LOW POWER SCHOTTKY INTEGRATED CIRCUITS

T54LS145
T74LS145

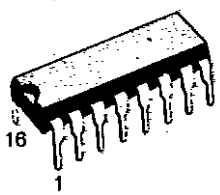
67C 16204 D T-51-17

PRELIMINARY DATA

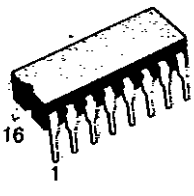
1-OF-10 DECODER/DRIVER OPEN COLLECTOR

DESCRIPTION

The T54LS145/T74LS145 is a 1-of-10 Decoder/Driver which accepts BCD inputs and produces outputs which drive 10 digit incandescent displays. All outputs remain off for all invalid binary intput conditions. It is designed for use as indicator/relay drivers or as an open collector logic circuit driver. Each high breakdown output transistor sinks up to 80mA of current. Typical power dissipation is 35mW. This device is fully compatible with TTL families, and is ideal as a lamp or solenoid driver.



B1
Plastic Package



D1/D2
Ceramic Package

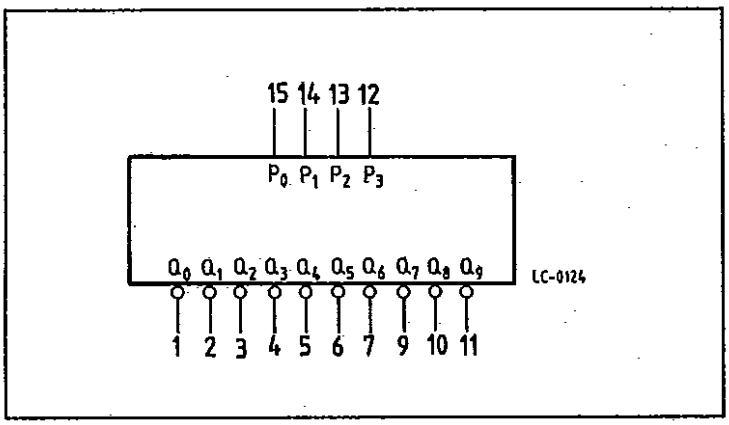
M1
Micro Package

C1
Plastic Chip Carrier

ORDERING NUMBERS:

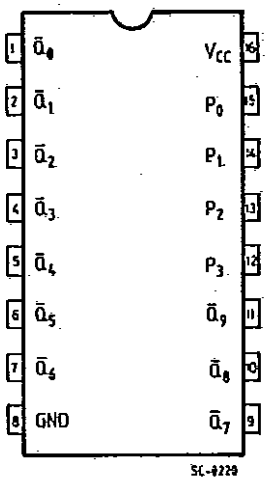
T54LS145 D2	T74LS145 C1
T74LS145 D1	T74LS145 M1
T74LS145 B1	

- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS

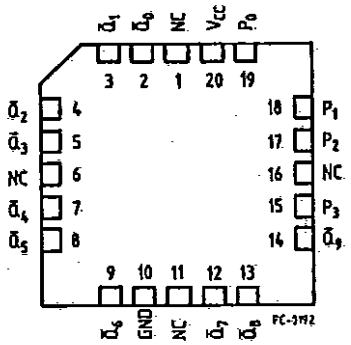


PIN CONNECTION
(top view)

DUAL IN LINE



CHIP CARRIER



NC = No Internal Connection

PIN NAMES

P_0, P_1, P_2, P_3	BCD Inputs
$\overline{Q}_3$ to $\overline{Q}_9$	Outputs

TRUTH TABLE

INPUTS				OUTPUTS									
P_D	P_C	P_B	P_A	$\overline{Q}_0$	$\overline{Q}_1$	$\overline{Q}_2$	$\overline{Q}_3$	$\overline{Q}_4$	$\overline{Q}_5$	$\overline{Q}_6$	$\overline{Q}_7$	$\overline{Q}_8$	$\overline{Q}_9$
L	L	L	L	L	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	H	H
L	L	H	L	H	H	L	H	H	H	H	H	H	H
L	L	H	H	H	H	H	L	H	H	H	H	H	H
L	H	L	L	H	H	H	H	L	H	H	H	H	H
L	H	L	H	H	H	H	H	H	L	H	H	H	H
L	H	H	L	H	H	H	H	H	H	L	H	H	H
L	H	H	H	H	H	H	H	H	H	H	L	H	H
H	L	L	L	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L
H	L	H	L	H	H	H	H	H	H	H	H	H	H
H	L	H	H	H	H	H	H	H	H	H	H	H	H
H	H	L	L	H	H	H	H	H	H	H	H	H	H
H	H	L	H	H	H	H	H	H	H	H	H	H	H
H	H	H	L	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	H	H	H	H	H	H

