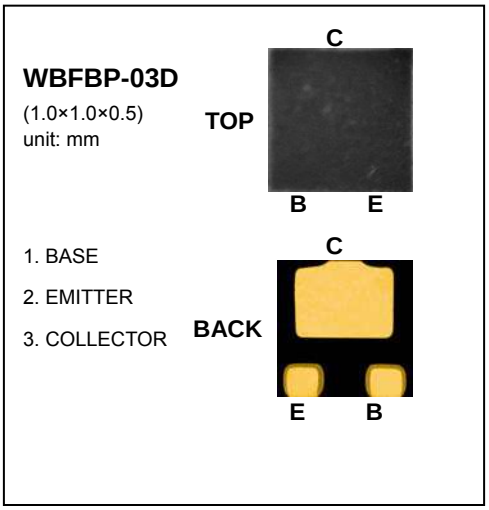
# WBFBP-03D Plastic-Encapsulate Transistors

## TK3906LLD03 TRANSISTOR

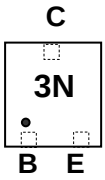



### DESCRIPTION
PNP Epitaxial Silicon Transistor

### FEATURES
Epitaxial Planar Die Construction
Complementary NPN Type Available (TK3904LLD03)
Ultra-Small Surface Mount Package
Also Available in Lead Free Version

### APPLICATION
General Purpose Amplifier, switching
For portable equipment:(i.e. Mobile phone,MP3, MD,CD-ROM, DVD-ROM, Note book PC, etc.)

### MARKING:3N




### MAXIMUM RATINGS($T_a$=25℃ unless otherwise noted)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | -40 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | -40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | -5 | V |
| $I_C$ | Collector Current -Continuous | -200 | mA |
| $P_D$ | Power Dissipation | 100 | mW |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 1250 | ℃/W |
| $T_J$ | Operating Temperature | 150 | ℃ |
| $T_{stg}$ | Storage and Temperature | -55~150 | ℃ |

### ELECTRICAL CHARACTERISTICS ($T_a$=25℃ unless otherwise specified)

| Parameter | Symbol | Test conditions | Mlin | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Collector-base breakdown voltage** | $V_{(BR)CBO}$ | $I_C$=-10μA,$I_E$=0 | -40 | | | V |
| **Collector-emitter breakdown voltage** | $V_{(BR)CEO}$ | $I_C$=-1mA,$I_B$=0 | -40 | | | V |
| **Emitter-base breakdown voltage** | $V_{(BR)EBO}$ | $I_E$=-10μA,$I_C$=0 | -5 | | | V |
| **Collector cut-off current** | $I_{CEX}$ | $V_{CE}$=-30V,$V_{EB(off)}$=-3V | | | -0.05 | μA |
| **Emitter cut-off current** | $I_{EBO}$ | $V_{EB}$=-5V,$I_C$=0 | | | -0.1 | μA |
| **DC current gain** | $h_{FE(1)}$ | $V_{CE}$=-1V,$I_C$=-0.1mA | 60 | | | |
| | $h_{FE(2)}$ | $V_{CE}$=-1V,$I_C$=-1mA | 80 | | | |
| | $h_{FE(3)}$ | $V_{CE}$=-1V,$I_C$=-10mA | 100 | | 300 | |
| | $h_{FE(4)}$ | $V_{CE}$=-1V,$I_C$=-50mA | 60 | | | |
| | $h_{FE(5)}$ | $V_{CE}$=-1V,$I_C$=-100mA | 30 | | | |
| **Collector-emitter saturation voltage** | $V_{CE(sat)1}$ | $I_C$=-10mA,$I_B$=-1mA | | | -0.25 | V |
| | $V_{CE(sat)2}$ | $I_C$=-50mA,$I_B$=-5mA | | | -0.4 | V |
| **Base-emitter saturation voltage** | $V_{BE(sat)1}$ | $I_C$=-10mA,$I_B$=-1mA | -0.65 | | -0.85 | V |
| | $V_{BE(sat)2}$ | $I_C$=-50mA,$I_B$=-5mA | | | -0.95 | V |
| **Transition frequency** | $f_T$ | $V_{CE}$=-20V,$I_C$=-10mA,f=100MHz | 250 | | | MHz |

## ELECTRICAL CHARACTERISTICS ($T_a$=25℃ unless otherwise specified)

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Collector output capacitance** | $C_{ob}$ | $V_{CB}$=-5V,$I_E$=0,f=1MHz | | | 4.5 | pF |
| **Input capacitance** | $C_{ib}$ | $V_{EB}$=-0.5V,$I_C$=0,f=1MHz | | | 10 | pF |
| **Noise figure** | NF | $V_{CE}$=-5V,$I_c$=0.1mA,f=1KHz,$R_S$=1KΩ | | | 4 | dB |
| **Delay time** | $t_d$ | $V_{CC}$=-3V, $V_{BE(OFF)}$=0.5V,$I_C$=-10mA , $I_{B1}$=-1mA | | | 35 | ns |
| **Rise time** | $t_r$ | | | | 35 | ns |
| **Storage time** | $t_S$ | $V_{CC}$=-3V, $I_C$=-10mA,$I_{B1}$= $I_{B2}$=- 1mA | | | 225 | ns |
| **Fall time** | $t_f$ | | | | 75 | ns |