

SMD-codes

DATABOOK

SMD-codes

Active SMD semiconductor components
marking codes



- 405.000 SMD-codes for active semiconductor components:
- Diodes, Transistors, Thyristors, Integrated Circuits
- Case pin assignment
- Pinout
- Marking style
- Schematic diagram
- Additional SMD info
- Case drawings
- Manufacturers

2019 EDITION



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ELECTRONICS

COMPONENTS

Active SMD components marking codes

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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 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")	LVR/Vdet-IC	Linear voltage regulator/Voltage detector combined integrated circuit
Column 2 ("Type")	MMIC	Monolithic Microwave Integrated Circuit
The type designations correspond to those of the respective manufacturer documentations.	-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
	PHEMT	Pseudomorphic high electron mobility transistors
Column 3 ("Function")	PIN-diode	PIN-diode
Short definition of the semiconductor component.	SA-Z-diode	Surge Absorption Zener diode
Used abbreviations:	Si-diode	Silicon diode
BM-IC	Si-Varistor	Silicon voltage depending resistor
Battery Management integrated circuit	Si-npn	Silicon npn transistor
BR	Si-n/p	Silicon npn and pnp transistors area
Bridge Rectifier	Si-npn-Darl	Silicon npn Darlington transistor
C-diode	Si-npn-Digi	Silicon npn "digital" transistor
Capacitance diode (varactor, varicap)	Si-npn-Digi+Di	Silicon npn "digital" transistor with internal diode
CMOS-Log	Si-pnp	Silicon pnp transistor
CMOS logic integrated circuit	Si-pnp-Darl	Silicon pnp Darlington transistor
Comp-IC	Si-pnp-Digi	Silicon pnp "digital" transistor
Voltage comparator integrated circuit	Si-pnp-Digi+Di	Silicon pnp "digital" transistor with
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		
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		

SiC-diode	internal diode
SiGe-npn	Silicon Carbide diode
Si-Stab	Silicon/Geramanium npn transistor
SVR-IC	Silicon stabistor
Tdet-IC	Switching Voltage Regulator integrated circuit
Thy-SCR	Thermal detector integrated circuit
Thy-SPD	Thyristor-controlled rectifier
Triac	Thyristor-surge protector device
TVS	Triode for alternating current
Vdet-IC	Transient voltage suppressor
Vref-IC	Voltage Detector integrated circuit
Z-diode	Voltage Reference integrated circuit
	Zener diode
Column 4 ("Short description")	
Short data or description of function of each type.	
Used abbreviations:	
Adj.	Adjust, adjustable
AF	Audio Frequency
AGC	Automatic Gain Control
ALC	Automatic Level Control
AM	Amplitude Modulation (AM range)
Amp	Amplifier
Ant	Antenna
Att	Attenuator
Aval	Avalanshe
Disc.	Internal CL discharge
BTL	Bridge Tied Loads
Buff	Buffer
CATV	Broad band cable amplifier
+CE	Active HIGH Chip Enable
-CE	Active LOW Chip Enable
Cell	Cellular
CL	Internal CL discharge resistor
Contr	Controlled
Conv	Converter
Cordl	Cordless
Det	Detector
DG	Dual Gate
Diff	Differential
Dr, Drv	Driver
EN	Enable
Ext.	External
FM	Frequency Modulation (FM range)
GaAs	Gallium arsenide
GP	General Purpose Applications
HF	High Frequency
HFr	Halogen-free
Hi-sp	High-speed
HSST	High-Speed Soft-Start
HV	High Voltage
I2C	I2C interface control
I2S	I2S interface
ICP	Inrush Current Protection
Instrum.	Instrumental
Latch-Pr.	Latch-Protection
LDO	Low drop voltage
LED	Light-emitting diode
LFr	Lead-free
LLS	Logic Level Shifter
LN	Low Noise
LogL	Logic Level ($U_{th} > 0,8\ldots 2V$)
Lo-sat	Low collector-emitter saturation voltage
LSST	Low-Speed Soft-Start
Mix	Mixer
MR	Manual Reset
OCL	Output Current Limiter
ODO	Open Drain Output
OCO	Open Collector Output
OVin	Over Voltage Rest Input (negative)
OVP	Over Voltage Protection
Osc	Oscillator
Out	Output
OV	Latched OverVoltage function
PA	Power Amplifier
PAD	Pico-Amper Diode
PCA	Pulse Current Amplitude modulation
PDR	Internal pull-down resistor
PFM	Pulse-frequency modulation
Pow	Power
PPO	Push-Pull Output
PSM	Pulse-skip modulation
PUR	Internal pull-up resistor
PWM	Pulse-width modulation
Rect.	Rectifier
Reg.	Regulated
Res.	Resistor
Reset-Pr.	Reset-Protection
RF	Radio Frequency applications
Rt	Reset delay time
SBD	Schottky Barrier Diode
SBR	Schottky Barrier Rectifier Diode
SPI	SPI interface
SS	Soft start
St-dwn	Step-down
St-up	Step-up
Supress.	Suppressor
Sw.	Switching
TMBSR	Trench MOS Barrier Schottky Rectifier
T-MOS	Trench-FET MOSFET
Trd	Time Reset Delay
Tun	Tuner
U-Speed	Ultra-speed
UHF	RF applications (>250 MHz)
ULN	Ultra Low-Noise
UV	Latched OverVoltage function
UVLO	Under voltage lock output
Var	Variable
VCO	Voltage controlled oscillator
VDet	Voltage Detector
Vdi	Input voltage detection
Vdo	Output voltage detection
VHF	RF applications (100...250MHz)
VFM	Voltage-Frequency Modulation
Vid	Video output stages
V-MOS	Vertical Metal Oxide Semiconductor
VR	Voltage Regulator
WB	Wide Band
WD	Watch-Dog Timer