H = HIGH Voltage Level
L = LOW Voltage Level

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	−0.5 to 7	V
V_I	Input Voltage, Applied to Input	−0.5 to 15	V
V_O	Output Voltage, Applied to Output	0 to 10	V
I_I	Input Current, Into Inputs	−30 to 5	mA
I_O	Output Current, Into Outputs	50	mA

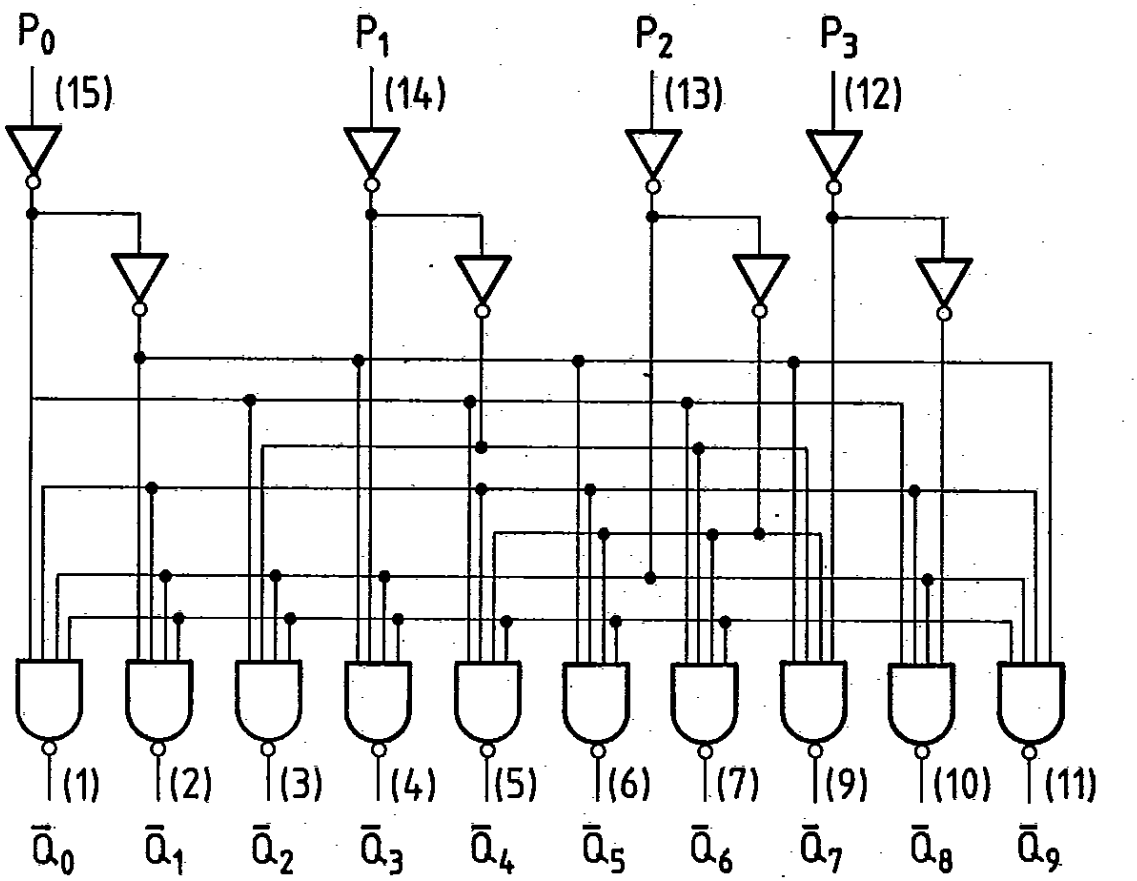
Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

GUARANTEED OPERATING RANGES

Part Numbers	Supply Voltage			Temperature
	Min	Typ	Max	
T54LS145D2	4.5 V	5.0 V	5.5 V	−55°C to +125°C
T74LS145XX	4.75 V	5.0 V	5.25 V	0°C to +70°C

XX = package type.

