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# SP8634B SP8635B SP8637B

700/600/400MHz ÷ 10 (BCD OUTPUTS)

The SP8634/5 and 7 are ECL decade counters with TTL compatible BCD outputs. They require an AC coupled input of 600mV p-p and have an ECL 10K compatible inhibit input which inhibits the device when in the high state. Both ECL and TTL 'carry' outputs are provided and there is a TTL reset.

### FEATURES

- BCD Outputs TTL Compatible
- Reset Input TTL Compatible
- AC Coupled Input (Internal Bias)
- TTL and ECL Compatible Carry Outputs
- Clock Inhibit Input ECL Compatible

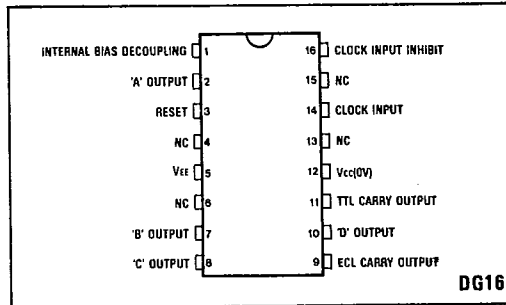


Fig.1 Pin connections - top view

### QUICK REFERENCE DATA

- Supply Voltage: 5.2V
- Power Consumption: 400mW
- Temperature Range: 0°C to +70°C

### ABSOLUTE MAXIMUM RATINGS

Supply voltage	-8V
BCD outputs voltage	V <sub>EE</sub> +11V
Storage temperature range	-55°C to +150°C
Max. junction temperature	+175°C
Max. clock I/P voltage	2.5V p-p

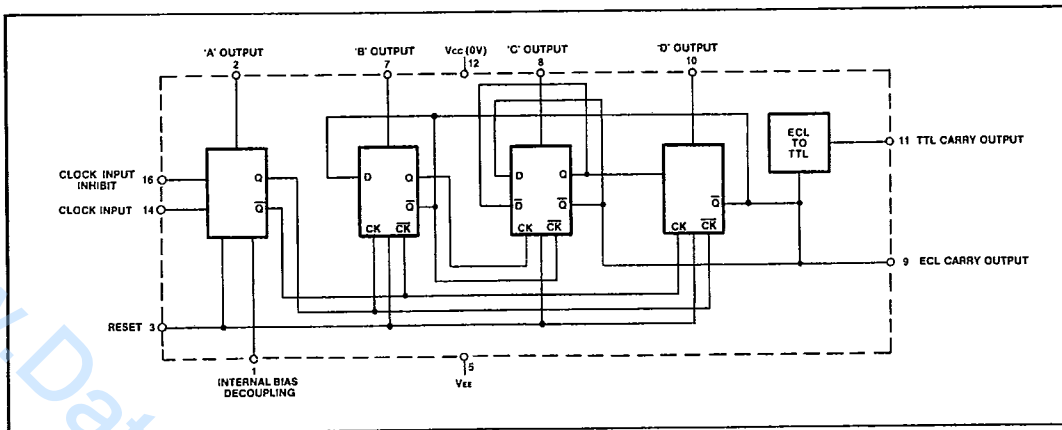


Fig.2 Functional diagram

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ELECTRICAL CHARACTERISTICS

PLESSEY SEMICONDUCTORS

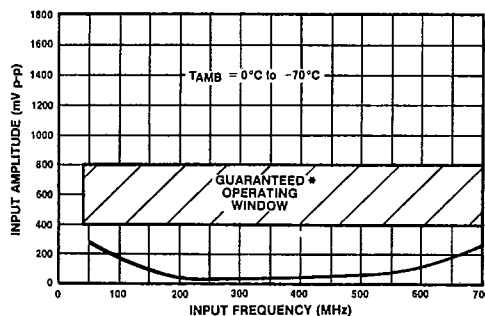
Supply Voltage:  $V_{CC} = 0V$   $V_{EE} = -5.2V \pm 0.25V$   
 Temperature:  $T_{amb} = 0^{\circ}C$  to  $+70^{\circ}C$

