

# INTERNATIONAL STANDARD

## AMENDMENT 20

The sheets contained in this amendment are to be inserted in IEC 60191-2

**Mechanical standardization of semiconductor devices –  
Part 2: Dimensions**

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### **Mechanical standardization of semiconductor devices – Part 2: Dimensions**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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Replace the existing title page with the new title page.

Remove the existing page 60191 IEC I containing the preface and insert in its place the new page 60191 IEC I containing the preface to Amendment 20 (2018).

Chapter I:

Add the following new sheets:

60191 IEC I-188F-a/b

60191 IEC I-189F-a/b

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# INTERNATIONAL STANDARD

## Mechanical standardization of semiconductor devices – Part 2: Dimensions

Includes Supplements and Amendments / Inclut les Compléments et Amendements:  
A (1967), B (1969), C (1970), D (1971), E (1974), F (1976), G (1978), H (1978),  
J (1980), K (1981), L (1982), M (1983), N (1987), P (1988), Q (1990), R (1995),  
S (1995), T(1995), U(1997), V(1998), W(1999), X(1999), Y(2000), Z(2000), 1 (2001),  
2(2001), 3(2001), 4(2001), 5(2002), 6(2002), 7(2002), 8(2003), 9(2003), 10(2004),  
11(2004), 12(2006), 13(2006), 14(2006), 15(2006), 16(2007), 17(2008), 18(2011),  
19(2012), 20(2018)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PUBLICATION 191-2

**MECHANICAL STANDARDIZATION OF SEMICONDUCTOR DEVICES –**

**Part 2: Dimensions**

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IEC PUBLICATION 191-2

IEC Publication 191-2  
Date: 1987

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

Amendment 20 (2018) to IEC 60191-2 (1966)

### MECHANICAL STANDARDIZATION OF SEMICONDUCTOR DEVICES –

#### Part 2: Dimensions

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### PREFACE TO AMENDMENT 20 (2018)

This amendment has been prepared by subcommittee 47D: Semiconductor Packaging, of IEC technical committee 47: Semiconductor devices.

The text of this standard is based on the following documents:

| FDIS         | Report on voting |
|--------------|------------------|
| 47D/900/FDIS | 47D/906/RVD      |

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

## CHAPTER I – DEVICE OUTLINE DRAWINGS

## List of drawings (continued)

| IEC code number | Code of country of origin | Page number and date |      |
|-----------------|---------------------------|----------------------|------|
| 116E01          | SC-529-14BA               | I-116E               | 1988 |
| 116E02          | SC-530-16CA               |                      |      |
| 116E03          | SC-531-20AA               |                      |      |
| 117E01          | SC-530-16BA               | I-117E               | 1988 |
| 117E02          | SC-531-20BA               |                      |      |
| 117E03          | SC-532-24AA               |                      |      |
| 117E04          | SC-533-28AA               |                      |      |
| 117E05          | SC-533-28BA               |                      |      |
| 118E01          | SC-532-24BA               | I-118E               | 1988 |
| 118E02          | SC-533-28CA               |                      |      |
| 119E02          | (USA)                     | I-119E               | 1990 |
| 119E03          |                           |                      |      |
| 120E            | NT194                     | I-120E               | 1990 |
| 121E            | NT213                     | I-121E               | 1994 |
| 122E            | NT221                     | I-122E               | 1994 |
| 123E            |                           | I-123E               | 1997 |
| 129E            | NT223                     | I-129E               | 1994 |
| 133E            |                           | I-133E               | 2000 |
| 134E            |                           | I-134E               | 2000 |
| 135E            |                           | I-135E               | 2000 |
| 136E            |                           | I-136E               | 2000 |
| 137E            |                           | I-137E               | 2000 |
| 138E            |                           | I-138E               |      |
| 139E            |                           | I-139E               |      |
| 140E            |                           | I-140E               | 1999 |
| 141E            |                           | I-141E               | 1999 |
| 142E            |                           | I-142E               | 1998 |
| 143E            |                           | I-143E               | 1998 |
| 144E            |                           | I-144E               | 1999 |
| 147E            |                           | I-147E               | 1999 |
| 148E            |                           | I-148E               | 1999 |
| 149E            |                           | I-149E               | 2002 |
| 150E            |                           | I-150E               | 2002 |
| 151E            |                           | I-151E               | 2002 |
| 152E            |                           | I-152E               | 2002 |
| 153E            |                           | I-153E               | 2002 |
| 154E            |                           | I-154E               | 2001 |
| 155E            |                           | I-155E               | 2001 |
| 156E            |                           | I-156E               | 2004 |
| 157E            |                           | I-157E               | 2001 |
| 158E            |                           | I-158E               | 2002 |
| 159E            |                           | I-159E               | 2002 |
| 160E            |                           | I-160E               | 2001 |
| 161E            |                           | I-161E               | 2001 |
| 162E            |                           | I-162E               | 2001 |
| 163E            |                           | I-163E               | 2002 |
| 164E            |                           | I-164E               | 2001 |
| 165E            |                           | I-165E               | 2002 |
| 166E            |                           | I-166E               | 2003 |
| 167E            |                           | I-167E               | 2003 |
| 168E            |                           | I-168E               | 2004 |
| 171E            |                           | I-171E               | 2006 |
| 175E            |                           | I-175E               | 2005 |
| 176E            |                           | I-176E               | 2004 |
| 177E            |                           | I-177E               | 2007 |
| 178E            |                           | I-178E               | 2006 |
| 179E            |                           | I-179E               | 2006 |
| 180E            |                           | I-180E               | 2008 |
| 181E            |                           | I-181E               | 2008 |
| 183E            |                           | I-183E               | 2011 |
| 187E            |                           | I-187E               | 2012 |

