## SMD-codes

DATABOOK

# SMD-codes.
# BGA and DFN cases active SMD semiconductor components marking codes.

- 131.500 semiconductor components SMD-codes:
- Diodes, Transistors, Integrated circuits
- Case pin assignment
- Pinout
- Marking style
- Schematic diagram
- Additional SMD info
- Case drawings
- Manufacturers

**2024-2025 EDITION**

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ELECTRONICS COMPONENTS

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# BGA and DFN cases
# active SMD semiconductor components
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*http://www.turuta.md*

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## Introduction

At earlier eighties began a trend to replace a traditional through-hole technique with the surface mounted technology (SMT) using surface mounted devices (SMD). The SMT, although intended in principle for automatic manufacturing only expand more and more, even into a hobby world. This trend will continue, because many new components are available in SMD versions only. The SMT technique opens advantages and new applications through miniaturising of the components and increasing of reliability. The industry standard unfortunately allows that most of the SMD components does not have a clear description. Since a tiny size of the components, they are labelled with one, two or more character or graphic SMD code. Thus it is necessary to take into account that the colour and (or) placing of alphanumeric or graphic symbols are also important. Therefore a sure identification of the components is impossible without appropriate technical documentation. Moreover the polarity and pin - outs of different components could be not identified without data sheets.

Identifying the manufacturers type number of an SMD device from the package code can be a difficult task. Unfortunately, each device code is not necessarily unique.

For various manufacturers it is possible to place different devices in the same case with the same SMD-code. For example, with a **6H** SMD-code in a SOT-23 case might be either a npn-transistor **BC818** (CDIL) or a capacitance-diode **FMMV2104** (Zetex) or a n-channel jFET transistor **MMBF5486** (Motorola) or a pnp-digital transistor **MUN2131** (Motorola) or a pnp-digital transistor **UN2117** (Panasonic) or a CMOS-integrated circuit- voltage detector with reset output **R3131N36EA** (Ricoh). Even the same manufacturer may use the same code for different devices.

To identify a particular SMD device, is necessary to identify the manufacturer, package type and note the SMD code printed on the device.

The identification of the manufacturer is possible only if on the case are printed the manufacturer's logos, but it not always happens. Besides, sometimes, it is possible to determine the manufacturer with indirect tags. Many recent ON Semiconductor devices have a small superscript letter after the device code, such as **SA$^{c}$** (this smaller letter is merely a month of manufacture code). Infineon devices usually have a lower case **'s'** (ATs, LOs). NXP (Philips) devices usually have a lower case **'p'** (AHp, Z1p, pB0) or **'-'** (DQ-, -ZS) for the devices made in Hong Kong, **'t'** (tT9, Y7t) for the devices made in Malaysia, "W" (WT9, Y7W) for the devices made in China. In section 19 are submitted the logos of the SMD devices manufacturers.

The package type is another problem for the identification of SMD devices. The different manufacturers can designate identical cases concerning by the various standards (or concerning by the internal system). Besides, the various cases can have an identical kind (form) and differ only by sizes. This distinction of sizes so it is not enough, that can be is measured only by special measuring devices.

Compliance with the name and type of cases from different manufacturers is solved by applying in the column "Case" an equivalent type name for equivalent cases.

In addition to SMD-code, uper case may be put padding alpha-numeric information (usually by another font or size of characters, also may be by other arrangement). Relationship position of the SMD-code and padding information have defined as style and show in the column "Style"

In the following tables sections the SMD semiconductor components - irrelevant as to whether it is dealing with transistors, diodes, integrated circuits etc. are placed in separate tables according to numbers of terminals and (or) type of cases and are listed in alpha-numeric order by SMD-codes.

### Column 1 ("SMD-Code")

### Column 2 ("Type")

The type designations correspond to those of the respective manufacturer documentations.

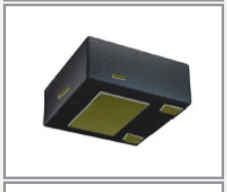
### Column 3 ("Function")

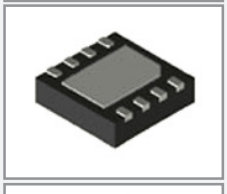
Short definition of the semiconductor component.
Used abbreviations:

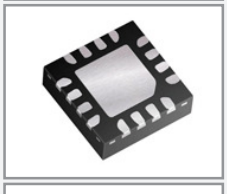
| | |
|---|---|
| BM-IC | Battery Management integrated circuit |
| BR | Bridge Rectifier |
| C-diode | Capacitance diode (varactor, varicap) |
| CMOS-Log | CMOS logic integrated circuit |
| Comp-IC | Voltage comparator integrated circuit |
| DC/DC-IC | DC/DC voltage converter integrated circuit |
| ESDP-diode | ElectroStatic Discharge Protection diode |
| ESD-Prot | ElectroStatic Discharge Protection thyristor |
| -FET | Field Effect Transistor |
| HEMT | High electron mobility transistors |
| H-IC | Hall-effect sensor integrated circuit |
| HSPS-IC | High-side power switch integrated circuit |
| IGBT | Insulated Gate Bipolar Transistor |
| IGBT+Di | Insulated Gate Bipolar Transistor with antiparallel diode |
| LDR-IC | LED driver integrated circuit |
| Lin-IC | Linear integrated circuit |
| LVR-IC | Linear voltage regulator integrated circuit |
| LVR/Vdet-IC | Linear voltage regulator/Voltage detector combined integrated circuit |
| MMIC | Monolithic Microwave Integrated Circuit |
| -MOSFET | Metal-Oxide-Semiconductor FET |
| -MESFET | MEtal-Semiconductor FET |
| n- | n-channel junction transistor |
| n/p- | n-channel and p-channel transistors area |
| Op-IC | Operational amplifier integrated circuit |
| p- | p-channel junction transistor |
| PDS-IC | Power distrubution switch integrated circuit |
| PHEMT | Pseudomorphic high electron mobility transistors |
| PIN-diode | Diode with a wide, undoped intrinsic semiconductor region |
| PSW-IC | Power Switch IC |
| Si-diode | Silicon diode |
| SiGe-diode | Silicon/Germanium diode |
| Si-npn | Silicon npn transistor |
| Si-n/p | Silicon npn and pnp transistors area |
| Si-npn-Darl | Silicon npn Darlington transistor |

