

## Special Topics

# Sensors and Controllers

## Ordering Codes, Packaging, Handling

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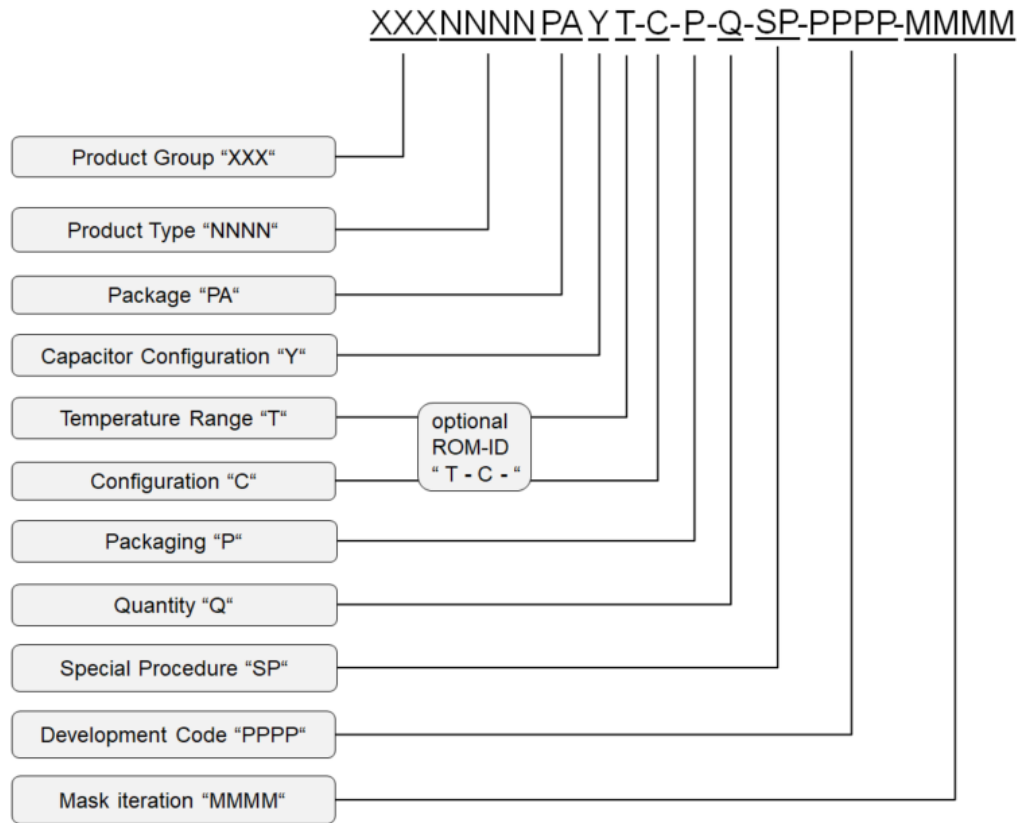
## 1. Ordering Codes for Sensors

**Release Note:** This document is intended as a guideline for ordering and handling Micronas Hall sensors and controllers and is not to be considered as a delivery specification with guaranteed values.

### 1.1.Overview

The product group “Sensors” from TDK-Micronas comprises several Hall sensor families of switches, linear sensors, direct-angle sensors and current sensors available in a variety of packages, packaging variants, and temperature ranges.

This section gives an overview of the packaging variants and explains the ordering code system for our sensors.



**Fig. 1–1:** Key to ordering codes for sensors

First, all components of the ordering codes are explained separately. In [Section 3](#), from page 13 onwards, the complete ordering codes, forms of delivery, marking, and the packaging variants for each package are shown.

The sensor type is determined by the application, the product group, the package, and the temperature range.

## 1.2. Product Group “XXX”

The first three characters of the ordering codes are fixed to determine the product group:

**Table 1–1:** Product Group

Product Group	Description
CUR	Hall-effect current sensors
HAL	Hall-effect sensor
HAC	Hall sensor with integrated capacitors
HAR	Hall sensor with redundancy functionality

## 1.3. Product Type “NNNN”

The following three to four digits are reserved for the designation of the product. For example, the sensor type “3736” refers to the Hall sensor “HAL 3736”. A detailed description of functions, features, and parameters can be found in the related data sheet “HAL 371x, HAL 372x, HAL 373x”.

## 1.4. Package “PA”

Hall sensors from TDK-Micronas are available in the following packages:

**Table 1–2:** Sensor package codes

Package Code	Package	Pins
DJ, DZ	SOIC8	SMD (Moisture Sensitivity Level 3)
SU	SOT23	SMD (Moisture Sensitivity Level 1)
SF, TQ	SOT89B	SMD (Moisture Sensitivity Level 1)
UA, JQ	TO92UA	leaded
CX	TO92UF	leaded
UG	TO92UG	leaded
UP, CV	TO92UP	leaded
UT	TO92UT	leaded
GP	TSSOP14	SMD (Moisture Sensitivity Level 3)

## 1.5. Capacitor Configuration “Y”

Our Hall sensors with integrated caps have the following capacitor value cross reference. The capacitor availability offered for the product can be found in the corresponding data sheet.

**Table 1–3:** Capacitance codes

Capacitance Code “Y” / Letter Cross Reference	Capacitor from VSUP to GND	Capacitor from OUT to GND
G	10 nF	No capacitor
L	100 nF	10 nF
W	100 nF	No capacitor
M, J*	100 nF	100 nF
H*	100 nF	1 nF

\*only for TO92UF package

## 1.6. Temperature Range “T”

The Hall sensors from TDK-Micronas are suitable for the following temperature ranges:

**Table 1–4:** Temperature codes

Temperature Code	Junction temperature range (T <sub>J</sub> ) of the sensors	
	min.	max.
C	0 °C	85 °C
E	–40 °C	100 °C
I	–20 °C	125 °C
K	–40 °C	140 °C
A	–40 °C	170 °C

**Note:** The specified temperature ranges for all sensors in this brochure and in the data sheets always refer to the junction temperature. On account of self-heating, the junction temperature (T<sub>J</sub>) is always higher than the ambient temperature (T<sub>A</sub>). The relationship between junction temperature and ambient temperature is explained in the data sheet section „Application Notes“. This allows the calculation of the maximum permissible ambient temperature for the appropriate application.

