

SMT

新入 社員

1.

가

.

2.

AXIAL , RADIAL , SMT

3.

	Jumper Wire(J/W), 0Ω(SMT)
	, , ,가 ,Chip
	, , , , ,
TR	TR,Power TR
	, , (LED)
(IC)	BGA,PLCC,CSP,SOP,SOJ
	COIL, , ,LAMP,SW,X-TAL

4.

10E 3	1000	1 K ()	10E - 6	U ()
10E 6	1000 K	1 M (가)	10E - 9	N ()
10E 9	1000 M	1 G (가)	10E - 12	P ()
10E 12	1000 G	1 T ()		

(Resister)

SURFACE MOUNT TECHNOLOGY

1.

가

2.

, ,가 ,ARRAY, 4 (4),5 (5) 2가 .

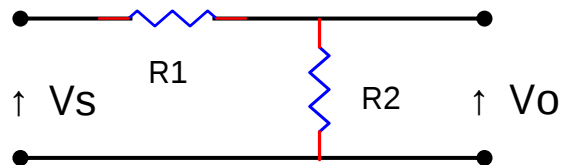
3.

가) : Ω (ohm :)

) : 

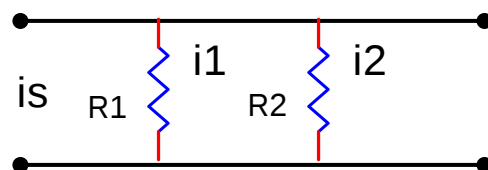
4.

가) :



$$V_o = \frac{R_2}{R_1 + R_2} \times V_s [V]$$

) :



$$i_2 = \frac{R_1}{R_1 + R_2} \times i_s [A]$$

(1)

SURFACE MOUNT TECHNOLOGY

1. (Color Code)
.(SMT)
2. ohm(Ω),100 (k Ω), 가 (M Ω)
가 (G Ω) .

				1	2	3	4
						()	(%)
()	BLACK	0		0	0	10E0(Ω)	
	BROWN	1		1	1	10E1(10 Ω)	$\pm 1\%$ (F)
()	RED	2		2	2	10E2(100 Ω)	$\pm 2\%$ (G)
()	ORANGE	3		3	3	10E3(1k Ω)	
()	YELLOW	4		4	4	10E4(10k Ω)	
()	GREEN	5		5	5	10E5(100k Ω)	
()	BLUE	6		6	6	10E6(1M Ω)	
()	VIOLET	7		7	7	10E7(10M Ω)	
	GRAY	8		8	8	10E8(100M Ω)	
()	WHITE	9		9	9	10E9(1,000M Ω)	
	GOLD			-	-	$10^{-1} = (0.1\Omega)$	$\pm 5\%$ (J)
	SILVER			-	-	$10^{-2} = (0.01\Omega)$	$\pm 10\%$ (K)
	(nocolor)			-	-	-	$\pm 20\%$

(2)

SURFACE MOUNT TECHNOLOGY

1. AXIAL,RADIAL:

2. SMT :

.(.)

Axial 形



4.7Ω J 1/4W

1	2		
4	7	10E-1	±5%
47 × 10E-1			
4.7Ω ±20%			

1	2		
4	7	10E4	±5%
47 × 10E4			
470KΩ ±20%			

SMT 形



2.2Ω J 1/2W

1	2		
2	R	2	
2.2 Ω			
2.2Ω			

1	2		
4	7	2	
47 × 10E2(100)			
4700Ω(4.7kΩ)			

	1005	1608	2125	3216
SIZE		1/16	1/10	1/8 , 1/4
가	1.0mm	1.6mm	2.0mm	3.2mm
	0.5mm	0.8mm	1.2mm	1.6mm

(3)

SURFACE MOUNT TECHNOLOGY

No	1	2	3	4			
					1.8 K Ω	$\pm 2\%$	$18 \times 10E2 = 1800 = 1.8 \text{ K}\Omega$
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
	1	0	4	J	100 K Ω	$\pm 5\%$	$10 \times 10E4 = 100000 = 100 \text{ K}\Omega$
11	4	3	1	J			
12	1	2	4	J			
13	2	2	2	J			
14	3	9	4	F			
15	4	R	7	J			

(Condenser)

SURFACE MOUNT TECHNOLOGY

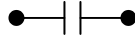
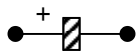
1.

