

SECTION 2: SYMBOL LIST**Contents**

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2.1 (DO/TO) Symbols for semiconductor device outlines with up to four terminals

Please note 2.1, 2.3, 2.4 were last revised in September 1993.

A	Distance from seating plane to top of body or case.
A1, A2, etc.	Other distances from base or seating plane to points on body or case.
Øa	Diameter of the circle upon which the terminal positions are located. (See Note 1.)
B	Major cross-section dimension of a standoff.
B1	Minor cross-section dimension of a standoff.
ØB	Diameter of a standoff.
b	Major cross-section dimension of a plated or coated terminal
b1, b2, etc.	Other terminal cross-section dimensions including bare metal.
Øb, Øb1, etc.	Diameter of round plated or coated terminals. (Alternate definition) - Diameter of circumscribed circle containing the terminal.
c	Minor cross-section dimension of a plated or coated terminal.
c1, c2, etc.	Other minor cross-section dimensions including bare metal.
D	Largest dimension, excluding terminals, on the major axis of a noncircular body or case.
D1, D2 etc.	Other body or case dimensions, excluding terminal, on the major axis of a noncircular package.
ØD	Largest diameter of body or case. (Alternate definition) - Distance-across-points of a hexagon.
ØD1, ØD2, etc.	Other diameters related to body or case.
E	Largest dimension, excluding terminals, on the minor axis of a noncircular body or case.
E1, E2, etc.	Other body or case dimensions, excluding terminals, on the minor axis of a noncircular package.
e	Linear distance between two terminal centers. (See Note 1.)
e1, e2, etc.	Other linear, terminal location dimensions. (See Note 1.)
F	Overall dimension of flange or hexagon zone including any fillet.
F1	Dimension of a flange or hexagon zone excluding any fillet.
G	Length of body constant cross-section.
G1, G2, etc.	Other body lengths.
H	Largest overall dimension including terminals.
H1, H2, etc.	Other dimensions including terminals.
h	Height or depth of index feature.

2.1 (DO/TO) Symbols for semiconductor device outlines with up to four terminals (cont'd)

J	Height from seating plane of solid terminals or of space cylinder within which extended flexible terminals can be bent at right angle. (See Note 2.)
J1, J2, etc.	Other terminal heights from seating plane.
j	Width of index feature. (See Note 3.)
Øj	Diameter of index feature.
k	Length of index feature. (See Note 3 and 4.)
L	Overall terminal length.
L1	Length of uncontrolled cross-section of terminal. (See Note 5.)
L1, L2, etc.	Other terminal lengths.
M	Other unthreaded sections of stud.
ØM	Diameter of thread relief zone.
N	Overall length of stud.
N1	Length of incomplete or undercut threads.
O	Longest dimension between seating plane and center of hole in lug of a terminal. (See Note 6.)
O1, O2, etc.	Dimensions between seating plane and center of hole in lug of other terminals.
P	Length of controlled zone of case.
Øp	Diameter of mounting holes.
Q	Other dimensions.
q, q1	Distance between centers of two mounting holes.
R, R1, etc.	Curve radii associated with body.
r, r1, etc.	Other curve radii, such as index tab radii.
S, S1, etc.	Miscellaneous dimensions of terminal flat relative to terminal hole. (See Note 7.)
s, s1, etc.	Distance from reference line through the center of two terminals to a body feature.
T, T1, etc.	Dimensions of noncircular holes in terminals
Ø1, ØT1, etc.	Diameter of hole in terminal.
V, V1, etc.	Depth of threaded hole.
ØW, ØW1	Pitch diameter per thread specification ANS Bi.1-1960
Y, Y1, etc.	Other dimensions.
Z, Z1, etc.	Functional dimension diameter or total tolerance zone dimensions.
β, β1, etc.	Angular spacing between adjacent terminal positions.
α, α1, etc.	Index datum angle to first terminal position on each pin circle.