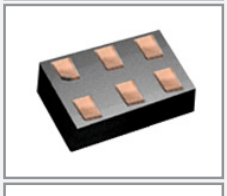
SECTION 1

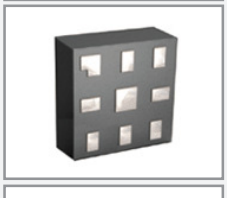
# BGA and DFN case SMD semiconductor components

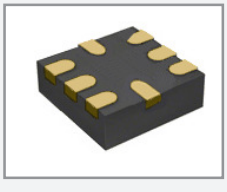




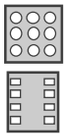




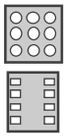




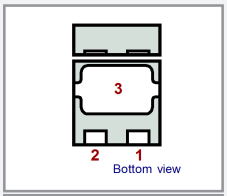
| SMD code | Type | Function | Case | Style | Short description | Atr | A.d. | Pin | Sch | Mnf |
|---|---|---|---|---|---|---|---|---|---|---|
| +AAT | MAX9724AETC+ | Lin-IC | QFN-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 38 | - | Max |
| +AAU | MAX9724BETC+ | Lin-IC | QFN-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 38 | - | Max |
| +AAW | MAX9718BETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| +AAX | MAX9718CETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| +AAY | MAX9718DETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| +ABJ | MAX9724CETC+ | Lin-IC | QFN-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 38 | - | Max |
| +ABK | MAX9724DETC+ | Lin-IC | QFN-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 38 | - | Max |
| +ADH | MAX9724AEBC+T | Lin-IC | BGA-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 39 | - | Max |
| +ADI | MAX9724BEBC+T | Lin-IC | BGA-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 39 | - | Max |
| +ADX | MAX9718BEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +ADZ | MAX9718CEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +AEA | MAX9718DEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +AEH | MAX9724DEBC+T | Lin-IC | BGA-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 39 | - | Max |
| +AEV | MAX98306ETD+ | Lin-IC | DFN-14 | 9ac | APA, BTL, 2.7..5.5V, 2x3.7W(5V/4Ω), shutdown | - | - | 37 | - | Max |
| +AFB | MAX9718EEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +AFC | MAX9718FEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +AFD | MAX9718GEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +AFE | MAX9718HEBL+TG45 | Lin-IC | BGA-9 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 39 | AFP54 | Max |
| +AGE | MAX9724CEBC+T | Lin-IC | BGA-12 | 9m | APA, 2.7..5.5V, 2x60mW(3V/32Ω), shutdown | - | - | 39 | - | Max |
| +AIN | MAX98307ETE+ | Lin-IC | QFN-16 | 9ac | APA, BTL, class-D, 2.7..6.6V, 3.3W(5V/3Ω), shutdown | - | - | 38 | - | Max |
| +AIY | MAX98309EWL+ | Lin-IC | BGA-9 | 9ac | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), shutdown | - | - | 39 | - | Max |
| +AIZ | MAX98310EWL+ | Lin-IC | BGA-9 | 9ac | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), shutdown | - | - | 39 | - | Max |
| +ASY | MAX9718EETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| +ASZ | MAX9718FETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| +ATA | MAX9718GETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| +ATB | MAX9718HETB+T | Lin-IC | DFN-10 | 9m | APA, BTL, 2.7..5.5V, 1.4W(5V/4Ω), select shutdown | - | - | 37 | AFP20 | Max |
| 0 | FP6121-AWDG | LVR-IC | TDFN-6 | 9m | LDO, Dual out, Vout1/Vout2=3.3V/2.8V±2%, 150mA, +CEV, Green pack. | - | - | 56xv | VR19 | Fit |
| 0 | TCR3UG30A | LVR-IC | WCSP4F | 9m | LDO, 3.0V±1%, 300mA, +CE, CL | H16a | - | 63bc* | VR4 | Tos |
| 0 | TCR3UG30B | LVR-IC | WCSP4F | 9m | LDO, 3.0V±1%, 300mA, +CE | H16b | - | 63bc* | VR4 | Tos |
| 0 | TCR4DG30 | LVR-IC | WCSP4E | 9m | LDO, 3.0V±1%, 420mA, +CE | H16a | - | 63bc* | VR4 | Tos |
| 00 | RP110L081B | LVR-IC | DFN1010-4 | 9ac | LDO, 0.8V±1%, 150mA, +CE | - | - | 48vm | VR4 | Ric |
| 00 | XC6129C55A9R-G | Vdet-IC | USPQ-4B05 | 9ad | 5.5V±0.8%, -Reset PPO, Rel. Delay | H33b | 05 | 115r2 | VD3a | Tor |
| 00 | XC6129N55A9R-G | Vdet-IC | USPQ-4B05 | 9ad | 5.5V±0.8%, -Reset ODO, Rel. Delay | H33a | 05 | 115r2 | VD1a | Tor |
| 00 | XC6224A0817R | LVR-IC | USPN-4B02 | 9e | LDO, 0.8V±20mV, 150mA, +CE | - | 05 | 58vm | VR4 | Tor |
| 00 | XC6229D1211R-G | LVR-IC | BGA-4 | 9ac | LDO, 1.2V±20mV, 300mA, +CE | - | 09 | 63ba* | VR4 | Tor |
| 0001 1000 | PDTA124XMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, R1/R2=22k/47k | - | - | 172ta | - | Nxp |
| 0001 1001 | PDTA114EMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=10k/10k | - | - | 172ta | - | Nxp |
