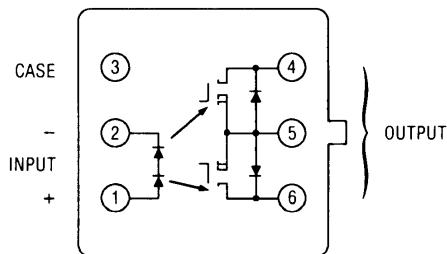


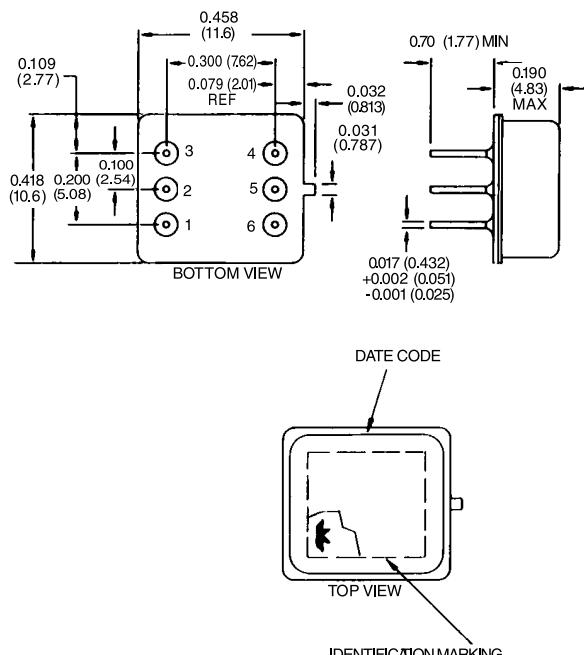
Part Number*	DESC Drawing Number	Relay Description
FB00CDW		Solid State Relay
FB00CDY	89116-006	$\pm 1.0 \text{ A} @ \pm 80 \text{ Vdc Output}$
FB00FCW		Solid State Relay
FB00FCY	89116-002	$\pm 0.5 \text{ A} @ \pm 180 \text{ Vdc Output}$
FB00KBW		Solid State Relay
FB00KBY	89116-004	$\pm 250 \text{ mA} @ \pm 350 \text{ Vdc Output}$

\* The Y suffix denotes parameters tested to MIL-PRF-28750 specifications. The W suffix denotes parameters tested to Teledyne specifications.

### BLOCK DIAGRAM



### MECHANICAL SPECIFICATIONS



DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)



### FEATURES

- High voltage output
- Extremely low leakage current (200 nanoamperes)
- Bi-directional Power FET output
- Optical isolation
- Fast switching speed
- Adjustable turn-on times
- Low profile 6-pin mini-DIP
- Built and tested to the requirements of MIL-PRF-28750

### APPLICATIONS

- Ideal for Automatic Test Equipment (ATE)
- Telecommunications applications
- High-voltage instrumentation systems
- High-speed switching with low EMI

### DESCRIPTION

The Series FB relay is an advanced solid-state bi-directional relay designed specifically for high-speed switching in A.T.E. systems. These devices utilize Teledyne state-of-the-art solid-state circuit technology and manufacturing techniques to provide high reliability, low life cycle cost and exceptional switch performance. Each device is uniquely characterized by its switching function. The FB00FC is a power instrumentation relay with low ON resistance and leakage current. The FB00KB is a high-voltage instrumentation relay with a quarter ampere current rating. The FB00CD is a power relay with a current rating of 1 ampere and an ON resistance of 0.4 ohm. The FB solid-state relay has very fast turn on times of under 1 msec and can also be controlled and adjusted with the input current for specific requirements. Other features include optical coupling and full military temperature operating range for extreme applications. Optical coupling minimizes EMI generation and isolates and protects delicate input logic circuits from output voltage transients. These devices are packaged and hermetically sealed in a low-profile metal 6- pin mini-DIP with lead spacing on 0.300 centers for standard mounting configurations.

