PRO ELECTRON

EUROPEAN TYPE DESIGNATION CODE SYSTEM FOR ELECTRONIC COMPONENTS

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D.15
Sixteen Edition
2010 - 07

Compiled by: PRO ELECTRON, Brussels (Belgium)

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D15/2010-07

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1 EUROPEAN TYPE DESIGNATION CODE SYSTEM

1.1 The System

The PRO ELECTRON system is the European type designation and registration system for active components ,such as electronic tubes and cathode ray tubes, semiconductors, liquid crystal displays, sensor devices, etc. providing concise and unambiguous type designations. The system provides integrity of the designations, and creates transparent and unique product identification, thus preventing confusion in the market place.

All PRO ELECTRON type numbers consist of a prefix followed by a serial number. The prefix, generally two or three letters, clearly classifies the devices into categories with a sub-classification into classes, series or families.

The serial number is a registration number and identifies a particular device in a class, series, or family.

1.2 Organisational aspects

PRO ELECTRON is a non-profit making organisation operating as an agency of the European Electronic Component Manufacturers Association (EECA), Brussels, Belgium.

The PRO ELECTRON Steering Committee supported by the EECA/PRO ELECTRON Secretariat manages and administers the system.

1.3 The Benefits

- The type numbering system identifies a device in an unambiguous way.
- Identical devices will carry the same type designation.
- The same type designation will never be allocated to any other device, barring misappropriation by outsiders.
- The type designation system enhances an easy communication between manufacturers and users of electronic components.
- A device can be ordered by electronic equipment manufacturers or service engineers with confidence that it corresponds to the same defined data, even if it is made by more than one manufacturer or if several years have passed since it was first introduced.
- Type designations allow a convenient method of indicating interchangeability or similarity of devices.
- Type designations are short, self-explanatory and easy to memorize.
- Type designations include information which readily associates them with a group or family of devices and their applications.
- Classification letters have been carefully chosen to assist alphanumeric filing of data sheets, as well as providing a convenient arrangement in lists or tables of devices.
- In using the code consistently for all devices of the same category, a manufacturer can assure an orderly progression in the development of new types.
- The code is accepted by national government agencies and international organisations.

1.4 Background

A common type nomenclature code for receiving tubes was introduced by a number of manufacturers in the 1930s, followed in the 1950s by a common code for semiconductor devices. Later, as more and more manufacturers realized the advantage of the use of a common type numbering code and became interested in using the system, it was decided to found a separate organization to administer the allocation and registration of type numbers. So in 1966 the pan-European organisation “PRO ELECTRON” was set up in Brussels to perform this function. On 1st January 1983 Pro Electron merged with the European Electronic Component Manufacturers Association (EECA) and pursued its activities under the name of “Pro Electron Registration Office, and EECA Agency”.

For TV picture tubes, for monitor tubes and for oscilloscope tubes, PRO ELECTRON in Europe, the Electronic Industries Alliance of the United States of America, the Japan Electronics and Information Technology Industries Association and the Electronic Industries Association of Korea, maintain jointly one World-wide type Designation Code System (WTDS). This part of the PRO ELECTRON system is administered by registration offices, PRO ELECTRON in Europe, EDEREC in Tokyo, Japan, ECRC in Seoul, Korea and ECA/EIA in Arlington, VA, USA.

Since 2007 TV picture tubes industries have stopped there activities in Europe and no reservation/registration of codes are operating today.

2 TYPE DESIGNATION CODES

2.1 Discrete semiconductor devices

This type designation code applies to discrete semiconductor devices - as opposed to integrated circuits - multiples of such devices, semiconductor chips and Darlington transistors.

A **basic type number** consists of **two letters** followed by **a serial number**

2.1.1 The **first letter** gives information about the material used for the active part of the device.

A - Germanium or other material with band gap of 0,6 - 1,0 eV
B - Silicon or other material with band gap of 1,0 - 1,3 eV
C - Gallium-arsenide or other material with band gap of 1,3 eV or more
D - Ceramic
R - Compound materials (e.g. Cadmium sulphide)

2.1.2 The **second letter** indicates the function for which the device is primarily designed[1]). The same letter could be used for multi-chips devices with similar elements.

