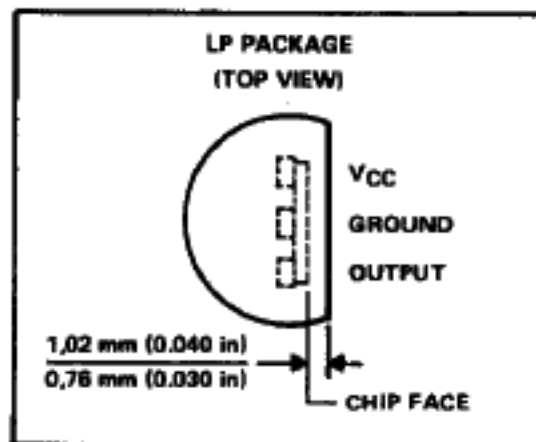


- Magnetic-Field Sensing Hall-Effect Input
- On-Off Hysteresis
- Small Size
- Solid-State Technology
- Open-Collector Output

description

The TL170C is a low-cost magnetically operated electronic switch that utilizes the Hall Effect to sense steady-state magnetic fields. Each circuit consists of a Hall-Effect sensor, signal conditioning and hysteresis functions, and an output transistor integrated into a monolithic chip. The outputs of these circuits can be directly connected to many different types of electronic components.

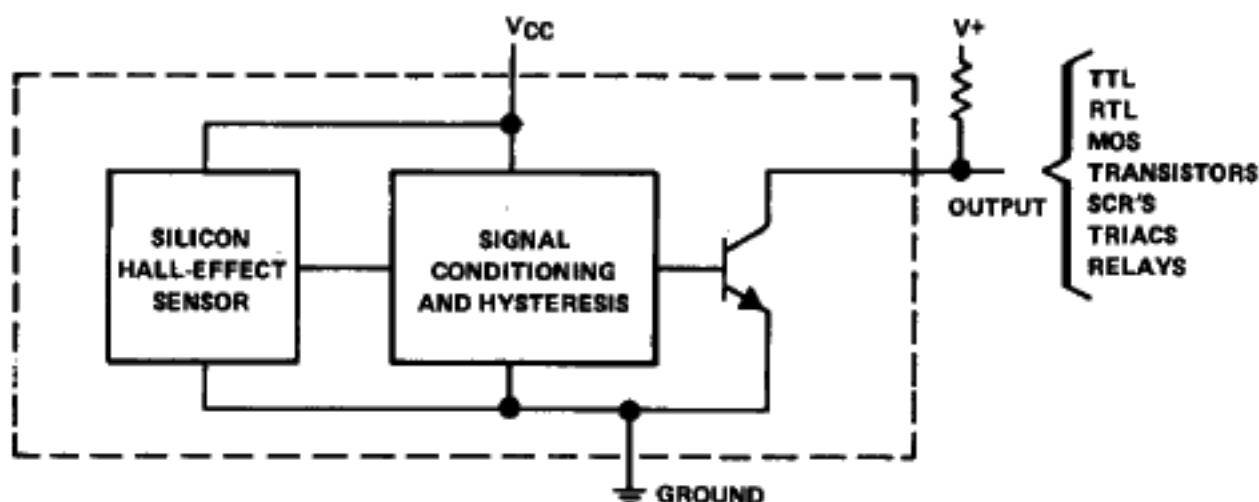
The TL170C is characterized for operation over the temperature range of 0°C to 70°C.



FUNCTION TABLE ($T_A = 25^\circ\text{C}$)

FLUX DENSITY	OUTPUT
$\leq -25 \text{ mT}$	Off
$-25 \text{ mT} < B < 25 \text{ mT}$	Undefined
$\geq 25 \text{ mT}$	On

functional block diagram



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1)	3
Output voltage	20
Output current	0°C to 70°C
Operating free-air temperature range	-65°C to 150°C
Storage temperature range	260
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds	unlim
Magnetic flux density	

NOTE 1. Voltage values are with respect to network ground terminal.

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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electrical characteristics at specified free-air temperature, $V_{CC} = 5\text{ V} \pm 5\%$ (unless otherwise specified).

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX
B _{T+}	Threshold of positive-going magnetic flux density†			25°C		
				0°C to 70°C		
B _{T-}	Threshold of negative-going magnetic flux density†			25°C		
				0°C to 70°C		
B _{T+} - B _{T-}	Hysteresis			0°C to 70°C		
I _{OH}	High-level output current	V _{OH} = 20 V		0°C to 70°C		
V _{OL}	Low-level output voltage	V _{CC} = 4.75 V, I _{OL} = 16 mA		0°C to 70°C		
I _{CC}	Supply current	V _{CC} = 5.25 V	Output low	0°C to 70°C		
			Output high			

[†]Threshold values are those levels of magnetic flux density at which the output changes state. For the TL170C, a level more positive than B_{T+} causes the output to go to a low level and a level more negative than B_{T-} causes the output to go to a high level.

[‡]The unit of magnetic flux density in the International System of Units (SI) is the tesla (T). The tesla is equal to one weber per meter. Values expressed in milliteslas may be converted to gauss by multiplying by ten.

[§]The algebraic convention, where the most negative limit is designated as minimum, is used in this data sheet for flux-density levels only.

The north pole of a magnet is the pole that is attracted by the geographical north pole. The north pole of a magnet repels the north-seeking pole of a compass. By accepted magnetic convention, lines of flux emanate from the north pole of a magnet and enter the south pole.

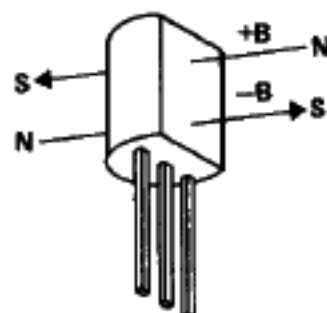
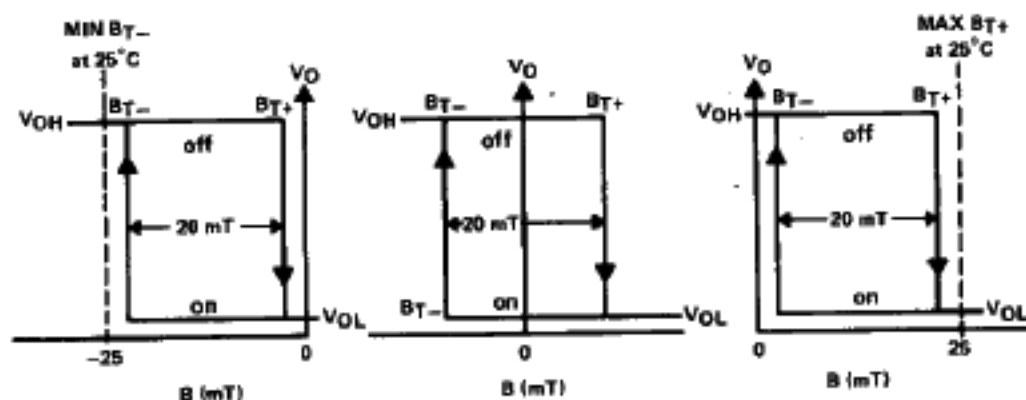


FIGURE 1. DEFINITION OF MAGNETIC FLUX POLARITY



The positive-going threshold (B_{T+}) may be a negative or positive B level at which a positive-going (decreasing negative or increasing positive) flux density results in the TL170 output turn-on. The negative-going threshold is a positive or negative B level at which a negative-going (decreasing positive or increasing negative) flux density results in the TL170 turning off.

FIGURE 2. REPRESENTATIVE CURVES OF V_O vs B

4

Special Functions