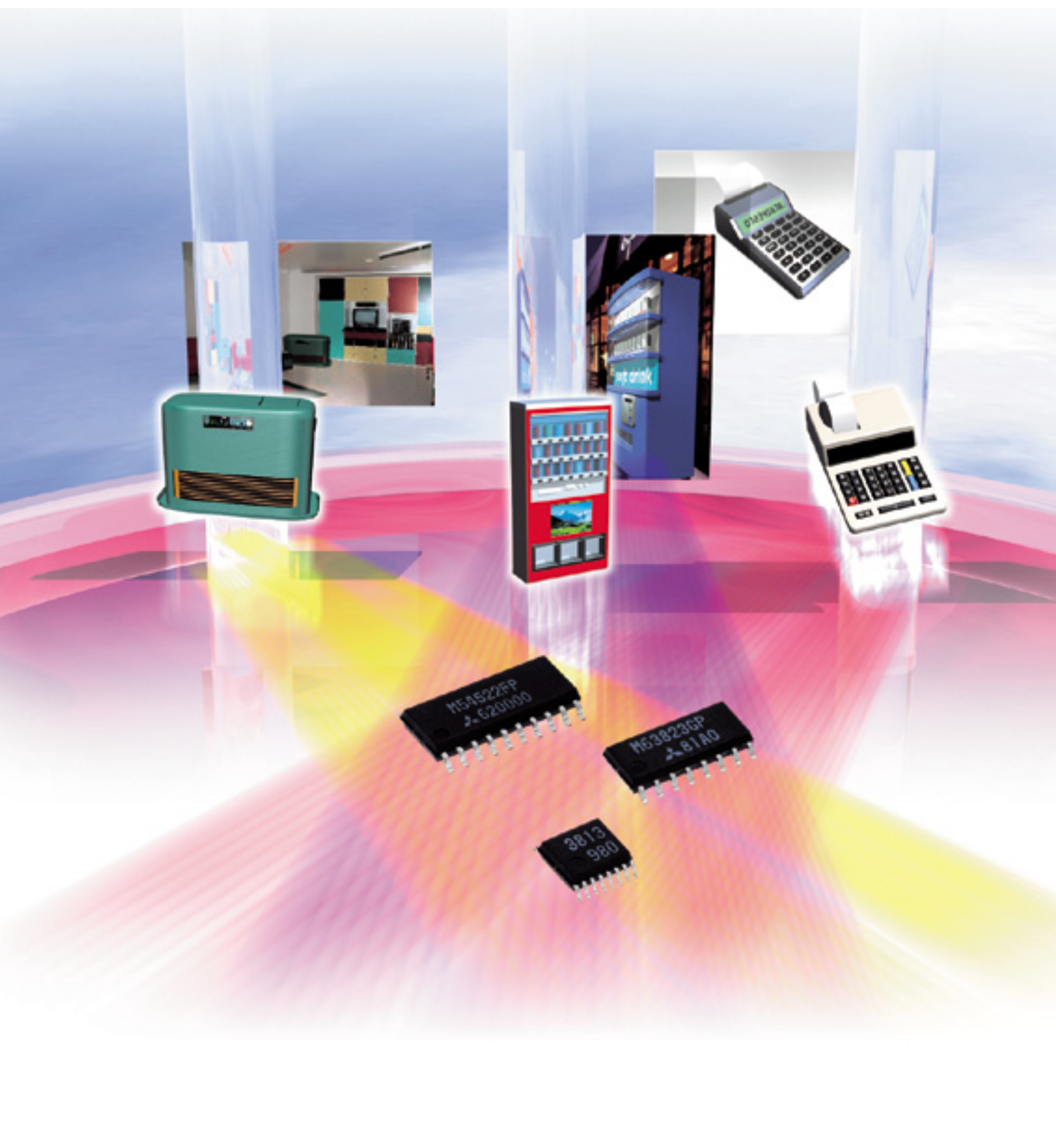




Changes for the Better

Transistor-Array series



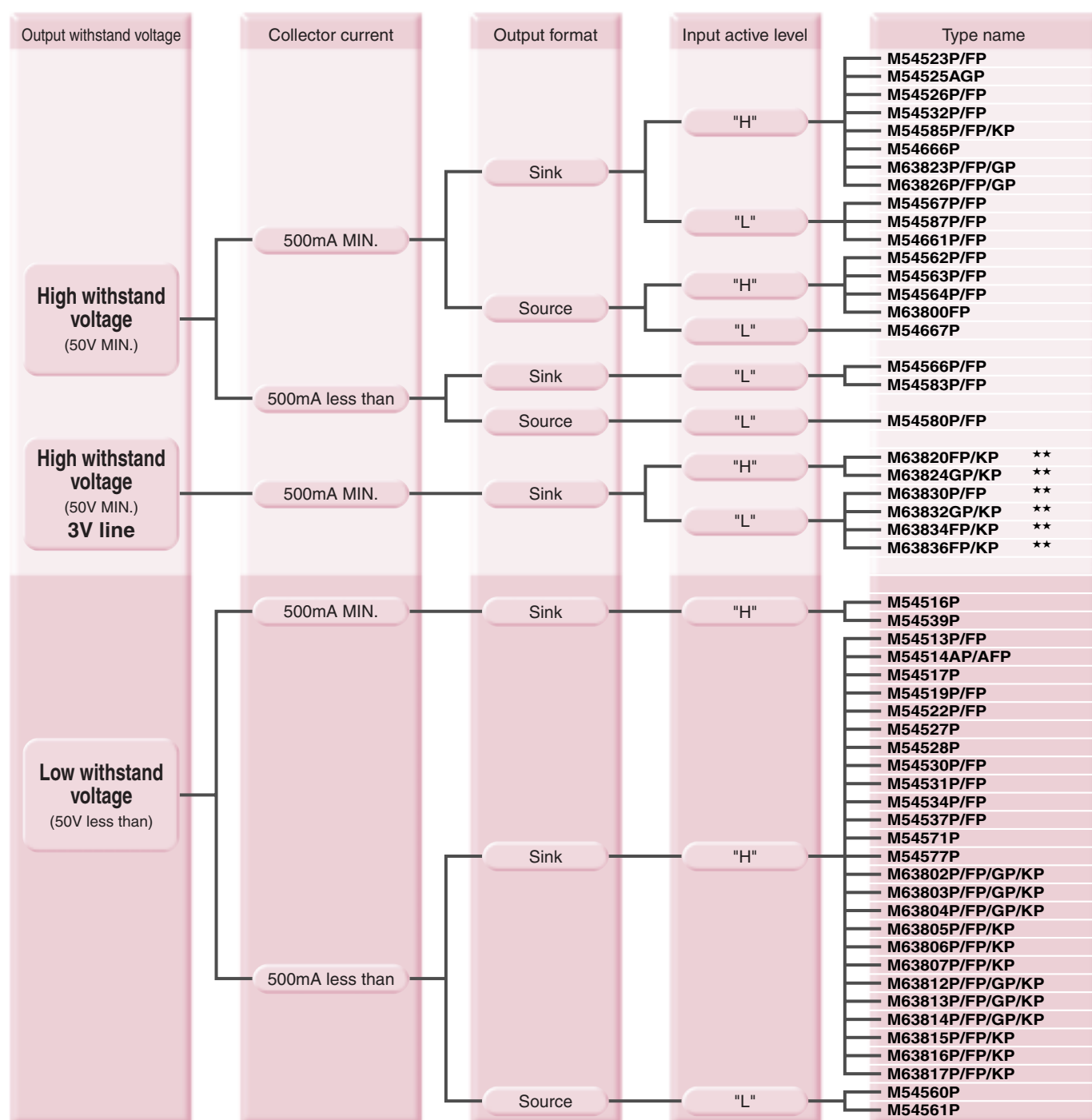
Application

Transistor Array is a semiconductor integrated circuit in which a minute input current enables a high current drive. Transistor Arrays are used in a wide range of fields therefore they are available in an abundant product series (30mA to 1.5A/20V to 80V). Utilization of surface-mount packages also enables compact, lightweight, and high density mounting of the target applications sets.



