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Manual for the preparation of outline drawings of discrete semiconductor packages

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Manual for the preparation of outline drawings of discrete semiconductor packages

1. Scope

This manual defines items to be described for preparing outline drawings of discrete-semiconductor packages for individual standard.

2. Terminology

General terminology complies with “Recommended practice on standard for the preparation of outline drawings of semiconductor packages,” **EIAJ ED-7300**, while the specific terminology is defined in the contents of this guide.

Some descriptions that were ambiguous to the discrete semiconductors in **EIAJ ED-7300** have also been redefined in this manual.

3. Contents of this manual

This manual describes the following items:

- (1) Structure of the individual standard
- (2) Details of the individual standard
- (3) Registration, constitution and revision
- (4) Assignment of terminal numbers
- (5) Common rules of preparing the drawings of the discrete semiconductor packages
- (6) Individual rules of the reference symbols and names of the outline dimensions
- (7) Dimensions to be registered (representative package drawings)

4. Structure of the individual standard

The individual standard comprises a master form (**Attached Drawing 1**), outline drawings and tables of dimensions (**Attached Table 1**).

5. Details of the individual standard

5.1 Master form

The master form of the individual standard consists of:

- (1) Symbol that denotes the third angle projection
- (2) Title of the **JEITA** standard (JEITA STANDARD PACKAGE OUTLINE DRAWING)
- (3) Registration date and revision date (REGISTRATION DATE, REVISION DATE)
- (4) Package code (PACKAGE CODE)
- (5) Sheet number (SHEET)

5.2 Outline drawing

The outline drawing includes:

(1) Package front view

(2) Package side view (necessary side only)

(3) Package bottom view

- (a) The bottom view must be specified when a surface mount device (SMD) has terminals or a heat spreader which are partially or fully exposed on the package bottom.
- (b) The bottom view of a through-hole device (THD) or the other SMD packages than mentioned above may be specified when it is necessary.
- (c) The bottom view is not required when a package does not have any significance on the bottom and is fully described by other views.

(4) Cross-sectional diagram of a terminal

- (a) The cross-sectional diagram of a terminal shall be described for SMD packages.
- (b) The cross-sectional diagram of a terminal is described for THD packages wherever necessary, e.g., the terminal having distinguishing shape in cross section.

(5) Pattern of terminal position areas

- (a) The pattern of terminal position areas shall be specified for the SMD packages but not for the THD packages.

(6) Others

- (a) All necessary drawings are shown, such as detail drawings or separate drawings of distinguishing features.

5.3 Table of dimensions

5.3.1 Group

All dimensions designated in the drawings are classified into Group 1 or Group 2 and specified in the table of dimensions.

5.3.2 Group classification

Group classification complies with the **section 9** in the “Recommended practice on standard for the preparation of outline drawings of semiconductor packages,” **EIAJ ED-7300**. In addition, Group 2 includes the dimensions related to the pattern of terminal position areas and the ones specifying the index feature such as $\alpha_1 \dots$, $\beta_1 \dots$, h , k , j , $2\alpha_A \dots$, $\beta_B \dots$

5.3.3 Dimension to be specified

Section 11 of this manual indicates the dimensions to be specified.

When preparing the outline drawing of the package that is not similar to none of the examples listed in this manual, dimensions to be specified are described separately in each individual standard.

5.3.4 Examples of the tables of dimensions

Some examples of the tables of dimensions are shown in the **Attached Table 3a** and the subsequent tables.

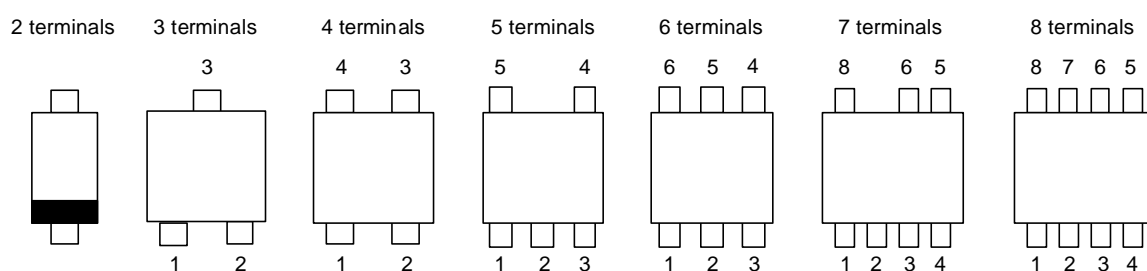
6. Registration, constitution and revision of the standards

- (1) A registration date is defined as the date on which a proposal draft of new package outline standard is approved by the Technical Standardization Committee on Semiconductor Device Package.
- (2) An constitution date is defined as the date on which a standard booklet is published from **JEITA**.
- (3) A revision date is defined as the date on which an amendment draft of the standard is approved by the Technical Standardization Committee on Semiconductor Device Package.

7. Assignment of the terminal numbers

- (1) When a package is viewed in as-mounted condition with the highest terminal-count side down, the lower left terminal is defined as terminal #1. Then the terminals are numbered counterclockwise and the numbers shall appear outside the package body but close to the corresponding terminals in the drawing.
- (2) For a two-terminal device an index mark shall be clearly identified.
(Terminal numbers are not required in the drawing but index mark only.)

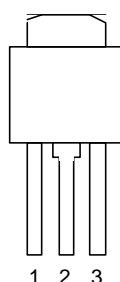
<Surface Mount Device>



- (a) For the packages with less than seven terminals, the terminals shall be numbered in serial order without any missing numbers.

For the packages with seven or more terminals, the depopulated terminals are also numbered and these numbers are missing in the drawing.

<Through Hole Device>



- (a) Suppose a marking surface is in front view, the left bottom lead is defined as terminal #1.
- (b) A heat spreader is not numbered.

8. Common rules for the preparation of the outline drawings

8.1 Preparation of the package outline drawings and dimensions

- (1) All Dimensions in the outline drawings shall be represented by the symbols defined in the **Attached Table 2**. Actual figures shall not be directly shown in the drawing.
The symbols and their corresponding values shall be specified in the table of dimensions.
- (2) Any dimension specified in the table of dimensions is a number with two decimal places.
But if necessary, the number with three decimal places is acceptable.
- (3) Dimensions that specify the theoretically exact size (represented by a character enclosed in a box) are listed in the column of "Nom" with an asterisk mark.
- (4) A diameter is indicated by prefix " ϕ " followed by a character in the outline drawings and in the table of dimensions.
- (5) For the dimensions related to the pattern of terminal position areas, only maximum dimensions are shown in the table of dimensions.
- (6) The patterns of terminal position areas are defined such as shown in the **Attached Drawings 2a, 2b and 2c**. When terminal position areas do not comply with the above drawings, its reasons shall be recorded in the individual standards.
- (7) The patterns of terminal position areas are not hatched.
- (8) Index area shall be hatched by lines slanting to the top right.
- (9) In a cross-sectional diagram of terminal, a section of solder-coating (lead finish) shall be hatched by lines slanting to the top right.
- (10) The dimensions are basically specified for all physical parts of the package in the drawing. However, the objects that are described only for showing the specific feature of the package may not be accompanied with dimensions.

Example: The dimensions are not specified for the square hole in the heat spreader on the drawing of SC-100.

- (11) "**Note**" with a parenthesized superior figure in numerical order heads a sentence of comments and notes.

Example: Note ⁽¹⁾:

Note ⁽²⁾:

- (12) The category and symbols of a heat spreader vary between the package types.
 - THD packages: The heat spreader is regarded as a part of the body;
therefore symbols are D_1 , D_2 , etc.
 - SMD packages: The heat spreader is regarded as a part of terminals;
therefore symbols are b_1 , b_2 , etc.
- (13) The package body size does not include a resin burr, but the Notes may indicate the body size including the resin burr when it is necessary.
Metal burrs on the tips of leads are disregarded in any dimension as well.
Notes may indicate the dimensions including metal burr when it is necessary.
- (14) It is a basic rule to use Mincho font for Japanese letters and Arial font for others.

8.2 Common rules of assigning symbols and naming dimensions

- (1) The subindex numbers are given in series in the package outline drawing first, then in the cross sectional diagram of a terminal, and finally in the pattern of terminal position areas.
- (2) The subindex shall be given in numeric order without any missing number in each character group.

Examples: L, L₁, L₂, L₃,

l₁, l₂, l₃,

The length of the terminal position areas is designated as “l₁,” the combination of the small letter of “L” and the subindex of one. Since “l” (small letter of L) could be misread as “I” (capital letter of i) or “1” (number), “l” (small letter of L) shall not be used alone but must be accompanied with the subindex.

- (3) The font size of the subindex shall be smaller than the preceding character.

8.3 Preparation of the table of dimensions

- (1) The tabular format shall meet the **Attached Table 1**. An inapplicable cell is filled with “-”.
- (2) The symbols shall be listed in the table following the alphabetical or numeric order in each group.
- (3) The symbols in the drawings shall be identical with the ones in the table of dimensions.
- (4) The symbols that belong to both Group 1 and 2 are listed in the table of Group 1.

9. Individual rules of the symbols and names of the outline dimensions

Attached Table 2 specifies the dimensions, symbols and names that are commonly used in the package outline drawings and the table of dimensions.

