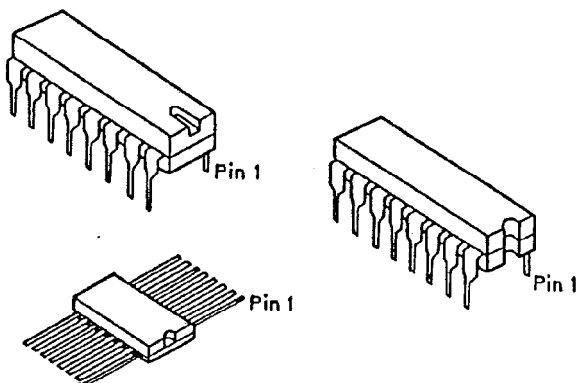


BRITISH STANDARDS INSTITUTION 2 PARK STREET, LONDON. W1A 2BS	BS CECC 90102 - 047 ISSUE 1 OCTOBER 1982 Page 1 of 18 pages
Specification available from:- AS SHOWN IN PD 9002 AND CECC 00 200 AND ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH: BS CECC 90 000 : 1976 BS CECC 90 100 : 1977	 MANUFACTURERS TYPE NUMBER 54S112 64S112 74S112 84S112 SEE PD 9002 AND CECC 00 200 For ordering information see clause 1
Outline not to scale: Isometric projection Marking information see clause 1  Refer to IEC 191-1-50a (type A50C) Dual-in-Line (plastic or ceramic) refer to Appendix A1.3 Flatpack (metal or ceramic)	DUAL J-K NEGATIVE-EDGE TRIGGERED BISTABLES WITH PRESET AND CLEAR TYPICAL CONSTRUCTION SILICON MONOLITHIC BIPOLAR CAVITY AND NON-CAVITY PACKAGES ASSESSMENT LEVELS R, S, T AND V

1. Type description

1.1 Truth table (see page 2)

Refer to Qualified Products List PD 9002 and/or CECC 00 200 for details of manufacturers approved to this specification

1.1 Truth table (contd)

INPUTS					OUTPUTS	
PRESET	CLEAR	CLOCK	J	K	Q	$\bar{Q}$
L	H	X	X	X	H	L
H	L	X	X	X	L	H
L	L	X	X	X	H*	H*
H	H	↓	L	L	Q ₀	$\bar{Q}_0$
H	H	↓	H	L	H	L
H	H	↓	L	H	L	H
H	H	↓	H	H	TOGGLE	TOGGLE
H	H	H	X	X	Q ₀	$\bar{Q}_0$

H = High level

L = Low level

X = Logic level irrelevant

↓ = Transition from High to Low level

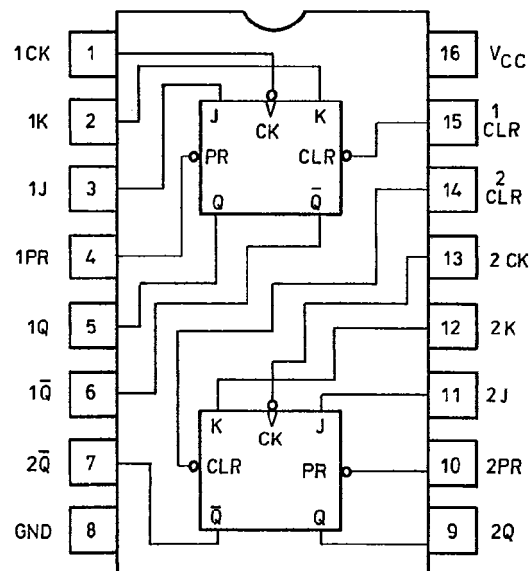
Q₀ = The level of Q before the indicated input conditions were established.

TOGGLE = Each output changes to the complement of its previous level on each active transition of the clock

* = This configuration is non-stable; i.e. it will not persist when preset and clear inputs return to their inactive level

1.2 Terminal identification, type designation and marking

1.2.1 Terminal identification



Dual J-K negative-edge triggered bistables with preset and clear

1.2.2 Type designation

TEMPERATURE RANGE	PACKAGE		
	Ceramic Dual-in-Line	Plastic Dual-in-Line	Ceramic Flatpack
0 + 70	74S112J	N	W
-25 + 85	84S112J		
-40 + 85	64S112J		
-55 +125	54S112J		

1.2.3 Marking

Each integrated circuit shall bear the following markings:

- (1) Terminal identification
- (2) Type designation
- (3) Date code
- (4) Factory identification code (unless derived from trademark)
- (5) Manufacturers trade name or mark
- (6) Mark of conformity (unless a certificate of conformity is used)

2. Limiting conditions of use (not for inspection purposes)

2.1	Minimum and maximum continuous supply voltage	V_{CC}						-0,5V +7,0V
2.2	Minimum and maximum input voltages							
2.2.1	Minimum and maximum input voltage	V_I						-0,5V +5,5V
2.2.2	Maximum input voltage between multiple emitter transistor inputs	V_{II}						+5,5V
				54S	64S	74S	84S	
2.3	Minimum and maximum operating ambient temperature	$T_{amb}(^{\circ}C)$	min. max.	-55 +125	-40 +85	0 +70	-25 +85	
2.4	Minimum and maximum storage temperatures	$T_{stg}(^{\circ}C)$	min. max.	-65 +150	(All types)			

3. Recommended operating conditions and associated characteristics (not for inspection purposes)

3.1 Recommended operating conditions

These apply over the operating ambient temperature range unless otherwise stated.

