | µs |

**** $h_{FE}$ Classification:-**

| | | | | | |
|---|---|---|---|---|---|
| **Note:- Product is pre selected in DC current gain (Groups A to F). CDIL reserves the right to ship any of the groups according to production availability.** | **A**<br>**11-16** | **B**<br>**15-19** | **C**<br>**18-22** | **E**<br>**21-25** | **F**<br>**24-30** |
| **MARKING** | **CFD 13003A XY** | **CFD 13003B XY** | **CFD 13003C XY** | **CFD 13003E XY** | **CFD 13003F XY** |

***Pulse Test:- PW=300µs, Duty Cycle=2%**

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## Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Discrete Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Discrete Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

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