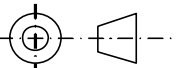
10. Dimensions to be specified in the individual standard

Attached Table 3 shows the dimensions to be specified in the individual standards.

Check mark “?” indicates the dimension to be filled, and blank cell indicates the optional dimension that is filled when it is necessary.

The outline drawings of representative packages are shown in **Attached Drawings 3** through **11**, and the tables of dimensions are shown in **Attached Tables 3a** through **11a**.

Attached Drawing 1

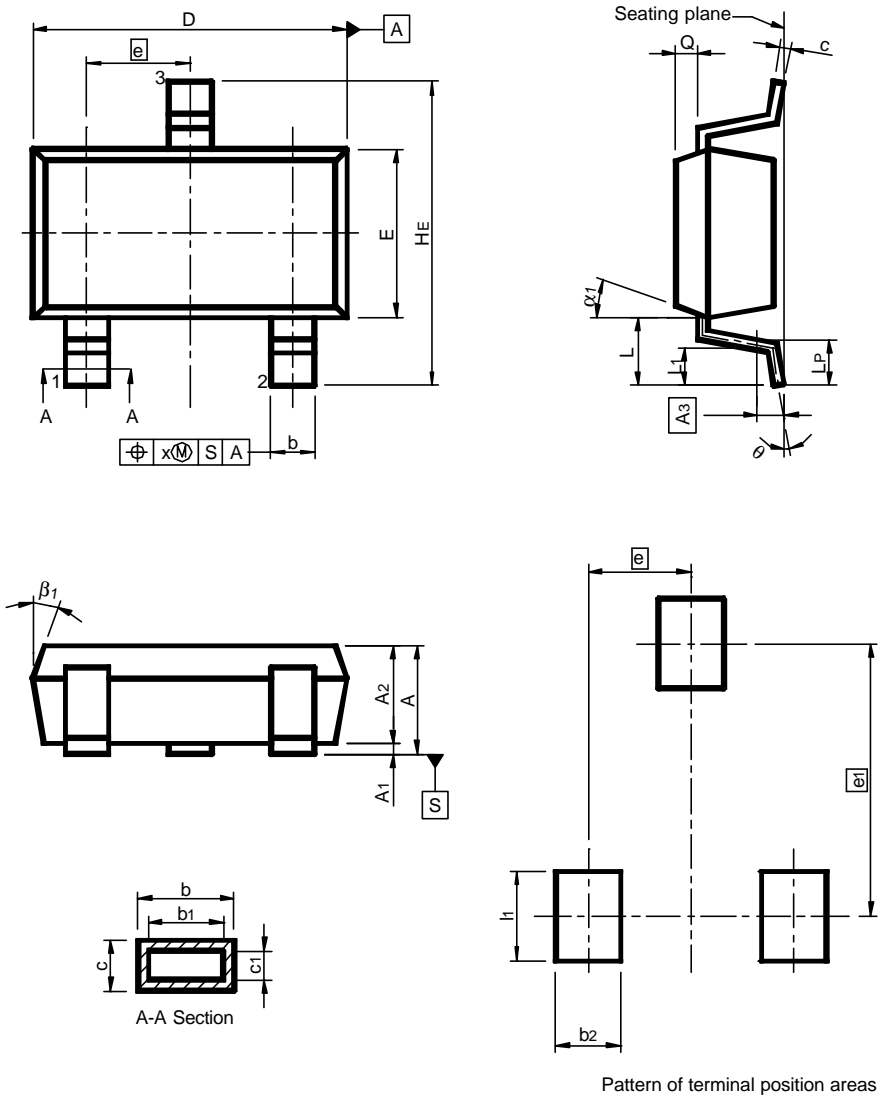
		JEITA STANDARD PACKAGE OUTLINE DRAWING	REGISTRATION DATE	REVISION DATE
PACKAGE CODE SC-XX				SHEET

Attached Table 1

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1					
Group 2					

Attached Drawing 2a

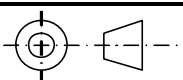
(a) SMD package with gull wing leads from both body sides



$$b_{2 \text{ Max}} = b_{\text{Max}} + x$$

$$l_{1 \text{ Max}} = \frac{H_{E \text{ Max}} - H_{E \text{ Min}}}{2} + L_{P \text{ Max}}$$

$$e_{1 \text{ Norm}} = \frac{H_{E \text{ Max}} + H_{E \text{ Min}}}{2} - L_{P \text{ Max}}$$



JEITA STANDARD
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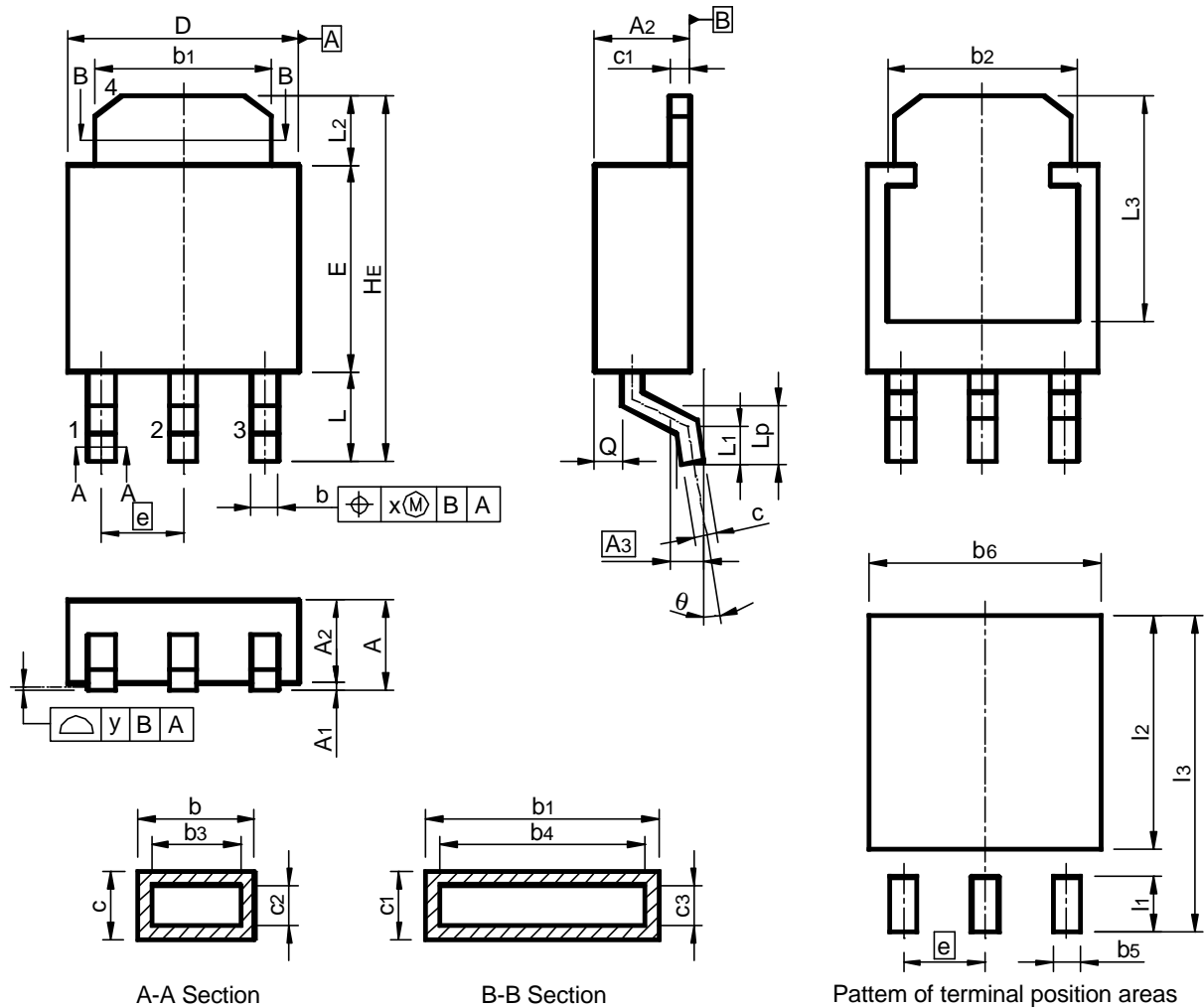
REVISION DATE