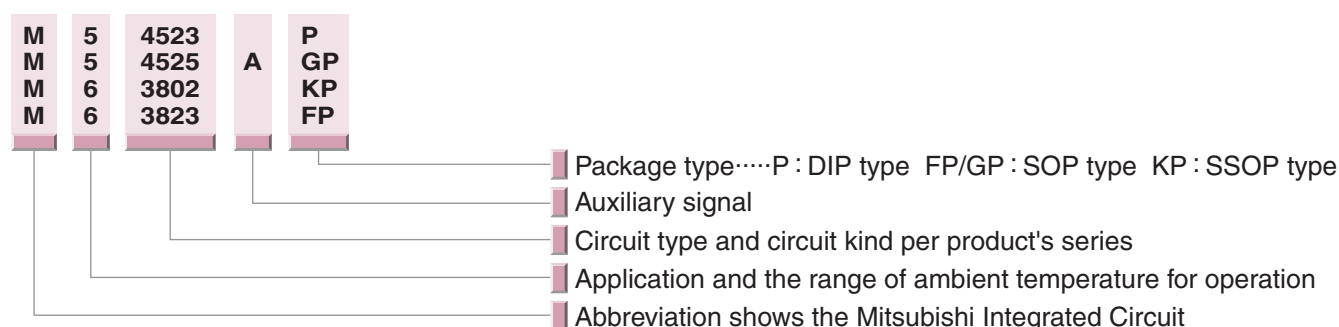
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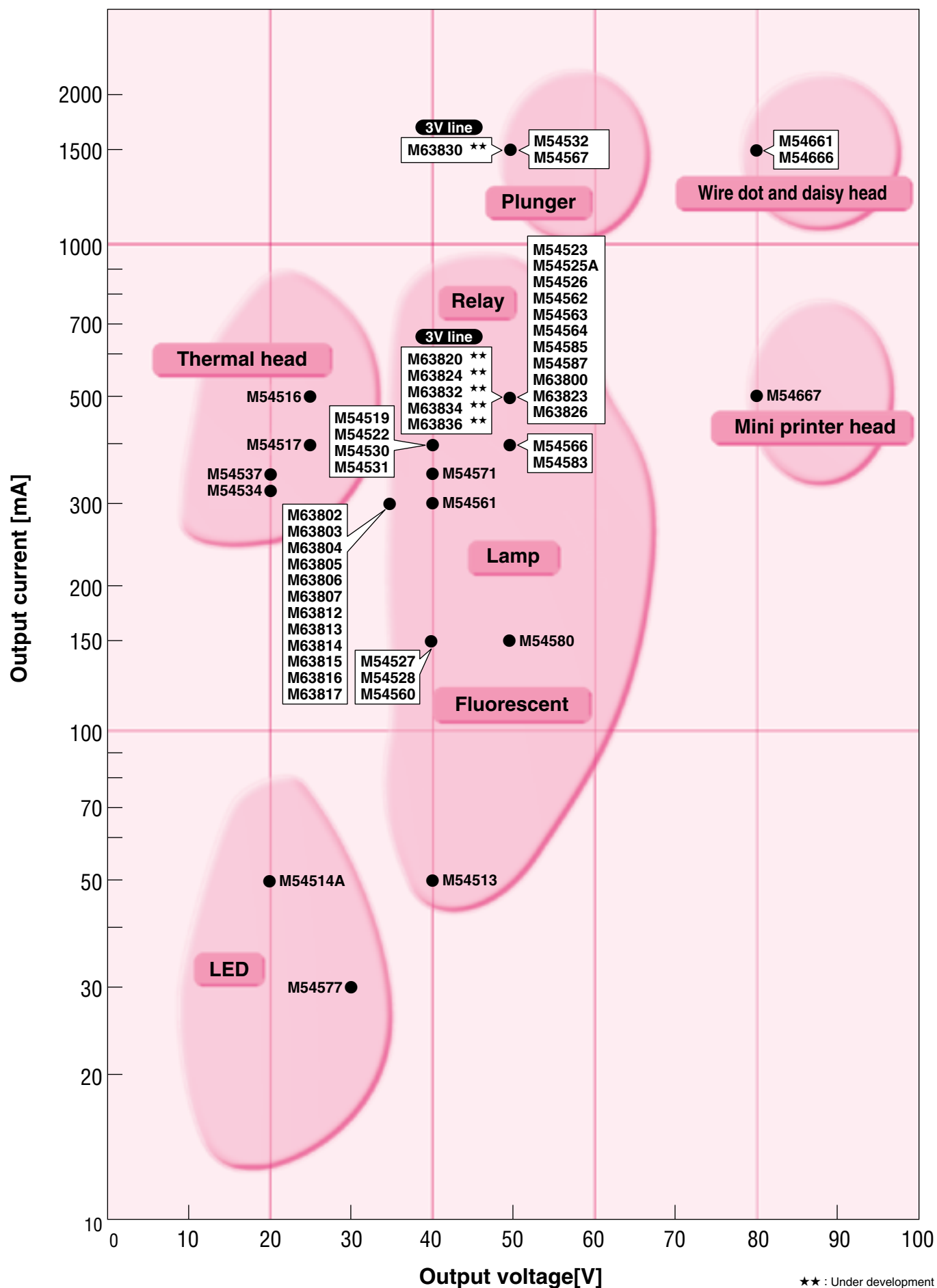
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★★ : Under development