Column 5 ("Case") Manufacturers case designation
(section 18).

Column 6 ("Sch") Sample schematic connection for some ICs. All drawings are placed in the section 16.

Column 7 ("St") "Style" (uppercase placement of the SMD-code and additional infomation drawing). All styles are placed in the section 15.

Column 8 ("Atr")

Additional SMD-codes attribute such as subscript bar, uperscript bar, reverse symbol and other (section 14).

Column 9 ("Ad")

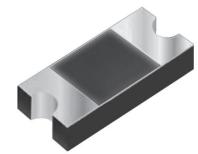
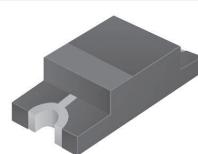
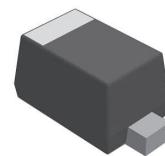
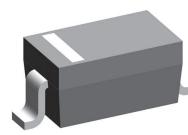
Additional information such as year, month, week or lot number designation (section 17).

Column 10 ("Pin") Related case pin assignments and pinout (section 12, 13).

Column 11 ("Mnf")

The names of the manufacturer are abbreviated to save space. The complete name, logos, and URL of each manufacurer is listed alphabetically on section 19.

SECTION 1
2-pin case SMD semiconductor components

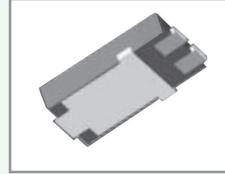
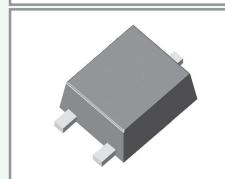
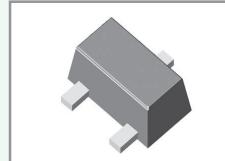
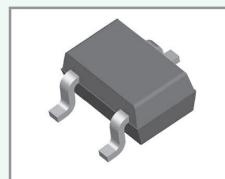