가

.

2.

가) : F[FARAD]

) :  or 

) [F] [uF],[NF],
[PF]

	1 uF	1 NF	1 PF
	10E - 6F	10E - 9F	10E - 12F

3. Condenser

,By - Pass , , , .

4. Condenser

가) (Ceramic Condenser)

) (Mylar Condenser)

) (Electronic Condenser)

) ,

(1)

SURFACE MOUNT TECHNOLOGY

1. ,

	1H 103 K			101 → 10 × 10E1 = 100 PF
	1 H	103	K	102 → 10 × 10E2 = 1000 PF = 0.001 uF
(SMT)		0.01 UF	± 10% (0.09 ~ 0.11)	103 → 10 × 10E3 = 10000 PF = 0.01 uF
(A/R)				104 → 10 × 10E4 = 100000 PF = 0.1 uF
(A/R)	50V			105 → 10 × 10E5 = 1000000 PF = 1 uF

가) : . [V]. 2H = 500V

	A	B	C	D	E	F	G	H	J	K
0	1	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0
1	10	12.5	16	20	25	31.5	40	50	63	80
2	100	125	160	200	250	315	400	500	630	800
3	1.000	1,250	1,600	2,000	2,500	3,150	4,000	5,000	6,300	8,000

) : 1 ,10pF %, 10pF pF , J=± 5%

	B	C	D	F	G	J	K	M	N	V	X	Z	P
(%)	±0.1	0.25	0.5	± 1	± 2	± 5	± 10	± 20	± 30	+20 -10	+40 -20	+80 -20	+100 -0
(PF)	±0.1	0.25	0.5	± 1	± 2								

(2)

(RCL METER)

	(%)					
B	± 0.1					
C	± 0.25		5 C	5.29pF	.	
D	± 0.5					
F	± 1.0					
G	± 2.0					
J	± 5.0		102 J	1.03nF	0.95 ~ 1.05 nF	
K	± 10		223 K	21.97nF	19.8 ~ 24.2 Nf	
M	± 20					
N	± 30					
V	+ 20	- 10				
X	+ 40	- 20				
Z	+ 80	- 20	105 Z	853nF	800 ~ 1800 nF	
P	+ 100	- 0				

Z

가

.

(3)

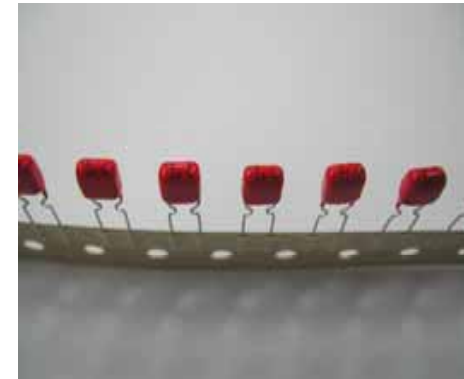
SURFACE MOUNT TECHNOLOGY

- 1.AXIAL :
- 2.RADIAL:

Axial 形



RADIAL 形



- - - -	2L - 104	0.27 J.63
102 K	1H 104JL3	0.27uF ±5% 63DC

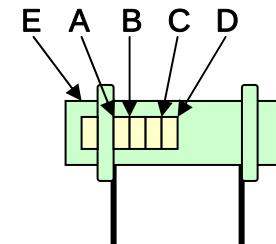
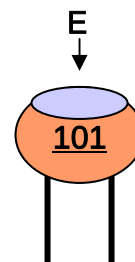
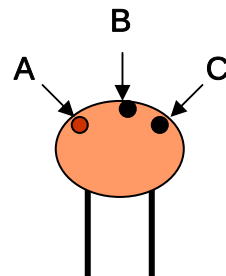
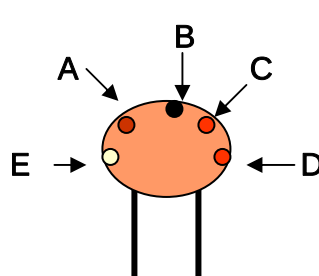
1H 102K 가 .

(4)

SURFACE MOUNT TECHNOLOGY

()

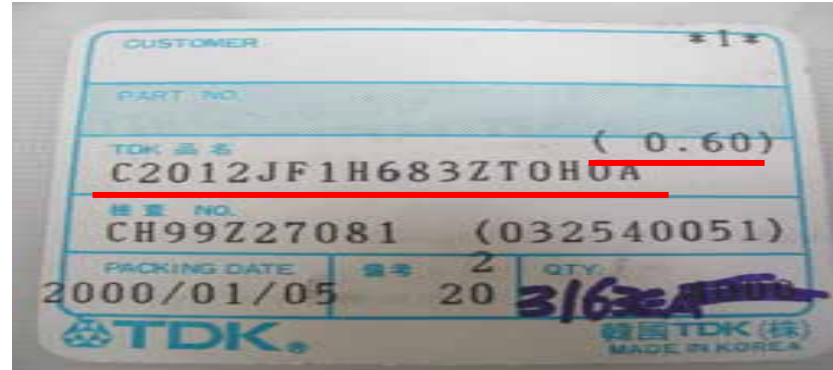
	A	B	C	D		E
					(%)	
	0		10E 0	± 2 PF	$\pm 20\%$	0 (NP 0)
	1		10E 1	± 0.1 PF	± 1 PF	- 33 (N 033)
	2		10E 2		± 2 PF	- 75 (N 075)
	3		10E 3		± 2.5 PF	- 150 (N150)
	4					- 220 (N 220)
	5			± 0.5 PF	± 5 PF	- 330 (N 330)
	6					- 470 (N 470)
	7					- 750 (N 750)
	8		0.01	± 0.25 PF		+ 30 (N 030)
	9		0.1	± 1.0 PF	± 10 PF	



(5)

3.SMT : 가 , TEST(LCR METER)
가 .

SMT 形



C2012JF 1H 683Z TOHOA

C2012			1H	683	Z	(0.60)
SIZE	가		(50V)	683 (0.068uF)	(+80, - 20	()
1005	1.0	0.5				
1608	1.6	0.8				
2125(2012)	2.0	1.2				
3216	3.2	1.6				

4.

가)
)

(SIZE)

RADIAL 形



35V 4.7uF 5 × 5

1.

2.

3. RADIAL

2가 TYPE

()

.(2.5mm, 5.0mm)

SMT 形



50V 4.7uF 6.5 × 5

1.

2.

3. SMT

가

1.

1948
(W.Shockley)