PACKAGE CODE
SC-XX

SHEET

Attached Drawing 2b

(b) SMD package with gull wing leads from single body side



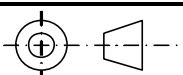
$$b_{5 \text{ Max}} = b_{\text{Max}} + x$$

$$b_{6 \text{ Max}} = b_{2 \text{ Max}}$$

$$l_{1 \text{ Max}} = H_{E \text{ Max}} - H_{E \text{ Min}} + L_{P \text{ Max}}$$

$$l_{2 \text{ Max}} = L_{3 \text{ Max}}$$

$$l_{3 \text{ Max}} = H_{E \text{ Max}}$$



JEITA STANDARD
PACKAGE OUTLINE DRAWING

REGISTRATION DATE

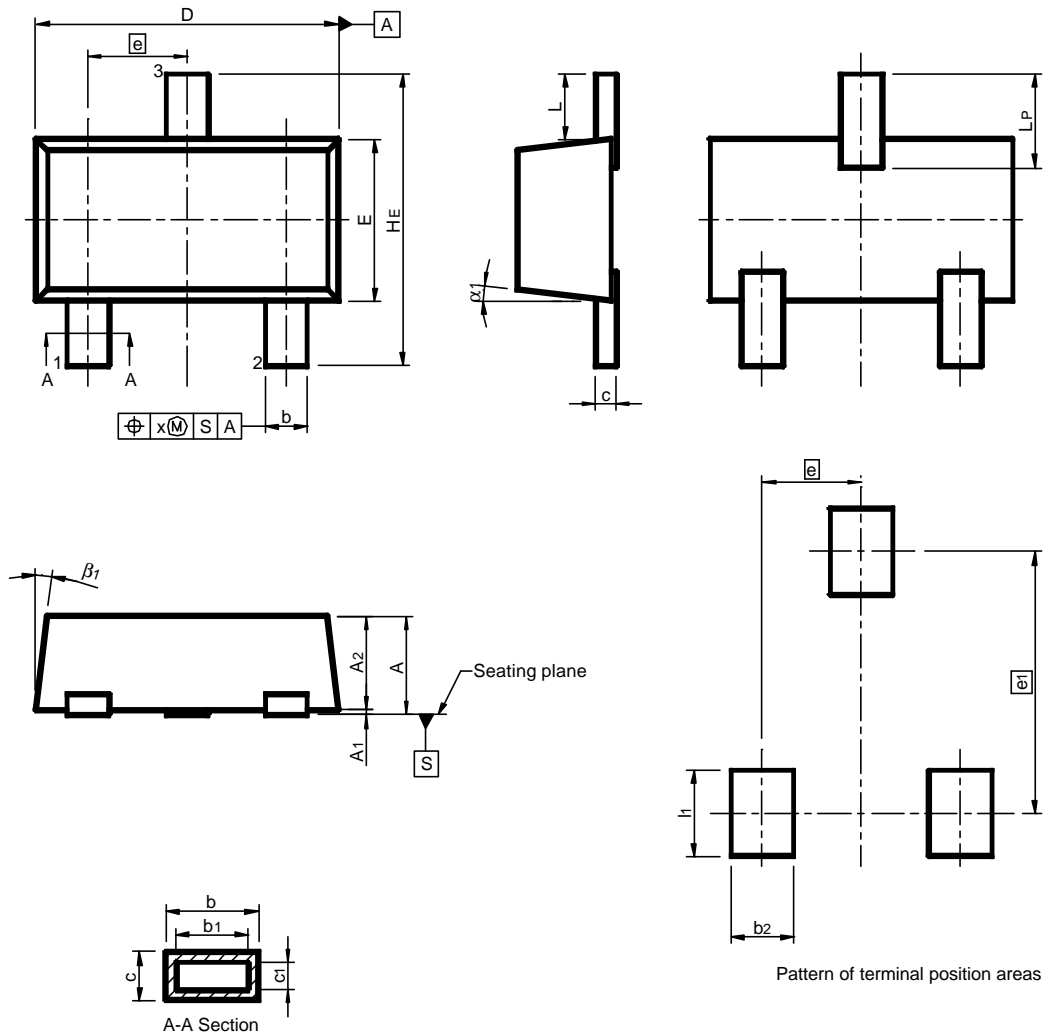
REVISION DATE

PACKAGE CODE
SC-XX

SHEET

Attached Drawing 2c

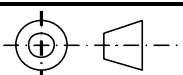
(c) SMD package with flat leads from both body sides



$$b_{2 \text{ Max}} = b_{\text{Max}} + x$$

$$l_{1 \text{ Max}} = \frac{H_{E \text{ Max}} - H_{E \text{ Min}}}{2} + L_{P \text{ Max}}$$

$$e_{1 \text{ Norm}} = \frac{H_{E \text{ Max}} + H_{E \text{ Min}}}{2} - L_{P \text{ Max}}$$



JEITA STANDARD
PACKAGE OUTLINE DRAWING

REGISTRATION DATE

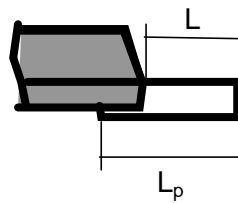
REVISION DATE

PACKAGE CODE
SC-XX

SHEET

Attached Table 2 Symbols and names of the commonly used dimensions

Classifications	Symbols	Names of dimensions	Notes
1. Body-related dimensions	ϕD	Body diameter	
	D, \boxed{D}	Body length	When a package is viewed in as-mounted condition with terminal #1 in the bottom left corner position, body size in the horizontal direction is defined as length. When the length is represented by D in the drawing, minimum and maximum dimensions shall be specified in the table. When the length is represented by \boxed{D} , nominal dimensions and its profile tolerance "f" shall be specified.
	D ₁ , D ₂ ...	Body-related length	
	E, \boxed{E}	Body width	When a package is viewed in as-mounted condition with terminal #1 in the bottom left corner position, body size in the vertical direction is defined as width. When the width is represented by E in the drawing, minimum and maximum dimensions shall be specified in the table. When the width is represented by \boxed{E} , nominal dimensions and its profile tolerance "f" shall be specified.
	E ₁ , E ₂ ...	Body-related width	
	f	Profile tolerance of the body	(Geometrical tolerance value)
	A ₂	Body height	
	A ₄ ...	Body-related height	Definitions of A, A ₁ , A ₂ , A ₃ are predetermined. A ₄ and the succeeding characters are used to represent some other body-related heights.
	R, R ₁ ...	Body-related radius	
2. Overall package-related dimensions including body and leads	$\alpha_1 \dots, \beta_1 \dots$	Slant angles of the side face of the body	When the body size, D or E, is 0.8 mm or less, the slant angles of the side face of the body shall be specified. The character α denotes the slant angle at width side E, while β denotes the one at length side D.
	ϕH	Overall diameter	
	H _D , $\boxed{H_D}$	Overall length	When an overall length is represented by $\boxed{H_D}$, nominal value and its geometrical tolerance "t" shall be specified.
	H _E , $\boxed{H_E}$	Overall width	When an overall width is represented by $\boxed{H_E}$, nominal value and its geometrical tolerance "t" shall be specified. Note: Although some of IEC standard specify the symmetrical tolerance, JEITA does not.

Classifications	Symbols	Names of dimensions	Notes
2. Overall package-related dimensions including body and leads	t	True position tolerance of terminal tips	(Geometrical tolerance value)
	ϕG	Facing-lead related diameter	
	G_D	Facing-lead related length	
	G_E	Facing-lead related width	
	Z, Z_D , Z_E	Package overhang dimension	Package overhang dimensions are specified if necessary.
	Z_1 , $Z_2 \dots$	Dimensions that relate to the package overhang	
	A	Seated height	
	A_1	Stand-off height	Stand-off height of the SMD packages that have leads on one side is defined by the space between the leads and the package-bottom base plain as a datum. (Datum symbol "S" is not applied to this datum.)
3. Terminal-related dimensions	Q, $Q_1 \dots$	The height of the leads coming out on a side face of package from the package base	This dimension, when it is important for mount, are classified into Group 1 with minimum and maximum dimensions specified. Otherwise they are classified into Group 2 with nominal dimension specified.
	A_3	Predetermined height for soldering	
	L	Length of the lead as a shadow image on the seating plane	The SMD package having leads on one side and the heat spreader on the other side will count the heat spreader as a lead. Note: The symbol " L_E " shall not be used.
	L_1 , $L_2 \dots$	Terminal-related length, or the length of foot of the gull-wing lead (L_1)	Terminal-related length shall be specified for the packages that have gull wing leads.
	l_1 , $l_2 \dots$	Dimensions that relate to the terminal position areas	
	L_p	Soldering length	L_p of the flat leads is defined as: 
	L_{p1} , $L_{p2} \dots$	Dimensions that relate to the soldering joint of terminals	
	ϕb	Terminal diameter	

Classifications	Symbols	Names of dimensions	Notes
3. Terminal-related dimensions	b	Terminal width	The letter “b” denotes the width of leads that belong to the largest group having the same lead width. Then, the widths of terminals are specified by b with subindex that is numbered in the order of the size of the group.
	b ₁ , b ₂ ...	Terminal-related width or diameter	
	b _p	Soldering width	
	c	Terminal thickness	
	c ₁ , c ₂ ...	Terminal-related thickness	
	θ	Terminal-foot angle	The terminal-foot angle is not required for the packages whose body sizes are 2.0 × 1.2 mm or smaller. Terminal-foot angle is defined as the angle of the lower face of the terminal-foot with respect to the seating plane.
	θ ₁ , θ ₂ ...	Terminal foot-related angle	Terminal-foot angle is defined as the angle of the lower face of the terminal-foot with respect to the seating plane.
4. The base- or flange-related dimensions	K, K ₁ ...	The lengths that relate to the base or flange of the package body	
	p, p ₁ ...	The widths that relate to the base or flange of the package body. Or the diameters of the holes in the body to accept lock pins.	
	F, F ₁ ...	The heights or thicknesses that relate to the base or flange of the package. Or the position of the holes in the body to accept lock pins.	
	q	The center to center distance of the base	
	S, S ₁ ...	The dimensions that relate to the center positions of the base	
	φB, B, B ₁ ...	The widths or diameters that relate to the objects which secure the stand-off height	
	d	The center to center distance of the objects that secure the stand-off height	(“d” is applied to the objects that secure the stand-off height.)