Codes for transistor array type name







	Type name	Package outlines	Unit	Application				Features									
				LED	Solenoid	Relay	Lamp	Input-function voltage	Output current	I _o max [mA]	V _o max (V)	Darlington transistor	With output clamp diode	Low V _{ce} (sat)	Low input voltage operation	Input diode	Mini-frat package
1	M54513P	18P4G	8	○			○	H	Sink	50	40			○	○		
2	M54513FP	20P2N	8	○			○	H	Sink	50	40			○	○		○
3	M54514AP	16P4	7	○				H	Sink	50	20			○	○		
4	M54514AFP	16P2N	7	○				H	Sink	50	20			○	○		○
5	M54516P	14P4	5	○		○	○	H	Sink	500	25	○					
6	M54517P	16P4	7	○		○	○	H	Sink	400	25	○					
7	M54519P	16P4	7	○		○	○	H	Sink	400	40	○					
8	M54519FP	16P2N	7	○		○	○	H	Sink	400	40	○					○
◎ 9	M54522P	18P4G	8	○	○	○	○	H	Sink	400	40	○	○				
◎ 10	M54522FP	20P2N	8	○	○	○	○	H	Sink	400	40	○	○				○
11	M54523P	16P4	7	○	○	○	○	H	Sink	500	50	○	○		○		
12	M54523FP	16P2N	7	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 13	M54525AGP	16P2S	7	○	○	○	○	H	Sink	500	50	○	○			○	○
14	M54526P	16P4	7	○	○	○	○	H	Sink	500	50	○	○				
15	M54526FP	16P2N	7	○	○	○	○	H	Sink	500	50	○	○				○
16	M54527P	14P4	6	○		○	○	H	Sink	150	40	○	○			○	
17	M54528P	16P4	7	○		○	○	H	Sink	150	40	○	○			○	
◎ 18	M54530P	16P4	7	○	○	○	○	H	Sink	400	40	○	○				
◎ 19	M54530FP	16P2N	7	○	○	○	○	H	Sink	400	40	○	○				○
◎ 20	M54531P	16P4	7	○	○	○	○	H	Sink	400	40	○	○			○	
◎ 21	M54531FP	16P2N	7	○	○	○	○	H	Sink	400	40	○	○			○	○
◎ 22	M54532P	16P4	4	○	○	○	○	H	Sink	1500	50	○	○		○		
◎ 23	M54532FP	16P2N	4	○	○	○	○	H	Sink	1500	50	○	○		○		○
24	M54534P	16P4	6	○		○	○	H	Sink	320	20		○	○		○	
25	M54534FP	16P2N	6	○		○	○	H	Sink	320	20		○	○		○	○
26	M54537P	16P4	7	○		○	○	H	Sink	350	20			○	○		
27	M54537FP	16P2N	7	○		○	○	H	Sink	350	20			○	○		○
28	M54539P	16P4	6	○		○	○	H	Sink	700	20		○	○	○		
29	M54560P	16P4	7	○		○	○	L	Source	150	40	○	○				
◎ 30	M54561P	16P4	7	○		○	○	L	Source	300	40	○	○				
◎ 31	M54562P	18P4G	8	○		○	○	H	Source	500	50	○	○		○		
◎ 32	M54562FP	20P2N	8	○		○	○	H	Source	500	50	○	○		○		○
◎ 33	M54563P	18P4G	8	○		○	○	H	Source	500	50	○	○		○		
◎ 34	M54563FP	20P2N	8	○		○	○	H	Source	500	50	○	○		○		○
◎ 35	M54564P	18P4G	8	○		○	○	H	Source	500	50	○			○		
◎ 36	M54564FP	20P2N	8	○		○	○	H	Source	500	50	○			○		○
◎ 37	M54566P	16P4	7	○		○	○	L	Sink	400	50	○					
◎ 38	M54566FP	16P2N	7	○		○	○	L	Sink	400	50	○					○
◎ 39	M54567P	16P4	4	○	○	○	○	L	Sink	1500	50	○	○			○	
◎ 40	M54567FP	16P2N	4	○	○	○	○	L	Sink	1500	50	○	○			○	○
41	M54571P	20P4	6	○	○	○	○	H	Sink	350	40		○	○	○		
42	M54577P	16P4	7	○				H	Sink	30	30			○		○	
◎ 43	M54580P	16P4	7	○		○	○	L	Source	150	50	○				○	
◎ 44	M54580FP	16P2N	7	○		○	○	L	Source	150	50	○				○	○
◎ 45	M54583P	18P4G	8	○		○	○	L	Sink	400	50	○				○	
◎ 46	M54583FP	20P2N	8	○		○	○	L	Sink	400	50	○				○	○
◎ 47	M54585P	18P4G	8	○	○	○	○	H	Sink	500	50	○	○		○		
◎ 48	M54585FP	20P2N	8	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 49	M54585KP	20P2E	8	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 50	M54587P	20P4	8	○	○	○	○	L	Sink	500	50	○	○			○	
◎ 51	M54587FP	20P2N	8	○	○	○	○	L	Sink	500	50	○	○			○	○
52	M54661P	16P4	4	○	○	○	○	L	Sink	1500	80	○	○			○	
53	M54661FP	16P2N	4	○	○	○	○	L	Sink	1500	80	○	○			○	○
54	M54666P	16P4	4	○	○	○	○	L	Sink	1500	80		○	○	○		
55	M54667P	20P4	8	○		○	○	H	Source	500	80	○	○				
◎ 56	M63800FP	16P2N	7	○		○	○	L	Source	500	50	○	○		○		
◎ 57	M63802P	16P4	7	○		○	○	H	Sink	300	35			○		○	
◎ 58	M63802FP	16P2N	7	○		○	○	H	Sink	300	35			○		○	○

		Type name	Package outlines	Unit	Application				Features									
					LED	Solenoid	Relay	Lamp	Input-function voltage	Output current	Io max [mA]	Vo max (V)	Darlington transistor	With output clamp diode	Low V _{ce} (sat)	Low input voltage operation	Input diode	Mini-frat package
◎ 59		M63802GP	16P2S	7	○		○	○	H	Sink	300	35			○		○	○
◎ 60		M63802KP	16P2Z	7	○		○	○	H	Sink	300	35			○		○	○
◎ 61		M63803P	16P4	7	○		○	○	H	Sink	300	35			○	○		
◎ 62		M63803FP	16P2N	7	○		○	○	H	Sink	300	35			○	○		○
◎ 63		M63803GP	16P2S	7	○		○	○	H	Sink	300	35			○	○		○
◎ 64		M63803KP	16P2Z	7	○		○	○	H	Sink	300	35			○	○		○
◎ 65		M63804P	16P4	7	○		○	○	H	Sink	300	35			○			
◎ 66		M63804FP	16P2N	7	○		○	○	H	Sink	300	35			○			○
◎ 67		M63804GP	16P2S	7	○		○	○	H	Sink	300	35			○			○
◎ 68		M63804KP	16P2Z	7	○		○	○	H	Sink	300	35			○			○
◎ 69		M63805P	18P4G	8	○		○	○	H	Sink	300	35			○		○	
◎ 70		M63805FP	20P2N	8	○		○	○	H	Sink	300	35			○		○	○
◎ 71		M63805KP	20P2E	8	○		○	○	H	Sink	300	35			○		○	○
◎ 72		M63806P	18P4G	8	○		○	○	H	Sink	300	35			○	○		
◎ 73		M63806FP	20P2N	8	○		○	○	H	Sink	300	35			○	○		○
◎ 74		M63806KP	20P2E	8	○		○	○	H	Sink	300	35			○	○		○
◎ 75		M63807P	18P4G	8	○		○	○	H	Sink	300	35			○			
◎ 76		M63807FP	20P2N	8	○		○	○	H	Sink	300	35			○			○
◎ 77		M63807KP	20P2E	8	○		○	○	H	Sink	300	35			○			○
◎ 78		M63812P	16P4	7	○		○	○	H	Sink	300	35		○	○		○	
◎ 79		M63812FP	16P2N	7	○		○	○	H	Sink	300	35		○	○		○	○
◎ 80		M63812GP	16P2S	7	○		○	○	H	Sink	300	35		○	○		○	○
◎ 81		M63812KP	16P2Z	7	○		○	○	H	Sink	300	35		○	○		○	○
◎ 82		M63813P	16P4	7	○		○	○	H	Sink	300	35		○	○	○		
◎ 83		M63813FP	16P2N	7	○		○	○	H	Sink	300	35		○	○	○		○
◎ 84		M63813GP	16P2S	7	○		○	○	H	Sink	300	35		○	○	○		○
◎ 85		M63813KP	16P2Z	7	○		○	○	H	Sink	300	35		○	○	○		○
◎ 86		M63814P	16P4	7	○		○	○	H	Sink	300	35		○	○			
◎ 87		M63814FP	16P2N	7	○		○	○	H	Sink	300	35		○	○			○
◎ 88		M63814GP	16P2S	7	○		○	○	H	Sink	300	35		○	○			○
◎ 89		M63814KP	16P2Z	7	○		○	○	H	Sink	300	35		○	○			○
◎ 90		M63815P	18P4G	8	○		○	○	H	Sink	300	35		○	○		○	
◎ 91		M63815FP	20P2N	8	○		○	○	H	Sink	300	35		○	○		○	○
◎ 92		M63815KP	20P2E	8	○		○	○	H	Sink	300	35		○	○		○	○
◎ 93		M63816P	18P4G	8	○		○	○	H	Sink	300	35		○	○	○		
◎ 94		M63816FP	20P2N	8	○		○	○	H	Sink	300	35		○	○	○		○
◎ 95		M63816KP	20P2E	8	○		○	○	H	Sink	300	35		○	○	○		○
◎ 96		M63817P	18P4G	8	○		○	○	H	Sink	300	35		○	○			
◎ 97		M63817FP	20P2N	8	○		○	○	H	Sink	300	35		○	○			○
◎ 98		M63817KP	20P2E	8	○		○	○	H	Sink	300	35		○	○			○
◎ 99		M63820FP **	20P2N	8	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 100		M63820KP **	20P2E	8	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 101		M63823P	16P4	7	○	○	○	○	H	Sink	500	50	○	○		○		
◎ 102		M63823FP	16P2N	7	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 103		M63823GP	16P2S	7	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 104		M63824GP **	16P2S	7	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 105		M63824KP **	16P2Z	7	○	○	○	○	H	Sink	500	50	○	○		○		○
◎ 106		M63826P	16P4	7	○	○	○	○	H	Sink	500	50	○	○				
◎ 107		M63826FP	16P2N	7	○	○	○	○	H	Sink	500	50	○	○			○	○
◎ 108		M63826GP	16P2S	7	○	○	○	○	H	Sink	500	50	○	○			○	○
◎ 109		M63830P **	16P4	4	○	○	○	○	L	Sink	1500	50	○	○		○	○	○
◎ 110		M63830FP **	16P2N	4	○	○	○	○	L	Sink	1500	50	○	○		○	○	○
◎ 111		M63832GP **	16P2S	7	○		○	○	L	Sink	500	50	○			○	○	○
◎ 112		M63832KP **	16P2Z	7	○		○	○	L	Sink	500	50	○			○	○	○
◎ 113		M63834FP **	20P2N	8	○		○	○	L	Sink	500	50	○			○	○	○
◎ 114		M63834KP **	20P2E	8	○		○	○	L	Sink	500	50	○			○	○	○
◎ 115		M63836FP **	20P2N	8	○	○	○	○	L	Sink	500	50	○	○		○	○	○
◎ 116		M63836KP **	20P2E	8	○	○	○	○	L	Sink	500	50	○	○		○	○	○