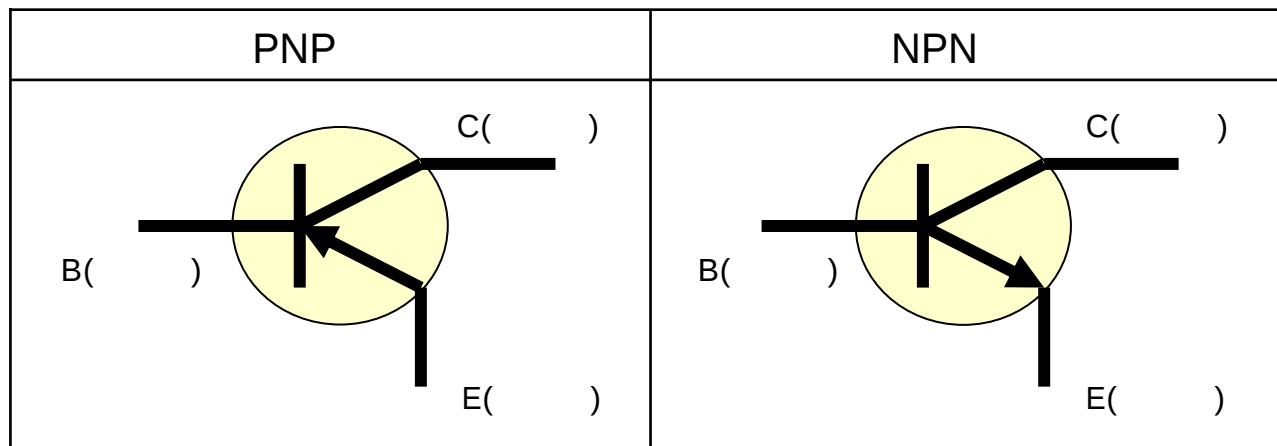
(J. Bardeen), (W. H. Brattain),
, TRANS fer of a signal through a varISTOR)

2.

PNP ,NPN

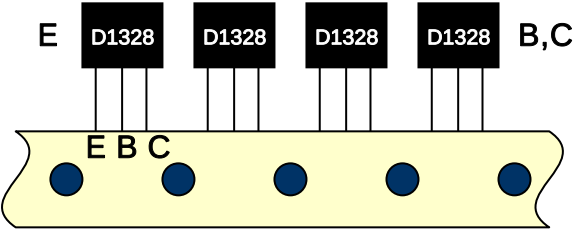
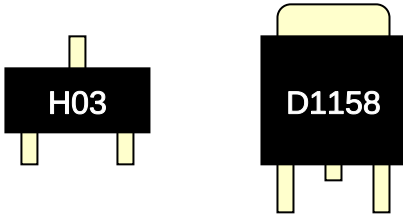
3.

4. : TR(Transistor)



			2 S B 292 A 1 2 3 4 5
1	1 ()	0→ 1→ 2→ 3→4	
2	(Semiconductor) . ()	S→	.
3	가 가 (,)	A→PNP B→PNP C→NPN D→NPN	F→P G→P H→ J→P K→P M→
4	11		. ()
5	ABCDEFGHIJKM		.

1. AXIAL :
2. RADIAL:
3. S M T : TR Making , TR
4. (IC,TR) , , 가

AR		1. RADIAL 2. TR, POWER - TR
SMT		1. TR Marking , TR 2. 가 .

1.

(Si) (Ge) .
P N .

2.

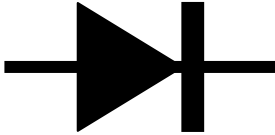
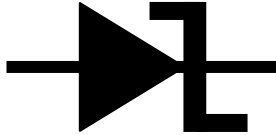
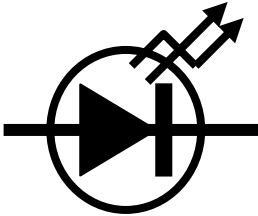
P N 가

3.

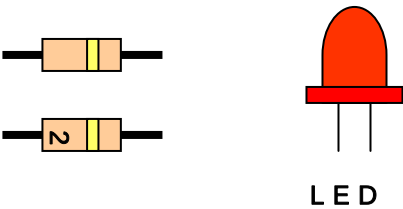
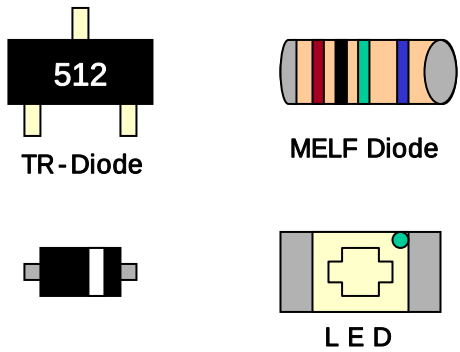
’ ’ ’

4.