**ELECTRICAL SPECIFICATIONS**

(-55°C TO 120°C Ambient Temperature Unless Otherwise Noted)

INPUT (CONTROL) SPECIFICATION					ENVIRONMENTAL SPECIFICATIONS			
(See Note 1)	Min	Typ	Max	Units		Min	Max	Units
Rated Input Current	10		25	mAdc	Temperature			
Input Voltage Drop @ 25 mA			3.25	Vdc	Operating	-55	+120	°C
Continuous Input Current					Storage	-55	+125	°C
-55°C < T <sub>A</sub> < 105°C	10		50	mAdc	Vibration, 100 g	10	2000	Hz
105°C < T <sub>A</sub> < 120°C	10		25	mAdc	Constant Acceleration		5000	g
Reverse Voltage Protection			-5	Vdc	Shock, 0.5 ms pulse		1500	g
Input Current (Guaranteed Off)			10	μAdc				
Input Current (Guaranteed On)	10			mA				
Turn-Off Voltage			1.5	Vdc				

**OUTPUT (LOAD) SPECIFICATIONS**
**BI-DIRECTIONAL AND AC CONFIGURATIONS (PIN 4 TO PIN 6), SEE NOTE 2**

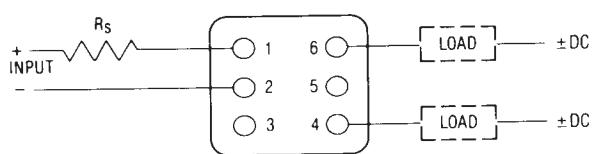
	FB00CD		FB00FC		FB00KB		Units
	Min	Max	Min	Max	Min	Max	
Continuous Load Current (See Fig. 3 & Note 5)		±1.0		±0.5		±0.25	Adc
Leakage Current @ V <sub>load</sub> = max. operating voltage							
-55°C < T <sub>A</sub> < +25°C		±200		±200		±200	nAdc
+25°C < T <sub>A</sub> < 120°C		±20		±20		±20	μAdc
Output Voltage Drop		±0.75		±1.0		±2.4	Vdc
Continuous Operating Load Voltage		±80		±180		±350	Vdc
Transient Blocking Voltage (5 s max.)		±90		±180		±360	Vdc
ON Resistance R <sub>ds</sub> (on) at T <sub>J</sub> = 25°C		0.6		1.0		8.0	Ohm
I <sub>LOAD</sub> = 100 mAdc (See Fig. 4 & Note 6)							
Turn-On Time @ I <sub>IN</sub> = 25 mA (See Fig. 2 and 5)	800		800		500		μs
Turn-Off Time (See Fig. 5)	500		500		500		μs
dV/dt	100		100		100		V/μs
Load Surge Current (See Note 3)		±3.5		±1.75		±0.875	Adc
DC Offset Voltage		100		100		100	μV
Output Capacitance at 25 Vdc, 1 MHz		325		250		100	pF

**OUTPUT (LOAD) SPECIFICATIONS**
**DC Configuration (Pins 4 and 6 connected together referenced to Pin 5) (See Notes 2 & 7)**

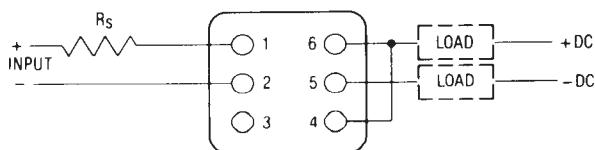
	FB00CD		FB00FC		FB00KB		
	Min	Max	Min	Max	Min	Max	Units
Continuous Load Current (See Fig. 3 & Note 5)		2.0		1.0		0.5	Adc
Leakage Current @ $V_{load}$ = max. operating voltage							
$-55^{\circ}\text{C} < T_A < +25^{\circ}\text{C}$		400		400		400	nAdc
$+25^{\circ}\text{C} < T_A < 120^{\circ}\text{C}$		40		40		40	$\mu\text{Adc}$
Output Voltage Drop		0.4		0.5		1.8	Vdc
Continuous Operating Load Voltage		80		180		350	Vdc
Transient Blocking Voltage (5 s max.)		90		180		360	Vdc
ON Resistance $R_{ds}$ (on) at $T_J = 25^{\circ}\text{C}$		0.15		0.25		2.0	Ohm
$I_{LOAD} = 100 \text{ mAdc}$ (See Fig. 4 & Note 6)							
Turn-On Time @ $I_{IN} = 25 \text{ mA}$ (See Fig. 2 and 5)		800		800		500	$\mu\text{s}$
Turn-Off Time (See Fig. 5)		500		500		500	$\mu\text{s}$
Load Surge Current (See Note 3)		7.0		3.5		1.75	Adc
Output Capacitance at 25 Vdc, 1 MHz		650		500		200	pF

**OUTPUT (LOAD) SPECIFICATIONS**

	FB00CD		FB00FC		FB00KB		
	Min	Max	Min	Max	Min	Max	Units
All Configurations							
Input to Output Capacitance		5		5		5	pF
Dielectric Strength	500		500		500		Vac
Insulation Resistance @ 500 Vdc	$10^9$		$10^9$		$10^9$		Ohm
Output Junction Temperature @ $I_{LOAD} = I_{max \text{ rated}}$		125		125		125	°C
Maximum Junction Temperature ( $T_J$ Max.)	150		150		150		°C
Thermal Resistance Junction to Ambient ( $\theta_{JA}$ )	110		110		110		°C/W
Thermal Resistance Junction to Case ( $\theta_{JC}$ )	20		20		20		°C/W