Type name	I _o max. (mA)	V _o max. (V)	Circuit diagram	Pin connection	Package outlines
M54513P/FP	50	40			 18P4G 20P2N
M54514AP/AFP	50	20			 16P4 16P2N
M54516P	500	25			 14P4
M54517P	400	25			 16P4
M54519P/FP	400	40			 16P4 16P2N
M54522P/FP	400	40			 18P4G 20P2N
M54523P/FP	500	50			 16P4 16P2N

NC : No connection

Type name	I _o max. (mA)	V _o max. (V)	Circuit diagram	Pin connection	Package outlines
M54525AGP	500	50			
M54526P/FP	500	50			
M54527P	150	40			
M54528P	150	40			
M54530P/FP	400	40			
M54531P/FP	400	40			
M54532P/FP	1500	50			
M54534P/FP	320	20			

NC : No connection

Type name	Io max. (mA)	Vo max. (V)	Circuit diagram	Pin connection	Package outlines
M54537P/FP	350	20			 16P4 16P2N
M54539P	700	20			 16P4
M54560P	150	40			 16P4
M54561P	300	40			 16P4
M54562P/FP	500	50			 18P4G
M54563P/FP	500	50			 20P2N
M54564P/FP	500	50			 18P4G 20P2N

NC : No connection

Type name	Io max. (mA)	Vo max. (V)	Circuit diagram	Pin connection	Package outlines
M54566P/FP	400	50			 16P4 16P2N
M54567P/FP	1500	50			 16P4 16P2N
M54571P	350	40			 20P4
M54577P	30	30			 16P4
M54580P/FP	150	50			 16P4 16P2N
M54583P/FP	400	50			 18P4G 20P2N

NC : No connection

Type name	Io max. (mA)	Vo max. (V)	Circuit diagram	Pin connection	Package outlines
M54585P/FP/KP	500	50			 18P4G 20P2N 20P2E
M54587P/FP	500	50			 20P4 20P2N
M54661P/FP	1500	80			 16P4 16P2N
M54666P	1500	80			 16P4
M54667P	500	80			 20P4
M63800FP	500	50			 16P2N

NC : No connection

Type name	I _o max. (mA)	V _o max. (V)	Circuit diagram	Pin connection	Package outlines
M63802P/FP/ GP/KP	300	35			 16P4 16P2N 16P2S 16P2Z
M63803P/FP/ GP/KP	300	35			
M63804P/FP/ GP/KP	300	35			 16P2Z
M63805P/FP/ KP	300	35			 18P4G
M63806P/FP/ KP	300	35			 20P2N 20P2E
M63807P/FP/ KP	300	35			
M63812P/FP/ GP/KP	300	35			 16P4
M63813P/FP/ GP/KP	300	35			 16P2N 16P2S 16P2Z
M63814P/FP/ GP/KP	300	35			 16P2Z

NC : No connection

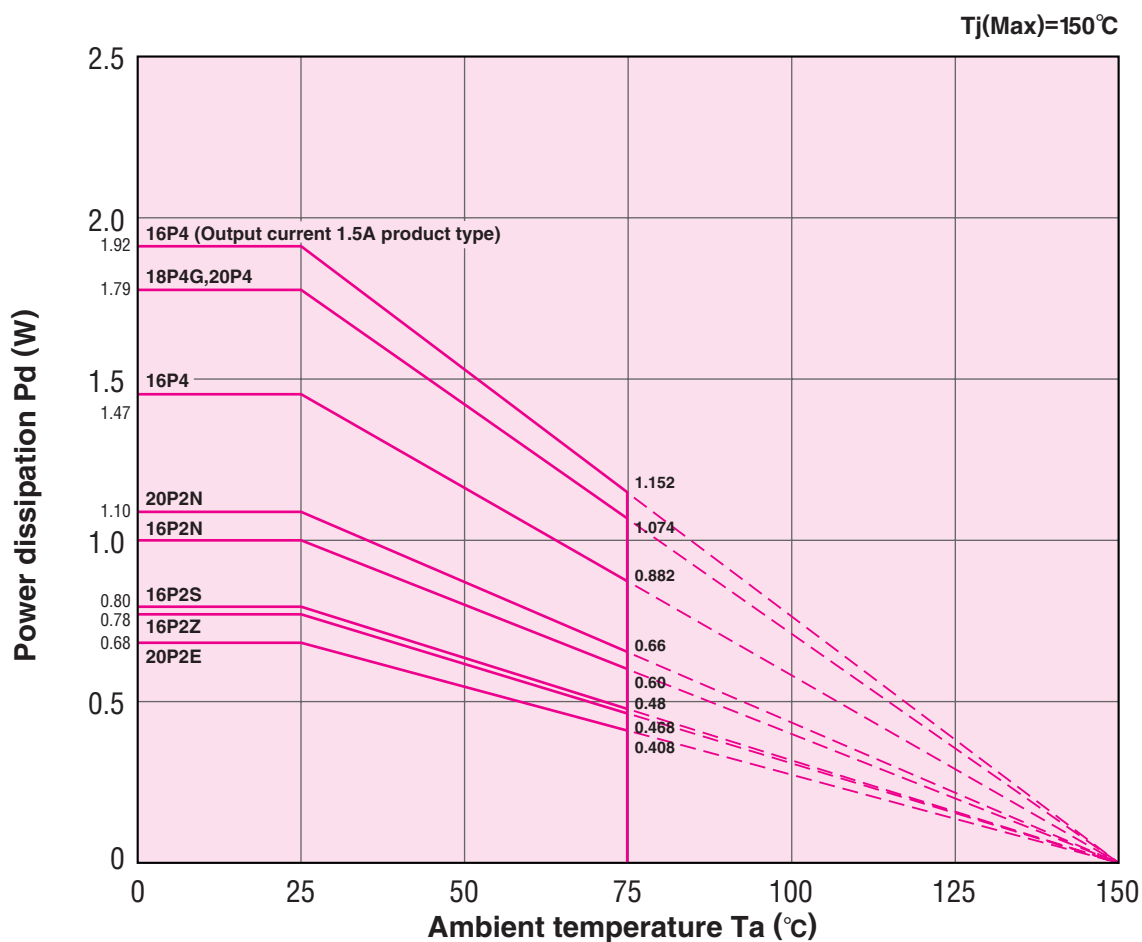
Type name	I _o max. (mA)	V _o max. (V)	Circuit diagram	Pin connection	Package outlines
M63815P/FP/ KP	300	35			 18P4G
M63816P/FP/ KP	300	35			 20P2N
M63817P/FP/ KP	300	35			 20P2E
M63820FP/KP ^{★★}	500	50			 20P2N 20P2E
M63823P/FP/ GP	500	50			 16P4 16P2N 16P2S
M63824GP/KP ^{★★}	500	50			 16P2S 16P2Z
M63826P/FP/ GP	500	50			 16P4 16P2N 16P2S
M63830P/FP ^{★★}	1500	50			 16P4 16P2N

Thermal derating factor characteristics

Type name	I _o max. (mA)	V _o max. (V)	Circuit diagram	Pin connection	Package outlines
M63832GP/KP ^{★★}	500	50			 16P2S 16P2Z
M63834FP/KP ^{★★}	500	50			 20P2N 20P2E
M63836FP/KP ^{★★}	500	50			 20P2N 20P2E

NC : No connection ★★ : Under development

Thermal derating factor characteristics



Mitsubishi transistor array is a semiconductor integrated circuit formed of 4 to 8 circuits containing transistors that can operate at an output withstand voltage of 30 to 80V and an output current of 50 to 1,500 mA. This transistor array has a variety of specifications, some of which will be introduced here.