SECTION 2

SOD-80 (MELF) case SMD semiconductor components



SECTION 3
3-pin case SMD semiconductor components



SECTION 4

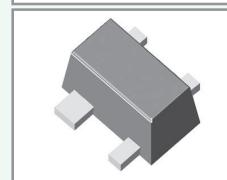
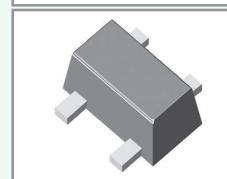
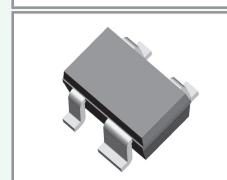
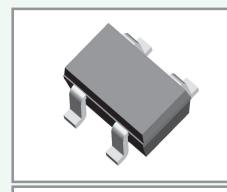
SOT-223 case SMD semiconductor components



SECTION 5
SOT-89 case SMD semiconductor components

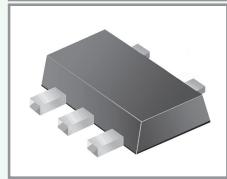
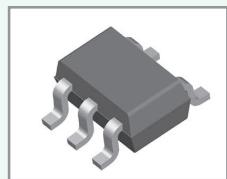


SECTION 6
4-pin case SMD semiconductor components

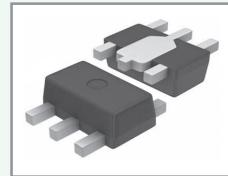


SECTION 7

5-pin case SMD semiconductor components

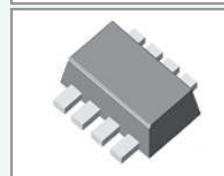
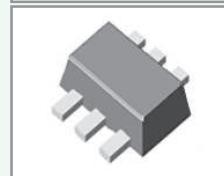


SECTION 8
SOT-89-5 case SMD semiconductor components



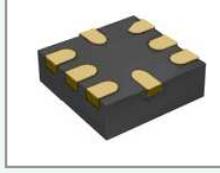
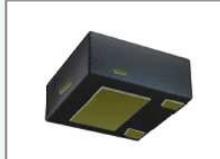
SECTION 9