The maximum permissible ambient temperature is always lower than the specified junction temperature.

## 1.7. Configuration “C”

Three different configurations are offered. Please refer to [Table 1–5](#).

The packages TO92UA and TO92UT are offered in two different configurations. The basic type has straight legs (inline, not spread; configuration code “2”). For simple PCB designs, this package is also available with spread legs (inline, spread; configuration code “1”).

**Table 1–5:** Description of the Configuration Codes

Configuration Code	Configuration
1	Inline, spread TO92UA or TO92UT
2	Inline, not spread TO92UA, TO92UF, TO92UG, TO92UT or TO92UP
4	SMD SOIC8, SOT23, SOT89, TSSOP14 on carrier tape

## 1.8. Packaging “P”

Depending on the sensor package, different packaging variants are offered:

All sensors in packages TO92UA and TO92UT are available with straight legs (configuration inline, not spread) in bulk and carrier tape form (Ammopack, according to IEC 286). Spread legs are only available in carrier tape and with standard lead length.

In order to achieve the highest quality level, TDK-Micronas recommends to use Ammopack instead of bulk. Delivery of parts in bulk implies scratches and damages by mechanical forces during delivery.

The TO92UP package is only available with straight legs in carrier tape.

The packages SOT23, SOT89B, SOIC8 and TSSOP14 are available in carrier tape on reels according to IEC 286.

**Table 1–6:** Packaging Codes

Packaging Code	Delivery	Package
A	Ammopack (standard leads)	TO92UA, TO92UT and TO92UP
L	Ammopack (long leads)	TO92UA, TO92UT
B	Bulk (standard leads)	TO92UA, TO92UT and TO92UP
M	Bulk (long leads)	TO92UA, TO92UT
R	Reel	SOIC8, SOT23, SOT89B, TO92UF, TO92UG and TSSOP14

**Note:** Possible combinations of packaging code and Quantity Code can be found on Table 1–8 on page 9 and Table 1–9 on page 9.

## 1.9. Quantity “Q”

The sensors are delivered in different packaging units and quantities. The packaging size is determined by the inner packaging (basic unit) and the outer packaging (card-board box).

Only entire packaging units (outer packaging) can be ordered.

**Table 1–7: Delivery Quantities**

Quantity Code	Outer Packaging	Inner Packaging	Package and Form Of Delivery
1	2000	1000	TO92UA/UT/UP Bulk: 2 bags with 1000 sensors each or SOT89B: 2 Reels with 1000 sensors each
2	2000	2000	TO92UA/UT/UP Ammopack 1 tape with 2000 sensors
4	4800	2400	TO92UF Reel 2 reels with 2600 sensors each
5	15000	5000	SOT89B Reel 3 reels with 5000 sensors each
6	20000	10000	SOT23 Reel 2 reels with 10000 sensors each
7	6000	3000	SOT23 Reel 2 reels with 3000 sensors each
8	7000	3500	SOIC8 Reel 2 reels with 3500 sensors each
9	8000	4000	TSSOP14/TO92UG Reel 2 reels with 4000 sensors each

Packaging for each package is described from page 13 onwards.



The following tables show possible variants of configuration, packaging, and quantity depending on the sensor's package.

**Table 1–8:** Available variants for **TO92UA / TO92UT / TO92UP**

Configuration Code	Packaging Code	Quantity Code
1 (=spread)*	A (=Ammopack)	2
2 (=non-spread)	A (=Ammopack)	2
1 (=spread)*	L** (=Ammopack)	2
2 (=non-spread)	L** (=Ammopack)	2
2 (=non-spread)	B (=Bulk)	1
2 (=non-spread)	M** (=Bulk)	1

\*not available for HAL 1xy, HAL 2xy and TO92UP package

\*\* not available for TO92UP (for TO92UT only available with configuration not spread)

**Table 1–9:** Available variants for **SOIC8, SOT89B, SOT23, TO92UF, TO92UG, and TSSOP14**

Configuration Code	Packaging Code	Quantity Code
4 (=SOIC8)	R (=Reel)	8
4 (=SOT23)	R (=Reel)	6 (20000 pcs.) 7 (6000 pcs.)
4 (=SOT89B)	R (=Reel)	1 (2000 pcs.) or 5 (15000 pcs.)
2 (=TO92UF)	R (=Reel)	4
2 (=TO92UG)	R (=Reel)	9
4 (=TSSOP14)	R (=Reel)	9

Starting with [Section 3.5](#) an overview per package with examples and the complete ordering codes is given.

## 1.10. Special Procedure “SP”

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These two digits of the ordering code are reserved for customer-specific variants (special procedure). The specification of a special procedure is named S70xxx. Generally, the last two digits of this specification is used for ordering code.

The value “00” is used for standard parts.

## 1.11. PPPP-MMMM

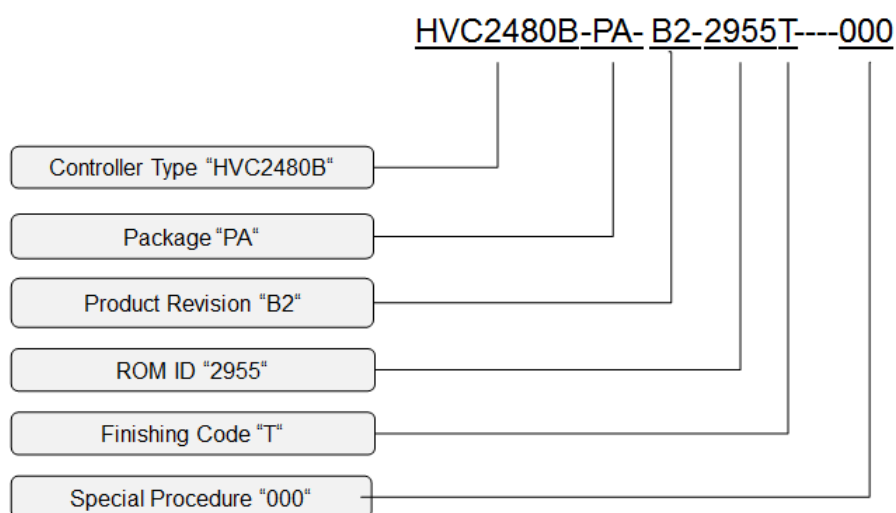
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For internal purpose only.

