

**Type 2N3960**  
**Geometry 0003**  
**Polarity NPN**  
**Qual Level: JAN - JANTXV**

**Generic Part Number:**  
**2N3960**

**REF: MIL-PRF-19500/399**

**Features:**

[Request Quotation](#)

- General-purpose low-power NPN silicon transistor.
- Housed in [TO-18](#) case.
- Also available in chip form using the [0003](#) chip geometry.
- The Min and Max limits shown are per [MIL-PRF-19500/399](#) which Semicoa meets in all cases.



**Maximum Ratings**

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

Rating	Symbol	Rating	Unit
Collector-Emitter Voltage	$V_{CEO}$	12	V
Collector-Base Voltage	$V_{CBO}$	20	V
Emitter-Base Voltage	$V_{EBO}$	4.5	V
Power Dissipation, $T_A = 25^\circ\text{C}$	$P_T$	400	mW
Derate above $25^\circ\text{C}$		2.3	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 $I_C = 10\ \mu\text{A}$	$V_{(BR)CBO}$	20	---	V
Collector-Emitter Breakdown Voltage $I_C = 10\ \text{mA}$	$V_{(BR)CEO}$	12	---	V
Emitter-Base Breakdown Voltage $I_C = 10\ \mu\text{A}$	$V_{(BR)EBO}$	4.5	---	V
Collector-Emitter Cutoff Current $V_{CE} = 10\ \text{V}, V_{BE} = 0.4\ \text{V}$	$I_{CEX1}$	---	1.0	$\mu\text{A}$
$V_{CE} = 10\ \text{V}, V_{EB} = 2.0\ \text{V}$	$I_{CEX2}$	---	5.0	nA
$V_{CE} = 10\ \text{V}, V_{EB} = 2.0\ \text{V}, T_A = 150^\circ\text{C}$	$I_{CEX3}$	---	5.0	$\mu\text{A}$

ON Characteristics	Symbol	Min	Max	Unit
<b>Forward Current Transfer Ratio</b> $I_C = 1.0\ \text{mA}, V_{CE} = 1\ \text{V}$	$h_{FE1}$	40	---	---
$I_C = 10\ \text{mA}, V_{CE} = 1\ \text{V}, \text{pulsed}$	$h_{FE2}$	60	300	---
$I_C = 30\ \text{mA}, V_{CE} = 1\ \text{V}, \text{pulsed}$	$h_{FE3}$	30	---	---
$I_C = 10\ \text{mA}, V_{CE} = 1.0\ \text{V}, T_C = -55^\circ\text{C}$	$h_{FE4}$	30	---	---
<b>Base-Emitter Saturation Voltage</b> $V_{CE} = 1.0\ \text{V}, I_C = 1.0\ \text{mA}$	$V_{BE1}$	---	0.8	V dc
$V_{CE} = 1.0\ \text{V}, I_C = 30\ \text{mA}$	$V_{BE2}$	---	1.0	V dc
<b>Collector-Emitter Saturation Voltage</b> $I_C = 1.0\ \text{mA}, I_B = 0.1\ \text{mA}$	$V_{CE(sat)1}$	---	0.2	V dc
$I_C = 30\ \text{mA}, I_B = 3.0\ \text{mA}$	$V_{CE(sat)2}$	---	0.3	V dc

Small Signal Characteristics	Symbol	Min	Max	Unit
<i>Magnitude of Common Emitter, Small Signal, Short Circuit</i>				
Forward Current Transfer Ratio $V_{CE} = 4\ \text{V}, I_C = 5.0\ \text{mA}, f = 100\ \text{MHz}$	$ h_{FE1} $	13	---	---
$V_{CE} = 4\ \text{V}, I_C = 10\ \text{mA}, f = 100\ \text{MHz}$	$ h_{FE2} $	14	---	---
$V_{CE} = 4\ \text{V}, I_C = 30\ \text{mA}, f = 100\ \text{MHz}$	$ h_{FE3} $	12	---	---
<b>Open Circuit Output Capacitance</b> $V_{CB} = 4\ \text{V}, I_E = 0, 100\ \text{kHz} < f < 1\ \text{MHz}$	$C_{OBO}$	---	2.5	pF
<b>Input Capacitance, Output Open Circuited</b> $V_{EB} = 0.5\ \text{V}, I_C = 0, 100\ \text{kHz} < f < 1\ \text{MHz}$	$C_{IBO}$	---	2.5	pF