6 and more pin case SMD semiconductor components



SECTION 10

BGA, DFN and QFN case SMD semiconductor components



SECTION 11

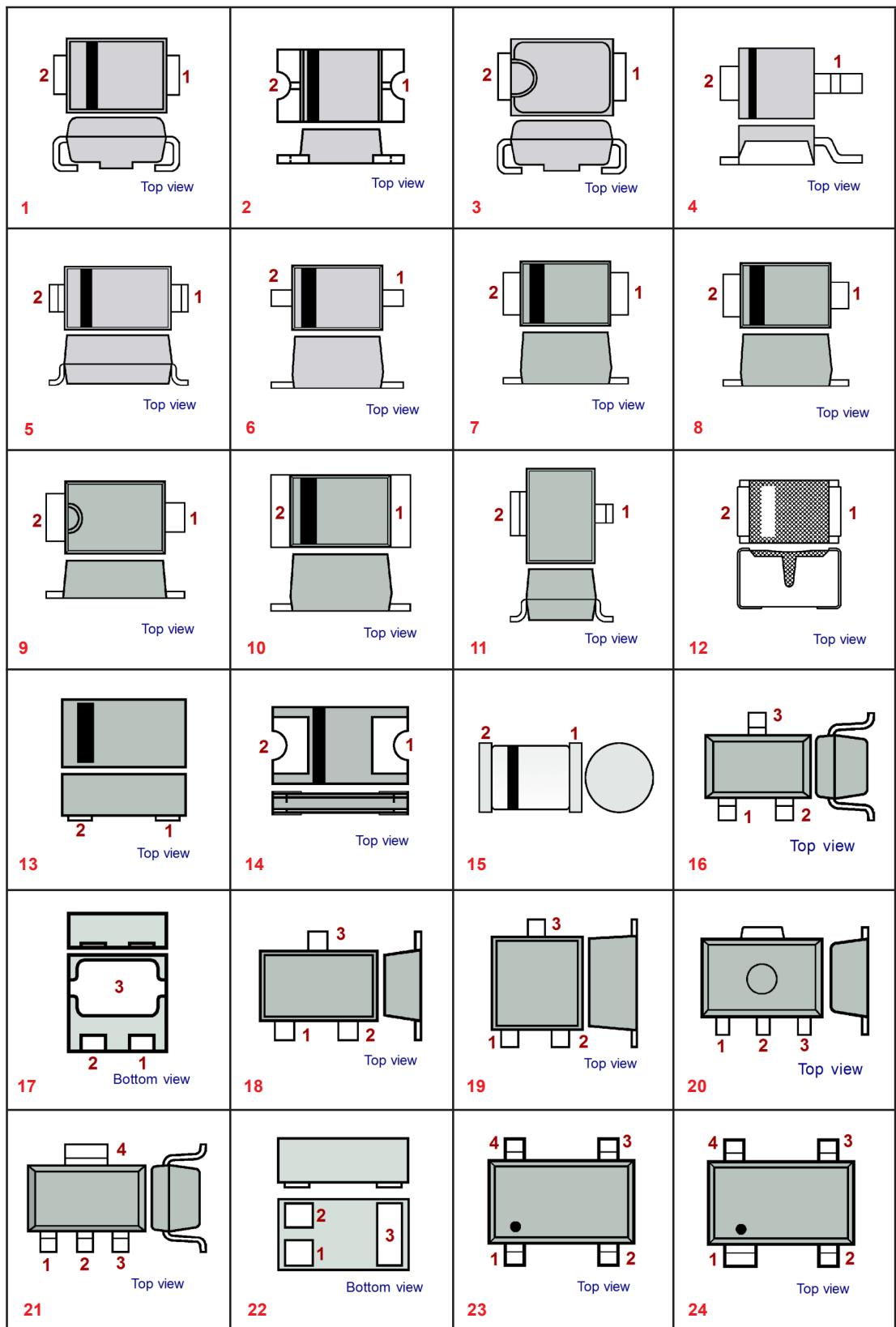
D-PAK and I-PAK case SMD semiconductor components



SECTION 12

Conventional case drawings. Pin assignment





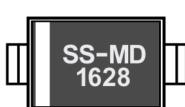
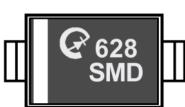
SECTION 13
Pinout (table)



	PIN 1	PIN2	PIN3	PIN4	PIN5	PIN6	PIN7	PIN8
a0	GND	Output	Vcc	+Input	-Input	-	-	-
a1	GND	GND	Input	GND	GND	Vcc/Out	-	-
a2	N/C	Anode	Cathode	N/C	Adjust	-	-	-
a3	OE	GND	Vinput	Voutput	Adjust	N/C	-	-
a4	OE	Vinput	Voutput	Switch	GND	Feedb.	-	-
a5	No data	See dsc.	-	-	-	-	-	-
a6	See sch	See dsc.	-	-	-	-	-	-
a7	OE	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=Vout	Lx	C1=Vinput	C3=GND	-	-	-
ab	Input	GND	GND	Output	GND	Vcc	-	-
ab*	A1=CE/MODE	A3=Feedb.	Lx	C1=Vinput	C3=GND	-	-	-
ac	Vcc	GND	Input	GND	GND	Output	GND	GND
ad	Input	GND	Vcc	Output	GND	-	-	-
ae	Input	Vcc	GND	Output	GND	GND	-	-
af	N/C	Vinput	N/C	GND	N/C	Vout	N/C	N/C
ag	Contact	Contact	N/C	-	-	-	-	-
