

**2N3963
 2N3964**

**SILICON
 PNP TRANSISTORS**

MAXIMUM RATINGS: ($T_A=25^\circ\text{C}$)	SYMBOL	<u>2N3963</u>	<u>2N3964</u>	UNITS
Collector-Base Voltage	V_{CB0}	80	45	V
Collector-Emitter Voltage	V_{CEO}	80	45	V
Emitter-Base Voltage	V_{EBO}		6.0	V
Continuous Collector Current	I_C		200	mA
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D		1.2	W
Power Dissipation	P_D		360	mW
Operating and Storage Junction Temperature	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$
Thermal Resistance	θ_{JC}		146	$^\circ\text{C/W}$
Thermal Resistance	θ_{JA}		486	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS: ($T_A=25^\circ\text{C}$ unless otherwise noted)

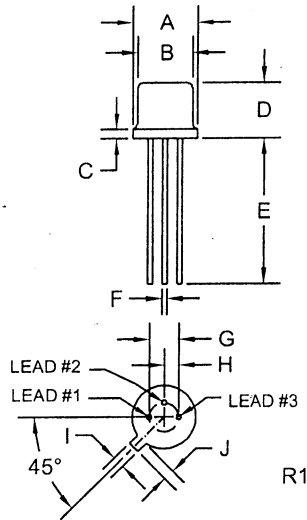
SYMBOL	TEST CONDITIONS	<u>2N3963</u>		<u>2N3964</u>		UNITS
		MIN	MAX	MIN	MAX	
I_{CBO}	$V_{CB}=70\text{V}$	-	10	-	-	nA
I_{CBO}	$V_{CB}=40\text{V}$	-	-	-	10	nA
I_{CES}	$V_{CE}=70\text{V}$	-	10	-	-	nA
I_{CES}	$V_{CE}=40\text{V}$	-	-	-	10	nA
I_{EBO}	$V_{EB}=4.0\text{V}$	-	10	-	10	nA
BV_{CBO}	$I_C=10\mu\text{A}$	80	-	45	-	V
BV_{CES}	$I_C=10\mu\text{A}$	80	-	45	-	V
BV_{CEO}	$I_C=5.0\text{mA}$	80	-	45	-	V
BV_{EBO}	$I_E=10\mu\text{A}$	6.0	-	6.0	-	V
$V_{CE(SAT)}$	$I_C=10\text{mA}, I_B=0.5\text{mA}$	-	0.25	-	0.25	V
$V_{CE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$	-	0.40	-	0.40	V
$V_{BE(SAT)}$	$I_C=10\text{mA}, I_B=0.5\text{mA}$	-	0.90	-	0.90	V
$V_{BE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$	-	0.95	-	0.95	V
hFE	$V_{CE}=5.0\text{V}, I_C=1.0\mu\text{A}$	60	-	180	-	
hFE	$V_{CE}=5.0\text{V}, I_C=10\mu\text{A}$	100	300	250	500	
hFE	$V_{CE}=5.0\text{V}, I_C=10\mu\text{A}, T_A=-55^\circ\text{C}$	40	-	100	-	
hFE	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}$	100	-	250	-	
hFE	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}$	100	450	250	600	
hFE	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, T_A=100^\circ\text{C}$	-	600	-	800	
hFE	$V_{CE}=5.0\text{V}, I_C=10\text{mA}$	100	-	200	-	
hFE	$V_{CE}=5.0\text{V}, I_C=50\text{mA}$	90	-	180	-	
hFE	$V_{CE}=5.0\text{V}, I_C=50\text{mA}, T_A=-55^\circ\text{C}$	45	-	90	-	



ELECTRICAL CHARACTERISTICS - Continued: ($T_A=25^\circ\text{C}$ unless otherwise noted)

SYMBOL	TEST CONDITIONS	2N3963		2N3964		UNITS
		MIN	MAX	MIN	MAX	
f_T	$V_{CE}=5.0\text{V}, I_C=0.5\text{mA}, f=20\text{MHz}$	40	-	50	-	MHz
C_{ob}	$V_{CB}=5.0\text{V}, I_E=0, f=1.0\text{MHz}$	-	6.0	-	6.0	pF
C_{ib}	$V_{EB}=0.5\text{V}, I_C=0, f=1.0\text{MHz}$	-	15	-	15	pF
h_{ie}	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	2.5	17	6.0	20	k Ω
h_{re}	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	-	10	-	10	10^{-4}
h_{fe}	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	100	550	250	700	
h_{oe}	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	5.0	40	5.0	50	μS
NF	$V_{CE}=5.0\text{V}, I_C=20\text{mA}, \text{BW}=15.7\text{kHz}$	-	3.0	-	2.0	dB
NF	$V_{CE}=5.0\text{V}, I_C=20\mu\text{A}, \text{BW}=1.5\text{kHz}$ $f=10\text{kHz}, R_S=10\text{k}\Omega$	-	3.0	-	2.0	dB
NF	$V_{CE}=5.0\text{V}, I_C=20\mu\text{A}, \text{BW}=150\text{Hz}$ $f=1.0\text{kHz}, R_S=10\text{k}\Omega$	-	3.0	-	2.0	dB
NF	$V_{CE}=5.0\text{V}, I_C=20\mu\text{A}, \text{BW}=15\text{Hz}$ $f=100\text{Hz}, R_S=10\text{k}\Omega$	-	10	-	4.0	dB
NF	$V_{CE}=5.0\text{V}, I_C=20\mu\text{A}, \text{BW}=2.0\text{Hz}$ $f=10\text{Hz}, R_S=10\text{k}\Omega$	-	-	-	8.0	dB

TO-18 CASE - MECHANICAL OUTLINE



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.209	0.230	5.31	5.84
B (DIA)	0.178	0.195	4.52	4.95
C	-	0.030	-	0.76
D	0.170	0.210	4.32	5.33
E	0.500	-	12.70	-
F (DIA)	0.016	0.019	0.41	0.48
G (DIA)	0.100		2.54	
H	0.050		1.27	
I	0.036	0.046	0.91	1.17
J	0.028	0.048	0.71	1.22

TO-18 (REV: R1)

LEAD CODE:

- 1) Emitter
- 2) Base
- 3) Collector