

# LOW POWER SCHOTTKY INTEGRATED CIRCUITS

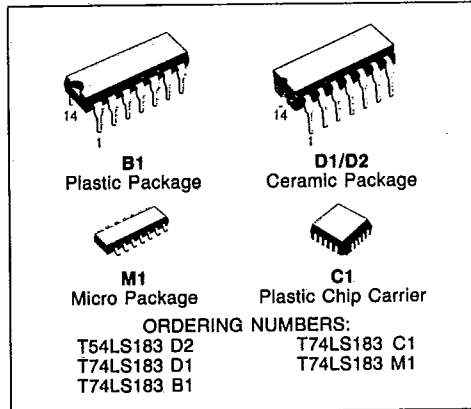


67C 16292 D T-45-07

## DUAL CARRY-SAVE FULL ADDER

### DESCRIPTION

The T54LS183/T74LS183 is a Dual Adder characterising high-speed, high-fan-out Darlington outputs, all inputs are diode clamped for system design simplification. A separate carry output for each bit is designed to be used in multiple input, carry-save techniques to produce true sum and true carry outputs with two gate delays at least.

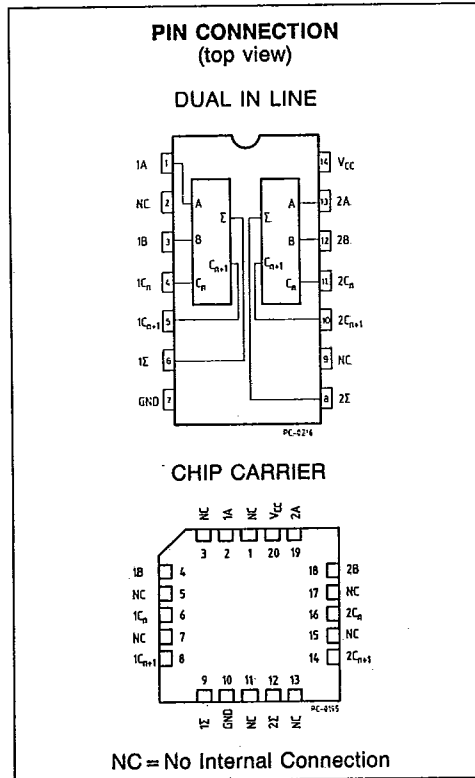


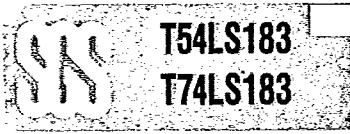
- FOR USE IN HIGH-SPEED WALLACE-TREE SUMMING NETWORKS
- HIGH-SPEED, HIGH-FAN-OUT DARLINGTON OUTPUTS

### TRUTH TABLE

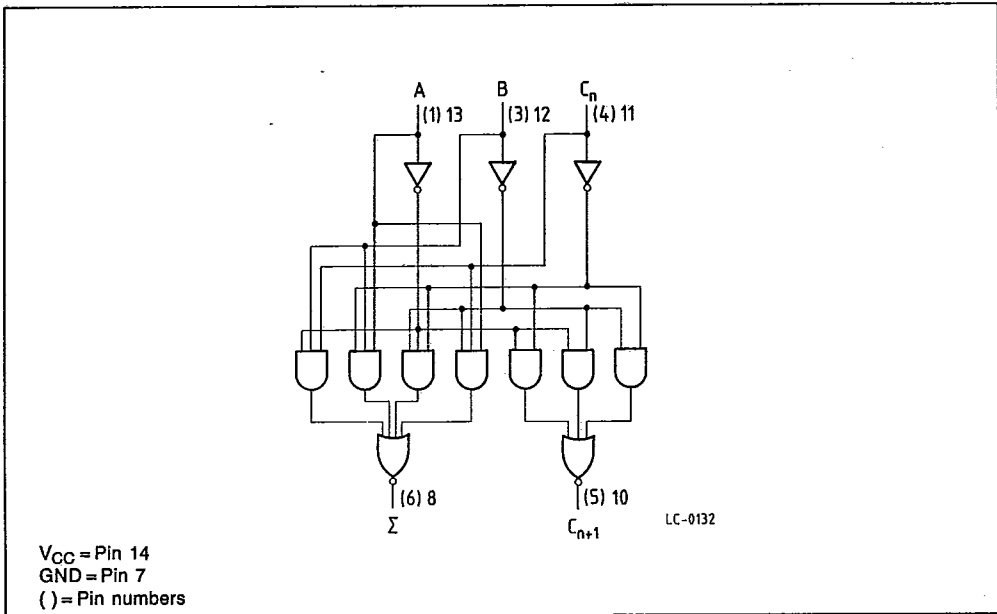
INPUTS			OUTPUTS	
$C_n$	B	A	$\Sigma$	$C_{n+1}$
L	L	L	L	L
L	L	H	H	L
L	H	L	H	L
L	H	H	L	H
H	L	L	H	L
H	L	H	L	H
H	H	L	L	H
H	H	H	H	H