## 2. Ordering Codes for Controllers

### 2.1. Overview

This section gives an overview of the packaging variants and explains the ordering code system for the product group “Controllers”.



**Fig. 2–2:** Key to Ordering Codes Controllers

First, all components of the ordering codes are explained separately. The complete ordering codes, forms of delivery, marking and the packaging variants for each package are shown in “Section 3., Forms of Delivery, Marking, and Packaging for Sensors and Controllers on page 13”.

The controller is determined by the type, the package, and the finishing variant.

### 2.2. Controller Type “HVC 2480B”

The first eight characters are reserved for the designation of the product. A detailed description of functions, features, and parameters can be found in the related data sheets, for example “HVC 2480B” or “HVC 4223F”.

## 2.3. Package Code “PA”

The controllers from TDK-Micronas are available in the following packages:

**Table 2–10:** Package codes controllers

Package Code	Package
DV	PQFN40-2 (6 x 8 x 0.9 mm) (Moisture Sensitivity Level 3)
DL	PQFN40-4 (6 x 6 x 0.85 mm) (Moisture Sensitivity Level 3)

## 2.4. Product Revision “B2”

These two characters refer to the hard- and software revision of the controller and is also mentioned in the related data sheet.

## 2.5. ROM ID “2955”

These four digits refer to the customer-specific software and is optional.

## 2.6. Finishing Code “T”

Character “T” shows the finishing code. All our controllers are offered in trays.

## 2.7. Special Procedure “000”

These three digits of the ordering code are reserved for customer-specific variants (special conditions). Should this be the case, please use the number code provided by TDK-Micronas.

The value “000” is used for standard parts.

### 3. Forms of Delivery, Marking, and Packaging for Sensors and Controllers

In this section, possible forms of delivery and the appropriate ordering codes examples are shown. The available variants (product type, package and temperature range) are listed in each data sheet.

The product information is marked on top of the package (branded side). For the sensors, the upper row includes the designation of the sensor and the junction temperature range  $T_J$ . Marking corresponds to the information in the data sheets (section "ordering information").

**For Operating Junction Temperature Range ( $T_J$ ) refer to Table 1.6 on page 6**

For the controllers, the product information is also marked on the top of the package and is explained in the corresponding package chapter starting with "Package PQFN40-2 (6 x 8 mm)" on page 44

#### 3.1. Special Marking of Prototype Parts

##### For sensors:

Prototype parts are coded with an underscore beneath the temperature range letter and on each product. They may be used for lab experiments and design-ins but are not intended to be used for qualification tests or as production parts. For package SOT23 the underscore beneath the last digit of the product name shows that these are prototype parts.

##### For controllers:

Prototype parts are marked with characters "ES" on each product. They may be used for lab experiments and design-ins but are not intended to be used for qualification tests or as production parts.

#### 3.2. Date Code Example

##### Date Code

1 <sup>st</sup> Digit	2 <sup>nd</sup> Digit and 3 <sup>rd</sup> Digit	4 <sup>th</sup> Digit
Year (0...9)	Week (1...52)	Day (1...7)
6=2016, 7=2017, 8=2018 etc.	01=Week 1 to 52=Week 52	1=Monday to 7=Sunday

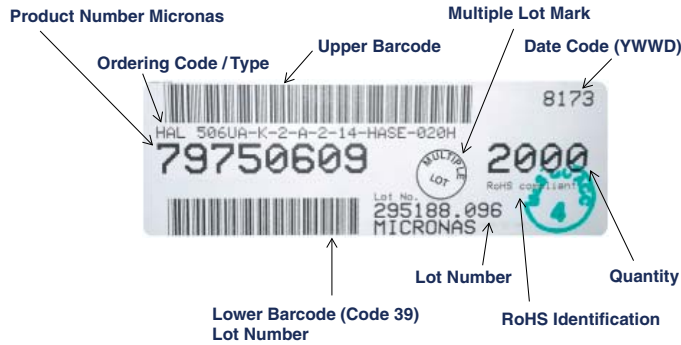
Example:

The Date Code on the sensor/controller is 8105.

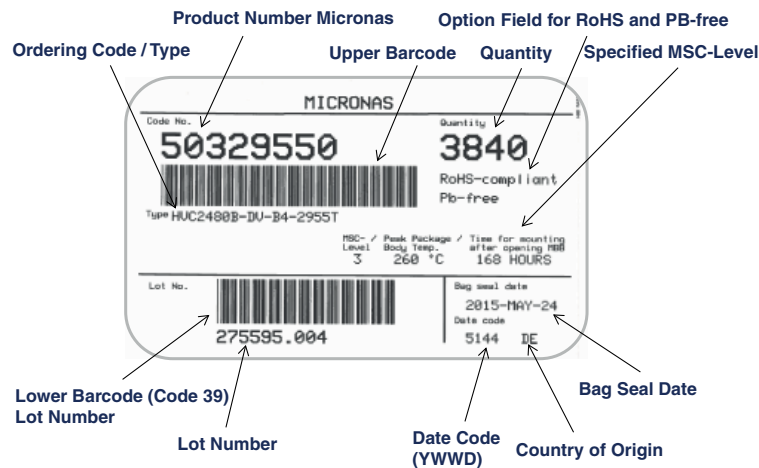
These products have been finished in 2018, week 10 on the fifth day (Friday): This was March 9th, 2018.

## 3.3. Packaging Labels

Both the outer packaging, as well as the inner packaging units are labelled with all relevant information. Fig. 3-3 and Fig. 3-4 give an example describing each element separately.



**Fig. 3-3:** Information on the label for sensors in packages SOT23, SOT89, TO92UA, TO92UP, and TO92UT



**Fig. 3-4:** Information on the label for controllers and sensors in packages SOIC8, TO92UF, TO92UG, TSSOP14, and PQFN40

The complete ordering code plus optional internal information is printed on the label. The TDK-Micronas code number refers to this ordering code. Every packaging variant is defined by the complete ordering code or the TDK-Micronas code number.

