

**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

**MECHANICAL DATA**

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

**APPLICATION**

- General purpose switching and AF amplifier application



1. Emitter
2. Collector
3. Base



**TO-92**

<b>MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS</b> ( $T_A=25^\circ\text{C}$ unless otherwise noted)			
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>VALUE</b>	<b>UNIT</b>
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	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to + 150	$^\circ\text{C}$

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

**CLASSIFICATION OF  $h_{FE}$**

<b>RANK</b>	<b>O</b>	<b>Y</b>	<b>GR</b>	<b>BL</b>
<b>RANGE</b>	70-140	120-240	200-400	300-700

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**RATINGS AND CHARACTERISTICS CURVES**

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

FIG.1 Static Characteristic

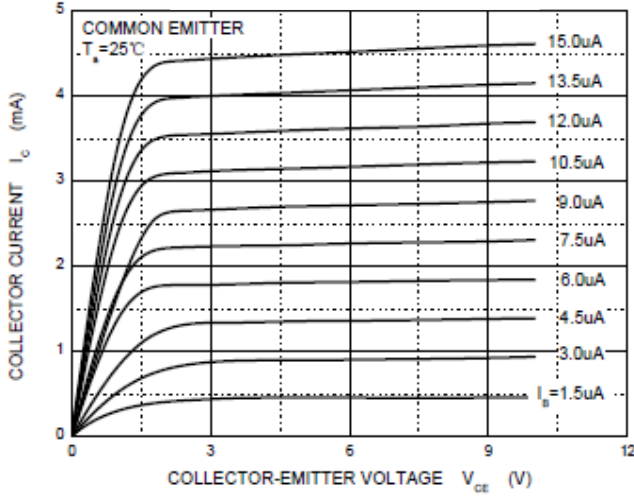


FIG.2  $h_{FE}$  vs.  $I_C$

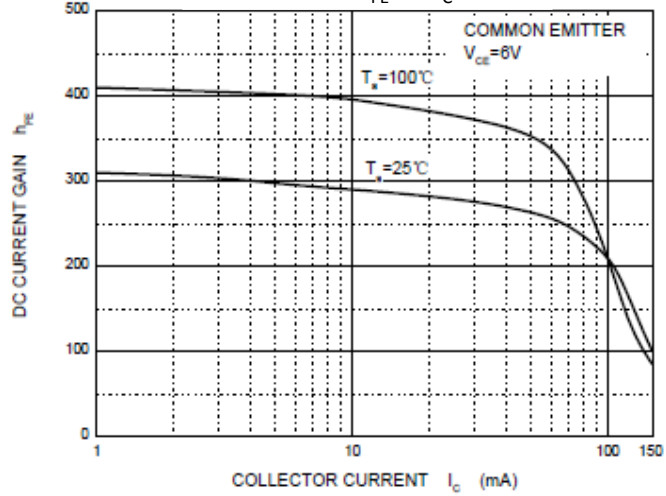


FIG.3  $V_{CE(sat)}$  vs.  $I_C$

