## Small Signal Product

# TO-92 NPN Bipolar Transistor

### FEATURES

- The transistor is subdivided into four groups according to its DC current gain: O, Y, GR, BL
- Pb free and RoHS compliant


Pb-Free

RoHS COMPLIANT

### MECHANICAL DATA

- Case: TO-92 small outline plastic package
- High temperature soldering guaranteed: 260°C/10s
- Weight: 195mg (approximately)

1. Emitter
2. Collector
3. Base

**TO-92**

### APPLICATION

- General purpose switching and AF amplifier application

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS** ($T_A$=25℃ unless otherwise noted)

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Collector Power Dissipation | $P_C$ | 0.5 | W |
| Collector-Base Voltage | $V_{CBO}$ | 60 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 50 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | V |
| Collector Current | $I_C$ | 0.15 | A |
| Thermal Resistance From Junction to Ambient | $R_{\theta JA}$ | 250 | ℃/W |
| Junction and Storage Temperature Range | $T_J$ , $T_{STG}$ | -55 to + 150 | °C |

| PARAMETER | | SYMBOL | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| Collector Cut-off Current | $V_{CB}$= 60V, $I_E$= 0 | $I_{CBO}$ | - | 0.1 | μA |
| Emitter Cut-off Current | $V_{EB}$= 5V, $I_C$= 0 | $I_{EBO}$ | - | 0.1 | μA |
| DC Current Gain | $V_{CE}$= 6V, $I_C$= 2mA | $h_{FE(1)}$ | 70 | 700 | |
| | $V_{CE}$= 6V, $I_C$= 150mA | $h_{FE(2)}$ | 25 | | |
| Collector-Emitter Saturation Voltage | $I_C$= 100mA, $I_B$=10mA | $V_{CE(sat)}$ | | 0.25 | V |
| Base-Emitter Saturation Voltage | $I_C$= 100mA, $I_B$=10mA | $V_{BE(sat)}$ | | 1 | V |
| Transition Frequency | $V_{CE}$= 10V, $I_C$=1mA | $f_T$ | 80 | | MHz |
| Collector Output Capacitance | $V_{CB}$= 10V, $I_E$=0, f=1MHz | $C_{ob}$ | | 3.5 | pF |

**CLASSIFIACTION OF $h_{FE}$**

| RANK | O | Y | GR | BL |
|---|---|---|---|---|
| RANGE | 70-140 | 120-240 | 200-400 | 300-700 |

## Small Signal Product

### RATINGS AND CHARACTERISTICS CURVES

($T_A$=25℃ unless otherwise noted)