## CHAPTER I – DEVICE OUTLINE DRAWINGS

**List of drawings** (continued)

| IEC code number | Code of country of origin | Page number and date |      |
|-----------------|---------------------------|----------------------|------|
| <b>Form F</b>   |                           |                      |      |
| 084F            |                           | I-084F               | 1996 |
| 100F            |                           | I-100F               | 1990 |
| 101F01          | 101F01                    | I-101F               | 1998 |
| 101F01          | 101F01                    |                      |      |
| 102F            |                           |                      |      |
| 102F0           | 102F01                    | I-102F               | 1998 |
| 102F02          | 102F02                    |                      |      |
| 102F033         | 102F03                    |                      |      |
| 186F            |                           | I-186F               | 2012 |
| 188F            |                           | I-188F               | 2018 |
| 189F            |                           | I-189F               | 2018 |
| <b>Form G</b>   |                           |                      |      |
| 050G01          | SO5-87D                   | I-50a/b/c/d          | 1985 |
| 050G02          | SO-188D                   |                      |      |
| 050G03          | SO-87A                    |                      |      |
| 050G04          | SO-87B                    |                      |      |
| 050G05          | SO-188A                   |                      |      |
| 050G06          | SO-188B                   |                      |      |
| 050G07          | SO-188F                   |                      |      |
| 050G08          | SO-87C                    |                      |      |
| 050G10          | SO-188C                   |                      |      |
| 050G11          | SO505-18A                 |                      |      |
| 050G12          | SO-87G                    | I-50e                | 1990 |
| 050G13          | SO-188E                   |                      |      |
| 050G14          | (Sweden)                  |                      |      |
| 050G16          | A1AA                      |                      |      |
| 050G17          | A1AB                      |                      |      |
| 050G18          | A1BA                      |                      |      |
| 050G19          | A1BB                      |                      |      |
| 050G20          | A1CB                      |                      |      |
| <b>Form B</b>   |                           |                      |      |
| 184B            |                           | I-184B               | 2012 |
| 185B            |                           | I-185B               | 2012 |

Types of semiconductor devices generally mounted in the packages  
of chapter I of IEC 60191-2