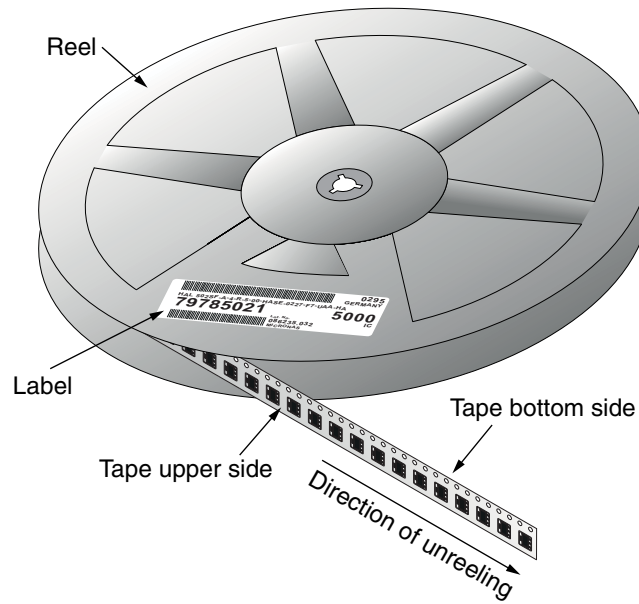
Moreover, the label contains the Date Code, the quantity of sensors, and the lot number (TDK-Micronas charge number).

**Note:** The lot number on the label enables internal backtracking of the sensor. In case of further inquiries, please provide us with this number or a copy of the label. The Date Code on the label represents the finishing code of the complete packaging unit. It can differ from the Date Code on the sensor package or from the Date Code on the inner bag label.

The label includes two barcode markings for automatic registration. The upper barcode starts with “W”, followed by the TDK-Micronas product number, the Date Code and the quantity. The lower barcode contains the lot number (TDK-Micronas charge number).

### 3.4. Tape Reeling and Label Area on the Reel

The SMD devices are delivered in tape and reel and are labelled according to IEC 60286-3.

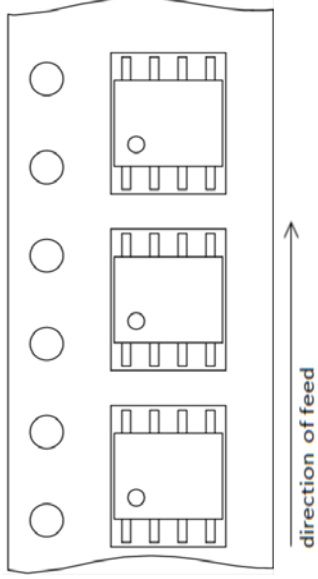
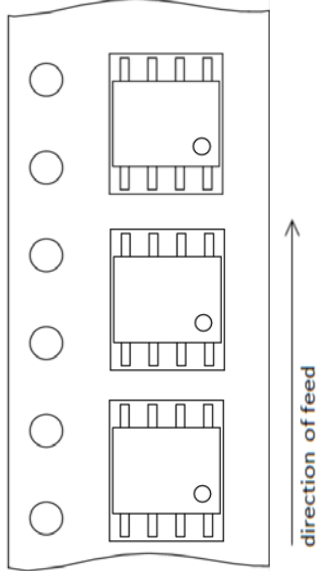


**Fig. 3–5:** Tape reeling and label area on the reel

## 3.5. Package SOIC8

For package **SOIC8** the sensors delivered with Quantity Code “8”. They are shipped in a cardboard box containing 7000 pieces (2 reels with 3500 sensors each) in dry pack.

The cardboard box has two labels; each reel is individually labelled.

<p><b>Carrier Tape 12 mm</b>  <b>Reel Diameter 330 mm</b>  <b>Die-Up Package</b></p> <p>Configuration Code:4 SMD (SOIC8)                  Packaging Code: R (Reel)                  Quantity Code: 8                  Packing unit: Two reels with 3500 pcs. each                  Minimum Order Quantity: 7000                  Moisture Sensitivity Level: 3</p> <p>Example:                  HAL3625DJ-A-4-R-8-00</p>	
<p><b>Carrier Tape 12 mm</b>  <b>Reel Diameter 330 mm</b>  <b>Die-Down Package</b></p> <p>Configuration Code:4 SMD (SOIC8)                  Packaging Code: R (Reel)                  Quantity Code: 8                  Packing unit: Two reels with 3500 pcs. each                  Minimum Order Quantity: 7000</p> <p>Example:                  CUR3115DZ-A-4-R-8-00</p>	



### Marking:



Line 1: Product Group / Product Type / Temperature Range

optional for HAL 39xy: Product Type / ROM-ID

Line 2: Lot number

Line 3: Date Code / Option 1 (optional)

### Packaging:

All sensors in the package SOIC8 are available in this packaging variant.

The appropriate order codes are HALxxxxDJ-x-A-R-8-00 or HALxxxxDZ-x-A-R-8-00.



**Fig. 3-6:** SOIC8 reel



**Fig. 3–7:** SOIC8 reel in Dry Pack



**Fig. 3–8:** SOIC8 cardboard box including two reels in Dry Pack

### Dimensions in mm

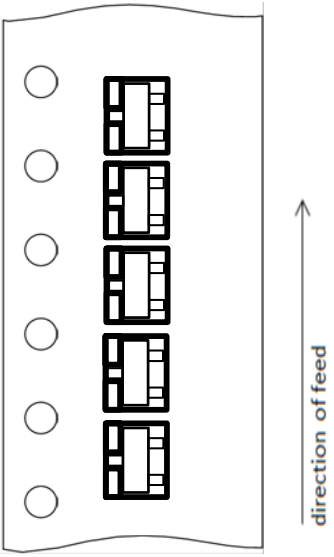
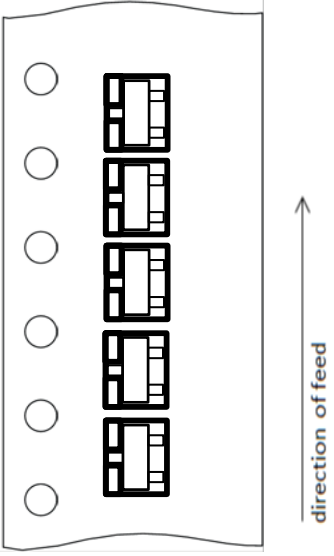
Cardboard Box			Reel
Length	Width	Height	Diameter
390	390	120	330

### 3.6. Package SOT23

For package **SOT23** the sensors are delivered with Quantity Code “6”. They are shipped in a cardboard box containing 20000 pieces (2 reels with 10000 sensors each) or with Quantity Code “7” in a cardboard box containing 6000 pcs. (2 reels with 3000 sensors each)

The cardboard box has two labels; each reel is individually labelled.