Classifications	Symbols	Names of dimensions	Notes
5. The index feature-related dimensions	$h, h_1 \dots$	The height or depth that relate to the index feature	
	$k, k_1 \dots$	The length that relate to the index feature	
	$j, j_1 \dots$	The width or diameter that relate to the index feature	
	γ, δ	The angle that relate to the index feature	
	$\alpha, \alpha_A, \alpha_B \dots$	The nominal angles that indicate the position of the index feature	
6. Dimensions that relate to the terminal positions	e	The distance between the center lines of any adjacent terminals	When all terminals align in a pitch, a single description of pitch is enough in a drawing.
	$e_1, e_2 \dots$	The dimensions that relate to the distance between the centerlines of terminals	e_1 mostly denotes the distance between the rows of terminals.
	$\phi a, \phi a_A, \phi a_B \dots$	The diameters of circle on which terminals are located.	
	$\beta, \beta_A, \beta_B \dots$	The nominal angles that indicate the position of the terminals	
	x, v, w (in small letters)	Positional tolerance of the terminals	"x" is used for the tolerance that controls dimension alone. (Geometrical tolerance value)
	y	Coplanarity	(Geometrical tolerance value) Coplanarity is specified for the packages that have more than three terminals.
7. Datum-related dimensions	S	Primary datum plane	A seating plane is defined as primary datum.
	A, B...	Secondary datum plane, and the subsequent datum planes	For the surface mount devices that have leads on a single side, the bottom package surface is defined as the base plane.
8. Number	n	Number of terminals	Terminal number starts from the lead that belongs to the largest group of the same lead configuration. On the Drawing, the terminal number is described outside the package but close to the lead.
	M, M_D, M_E	Number of terminal grid	M_D and M_E are used to express rectangular grid, while M represents square grid.

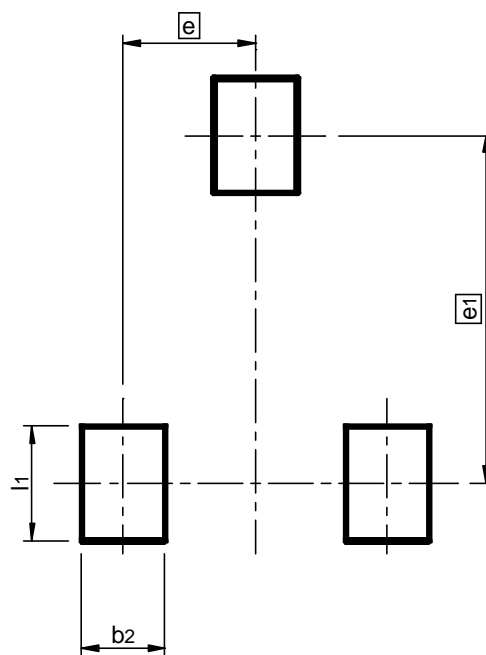
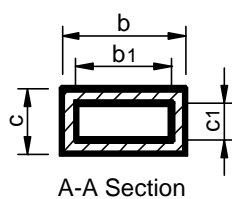
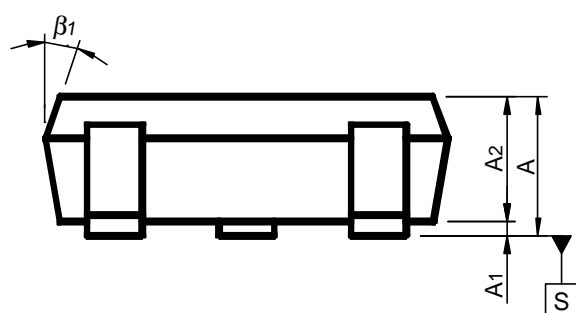
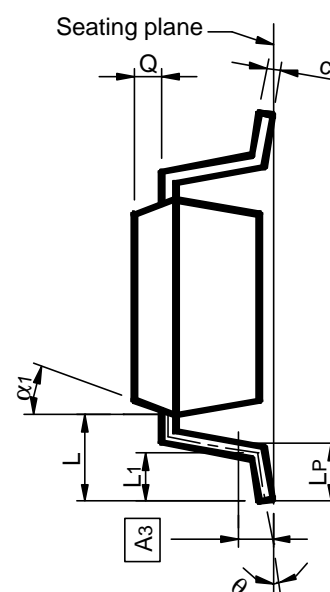
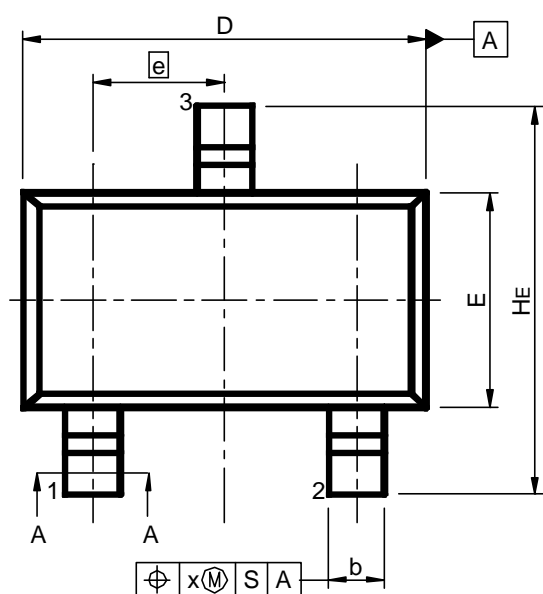
Attached Table 3 Dimensions to be indicated in the individual standards

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	A ₃		?		
	A ₄ ...	?		?	
	φB, B, B ₁	?		?	
	φb	?		?	
	b	?		?	
	b ₁ , b ₂ ...	?		?	
	b _p	?		?	
	c	?		?	
	c ₁ , c ₂ ...	?		?	
	D	?		?	
	D		?		
	D ₁ , D ₂ ...	?		?	
	d		?		
	E	?		?	
	E		?		
	E ₁ , E ₂ ...	?		?	
	e		?		
	e ₁ , e ₂ ...		?		
	F, F ₁ ...	?		?	
	f			?	
	φG	?		?	
	G _D	?		?	
	G _E	?		?	
	φH	?		?	
	H _D	?		?	
	H _D		?		
	H _E	?		?	
	H _E		?		
	K, K ₁ ...	?		?	
	L	?		?	
	L ₁ , L ₂ ...	?		?	
	L _p	?		?	
	L _{p1} , L _{p2} ...	?		?	

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	p, p ₁ ...	?		?	
	Q, Q ₁ ...	?		?	
	q		?		
	R, R ₁ ...	?		?	
	S, S ₁ ...	?		?	
	t			?	
	x, v, w (in small letters)			?	
	y (in small letters)			?	
	Z, Z _D , Z _E	?		?	
	Z, Z ₁ ...	?		?	
	θ	?		?	
	θ ₁ , θ ₂ ...	?		?	
Group 2	h, h ₁ ...	?		?	
	k, k ₁ ... (in small letters)	?		?	
	j, j ₁ ...	?		?	
	γ, δ	?		?	
	α , α_A , α_B ...		?		
	ϕa , ϕa_A , ϕa_B ...		?		
	β , β_A , β_B ...		?		
	l ₁ , l ₂ ...			?	

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	p, p ₁ ...	?		?	
	Q, Q ₁ ...	?		?	
	q		?		
	R, R ₁ ...	?		?	
	S, S ₁ ...	?		?	
	t			?	
	x, v, w (in small letters)			?	
	y (in small letters)			?	
	Z, Z _D , Z _E	?		?	
	Z, Z ₁ ...	?		?	
	θ	?		?	
	θ ₁ , θ ₂ ...	?		?	
Group 2	h, h ₁ ...	?		?	
	k, k ₁ ... (in small letters)	?		?	
	j, j ₁ ...	?		?	
	γ, δ	?		?	
	α , α_A , α_B ...		?		
	ϕa , ϕa_A , ϕa_B ...		?		
	β , β_A , β_B ...		?		
	l ₁ , l ₂ ...			?	