1 Direct operation with C-MOS IC

Examples of connections with C-MOS ICs are shown here. This type of C-MOS output current can be either the "sink" or "source" type. Connection examples are shown in Figs. 1 and 2.

Fig. 1. Operating with "H" input

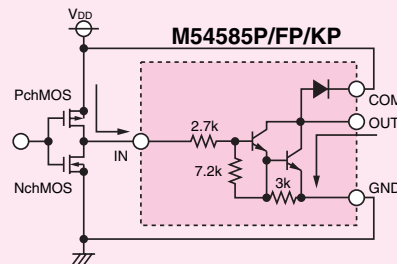
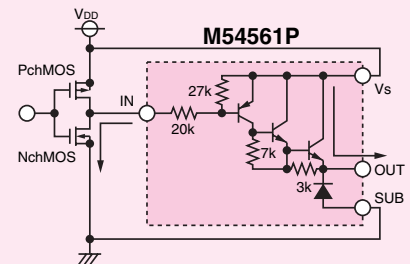


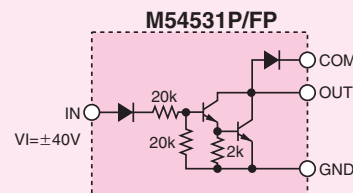
Fig. 2. Operating with "L" input



2 Negative input applied voltage type

Fig. 3 shows the internal circuit of a transistor array into which an input diode is built. Negative voltage can be applied using this diode.

Fig. 3. Negative input applied voltage type



3 Output sink, source type

There are two output current format types, the current sink type (intake type) and the source type (supply type). Example applications of these are shown in Figs. 4 and 5.

Fig. 4. Output sink type application example

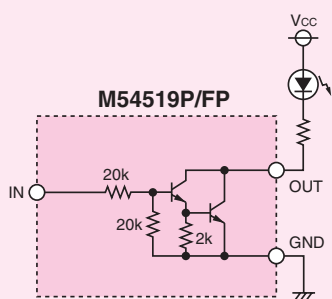
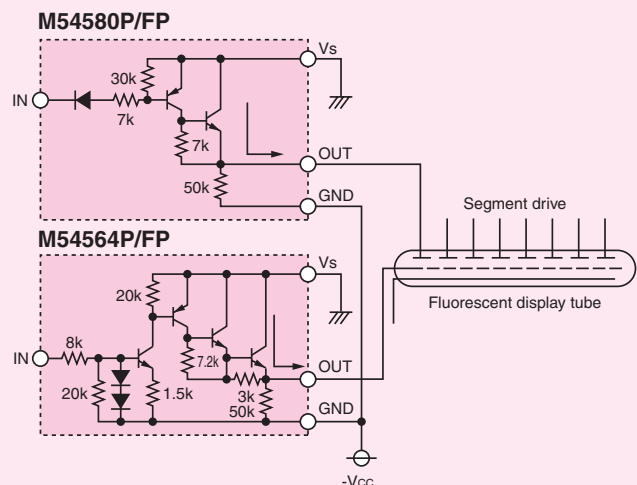


Fig. 5. Output source type application example



4

Low output saturation type

The output transistor formats are the Darlington type and the single type. The Darlington type shown in Fig. 6 can generate high operation current from a minute input current, but the output saturation voltage is 0.95 to 1.05V. The single type shown in Fig. 7 can keep the saturation voltage low. The output saturation voltage and collector current characteristics of these two types are shown in Fig. 8.

Fig. 6. Darlington type

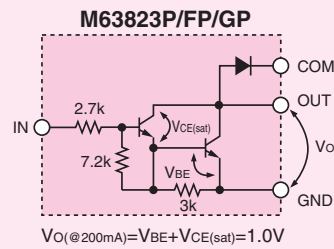


Fig. 7. Single type

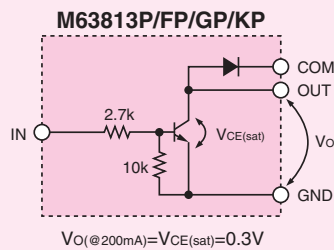
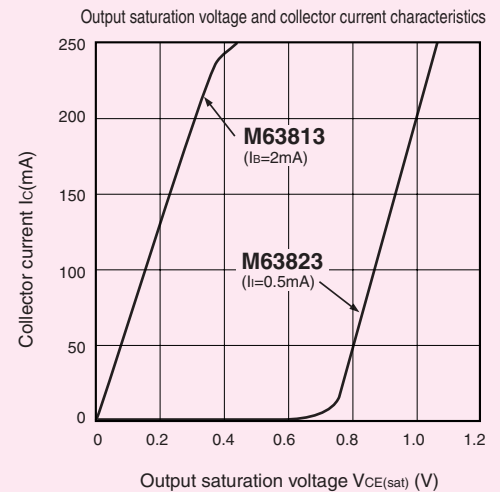


Fig. 8. Output saturation voltage and collector current characteristics



5

Built-in output clamp diode type

When operating under an inductive(L) load, such as a relay or motor, the built-in clamp diode shown in Fig. 10(b) is used to protect the circuit from the reverse voltage that occurs when the transistor array is turned off.

When only the clamp diode is connected, the flow time of the current in the clamp diode is long and the switching sometimes

deteriorates a little for relays, etc. as shown in Fig. 9.

When this is a problem, a Zener diode is inserted at the clamp diode COM terminal(in reverse series) as shown in Fig. 10(c) to improve the current smooth flow. The Zener diode voltage (V_Z) should be selected such that $V_S + V_Z + V_F < V_{BR(CEO)}$ and a voltage type Zener should be used.

Fig. 9. Output voltage and current waveform during L load operation

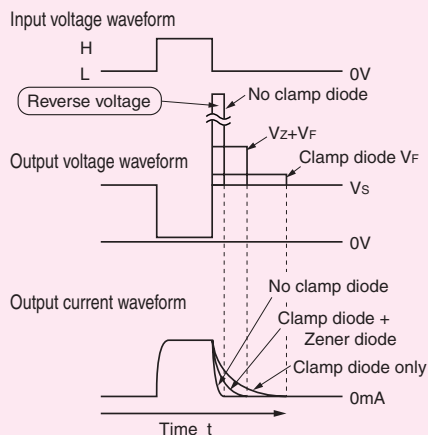
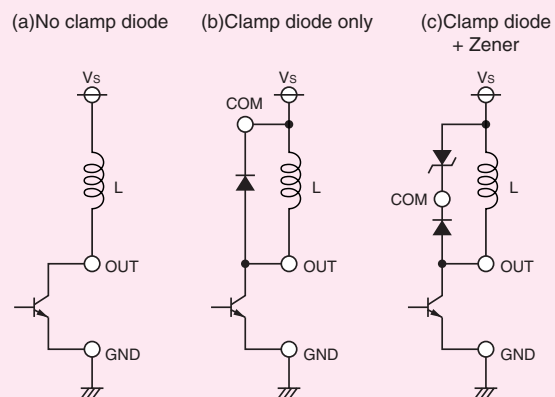
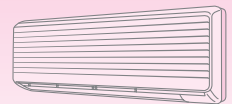
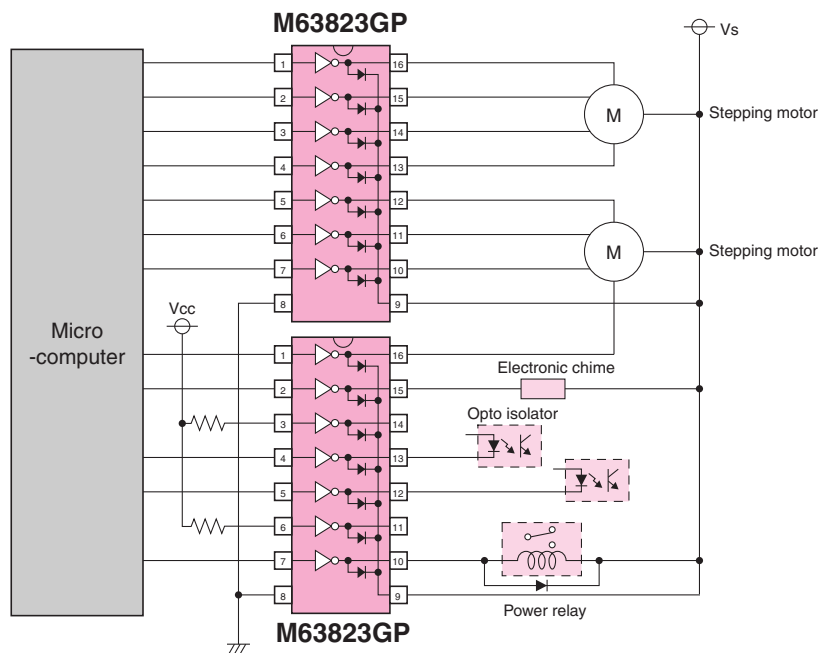