| 0001 1100 | PDTA113EMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=1k/1k | - | - | 172ta | - | Nxp |
| 0001 1101 | PDTA113ZMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=1k/10k | - | - | 172ta | - | Nxp |
| 0001 1110 | PDTA114TMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1=10k | - | - | 172ta | - | Nxp |
| 0001 1111 | PDTA114YMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=10k/47k | - | - | 172ta | - | Nxp |
| 0010 0000 | PDTA115EMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=100k/100k | - | - | 172ta | - | Nxp |
| 0010 0001 | PDTA115TMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1=100k | - | - | 172ta | - | Nxp |
| 0010 0010 | PDTA123EMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=2.2k/2.2k | - | - | 172ta | - | Nxp |
| 0010 0011 | PDTA123TMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1=2.2k | - | - | 172ta | - | Nxp |
| 0010 0100 | PDTA123YMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=2.2k/10k | - | - | 172ta | - | Nxp |
| 0010 0101 | PDTA124EMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, R1/R2=22k/22k | - | - | 172ta | - | Nxp |
| 01 | RP110L091B | LVR-IC | DFN1010-4 | 9ac | LDO, 0.9V±1%, 150mA, +CE | - | - | 48vm | VR4 | Ric |
| 01 | TS4601EIJT | Lin-IC | BGA-16 | 9p | APA, 2.7..5.5V, 2x75mW(5V/16Ω), stand-by, I2C | - | - | 39 | - | Ste |
| 01 | XC6224A0917R | LVR-IC | USPN-4B02 | 9e | LDO, 0.9V±20mV, 150mA, +CE | - | 05 | 58vm | VR4 | Tor |
| 01 | XC6229D12B1R-G | LVR-IC | BGA-4 | 9ac | LDO, 1.25V±20mV, 300mA, +CE | - | 09 | 63ba* | VR4 | Tor |
| 01 | XC6420AB017R-G | LVR-IC | USPN-6 | 9ac | LDO, Dual out, Vout1/Vout2=1.20/1.20V±2%, 150mA, +CE | - | 05 | 52xv | VR19 | Tor |
| 01 | XC6420AB01DR-G | LVR-IC | USP-6B04 | 9ac | LDO, Dual out, Vout1/Vout2=1.20/1.20V±2%, 150mA, +CE | - | 05 | 73x4 | VR19 | Tor |
| 0100 1001 | PDTA123JMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, 180MHz, R1/R2=2.2k/47k | - | - | 172ta | - | Nxp |
| 011 | AP64011-GU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.3V±2%, 250mA, +CE, H-free | H22g | - | 56xv | VR19 | Anw |
| 011 | AP64011-PU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.3V±2%, 250mA, +CE | - | - | 56xv | VR19 | Anw |
| 011 | EC49222-1-FFF | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.3V±2%, 250mA, +CE, L-free | H22f | 14 | 56xv | VR19 | Ecm |
| 011 | EC49222-1-FFG | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.3V±2%, 250mA, +CE, H-free | H31 | 14 | 56xv | VR19 | Ecm |
| 0111 1011 | PDTA124TMB | Si-pnp-Digi | DFN1006B-3 | 9za | Sw, 50V, 100mA, 250mW, R1=22k | - | - | 172ta | - | Nxp |
| 012 | AP64012-GU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=1.8V/3.0V±2%, 250mA, +CE, H-free | H22g | - | 56xv | VR19 | Anw |
| 012 | AP64012-PU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=1.8V/3.0V±2%, 250mA, +CE | - | - | 56xv | VR19 | Anw |
| 012 | EC49222-2-FFF | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=1.8V/3.0V±2%, 250mA, +CE, L-free | H22f | 14 | 56xv | VR19 | Ecm |
| 012 | EC49222-2-FFG | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=1.8V/3.0V±2%, 250mA, +CE, H-free | H31 | 14 | 56xv | VR19 | Ecm |
| 013 | AP64013-GU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.0V±2%, 250mA, +CE, H-free | H22g | - | 56xv | VR19 | Anw |
| 013 | AP64013-PU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.0V±2%, 250mA, +CE | - | - | 56xv | VR19 | Anw |
| 013 | EC49222-3-FFF | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.0V±2%, 250mA, +CE, L-free | H22f | 14 | 56xv | VR19 | Ecm |
| 013 | EC49222-3-FFG | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.0V/3.0V±2%, 250mA, +CE, H-free | H31 | 14 | 56xv | VR19 | Ecm |
| 014 | EC49222-4-FFF | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=1.3V/2.8V±2%, 250mA, +CE, L-free | H22f | 14 | 56xv | VR19 | Ecm |
| 014 | EC49222-4-FFG | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=1.3V/2.8V±2%, 250mA, +CE, H-free | H31 | 14 | 56xv | VR19 | Ecm |
| 01A | AP6401A-GU | LVR-IC | UFN-6 | 9ia | LDO, Dual out, Vout1/Vout2=3.3V/3.3V±2%, 250mA, +CE, H-free | H22g | - | 56xv | VR19 | Anw |

