

2N2223
2N2223A

**SILICON
DUAL NPN TRANSISTORS**



TO-78 CASE

DESCRIPTION:

The CENTRAL SEMICONDUCTOR 2N2223 and 2N2223A are dual silicon NPN transistors manufactured by the epitaxial planar process utilizing two individual chips mounted in a hermetically sealed metal case designed for differential amplifier applications.

MARKING: FULL PART NUMBER

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

Collector-Base Voltage
Collector-Emitter Voltage
Collector-Emitter Voltage
Emitter-Base Voltage
Continuous Collector Current
Power Dissipation (One Die)
Power Dissipation (Both Dice)
Operating and Storage Junction Temperature

SYMBOL		UNITS
V_{CB0}	100	V
V_{CER}	80	V
V_{CEO}	60	V
V_{EBO}	7.0	V
I_C	500	mA
P_D	500	mW
P_D	600	mW
T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

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

SYMBOL	TEST CONDITIONS	MIN	MAX	UNITS
I_{CBO}	$V_{CB}=80\text{V}$		10	nA
I_{CBO}	$V_{CB}=80\text{V}, T_A=150^\circ\text{C}$		15	μA
I_{EBO}	$V_{EB}=5.0\text{V}$		10	nA
BV_{CB0}	$I_C=100\mu\text{A}$	100		V
BV_{CER}	$I_C=100\text{mA}, R_{EB}=10\Omega$	80		V
BV_{CEO}	$I_C=30\text{mA}$	60		V
BV_{EBO}	$I_E=100\mu\text{A}$	7.0		V
$V_{CE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		1.2	V
$V_{BE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.9	V
h_{FE}	$V_{CE}=5.0\text{V}, I_C=10\mu\text{A}$	15		
h_{FE}	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}$	25	150	
h_{FE}	$V_{CE}=5.0\text{V}, I_C=10\text{mA}$	50	200	
f_T	$V_{CE}=10\text{V}, I_C=50\text{mA}, f=20\text{MHz}$	50		MHz
C_{ob}	$V_{CB}=10\text{V}, I_E=0, f=1.0\text{MHz}$		15	pF
C_{ib}	$V_{BE}=0.5\text{V}, I_C=0, f=1.0\text{MHz}$		85	pF
h_{ib}	$V_{CB}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	20	30	Ω
h_{rb}	$V_{CB}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$		3.0	$\times 10^{-4}$
h_{fe}	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	40	200	
h_{ob}	$V_{CB}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$		0.5	μS

MATCHING CHARACTERISTICS:

SYMBOL	TEST CONDITIONS	2N2223		2N2223A		UNITS
		MIN	MAX	MIN	MAX	
h_{FE1}/h_{FE2} (Note 1)	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}$	0.8	1.0	0.9	1.0	
$ V_{BE1}-V_{BE2} $	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}$	-	15	-	5.0	mV

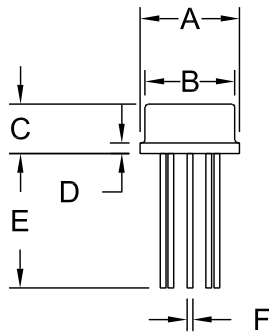
Notes: (1) The lowest reading is taken as h_{FE1} .

2N2223
2N2223A

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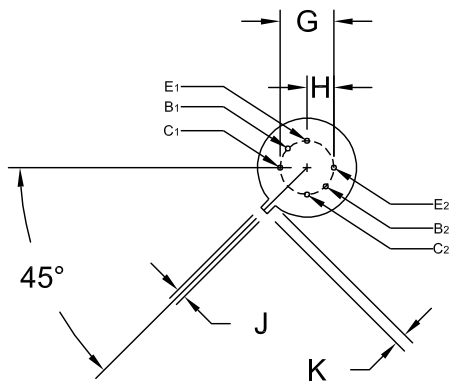


TO-78 CASE - MECHANICAL OUTLINE



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.335	0.370	8.51	9.40
B (DIA)	0.305	0.335	7.75	8.51
C	0.150	0.185	3.81	4.70
D	-	0.040	-	1.02
E	0.500	-	12.70	-
F (DIA)	0.016	0.021	0.41	0.53
G	0.200		5.08	
H	0.100		2.54	
J	0.028	0.034	0.71	0.86
K	0.029	0.045	0.74	1.14

TO-78 (REV: R1)



R1

MARKING: FULL PART NUMBER

R0 (22-January 2014)

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).

