

Part Number	Description
FR75-1	1A, 60 Vdc short-circuit protected solid-state relay for through-hole mount

**ELECTRICAL SPECIFICATIONS**

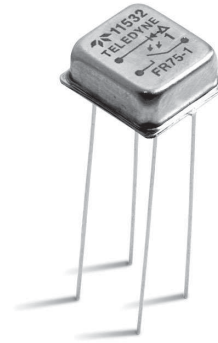
(-40°C to +85°C ambient temperature unless otherwise specified)

**INPUT (CONTROL) SPECIFICATIONS**

	Min	Max	Units
Input Voltage Range (See Note 1)	4.5	5.5	Vdc
Input Current @ 5 Vdc (See Figure 2)	15		mA
Must Turn-On Voltage	3.8		Vdc
Must Turn-Off Voltage		1.5	Vdc
Must Turn-Off Current		50	µA <sub>dc</sub>
Reserve Polarity	-10		Vdc

**OUTPUT (LOAD) SPECIFICATIONS**

	Min	Max	Units
Load Voltage Range		60	Vdc
Output Current Rating (See Figure 4)		1.0	A <sub>dc</sub>
Leakage Current at Rated Voltage		100	µA <sub>dc</sub>
Transient Blocking Voltage		80	Vdc
Output Capacitance @25Vdc (25°C)		600	pF
Output Voltage Drop		0.32	Vdc
On Resistance		0.32	Ohm
Turn-On Time		3.0	ms
Turn-Off Time		0.3	ms
Trip Overload (See Figure 6)		6	A <sub>dc</sub>



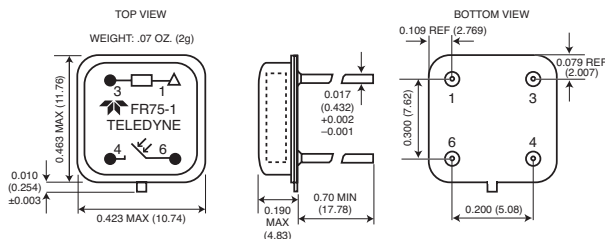
**FEATURES/BENEFITS**

- Short-circuit protected: Prevents damage to system components, assemblies and system wiring
- Optical isolation: Isolates control circuits from load transients and eliminates ground loops and signal ground noise
- Low off-state leakage: For high off-state impedance
- Switches high currents: To 1.0 A<sub>dc</sub>
- High noise immunity: Control signals isolated from switching noise
- High dielectric strength: For safety and for protection of control and signal level circuits

**DESCRIPTION**

The FR75-1 solid-state relay utilizes a power FET switch that is protected against short circuits and overload currents. The short-circuit protection feature provides protection when a short or overload occurs while the relay is on as well as when the relay is switched into a short. In either case, the relay will sense the short-circuit condition and then block it indefinitely until the short is removed and the unit is reset by cycling the input control. Using the FR75-1 to switch power sources and loads prevents damage to system assemblies and system wiring. The power FET output offers low "ON" resistance and can switch loads in either the high or the low side of the power line. The FR75-1 is packaged in a low-profile mini-DIP package.

**MECHANICAL SPECIFICATION**



• Material and Plating:  
Pins and Header — Kovar gold plated; Cover — Nickel  
• Tolerance: ±0.005 inch unless otherwise specified

Figure 1 – FR75-1 mechanical specification;  
dimensions in inches (mm)

**GENERAL SPECIFICATIONS**

(+25°C ambient temperature unless otherwise specified)

**ENVIRONMENTAL SPECIFICATION**

	Min	Max	Units
Operating Temperature	- 40	+85	°C
Storage Temperature	- 55	+125	°C
Junction Temperature @ 1A		+125	°C
Thermal Resistance $\theta_{JA}$		125	°C/W
Shock	1500		g
Vibration	100		g
Dielectric Strength	500		Vac
Insulation Resistance (@500 Vdc)	10 <sup>9</sup>		Ohm
Input to Output Capacitance		5	pF
Altitude	55,000		ft.
Resistance to			
Soldering Heat	MIL STD 202, method 210		
Solderability	MIL STD 202, method 208		
Thermal Shock	MIL STD 202, method 107		