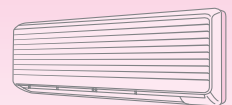
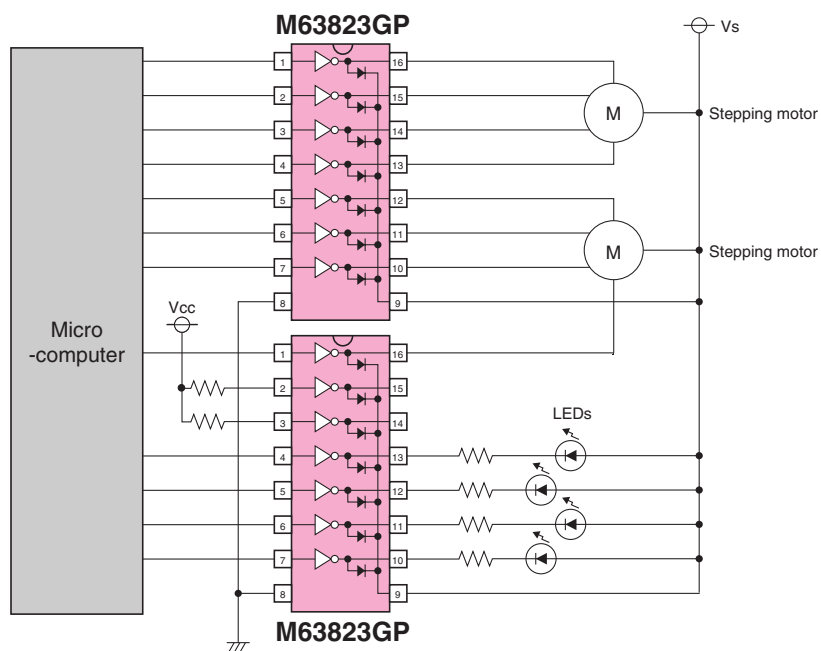
Fig. 10. Method for protecting the transistor during L load operation



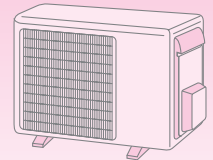
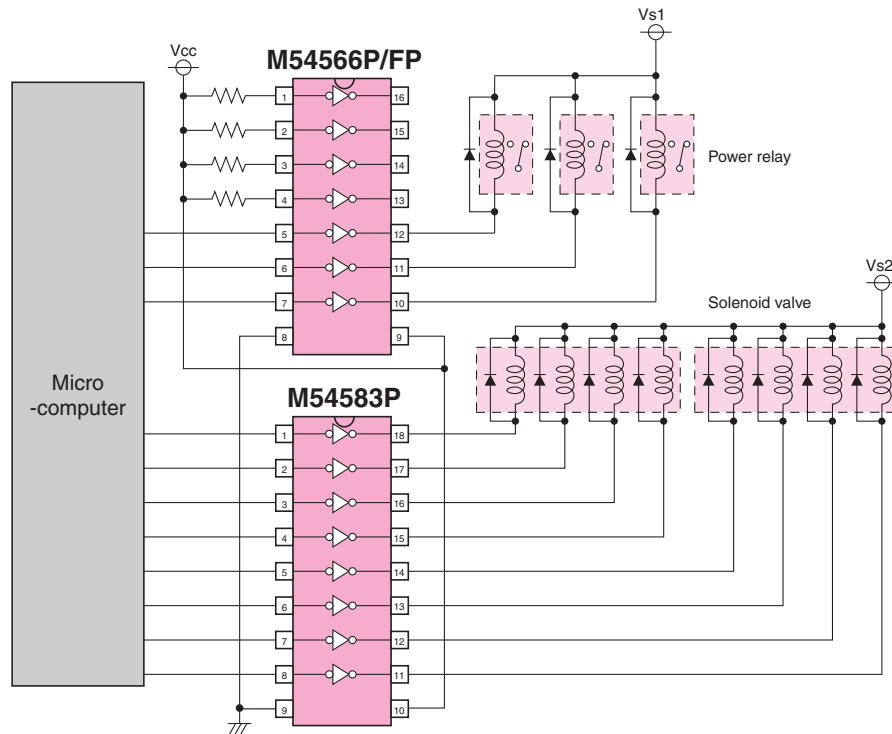
Air conditioner example 1 [Internal unit]



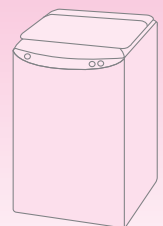
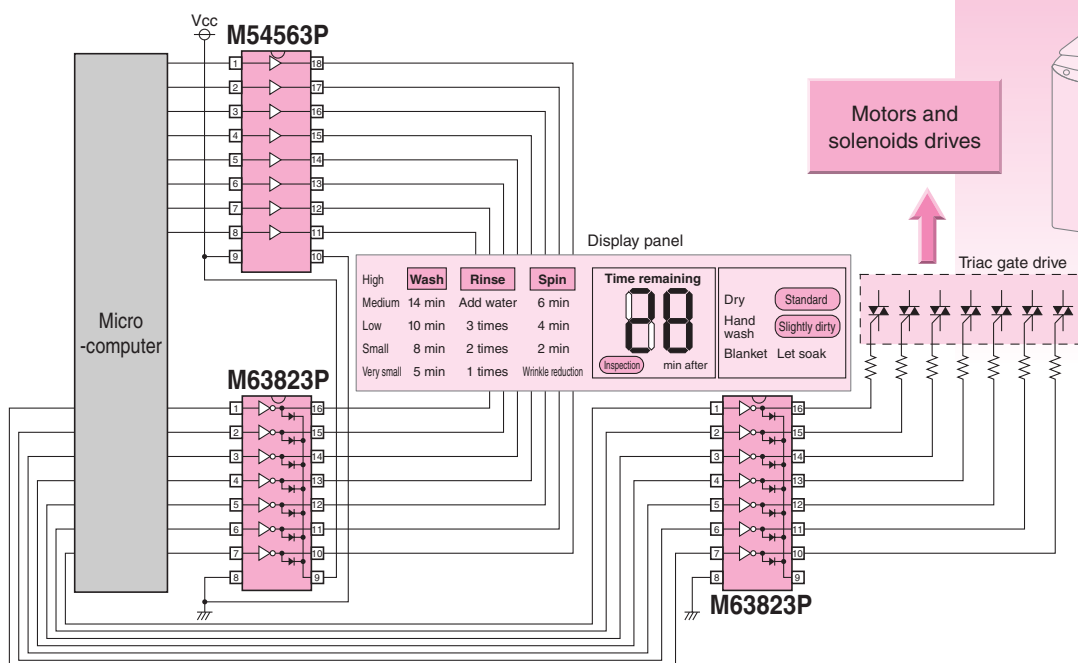
Air conditioner example 2 [Internal unit]