| Type of device                             | IEC code number of package drawing                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal diodes and small-power Zener diodes | A1, A20, A24, A32, A54, A55, A58, A67, A69, A70, A71, 098H, 100H                                                                                                                                                                                                                                                                                                                      |
| Microwave diodes                           | A18                                                                                                                                                                                                                                                                                                                                                                                   |
| Rectifier diodes, small and medium power   | A2, A3, A4, A6, A7, A19, A37, A44, A74, 077B, 100B                                                                                                                                                                                                                                                                                                                                    |
| High-power rectifier diodes                | A8, A9, A10, A15, A16, A17, A21, A22, A35, 083B, 103B                                                                                                                                                                                                                                                                                                                                 |
| Thyristors, small and medium power         | A11, A13, A14, A38, A43                                                                                                                                                                                                                                                                                                                                                               |
| High-power thyristors                      | A12, A27, A28, A29, A34, A39, A47, 104B, 105B                                                                                                                                                                                                                                                                                                                                         |
| Signal transistors                         | A36, A40, A41, 068A, 046E, 114E, 183E                                                                                                                                                                                                                                                                                                                                                 |
| Power transistors                          | A23, A30, A31, A43, A48, A56, A57, A45, A73, 080B, 081B, 082B, 101B, 102B, 102F, 120E, 084F, P100F, 184B, 185B, 186F, 187E, 188F, 189F                                                                                                                                                                                                                                                |
| Microwave transistors                      | A26, A42, A43, A59, A66, A72, 100C                                                                                                                                                                                                                                                                                                                                                    |
| Optoelectronic devices                     | A62, A64, A65, A63A, 100A, 101A, 106B, 107B                                                                                                                                                                                                                                                                                                                                           |
| Integrated circuits                        | A52, A53, A61, 075E, 076E, 099E, 100E, 102E, 112E, 115E, 116E, 117E, 118E, 119E, 121E, 122E, 123E, 129E, 133E, 134E, 135E, 136E, 137E, 138E, 139E, 140E, 141E, 144E, 147E, 148E, 149E, 150E, 151E, 152E, 153E, 154E, 155E, 156E, 157E, 158E, 159E, 160E, 161E, 162E, 163E, 164E, 165E, 166E, 167E, 168E, 171E, 175E, 176E, 177E, 178E, 179E, 180E, 181E, 050G, 051G, 060G, 100G, 101G |

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## FOREWORD

This amendment has been prepared by subcommittee 47D: Semiconductor devices packaging, of IEC technical committee 47: Semiconductor devices.

The text of this amendment is based on the following documents:

|              |                  |
|--------------|------------------|
| FDIS         | Report on voting |
| 47D/900/FDIS | 47D/906/RVD      |

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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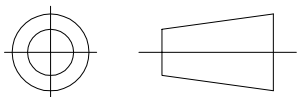
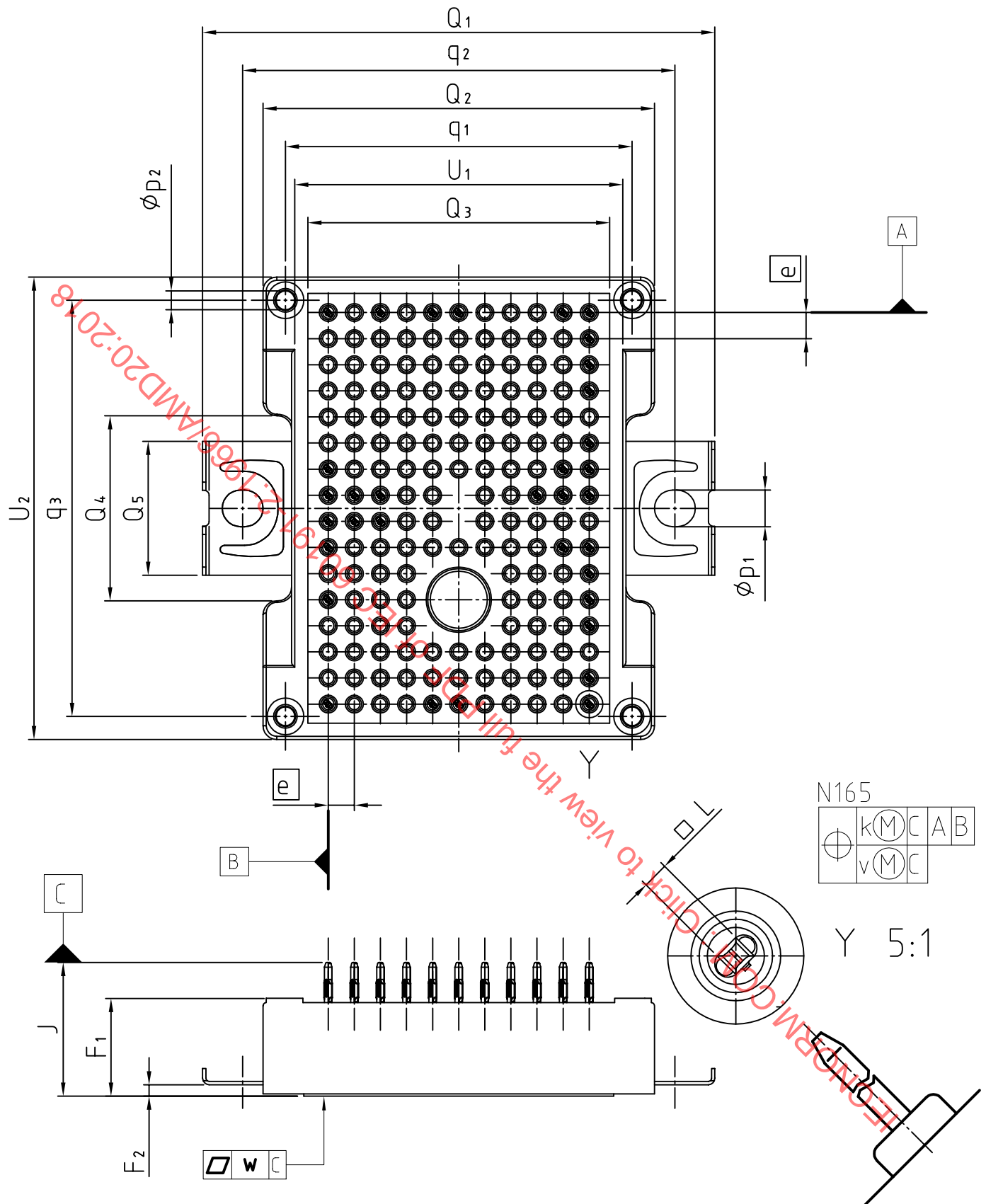
*Insert the new drawing "60191 IEC I-188F", with the following associated information:*