FIG.1 Static Characteristic

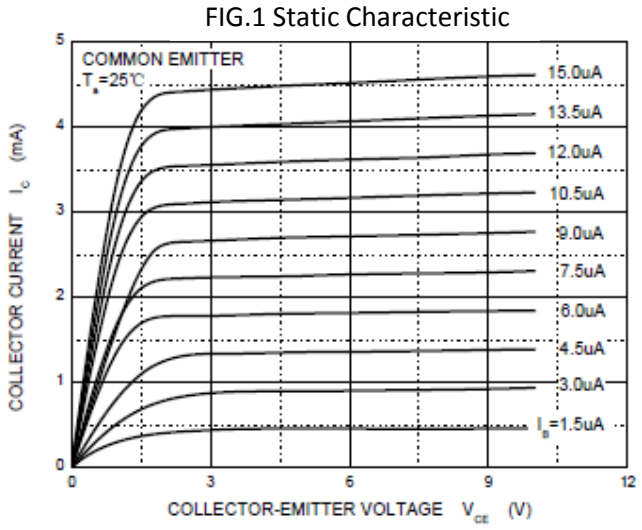



FIG.2 $h_{FE}$ vs. $I_C$

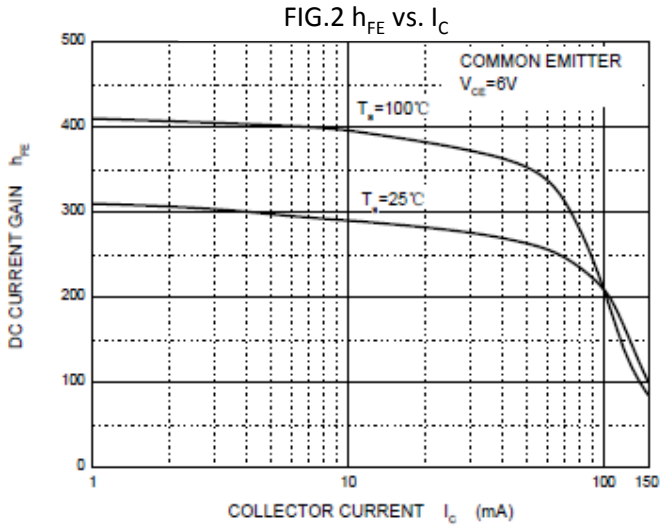



FIG.3 $V_{CE(sat)}$ vs. $I_C$

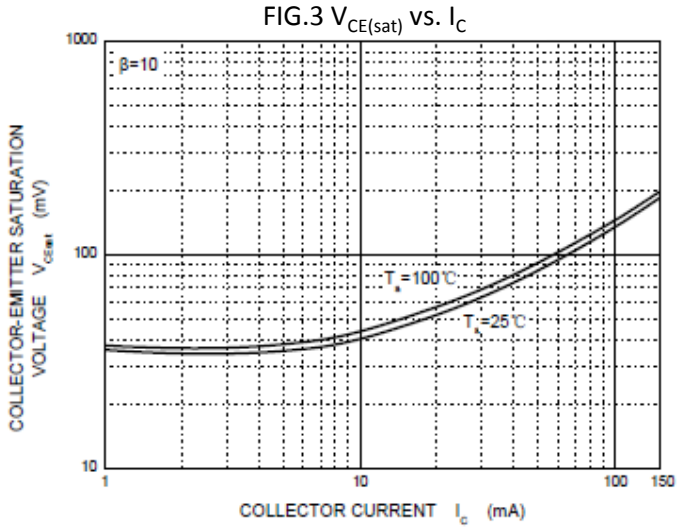



FIG.4 $VB_{BE(sat)}$ vs. $I_C$

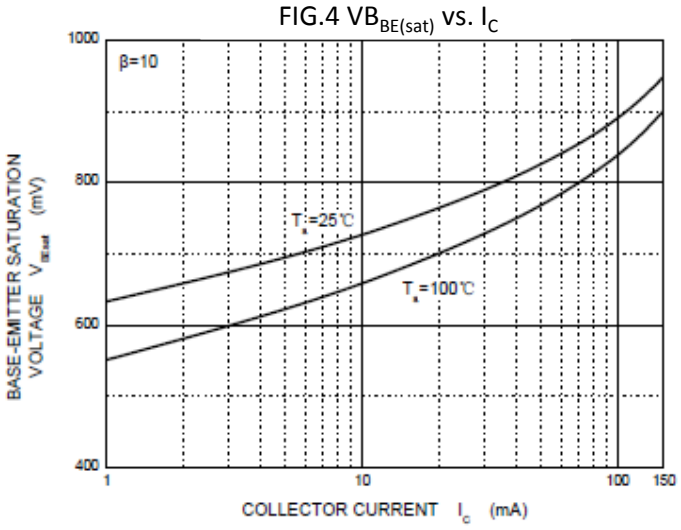



FIG.5 $C_{ob}$ / $C_{Ib}$ vs. $V_{CB}$ / $V_{Eb}$

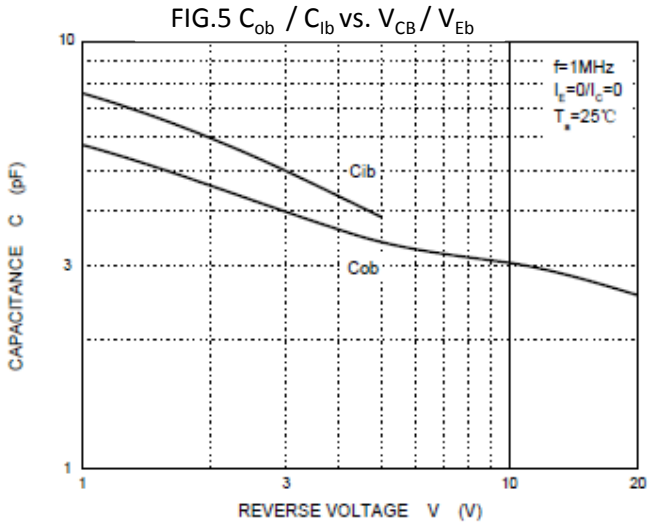
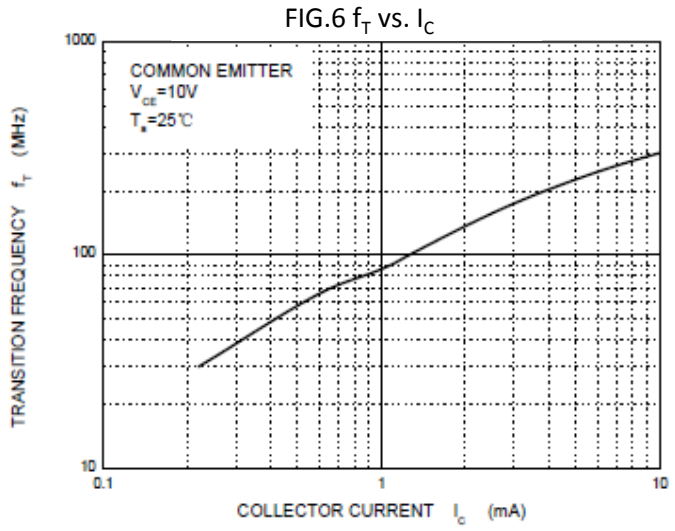



FIG.6 $f_T$ vs. $I_C$



## Small Signal Product

| ORDERING INFORMATION | | | | | | |
|---|---|---|---|---|---|---|
| **PART NO.** | **MANUFACTURE CODE** | **PACKING CODE** | **GREEN COMPOUND CODE** | **PACKAGE** | **PACKING** | **MARKING** |
| KTC3198-xx (Note2) | (Note1) | A1 | G | TO-92 | 4K / Ammo | KTC 3198 xx021 (Note3) |