A	Diode	Signal, low power [2])
B	Diode	Variable capacitance
C	Transistor	Low power, audio frequency
D	Transistor	Power, audio frequency
E	Diode	Tunnel
F	Transistor	Low power, high frequency
K	Capacitor	
G	Multiple devices	Miscellaneous Devices[3])
H	Diode	Magnetic sensitive
L	Transistor	Power, high frequency
M	Mixer	
N	Photo coupler	
Q	Radiation generator	Light emitting diode LED, Laser [3])
R	Control or switching device	Low power (e.g. Thyristors, Diacs, Triacs, Uni-junction transistors (UJT), Programmable uni-junction transistors (PUT), Silicon bidirectional switch (SBS) or Opto-triacs) [3])
S	Transistor	Low power, switching
T	Control or switching device	Power (e.g. Thyristors or Triacs)[3])
U	Transistor	Power, switching
V	Antennas	
W	Surface acoustic wave device	
X	Diode	Multiplier (e.g. Varactor, step recovery)
Y	Diode	Rectifying, booster voltage reference or regulator
Z	Diode	Transient voltage suppressor diode[3])

[1]) Low power type = R thjc > 15°C/W; Power type = R thjc < 15°C/W

[2]) See Pro Electron Colour Code for small signal diodes at the end of 4.1.6

[3]) With special third letter: see under "Serial Number", 4.1.3.

2.1.3 The **serial number** may be either:

A four digit number, running from 0001 to 9999, assigned by Pro Electron, or

One letter (Z, Y, X, etc.) and a three digit number, running from 001 to 999, assigned by Pro Electron.

This letter has no fixed meaning, with the following exceptions:

A - for triacs after second letter "R" or "T"
B - for HBT transistor (bipolar)
F - for emitters and receivers in fibre-optic communication, after second letter "G", "P" or "Q" [4])
H - for HEMT transistor
L - for lasers in non-fibre-optic applications, after second letter "G" or "Q"
M - for transistor drivers, after second letter "R"
O - for opto-triacs after second letter "R"
R - for semiconductor resistor network, after second letter "C"
T - for tri-state bicolour LEDs after second letter "Q".
W - for transient voltage suppressor diodes after second letter "Z"

For Photocouplers: One letter and the serial number (even if the serial number is a combination of figures and letters) of an existing company type designation of the manufacturer.

Examples of basic type numbers:

AA112	Germanium, low power signal diode,
ACY32	Germanium, low power AF transistor,
BD232	Silicon, power AF transistor,

To a **basic number** may be added:

2.1.4 The **version letter(s)**: One or two letters, indicating a minor variant of the basic type either electrically or mechanically. The letters never have a fixed meaning, except letter **R**, indicating reverse polarity, letter **W**, for Surface Mounted Devices (SMD)

2.1.5 A **suffix**: Sub-classification may be used for devices supplied in a wide range of variants called associated types. Following sub-coding suffixes are in use:

2.1.5.1 **Voltage reference and voltage regulator diodes**

One letter and **one number**, preceded by a hyphen.

The **letter**, if required, indicates the nominal tolerance of the Zener voltage:

A - 1 % (according to IEC 60063: series E96)
B - 2 % (according to IEC 60063: series E48)
C - 5 % (according to IEC 60063: series E24)
D - 10 % (according to IEC 60063: series E12)
E - 20 % (according to IEC 60063: series E6)

Note - In the case of a 3% nominal tolerance the letter "F" will be used. The number denotes the typical operating (Zener) voltage related to the nominal current rating for the whole range. The letter **"V"** is used instead of a decimal point.
Examples: BZY74-C6V3, BZY74-C10, etc.

[4]) In the case of second letter "G", the first letter ought to be defined in accordance with the material of the main optical device.

2.1.5.2 **Transient voltage suppressor diodes**:

One number, preceded by a hyphen.

The **number** indicates the maximum recommended continuous reversed (stand-off) voltage V_R. **"V"** is used instead of a decimal point.
Example: BZW70-9V1 or -39.

The letter **B** may be used immediately after the last number to indicate "bi-directional suppressor diodes".
Example: BZW10-15B.

2.1.5.3 Conventional and controlled avalanche **Rectifier Diodes and Thyristors**:

One number, preceded by a hyphen.

The **number** indicates the rated maximum repetitive peak reverse voltage (V_{RRM}) or the rated repetitive peak off-state voltage (V_{DRM}) whichever is the lower. Reverse polarity with respect to case is indicated by letter **R**, immediately after the number.
Example: BTY80-100 or -100R.

2.1.5.4 **Radiation detectors**:

One number, preceded by a hyphen.

The **number** indicates the depletion layer in µm. The resolution is indicated by a version **letter**.
Example: BPX10-2A.

2.1.5.5 **Array of radiation detectors and generators**:

One number, preceded by a hyphen.

The **number** indicates how many basic devices are assembled into the array.
Example: BPW50-6, BPW50-9, BPW50-12.