ah	Emitter	Emiter	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)	Anode(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	OE	SS	Voutput	Vinput	GND	Vbias	-	-
av	Vbias	GND	Vinput	Voutput	SS	OE	-	-
aw	OE	llim	Voutput	Vinput	GND	Vbias	-	-
ax	Vbias	GND	Vinput	Voutput	llim	OE	-	-
ay	A1=Vout2	A2=Vcc	A3=Vout1	B1=CE2	B2=GND	B3=CE1	-	-
ba	An/Cath.	An/Cath.	-	-	-	-	-	-
ba*	A1=GND	A2=Vout	B1=CE	B2=Vin	-	-	-	-
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	Vcc	Reset	MR	-	-	-	-
be*	A1=CE	A3=Cb	B2=GND	C1=Vout	C3=Vinput	-	-	-
bf*	A1=Out L	A2=GND	A3=Out R	B1=In L	B3=In R	C1=Shutdn	C2=Vcc	C3=Cext
bg	Cathode1	Cathode2	Anode2	N/C	Anode1	-	-	-
bg*	A1=GND	A2=CE	B1=Voutput	B2=Vinput	-	-	-	-
bh	Anode1	Common 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	-	-	-
bm1	N/C	Cout	Dout	GND	V+	V-	-	-
bm2	V-	V+	GND	Dout	Cout	-	-	-
bn	OVP	Vinput	OE	A GND	N/C	Feedback	Switch.	P GND
bp	Cathode	Cathode	Anode	Anode	Cathode	Cathode	-	-
bq	GND	Voutput	Lx	-	-	-	-	-
br	GND	Voutput	Ext	-	-	-	-	-
bs	Anode1	Com. Cath.	Anode2	Com. Cath.	-	-	-	-
bt	Cathode1	N/C	Cathode2	Com Anode	-	-	-	-
bu	Anode1	N/C	Anode2	Com Cath.	-	-	-	-
bv	Anode1	N/C	Cathode2	Cath.1/An2	-	-	-	-
bw	Anode1	Com Cath.	Anode2	Anode3	Com Cath.	Anode4	-	-