**INPUT CURRENT VS. INPUT VOLTAGE**

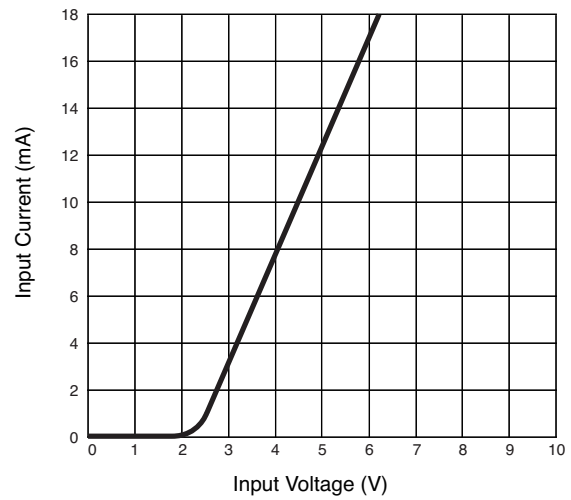


Figure 2 — FR75-1 input current vs. input voltage

**FUNCTIONAL BLOCK DIAGRAM**

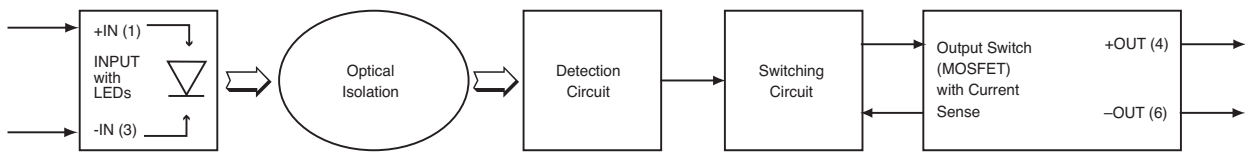


Figure 3 — FR75-1 functional block diagram

**LOAD CURRENT VS. AMBIENT TEMPERATURE**

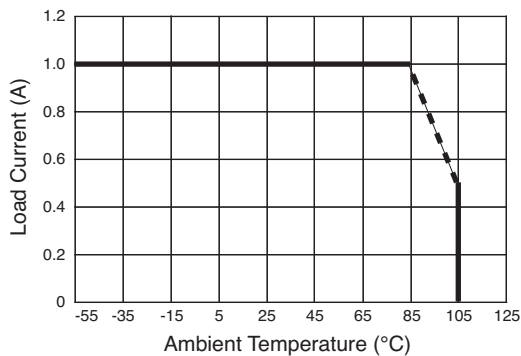


Figure 4 — FR75-1 load current vs. ambient temperature

**TYPICAL WIRING DIAGRAM**

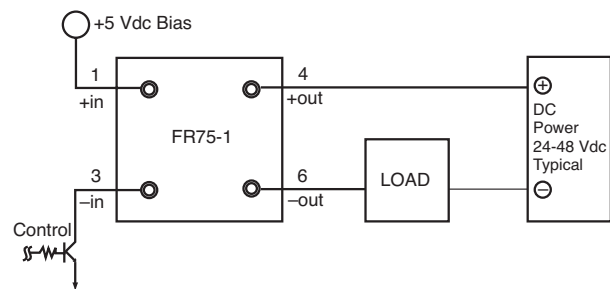


Figure 5 — FR75-1 typical wiring diagram

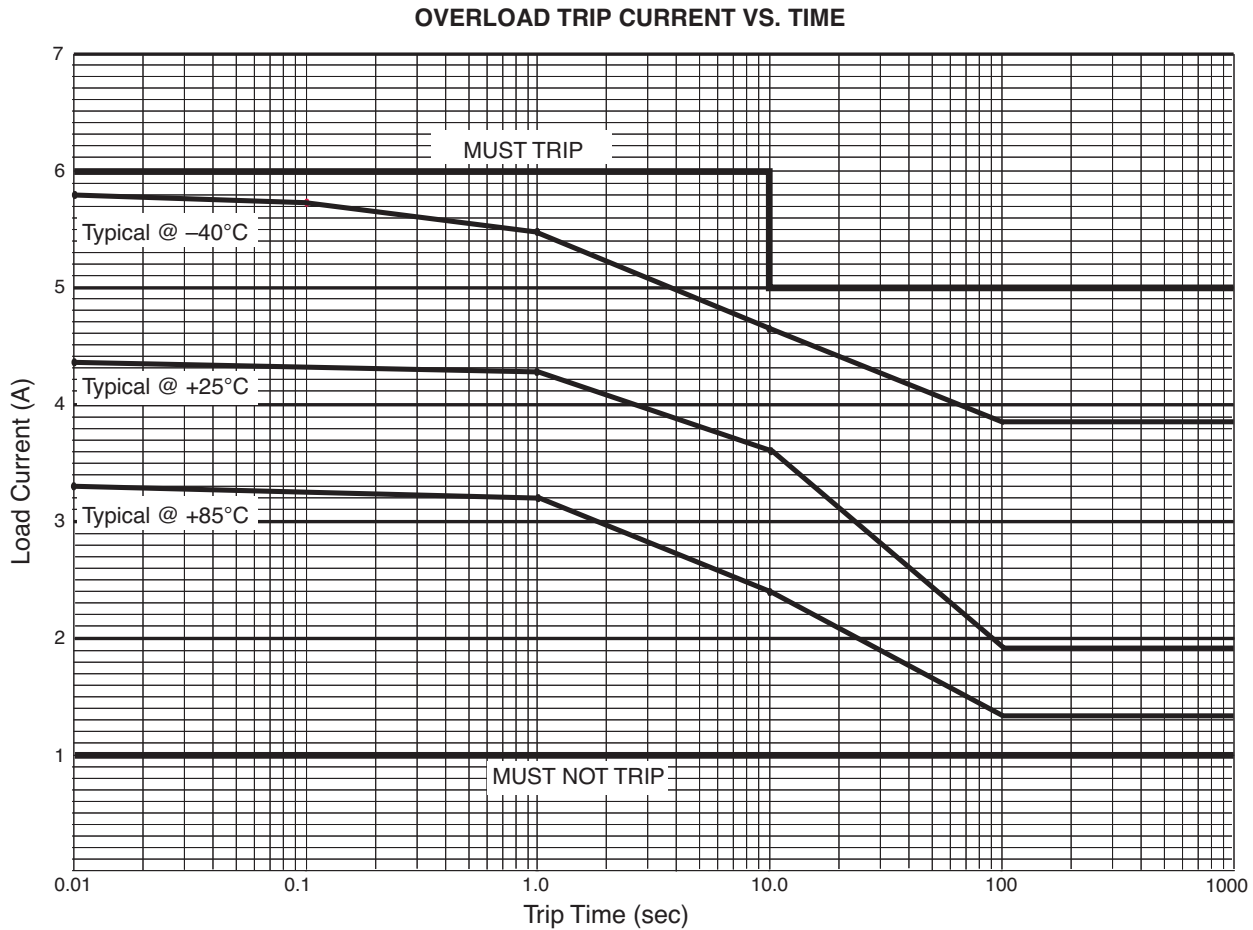


Figure 6 — FR75-1 overload trip current vs. time

NOTES:

1. For input voltages greater than 6 volts, use an external resistor in series with the relay input. Select resistor value with the following equation:  $R_{ext} = (V_{in} - 6V_{dc}) / 15mA$
2. Unless otherwise specified: conformance testing is at room temperature; the input voltage is 5 Vdc or zero volts as required; the output load is 48 Vdc, 1 amp.
3. With a shorted load condition, system inductance shall be limited to 50  $\mu$ H.
4. Relay input voltage transitions should be less than 1.0 millisecond.
5. Maximum load current ratings are with the relay in free air and soldered to a printed circuit board.
6. Loads may be attached to either the positive or negative output terminal.
7. Timing is measured from the input voltage transition to the 10% or 90% point on the output voltage off-to-on or on-to-off transition. Rise and fall times are measured from the 10 to 90% points on the output voltage transition.
8. Hermeticity is not a requirement.