



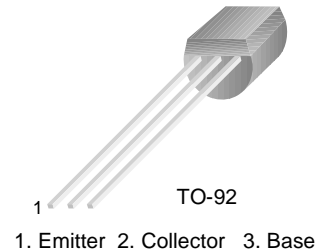
**THE DATASHEET OF**  
**2N4953**



## 2N4953

### NPN General Purpose Amplifier

- This device designed for use as general purpose amplifier and switches requiring collector currents to 500mA.
- Sourced from Process 10.



### NPN Epitaxial Silicon Transistor

#### Absolute Maximum Ratings\* $T_a=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	30	V
$V_{CBO}$	Collector-Base Voltage	60	V
$V_{EBO}$	Emitter-Base Voltage	5.0	V
$I_C$	Collector Current - Continuous	1.0	A
$T_J, T_{ST}$	Operating and Storage Junction Temperature Range	-55 ~ +150	$^\circ\text{C}$

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

**Electrical Characteristics**  $T_a=25^\circ\text{C}$  unless otherwise noted

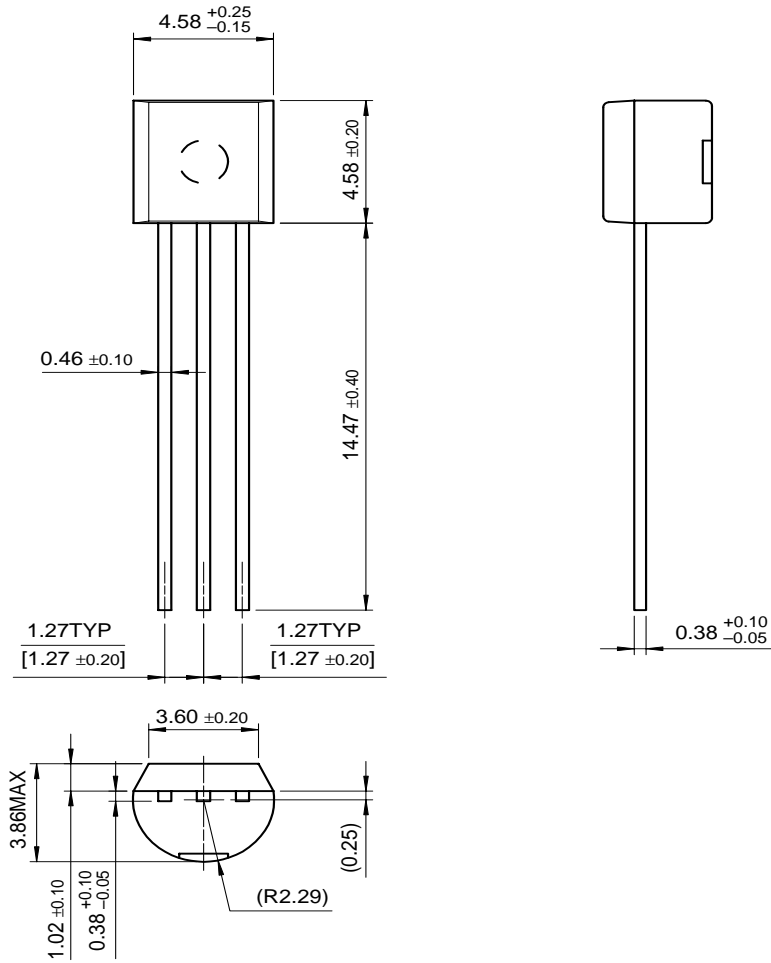
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$BV_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 10\text{mA}, I_B = 0$	30			V
$BV_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	60			V
$BV_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	5.0			V
$I_{CBO}$	Collector Cut-off Current	$V_{CB} = 40\text{V}, I_E = 0$			50	nA
$I_{EBO}$	Reverse Base Current	$V_{EB} = 3.0\text{V}, I_C = 0$			50	nA
<b>On Characteristics *</b>						
$h_{FE}$	DC Current Gain	$V_{CE} = 10\text{V}, I_C = 1.0\text{mA}$ $V_{CE} = 10\text{V}, I_C = 10\text{mA}$ $V_{CE} = 10\text{V}, I_C = 150\text{mA}$	75 150 200		600	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$			0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$			1.3	V
$V_{BE(on)}$	Base-Emitter On Voltage	$V_{CE} = 10\text{V}, I_C = 150\text{mA}$			1.2	V
<b>Small Signal Characteristics</b>						
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$			8.0	pF
$h_{fe}$	Small-Signal Current Gain	$I_C = 20\text{mA}, V_{CE} = 10\text{V},$ $f = 100\text{MHz}$	2.5			
$t_{on}$	Turn-On Time	$V_{CC} = 30\text{V}, I_C = 150\text{mA},$			40	ns
$t_{off}$	Turn-Off Time	$I_{B1} = I_{B2} = 15\text{mA}$			400	ns

\* Pulse Test: Pulse  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ **Thermal Characteristics**  $T_A=25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Max.	Units
$P_D$	Total Device Dissipation	625	mW
	Derate above $25^\circ\text{C}$	5.0	mW/ $^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	$^\circ\text{C}/\text{W}$

# Package Dimensions

## TO-92



Dimensions in Millimeters

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