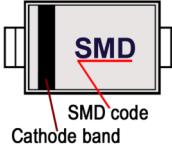
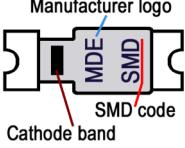
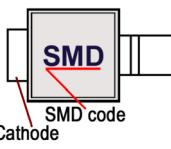
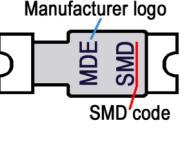
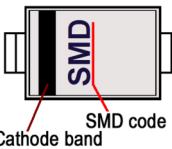
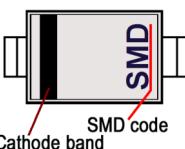
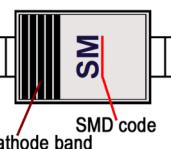
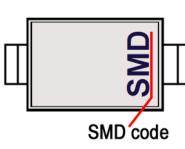
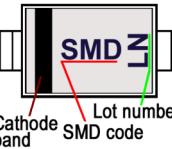
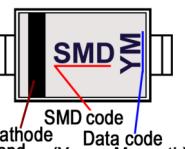
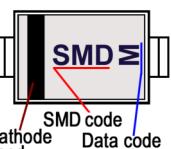
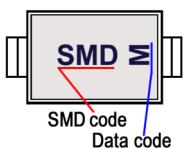
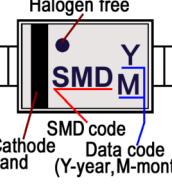
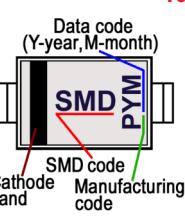
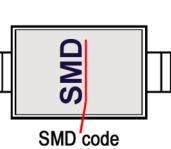
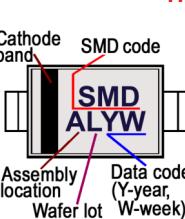
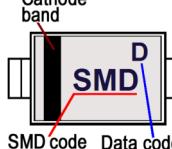
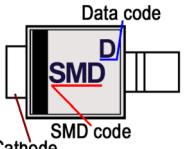
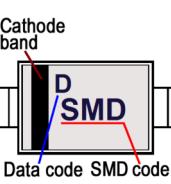
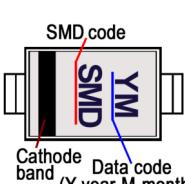
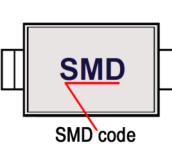
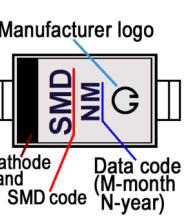
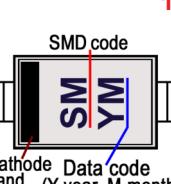
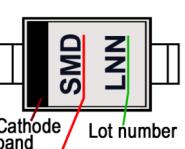
SECTION 14
SMD-code marking attribute



