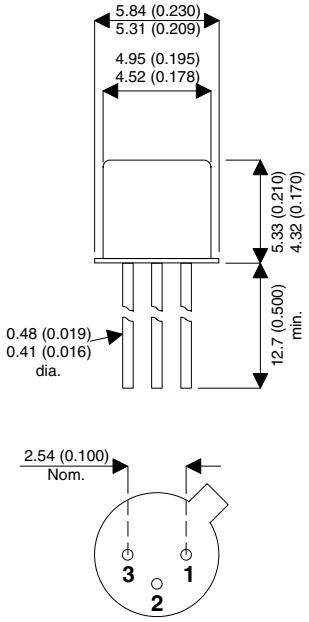
2N3904-T18

MECHANICAL DATA

Dimensions in mm (inches)



TO-18 (TO-206AA)

Underside View

Pin 1 – Emitter Pin 2 – Base Pin 3 – Collector

GENERAL PURPOSE HERMETIC NPN SILICON TRANSISTOR

FEATURES

- **SILICON NPN EPITAXIAL TRANSISTOR**
- **HERMETIC TO18 PACKAGE**
- **HI-REL SCREENING OPTIONS AVAILABLE**
- **HIGH SPEED SATURATED SWITCHING**

APPLICATIONS

A hermetically sealed TO18 version of the popular 2N3904 plastic part intended for high reliability applications.

ABSOLUTE MAXIMUM RATINGS T_{CASE} = 25°C unless otherwise stated

V_{CBO}	Collector - Base Voltage	60V
V_{CEO}	Collector - Emitter Voltage (I_B = 0)	40V
V_{EBO}	Emitter – Base Voltage (I_C = 0)	6.0V
I_C	Continuous Collector Current	200mA
P_D	Total Power Dissipation at T_A = 25°C	0.31W
	Derate Above 25°C	1.8mW/°C
$T_{J / Stg}$	Operating and Storage Temperature Range	-65 to +200°C

THERMAL DATA

$R_{\theta JA}$	Thermal Resistance Junction - Ambient	Max	565	°C/W

Semelab plc. Telephone +44(0)1455 556565. Fax +44(0)1455 552612.
E-mail: sales@semelab.co.uk Website: http://www.semelab.co.uk

2N3904-T18

ELECTRICAL CHARACTERISTICS (T_{case}=25°C unless otherwise stated)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)CEO}$*	Collector Emitter Breakdown Voltage	I_C = 1.0mA	I_B = 0	40	-	-	V
$V_{(BR)CBO}$	Collector Base Breakdown Voltage	I_C = 10μA	I_E = 0	60	-	-	
$V_{(BR)EBO}$	Emitter Base Breakdown Voltage	I_E = 10μA	I_C = 0	6	-	-	
I_{CEX}	Collector Emitter Cut-Off Current	V_{CE} = 30V	V_{EB} = 3V	-	-	50	nA
h_{FE}*	DC Current Gain (V_{CE} = 10V)	I_C = 0.1mA	V_{CE} = 1.0V	40	-	-	
		I_C = 1.0mA	V_{CE} = 1.0V	70	-	-	
		I_C = 10mA	V_{CE} = 1.0V	100	-	300	
		I_C = 50mA	V_{CE} = 1.0V	60	-	-	
		I_C = 100mA	V_{CE} = 1.0V	30	-	-	
h_{fe}	Small Signal Current Gain f=1.0KHz	I_C = 1.0mA	V_{CE} = 10V	100	-	400	
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 10mA	I_B = 1.0mA	-	-	0.2	V
		I_C = 50mA	I_B = 5.0mA	-	-	0.3	
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 10mA	I_B = 1.0mA	0.65	-	0.85	
		I_C = 50mA	I_B = 5.0mA	-	-	0.95	

DYNAMIC CHARACTERISTICS (T_{case}=25°C unless otherwise stated)

f_T	Current Gain – Bandwidth Product	I_C = 10mA f = 100MHz	V_{CE} = 20V	300	-	-	MHz
C_{obo}	Output Capacitance	I_E = 0 f = 1.0MHz	V_{CB} = 5V	-	-	4	pF
C_{IBO}	Input Capacitance	I_C = 0 f = 1.0MHz	V_{EB} = 0.5V	-	-	8	
N_F	Noise Figure!	I_C = 100μA f = 1.0KHz	V_{CE} = 5V R_S = 1KΩ	-	-	5	dB
t_d	Delay Time	V_{CC} = 3V	V_{BE} = 0.5V	-	-	35	ns
t_r	Rise Time	I_C = 10mA	I_{B1} = 1.0mA	-	-	35	
t_s	Storage Time	V_{CC} = 3V	V_{BE} = 0.5V	-	-	200	
t_f	Fall Time	I_C = 10mA	I_{B1}=I_{B2}= 1.0mA	-	-	50	

* Pulse test t_p = 300μs, δ < 2%

! Parameter characteristic verified by design only

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E-mail: sales@semelab.co.uk Website: http://www.semelab.co.uk