

2N3903
2N3904

NPN SILICON TRANSISTOR



TO-92 CASE



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DESCRIPTION:

The CENTRAL SEMICONDUCTOR 2N3903 and 2N3904 types are NPN silicon transistors designed for general purpose amplifier and switching applications. PNP complementary types are 2N3905 and 2N3906.

MARKING: FULL PART NUMBER

MAXIMUM RATINGS: ($T_A=25^{\circ}\text{C}$)

Collector-Base Voltage
Collector-Emitter Voltage
Emitter-Base Voltage
Continuous Collector Current
Power Dissipation
Operating and Storage Junction Temperature
Thermal Resistance

SYMBOL

V_{CBO}	60
V_{CEO}	40
V_{EBO}	6.0
I_C	200
P_D	625
T_J, T_{stg}	-65 to +150
Θ_{JA}	200

UNITS

V
V
V
mA
mW
 $^{\circ}\text{C}$
 $^{\circ}\text{C/W}$

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

SYMBOL	TEST CONDITIONS	2N3903		2N3904		UNITS
		MIN	MAX	MIN	MAX	
I_{CEV}	$V_{CE}=30\text{V}, V_{EB}=3.0\text{V}$	-	50	-	50	nA
BV_{CBO}	$I_C=10\mu\text{A}$	60	-	60	-	V
BV_{CEO}	$I_C=1.0\text{mA}$	40	-	40	-	V
BV_{EBO}	$I_E=10\mu\text{A}$	6.0	-	6.0	-	V
$V_{CE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	-	0.2	-	0.2	V
$V_{CE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$	-	0.3	-	0.3	V
$V_{BE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	0.65	0.85	0.65	0.85	V
$V_{BE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$	-	0.95	-	0.95	V
h_{FE}	$V_{CE}=1.0\text{V}, I_C=0.1\text{mA}$	20	-	40	-	
h_{FE}	$V_{CE}=1.0\text{V}, I_C=1.0\text{mA}$	35	-	70	-	
h_{FE}	$V_{CE}=1.0\text{V}, I_C=10\text{mA}$	50	150	100	300	
h_{FE}	$V_{CE}=1.0\text{V}, I_C=50\text{mA}$	30	-	60	-	
h_{FE}	$V_{CE}=1.0\text{V}, I_C=100\text{mA}$	15	-	30	-	
h_{fe}	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	50	200	100	400	
f_T	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	250	-	300	-	MHz
C_{ob}	$V_{CB}=5.0\text{V}, I_E=0, f=100\text{kHz}$	-	4.0	-	4.0	pF
C_{ib}	$V_{EB}=0.5\text{V}, I_C=0, f=100\text{kHz}$	-	8.0	-	8.0	pF
NF	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}, R_S=1.0\text{k}\Omega$ $f=10\text{Hz to } 15.7\text{kHz}$	-	6.0	-	5.0	dB
t_{on}	$V_{CC}=3.0\text{V}, V_{BE(OFF)}=0.5\text{V}, I_C=10\text{mA}$ $I_{B1}=1.0\text{mA}$	-	70	-	70	ns
t_{off}	$V_{CC}=3.0\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1.0\text{mA}$	-	225	-	250	ns

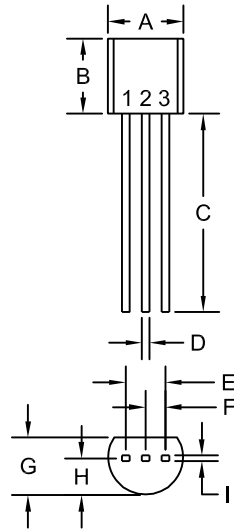
R2 (12-October 2011)

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TO-92 CASE - MECHANICAL OUTLINE



DIMENSIONS				
SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.175	0.205	4.45	5.21
B	0.170	0.210	4.32	5.33
C	0.500	-	12.70	-
D	0.016	0.022	0.41	0.56
E	0.100		2.54	
F	0.050		1.27	
G	0.125	0.165	3.18	4.19
H	0.080	0.105	2.03	2.67
I	0.015		0.38	

TO-92 (REV: R1)

LEAD CODE:

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

MARKING:
FULL PART NUMBER

R2 (12-October 2011)

OUTSTANDING SUPPORT AND SUPERIOR SERVICES



PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2nd day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix "TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix "PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

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