Attached Drawing 3



Pattern of terminal position areas

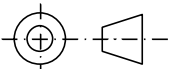
	JEITA STANDARD PACKAGE OUTLINE DRAWING	REGISTRATION DATE	REVISION DATE
PACKAGE CODE SC-XX			SHEET

Attached Table 3a

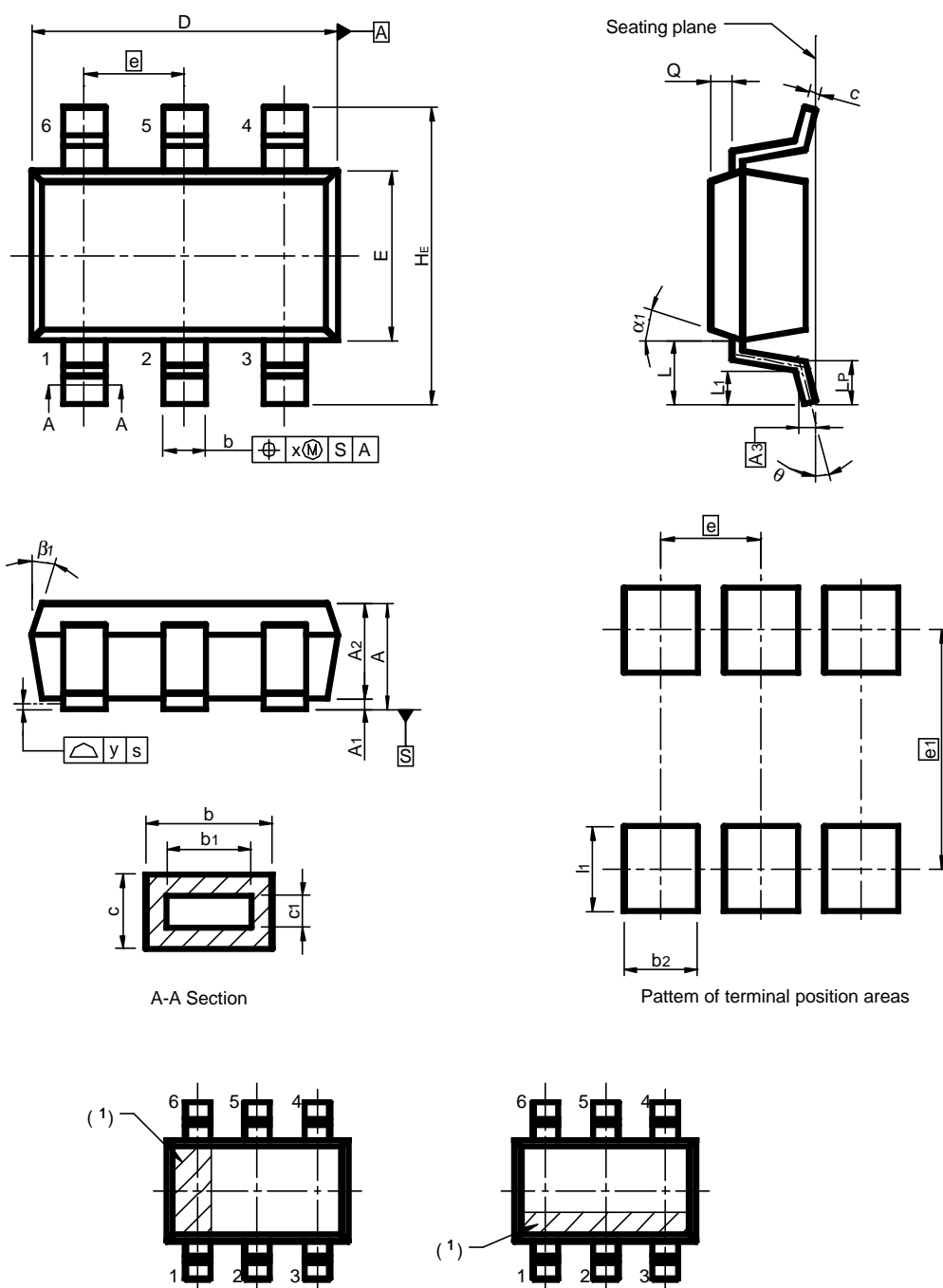
	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	A₃		? *		
	b	?		?	
	b ₁	?		?	
	c	?		?	
	c ₁	?		?	
	D	?		?	
	E	?		?	
	e		? *		
	H _E	?		?	
	L	?		?	
	L ₁	?		?	
	L _p	?		?	
	x			?	
	θ	?		?	
Group 2	b ₂			?	
	e₁		? *		
	l ₁			?	
	Q		?		
	α ₁		?		Note ⁽¹⁾
	β ₁		?		Note ⁽¹⁾

“*” indicates true geometrical position

Note ⁽¹⁾: α₁ and β₁ shall be specified when D or E shorter than 0.8 mm.

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Attached Drawing 4



Note (1): Hatched zone indicates the index-making area.

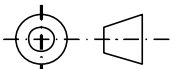
	JEITA STANDARD PACKAGE OUTLINE DRAWING	REGISTRATION DATE	REVISION DATE
PACKAGE CODE SC-XX			SHEET

Attached Table 4a

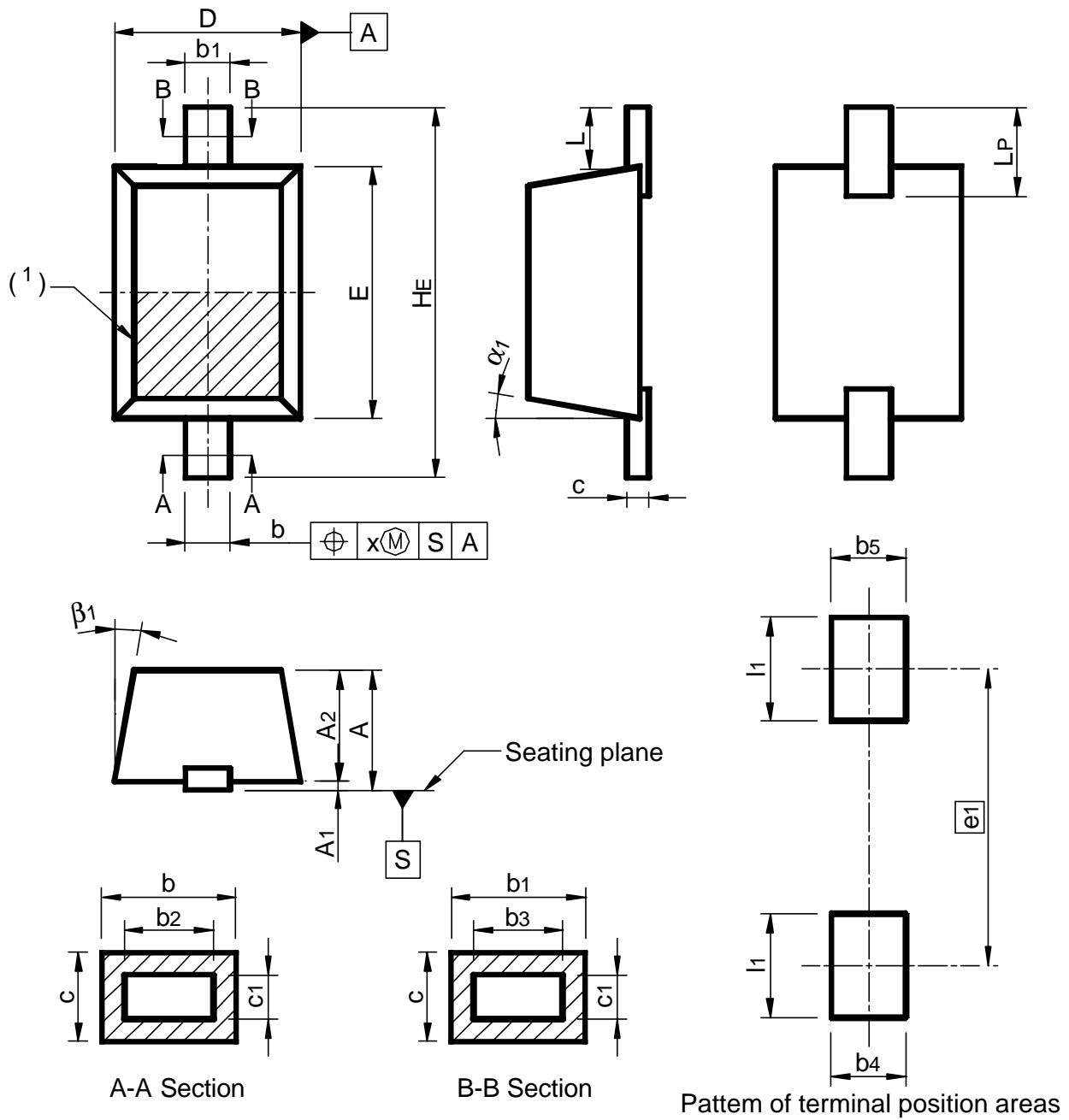
	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	A₃		? *		
	b	?		?	
	b ₁	?		?	
	c	?		?	
	c ₁	?		?	
	D	?		?	
	E	?		?	
	e		? *		
	H _E	?		?	
	L	?		?	
	L ₁	?		?	
	L _p	?		?	
	x			?	
	y			?	
	θ	?		?	
Group 2	b ₂			?	
	e₁		? *		
	l ₁			?	
	Q		?		
	α ₁		?		Note ⁽¹⁾
	β ₁		?		Note ⁽¹⁾

“*” indicates true geometrical position

Note ⁽¹⁾: α₁ and β₁ shall be specified when D or E shorter than 0.8 mm.

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Attached Drawing 5



Note (1): Hatched zone indicates the index-making area.