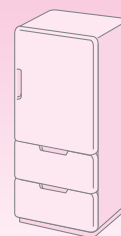
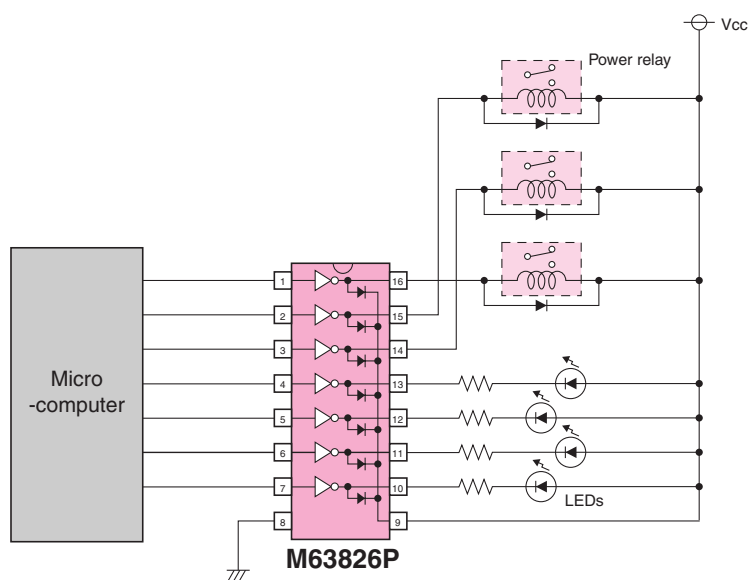
Air conditioner example 3 [External unit]



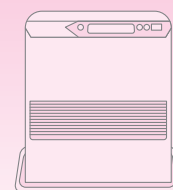
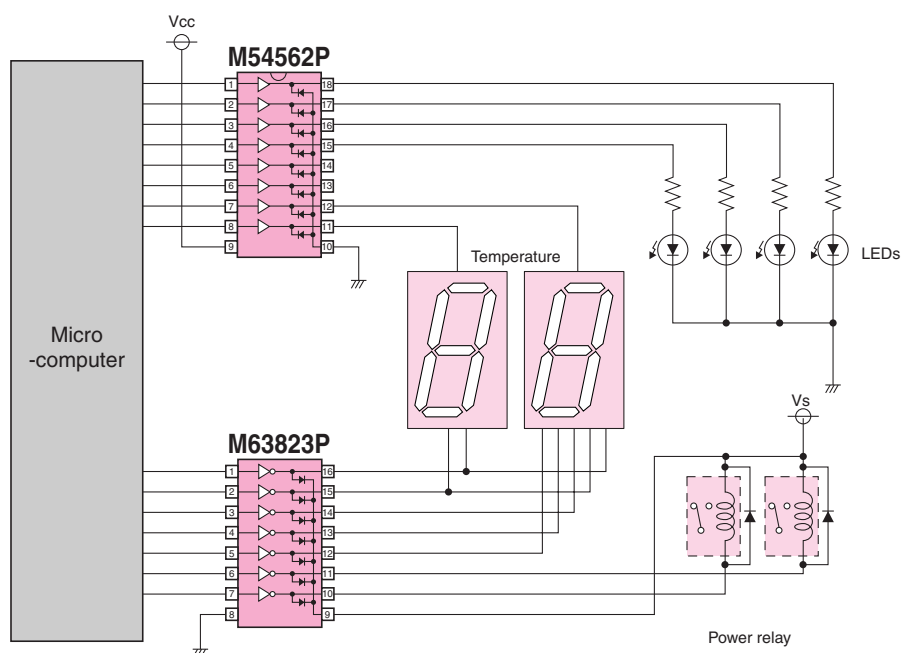
Washing machine



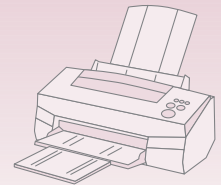
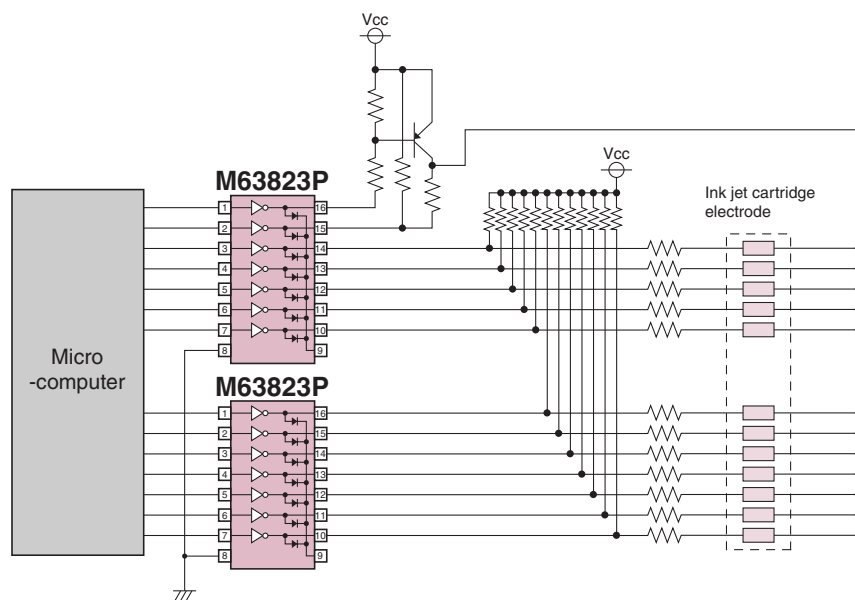
Refrigerator



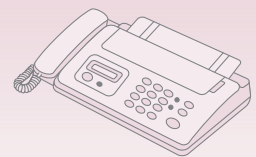
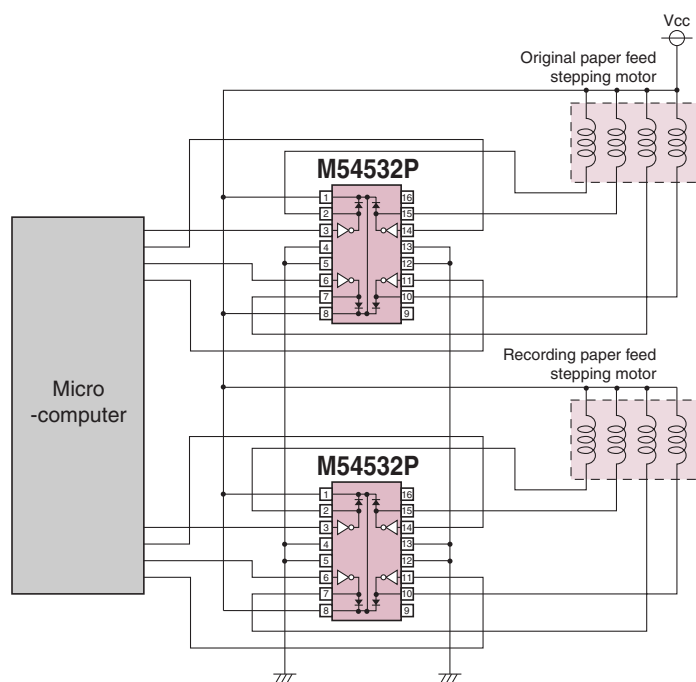
Fan heater