LOGIC DIAGRAM



LC-0125

V_{CC} = Pin 16
GND = Pin 8
( ) = Pin numbers

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter		Limits Min.	Limits Typ.	Limits Max.	Test Conditions (Note 1)		Units
V_{IH}	Input HIGH Voltage		2.0			Guaranteed input HIGH Voltage for all Inputs		V
V_{IL}	Input LOW Voltage	54			0.7	Guaranteed input LOW Voltage for all Inputs		V
		74			0.8			
V_{CD}	Input Clamp Diode Voltage			−0.65	−1.5	V_{CC} = MIN, I_{IN} = −18mA		V
I_{OH}	Output HIGH Current	54,74			250	V_{CC} = MIN, V_{OH} = 15V		mA
V_{OL}	Output LOW Voltage	54,74		0.25	0.4	I_{OL} = 12mA	V_{CC} = MIN, V_{IN} = V_{IL} or V_{IH} per Truth Table	V
		74		0.35	0.5	I_{OL} = 24mA		
		54,74		2.3	3.0	I_{OL} = 80mA		
I_{IH}	Input HIGH Current				20 0.1	V_{CC} = MAX, V_{IN} = 2.7V V_{CC} = MAX, V_{IN} = 7.0V		μA mA
I_{IL}	Input LOW Current				−0.4	V_{CC} = MAX, V_{IN} = 0.4V		mA
I_{CC}	Power Supply Current				13	V_{CC} = MAX, V_{IN} = GND		mA

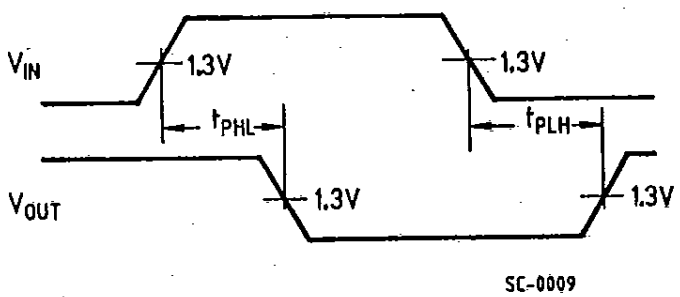
AC CHARACTERISTICS: $T_A = 25°C$

Symbol	Parameter	Limits Min.	Limits Typ.	Limits Max.	Test Conditions	Units
t_{PHL} t_{PLH}	Propagation Delay, P_n Input to Q_n Output			50 50	V_{CC} = 5.0V C_L = 45pF	ns

Notes:
1) For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
2) Typical values are at V_{CC} = 5.0V, T_A = 25°C