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Characteristics	Symbol	Value		Units	Grade	Conditions	Notes
		Min.	Max.				
Maximum frequency sinewave input	$f_{max}$	700		MHz	SP8634B	Input = 400-800mV p-p	} Note 5
		600		MHz	SP8635B		
		400		MHz	SP8637B		
Minimum frequency sinewave input	$f_{min}$		40	MHz	All	Input = 400-800mV p-p	Note 7
Power supply current	$I_{EE}$		90	mA	All	$V_{EE} = -5.2V$	Note 6
Clock inhibit high voltage	$V_{INH}$	-0.96		V	All	$V_{EE} = -5.2V (25^{\circ}C)$	
Clock inhibit low voltage	$V_{INL}$		-1.65	V	All	$V_{EE} = -5.2V (25^{\circ}C)$	
TTL output high voltage (pin 2,7,8,10)	$V_{OH}$	2.4		V	All	10k $\Omega$ from TTL output to +5V	Note 6
TTL output low voltage (pin 2,7,8,10)	$V_{OL}$		0.4	V	All	10k $\Omega$ from TTL output to +5V	Note 6
TTL output voltage (pin 11)	$V_{OH}$	2.4		V	All	5k $\Omega$ from TTL output to +5V	Note 6
TTL output low voltage (pin 11)	$V_{OL}$		0.4	V	All	5k $\Omega$ from TTL output to +5V	Note 6
ECL output high voltage (pin 9)	$V_{OH}$	-0.9	-0.7	V	All	$V_{EE} = -5.2V (25^{\circ}C)$	
ECL output low voltage (pin 9)	$V_{OL}$	-1.8	-1.5	V	All	$V_{EE} = -5.2V (25^{\circ}C)$	
Edge speed for correct operation at maximum frequency	$t_e$		2.5	ns	All	10% to 90%	Note 7
Reset on time for correct operation	$t_{ON}$	100		ns	All		Note 7
Reset input high voltage	$V_{INH}$	2.4		V	All		Note 6
Reset input low voltage	$V_{INL}$		0.5	V	All		Note 6

NOTES

1. Unless otherwise stated the electrical characteristics are guaranteed over full specified supply, frequency and temperature range.
2. The temperature coefficient of  $V_{OH}(ECL) = +1.3mV/^{\circ}C$  and  $V_{OL} = +0.5mV/^{\circ}C$  but these are not tested.
3. The temperature coefficient of inhibit threshold voltage =  $+0.24mV/^{\circ}C$  but this is not tested.
4. The test configuration for dynamic testing is shown in Fig.5.
5. Tested at  $0^{\circ}C$  and  $+70^{\circ}C$  only.
6. Tested at  $+25^{\circ}C$  only.
7. Guaranteed but not tested.



\* Tested as specified in table of Electrical Characteristics

Fig.3 Typical input characteristics SP8634

PLESSEY SEMICONDUCTORS

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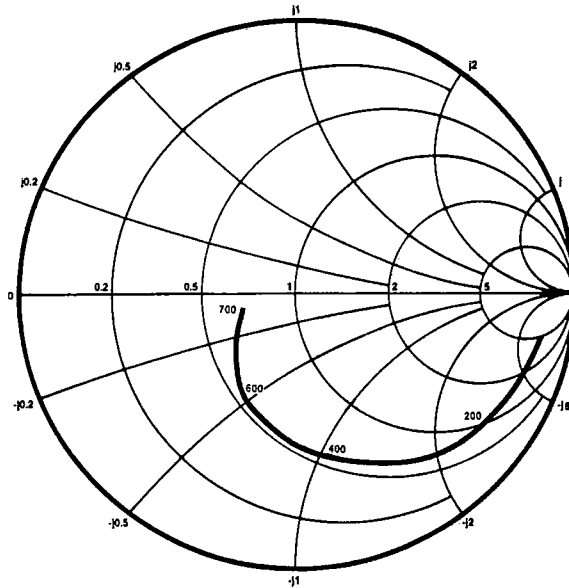


Fig.4 Typical input impedance. Test conditions: supply voltage 5.2V, ambient temperature 25°C. Frequencies in MHz, impedances normalised to 50 ohms.

