

Type 2N4150

Geometry 9201

Polarity NPN

Qual Level: JAN - JANTXV

**Generic Part Number:
2N4150**

REF: MIL-PRF-19500/394

Features:

- Power switching transistor for high speed switching applications.
- Housed in a [TO-5](#) 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.

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TO-5

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 $\text{mW}/^{\circ}\text{C}$
Power Dissipation at 25°C ambient Derate above 25°C	P_T	5.0 50	W $\text{mW}/^{\circ}\text{C}$
Thermal Impedance	R_{JC} R_{JA}	0.020 0.175	$^{\circ}\text{C}/\text{mW}$ $^{\circ}\text{C}/\text{mW}$
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 $I_C = 0.1\ \text{A}$, 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	μA μA μA
Emitter-Base Cutoff Current $V_{EB} = 5\ \text{V}$	I_{EBO}	---	0.1	μA
Collector-Base Cutoff Current $V_{CB} = 80\ \text{V}$	I_{CBO}	---	0.1	μA

ON Characteristics	Symbol	Min	Max	Unit
Forward current Transfer Ratio $I_C = 1\ \text{A}$, $V_{CE} = 5\ \text{V}$, 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 --- ---	--- --- --- ---
Collector-Emitter Saturation Voltage $I_C = 5\ \text{A}$, $I_B = 0.5\ \text{A}$ 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
Base-Emitter Saturation Voltage $I_C = 5\ \text{A}$, $I_B = 0.5\ \text{A}$, 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
Safe Operating Area, Continuous DC $T_C = 25^{\circ}\text{C}$, $t = 1.0\ \text{s}$	$V_{CE} = 40\ \text{V}$, $I_C = 0.22\ \text{A}$ $V_{CE} = 70\ \text{V}$, $I_C = 90\ \text{mA}$			

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