H = High level, L = Low level





**LOGIC DIAGRAM**



**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	
T54LS183D2	4.5 V	5.0 V	5.5 V	-55°C to +125°C
T74LS183XX	4.75 V	5.0 V	5.25 V	0°C to +70°C

XX = package type.



T54LS183

T74LS183

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter	Limits			Test Conditions (Note 1)	Units
		Min.	Typ.	Max.		
$V_{IH}$	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	$V_{CC} = \text{MIN}, I_{IN} = -18\text{mA}$	V
$V_{OH}$	Output HIGH Voltage	54	2.5	3.5	$V_{CC} = \text{MIN}, I_{OH} = -400\mu\text{A}, V_{IN} = V_{IH}$ or $V_{IL}$ per Truth Table	V
		74	2.7	3.5		
$V_{OL}$	Output LOW Voltage	54,74	0.25	0.4	$I_{OL} = 4.0\text{mA}$ $V_{CC} = \text{MIN}, V_{IN} = V_{IL}$ or $V_{IH}$ per Truth Table	V
		74	0.35	0.5		
$I_{IH}$	Input HIGH Current			60	$V_{CC} = \text{MAX}, V_{IN} = 2.7\text{V}$ $V_{CC} = \text{MAX}, V_{IN} = 7.0\text{V}$	$\mu\text{A}$ mA
				0.3		
$I_{IL}$	Input LOW Current			-1.2	$V_{CC} = \text{MAX}, V_{IN} = 0.4\text{V}$	mA
$I_{OS}$	Output Short Circuit Current (Note 2)	-20		-100	$V_{CC} = \text{MAX}$	mA
$I_{CC}$	Power Supply Current Total, Output HIGH Total, Output LOW			14	$V_{CC} = \text{MAX}$	mA
				17		

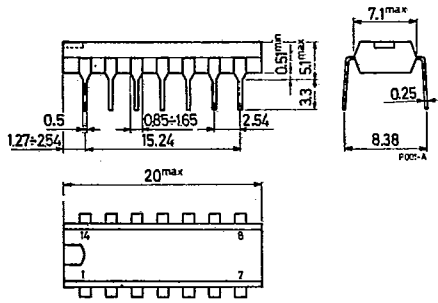
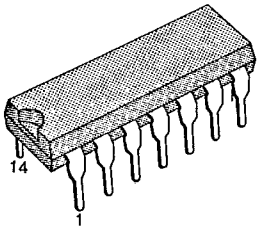
AC CHARACTERISTICS:  $T_A = 25^\circ\text{C}$ 

Symbol	Parameter	Limits			Test Conditions	Units
		Min.	Typ.	Max.		
$t_{PLH}$	Propagation Delay Time Low-to-High Level Output		9.0	15	$V_{CC} = 5.0\text{V}$ $C_L = 15\text{pF}$	ns
$t_{PHL}$	Propagation Delay Time Low-to-High Level Output		12	18		ns