#### Form of Delivery and Example:

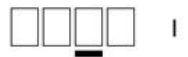
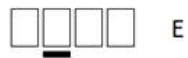
<p><b>Blister Tape 12 mm</b>  <b>Reel Diameter 330 mm</b></p> <p>Configuration Code: 4 SMD (SOT23)            Packaging Code: R (Reel)            Quantity Code: 6            Packing unit: Two reels with 10000 pcs. each            Minimum Order Quantity: 20000)            Moisture Sensitivity Level: 1</p> <p>Example:            HALxxxxSU-A-4-R-6-00</p>	
<p><b>Blister Tape 12 mm</b>  <b>Reel Diameter 179 mm</b></p> <p>Configuration Code: 4 SMD (SOT23)            Packaging Code: R (Reel)            Quantity Code: 7            Packing unit: Two reels with 3000 pcs. each            Minimum Order Quantity: 6000)            Moisture Sensitivity Level: 1</p> <p>Example:            HALxxxxSU-A-4-R-7-00</p>	

**Marking:**



Line 1: Product Name

Line 2: Underscore Marking Option for Temperature Range



Bottom Side: Trace Code

**Packaging Quantity Code 6:**

All sensors in the package SOT23 are available in this packaging variant.

The appropriate order code is HALxxxxSU-x-4-R-6-00



**Fig. 3–9:** SOT23 Quantity Code „6“ reel



**Fig. 3–10:** SOT23 Quantity Code „6“ cardboard box including two reels

**Dimensions in mm**

Cardboard Box			Reel
Length	Width	Height	Diameter
340	340	110	330

**Packaging Quantity Code 7:**

All sensors in the package SOT23 are available in this packaging variant.

The appropriate order code is HALxxxxSU-x-4-R-6-00



**Fig. 3–11:** SOT23 Quantity Code “7“ reel



**Fig. 3–12:** SOT23 Quantity Code “7” cardboard box including two reels

**Dimensions in mm**

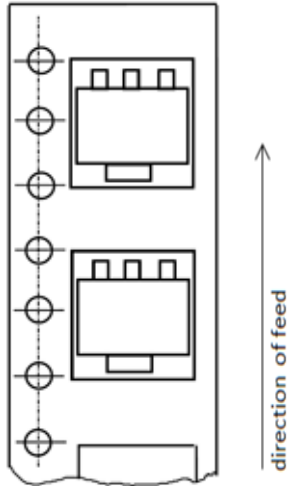
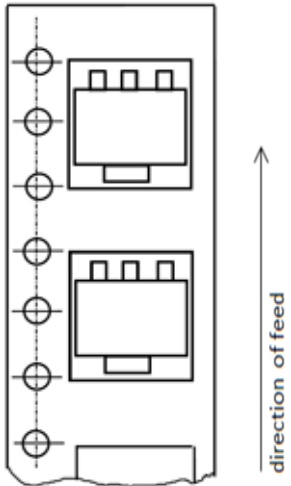
Cardboard Box			Reel
Length	Width	Height	Diameter
208	192	38	179

### 3.7. Package SOT89B

Sensors in the package **SOT89B** are delivered with Quantity Code “1” in a cardboard box containing 2000 pieces. (2 reels with 1000 sensors each) or with Quantity Code “5” in a cardboard box containing 15000 pcs. (3 reels with 5000 sensors each).

The cardboard box has two labels; each reel is individually labelled.

#### Forms of Delivery and Example

<p><b>Carrier Tape 12 mm</b></p> <p><b>Reel Diameter 180 mm</b></p> <p>Configuration Code:4 SMD (SOT89B)</p> <p>Packaging Code: R (Reel)</p> <p>Quantity Code: 1</p> <p>Packing Unit: Two reels with 1000 pcs. each</p> <p>Minimum Order Quantity: 2000 pcs.</p> <p>Moisture Sensitivity Level: 1</p> <p>Example: HAL 320SF-A-4-R-1-00</p>	
<p><b>Carrier Tape 12 mm</b></p> <p><b>Reel Diameter 330 mm</b></p> <p>Configuration Code:4 SMD (SOT89B)</p> <p>Packaging Code: R (Reel)</p> <p>Quantity Code: 5</p> <p>Packing Unit: Three reels with 5000 pcs. each</p> <p>Minimum Order Quantity: 15000 pcs.</p> <p>Moisture Sensitivity Level: 1</p> <p>Example: HAL 320SF-A-4-R-5-00</p>	

**Marking:**

Line 1: Product Name / Temperature Range

Line 2: Date Code / Option 1 (optional)

Bottom Side: Trace Code (optional)

**Packaging Quantity Code 1 (2000 pcs.):**

The appropriate order codes are HAL xxxSF-x-4-R-1-00 or HAL xxxTQ-x-4-R-1-00



**Fig. 3–13:** SOT89B Quantity Code "1" reel





**Fig. 3–14:** SOT89B Quantity Code “1” cardboard box inner view



**Fig. 3–15:** SOT89B Quantity Code “1” cardboard box closed including two reels

**Dimensions in mm**

Cardboard Box			Reel
Length	Width	Height	Diameter
208	190	40	180

**Packaging Quantity Code 5 (15000 pcs.):**

The appropriate order codes are HAL xxxSF-x-4-R-5-00 or HAL xxxTQ-x-4-R-5-00.



