

**Type 2N3499**  
**Geometry 5620**  
**Polarity NPN**  
**Qual Level: JAN - JANTXV**

**Generic Part Number:**  
**2N3499**

**REF: MIL-PRF-19500/366**

**Features:**

[Request Quotation](#)

- General-purpose silicon transistor for switching and amplifier applications.
- Housed in TO-39 case.
- Also available in chip form using the 5620 chip geometry.
- The Min and Max limits shown are per MIL-PRF-19500/366 which Semicoa meets in all cases.



**Maximum Ratings**

$T_C = 25^{\circ}\text{C}$  unless otherwise specified

Rating	Symbol	Rating	Unit
Collector-Emitter voltage	$V_{CEO}$	100	V
Collector-Base Voltage	$V_{CBO}$	100	V
Emitter-Base voltage	$V_{EBO}$	6.0	V
Collector Current, Continuous	$I_C$	500	mA
Power Dissipation, $T_A = 25^{\circ}\text{C}$	$P_D$	5.0	mW
Derate above $25^{\circ}\text{C}$		28.8	mW/ $^{\circ}\text{C}$
Operating Junction Temperature	$T_J$	-65 to +200	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-65 to +200	$^{\circ}\text{C}$

**Electrical Characteristics**
 $T_C = 25^\circ\text{C}$  unless otherwise specified

OFF Characteristics	Symbol	Min	Max	Unit
Collector-Base Breakdown Voltage $I_C = 10\ \mu\text{A}$	$V_{(BR)CBO}$	100	---	V
Collector-Emitter Breakdown Voltage $I_C = 10\ \text{mA}$	$V_{(BR)CEO}$	100	---	V
Emitter-Base Breakdown Voltage $I_E = 10\ \mu\text{A}$	$V_{(BR)EBO}$	6.0	---	V
Collector-Base Cutoff Current $V_{CB} = 50\ \text{V}$	$I_{CBO}$	---	50	nA
Emitter-Base Cutoff Current $V_{EB} = 4\ \text{V}$	$I_{EBO}$	---	25	nA
ON Characteristics	Symbol	Min	Max	Unit
<b>Forward Current Transfer Ratio</b>				
$I_C = 100\ \mu\text{A}, V_{CE} = 10\ \text{V}$ (pulsed)	$h_{FE1}$	35	---	---
$I_C = 1.0\ \text{mA}, V_{CE} = 10\ \text{V}$ (pulsed)	$h_{FE2}$	50	---	---
$I_C = 10\ \text{mA}, V_{CE} = 10\ \text{V}$ (pulsed)	$h_{FE3}$	75	---	---
$I_C = 150\ \text{mA}, V_{CE} = 10\ \text{V}$ (pulsed)	$h_{FE4}$	100	300	---
$I_C = 300\ \text{mA}, V_{CE} = 10\ \text{V}$ (pulsed)	$h_{FE6}$	20	---	---
<b>Base-Emitter Saturation Voltage</b>				
$I_C = 10\ \text{mA}, I_B = 1.0\ \text{mA}$	$V_{BE(sat)1}$	---	0.8	V dc
$I_C = 300\ \text{mA}, I_B = 300\ \text{mA}$	$V_{BE(sat)3}$	---	1.4	V dc
<b>Collector-Emitter Saturation Voltage</b>				
$I_C = 10\ \text{mA}, I_B = 1.0\ \text{mA}$	$V_{CE(sat)1}$	---	0.2	V dc
$I_C = 300\ \text{mA}, I_B = 30\ \text{mA}$	$V_{CE(sat)3}$	---	0.6	V dc
Small Signal Characteristics	Symbol	Min	Max	Unit
Short Circuit Forward Current Transfer Ratio $I_C = 10\ \text{mA}, V_{CE} = 10\ \text{V}, f = 1\ \text{kHz}$	AC $h_{FE}$	75	375	---
Magnitude of Common Emitter, Small Signal, Short Circuit Forward Current Transfer Ratio $V_{CE} = 20\ \text{V}, I_C = 20\ \text{mA}, f = 100\ \text{MHz}$	$ h_{FE} $	1.5	8.0	---
Open Circuit Output Capacitance $V_{CB} = 10\ \text{V}, I_E = 0, 100\ \text{kHz} < f < 1\ \text{MHz}$	$C_{OBO}$	---	10	pF
Input Capacitance, Output Open Circuited $V_{EB} = 0.5\ \text{V}, I_C = 0, 100\ \text{kHz} < f < 1\ \text{MHz}$	$C_{IBO}$	---	80	pF
Noise Figure $V_{CE} = 10\ \text{V}, I_C = 0.5\ \text{mA}, R_g = 1\ \text{k}\Omega, 1\ \text{kHz}$	NF	---	16	dB
Noise Figure $V_{CE} = 10\ \text{V}, I_C = 0.5\ \text{mA}, R_g = 1\ \text{k}\Omega, 1\ \text{kHz}$	NF	---	6.0	dB
Switching Characteristics	Symbol	Min	Max	Unit
Saturated Turn On Switching time to 90% $I_C = 150\ \text{mA}, I_{B1} = 15\ \text{mA}, V_{EB} = 2\ \text{V}$	$t_{ON}$	---	115	ns
Saturated Turn Off Switching time to 10% $I_C = 150\ \text{mA}, I_{B2} = -I_{B1} = 15\ \text{mA}$	$t_{OFF}$	---	1150	ns