2.1.5.6 **Radiation generators**:

One number, preceded by a hyphen.

The **number** indicates the luminous intensity range in milli-candela(mcd)
Example: CQY54-1.

2.1.5.7 **High frequency power transistors**:

One number, preceded by a hyphen.

The **number** indicates the supply voltage.
Example: BLU80-24.

2.1.6 Colour codes for small signal diodes

Table 1 - Colour codes for small signal diodes

PREFIX			**SERIAL NUMBER**	**VERSION LETTER (if any)**
METHOD I 2 broad bands		METHOD II Body colour	METHOD I: METHOD II:	narrow bands one broad band followed by narrow band (s)
AA. - brown BA. - red	Z. - white Y. - grey X. - black W. - blue V. - green T. - yellow S. - orange	BAY. - grey BAX. - black BAW - blue BAV. - green BAT. - yellow BAS. - orange	0. - black 1. - brown 2. - red 3. - orange 4. - yellow 5. - green 6. - blue 7. - violet 8. - grey 9. – white	A. - brown B. - red C. - orange D. - yellow E. - green F. - blue G. - violet H. - grey J. - white
The cathode side is indicated by the broad band (s)				

2.2 Integrated Circuits

This type nomenclature applies to semiconductor monolithic, semiconductor multichip, thin film and thick film hybrid integrated circuits.

A **basic type number** consists of **three letters** followed by **a serial number**

2.2.1 The **first** and the **second letters:**

2.2.1.1 Digital Family Circuits

The **first two letters (FA...FZ, IC...IT, GA...GZ, HA...HZ, PA...PZ, SA...SZ)** identify the **family**.

Note: A Survey of the basic characteristics (such as supply voltage, power consumption, propagation delay time, noise immunity) of several digital families is given in table 2.

2.2.1.2 Solitary Circuits

The **first letter** divides the solitary circuits into:

S - Solitary digital circuits
T - Analogue Circuits
U - Mixed analogue/digital circuits

The **second letter** is a serial letter without any further significance except **"H"** which stands for hybrid circuits.

Note - The first letter “S” should be used for all solitary memories, to which, in event of hybrids the Second letter “H” should be added (e.g. for “SH-“ for Bubble-memories).

2.2.1.3 Microprocessors

The **first two letters** identify microprocessors and correlated circuits as follows:

MA - Micro computer, Central processing unit
MB - Slice processor
MD - Correlated memories
ME - Other correlated circuits (Interface, clock, peripheral controller, etc).

Note - With “slice processor” is meant a functional slice of microprocessor.

2.2.1.4 Charge-Transfer Devices and Switched Capacitors

The **first two letters** identify the following:

NH - Hybrid circuits
NL - Logic circuits
NM - Memories
NS - Analogue signal processing, using switched capacitors.
NT - Analogue signal processing, using CTDs.
NX - Imaging devices
NY - Other correlated circuits

2.2.2 The **third letter** indicates the operating ambient temperature range.

The letters "**A**" through "**M**" give information about the temperature:

A - temperature range not specified below (*)
B - 0°C to + 70°C
C - -55°C to + 125°C
D - -25°C to + 70°C
E - -25°C to + 85°C
F - -40°C to + 85°C
G - -55°C to + 85°C
H - -40°C to + 110°C
K - -40°C to + 125°C
L - -40°C to + 150°C
M - -65°C to + 150°C

Note - If an IC is published for another temperature range, the letter indicating a narrower temperature range may be used or the letter "A".
Example: The range 0°C to +75°C can be indicated by **"B"** or **"A".**

(*) In the case of two same types with two different "temperature ranges not specified below", one type should use the letter **"A"** as 3rd letter and the other, the letter **"X".**

2.2.3 The **serial number** may be

- either a **5-digit number** assigned by Pro Electron or,
- a numeric or alpha-numeric **serial number** of an existing company type designation of the manufacturer.

To the **basic type number** may be added:

2.2.4 Version letter(s)

It indicates a minor variant of the basic type and/or the package

2.2.4.1 Package-outline style[5])

A **single-letter**-system.[6])
For package-outline styles the following letters shall be used:

C Flipchips
D Ceramic dual in line
E Ball grid array
F Flat pack
H Quad flat pack
J Dil bent sil
L Tape carrier package
N Quad flat non leaded
P Plastic dual in line
Q Quadruple in line
S Single in line
T Small outline
U Uncased
V Bump chip carrier
W Leaded chip carrier
X Leadless chip carrier
Y Pin grid array

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5) Former system of package-outline style, see Annex D, for reference purpose only

6) Optionally manufacturers may add a **second** letter, to indicate a minor variant of the package outline style, according to their internal system.

