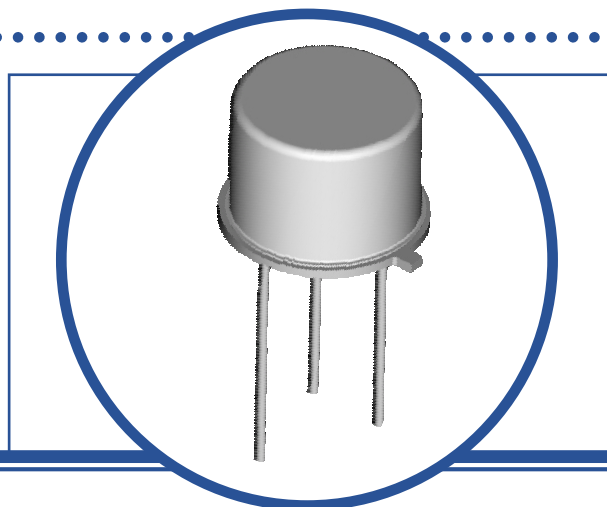


NPN SILICON TRANSISTOR

2N3019

- High Voltage, High Current Small Signal NPN Transistor.
- Hermetic TO-39 Metal Package.
- Ideally Suited For General Purpose Amplifier and High Speed Switching Applications.
- Screening Options Available



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise stated)

V_{CBO}	Collector – Base Voltage	140V
V_{CEO}	Collector – Emitter Voltage	80V
V_{EBO}	Emitter – Base Voltage	7V
I_C	Continuous Collector Current	1.0A
P_D	Total Power Dissipation at $T_A = 25^\circ\text{C}$	800mW
	Derate Above 25°C	4.57mW/ $^\circ\text{C}$
P_D	Total Power Dissipation at $T_C = 25^\circ\text{C}$	5W
	Derate Above 50°C	33.3mW/ $^\circ\text{C}$
T_J	Junction Temperature Range	-65 to $+200^\circ\text{C}$
T_{stg}	Storage Temperature Range	-65 to $+200^\circ\text{C}$

THERMAL PROPERTIES

Symbols	Parameters	Max.	Units
$R_{\theta JA}$	Thermal Resistance, Junction To Ambient	218.75	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction To Case	30	$^\circ\text{C/W}$

Semelab Limited 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.



NPN SILICON TRANSISTOR 2N3019

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

Symbols	Parameters	Test Conditions	Min.	Typ	Max.	Units
$V_{(BR)CEO}^{(1)}$	Collector-Emitter Breakdown Voltage	$I_C = 10\text{mA}$ $I_B = 0$	80			V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 140\text{V}$ $I_E = 0$			10	μA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 5\text{V}$ $I_C = 0$			10	nA
		$V_{EB} = 7\text{V}$ $I_C = 0$			10	μA
I_{CES}	Collector Cut-Off Current	$V_{CE} = 90\text{V}$ $I_B = 0$			10	nA
		$T_A = 150^\circ\text{C}$			5	μA
$h_{FE}^{(1)}$	Forward-current transfer ratio	$I_C = 0.1\text{mA}$ $V_{CE} = 10\text{V}$	50		300	V
		$I_C = 10\text{mA}$ $V_{CE} = 10\text{V}$	90			
		$I_C = 150\text{mA}$ $V_{CE} = 10\text{V}$	100		300	
		$T_A = -55^\circ\text{C}$	40			
		$I_C = 500\text{mA}$ $V_{CE} = 10\text{V}$	50		300	
$V_{CE(sat)}^{(1)}$	Collector-Emitter Saturation Voltage	$I_C = 150\text{mA}$ $I_B = 15\text{mA}$			0.2	V
		$I_C = 500\text{mA}$ $I_B = 50\text{mA}$			0.5	
$V_{BE(sat)}^{(1)}$	Base-Emitter Saturation Voltage	$I_C = 150\text{mA}$ $I_B = 15\text{mA}$			1.1	

DYNAMIC CHARACTERISTICS

h_{fe}	Small-Signal Current Gain	$I_C = 1.0\text{mA}$ $V_{CE} = 5\text{V}$ $f = 1.0\text{KHz}$	80		400	
$ h_{fe} $	Magnitude of Small-Signal Short-Circuit Forward Current, Transfer Ratio	$I_C = 50\text{mA}$ $V_{CE} = 10\text{V}$ $f = 20\text{MHz}$	5		20	
C_{obo}	Output Capacitance	$V_{CB} = 10\text{V}$ $I_E = 0$ $f = 1.0\text{MHz}$			12	pF
C_{ibo}	Input Capacitance	$V_{EB} = 0.5\text{V}$ $I_C = 0$ $f = 1.0\text{MHz}$			60	
NF ⁽²⁾	Noise Figure	$V_{CE} = 6\text{V}$ $I_C = 100\mu\text{A}$ $f = 1.0\text{KHz}$ $R_G = 1.0\text{K}\Omega$			4	dB
$r_b' C_C^{(2)}$	Collector Base Time Constant	$I_E = 10\text{mA}$ $V_{CB} = 10\text{V}$ $f = 79.8\text{MHz}$			400	ps
t_{on}	Turn-On Time	$I_C = 500\text{mA}$ $V_{CC} = 20\text{V}$ $I_{B1} = 50\text{mA}$			200	ns
t_{off}	Turn-Off Time	$I_C = 500\text{mA}$ $V_{CC} = 20\text{V}$ $I_{B1} = -I_{B2} = 50\text{mA}$			700	

Notes

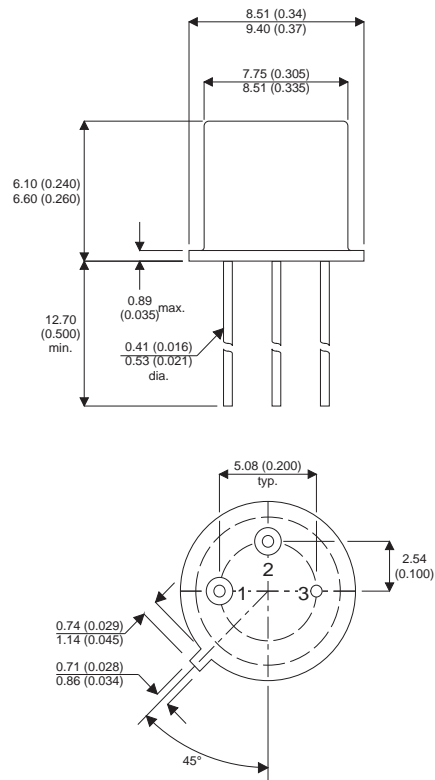
(1) Pulse Width $\leq 380\mu\text{s}$, $\delta \leq 2\%$

(2) By design only, not a production test.

NPN SILICON TRANSISTOR 2N3019

MECHANICAL DATA

Dimensions in mm (inches)



TO-39 (TO-205AD) METAL PACKAGE Underside View

Pin 1 - Emitter

Pin 2 - Base

Pin 3 - Collector