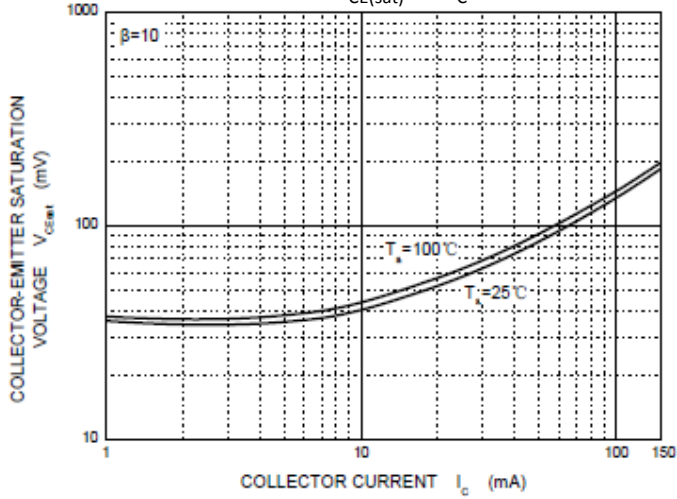


FIG.4  $V_{BE(sat)}$  vs.  $I_C$

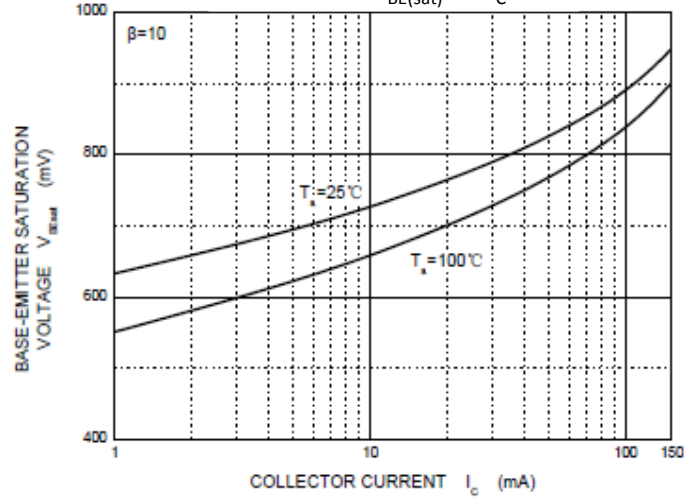


FIG.5  $C_{ob} / C_{ib}$  vs.  $V_{CB} / V_{Eb}$

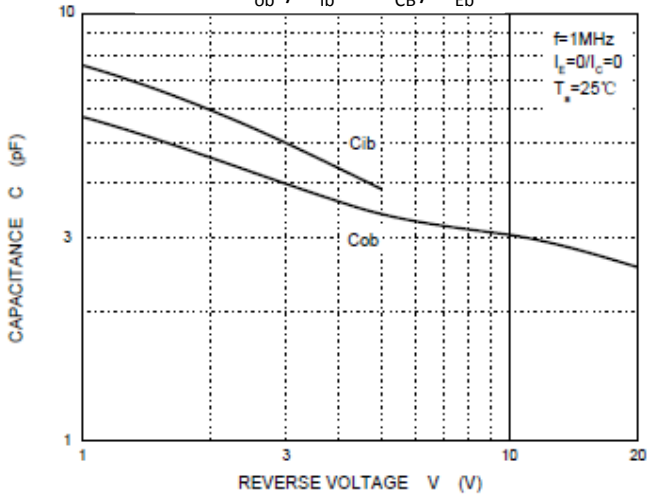
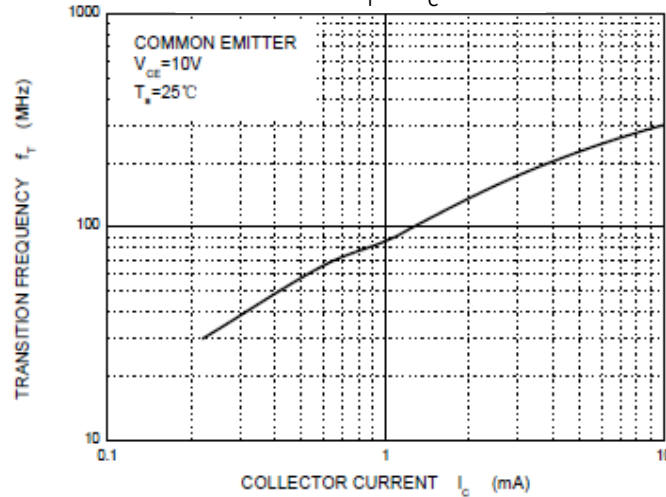


FIG.6  $f_T$  vs.  $I_C$



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<b>ORDERING INFORMATION</b>						
<b>PART NO.</b>	<b>MANUFACTURE CODE</b>	<b>PACKING CODE</b>	<b>GREEN COMPOUND CODE</b>	<b>PACKAGE</b>	<b>PACKING</b>	<b>MARKING</b>
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

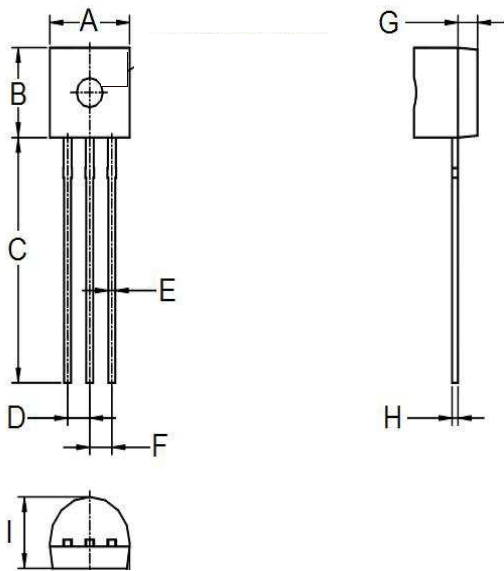
"MARKING" is   KTC  
                   3198  
                   O021

<b>EXAMPLE</b>					
<b>PREFERRED P/N</b>	<b>PART NO.</b>	<b>MANUFACTURE CODE</b>	<b>PACKING CODE</b>	<b>GREEN COMPOUND CODE</b>	<b>DESCRIPTION</b>
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

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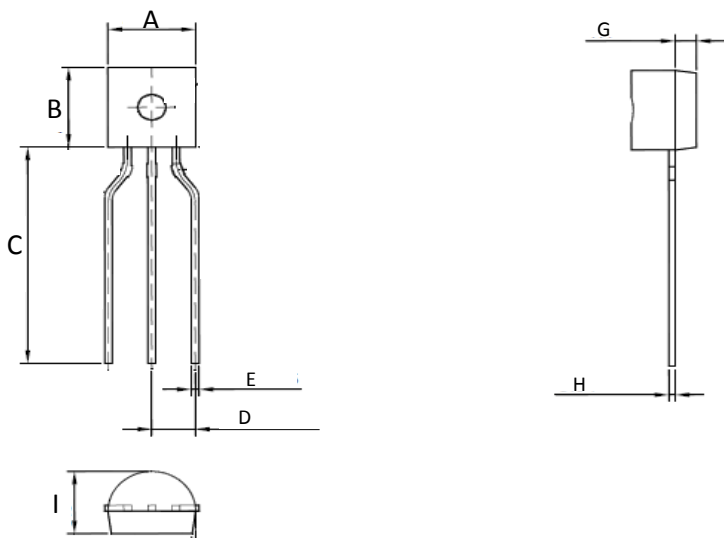
**PACKAGE OUTLINE DIMENSIONS**

**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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