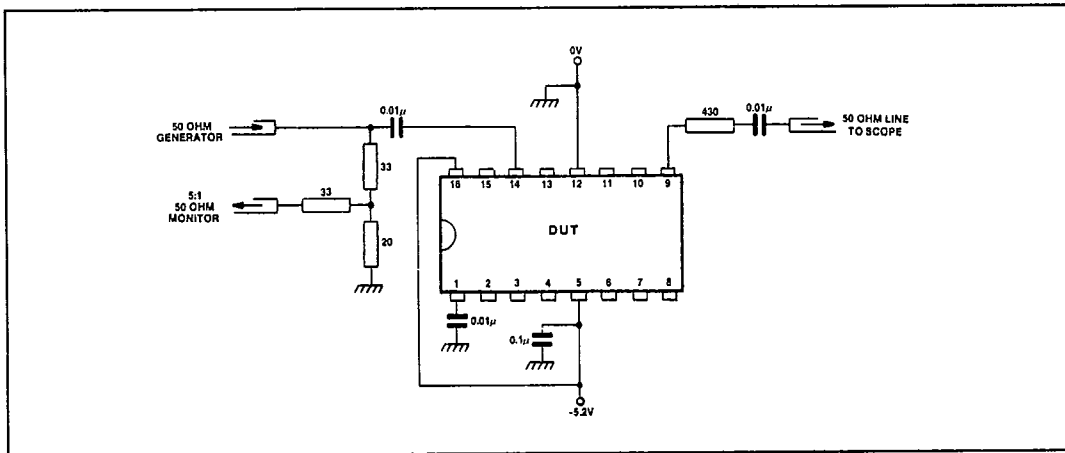


Fig.5 SP8634/5/7 high frequency test circuit

#### OPERATING NOTES

1. The clock input (pin 14) should be capacitively coupled to the signal source. The input signal path is completed by connecting a capacitor from the internal bias decoupling, pin 1, to ground.
2. In the absence of a signal the devices will self-oscillate. This can be prevented by connecting a 68k resistor between the clock input, pin 14, and the negative supply (pin 5).
3. The device will operate down to DC but the input slew rate must be better than 100V/µs.
4. The Carry O/P is ECL II compatible but can be interfaced ECL III/10K by the inclusion of two resistors. See Fig. 7.
5. The clock inhibit is compatible with ECL III/10K

throughout the temperature range.

6. The output (pins 2, 7, 8, 10 and 11) are current sources and can be made TTL compatible by addition of 10k and 5k (pin 11) to +5V. See Fig.6. This gives a fan-out of 1. This can be increased by buffering the output with a PNP emitter follower. See Fig.8.
7. The device is clocked on the positive transition of the clock input on pin 14, provided that the clock inhibit input (pin 16) is in the low state. It is important to note that the positive transition of clock inhibit must occur while the clock is in the high state to avoid spurious counting.