Table 2 - Digital IC families allocated by PRO ELECTRON

Family	Year of registration	Sponsor	Remarks
FA	1966	TELEFUNKEN	Obsolete
FB	1968	TELEFUNKEN	Obsolete
FC	1967	PHILIPS (d)	
FD	1971	PHILIPS(d)	
FE	1972	PHILIPS(d)	
FF	1966	PHILIPS(d)	
FG	1966	PHILIPS(d)	Obsolete
FH	1967	PHILIPS(d)	
FJ	1972	PHILIPS(d)	
FK	1967	PHILIPS(d)	
FL	2001	INFINEON	Re-requested
FN	1967	TELEFUNKEN	
FO	1996	SIEMENS [a)]	
FP	1967	TELEFUNKEN	
FQ	1970	SGS-ATES [b)]	
FR	1967	PHILIPS	
FS	1967	TELEFUNKEN	
FT	1998	SIEMENS [a)]	
FU	1973	SIEMENS [a)]	Obsolete
FV	1968	SGS-ATES [b)]	
FW	1969	SGS-ATES [b)]	
FX	1999	PHILIPS	
FY	1969	SIEMENS [a)]	Obsolete
FZ	1968-75	SIEMENS [a)]	Obsolete
GA	1969-73	T.I. (France)	
GB	1968	FERRANTI	
GC	1968	SGS-ATES [b)]	
GD	1969	SIEMENS [a)]	
GE	1969	SIEMENS [a)]	
GF	1973-76	T.I. (France)	
GH	1970-72	PHILIPS d)	
GJ	1969	T.I. (France)	
GK	1969	PHILIPS d)	
GM	1970-75	T.I. (France)	
GN	2008	NXP	
GP	1970	PHILIPS d)	
GR	1970-	PHILIPS d)	
GS	1970-73	SIEMENS [a)]	
GT	1971-72	PHILIPS d)	
GU	1970	PHILIPS d)	
GW	1971	TELEFUNKEN	
GX	1976-80	PHILIPS d)	
GY	1972-73	PHILIPS d)	
GZ	1972-77	PHILIPS d)	Cancelled
HA	1972-1974	PHILIPS d)	
HB	1974	SGS-ATES [b)]	Cancelled
HC	1974-81	SGS-ATES [b)]	
HD	-	-	Will not be used by PE
HE	1976-81	PHILIPS d)	
HH	1992	TESLA	
HK			Will not be used by PE
HX	1979	PHILIPS d)	
HY [c)]	1981-84	SIEMENS [a)]	

a) Since 1999-04-01: INFINEON Technologies

b) Current company name is STMicroelectronics

c) Not to be used for Digital ICs

Table 2 - Digital IC families allocated by PRO ELECTRON (Contd.)

Family	Year of registration	Sponsor	Remarks
IC	2000	INFINEON	
ID	2002	INFINEON	
IE	2010	INFINEON	
IF	2002	INFINEON	
IG	2005	INFINEON	
IH	2005	INFINEON	
IK	2005	INFINEON	
IM	2002	INFINEON	
IS	2002	INFINEON	
KT	2001	INFINEON	
PA	1991	SGS-THOMSON [b)]	
PB	2002	INFINEON	
PC	1984	PHILIPS d)	
PE [c)]	1982	SIEMENS [a)]	
PH [c)]			
PI	1986	SIEMENS [a)]	
PM	1991	SIEMENS [a)]	
PN	1982	PHILIPS d)	
PS [c)]	1982	SIEMENS [a)]	
PX	1994	SIEMENS [a)]	
SA	1972	ITT	
SB	1976	PHILIPS d)	
SC	1986	PHILIPS d)	
SE	1994	SIEMENS [a)]	
SF	1992	SMI	
SG	2002	INFINEON	
SJ	1996	PHILIPS	
SK	2002	INFINEON	
SP [c)]	1998	SIEMENS [a)]	
SQ	1995	SIEMENS [a)]	
SR	1995	SIEMENS [a)]	
ST [c)]			
SX-	1998	SIEMENS [a)]	
SZ	1995	PHILIPS d)	

a) Since 1999-04-01: INFINEON Technologies

b) Current company name is STMicroelectronics

c) Not to be used for Digital ICs

d) Since 01.09.2006: NXP Semiconductors

2.3 Sensor Devices

This type designation code applies to all sensor devices, including special semiconductor devices and integrated circuits.

A **basic type number** consists of **two letters** followed by **a serial number**

2.3.1 The **first letter** indicates the type of device. (See Note).

K - Sensor.