**Fig. 3–16:** SOT89B Quantity Code “5” reel



**Fig. 3–17:** SOT89B Quantity Code “5” cardboard box inner view



**Fig. 3–18:** SOT89B Quantity Code “5” cardboard box closed including three reels

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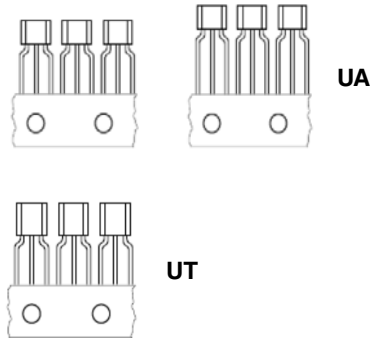
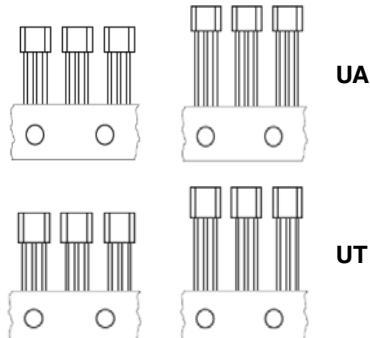
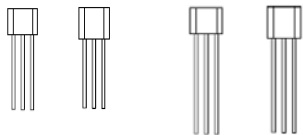
### Dimensions in mm

Cardboard Box			Reel
Length	Width	Height	Diameter
340	340	110	330

## 3.8. Package TO92UA/TO92UT

The sensors in the package **TO92UA** or **TO92UT** are delivered with Quantity Code “1” in bulk or with Quantity Code “2” in carrier tape (Ammopack). They are shipped in a cardboard box containing 2000 pieces (for bulk 2 bags with 1000 sensors each and for Ammopack one carrier tape with 2000 sensors). The cardboard box has two labels.

### Forms of Delivery:

<p><b>Ammopack Inline spread</b></p> <p>Configuration Code:1 (TO92UA / TO92UT, spread) long leads only for TO92UA</p> <p>Packaging Code: A (Ammopack)</p> <p>Quantity Code: 2</p> <p>Packing Unit / Minimum Order Quantity: One Ammopack with 2000 pcs.</p> <p>Example: HAL1820UA-A-1-A-2-00</p>	
<p><b>Ammopack Inline not spread</b></p> <p>Configuration Code:2 (TO92UA/TO92UT inline, not spread) standard lead length and long leads</p> <p>Packaging Code: A (Ammopack)</p> <p>Quantity Code: 2</p> <p>Packing Unit / Minimum Order Quantity: One Ammopack with 2000 pcs.</p> <p>Example: HAL1820UA-A-2-A-2-00</p>	
<p><b>Bulk Inline not spread</b></p> <p>Configuration Code:2 (TO92UA / TO92UT, inline)</p> <p>Packaging Code: B (Bulk)</p> <p>Quantity Code: 1</p> <p>Packing Unit: Two Bags with 1000 pcs. each</p> <p>Minimum Order Quantity: 2000 pcs.</p> <p>Example: HAL1820UA-A-2-B-1-00</p>	

### Marking of TO92UA:



Line 1: Product Type / Temperature Range

Line 2: Date Code / Option 1 (optional)

Bottom Side: Trace Code (optional)

### Marking of TO92UT



Line 1: Product Type / Temperature Range

Line 2: Date Code / Option 1 (optional)

Line 3: Trace Code (optional)

### Packaging in Bulk:

The sensors in the package **TO92UA** or **TO92UT** are delivered with Quantity Code "1". They are shipped in a cardboard box containing 2000 pieces bulk (2 bags with 1000 sensors each). The cardboard box has two labels; each bag is individually labelled.

All sensors in the package TO92UA or TO92UT with straight legs are available in this packaging variant.

The appropriate order codes are:

HALxxxxUA-x-**2-B-1**-00 for sensors TO92UA with straight legs (inline, not spread)

HALxxxxJQ-x-**2-B-1**-00 for sensors TO92UA with straight legs (inline, not spread)

HALxxxxUT-x-**2-B-1**-00 for sensors TO92UT-1 with straight legs (inline, not spread)

HALxxxxUA-x-**2-M-1**-00 for sensors TO92UA with straight legs (inline, not spread)

HALxxxxJQ-x-**2-M-1**-00 for sensors TO92UA with straight legs (inline, not spread)

HALxxxxUT-x-**2-M-1**-00 for sensors TO92UT-1 with straight legs (inline, not spread)



**Fig. 3–19:** TO92UA/UT bulk cardboard box inner view



**Fig. 3–20:** TO92UA/UT bulk cardboard box closed

#### Dimensions in mm

Cardboard Box		
Length	Width	Height
350	120	40

For packages **TO92UA** and **TO92UT** the sensors are delivered with Quantity Code "2". They are shipped in a cardboard box containing 2000 pieces in carrier tape (Ammo-pack: folded tape without additional packaging). The cardboard box has two labels.

All sensors in the package TO92UA and TO92UT with straight or spread legs are available in this packaging variant.

The appropriate order codes are

HALxxxUA-x-**2-A-2-00** for sensors TO92UA with straight legs (inline, not spread)

HALxxxUA-x-**1-A-2-00** for sensors TO92UA with spread legs

HALxxxUT-x-**2-A-2-00** for sensors TO92UT with straight legs (inline, not spread)

HALxxxUT-x-**1-A-2-00** for sensors TO92UT with spread legs

HALxxxUA-x-**2-L-2-00** for sensors TO92UA with straight legs (inline, not spread)

HALxxxUA-x-**1-L-2-00** for sensors TO92UA with spread legs

HALxxxUT-x-**2-L-2-00** for sensors TO92UT with straight legs (inline, not spread)



**Fig. 3–21:** TO92UA/UT Ammo-pack cardboard box inner view

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**Fig. 3–22:** TO92UA/UT Ammopack cardboard box closed

#### Dimensions in mm

Cardboard Box		
Length	Width	Height
350	120	40
350	120	45*

\* for long leads

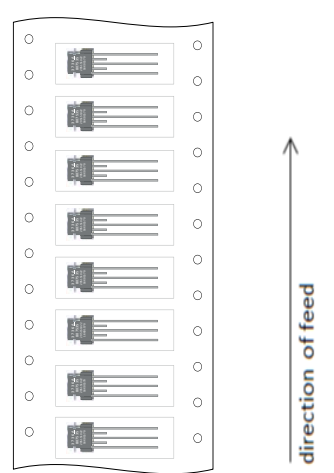


### 3.9. Package TO92UF

Sensors in the package **TO92UF** are delivered with Quantity Code “4” in a cardboard box containing 4800 pieces. (2 reels with 2400 sensors each).