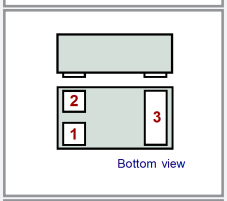


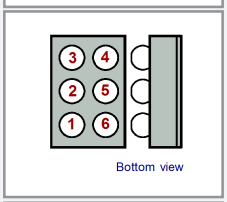
| SMD code | Type | Function | Case | Style | Short description | Atr | A.d. | Pin | Sch | Mnf |
|---|---|---|---|---|---|---|---|---|---|---|
| ZPC | XC9142F50D0R-G | DC/DC-IC | WLP-6-01 | 9ac | PWM st-up, 3.0MHz, 5.0V±2%, +CE (compl. out discon.) | H01 | 05 | 40he | DC19a | Tor |
| ZPC | XC9142F50DER-G | DC/DC-IC | USP-6C | 9ac | PWM st-up, 3.0MHz, 5.0V±2%, +CE (compl. out discon.) | H01 | 05 | 49he | DC19a | Tor |
| ZPD | XC9142F51D0R-G | DC/DC-IC | WLP-6-01 | 9ac | PWM st-up, 3.0MHz, 5.1V±2%, +CE (compl. out discon.) | H01 | 05 | 40he | DC19a | Tor |
| ZPD | XC9142F51DER-G | DC/DC-IC | USP-6C | 9ac | PWM st-up, 3.0MHz, 5.1V±2%, +CE (compl. out discon.) | H01 | 05 | 49he | DC19a | Tor |
| ZPE | XC9142F52D0R-G | DC/DC-IC | WLP-6-01 | 9ac | PWM st-up, 3.0MHz, 5.2V±2%, +CE (compl. out discon.) | H01 | 05 | 40he | DC19a | Tor |
| ZPE | XC9142F52DER-G | DC/DC-IC | USP-6C | 9ac | PWM st-up, 3.0MHz, 5.2V±2%, +CE (compl. out discon.) | H01 | 05 | 49he | DC19a | Tor |
| ZPF | XC9142F53D0R-G | DC/DC-IC | WLP-6-01 | 9ac | PWM st-up, 3.0MHz, 5.3V±2%, +CE (compl. out discon.) | H01 | 05 | 40he | DC19a | Tor |
| ZPF | XC9142F53DER-G | DC/DC-IC | USP-6C | 9ac | PWM st-up, 3.0MHz, 5.3V±2%, +CE (compl. out discon.) | H01 | 05 | 49he | DC19a | Tor |
| ZPH | XC9142F54D0R-G | DC/DC-IC | WLP-6-01 | 9ac | PWM st-up, 3.0MHz, 5.4V±2%, +CE (compl. out discon.) | H01 | 05 | 40he | DC19a | Tor |
| ZPH | XC9142F54DER-G | DC/DC-IC | USP-6C | 9ac | PWM st-up, 3.0MHz, 5.4V±2%, +CE (compl. out discon.) | H01 | 05 | 49he | DC19a | Tor |
| ZPK | XC9142F55D0R-G | DC/DC-IC | WLP-6-01 | 9ac | PWM st-up, 3.0MHz, 5.5V±2%, +CE (compl. out discon.) | H01 | 05 | 40he | DC19a | Tor |
| ZPK | XC9142F55DER-G | DC/DC-IC | USP-6C | 9ac | PWM st-up, 3.0MHz, 5.5V±2%, +CE (compl. out discon.) | H01 | 05 | 49he | DC19a | Tor |
| ZR | 74AVCH1T45FW3 | CMOS-Log | X2-DFN0910-6 | 9ij | Dual supply translating transceiver with 3-state output | - | 61 | 52 | Log95 | Di |
| ZR | XC6501D4817R-G | LVR-IC | WLP-4-01 | 9ad | LDO, 4.8V±1%, 200mA, +CE, CL, PDR | - | 05 | 63bk* | VR4 | Tor |
| ZS | XC6501D48A7R-G | LVR-IC | WLP-4-01 | 9ad | LDO, 4.85V±1%, 200mA, +CE, CL, PDR | - | 05 | 63bk* | VR4 | Tor |
| ZT | XC6501D4917R-G | LVR-IC | WLP-4-01 | 9ad | LDO, 4.9V±1%, 200mA, +CE, CL, PDR | - | 05 | 63bk* | VR4 | Tor |
| ZU | XC6501D49A7R-G | LVR-IC | WLP-4-01 | 9ad | LDO, 4.95V±1%, 200mA, +CE, CL, PDR | - | 05 | 63bk* | VR4 | Tor |
| ZV | XC6501D5017R-G | LVR-IC | WLP-4-01 | 9ad | LDO, 5.0V±1%, 200mA, +CE, CL, PDR | - | 05 | 63bk* | VR4 | Tor |
| ZVE | TS12A12511DRJ | CMOS-Log | QFN-8 | 9me | Single-pole/double-throw analog switch | - | - | 75 | Log130 | Ti |
| ZX | XC6221B48B7R | LVR-IC | USPN-4 | 9ac | LDO, 4.85V±1%, 200mA, +CE, CL | - | 05 | 58vm | VR4 | Tor |
| ZY | XC6221B49B7R | LVR-IC | USPN-4 | 9ac | LDO, 4.95V±1%, 200mA, +CE, CL | - | 05 | 58vm | VR4 | Tor |
| ZZ | NC7S86L | CMOS-Log | MicroPak-6 | 9ub | 2-input EXCLUSIVE-OR gate | - | - | 57 | Log5a | F |
| ZZ306 | XC9225G306D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.0V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ30C | XC9225G30CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.0V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ316 | XC9225G316D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.1V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ31C | XC9225G31CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.1V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ326 | XC9225G326D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.2V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ32C | XC9225G32CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.2V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ336 | XC9225G336D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.3V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ33C | XC9225G33CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.3V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ346 | XC9225G346D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.4V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ34C | XC9225G34CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.4V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ356 | XC9225G356D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.5V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ35C | XC9225G35CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.5V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ366 | XC9225G366D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.6V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ36C | XC9225G36CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.6V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ376 | XC9225G376D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.7V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ37C | XC9225G37CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.7V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ386 | XC9225G386D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.8V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ38C | XC9225G38CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.8V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ396 | XC9225G396D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.9V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ39C | XC9225G39CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.9V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3A6 | XC9225G3A6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.05V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3AC | XC9225G3ACD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.05V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3B6 | XC9225G3B6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.15V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3BC | XC9225G3BCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.15V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3C6 | XC9225G3C6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.25V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3CC | XC9225G3CCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.25V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3D6 | XC9225G3D6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.35V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3DC | XC9225G3DCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.35V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3E6 | XC9225G3E6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.45V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3EC | XC9225G3ECD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.45V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3F6 | XC9225G3F6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.55V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3FC | XC9225G3FCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.55V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3H6 | XC9225G3H6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.65V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3HC | XC9225G3HCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.65V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3K6 | XC9225G3K6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.75V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3KC | XC9225G3KCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.75V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3L6 | XC9225G3L6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.85V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3LC | XC9225G3LCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.85V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3M6 | XC9225G3M6D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 3.95V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ3MC | XC9225G3MCD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 3.95V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ406 | XC9225G406D | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 600kHz, 4.0V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |
| ZZ40C | XC9225G40CD | DC/DC-IC | USP-6B | 9b | PWM st-dwn, 1.2MHz, 4.0V±1%, 900mA, +CE, PDR | - | 09 | 49dc5 | DC1 | Tor |

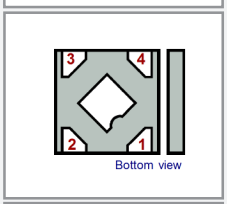


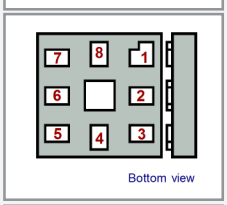
## SECTION 2
## Conventional case drawings. Pin assignment