Note - Some devices may also be coded as semiconductor devices or as integrated circuits.

2.3.2 The **second letter** gives information about the use.

A - Acceleration
E - Elongation; strain
F - Flow
G - Gas
H - Humidity
L - Level
M - Magnetic field
P - Pressure
R - Radiation
S - Geometric position
T - Temperature

2.3.3 The **serial number** may consist of:

- **Four digit figure**, running from 0001 to 9999, for the standard types.
- **One letter** (Z, Y, X,....etc) and **four digit figure**, running from 0001 to 9999, for the industrial types.

Examples: KH122 Humidity sensor, standard type.
KP240 Pressure sensor, standard type.
KGZ55 Gas sensor, industrial type.
KSY10 Geometric position sensor, industrial type.
KTY42 Temperature sensor, industrial type.

To a **basic type number** may be added:

2.3.4 **version letter(s):** for example, indicating the sensitivity range.

2.4 Miscellaneous products

2.4.1 Silicon monolytic microphone

A silicon monolytic microphone is a sound pressure transducer, which is manufactured on silicon, by means of a combination of silicon micromachining technologies and standard semiconductor technologies

A **basic type number** consists of **three letters** followed by **a serial number**

2.4.1.1 The **first** letter gives the information about the material

S - Silicon

2.4.1.2 The **second and third** letter indicate the function

MM - Monolytic microphone

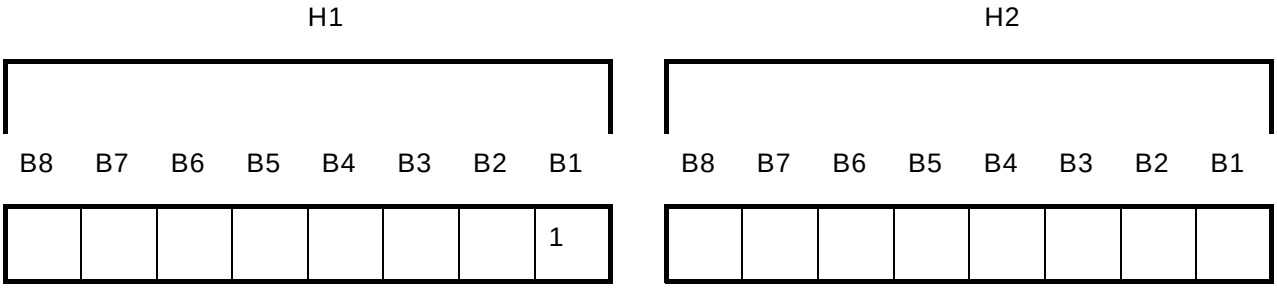
2.4.1.3 The **serial number** is a combination of **one letter (D or I)** and **a three digit number,** running from 001 to 999, assigned by Pro Electron.

D - Discrete model without signal conditioning
I - Integrated model without signal conditioning

2.5 Codification and registration system for EEPROMs for chip cards of the synchronous type according to ISO/IEC 7816-10

The following procedures are used in accordance with those agreed by the Pro Electron Working Group EEPROM on this subject.

The code consists of **two bytes H1** and **H2** as follows:



where:

Byte H1-bit B1 is 1

The remaining 15 bits in H1 and H2 represent information on the chip type and application, and are owned by the chip manufacturer.

In addition the following conditions and/or procedures apply:

2.5.1 Codification and registration for memory cards at present is limited to synchronous cards.

2.5.2 Codification and registration by Pro Electron will only be undertaken for members of Pro Electron.

2.5.3 The application for a code to be registered has to be made by the chip manufacturer to Pro Electron. The chip manufacturer consequently will include the code provided and registered by Pro Electron into the EEPROM. Because of the non-transparent nature of the code, application terminals need to read and check all 16 bits.

2.5.4 It is strongly recommended that only the basic chip type should be registered for an application.

2.5.5 Each chip manufacturer can only apply for a maximum of 200 codes. (Combination of H1 and H2) -due to the limited coding possibilities in the available 16 bites.

2.5.6 Once per year the members will be asked by PE for confirmation of the usage of their registered codes.

2.5.7 For future registration, the existing list for H1 and H2 as provided by the Working Group-Doc.EEPROM 38, will be taken into consideration.

2.5.8 According to ISO/IEC 7816 the byte transmission order is H1, H2, H3, etc. The bit transmission order per byte is from B1 (least significant bit) to B8 (most significant bit).

2.5.9 Any deviation from the above rules need to be agreed upon by the PE Working Group EEPROM.

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