2.1 (DO/TO) Symbols for semiconductor device outlines with up to four terminals (cont'd)

NOTE 1 Specify any gauging requirement or location of gauge plane if not otherwise defined.

NOTE 2 J is seated height with lead bent at right angle.

NOTE 3 Specify any special requirement such as minimum length that j must be held beyond r on a tab.

NOTE 4 Specify measurement reference point, such as “max ØD”.

NOTE 5 Specify any qualifications place on "uncontrolled" cross-section.

NOTE 6 When applicable, specify “flexible lead”,

NOTE 7 When applicable, specify “minimum flat”.

2.2 (MO) Symbols for solid state device axial and peripheral lead packages

These symbols must be used as appropriate for the equivalent features. The list will be updated when other symbols are required.

Letter or Symbol	Description of Dimension	Used with A – Axial P - Periph.
A	distance from seating plane to highest point of body	A,P
A1	distance between seating plane and base plane	A
A2	distance from base plane to highest point of body	A
Øa	diameter of lead circle upon which terminal positions are located	A
b	width of terminal leads measured along lead row or around lead circle at gauge plane	A
b	width of terminal leads measured in a plane parallel to seating plane	P
b1	width of terminal lead base material	A,P
b2	width of terminal lead standoffs which locate seating plane (standoff geometry optional)	A
Øb	diameter of round terminal leads measured at gauge plane (tip geometry optional)	A
Øb	diameter of round terminal leads	A
Øb1	diameter of terminal lead base material	A
Øb2,	diameter of terminal lead standoff which locates seating plane	A
Øb3, etc.	other terminal lead diameters	A,P
c	thickness of terminal leads measured perpendicular to lead row or lead circle at gauge plane	A

2.2 (MO) Symbols for solid state device axial and peripheral lead packages (cont'd)

Letter or Symbol	Description of Dimension	Used with A – Axial P - Periph.
c	thickness of terminal leads measured in a plane perpendicular to seating plane	P
c1	thickness of terminal lead base material	A,P
D	largest overall package dimension of mounted package measured parallel to the body length D_1	A,P
D1	body length dimension, the longest body dimension measured perpendicular to the body width E_1 and measured in a plane parallel to the seating plane.	A,P
D2, D3, etc.	other body dimensions	A,P
ØD	largest diameter of a cylindrical package measured in a plane parallel to the seating plane	A,P
ØD1	diameter of top surface of a cylindrical package	A,P
E	largest overall package dimension of mounted package measured parallel to body width E_1	A,P
E	body width dimension located within overall body width dimension A	P
E1	body width dimension, the smallest body dimension measured in a plane parallel to the seating plane	A,P
E2, E3, etc.	other body dimensions	A,P
e, eA, e1, etc.	linear spacing between true lead positions which applies over the entire lead length or at the gauge plane.	A,P
e1, e2	distances between centerlines of body standoffs	A,P
F	thickness of flange zone of body including any fillet	A
F1	thickness of flange body excluding any fillet	A
G1, G2, etc.	dimension locating mounting hole relative to mounting tab or body	A,P
H	distance from end of leads on one side of package to end of leads on opposite side	P
h	depth of an index feature; e.g. notch	A,P
j	width of an index feature; e.g. tab	A,P
k	length of an index feature; e.g. tab; on cylindrical packages k is measured from package diameter, ØD	A,P
L	distance from edge of zone Z to end of lead	P

2.2 (MO) Symbols for solid state device axial and peripheral lead packages (cont'd)