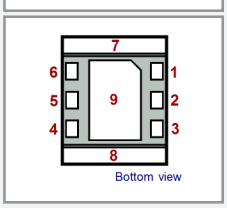


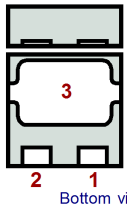



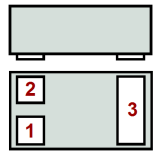





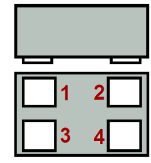
Bottom view

17



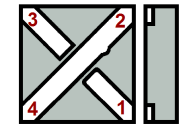
Bottom view

22



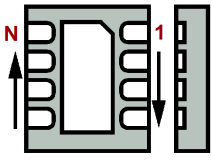
Bottom view

31



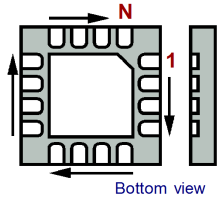
Bottom view

36



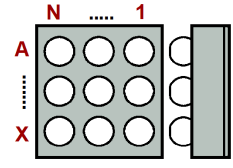
Bottom view

37



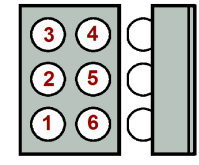
Bottom view

38



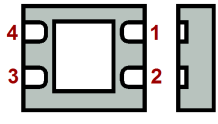
Bottom view

39



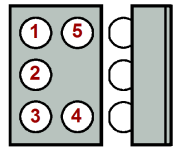
Bottom view

40



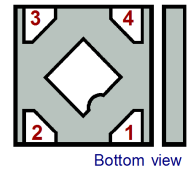
Bottom view

45



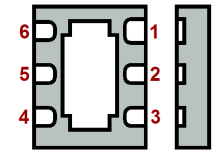
Bottom view

46



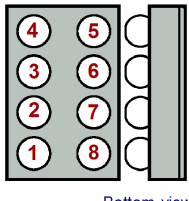
Bottom view

48



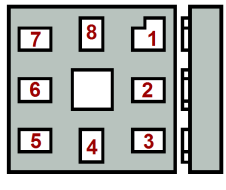
Bottom view

49



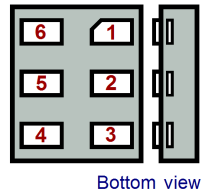
Bottom view

50



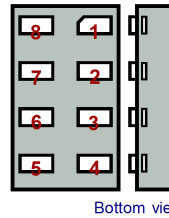
Bottom view

51



Bottom view

52



Bottom view

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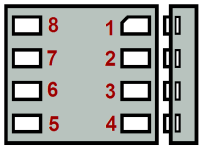
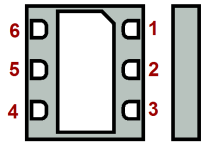


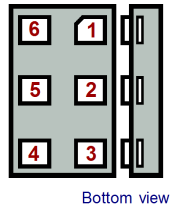
Bottom view

54



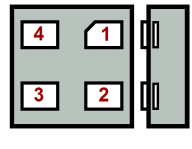
Bottom view

56



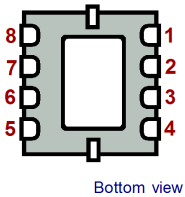
Bottom view

57



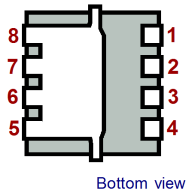
Bottom view

58



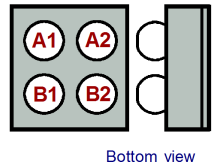
Bottom view

61



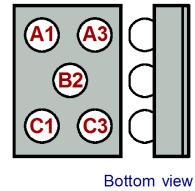
Bottom view

62



Bottom view

63



Bottom view

64

SECTION 3

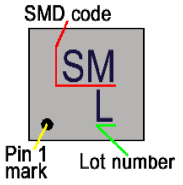
# Pinout (table)

| | PIN 1 | PIN2 | PIN3 | PIN4 | PIN5 | PIN6 | PIN7 | PIN8 |
|---|---|---|---|---|---|---|---|---|
| a0 | GND | Output | Vcc | +Input | -Input | - | - | - |
| a1 | GND | GND | Input | GND | GND | Vcc/Output | - | - |
| a2 | N/C | Anode | Cathode | N/C | Adjust | - | - | - |
| a3 | CE | GND | Vinput | Voutput | Adjust | N/C | - | - |
| a4 | CE | Vinput | Voutput | Switch | GND | Feedback | - | - |
| a5 | No data. | See datash. | See sch | - | - | - | - | - |
| a7 | CE | GND | SSC | Vinput | Voutput | - | - | - |
| a8 | Test | GND | Tdet | N/C | Vcc | - | - | - |
| a9 | Tdet | GND | Test | Vcc | - | - | - | - |
| aa | Input | GND | Vcc/Output | GND | - | - | - | - |
| aa* | A1=CE/MODE | A3=Voutput | B2=Lx | C1=Vinput | C3=GND | - | - | - |
| ab | Input | GND | GND | Output | GND | Vcc | - | - |
| ab* | A1=CE/MODE | A3=Feedb. | B2=Lx | C1=Vinput | C3=GND | - | - | - |
| ac | Vcc | GND | Input | GND | GND | Output | GND | GND |
| ac* | A1-CE | A2=Vinput | B1=GND | B2=Voutput | - | - | - | - |
| ad | Input | GND | Vcc | Output | GND | - | - | - |
| ae | Input | Vcc | GND | Output | GND | GND | - | - |
| af | N/C | Vinput | N/C | GND | N/C | Voutput | N/C | N/C |
| ag | Contact | Contact | N/C | - | - | - | - | - |
| ah | Emitter | Emitter | Base | Emitter | Emitter | Collector | - | - |
| ai | GND | Vcc | Input | Output | - | - | - | - |
| aj | GND | Vcc/Vout | GND | Input | - | - | - | - |
| ak | N/C | Cathode | Anode | - | - | - | - | - |
| am | Vcc/Output | GND | Input | GND | - | - | - | - |
| an | Output | GND | Input | Vcc | GND | - | - | - |
| ao | Cath.(Anode) | N/C | Cath.(Anode) | An.(Cath.) | - | - | - | - |
| ap | Cathode | N/C | Cathode | Anode | - | - | - | - |
| aq | Contact | N/C | Contact | - | - | - | - | - |
| ar | Contact | Contact | - | - | - | - | - | - |
| as | Emitter | Emitter | N/C | Base | Collector | Collector | Collector | Collector |
| at | Cathode | Gate | Anode | - | - | - | - | - |
| au | CE | SS | Voutput | Vinput | GND | Vbias | - | - |
| av | Vbias | GND | Vinput | Voutput | SS | CE | - | - |
| aw | CE | Ilim | Voutput | Vinput | GND | Vbias | - | - |
| ax | Vbias | GND | Vinput | Voutput | Ilim | CE | - | - |
| ax* | A1=CE1 | A2=Voutput1 | B1=GND | B2=Vinput | C1=CE2 | C2=Voutput2 | - | - |
| ay* | A1=Voutput2 | A2=Vcc | A3=Voutput1 | B1=CE2 | B2=GND | B3=CE1 | - | - |
| az | Vinput | N/C | Voutput | N/C | N/C | N/C | GND | CE |
| b0 | IN1 | POS | Vin | Vout | CE | GND | IN2 | NEG |
| b1 | Terminal | Gate | Terminal | - | - | - | - | - |
| ba | Anode/Cath. | Anode/Cath. | - | - | - | - | - | - |
| ba* | A1=GND | A2=Voutput | B1=CE | B2=Vinput | - | - | - | - |
| bb | Cathode1 | Cathode2 | Cathode3 | Anode3 | Anode2 | Anode1 | - | - |
| bb* | A1=GND | A2=CE | B1=Voutput | B2=Vinput | - | - | - | - |
| bc* | A1=Vinput | A2=Voutput | B1=CE | B2=GND | - | - | - | - |
| bd | Cathode | Cathode | Anode | - | - | - | - | - |
| bd* | A1=GND | A2=Vcc | B1=Reset | B2=MR | - | - | - | - |
| be* | A1=CE | A3=Cb | B2=GND | C1=Voutput | C3=Vinput | - | - | - |
| bf* | A1=Output L | A2=GND | A3=Output R | B1=Input L | B3=Input R | C1=Shutdown | C2=Vcc | C3=Cext |
| bg | Cathode1 | Cathode2 | Anode2 | N/C | Anode1 | - | - | - |
| bg* | A1=Voutput | A2=Vinput | B1=Adj | B2=CE | C1=GND | C2=Vbias | - | - |
| bh | Anode1 | Com. Cath. | Anode2 | Anode3 | Anode4 | - | - | - |
| bh* | A1=GND | A3=CE | B2=Cb | C1=Voutput | C3=Vinput | - | - | - |
| bi | Anode | Cathode | Anode | Anode | Cathode | Anode | - | - |
| bj* | A1=Voutput | A2=Vinput | B2=GND | C1=CE | C2= Vbias | - | - | - |
| bk* | A1=Voutput | A2=Vinput | B1=GND | B2=CE | | | | |
| bm1 | N/C | Cout | Dout | GND | V+ | V- | - | - |
| bm2 | V- | V+ | GND | Dout | Cout | - | - | - |
| bn | OVP | Vinput | CE | A GND | N/C | Feedback | Switching | P GND |
| bp | Cathode | Cathode | Anode | Anode | Cathode | Cathode | - | - |
| bq | GND | Voutput | L x | - | - | - | - | - |
| br | GND | Voutput | Ext | - | - | - | - | - |

