

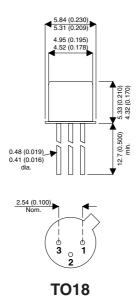
Issue 1



# NPN SILICON AMPLIFIER TRANSISTOR

#### **MECHANICAL DATA**

Dimensions in mm (inches)



### **FEATURES**

 SILICON PLANAR EPITAXIAL NPN TRANSISTOR

PIN 1 = Emitter PIN 2 = Base PIN 3 = Collector

# **ABSOLUTE MAXIMUM RATINGS** (T<sub>A</sub> = 25°C unless otherwise stated)

$V_{CBO}$	Collector – Base Voltage	60V
$V_{CEO}$	Collector – Emitter Voltage	60V
$V_{EBO}$	Emitter – Base Voltage	6V
$I_{\mathbb{C}}$	Collector Current Continuous	50mA
$P_{D}$	Total Device Dissipation @ T <sub>A</sub> =25°C	360mW
	Derate above 25°C	2.06mW / °C
$P_{D}$	Total Device Dissipation @ T <sub>C</sub> =25°C	1.2W
	Derate above 25°C	6.85mW / °C
$T_{STG}$ , $T_{J}$	Operating and Storage Temperature Range	−65 to +200°C

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

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## **ELECTRICAL CHARACTERISTICS** ( $T_A = 25^{\circ}C$ unless otherwise stated)

	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
OFF CHAF	RACTERISTICS					I .	
V <sub>(BR)CBO*</sub>	Collector – Base Breakdown Voltage	I <sub>C</sub> = 10μA	I <sub>B</sub> = 0	60			
V <sub>(BR)CEO</sub>	Collector – Emitter Breakdown Voltage	I <sub>C</sub> = 10mA	I <sub>E</sub> = 0	60			V
V <sub>(BR)EBO</sub>	Emitter – Base Breakdown Voltage	I <sub>E</sub> = 10μA	I <sub>C</sub> = 0	6			†
	Collector Cut-off Current	V <sub>CB</sub> = 45V	I <sub>E</sub> = 0			10	nA
I <sub>CBO</sub>			TA = 150°C			10	μА
I <sub>EBO</sub>	Emitter Cut-off Current	$V_{BE} = 5V$	I <sub>C</sub> = 0			10	nA
ON CHAR	ACTERISTICS						
V <sub>CE(sat)</sub>	Collector – Emitter Saturation Voltage	I <sub>C</sub> = 1mA	$I_B = 0.1 \text{mA}$		0.25	0.35	V
V <sub>BE(on)</sub>	Base – Emitter On Voltage	$I_C = 0.1 \text{mA}$	$V_{CE} = 5V$	0.5	0.65	0.7	V
	DC Current Gain	I <sub>C</sub> = 1μA	$V_{CE} = 5V$	30	190		
		$I_C = 10\mu A$	$V_{CE} = 5V$	100	250	500	
h <sub>FE</sub>			$TA = 55^{\circ}C$	20	40		
		$I_{C} = 100 \mu A$	V <sub>CE</sub> = 5V	175	275		
		I <sub>C</sub> = 500μA	V <sub>CE</sub> = 5V	200	300		
		I <sub>C</sub> = 1mA	$V_{CE} = 5V$	250	350		
		I <sub>C</sub> = 10mA	$V_{CE} = 5V$		400	800	
SMALL SIG	GNAL CHARACTERISTICS	•					
f <sub>T</sub>	Current Gain Bandwidth Product	$I_C = 0.05 \text{mA}$ f = 5 MHz	V <sub>CE</sub> = 5V	15	50		
		I <sub>C</sub> = 0.05mA f = 30MHz	V <sub>CE</sub> = 5V	60	100		MHz
C <sub>obo</sub>	Output Capacitance	$V_{CB} = 5V$	I <sub>E</sub> = 0		3	6	pF
C <sub>ibo</sub>	Input Capacitance	f = 140KHz	$I_C = 0.5 \text{mA}$		4	6	
h <sub>ie</sub>	Input Impedance			3.5		24	kΩ
h <sub>re</sub>	Voltage Feedback Ratio	I <sub>C</sub> = 1.0mA	$V_{CE} = 5V$			800	x 10 <sup>-6</sup>
h <sub>fe</sub>	Small Signal Current Gain	f = 1.0KHz		150		900	T —
h <sub>oe</sub>	Small Signal Current Gain					40	μmhos

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Parameter		Test Cor	Test Conditions N		Тур.	Max.	Unit
SMALL SIGNAL C	CHARACTERISTICS	•					
		$I_C = 10\mu A$	V <sub>CE</sub> = 5V		8.0	10	dB
	Noise Figure	$RS = 10K\Omega$	f = 100Hz				
		BW = 20Hz					
		$I_C = 10\mu A$	$V_{CE} = 5V$				
		$RS = 10K\Omega$	f = 1.0kHz			3.0	
N Noise		BW = 200Hz					
N <sub>F</sub> Noise		$I_C = 10\mu A$	$V_{CE} = 5V$				
		$RS = 10K\Omega$	f = 10kHz			2.0	
		BW = 2.0kHz					
		$I_C = 10\mu A$ $V_{CE} = 5V$			1		
		$RS = 10K\Omega$				2.0	
		f = 10Hz to 15	5.7kHz			3.0	
		BW = 15.7kH	Z				

### THERMAL CHARACTERISTICS

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case				146	°C // //
$R_{\theta JA(1)}$	Thermal Resistance, Junction to Case				485	°C/W
TL	Lead Temperature 1/16 from Case for				300	°C
	10 seconds				300	

<sup>\*</sup> Pulse Test:  $t_p \leq 300 \mu s, \ \delta \leq 2\%.$ 

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