| | | B1 | G | TO-92 | 5K / Bulk | |
| | | A2 | G | TO-92 | 2K / Ammo | |
| | | B2 | G | TO-92 | 10K / Bulk | |
| KTC3198-xx (Note2) | B0 | A1 | G | TO-92 | 4K / Ammo | KTC 3198 xx021 (Note3) |
| KTC3198-xx (Note2) | B0 | B1 | G | TO-92 | 5K / Bulk | |
| KTC3198-xx (Note2) | M0 | A2 | G | TO-92 | 2K / Ammo | |
| KTC3198-xx (Note2) | M0 | B2 | G | TO-92 | 10K / Bulk | |

Note1: Indicator of manufacturing site for manufacture special control, if empty means no special control requirement

Note2: "xx" means device code of "O", "Y", "GR", "BL"

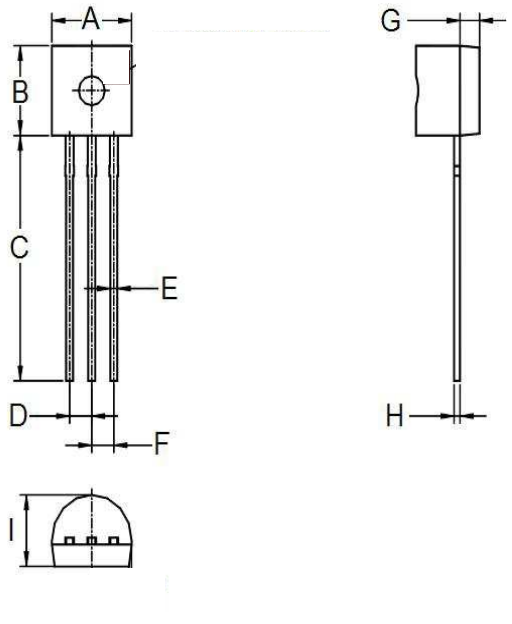
Note3: "MARKING" should follow the "PART NO.", for example, if "PART NO." is KTC3198-O, which