Description	Symbol	Type	Value	Unit
Positive supply voltage range	V_{CC}	54S 64/74/84S	4,5 - 5,5 4,75 - 5,25	V V
Minimum value of High level input voltage	V_{IHB}	All types	2,0	V
Maximum value of High level input voltage	V_{IHA}	All types	5,5	V
Minimum value of Low level input voltage	V_{ILB}	All types	-0,3	V
Maximum value of Low level input voltage	V_{ILA}	All types	0,8	V
Maximum value of Low level output current for each output	I_{OLA}	All types	20,0	mA
Maximum value of output current for each output at V_{OH}	I_{OHA}	All types	-1,0	mA
D.C. noise margin at Low level ($V_{ILA} - V_{OLA}$)	V_{NL}	All types	0,3	V
at High level ($V_{OHB} - V_{IHB}$)	V_{NH}	54S 64/74/84S	0,5 0,7	V V

3.2 Associated characteristics

3.2.1 Minimum and maximum values are given for the worst case operation over the ambient temperature range, except for those conditions marked with an asterisk (*)

	54S	64S	74S	84S	
T _{amb} min.	-55	-40	0	-25	°C
T _{amb} max.	+125	+85	+70	+85	
V _{CC} min.	4,5	4,75			V
V _{CC} max.	5,5	5,25			

3.2.2

Characteristics	Conditions	$V_{CC}(V)$	Symbol	Min.	Max.	Unit
Average total supply current	Q and $\bar{Q}$ outputs High in turn	V_{CC} max.	I_{CC}	-	50,0	mA
High level input current J or K inputs Clear, Preset Clock	$V_{IH(1)} = 5,5V$	V_{CC} max.	$I_{IH(1)}$	-	1,0	mA
	$V_{IH(2)} = 2,7V$	V_{CC} max.	$I_{IH(2)}$	-	50,0	μA
			$I_{IH(2)}$	-	100,0	μA
Low level input current J or K inputs Clear, Preset Clock	$V_{IN} = 0,5V$	V_{CC} max.	$-I_{IL}$	-	1,6	mA
			$-I_{IL}$	-	7,0	mA
			$-I_{IL}$	-	4,0	mA
Input clamping voltage	$-I_{IC} = 18,0mA$	V_{CC} min.	$-V_{IC}$	-	1,2	V
Output voltage 54S 64/74/84S All types	$I_{OH} = -1,0mA$ $I_{OH} = -1,0mA$ $I_{OL} = 20,0mA$ (1)	V_{CC} min.	V_{OH}	2,5	-	V
			V_{OH}	2,7	-	V
			V_{OL}	-	0,5	V
Output short circuit current	V_{IN} as defined by the truth table to give High level output $V_O = 0V$ (2)	V_{CC} max.	$-I_{OS}$	40,0	100,0	mA
Propagation times All types	$T_{amb} = 25^{\circ}C^*$ test conditions as in Sub-group A5	5,0V				
High to Low level						
From Preset or Clear (Clock High)	To $\bar{Q}$ or Q		t_{PHL}	-	7,0	ns
Preset or Clock (Clock Low)	$\bar{Q}$ or Q		t_{PHL}	-	7,0	ns
Clock	Q or $\bar{Q}$		t_{PHL}	-	7,0	ns

(1) Fan out = 10

(2) Only one output at a time, duration $t \leq 1$ sec

*See Clauses 3.1 and 3.2.1 of this specification

3.2.2
(contd)

Characteristics	Conditions	$V_{CC}(V)$	Symbol	Min.	Max.	Unit
Propagation times (contd)						
Low to High level						
From To						
Preset or Clear Q or $\bar{Q}$			t_{PLH}	-	7,0	ns
(Clock High)						
Preset or Clock Q or $\bar{Q}$			t_{PLH}	-	7,0	ns
(Clock Low)						
Clock Q or $\bar{Q}$			t_{PLH}	-	7,0	ns
Maximum clock frequency			f_{clock}	80,0	-	MHz
Input pulse duration						
Clock pulse			t_w	6,0	-	ns
Clock Pulse	Low level		t_w	6,5	-	ns
Clear or Preset Pulse	Low level		t_w	8,0	-	ns
Input set-up time						
High level data			t_{set-up}	3,0 $\downarrow$	-	ns
Low level data			t_{set-up}	3,0 $\downarrow$	-	ns
Hold time			t_{hold}	0 $\downarrow$	-	ns

 $\downarrow$ W.R.T. falling edge of clock pulse