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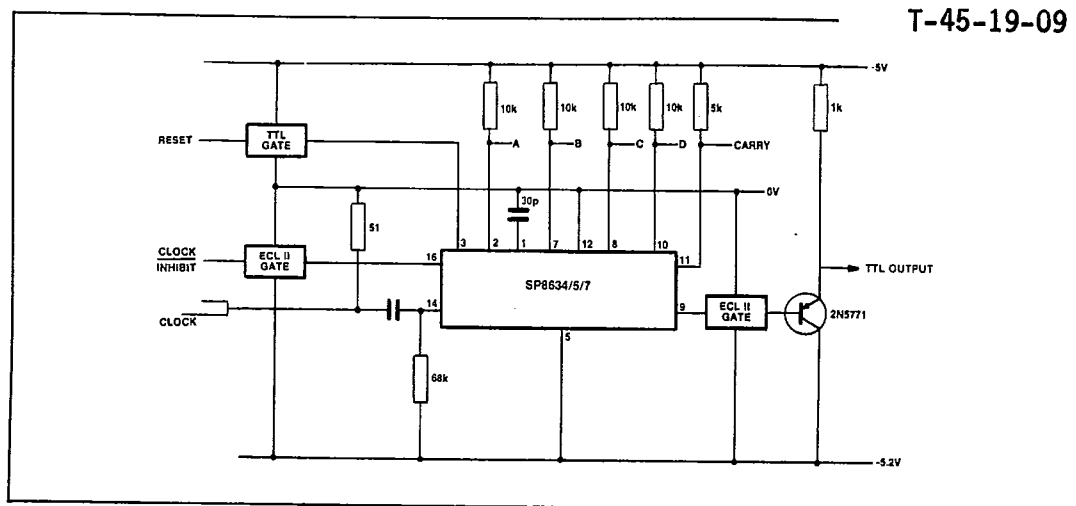


Fig. 6 Typical application configuration

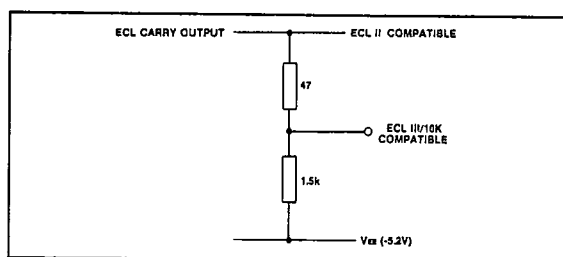


Fig. 7 ECL III/10K interfacing

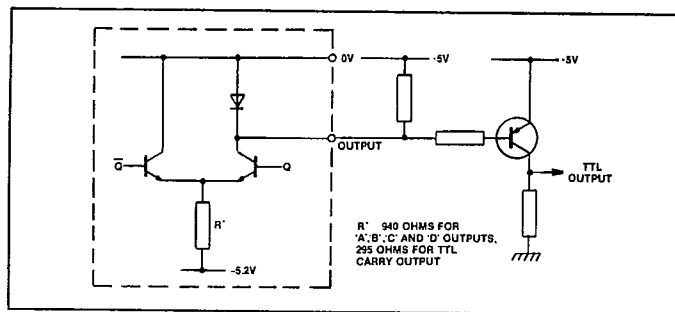


Fig. 8 TTL output buffering for increased fan-out

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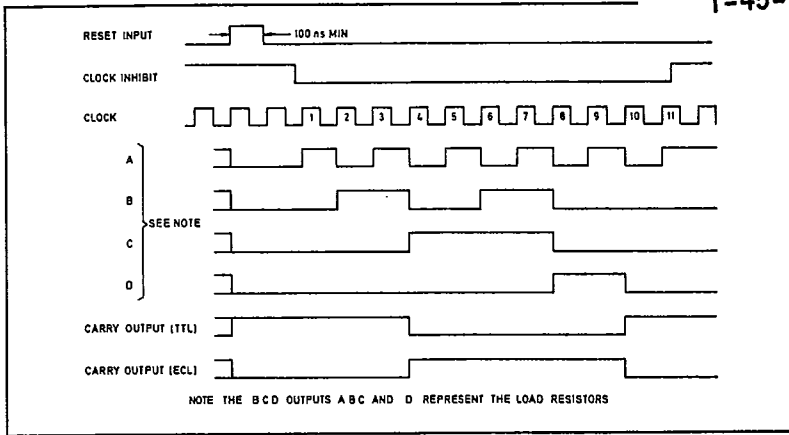


Fig.9 Timing diagram