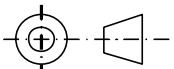
	JEITA STANDARD PACKAGE OUTLINE DRAWING	REGISTRATION DATE	REVISION DATE
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Attached Table 5a

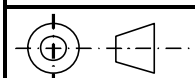
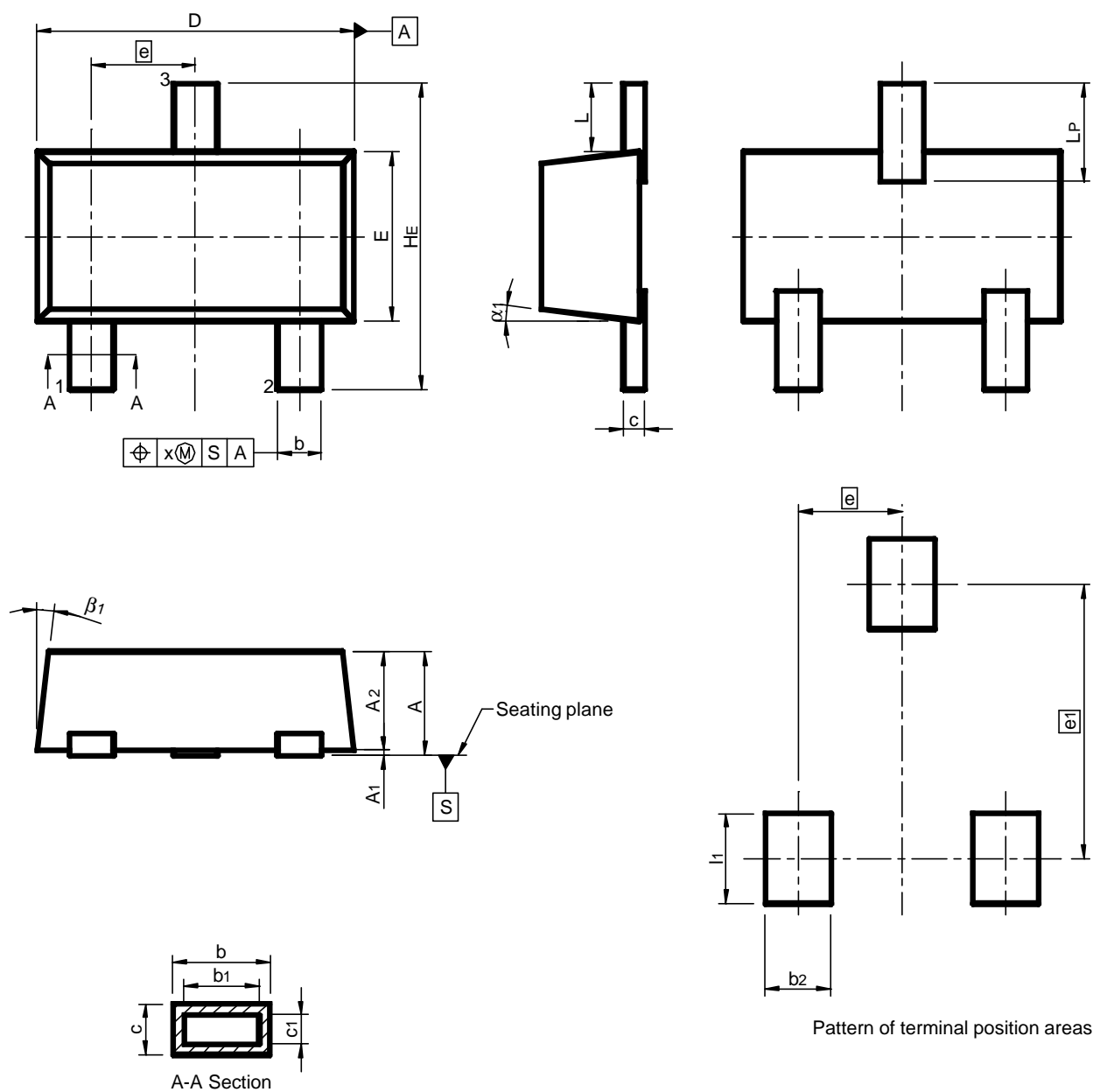
	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	b	?		?	
	b ₁	?		?	
	b ₂	?		?	
	b ₃	?		?	
	c	?		?	
	c ₁	?		?	
	D	?		?	
	E	?		?	
	H _E	?		?	
	L	?		?	
	L _p	?		?	
	x			?	
Group 2	b ₄			?	
	b ₅			?	
	e₁		? *		
	l ₁			?	
	α ₁		?		Note ⁽¹⁾
	β ₁		?		Note ⁽¹⁾

“*” indicates true geometrical position

Note ⁽¹⁾: α₁ and β₁ shall be specified when D or E shorter than 0.8 mm.

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Attached Drawing 6



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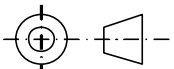
SHEET

Attached Table 6a

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	b	?		?	
	b ₁	?		?	
	c	?		?	
	c ₁	?		?	
	D	?		?	
	E	?		?	
	e		? *		
	H _E	?		?	
	L	?		?	
	L _p	?		?	
	x			?	
Group 2	b ₂			?	
	e ₁		? *		
	l ₁			?	
	α ₁		?		Note ⁽¹⁾
	β ₁		?		Note ⁽¹⁾

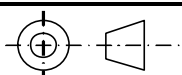
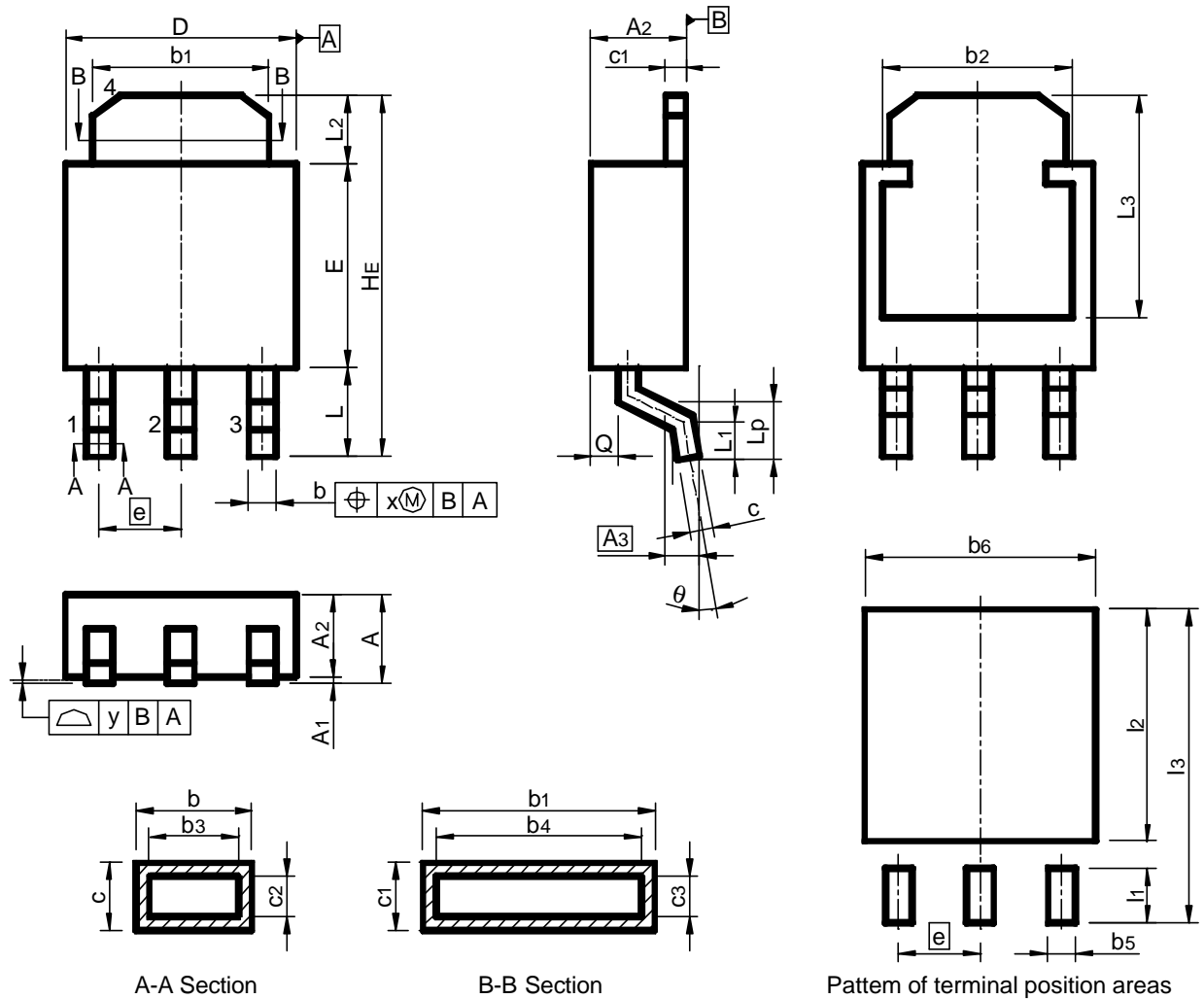
“*” indicates true geometrical position

Note ⁽¹⁾: α₁ and β₁ shall be specified when D or E shorter than 0.8 mm.

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付図 7

Attached Drawing 7



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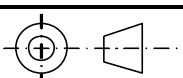
PACKAGE CODE
SC-XX

SHEET

Attached Table 7a

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	A ₃		? *		
	b	?		?	
	b ₁	?		?	
	b ₂	?		?	
	b ₃	?		?	
	b ₄	?		?	
	c	?		?	
	c ₁	?		?	
	c ₂	?		?	
	c ₃	?		?	
	D	?		?	
	E	?		?	
	e		? *		
	H _E	?		?	
	L	?		?	
	L ₁	?		?	
	L ₂	?		?	
	L ₃	?		?	
	L _p	?		?	
	x			?	
	y			?	
	θ	?		?	
Group 2	b ₅			?	
	b ₆			?	
	l ₁			?	
	l ₂			?	
	l ₃			?	
	Q		?		