Letter or Symbol	Description of Dimension	Used with A – Axial P - Periph.
L	distance from seating plane to end of lead	A
L1	length of zone in which lead dimensions are uncontrolled because of possible body or standoff irregularities extending down the lead	A
L2	distance between two defined planes wherein the lead dimensions are closely controlled	A
L3	distance from base plane to end of lead	A
N	the total number of potentially usable lead positions; the actual number of leads present may be less than N	A,P
N1	the maximum number of lead positions which can be unoccupied by actual leads; an optional parameter	A,P
Øp	diameter of a mounting hole	A,P
Q	distance from base plane to bottom of lead where it emerges from the body	P
Q	distance from top of body to top of lead where it emerges from the body	A
q	distance between centerlines of mounting holes	A,P
q1	distance from centerline of body to centerline of mounting holes	A,P
R1, R2, etc.	radius dimensions	A,P
S	distance from true position centerline of the No.1 lead position to the extremity of the body	A
S1, S2, etc.	distances from true position centerlines of other end lead positions to the extremity of the body if different from S	A
S, S1, S2, etc.	Note: In cases where leads extend beyond the body, S, S ₁ , S ₂ , etc. shall be specified as zero. Negative dimensions shall not be used.	P
T, T1, etc.	dimensions of non-circular mounting hole	A,P
Z	width of a zone which includes maximum overall body width and any irregularities in body or lead configuration	P
Z1	length of a zone which includes maximum overall body length and any irregularities in body or lead configuration	P
α, αA, αB, etc.	angular spacing between true lead positions measured at the gauge plane	A
α1	angular spacing between the index feature centerline and a true lead position	A
Ø, Ø2, etc.	angular dimensions for body drafts, etc.	A,P
Ø	angular displacement of lead standoff from specified datum	A

2.3 Symbols For uncased semiconductor outlines, UO-series

A	Maximum thickness of device
A1	Distance from seating plane to highest point of device b Terminal lead width over entire lead length
b2, b3, etc.	Other lead dimensions
B1	Width of terminal test land
B2	Length of terminal test land
B1, B2, etc.	Other terminal test land dimensions
D/E	Distance across outer edges of beam lead cut-outs
D1/E1	Distance across inner edges of beam lead cut-outs
D2/E2	Distance across the outer edges of the end leads of a row
D3/E3	Distance from datum to centerline of inner row of test pads
D4/E4	Distance from datum to centerline of outer row of test pads
D5/E5	Distance between registration or test holes
D6	Width of film
E6	Length bf singulated film frame
D7/E7	Device body dimensions
E	Basic distance between terminal centers
E1	Basic distance between test pad centers
F	Registration hole dimension
G	Sprocket hole dimension
N	Total quantity of potentially useable lead positions
N1	Quantity of allowable missing terminal leads
S	Inner corner space between beam lead cut-outs

2.4 Symbols for carrier outlines, CO-Series

2.4.1 Coinstack dimensions

a	Wall thickness
b	Bevel dimension
c	Slot width
d	Distance from end of carrier to edge of slot
e	Slot length
f	Distance between slots
g	Distance of slot centerline from side of carrier
r	Internal corner radius
A	Internal width of side of carrier
B	External width of side of carrier
C	Length of carrier

2.4.2 Tab magazine dimensions

A, A1	External dimensions of flange of lip
B, B1	External dimensions of hub of lip
C, C1	Internal dimensions of magazine
D	Distance from centerline of magazine to centerline of bead
E	External width of cap
E1	Length of cap
F	Internal width of cap
G	Distance between beads
H	Overall height of magazine

2.4 Symbols for carrier outlines, CO-Series (cont'd)

2.4.3 Tab tape carrier dimensions

A	Length of carrier
B	Width of carrier
C	Overall thickness of carrier
D, D1	Dimensions of aperture of carrier
E, E1	Dimensions of film recess of carrier
F	Depth of recess
G, G1	Tape retention area
H	Distance between adjacent carrier alignment slots
J	Distance between opposite carrier alignment slots
K	Distance between opposite rows of tape locating pins and registration holes
K1	Distance between adjacent tape locating pins
L, L1	Distance between tape fine alignment holes
M	Bevel
P	Diameter of registration hole
Q	Side of square registration hole
S	Diameter of tape locating pin

