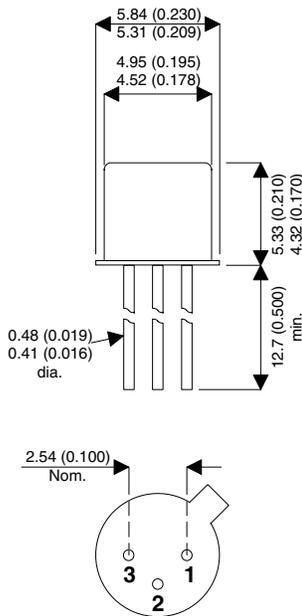


MECHANICAL DATA

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 $T_{CASE} = 25^{\circ}C$ 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 $T_A = 25^{\circ}C$	0.31W
	Derate Above $25^{\circ}C$	1.8mW/ $^{\circ}C$
$T_{J/Stg}$	Operating and Storage Temperature Range	-65 to +200 $^{\circ}C$

THERMAL DATA

$R_{\theta JA}$	Thermal Resistance Junction - Ambient	Max	565	$^{\circ}C/W$
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ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ 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	$I_C = 10\mu A$ $I_E = 0$	60	-	-	
$V_{(BR)EBO}$	Emitter Base Breakdown Voltage	$I_E = 10\mu A$ $I_C = 0$	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 ($T_{case} = 25^{\circ}C$ unless otherwise stated)

f_T	Current Gain – Bandwidth Product	$I_C = 10mA$ $V_{CE} = 20V$ $f = 100MHz$	300	-	-	MHz
C_{obo}	Output Capacitance	$I_E = 0$ $V_{CB} = 5V$ $f = 1.0MHz$	-	-	4	pF
C_{ibo}	Input Capacitance	$I_C = 0$ $V_{EB} = 0.5V$ $f = 1.0MHz$	-	-	8	
N_F	Noise Figure [!]	$I_C = 100\mu A$ $V_{CE} = 5V$ $f = 1.0KHz$ $R_S = 1K\Omega$	-	-	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 $t_p = 300\mu s$, $\delta < 2\%$

! Parameter characteristic verified by design only

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