 A02a	 A02b	 A02c	 A02d
 A02e	 A02f	 A02g	 A02h
 A02i	 A02j	 A02k	 A02m
 A02n	 A03a	 A04a	 A04b
 A04c	 A04d	 A04e	 A04f
 A05	 A06a	 A06b	 A06c

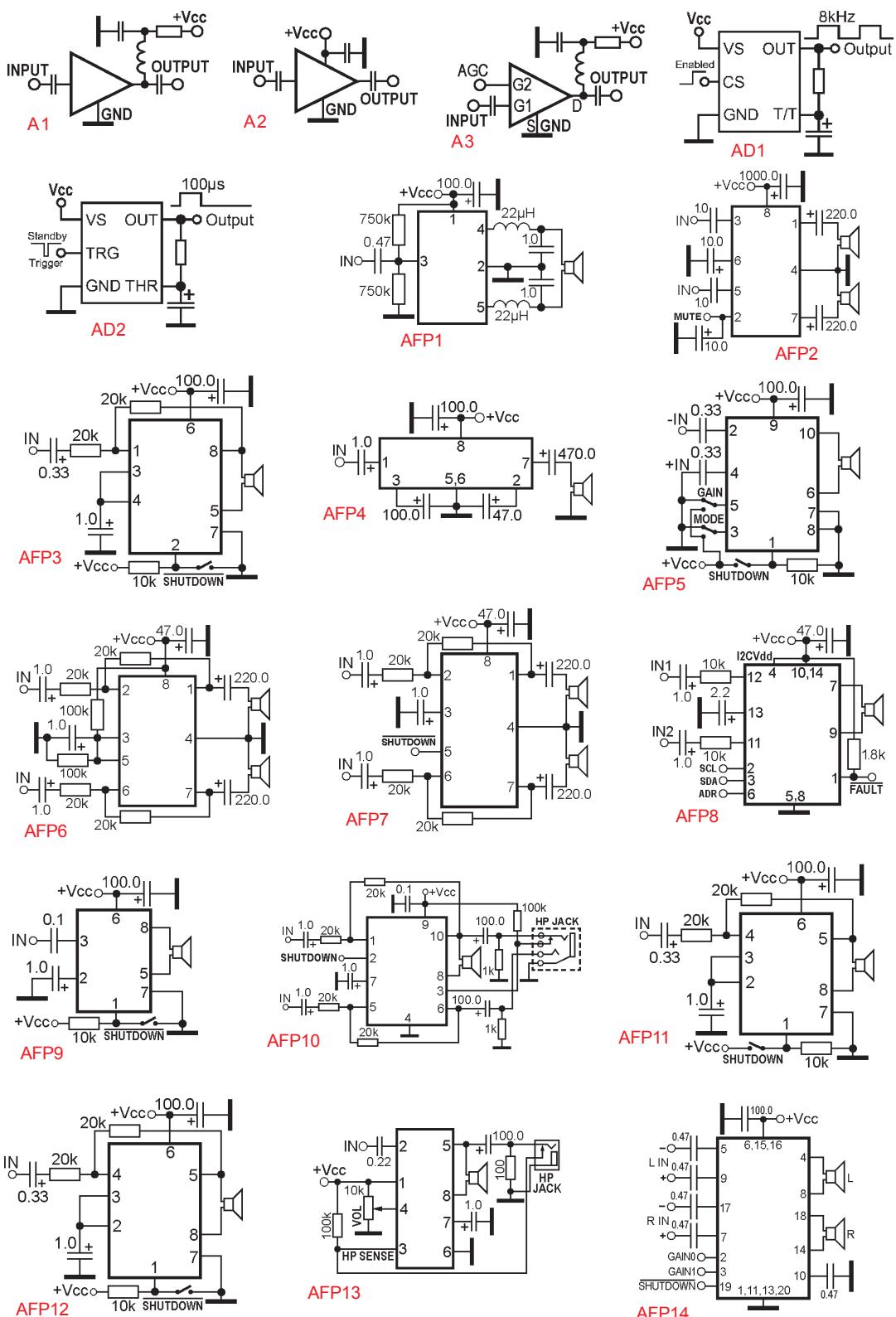
SECTION15
SMD-code marking style



1a	1ab	1ac	1ad
 Cathode band SMD code	 Manufacturer logo Cathode band SMD code	 Cathode SMD code	 Manufacturer logo SMD code
1b	1ba	1bb	1bc
 Cathode band SMD code	 Cathode band SMD code	 Cathode band SMD code	 SMD code
1c	1d	1da	1db
 Cathode band SMD code Lot number	 Cathode band SMD code Data code (Y-year, M-month)	 Cathode SMD code Data code (M-month)	 SMD code Data code (M-month)
1dc	1dd	1e	1f
 Halogen free Cathode band SMD code Data code (Y-year, M-month)	 Data code (Y-year, M-month) Cathode band SMD code Manufacturing code	 Cathode SMD code	 Cathode band SMD code Assembly location Wafer lot Data code (Y-year, W-week)
1g	1ga	1h	1i
 Cathode band SMD code Data code	 Data code Cathode SMD code	 Cathode band Data code SMD code	 SMD code Cathode band Data code (Y-year, M-month)
1j	1k	1ka	1kc
 SMD code	 Manufacturer logo Cathode band SMD code Data code (M-month, N-year)	 Cathode band Data code (Y-year, M-month)	 Cathode band SMD code Lot number

SECTION 16
Sample schematic diagram



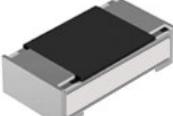
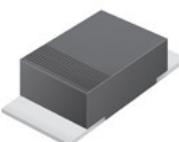
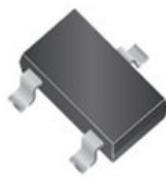
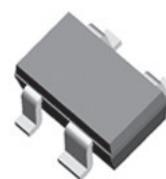


SECTION17
Additional SMD info



SECTION 18
Case drawings



			
0402 0503 1005 0603 SOD-723F	0402S 0805S 0503S 1206S	0805 1206	1408
			
1607 SMA SMA-1	1F 2F 3-4D1A	1F1A SOD-123 SOD-323	2025 CP CPH3
			
2-2H1A 2-2H1B SC-89-3	2-2K1A 2-2K1B	2-3JIA 2-3JIB	403 403-01 403B-01 403A 403C 403A-03 403D-2
			
BGA-4 CB4-3 UCSP-4	BGA-5 WCSP-5	BGA-6 μBGA-6 WCSP-6	BGA-8 MBGA-8 μBGA-8 WCSP-8
			
BGA-8A	BGA-9	BGA-10	BGA-12
			
BGA-14	BGA-15	BGA-16	BGA-18



SECTION 19
Manufacturers logos and URL





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



Ad- Analog Devices
<http://www.analog.com>



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



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>



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



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



Ans- AnaSem Inc.
<http://www.anasem.net/>



Ant- Advanced Analogic Technologies, Inc.
<http://www.analogitech.com>



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



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



Aot- IRICO AOTOM (Hong Kong) Holdings Co., Ltd.
<http://www.aotom.com>



Ape- Advanced Power Electronics Corp.
<http://www.a-power.com.tw/index.aspx>



Ask- AKM Semiconductor Inc.
<http://akm.com/index.asp>



Asm- Austria Microsystems AG
<http://www.austriamicrosystems.com>



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<http://www.turuta.md>