2.4.4 Generic carrier dimensions

A	Overall carrier thickness
A1, A2, etc.	Other thickness dimensions
b	width of alignment slot
D	Overall carrier width
D2	Distance across alignment slots
D3, D4	Other width dimensions
E	Overall carrier length
E1	Distance between adjacent alignment slots
E3	Other length dimensions

2.4 Symbols for carrier outlines, CO-Series (cont'd)**2.4.5 Handling and shipping tray dimensions**

J	Cavity length
J1, J2, etc.	Other cavity length dimensions
K	Cavity width
K1, K2	etc. Other cavity width dimensions
M	Mechanical index position
M1, M2, etc.	Other mechanical index positions
N1	Number of columns of cavities
N2	Number of rows of cavities

2.4.6 Magazine and shipping tube dimensions

J1, J2, etc.	Cavity length positions
ØJ	Cavity diameter
K	Width of opening
L	Overall carrier length
L1, L2	Other length dimension
R, R1, R2	Carrier radii
t	wall thickness
T	Overall carrier thickness (height)
T1, T2, etc.	Other thickness dimensions
W	Overall carrier width
ØW	Overall carrier diameter
W1, W2	Other width dimensions
Y1, Y2	Other dimensions
ØY1	Hole diameter

2.5 Symbols for gauges

(See Figures 1 and 2 for application of symbols)

α	Terminal lead angular spacing.
$\alpha_1, \alpha_2, \text{etc.}$	Other angular dimensions.
$B_1, B_2, \text{etc.}$	Terminal lead hole linear spacing dimensions.
$\varnothing B$	Terminal lead hole diameter.
$\varnothing D$	Largest, or outside diameter of a circular gauge.
$\varnothing D_1, \varnothing D_2, \text{etc.}$	Other gauge body and/or gauge feature diameters.
$\varnothing E$	Terminal lead hole circle diameter.
F	Maximum allowable force or load, to seat product in seating plane gauges (expressed on a per lead per unit of diameter basis, e.g., grams per lead per mm of lead diameter).
f	Surface finish. Roughness height expressed in microinches. See ANSI Standard B46.1-1962 for preferred values.
H	Gauge hardness. Use Rockwell hardness scale units. See American Society for Testing and Materials Standard E 18-16.
L	Overall gauge length, noncircular gauges.
$L_1, L_2, \text{etc.}$	Other gauge body dimensions along the same axis as L.
N	Total number of terminal lead holes.
T	Overall gauge thickness.
$T_1, T_2, \text{etc.}$	Other gauge body dimensions along the same axis as T.
W	Overall gauge width, noncircular gauges.
$W_1, W_2, \text{etc.}$	Other gauge body dimensions along the same axis as W.