"MARKING" is KTC
3198
O021

| EXAMPLE | | | | | |
|---|---|---|---|---|---|
| **PREFERRED P/N** | **PART NO.** | **MANUFACTURE CODE** | **PACKING CODE** | **GREEN COMPOUND CODE** | **DESCRIPTION** |
| KTC3198-O A1G | KTC3198-O | | A1 | G | Green compound |
| KTC3198-O-B0 A1G | KTC3198-O | B0 | A1 | G | Green compound |
| KTC3198-O-B0 B1G | KTC3198-O | B0 | B1 | G | Green compound |
| KTC3198-O-M0 A2G | KTC3198-O | M0 | A2 | G | Green compound |
| KTC3198-O-M0 B2G | KTC3198-O | M0 | B2 | G | Green compound |

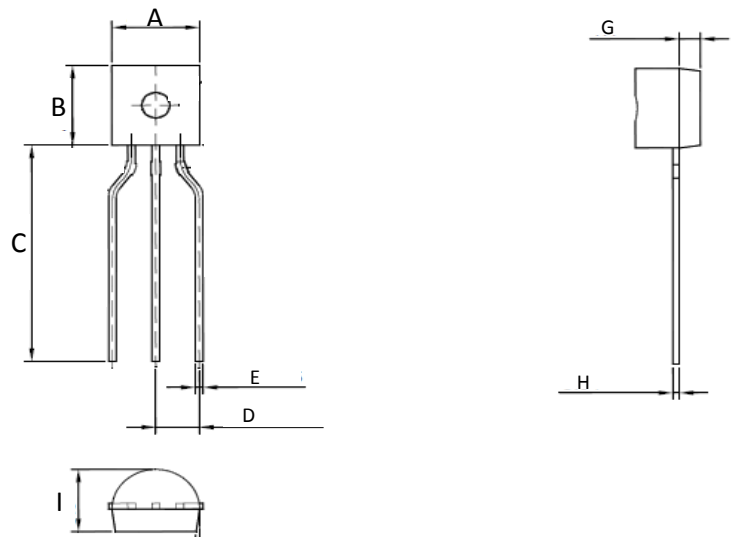
## PACKAGE OUTLINE DIMENSIONS

### TO-92 Bulk




| DIM. | Unit (mm) | | Unit (inch) | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 4.30 | 4.70 | 0.169 | 0.185 |
| B | 4.30 | 4.70 | 0.169 | 0.185 |
| C | 12.50 | 14.50 | 0.492 | 0.571 |
| D | 1.17 | 1.37 | 0.046 | 0.054 |
| E | 0.35 | 0.55 | 0.014 | 0.022 |
| F | 1.17 | 1.37 | 0.046 | 0.054 |
| G | 0.59 | 1.20 | 0.023 | 0.047 |
| H | 0.29 | 0.51 | 0.011 | 0.020 |
| I | 3.30 | 3.70 | 0.130 | 0.146 |

### TO-92 Ammo




| DIM. | Unit (mm) | | Unit (inch) | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 4.30 | 4.70 | 0.169 | 0.185 |
| B | 4.30 | 4.70 | 0.169 | 0.185 |
| C | 12.50 | - | 0.492 | - |
| D | 2.20 | 2.80 | 0.087 | 0.110 |
| E | 0.35 | 0.55 | 0.014 | 0.022 |
| G | 0.59 | 1.20 | 0.023 | 0.047 |
| H | 0.29 | 0.51 | 0.011 | 0.020 |
| I | 3.30 | 3.70 | 0.130 | 0.146 |

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