

SMD Resistor Coding

SMD Resistors are usually coded with a numerical equivalent of the familiar three band colour code. In the same way as wire ended components, precision resistors (1% or better) may be marked with a four digit code.

The first two (or 3) digits are the first two (or 3) digits of the resistance in ohms, and the third(or 4th) is the number of zeros to follow - the 'multiplier'.

Resistances of less than 10 ohms have a 'R' to indicate the position of the decimal point.

Some examples will meake this clearer:

Three Digit Examples	Four Digit Examples
330 is 33 ohms - <i>not 330 ohms</i>	1000 is 100 ohms - <i>not 1000 ohms</i>
221 is 220 ohms	4992 is 49 900 ohms, or 49.9 kohm
683 is 68 000 ohms, or 68 kohm	16234 is 162 000 ohms, or 162 kohm
105 is 1 000 000 ohms, or 1 Mohm	0R56 or R56 is 0.56 ohms
8R2 is 8.2 ohms	

But just to make life more interesting, a new coding system has appeared on **1% types**. This is known as the EIA-96 marking method. It consists of a three-character code. The first two digits signify the 3 significant digits of the resistor value, using the lookup table below. The third character - a letter - signifies the multiplier.

code	value	code	value	code	value	code	value	code	value	code	value
01	100	17	147	33	215	49	316	65	464	81	681
02	102	18	150	34	221	50	324	66	475	82	698
03	105	19	154	35	226	51	332	67	487	83	715
04	107	20	158	36	232	52	340	68	499	84	732
05	110	21	162	37	237	53	348	69	511	85	750
06	113	22	165	38	243	54	357	70	523	86	768
07	115	23	169	39	249	55	365	71	536	87	787
08	118	24	174	40	255	56	374	72	549	88	806
09	121	25	178	41	261	57	383	73	562	89	825
10	124	26	182	42	237	58	392	74	576	90	845
11	127	27	187	43	274	59	402	75	590	91	866
12	130	28	191	44	280	60	412	76	604	92	887
13	133	29	196	45	287	61	422	77	619	93	909
14	137	30	200	46	294	62	432	78	634	94	931
15	140	31	205	47	301	63	442	79	649	95	953
16	143	32	210	48	309	64	453	80	665	96	976

The **multiplier** letters are as follows:

letter	mult	letter	mult
F	100000	B	10
E	10000	A	1
D	1000	X or S	0.1
C	100	Y or R	0.01

22A is a 165 ohm resistor, **68C** is a 49900 ohm (49.9 k) and **43E** a 2740000 (2.74 M). This marking scheme applies to 1% resistors only.

A similar scheme can be used for **2, 5 and 10%** tolerance types. The multiplier letters are identical to the 1% ones, but occur **before** the number code. Just to make it even more fun, a **different** coding

scheme is used. Here it is:

2%				5%				10%	
code	value	code	value	code	value	code	value	code	value
01	100	13	330	25	100	37	330	49	100
02	110	14	360	26	110	38	360	50	120
03	120	15	390	27	120	39	390	51	150
04	130	16	430	28	130	40	430	52	180
05	150	17	470	29	150	41	470	53	220
06	160	18	510	30	160	42	510	54	270
07	180	19	560	31	180	43	560	55	330
08	200	20	620	32	200	44	620	56	390
09	220	21	680	33	220	45	680	57	470
10	240	22	750	34	240	46	750	58	560
11	270	23	820	35	270	47	820	59	680
12	300	24	910	36	300	48	910	60	820

So with this scheme, **A55** is a 330 ohm, 10% tolerance resistor, **C31** a 5%, 18000 ohm (18 kilohm) unit, and **D18** 510000 ohms (510 kohm) 2% tolerance.

Personally, I'd check with an ohm-meter!

last updated 10 April 2003 by G4PMK

PACKAGE EQUIVALENTS

Here is a table of more-or-less equivalents for many SMD packages.

Package	Equivalent
SOT89	SC62
SOT223	SC73
SOT323	SC70
SOT346	SC59
SOT363	SC88
SOT416	SC75, SC90
SOT457	SC74
SOD323	SC76

Date Coding

There are a variety of date coding schemes in use. Here are some of them. Often, it's possible to confuse which is the device code and which is the date code. Date codes are often in a different font, of a different size, or placed in a different orientation. Sometimes they are incorporated into the code number - where possible this will be indicated on the code entry by 'xx' and a note in the data entry. Some devices are only marked with the month of production.

Method 1

2 characters from tables below in form YM for year, month

Year	2002	2003	2004	2005	2006	2007	2008
Code	N	P	R	S	T	U	V

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Another alternative year table..... likely to apply to General Semiconductor products up to 2000

Year	1994	1995	1996	1997	1998	1999	2000
Code	E	F	H	J	K	L	M

Method 2

2 characters from tables below in form YM for year, month

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Code	7	8	9	0	1	2	3	4	5

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	A	B	C