CONTACT US

Corporate Headquarters & Customer Support Team

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www.centrasemi.com/wwreps

Worldwide Distributors:
www.centrasemi.com/wwdistributors

For the latest version of Central Semiconductor's **LIMITATIONS AND DAMAGES DISCLAIMER**, which is part of Central's Standard Terms and Conditions of sale, visit: www.centrasemi.com/terms

Product End of Life Notification

PDN ID:	PDN01061
Notification Date:	1/17/17
Last Buy Date:	7/17/17
Last Shipment Date	1/17/18

Summary: All transistors manufactured in the TO-78 package are discontinued and now classified as End of Life (EOL).

Although Central Semiconductor Corp. makes every effort to continue to produce devices that have been proclaimed EOL (End of Life) by various manufacturers, it is an accepted industry practice to discontinue certain devices when customer demand falls below a minimum level of sustainability. Accordingly, the following product(s) have been transitioned to End of Life status as part of Central's Product Management Process. Any replacement product will be noted below. The effective date for placing the last purchase order will be six(6) months from the date of this notice and twelve(12) months from the notice date for final shipments; this may be extended if inventory is available.

<u>Central Part Number</u>	<u>Replacement</u>
CEN876	N/A
CEN894	N/A
CEN895	N/A
CEN896	N/A
CEN911	N/A
CEN947	N/A
CEN955 W/DATA	N/A
MD2219A	N/A
MD2369	N/A
MD2369A	N/A
MD2369B	N/A
MD2905	N/A
MD2905A	N/A
MD5179	N/A
MD7000	N/A
MD7001	N/A
MD7003	N/A
MD7003A	N/A
MD7003B	N/A
MD8002	N/A
MD8003	N/A
MD918	N/A
MD918A	N/A
MD918B	N/A
MD984	N/A
2N2060	N/A
2N2060A	N/A
2N2060M	N/A
2N2223	N/A
2N2223A	N/A
2N2453	N/A
2N2453A	N/A
2N2480	N/A
2N2480A	N/A
2N2639	N/A
2N2640	N/A
2N2641	N/A
2N2642	N/A

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DISCLAIMER: This End of Life (EOL) notification is in accordance with JEDEC standard JESD48 - Product Discontinuance. Central Semiconductor Corp. will make every effort to offer life-time buy (LTB) opportunities and/or offer replacement devices to existing customers for discontinued devices, however, one or both may not be possible for all devices. Please contact your local Central Semiconductor sales representative for LTB opportunities/additional information.

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*** CONTINUED FROM PRIOR PAGE ***

<u>Central Part Number</u>	<u>Replacement</u>
2N2643	N/A
2N2644	N/A
2N2652	N/A
2N2652A	N/A
2N2720	N/A
2N2721	N/A
2N2722	N/A
2N2903	N/A
2N2903A	N/A
2N2913	N/A
2N2914	N/A
2N2915	N/A
2N2915A	N/A
2N2916	N/A
2N2916A	N/A
2N2917	N/A
2N2918	N/A
2N2919	N/A
2N2919A	N/A
2N2920	N/A
2N2920A	N/A
2N3726	N/A
2N3727	N/A
2N3806	N/A
2N3807	N/A
2N3808	N/A
2N3809	N/A
2N3810	N/A
2N3810A	N/A
2N3811	N/A
2N3811A	N/A
2N4015	N/A
2N4016	N/A
2N4854	N/A
2N4937	N/A
2N4938	N/A
2N4939	N/A
2N5793	N/A
2N5794	N/A
2N5796	N/A
2N5912	N/A
2N6502	N/A

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<http://www.centrasemi.com>

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Central Part Number Replacement

Central would be happy to assist you by providing additional information or technical data to help locate an alternate source if we have no replacement available. Please email your requests to engineering@centrasemi.com.

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