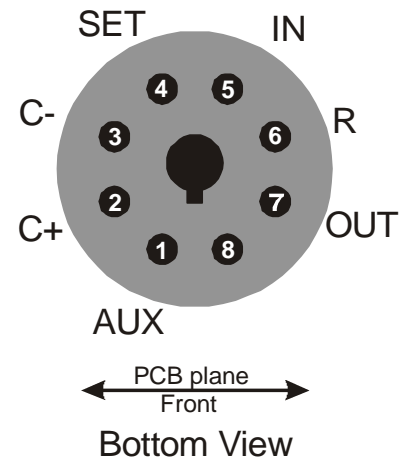
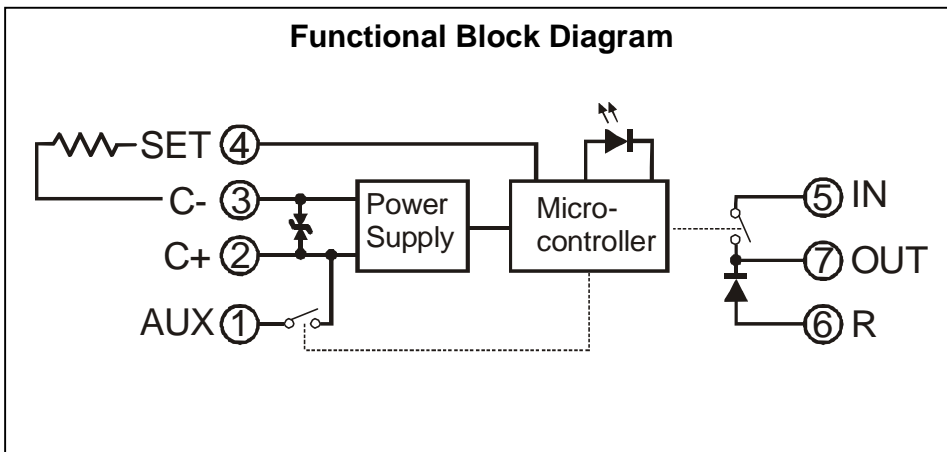




Solid-Time Delay Relay

- Convenient octal glass tube package
- Pinout compatible Amperite glass time delay relays
- Two versions available:
 - 60V, 6.5A AC/DC (TDR-LV)
 - 1000V, 0.9A AC/DC (TDR-HV)
- 1500V input-to-output isolation
- Delay time programmable from 0 to 255 seconds with single external resistor
- Auxiliary output for indicator or other uses
- LED indicates when power is applied and when time delay has expired
- Applications:
 - B+ delay circuits
 - General time delay applications

Functional Block Diagram



Absolute Maximum Ratings

SYMBOL	PARAMETER	MIN	MAX	UNIT
V _P	Peak blocking voltage -HV		1000	V
	-LV		60	
I _F	Continuous current -HV		0.9	A
	-LV		6.5	
I _{PK}	Peak current <10mS -HV		10	A
	-LV		25	
V _C	"Coil" voltage		15	VAC
			10	VDC
V _{AUX}	Aux blocking voltage		60	V
I _{AUX}	Aux current		1	A

Pin Connections

PIN	NAME	FUNCTION
1	AUX	Aux output
2	C+	"Coil" + or AC input
3	C-	"Coil" - or AC input
4	SET	Time programming
5	IN	Switch input
6	R	Diode (DC use only)
7	OUT	Switch output
8		No connection

Electrical Characteristics

SYMBOL	PARAMETER	CONDITIONS/COMMENTS	MIN	TYP	MAX	UNIT
R _{DS(ON)}	On resistance -HV	I _F = 1A, T = 25°C		1.78	2.5	Ω
	On resistance -LV	I _F = 1A, T = 25°C		0.027	0.52	
I _L	Leakage current	V _R = rated, T = 25°C		0	1	μA
V _{ISO}	Isolation voltage	Pins 5,6,7 to 1,2,3,4			1500	V
R _{ADS(ON)}	On resistance (AUX)	I _F = 1A, T = 25°C		0.25	0.7	Ω
V _{STRT}	Timing start voltage	V _C rising		3.3		VAC
				4.5		VDC
V _{RST}	Timing reset voltage	V _C falling		2.9		VAC
				4.0		VDC
Δt	Timing accuracy	<i>Accuracy is sum of both errors</i>	-1		+1	%
			-1		+1	S

Dimensions: Standard intermediate octal base - 33.5mm diameter.
Seated height 75mm, bulb diameter 29mm.

Description and Application

The SiTubes TDR is a solid-state time delay relay, mounted in a glass octal tube envelope. It is pin-compatible with glass, octal-based thermal delay relays, such as the "G" series from Amperite®.

Two versions of the TDR are available: the -HV version withstand 1000 volts DC or peak AC, and the -LV version withstands 60V. Other voltage and current ratings, as well as DC-only versions with lower R_{DS(ON)}, are available by special order (minimum quantity may apply).

The "coil" input can be an AC or DC voltage between 4.5VDC / 5VAC and 20VDC / 15VAC. For DC input, connect the positive to pin 2 and the negative to pin 3. Refer to the spec table above for voltage thresholds for the start and reset of the timing cycle.

These relays are of the "delay on operate" type. In other words, the output switch is not closed until an input voltage higher than V_{STRT} has been steadily applied for a period of time. If at any time the "coil" voltage drops below V_{RST}, the timing cycle is re-started. The delay time is set by connecting an external resistor between pins 3 and 4. The time delay can be programmed from 1 second up to 256 seconds, in 1 second increments. Zero ohms (short) corresponds to 1 second; open corresponds to 256 seconds. The required resistor for a given time delay is shown in the table below:

Time	Closest 1% value	Closest 5% value	Time for 5% value
15 Seconds	576Ω	560Ω	14 seconds
30 Seconds	1.27kΩ	1.2kΩ	28 seconds
45 Seconds	2.10kΩ	2kΩ	44 seconds
60 Seconds	3.01kΩ	3kΩ	60 seconds
90 Seconds	4.87kΩ	4.7kΩ	83 seconds
120 Seconds	8.87kΩ	8.2kΩ	116 seconds
t Seconds	10*(t-1) / (256-t) kΩ		-

An auxiliary switch closure on the input side is also provided, to connect indicators or other circuits that are referenced to the "coil" input.

For DC use, a diode is built-in to the TDR to provide for current recirculation when driving inductive loads. When switching DC, it is recommended to connect the power source (positive voltage) to pin 5, the load to pin 7, and ground to pin 6. Do not connect pin 6 when switching AC voltage.