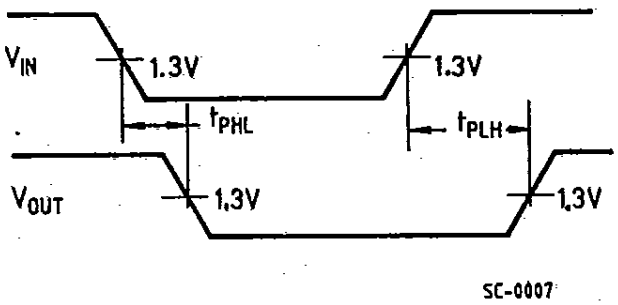
AC WAVEFORMS

Fig. 1



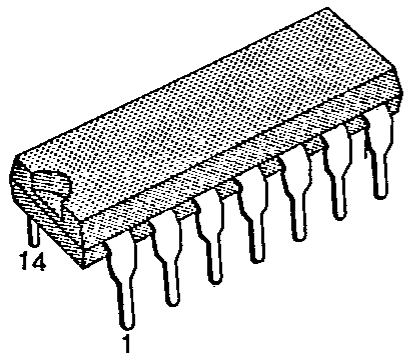
SC-0009

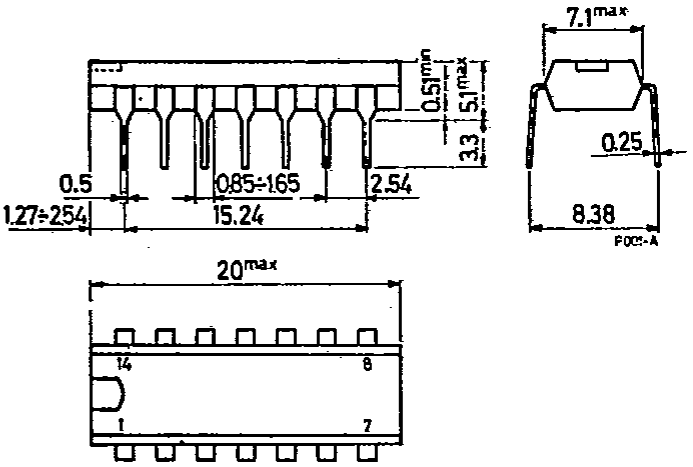
Fig. 2



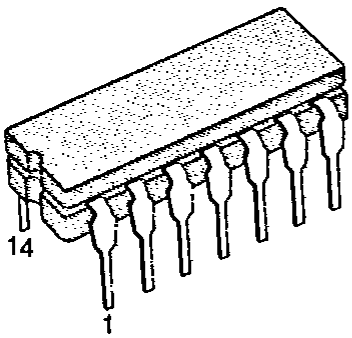
SC-0007

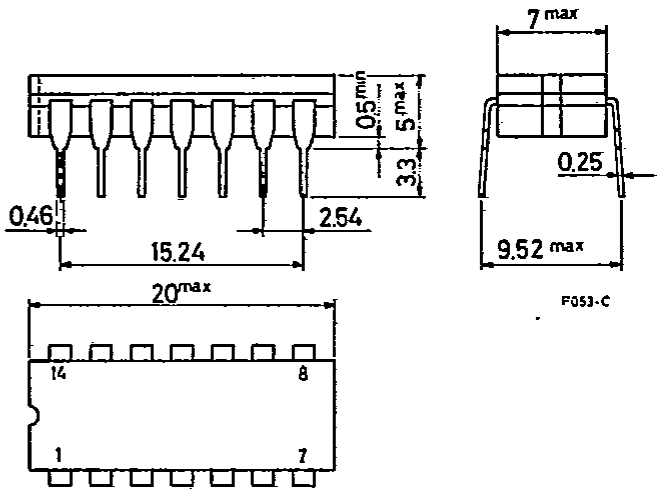
14-LEAD PLASTIC DIP



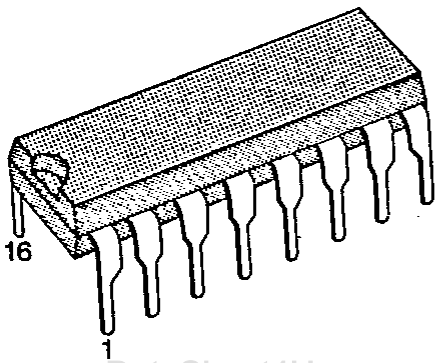


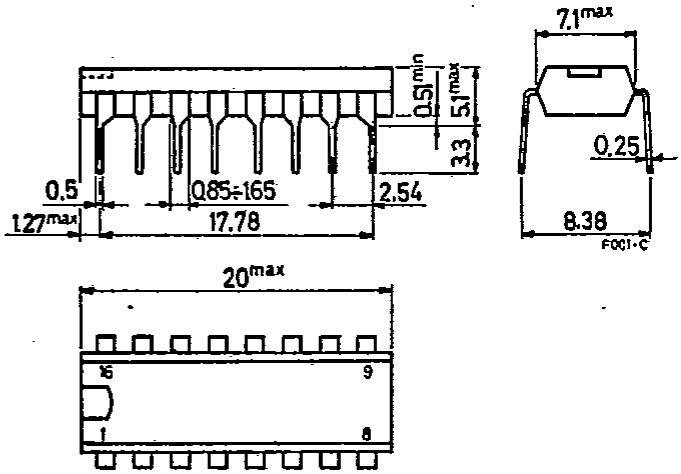
14-LEAD CERAMIC DIP





16-LEAD PLASTIC DIP





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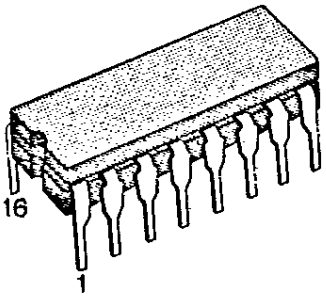