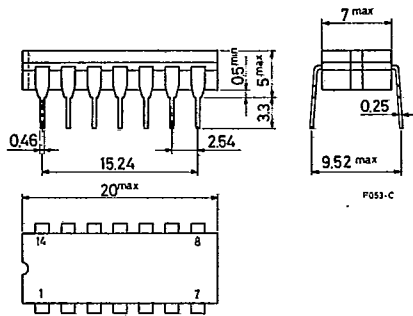
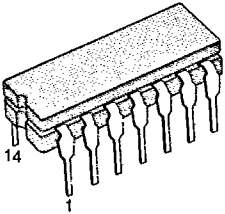
## Notes:

- 1) For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
- 2) Not more than one output should be shorted at a time.
- 3) Typical values are at  $V_{CC} = 5.0\text{V}$ ,  $T_A = 25^\circ\text{C}$

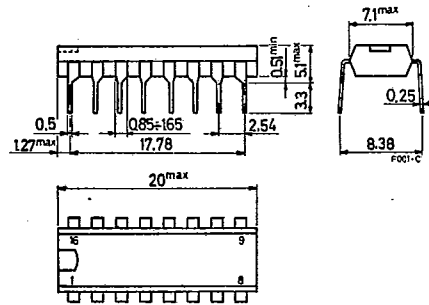
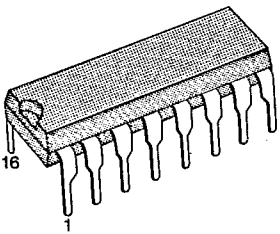
### 14-LEAD PLASTIC DIP



### 14-LEAD CERAMIC DIP



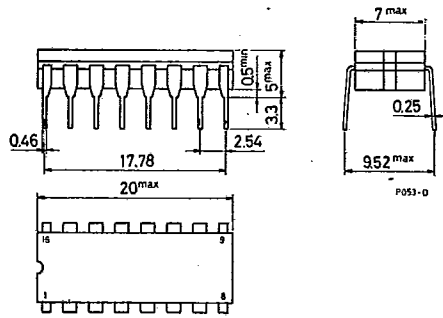
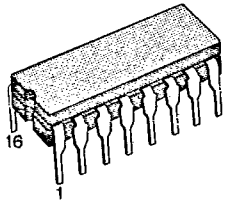
### 16-LEAD PLASTIC DIP



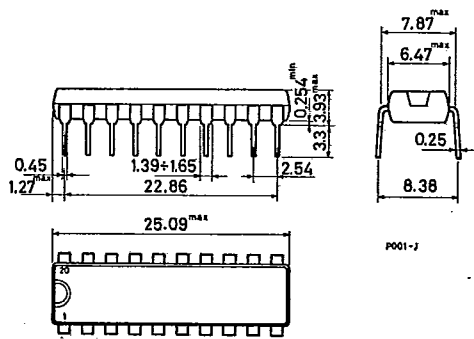
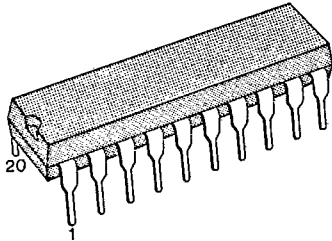
# Packages

67C 16545 D T-90-20

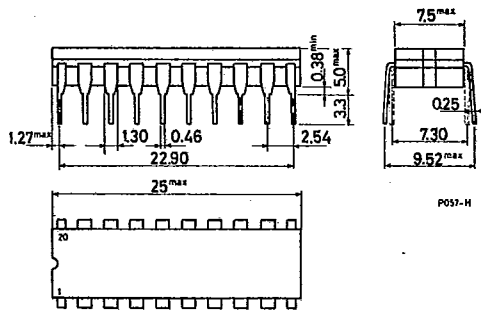
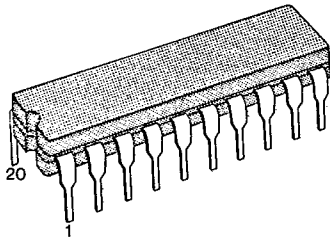
## 16-LEAD CERAMIC DIP