Ink jet printer

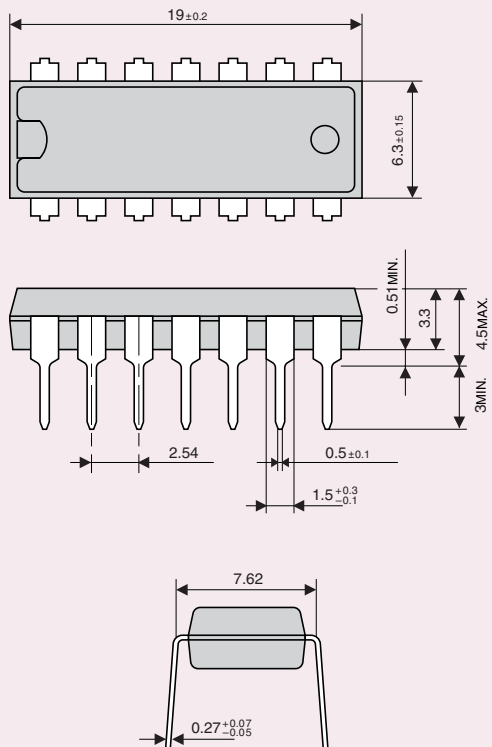


Fax



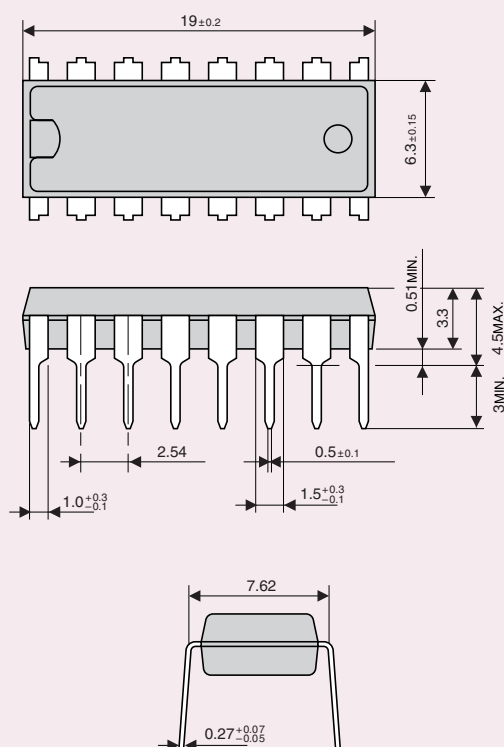
TYPE 14P4

14pin 300mil DIP



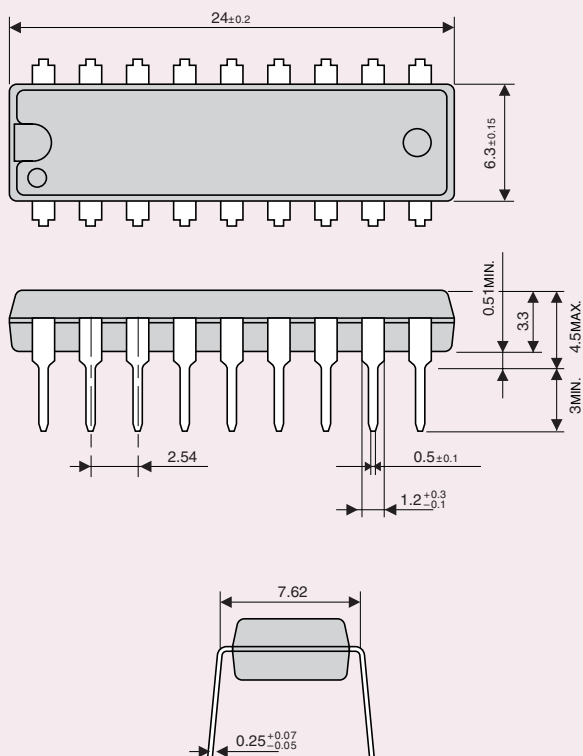
TYPE 16P4

16pin 300mil DIP



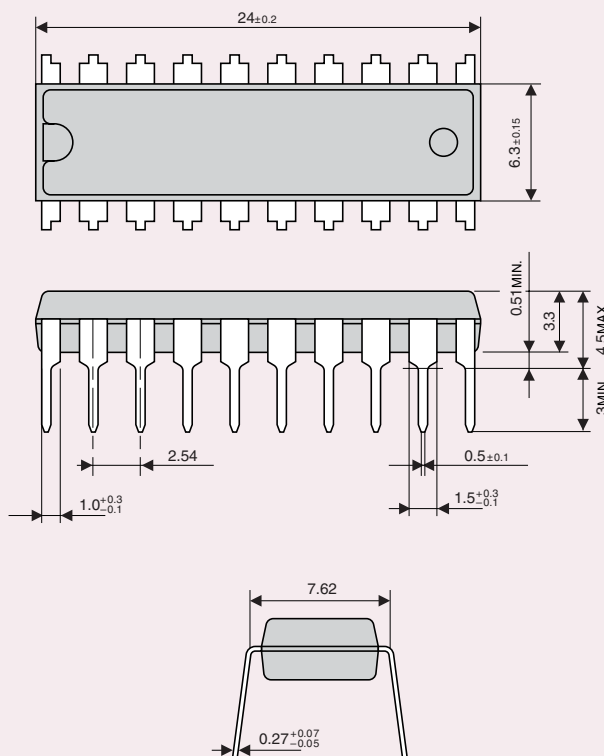
TYPE 18P4G

18pin 300mil DIP



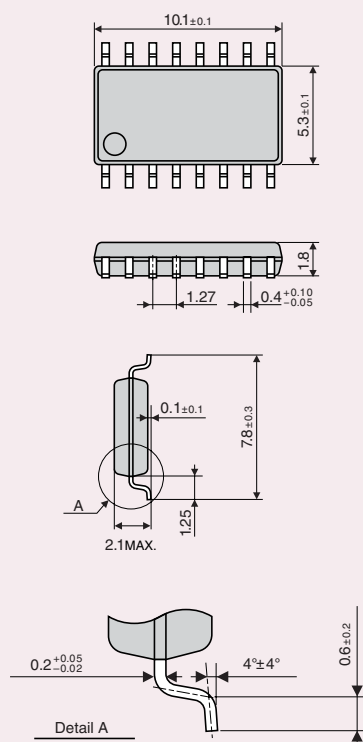
TYPE 20P4

20pin 300mil DIP

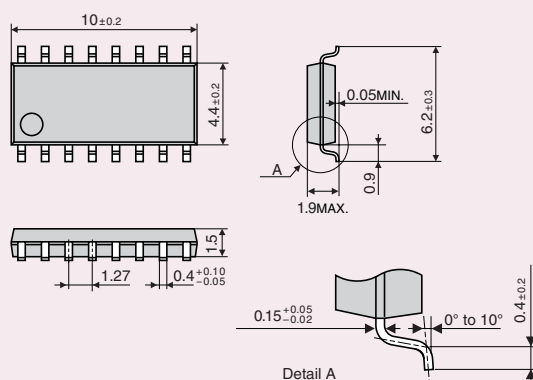


TYPE 16P2N

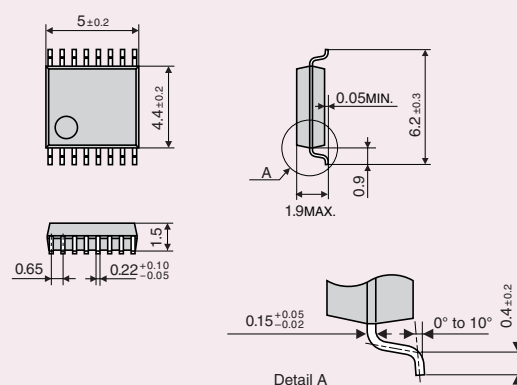
16pin 300mil SOP

**TYPE 16P2S**

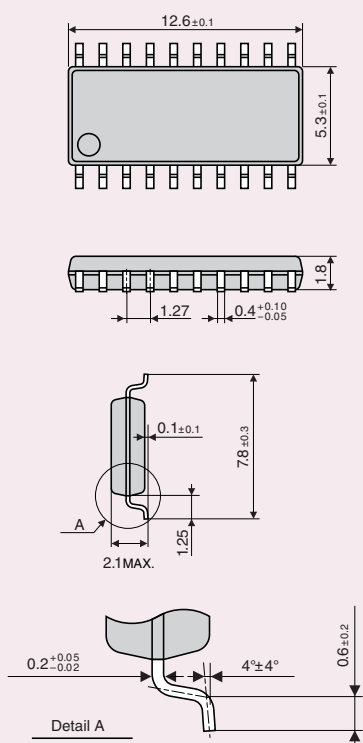
16pin 225mil SOP

**TYPE 16P2Z**

16pin 225mil SSOP

**TYPE 20P2N**

20pin 300mil SOP

**TYPE 20P2E**

20pin 225mil SSOP

