

**Type 2N4150S**  
**Geometry 9201**  
**Polarity NPN**  
**Qual Level: JAN - JANTXV**

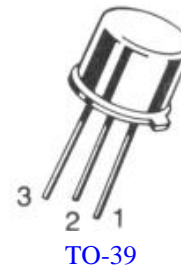
**Generic Part Number:**  
**2N4150S**

**REF: MIL-PRF-19500/394**

**Features:**

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- Power switching transistor for high speed switching applications.
- Housed in a [TO-39](#) case.
- Also available in chip form using the [9201](#) chip geometry.
- The Min and Max limits shown are per [MIL-PRF-19500/394](#) which Semicoa meets in all cases.



**Maximum Ratings**

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

Rating	Symbol	Rating	Unit
Collector-Emitter Voltage	$V_{CEO}$	70	V
Collector-Base Voltage	$V_{CBO}$	100	V
Emitter-Base Voltage	$V_{EBO}$	10	V
Collector Current, Continuous	$I_C$	10	A
Power Dissipation at 25°C ambient Derate above 25°C	$P_T$	1.0 5.7	mW mW/°C
Power Dissipation at 25°C ambient Derate above 25°C	$P_T$	5.0 50	W mW/°C
Thermal Impedance	$R_{JC}$ $R_{JA}$	0.020 0.175	°C/mW °C/mW
Operating Junction Temperature	$T_J$	-65 to +200	°C
Storage Temperature	$T_{STG}$	-65 to +200	°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 $I_C = 0.1 \text{ A}$ , pulsed	$V_{(BR)CEO}$	70	---	V
Emitter-Base Breakdown Voltage $I_E = 10 \mu\text{A}$	$V_{(BR)EBO}$	7.0	---	V
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ V}$ $V_{BE} = 0.5 \text{ V}$ , $V_{CE} = 100 \text{ V}$ $V_{BE} = -0.5 \text{ V}$ , $V_{CE} = 80 \text{ V}$ , $T_C = +150^\circ\text{C}$	$I_{CEO1}$ $I_{CEX}$ $I_{CEX2}$	---	10 10 100	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$
Emitter-Base Cutoff Current $V_{EB} = 5 \text{ V}$	$I_{EBO}$	---	0.1	$\mu\text{A}$
Collector-Base Cutoff Current $V_{CB} = 80 \text{ V}$	$I_{CBO}$	---	0.1	$\mu\text{A}$

ON Characteristics	Symbol	Min	Max	Unit
<b>Forward current Transfer Ratio</b> $I_C = 1 \text{ A}$ , $V_{CE} = 5 \text{ V}$ , pulsed $I_C = 5 \text{ A}$ , $V_{CE} = 5.0 \text{ V}$ , pulsed $I_C = 10 \text{ A}$ , $V_{CE} = 5 \text{ V}$ $I_C = 5 \text{ A}$ , $V_{CE} = 5.0 \text{ V}$ , $T_C = -55^\circ\text{C}$	$h_{FE1}$ $h_{FE2}$ $h_{FE3}$ $h_{FE4}$	50 40 10 20	200 120 ---	---
<b>Collector-Emitter Saturation Voltage</b> $I_C = 5 \text{ A}$ , $I_B = 0.5 \text{ A}$ pulsed $I_C = 10 \text{ A}$ , $I_B = 1 \text{ A}$ , pulsed	$V_{CE(sat)1}$ $V_{CE(sat)2}$	---	0.6 2.5	V dc V dc
<b>Base-Emitter Saturation Voltage</b> $I_C = 5 \text{ A}$ , $I_B = 0.5 \text{ A}$ , pulsed $I_C = 10 \text{ A}$ , $I_B = 1 \text{ A}$ , pulsed	$V_{BE(sat)1}$ $V_{BE(sat)2}$	---	1.5 2.5	V dc V dc
<b>Safe Operating Area, Continuous DC</b> $T_C = 25^\circ\text{C}$ , $t = 1.0 \text{ s}$	$V_{CE} = 40 \text{ V}$ , $I_C = 0.22 \text{ A}$ $V_{CE} = 70 \text{ V}$ , $I_C = 90 \text{ mA}$			

Small Signal Characteristics	Symbol	Min	Max	Unit
Magnitude of Common Emitter Small Signal Short Circuit Forward Current Transfer Ratio $V_{CE} = 10 \text{ V}$ , $I_C = 0.2 \text{ A}$ , $f = 10 \text{ MHz}$	$ h_{fe} $	1.5	7.5	---
Open Circuit Output Capacitance $V_{CB} = 10 \text{ V}$ , $I_E = 0$ , $100 \text{ kHz} < f < 1 \text{ MHz}$	$C_{OBO}$	---	350	pF
Small Signal, Short Circuit, Forward Current $V_{CE} = 10 \text{ V}$ , $I_C = 50 \text{ mA}$ , $f = 1 \text{ kHz}$	$h_{fe}$	40	160	---

Switching Characteristics	Symbol	Min	Max	Unit
Delay Time Per Figure 4, MIL-PRF-19500/394C	$t_d$	---	50	ns
Rise Time Per Figure 4, MIL-PRF-19500/394C	$t_r$	---	500	ns
Storage Time Per Figure 4, MIL-PRF-19500/394C	$t_s$	---	1.5	ns
Fall Time Per Figure 4, MIL-PRF-19500/394C	$t_f$	---	50	ns