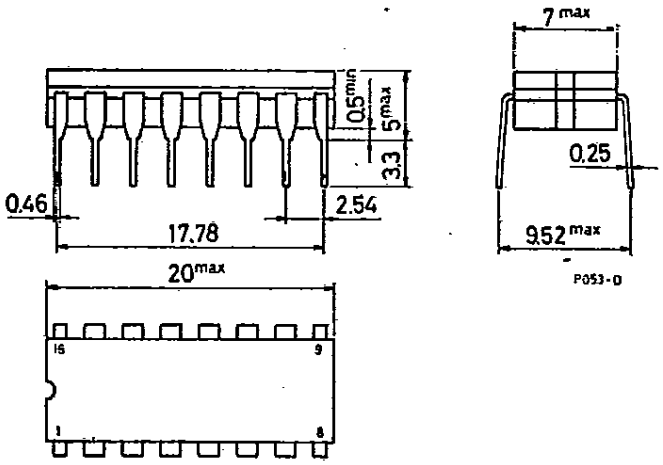

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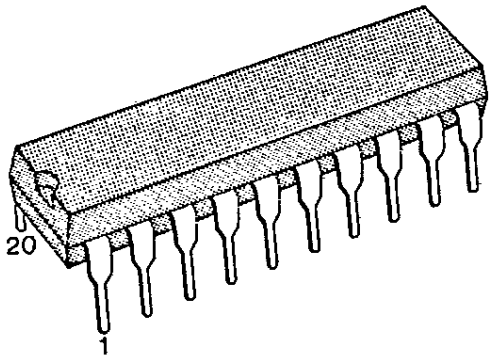

