TELEDYNE RELAYS

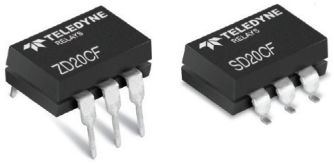
*A Unit of Teledyne Electronics and Communications*

# ZD20CF Series

**2A, 60 Vdc Optically Isolated Short-Circuit Protected**

| Part Number | Description |
|---|---|
| ZD20CF* | 2A, 60 Vdc, short-circuit protected up to 33 Vdc, solid-state relay for through-hole mounting |
| SZD20CF* | 2A, 60 Vdc, short-circuit protected up to 33 Vdc, solid-state relay for surface mount |

*W for +25°C ambient; T for over-temperature screen




## FEATURES/BENEFITS

- Short-circuit protected
- Overload protected
- 2 Amp load
- Low off-state leakage
- Optical isolation
- Compact 6-pin package

## DESCRIPTION

ZD20CF Series Relays have optical isolation between relay input and output. Loads may be connected to either the positive or negative output terminals. ZD20CF Relays act as electronic circuit breakers that sense shorted loads or other overload events and then trip-off. Relay contacts open and no current flows through the relay and associated loads. These relays prevent overcurrent damage to the system. Cycling the relay on-off removes the tripped or latched-off condition and returns the relay to the normal operating state.

## ELECTRICAL SPECIFICATIONS

(–55°C to +105°C ambient temperature unless otherwise specified)

### INPUT (CONTROL) SPECIFICATIONS

| | Min | Max | Units |
|---|---|---|---|
| Input Current | 8 | 20 | mA |
| Input Voltage @10mA | 2 | 3 | Vdc |
| Must Turn-On | 8 | | mA |
| Must Turn-Off Current | | 100 | µA |
| Must Turn-Off Voltage | | 0.8 | Vdc |
| Reverse Polarity | –6 | | Vdc |

### OUTPUT (LOAD) SPECIFICATIONS

| | Min | Max | Units |
|---|---|---|---|
| Load Voltage Range | 0 | 60 | Vdc |
| Output Current Rating (See Figure 5) | | 2.0 | A |
| Leakage Current at Rated Voltage | | 10 | µA |
| Transient Blocking Voltage @25°C | | 100 | Vdc |
| Output Capacitance @25Vdc (25°C) | | 600 | pF |
| Output Voltage Drop @2A | | 0.30 | Vdc |
| On Resistance | | 0.15 | Ohm |
| Turn-On Time | | 3.0 | ms |
| Turn-Off Time | | 1.0 | ms |
| Trip Overload | (See Figure 6) | | A |
| Short Circuit Protection | | 33 | Vdc |
| Operating Frequency | | 10 | Hz |

## GENERAL SPECIFICATIONS

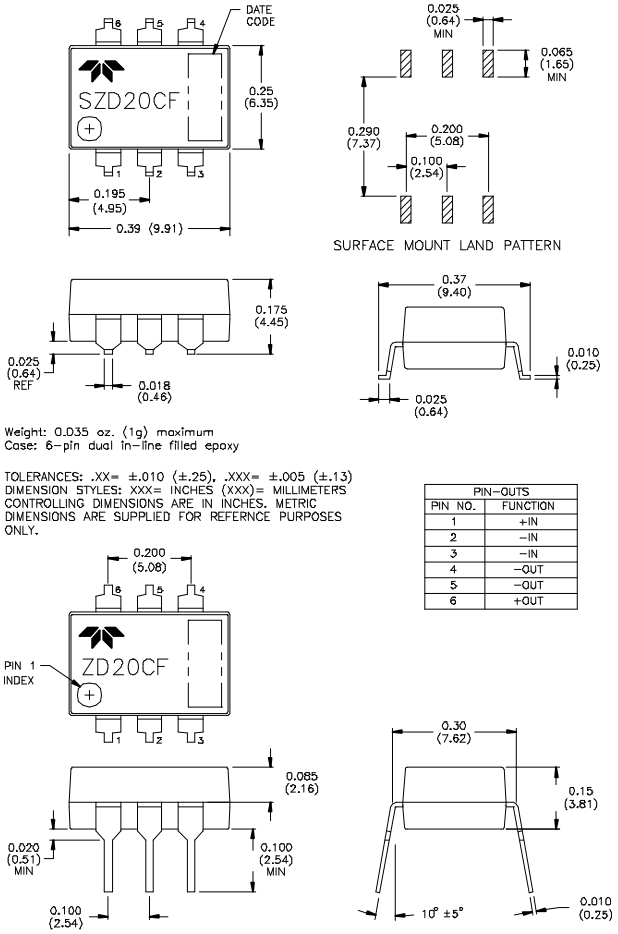
(+25°C ambient temperature unless otherwise specified)