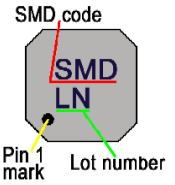
SECTION 4

# BGA and DFN cases SMD-code marking style

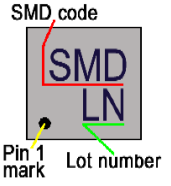
**9aa**



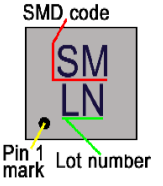

**9ab**



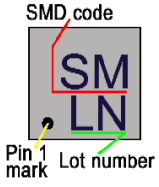

**9ac**



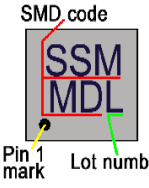

**9ad**




**9ae**

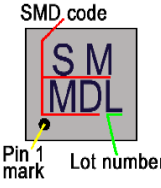



**9b**

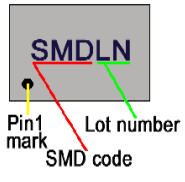



**9ba**

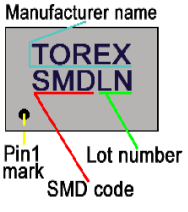
**9bb**



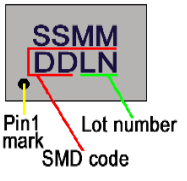

**9c**



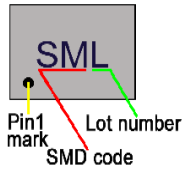

**9ca**



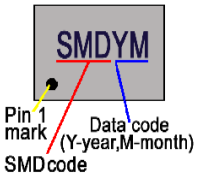

**9cb**



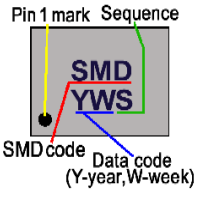

**9cd**



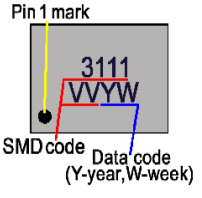

**9d**



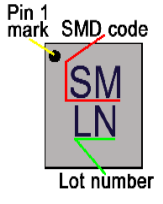

**9da**



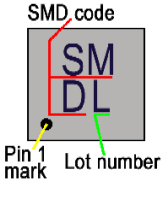

**9db**



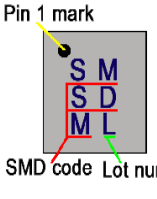

**9e**



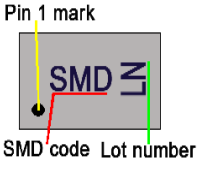

**9ea**




**9f**

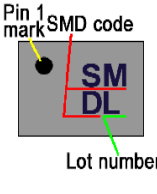



**9g**

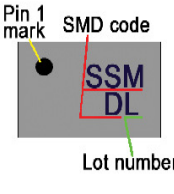



**9h**

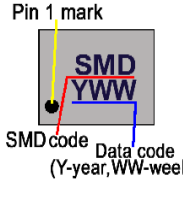
**9ha**



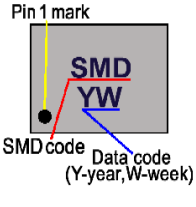

**9hb**




**9i**



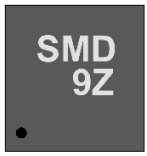

**9ia**



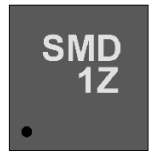
SECTION 5

# BGA and DFN cases SMD-code atribute

H01

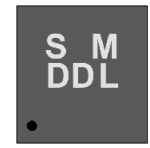



H02



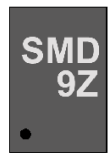

H03

H04




H05

H06



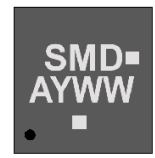

H07

H08

H09

H10

H11

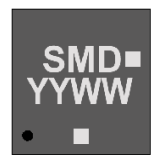



H12

H13

H14

H15




H16

H16a

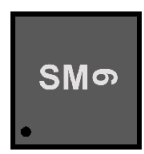
H16b

H17

H18

H19

H20




H21

H22

SECTION 6

# Additional production data info

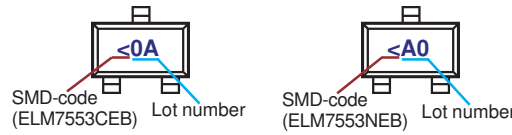
Besides SMD code, the manufacturers can place additional information such as internal production lot number, traceability code, data of production, assembly location etc. The adittional info is an arbitral position and arbitral content (depending of the manufacturer) and can be alphanumeric symbol (symbols) or graphic symbol.