|                      |                                   |
|----------------------|-----------------------------------|
| <b>IEC code:</b>     | 188F                              |
| <b>Package name:</b> | Power package with 3,2 mm pitch   |
| <b>Common name:</b>  | (Power package with 3,2 mm pitch) |
| <b>Device type:</b>  | Power transistors                 |
| <b>Material:</b>     | P                                 |
| <b>Features:</b>     | (Blank)                           |
| <b>Position:</b>     | Z                                 |
| <b>Package:</b>      | MP                                |
| <b>Form:</b>         | P                                 |
| <b>Count:</b>        | 165                               |

*Insert the new drawing "60191 IEC I-189F", with the following associated information:*

|                      |                                   |
|----------------------|-----------------------------------|
| <b>IEC code:</b>     | 189F                              |
| <b>Package name:</b> | Power package with 3,2 mm pitch   |
| <b>Common name:</b>  | (Power package with 3,2 mm pitch) |
| <b>Device type:</b>  | Power transistors                 |
| <b>Material:</b>     | P                                 |
| <b>Features:</b>     | (Blank)                           |
| <b>Position:</b>     | Z                                 |
| <b>Package:</b>      | MP                                |
| <b>Form:</b>         | P                                 |
| <b>Count:</b>        | 89                                |

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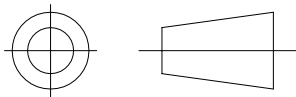


Power Package with 3,2mm Pitch  
P-ZMP-P165

| Ref. | Millimetre |         |       | Notes |
|------|------------|---------|-------|-------|
|      | min.       | nom.    | max.  |       |
| e    | -          | 3,2 (*) | -     | 4.    |
|      |            |         |       |       |
| F 1  | 11,65      | -       | 12,35 |       |
| F 2  | 1,1        | -       | 1,9   |       |
| J    | 15         | -       | 16,9  |       |
|      |            |         |       |       |
| k    | -          | 0,6     | -     |       |
| L    | 0,61       | -       | 0,67  |       |
|      |            |         |       |       |
| p 1  | 4,4        | -       | 4,6   |       |
| p 2  | 2,2        | -       | 2,5   |       |
|      |            |         |       |       |
| Q 1  | 62,3       | -       | 63,3  |       |
| Q 2  | 47,7       | -       | 48,3  |       |
| Q 3  | 36,8       | -       | 37,2  |       |
| Q 4  | 22,4       | -       | 23    |       |
| Q 5  | 16,2       | -       | 16,6  |       |
|      |            |         |       |       |
| q 1  | 42,3       | -       | 42,7  |       |
| q 2  | 52,9       | -       | 53,1  |       |
| q 3  | 50,8       | -       | 51,2  |       |
|      |            |         |       |       |
| U 1  | 40         | -       | 40,4  |       |
| U 2  | 56,4       | -       | 57    |       |
|      |            |         |       |       |
| v    | -          | 0,6     | -     |       |
| w    | -          | 0,15    | -     |       |

(\*) means true geometrical position

- 1. Pins are not numbered.  
Function according to individual data sheet.
- 2. Depopulation of pins varies according to function.
- 3. pin finish: 2-20 μm
- 4. The millimeter dimensions are derived from the original inch dimensions.
- 5. Datum A is established by the common axis of the upper left and the upper right terminal.
- 6. Datum B is established by the common axis of the upper left and the lower left terminal.



Power Package with 3,2mm Pitch  
P-ZMP-P165