“*” indicates true geometrical position



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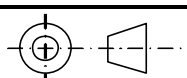
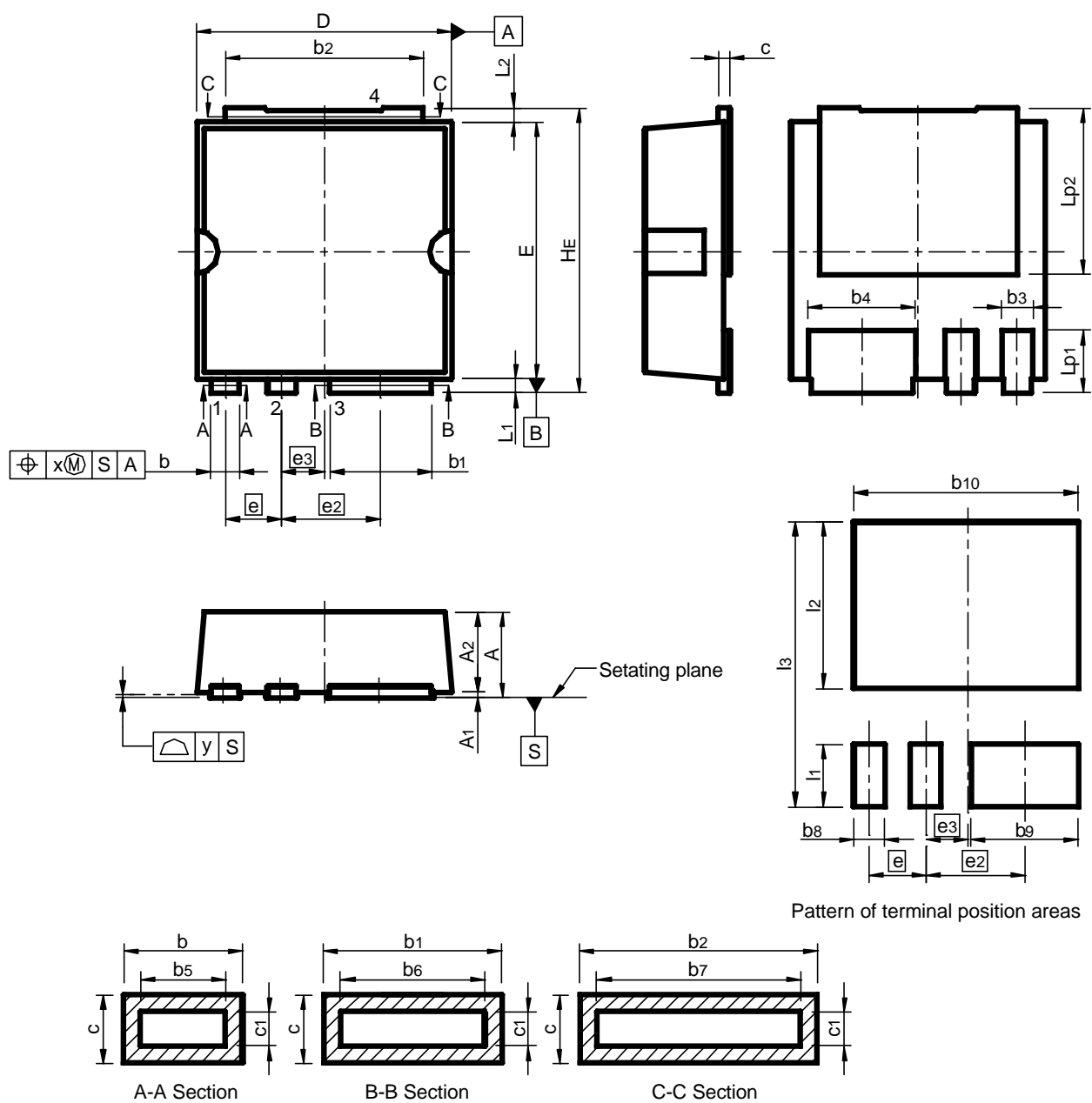
REGISTRATION DATE

REVISION DATE

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Attached Drawing 8



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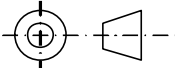
PACKAGE CODE
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SHEET

Attached Table 8a

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	b	?		?	
	b ₁	?		?	
	b ₂	?		?	
	b ₃	?		?	
	b ₄	?		?	
	b ₅	?		?	
	b ₆	?		?	
	b ₇	?		?	
	c	?		?	
	c ₁	?		?	
	D	?		?	
	E	?		?	
	e		? *		
	e ₂		? *		
	e ₃		? *		
	H _E	?		?	
	L ₁	?		?	
	L ₂	?		?	
	L _{p1}	?		?	
	L _{p2}	?		?	
	x			?	
	y			?	
Group 2	b ₈			?	
	b ₉			?	
	b ₁₀			?	
	l ₁			?	
	l ₂			?	
	l ₃			?	

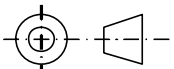
“*” indicates true geometrical position

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			PACKAGE CODE SC-XX	SHEET

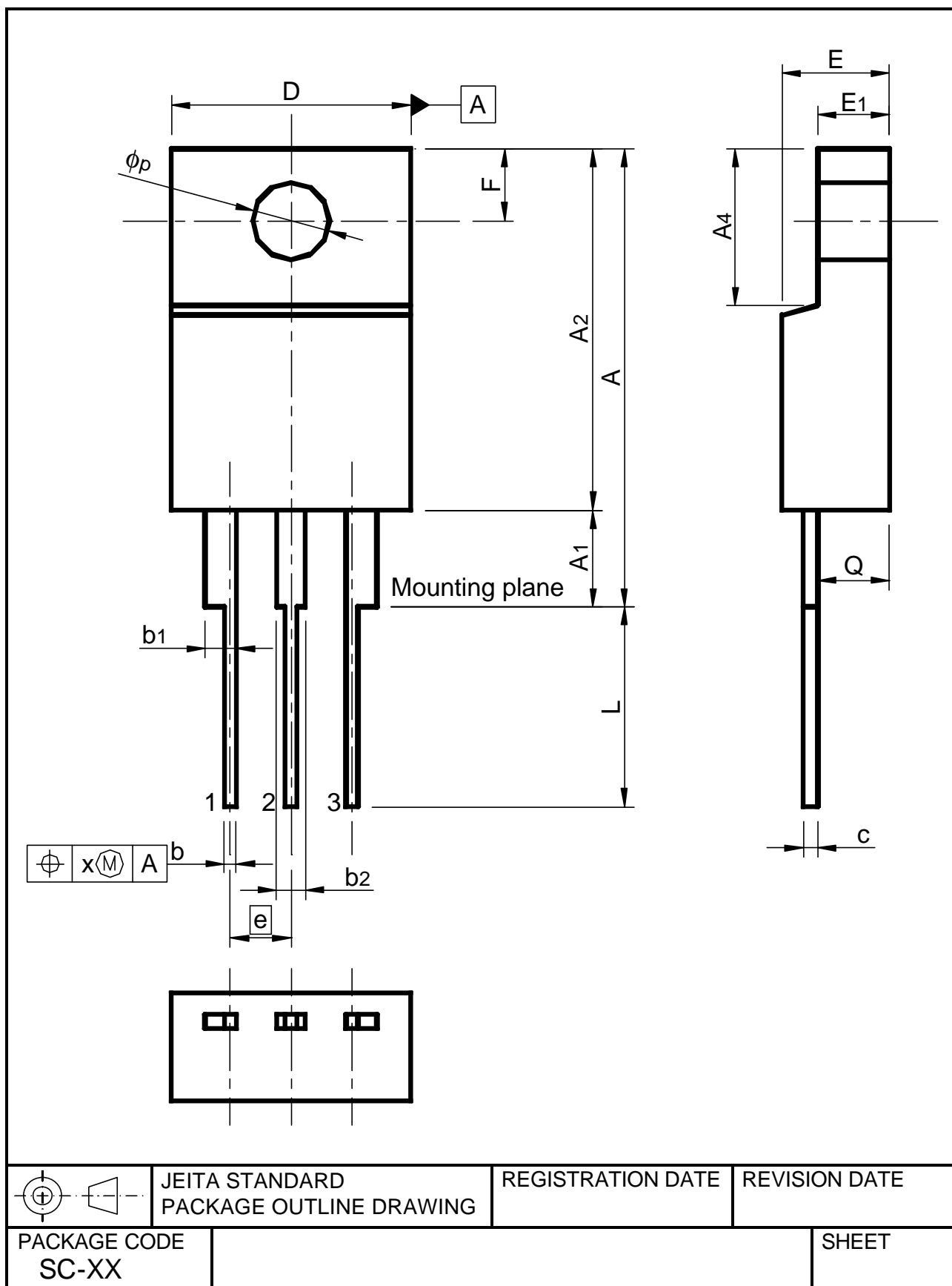
Attached Table 9a

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	b	?		?	
	D	?		?	
	E	?		?	
	e		? *		
	e ₁		? *		
	L	?		?	
	x			?	
	y			?	
Group 2	b ₁			?	
	l ₁			?	