: D(Diode)

- 1.AXIAL : , .
- 2.RADIAL: , .
- 3.S M T : , ,Marking ..
- 4.LED , , .
5. .

AR	 LED	1. . 2. . (Marking) 3.LED , , .
SMT	 TR-Diode MELF Diode LED	1. TR Marking , TR 2. 가 . 3.ARRAY Diode .

TR,Dio Marking Sheet (1)

SURFACE MOUNT TECHNOLOGY

No			Mark	No			Mark	No			Mark
1	D-TR	DA 204K	K	21	TR	DTC 123YK	62	41	D-TR	RD 5R6M	56Z
2	TR	DAP 202K	O	22	TR	DTC 123EK	25	42	D-TR	RD 8R2M	82Z
3	TR	DAN 202K	N	23	TR	DTC 124EU	25(小)	43		1SV 172	BE
4	TR	DTA 123YK	52	24	TR	DTC 343TK	H03	44		1SS 181	A3
5	TR	DTC 123EK	22	25	TR	DTC 143XK	H02	45	D-TR	1SS226	C3
6	TR	DTA 114EK	14	26	TR	DTC 143EK	43	46	D-TR	KDS 184A	KG
7	TR	DTA 114TK	94	27	TR	DTC 144EK	23	47	TR	DTC 143TK	B3
8	TR	DTA 114YK	54	28	TR	DTC 144EU	26	48	D-TR	SB 05-05	03`
9	TR	DTA 124EK	15	29	TR	DTC 144TK	26(小)	49	IC	UPD 1675	B
10	TR	DTA 143XK	33	30	TR	DTC 144WK	06`	50	P-TR	2SB 1188	CIA
11	TR	DTA 143EK	13	31		FMG 1	86	51	TR	2SC 3875Y	ALY
12	TR	DTA 144EK	16	32		FMG 2	G1	52	TR	2SC 2411K	CQ
13	TR	DTA 144EU	16	33		FMC 2	C2	53	TR	2SC 2712GR	LG
14	TR	DTA 144WK	86	34		FMC 3	C3	54	TR	2SD 1328T	ID-T
15	TR	DTA 144TK	96	35		FC 12	12G	55	TR	KYC 3880SY	AQY
16	TR	DTC 114YU	64	36	D	1MD 2	D2	56	TR	2SC 2412K	BQ
17	TR	DTC 114EK	24	37	D	1MN 10	NIO	57	TR	2SB 709A	B,Q
18	TR	DTC 114WK	84	38	D	MA 159	M1A	58	TR	2SC 2412KLU	LU
19	TR	DTC 114TK	04	39	D	MA 3056L	56L	59	TR	KV 1440	F4
20	TR	DTC 114YK	64	40	D	MA 3056H	56H	60	IC	IC 7SU04F	E6

TR,Dio Marking Sheet (2)