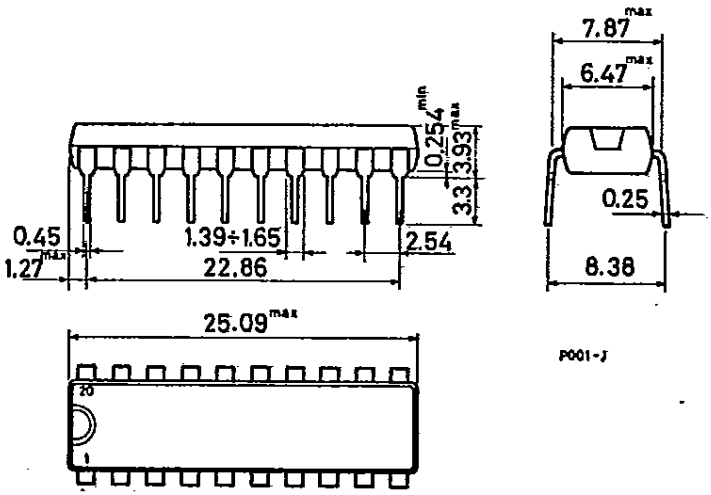

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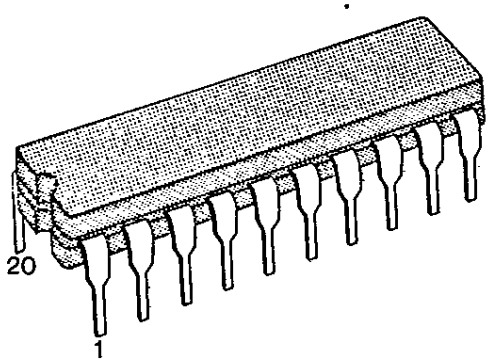
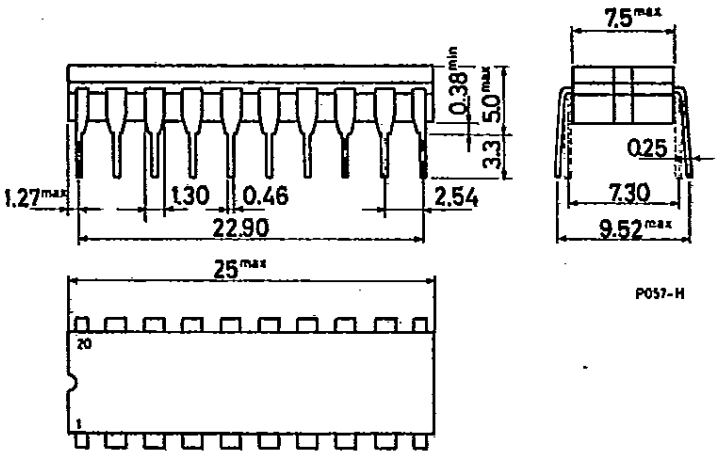
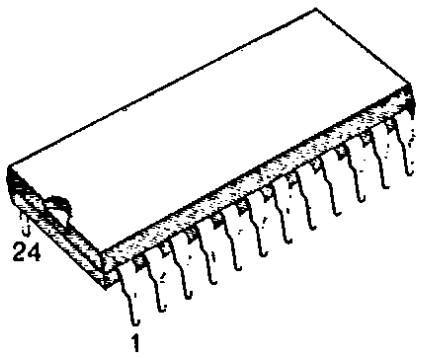
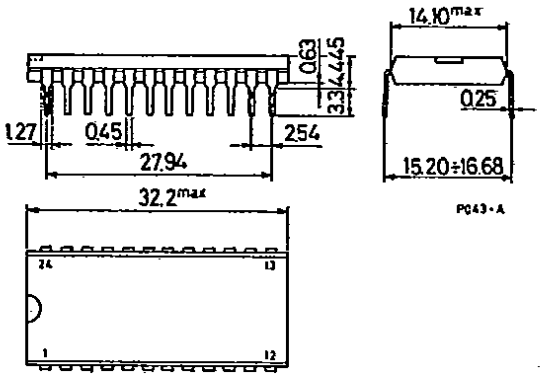




24-LEAD PLASTIC DIP





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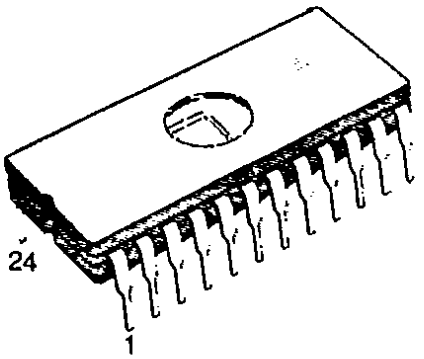
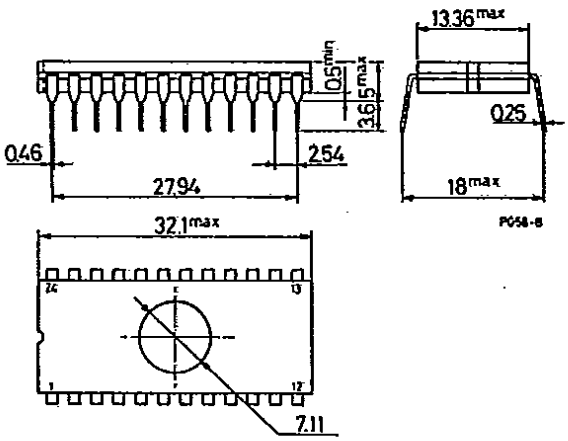
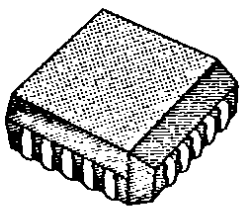
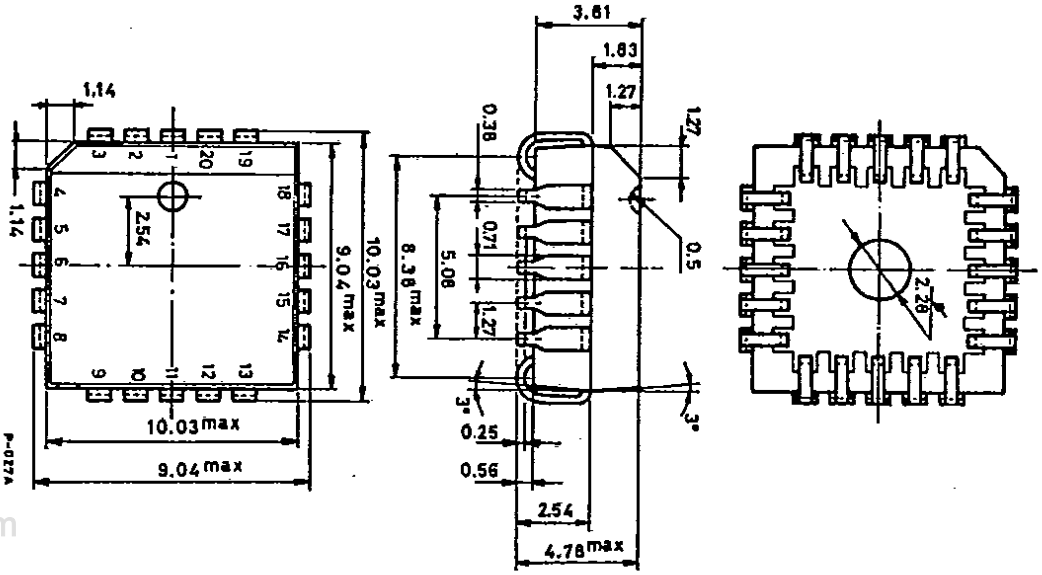


