

**1/20, 1/100 HIGH SPEED DIVIDER**

**DESCRIPTION**

The M54459L is a semiconductor integrated circuit consisting of a built-in 1/20 and 1/100 high speed frequency divider featuring an ECL circuit configuration.

**FEATURES**

- High-speed operation ( $f_{max} = 130\text{MHz}$ )
- Operation at low input amplitudes (180mV<sub>P-P</sub> minimum input amplitude)
- TTL level output

**APPLICATION**

FM radio prescalers, digital equipment for consumer and industrial applications.

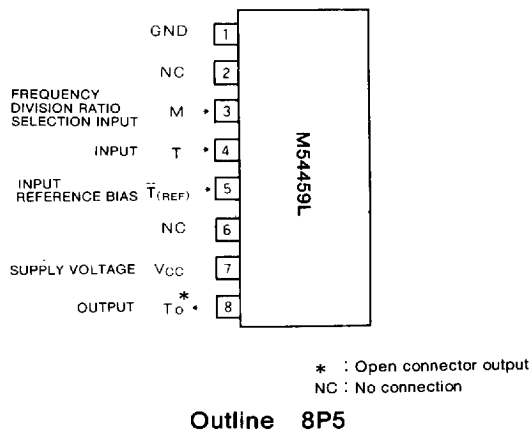
**FUNCTION**

This divider is based on an ECL circuit configuration. When a frequency up to a maximum of 130MHz is applied to the  $T_1$  input pin, a 1/20-divided output is produced when the division ratio selection input pin (M) is low-level or a 1/100-divided output is produced when the division ratio selection input pin (M) is high-level. The output ( $T_0$ ) is available in the TTL level open collector format.

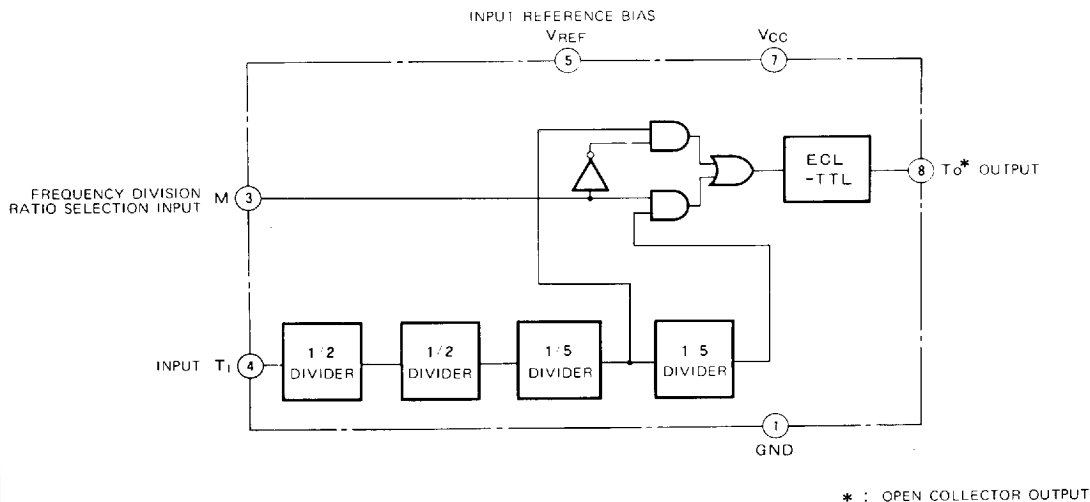
**Frequency division ratio selection input (M) and ratios**

| M              | Low  | High  |
|----------------|------|-------|
| Division ratio | 1/20 | 1/100 |

**PIN CONFIGURATION (TOP VIEW)**



**BLOCK DIAGRAM**



**1/20, 1/100 HIGH SPEED DIVIDER**

**ABSOLUTE MAXIMUM RATINGS** ( $T_a = -10 \sim +75^\circ\text{C}$ , unless otherwise noted)

| Symbol    | Parameter              | Conditions               | Ratings         | Unit             |
|-----------|------------------------|--------------------------|-----------------|------------------|
| $V_{CC}$  | Supply voltage         |                          | 7               | V                |
| $V_i$     | Input voltage          |                          | 2.5             | V                |
| $V_o$     | Output applied voltage |                          | 5.5             | V                |
| $P_d$     | Power dissipation      | $T_a = 25^\circ\text{C}$ | 1.33            | W                |
| $T_{opr}$ | Operating temperature  |                          | $-10 \sim +75$  | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature    |                          | $-55 \sim +125$ | $^\circ\text{C}$ |