Below we present some additional info.

## Lot number.

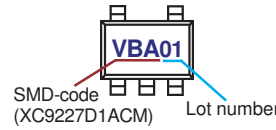
Manufacturer: Elm (ELM Technology Corporation):
Rules 1 (for ODO voltage detectors)
Symbol 1 - A to Z(I, O, X excepted)
Symbol 2 - 0 to 9
Rules 2 (for PPO voltage detectors)
Symbol 1 - 0 to 9
Symbol 2 - A to Z(I, O, X excepted)

Marking example:



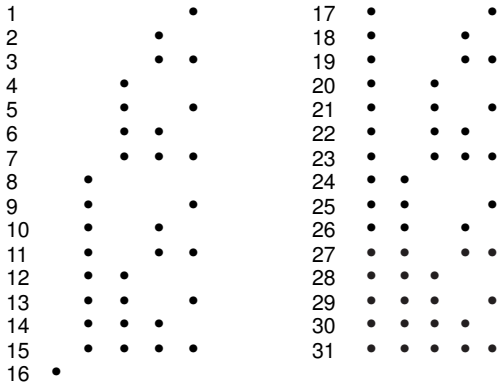

Manufacturer: Tor (Torex Semiconductor LTD):
01~09, 0A~0Z, 11~9Z, A1~A9, AA~AZ, B1~ZZ repeated,
(G, I, J, O, Q, W excluded.) * No character inversion used.

Marking example:

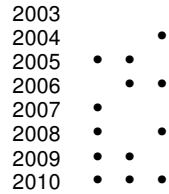



## Production data

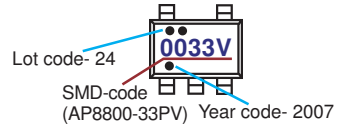
Manufacturer: Anw (Anwell Semiconductor Corp.)
Dot above product code: Lot Code:




Dot under product code: Year Code:



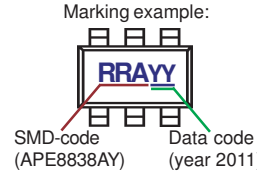

Marking example:




Manufacturer: Ape (Advanced Power Electronics Corp.)

| Code | Year |
|---|---|
| YY | 2004, 2008, 2012 |
| YY | 2003, 2007, 2011 |
| YY | 2002, 2006, 2010 |
| YY | 2001, 2005, 2009 |

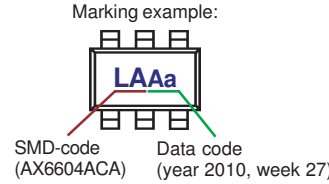
Marking example:




Manufacturer: Axl (AXElite Technology Co., Ltd)

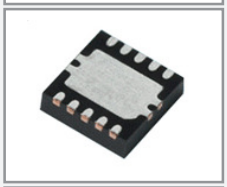
| Code | Year | Code | Week |
|---|---|---|---|
| 7 | 2007 | A...Z | 1...26 |
| 8 | 2008 | a...z | 27...52 |
| 9 | 2009 | | |
| A | 2010 | | |
| B | 2011 | | |
| C | 2012 | | |

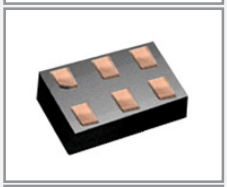
Marking example:

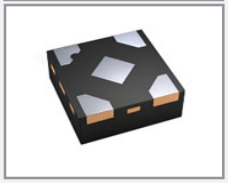



Manufacturer: Di (Diodes Inc.)
Y : Year : 0~9XXX
W : Week : A~Z : 1~26 week; a~z : 27~52 week; z represents 52 and 53 week

## SECTION 7
## Case drawings







ADFN1.5x1.5-6

BGA-4
BGA-4A
CB4-3

BGA-5

BGA-6

BGA-8

BGA-8A

BGA-9

BGA-10

BGA-12

BGA-14

BGA-15

BGA-16

BGA-18

BGA-20

BGA-24

BGA-25

BGA-29

BGA-30

BGA-36

BGA-42

BGA-48

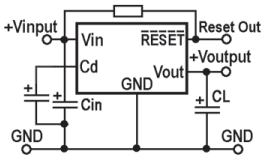
BGA-49

CL-2025
CL-2025-03

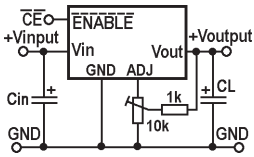
CP-6-3

SECTION 8

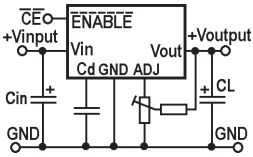
# Sample schematic diagram



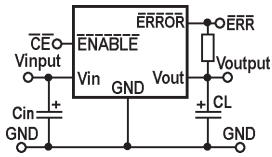

VR15b



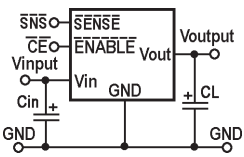

VR16



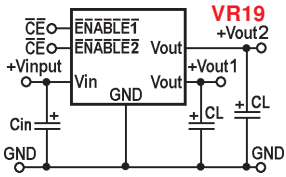

VR16a



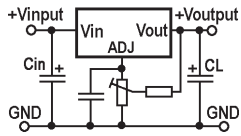

VR17




VR18




VR19

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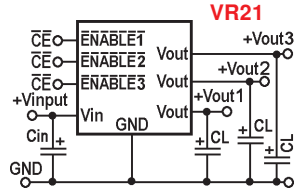