The cardboard box has two labels; each reel is individually labelled.

#### Forms of Delivery:

<p><b>Carrier Tape 44 mm</b> <b>Reel Diameter 330mm</b></p> <p>Configuration Code: 2 inline not spread Packaging Code: R (Reel) Quantity Code: 4 Packing Unit: Two reels with 2400 pcs. each Minimum Order Quantity: 4800 pcs.</p> <p>Example: HAC3736CXHA-2-R-4-00</p>	 <p>The diagram illustrates a carrier tape with six sensors arranged in a single row. Each sensor is represented by a small rectangular component with four pins extending from its bottom edge. The sensors are mounted on a carrier tape that has two circular holes on each side, one for each sensor. An arrow on the right side of the tape points upwards, labeled "direction of feed".</p>
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## Marking of TO92UF:



Line 1: Product Type / Temperature Range

Line 2: Date Code / Option 1 (optional)

Line 3: Lot number

Line 4: Tracecode



**Fig. 3–23:** TO92UF reel



**Fig. 3-24:** TO92UF cardboard box

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### Dimensions in mm

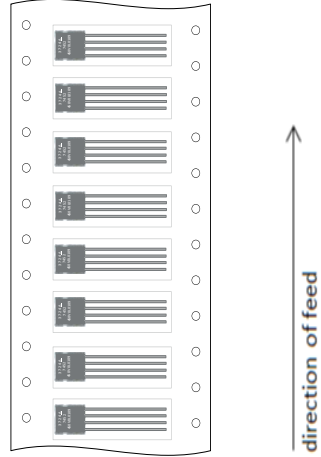
Cardboard Box			Reel
Length	Width	Height	Diameter
340	340	110	330

### 3.10. Package TO92UG

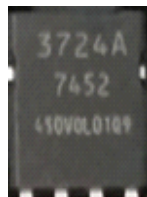
Sensors in the package **TO92UG** are delivered with Quantity Code "9" in a cardboard box containing 8000 pieces. (2 reels with 4000 sensors each).

The cardboard box has two labels; each reel is individually labelled.

#### Forms of Delivery:

<p><b>Carrier Tape 44 mm</b></p> <p><b>Reel Diameter 330 mm</b></p> <p>Configuration Code: 2 inline not spread</p> <p>Packaging Code: R (Reel)</p> <p>Quantity Code: 9</p> <p>Packing Unit: Two reels with 4000 pcs. each</p> <p>Minimum Order Quantity: 8000 pcs.</p> <p>Example: HAL3726UG-A-2-R-9-00</p>	
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#### Marking of TO92UG:



Line 1: Product Type / Temperature Range

Line 2: Date Code / Option 1 (optional)

Line 3: Trace Code (optional)



**Fig. 3–25:** TO92UG reel



**Fig. 3–26:** TO92UG cardboard box including two reels

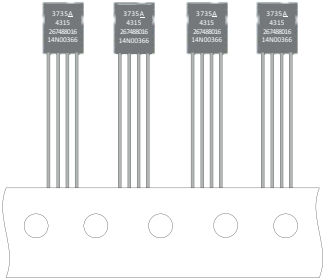
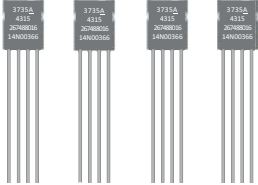
**Dimensions in mm**

Cardboard Box			Reel
Length	Width	Height	Diameter
340	340	110	330

### 3.11. Package TO92UP

The sensors in the package **TO92UP** are delivered with Quantity Code “2”. They are shipped in a cardboard box containing 2000 pieces in carrier tape (Ammopack: folded tape without additional packaging). The cardboard box has two labels.

#### Possible Form of Delivery:

<p><b>Ammopack Inline not spread</b></p> <p>Configuration Code:2 (TO92UP, inline, not spread)</p> <p>Packaging Code: A (Ammopack)</p> <p>Quantity Code: 2</p> <p>Packing Unit: One Ammopack with 2000 pcs.</p> <p>Minimum Order Quantity: 2000 pcs.</p> <p>Example: HAL3735UP-A-2-A-2-00</p> <p><b>Bulk Inline not spread</b></p> <p>Configuration Code:2 (TO92UP, inline, not spread)</p> <p>Packaging Code: B (bulk)</p> <p>Quantity Code: 1</p> <p>Packing Unit: Two bags with 1000 pcs. each</p> <p>Minimum Order Quantity: 2000 pcs.</p> <p>Example: HAL3735UP-A-2-B-1-00</p>	 <p>The diagram shows four TO92UP sensors mounted on a carrier tape. Each sensor is labeled with the part number 3735A 4315 and the quantity code 2. The carrier tape has five circular holes for mounting.</p>  <p>The diagram shows four TO92UP sensors standing upright. Each sensor is labeled with the part number 3735A 4315 and the quantity code 2.</p>
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### Marking:



Line 1: Product Type / Temperature Range

Line 2: Date Code / Option 1 (optional)

Line 3: Lot number

Line 4: Trace Code

### Packaging:

All sensors in the package TO92UP with straight legs are available in this packaging variant.

The appropriate order code is:

HAL xxxUP-x-2-A-2-00 for sensors with straight legs (inline, not spread) in Ammopack

HAL xxxUP-x-2-B-1-00 for sensors with straight legs (inline, not spread), bulk



**Fig. 3–27:** TO92UP bulk cardboard box inner view



Fig. 3–28: TO92UP Ammopack cardboard box inner view



Fig. 3–29: TO92UP cardboard box closed

#### Dimensions in mm

Cardboard Box		
Length	Width	Height
350	120	45

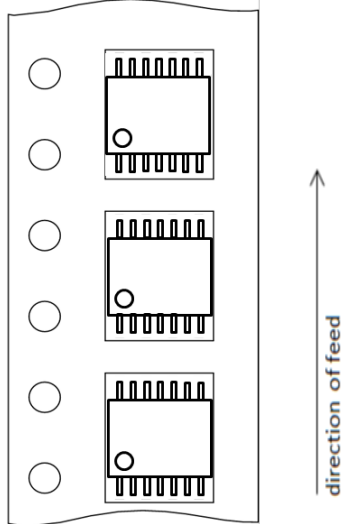


### 3.12. Package TSSOP14

The sensors in the package **TSSOP14** are delivered with Quantity Code “9”. They are shipped in a cardboard box containing 8000 pieces (2 reels with 4000 sensors each, in dry pack).