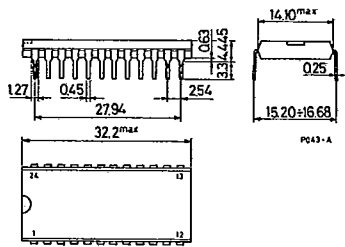
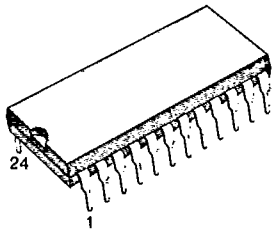
## 20-LEAD PLASTIC DIP



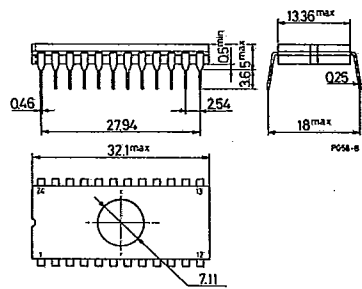
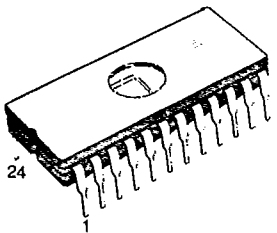
## 20-LEAD CERAMIC DIP



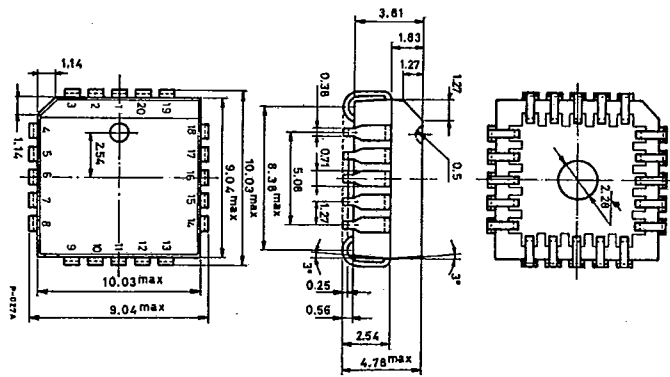
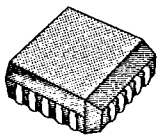
24-LEAD PLASTIC DIP



24-LEAD CERAMIC DIP



CHIP CARRIER 20 LEAD PLASTIC



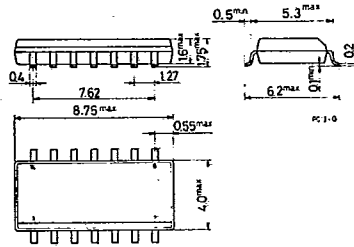
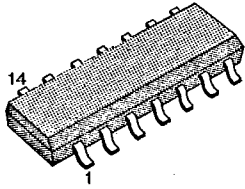
# Packages

67C 16547

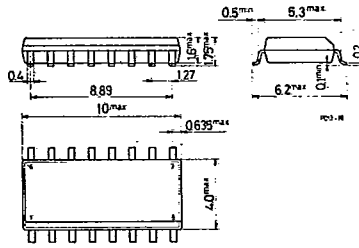
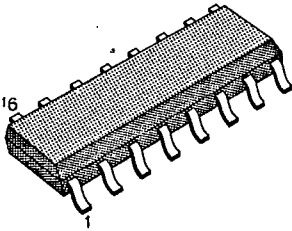
D

T-90-20

## 14-LEAD PLASTIC DIP MICROPACKAGE



## 16-LEAD PLASTIC DIP MICROPACKAGE



NOTE: FOR 20-LEAD PLASTIC DIP MICROPACKAGE CONTACT SGS

# Surface Mounted

67C 16548

D

T-90-20

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 propagation 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.