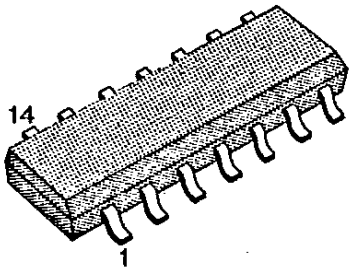


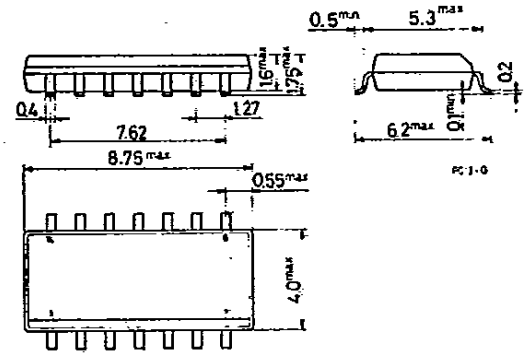
CHIP CARRIER 20 LEAD PLASTIC





14-LEAD PLASTIC DIP MICROPACKAGE





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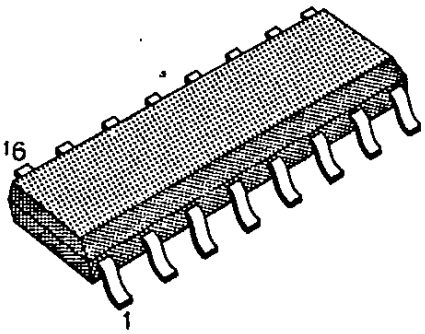

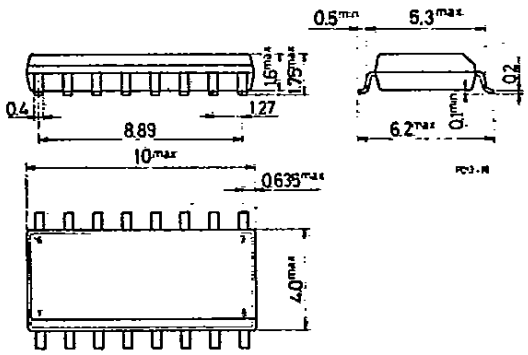

NOTE: FOR 20-LEAD PLASTIC DIP MICROPACKAGE CONTACT SGS

Surface Mounted

One possible solution to the important problem of PWB minimization, is that of using surface mounted components. Integrated circuits in SO (Small Outline) packages are made up of standard chips mounted in very small plastic packages.
The advantages given by using these devices are:

PWB Reduction

This is by far the most important advantage since the reduction of PWB size varies from 40 to 60% in comparison with standard board types. (See page 584 for package dimensions.)

Assembly Cost Reduction

SO Devices require no preliminary operation prior to mounting and can therefore be easily utilized in fully automatic equipment.

Increasing Reliability

The following characteristics lead to a higher level of reliability with respect to their standard packaged counter parts:

- The mounting system is fully automatic
- PWB number and the interconnections between them are reduced when the same number of devices are used.
- The high density of components on the board makes it thermally much more stable.

Noise Reduction and Improved Frequency Response

The reduction of the length of the connecting wires between the leads and the silicon guarantees a more homogeneous propogation delay between the external pins, with respect to the standard type.

Assembly Without Board Holes

The devices are placed on the board and soldered. This technology permits a higher level of tolerance in the positioning (automatic) of the device. For the standard DIP types this must be done with great accuracy due to the insertion of the leads into their holes.