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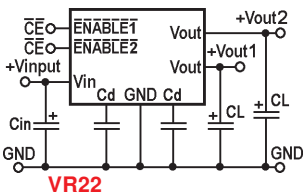
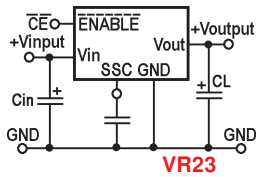
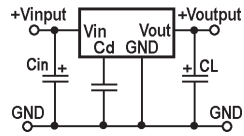


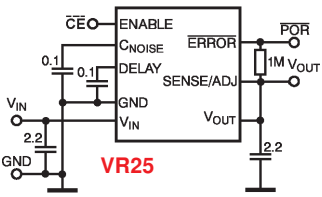

VR22



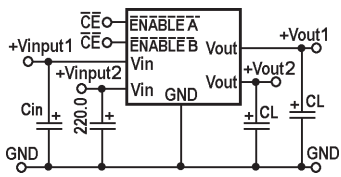

VR23




VR24




VR25

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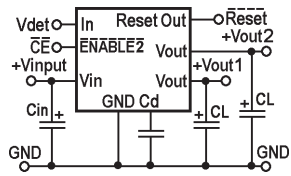
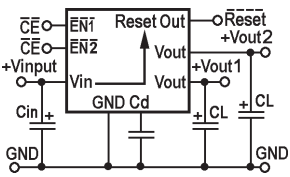
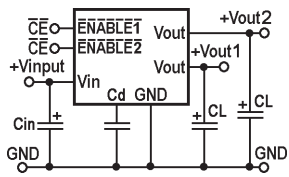


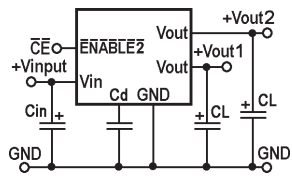

VR27




VR28




VR29

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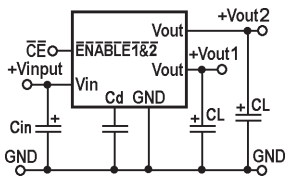
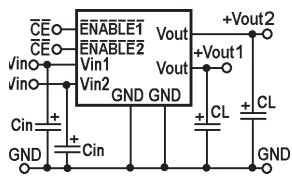



VR31

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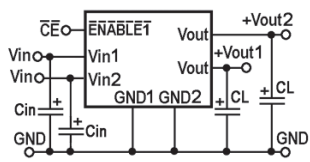


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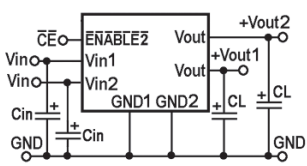


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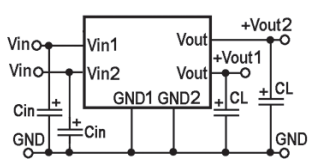


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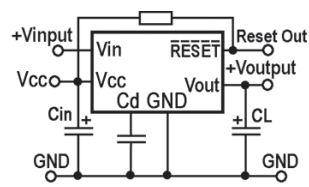


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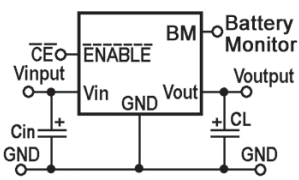


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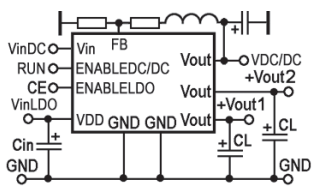
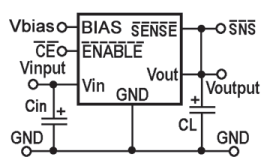



VR38




VR39

## SECTION 9
## Manufacturers name, logo and web page URL

**Aat- Advanced Analog Technology**
*http://www.aatech.com.tw/index.aspx*

**Abl- ABLIC Inc.**
*https://www.ablicinc.com/en/semicon/*

**Ad- Analog Devices**
*http://www.analog.com*

**Adt- ADDtek**
*http://www.addmtek.com/Index.htm*

**Afs- Analog Future Chip Co., Ltd.**
*http://www.afsemi.com/*

**Agi- Agilent Technologies**
*www.semiconductor.agilent.com*

**Aic- Analog Integrations Corporation**
*http://www.analog.com.tw*

**Ali- Alliance Semiconductor**
*http://www.alsc.com*

**All- Allegro MicroSystems Inc.**
*http://www.allegromicro.com*

**Alt- Aolittel Technology Co., Ltd**
*http://www.aolittel.com*

**Ame- AME, Inc.**
*www.ame.com.tw*

**Ams- AMOS Technology Limited**
*http://www.amos-tech.com*

**Amz- Amazing Microelectronic**
*http://www.amazingIC.com*

**Ana- Anachip Corp.**
*www.anachip.com.tw*

**Anb- Anbon Semiconductor Co., Ltd.**
*http://www.anbonsemi.com*

**Anp- Anpec Electronics Corp.**
*www.anpec.com.tw*

**Ans- AnaSem Inc.**
*http://www.anasem.net/*

**Ant- Advanced Analogic Technologies, Inc.**
*http://www.analogictech.com*

**Anv- Anova Technologies Co. Ltd**
*http://anova-semi.com/*

**Anw- Anwell Semiconductor Corp.**
*http://www.ansc.com.tw/*

**Aom- Alpha & Omega Semiconductor**
*http://www.aosmd.com/*

**Yea- Yeashin.Technologogy Co., Ltd**
*http://www.yeashin.com/*

**Yen- Yenyo Technology Co., Ltd.**
*http://www.yenyo.com.tw/*

**Ynt- Yint Electronics Co., Ltd.**
*http://www.yint.com.cn*

**Zbo- Zibo Micro Commercial Components Corp.**
*http://www.zbmcc.com/en/*

**Zbs- Zhide Electronics Co., Ltd**
*http://www.senocn.com/*

**Zhd- Zibo Seno Electronic Engineering Co., Ltd.**
*http://www.cz-zhide.com/*

**Zlg- Zilog, Inc.**
*http://www.zilog.com/*

**Zow- Zowie Technology Corporation**
*http://www.zowie.com.tw/*

**Zx- Zetex plc.**
*http://www.zetex.com*

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Chisinau, © 2024-2025 edition