### ENVIRONMENTAL SPECIFICATIONS

| | Min | Max | Units |
|---|---|---|---|
| Operating Temperature | –55 | +105 | °C |
| Storage Temperature | –55 | +125 | °C |
| Junction Temperature @2A | | +125 | °C |
| Thermal Resistance $\theta_{JA}$ | | +120 | °C/W |
| Dielectric Strength | 1000 | | Vac |
| Insulation Resistance (@500 Vdc) | $10^9$ | | Ohm |
| Input to Output Capacitance | | 5 | pF |

| | |
|---|---|
| Shock | MIL-STD-202, method 213, cond. F, 1500g |
| Vibration | MIL-STD-202, method 204, cond. F, 100g |
| Resistance to Soldering Heat | MIL STD 202, method 210 |
| Solderability | MIL STD 202, method 208 |
| Thermal Shock | MIL STD 202, method 107 |

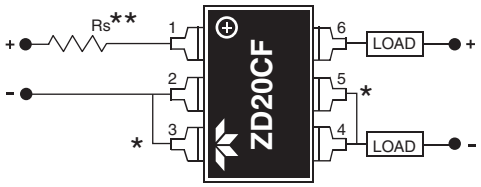
## MECHANICAL SPECIFICATIONS




| PIN-OUTS | |
|---|---|
| PIN NO. | FUNCTION |
| 1 | +IN |
| 2 | –IN |
| 3 | –IN |
| 4 | –OUT |
| 5 | –OUT |
| 6 | +OUT |

*Figure 1*

## TYPICAL WIRING DIAGRAM




*Shorted internally
**Series resistor required to limit input current to 20mA maximum