The cardboard box has two labels; each reel is individually labelled.

#### Possible Form of Delivery:

<p><b>Carrier Tape 12 mm</b></p> <p><b>Reel Diameter 330 mm</b></p> <p>Configuration Code: 4 SMD (TSSOP14)</p> <p>Packaging Code: R (Reel)</p> <p>Quantity Code: 9</p> <p>Packing Unit: Two reels with 4000 pcs. each</p> <p>Minimum Order Quantity: 8000</p> <p>Moisture Sensitivity Level: 3</p> <p>Example: HAR2425GP-A-4-R-9-00</p>	
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#### Marking:



Line 1: Product Name / Temperature Range

Line 2: Lot number

Line 3: Date code / Option 1 (optional)

**Packaging:**

All sensors in the package TSSOP14 are available in this packaging variant.

The appropriate order code is HARxxxxGP-x-4-R-9-00.



**Fig. 3–30:** TSSOP14 reel

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**Fig. 3–31:** TSSOP14 reel in Dry Pack



**Fig. 3–32:** TSSOP14 cardboard box including two reels

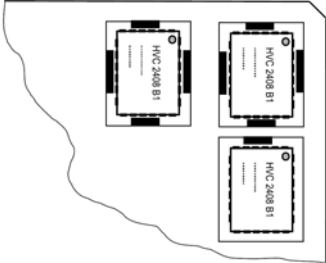
### Dimensions in mm

Cardboard Box			Reel
Length	Width	Height	Diameter
380	380	115	330

### 3.13. Package PQFN40-2 (6 x 8 mm)

The controllers in the package **PQFN40-2** are shipped in a cardboard box containing 3840 pcs. (10 trays with 384 pcs. each and one cover tray) in Dry Pack.

#### Possible Form of Delivery:

<p><b>Tray</b>  <b>315 x 135.9 mm</b>          Configuration Code: 4 SMD (PQFN40-2)          Packaging Code: T (Tray)          Quantity: 3840 (10 Trays x 384 pcs.)          Moisture Sensitivity Level: 3</p> <p>Example:  <b>HVC2480B-DV-B2-2954T</b></p>	
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#### Marking:



Line 1: Product Name

Line 2: Lot number

Line 3: Internal Code / Date Code / Internal Code

#### Packaging:

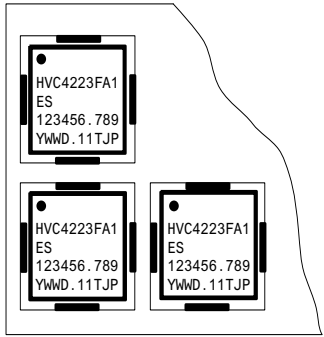
See “Package PQFN40-4 (6 x 6 mm)” on page 45. The outer packaging of JEDEC-trays is identical at TDK-Micronas.

The appropriate order code is HVC2480B-DV-xy-----T

### 3.14. Package PQFN40-4 (6 x 6 mm)

The Controllers in the package **PQFN40-4** are shipped in a cardboard box containing 4900 pcs. (10 trays with 490 pcs. each and one cover tray), in Dry Pack.

#### Possible Form of Delivery:

<p><b>Tray</b></p> <p><b>315 x 135.9 mm</b></p> <p>Packaging Code: T (Tray)</p> <p>Quantity Code:</p> <p>Quantity: 4900 (10 x 490 pcs.)</p> <p>Moisture Sensitivity Level: 3</p> <p>Example:</p> <p>HVC4223F-DL-xy-----T</p>	
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#### Marking:



Line 1: Product Name

Line 2: ES (Engineering Samples / optional)

Line 3: Lot number

Line 4: Date Code / Internal Code

#### Packaging:

All controllers in the package QFN40 are available in this packaging variant.

The appropriate order codes for QFN40-2 are HVC2480B-DV-xy-----T and the appropriate order codes for QFN40-4 are HVC4223F-DL-xy-----T



**Fig. 3–33:** QFN40 trays fixed with 4 bands

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**Fig. 3–34:** QFN40 cardboard box inner view

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**Fig. 3–35:** QFN40 cardboard box closed

### Dimensions in mm

Cardboard Box		
Length	Width	Height
400	180	100

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## 4. Document History

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1. Hall Sensors: Ordering Codes, October 24, 1997, 6200-249-1E. First release.
2. Sensors and Controllers: Hall Sensors: Ordering Codes, Packaging, Handling, Sept. 12, 2001, 6200-249-2E. Second release.
3. Hall Sensors: Ordering Codes, Packaging, Handling, May 26, 2004, 6200-249-3E. Third release.
4. Hall Sensors: Ordering Codes, Packaging, Handling, Aug. 13, 2007, GL000002\_002EN. Fourth release.
5. Hall Sensors: Ordering Codes, Packaging, Handling, Nov. 9, 2007, GL000002\_003EN. Fifth release.
6. Hall Sensors: Ordering Codes, Packaging, Handling, May 22, 2013, GL000002\_004EN. Sixth release.
7. Sensors and Controllers: Ordering Codes, Packaging, Handling, Sept. 10, 2015, GL000002\_005EN. Seventh release, controllers included
8. Sensors and Controllers: Ordering Codes, Packaging, Handling, June 8, 2018, GL000002\_006EN. Eighth release of the document.

Major changes:

- Extended ordering code for sensors
- Packaging code: long lead version added
- TO92UG and TO92UF packages added
- New quantity code 4 for TO92UF package added
- Packaging label: new example with multiple lot stamp

9. Sensors and Controllers: Ordering Codes, Packaging, Handling, March 12, 2020; GL000002\_007EN. Ninth release of the document.

Major changes:

- Section 1.9 Table 1–7, Quantity Code 4 changed, Quantity Code 7 added
- Section 1.9 Table 1–9, Quantity Code 7 added
- Section 3.6 Quantity Code 7 added
- Section 3.6 Marking: Underscore Marking Option for Temperature Range added
- Section 3.6 Packaging variants for Quantity Code 7 added