

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°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	μA
$V_{CE} = 10 \text{V}, V_{EB} = 2.0 \text{V}$	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	μA

ON Characteristics	Symbol	Min	Max	Unit
Forward Current Transfer Ratio $I_C = 1.0 \text{mA}, V_{CE} = 1 \text{V}$	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	---	---
Base-Emitter Saturation Voltage $V_{CE} = 1.0 \text{V}, I_C = 1.0 \text{mA}$	V_{BE1}	---	0.8	V dc
$V_{CE} = 1.0 \text{V}, I_C = 30 \text{mA}$	V_{BE2}	---	1.0	V dc
Collector-Emitter Saturation Voltage $I_C = 1.0 \text{mA}, I_B = 0.1 \text{mA}$	$V_{CE(sat)1}$	---	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	---	---
Open Circuit Output Capacitance $V_{CB} = 4 \text{V}, I_E = 0, 100 \text{kHz} < f < 1 \text{MHz}$	C_{OBO}	---	2.5	pF
Input Capacitance, Output Open Circuited $V_{EB} = 0.5 \text{V}, I_C = 0, 100 \text{kHz} < f < 1 \text{MHz}$	C_{IBO}	---	2.5	pF