



13003DF

Preliminary

NPN SILICON TRANSISTOR

NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

DESCRIPTION

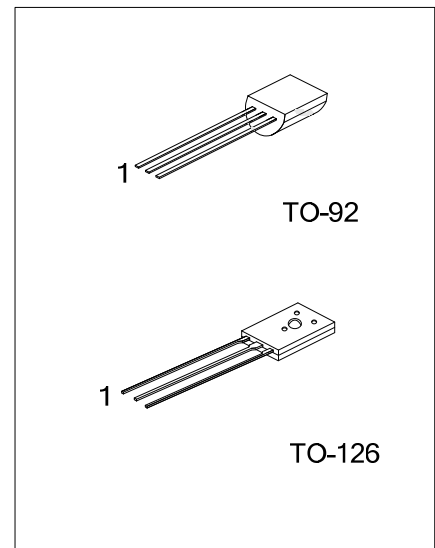
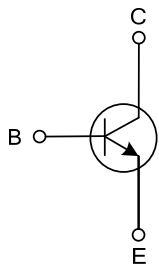
The UTC **13003DF** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

The UTC **13003DF** is suitable for electronic ballast power switch circuit and the compact electronic energy-saving light.

FEATURES

- * High collector-base breakdown voltage
- * Low reverse leakage current
- * High reliability

EQUIVALENT CIRCUIT



ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|---------------------|---------------------|---------|----------------|---|---|----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 13003DFL-xx-T60-F-K | 13003DFG-xx-T60-F-K | TO-126 | B | C | E | Bulk |
| 13003DFL-xx-T92-A-B | 13003DFG-xx-T92-A-B | TO-92 | E | C | B | Tape Box |
| 13003DFL-xx-T92-A-K | 13003DFG-xx-T92-A-K | TO-92 | E | C | B | Bulk |

Note: Pin Assignment: B: Base C: Collector E: Emitter

| | |
|---|---|
| <p>13003DFL-T60-F-B</p> <p>(1) Packing Type (2) Pin Assignment (3) Package Type (4) Lead Free</p> | <p>(1) B: Bluk, K: Bulk (2) refer to Pin Assignment (3) T60: TO-126, T92: TO-92 (4) L: Lead Free, G: Halogen Free</p> |
|---|---|

MARKING

| TO-126 | TO-92 |
|--------|-------|
| | |

■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise noted)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|------------------------------|------------------------|-----------|----------|------------------|
| Collector-Base Voltage | | V_{CBO} | 600 | V |
| Collector-Emitter Voltage | | V_{CEO} | 400 | V |
| Emitter-Base Voltage | | V_{EBO} | 9 | V |
| Continuous Collector Current | | I_C | 1.5 | A |
| Power Dissipation | $T_A=25^\circ\text{C}$ | P_D | 1.25 | W |
| | $T_C=25^\circ\text{C}$ | | 50 | W |
| Junction Temperature | | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{STG} | -55~+150 | $^\circ\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|-------------------|---|------|-----|-----|---------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | $I_C=0.1\text{mA}$ | 600 | | | V |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | $I_C=1\text{mA}$ | 400 | | | V |
| Emitter-Base Breakdown Voltage | BV_{EBO} | $I_E=0.1\text{mA}$ | 9 | | | V |
| Collector Cut-Off Current | I_{CBO} | $V_{CB}=600\text{V}, I_E=0$ | | | 0.1 | mA |
| Collector-Emitter Cut-Off Current | I_{CEO} | $V_{CE}=400\text{V}, I_B=0$ | | | 0.1 | mA |
| Emitter-Base Cut-Off Current | I_{EBO} | $V_{EB}=9\text{V}, I_C=0$ | | | 0.1 | mA |
| DC Current Gain (Note 1) | h_{FE} | $V_{CE}=5\text{V}, I_C=0.2\text{A}$ | 15 | | 30 | |
| Low current and high current h_{FE2} h_{FE1} ratio | h_{FE1}/h_{FE2} | $h_{FE1}: V_{CE}=5\text{V}, I_C=5\text{mA}$ | 0.75 | 0.9 | | |
| | | $h_{FE2}: V_{CE}=5\text{V}, I_C=0.2\text{A}$ | | | | |
| Collector-Emitter Saturation Voltage (Note) | $V_{CE(SAT)}$ | $I_C=1\text{A}, I_B=0.25\text{A}$ | | 0.3 | 0.9 | V |
| Base-Emitter Saturation Voltage (Note) | $V_{BE(SAT)}$ | $I_C=1\text{A}, I_B=0.25\text{A}$ | | 0.9 | 1.2 | V |
| Storage Time | t_s | UI9600, $I_C=0.1\text{A}$ | 3 | | 5 | μs |
| Rise Time | t_R | | | | 1 | μs |
| Fall Time | t_F | | | | 1 | μs |
| Transition Frequency | f_T | $I_C=0.1\text{A}, V_{CE}=10\text{V}, f=1\text{MHz}$ | 5 | | | MHz |

Note: Pulse test, pulse width $t_p \leq 300\mu\text{s}$, Duty cycles $\leq 2\%$

■ CLASSIFICATION OF h_{FE}

| RANK | A | B | C |
|-------|---------|---------|---------|
| RANGE | 15 ~ 20 | 20 ~ 25 | 25 ~ 30 |

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