“*” indicates true geometrical position

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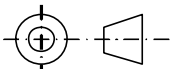
Attached Drawing 10



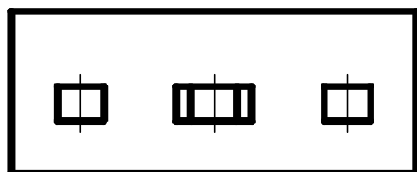
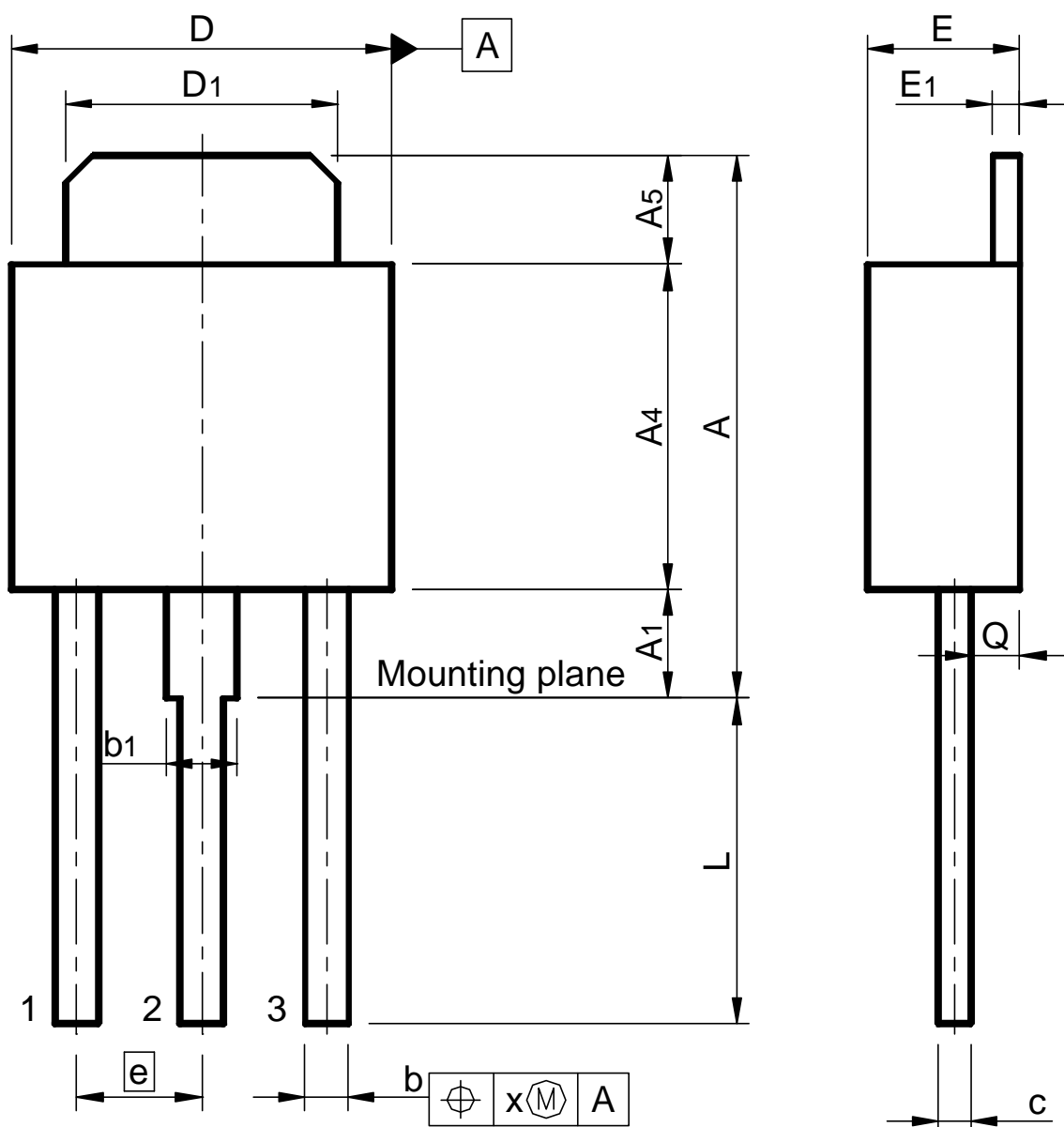
Attached Table 10a

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₂	?		?	
	A ₄	?		?	
	b	?		?	
	b ₁	?		?	
	b ₂	?		?	
	c	?		?	
	D	?		?	
	E	?		?	
	E ₁	?		?	
	e		?	*	
	F	?		?	
	L	?		?	
	φp	?		?	
	Q	?		?	
	x			?	

“*” Indicates true geometrical position

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Attached Drawing 11

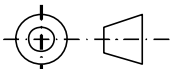


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Attached Table 11a

	CODE	SC-XX			Remarks
	Ref.	Min.	Nom.	Max.	
Group 1	A	?		?	
	A ₁	?		?	
	A ₄	?		?	
	A ₅	?		?	
	b	?		?	
	b ₁	?		?	
	c	?		?	
	D	?		?	
	D ₁	?		?	
	E	?		?	
	E ₁	?		?	
	e		? *		
	L	?		?	
	Q	?		?	
	x			?	

“*” indicates true geometrical position

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	PACKAGE OUTLINE DRAWING		
PACKAGE CODE	SHEET		
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Explanatory Notes

1. Purpose of establishment

This manual aims at describing the concrete definitions and specifications of the unique features of discrete semiconductor devices on the basis of **EIAJ ED-7300**, and indicating the way how to prepare the individual standards regarding to the items and contents to be specified.

2. Background

Over the last few years, downsizing trend of electronics devices has induced variety of requirements for discrete-semiconductor packages in an accelerated manner and activated the package development, reflecting the growing importance of the packages. "Recommended practice on standard for the preparation of outline drawings of semiconductor packages," **EIAJ ED-7300**, was the only specification that had been relied on to prepare the outline drawings of discrete devices since it was published in Aug. 1997.

However, there were many packages that cannot be described by following **EIAJ ED-7300**; design guide specifically focused on the discrete-semiconductor packages was expected. In response to such a requirement this design guide was established based on **EIAJ ED-7300** to describe in detail the unique definitions and specifications of discrete-semiconductor packages and accelerate the standardization activity without difficulties.

3. History of the reviews

In a past, the preparation rule of the package-outline standard for integrated circuit was specified as **EIAJ SD-74-1** established in Mar. 1968. The Technical Committee on Semiconductor Device decided in 1988 to create new specifications to substitute the outdated **EIAJ SD-74-1**. The new preparation rule of the package-outline standard for integrated circuits, **EIAJ ED-7401**, was published in 1991 and the one for discrete semiconductors, **EIAJ ED-7501**, was published in Jun. 1992.

In Aug. 1997, in order to establish the basic rules for the preparation of package-outline standard for both integrated circuits and discrete semiconductor, the "Recommended practice on standard for the preparation of outline drawings of semiconductor packages," **EIAJ ED-7300**, was constituted by combining the **EIAJ ED-7401** and **EIAJ ED-7501**, both of which were then abolished. However the "Manual for the standard of integrated circuits package," **EIAJ ED-7301**, was published as the guide for the preparation of the individual standards of integrated circuits in Dec. 1996, there had been no manual for the preparation of the individual standard of the discrete-semiconductor packages until this **EIAJ ED-7502** was published.

This manual does not include the specifications of old packages such as stud-pin type packages for power devices or metal can packages for transistors, but those of most plastic packages, which are the mainstream on a market at present.

4. Definition of the reference patterns of soldering pads

“Standards for the Dimensions of Semiconductor Devices (Discrete Semiconductor Devices),” **EIAJ ED-7500A** (published in Sep. 1990), defines the reference pattern of soldering pads in the explanatory notes. This manual specifies the “Terminal position areas” that is equivalent to the said definition, and substitutes the above specification. Therefore, the description of the reference patterns of soldering pads will be deleted from the explanatory notes in **EIAJ ED-7500A**, when it is revised next time.

5. Related and Reference Standards

The related and reference standards are:

- (1) **EIAJ ET-9001** “Rules for the Drafting and Presentation of EIAJ Standards”
- (2) **EIAJ ED-7300** “Recommended Practice on General Rules for the Preparation of outline Drawings of Semiconductor Package”
- (3) **EIAJ ED-7500A** “Standards for the Dimensions of Semiconductor Devices (Discrete Semiconductor Devices)”

6. Examination members

This standard has been mainly examined by the Subcommittee on Discrete Semiconductor Device Package of the Technical Standardization Committee on Semiconductor Device Package. The members are listed below:

<Technical Standardization Committee on Semiconductor Device Package>

TSC Chairman	Chiaki Takubo	Toshiba Corp.
--------------	---------------	---------------

<Subcommittee on Discrete Semiconductor Device Package>

Chief	Takahiro Ohnishi	Shindengen Electric Mfg. Co., LTD.
Vice Chief	Akio Mikami	Renesas Technology Corp.
Members	Kenichi Kaneda	NEC Electronics Corp.
	Yukinori Tabira	NEC Electronics Corp.
	Yasuhiro Takano	Sanyo Electric Co., LTD.
	Araki Koji	Toshiba Corp.
	Shinichi Kouyama	Toshiba Corp.
	Masahide Maeda	Rohm Co., LTD.
	Yasufumi Matsuoka	Rohm Co., LTD.
	Kenichi Ito	Matsushita Electric Industrial Co., LTD.
	Masachika Masuda	Dai Nippon Printing Co., LTD.
	Masahide Kohno	Philips Japan, LTD.
	Atsushi Maruyama	Fuji Electric Co., LTD.

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