*Figure 2*

## CONTROL CURRENT VS. INPUT VOLTAGE

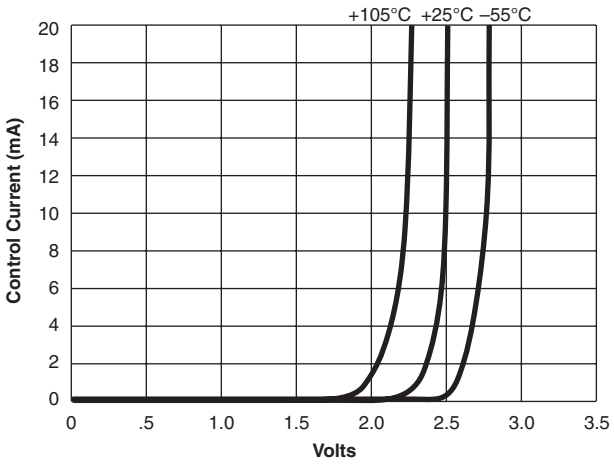



*Figure 3*

## TYPICAL TURN-ON TIME VS. INPUT CURRENT

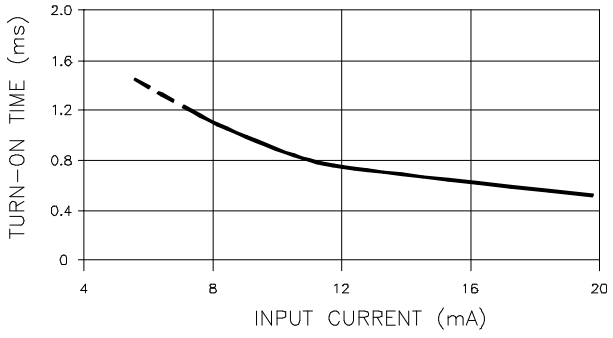



*Figure 4*

## LOAD CURRENT VS. AMBIENT TEMPERATURE

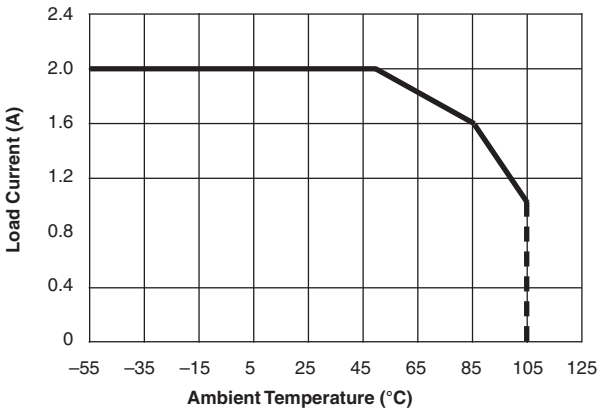



*Figure 5*

## TYPICAL OVERLOAD CURRENT VS. TRIP TIME

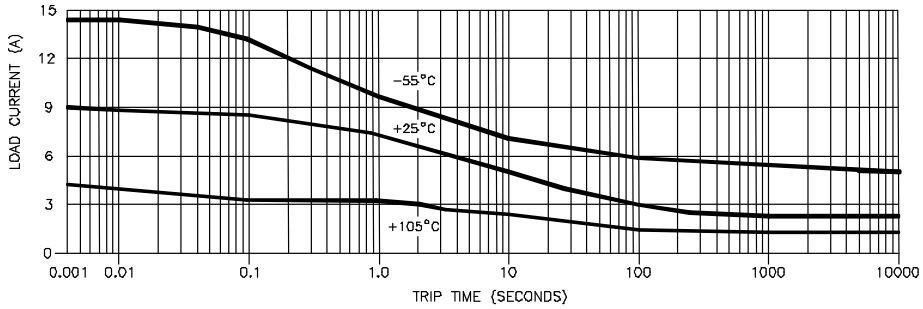



*Figure 6*

## FUNCTIONAL BLOCK DIAGRAM

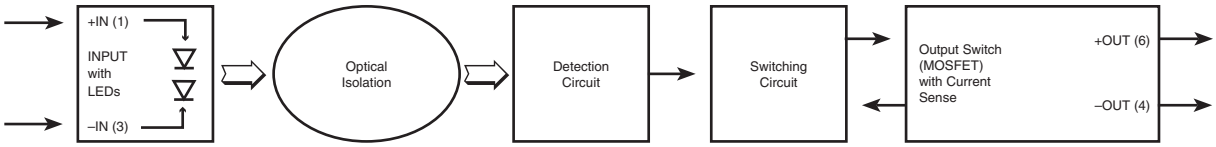



*Figure 7*

NOTES:
1. The ZD20CF relay's input current should be limited to between 8 and 20mA. An external resistor whose value =($V_{IN}$ – 2.5 volts) ÷ 0.012 Amps is a good choice for limiting input current.
2. Relay input transitions should be less than 1.0 millisecond.
3. Loads may be attached to either the positive or negative output terminal.
4. Maximum load current ratings are with the relay in free air and soldered to a printed circuit board.
5. Timing is measured from the input current transition to the 10% or 90% points on the output voltage transition.
6. Overload conditions (including shorted loads) are specified for load supply voltages to 33 Vdc maximum.
7. For through-hole-PCB-solder-attaching ZD20CF series relays, the wave-solder or solder pot operations are limited to +260°C maximum for 10 seconds, maximum.
8. For surface-mount-solder-attaching SZD20CF series relays, in IR heating or convection heating systems, the component temperature is limited to +235°C maximum for 10 seconds maximum.