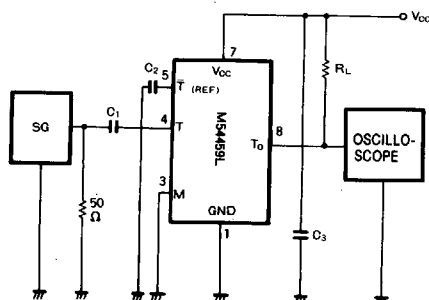
**RECOMMENDED OPERATING CONDITIONS** ( $T_a = -10 \sim +75^\circ\text{C}$ , unless otherwise noted)

| Symbol      | Parameter                  | Conditions                                              | Limits |     |          | Unit              |
|-------------|----------------------------|---------------------------------------------------------|--------|-----|----------|-------------------|
|             |                            |                                                         | Min    | Typ | Max      |                   |
| $V_{CC}$    | Supply voltage             |                                                         | 4.5    | 5   | 5.5      | V                 |
| $f_{IN}$    | Input frequency            |                                                         | 30     |     | 130      | MHz               |
| $V_{IN}$    | Input amplitude            | $V_{CC} = 5\text{V}$ , $f_{IN} = 30 \sim 130\text{MHz}$ | 200    |     | 800      | mV <sub>P-P</sub> |
| $V_{IH(M)}$ | High-level M input voltage |                                                         | 2.6    |     | $V_{CC}$ | V                 |
| $V_{IL(M)}$ | Low-level M input voltage  |                                                         | 0      |     | 0.4      | V                 |

**ELECTRICAL CHARACTERISTICS** ( $T_a = -10 \sim +75^\circ\text{C}$ , unless otherwise noted)

| Symbol             | Parameter                  | Test conditions                                                                    | Limits |     |     | Unit              |
|--------------------|----------------------------|------------------------------------------------------------------------------------|--------|-----|-----|-------------------|
|                    |                            |                                                                                    | Min    | Typ | Max |                   |
| $I_{CC}$           | Supply current             | $V_{CC} = 5\text{V}$                                                               |        | 6.5 | 10  | mA                |
| $V_{IN}$           | Prescaler operating input  | $V_{CC} = 5\text{V}$ , $f_{IN} = 30 \sim 130\text{MHz}$ , $T_a = 25^\circ\text{C}$ |        |     | 180 | mV <sub>P-P</sub> |
| $I_{IH(M)}$        | High-level M input current | $V_{CC} = 5\text{V}$ , $V_{IH(M)} = 2.6\text{V}$                                   |        | 2   |     | $\mu\text{A}$     |
| $I_{IL(M)}$        | Low-level M input current  | $V_{CC} = 5\text{V}$ , $V_{IL(M)} = 0.4\text{V}$                                   |        | 0.1 |     | $\mu\text{A}$     |
| $I_o(\text{leak})$ | Output leak current        | $V_{CC} = 5\text{V}$ , $V_o = 5.5\text{V}$                                         |        |     | 100 | $\mu\text{A}$     |
| $V_{OL}$           | Low-level output voltage   | $V_{CC} = 5\text{V}$ , $I_{OL} = 5\text{mA}$                                       |        |     | 0.5 | V                 |

**$f_{max}$  TEST CIRCUIT**



$C_1 \approx 1000\text{pF}$ ,  $C_2 \approx 1000\text{pF}$ ,  $C_3 \approx 10000\text{pF}$ ,  $R_L \approx 5\text{k}\Omega$

Notes : The above figure shows the configuration with 1/20 frequency division.  
 Connect the frequency division ratio selection input (M) to the supply voltage  $V_{CC}$  pin for 1/100 frequency division.

**TYPICAL CHARACTERISTICS**