2.5 Symbols for gauges (cont'd)

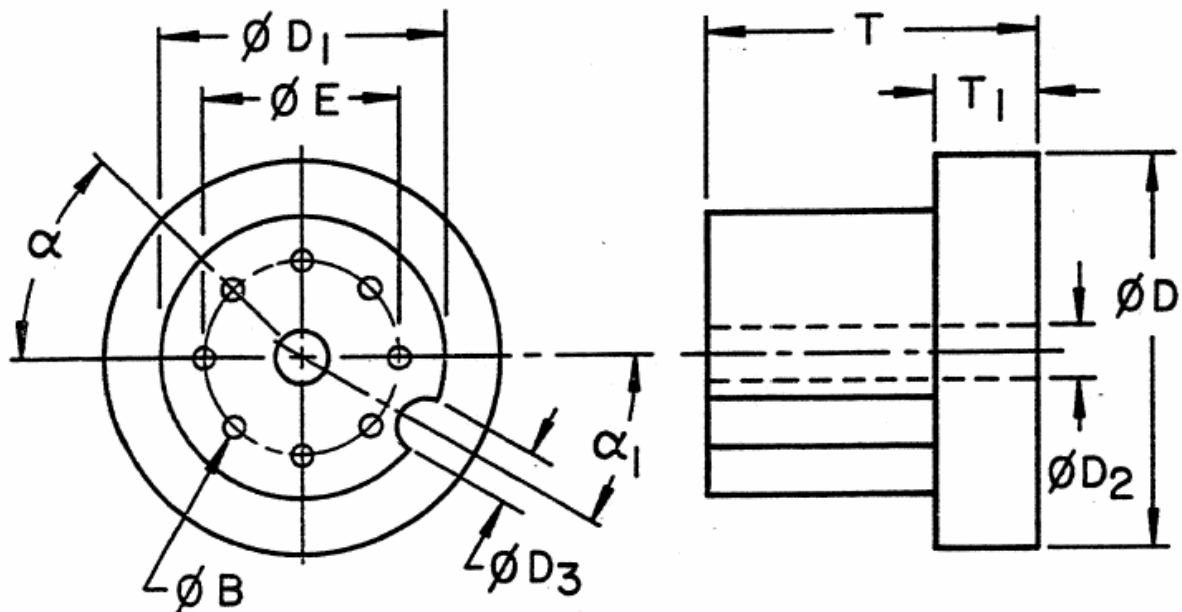


Figure 1 — Application of symbols used for circular gauges

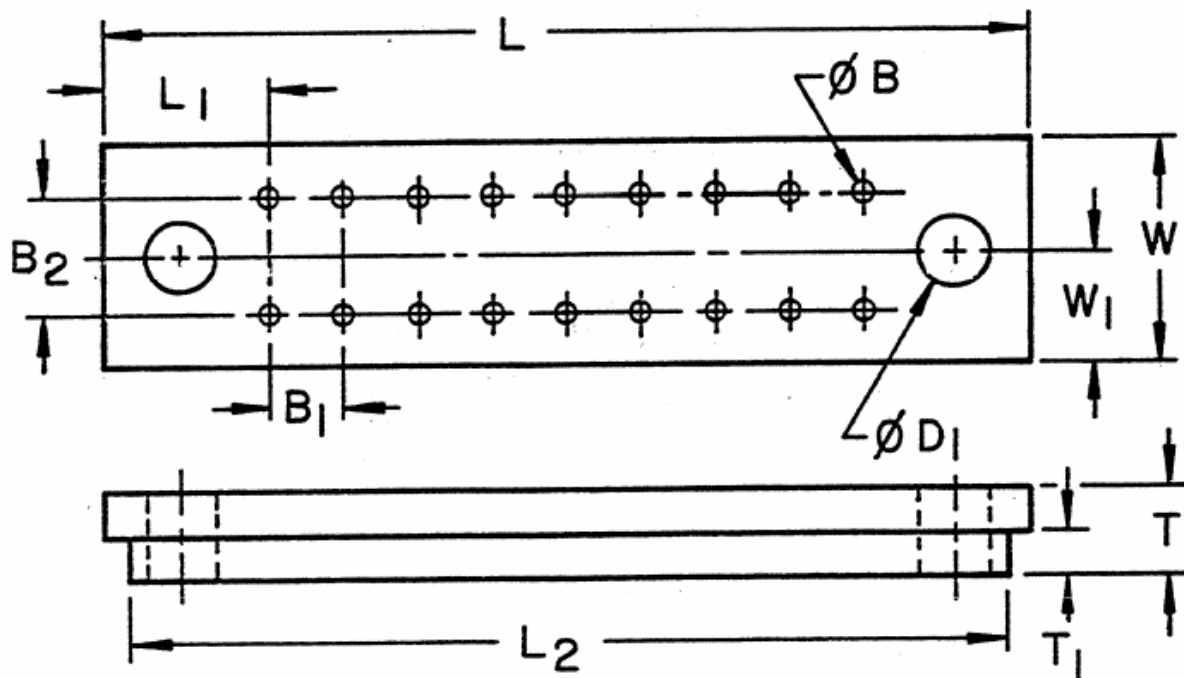


Figure 2 — Application of symbols used for non-circular gauges