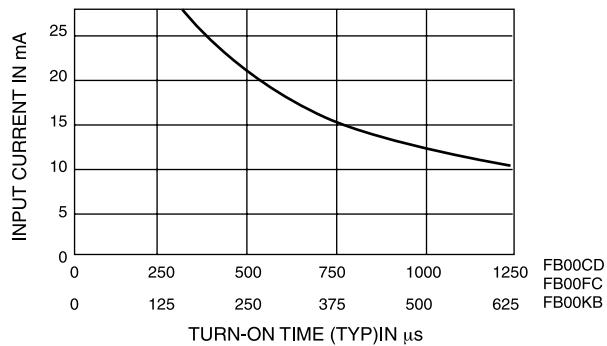


A) BI-DIRECTIONAL AND DC CONFIGURATION (SEE NOTE 4)

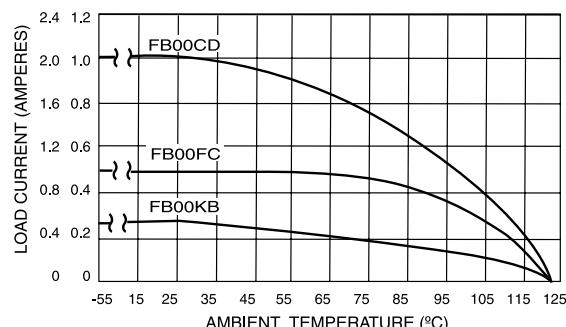


B) DC CONFIGURATION (SEE NOTE 4)

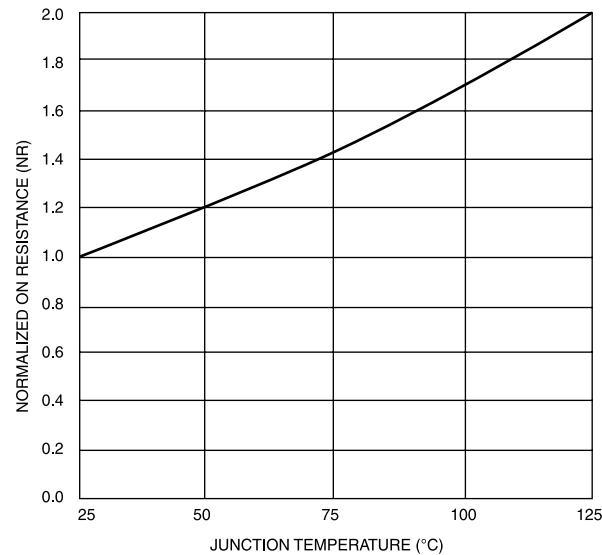
**WIRING CONFIGURATIONS  
FIGURE 1**



**INPUT CURRENT VS TURN-ON TIME  
FIGURE 2**



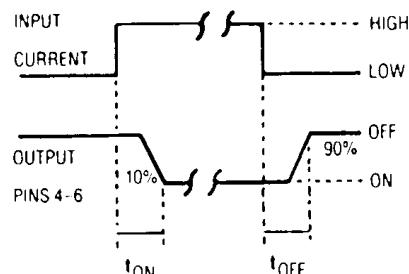
**LOAD CURRENT DERATING CURVE  
FIGURE 3**



**NORMALIZED ON RESISTANCE VS JUNCTION  
TEMPERATURE.  
FIGURE 4 (SEE NOTE 6)**

**NOTES:**

1. Series resistor required to limit input current to 50 mA max.
2. The rated input current is 25 mA for all tests unless otherwise specified.
3. Surge current is specified for 25°C, 10 cycles maximum at a 1 Hz repetition rate with 10% duty cycle and 0.1 s. duration.
4. Relays may drive loads connected to either positive or negative referenced power supply lines. Inductive loads must be diode suppressed.
5. Continuous load current is rated under the condition of still air.
6. To calculate the maximum ON resistance for a given junction temperature, find the normalized ON resistance factor (NR) from Figure 4. Calculate the new ON resistance as follows:  
 $R_{(ON)} = NR \times R_{(ON)} @ 25^\circ\text{C}$
7. Relays are tested in the bi-directional configuration only.



**OUTPUT TURN-ON AND OFF TIMING  
FIGURE 5**

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