SURFACE MOUNT TECHNOLOGY

No			Mark	No			Mark	No			Mark
61	TR	2SA 1037K	Q	81	TR	U 221F	80	101	P-TR	78L 05F	8A
62	TR	TC 7D004F	E5	82	TR	UN 221L	8Q	102	P-TR	78L 09F	8E
63	TR	DTC 143ZK	E23	83	TR	UN 2110	6L	103	P-TR	78L 05UA	8C
64	IC	TC 7S008F	E2	84	TR	UN 2112	6B	104	TR	MA 133-TX	TC
65	TR	DTC 124TK	05`	85	TR	UN 211L	6Q	105	TR	DTC 124XB	45
66		HSM 123	A9	86	TR	UN 211H	6P	106	TR	2SC 2411K	CQ
67	P-TR	80744 HL	U8	87	TR	UN 2226	FY	107	IC	TC 7S04FU	E5
68	P-TR	8052	CR	88	TR	XN 1A311	FN	108	IC	7S08FU	HZ
69	P-TR	8053 A	LJ	89	TR	XNA 312	4P	109	TR	2SC 2462	LD
70	P-TR	8054 A	LN	90	TR	XN 4506	EN	110	TR	38054	LM
71	TR	2SD 1383K	WB	91	TR	XNOF 256	6A	111	TR	2SD 874A	YS
72	TR	2SD 601A	ZS	92	TR	XN 1212	9K	112	ZD	ZD 10MO	10T
73	TR	2SD 1781K	AFQ	93	TR	MA 153A	MP	113	IC	S81223SG	QFA
74	TR	2SD 2114	BBW	94	TR	MA 133	MP	114	IC	S 90823	DDLA
75	TR	2SD 1328	10T	95	TR	MA 152WK	MU	115	TR	KTN 2907AS	ZD,ZH
76	IC	3SK 131A	V16	96	TR	MA 152WA	MO	116	TR	KTN 2222S	ZB,ZG
77	TR	KV 1410	F1	97	TR	2SB 709A	B,R,Q	117	TR	TRSB 07	J
78	TR	UN 2211	8A	98	TR	KTD 1003	LA	118	TR	RN 1602	XB
79	TR	UN 2212	8B	99	TR	D 1898A	DF	119	TR	RN 1406	XF
80	TR	UN 2215	8E	100	TR	2SK 3065	KE	120	TR	RJN 2427	RG

TR,Dio Marking Sheet (3)

SURFACE MOUNT TECHNOLOGY

No			Mark	No			Mark	No			Mark
121	TR	2SA 1213	NY	141				161			
122	TR	2SA 1298	IY	142				162			
123	TR	DN 77L05M	E5	143				163			
124	D-TR	IMD 3A	D3	144				164			
125	TR	IMX1	X1	145				165			
126	D-TR	MA1A	A1	146				166			
127	TR	1MB4	B4	147				167			
128	DIO	MA 3056 - M	5.6M	148				168			
129	DIO	MA 3075 - H	7.5H	149				169			
130	DIO	MA 3082 - H	8.2H	150				170			
131	D-TR	ERZ02W9.1V - Y	9.1V	151				171			
132	D-TR	RD 5.1MB	512	152				172			
133	IC	80736	DO	153				173			
134	P-TR	S - 80943	DD7U	154				174			
135	P-TR	S - 81233	QFB	155				175			
136	TR	KRC 102S	NB	156				176			
137	TR	KRA 101S	PA	157				177			
138	TR	KRA 114S	PP	158				178			
139	TR	DTC 124XK	45	159				179			
140	TR	KRC 114S	NP	160				180			

(COIL)

1.

()

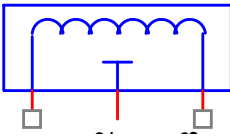
2.

()
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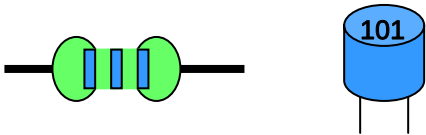
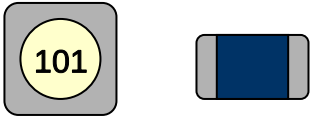
3.

4.

: C(COIL)

COIL	COIL
	

- 1.AXIAL :
2.RADIAL:
3.S M T : , ,Marking, ..
4.COIL 가
5.COIL

AR		1.AXIAL TYPE 가 2.RADIAL TYPE 3.AR , ()
SMT		1.SMT TYPE CHIP 1005 Size CHIP TEST (RCL METER) 2. 3. 가

SURFACE MOUNT TECHNOLOGY

BGA



TRANS



CON BASE



P-TR



IC SOP



PLCC



IC SOP



IC QFP



LAMP

