TELEDYNE RELAYS
A Unit of Teledyne Electronic Technologies

Series QB00FM

Optically Isolated Bi-Directional & DC Output
Bi-Directional Solid-State Relay

Part Number*	Relay Description
QB00FM	±7.5A @ ±150Vdc Output ,Solid State Relay

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

ELECTRICAL SPECIFICATIONS

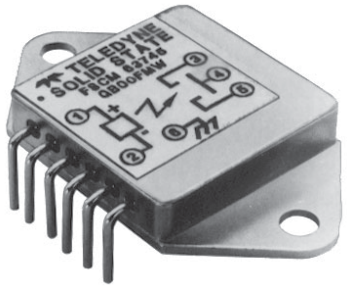
(-55°C TO +105°C Ambient Temperature Unless Otherwise Specified)

INPUT (CONTROL) SPECIFICATION

(See Fig. 1 and Note 1)	Min	Max	Units
Input Current @ V_{IN} = 6 Vdc		38	mAdc
Turn-Off Voltage (Guaranteed Off)		1.5	Vdc
Turn-On Voltage (Guaranteed On)	4.5		Vdc
Reverse Voltage Polarity		-16	Vdc
Input Supply Range (See Fig. 2 and Note 1)	4.5	16	Vdc

OUTPUT (LOAD) SPECIFICATIONS

Bi-directional Configuration (See Fig. 1)	Min	Max	Units
Load Current (See Fig. 3) (No Heat Sink)		±4.3	Adc
Leakage Current			
@ V_{LOAD} = ±150 Vdc (25°C)		±10	µAdc
@ V_{LOAD} = ±150 Vdc (105°C)		±100	µAdc
Output Voltage Drop @ 4.3A		0.7	Vdc
Continuous Operating Output Voltage		±150	Vdc
Transient Blocking Voltage (See Note 3)		±180	Vdc
ON Resistance R_{ds} (on) at T_J = 25°C I_{LOAD} = 100 mAdc (See Fig. 4 and Note 4)		0.10	Ohm
Turn-On Time (See Fig.5)		7.5	ms
Turn-Off Time (See Fig. 5)		2.0	ms
dV/dt @ +25°C	100		V/µs
Output Capacitance at 25 Vdc, 100 KHz		1600	pF



FEATURES

- High voltage output
- Low ON resistance
- Power FET output
- Optical isolation
- Fast switching speed
- High surge current capability
- Capable of DC or bi-directional DC switching (AC)
- Parameters tested utilizing MIL-PRF-28750 test methods

APPLICATIONS

- Ideal for Automatic Test Equipment (ATE)
- High voltage systems
- High-speed switching with low EMI
- Squib Fire

DESCRIPTION

The QB00FM relay is an advanced solid-state bi-directional relay designed for high-speed power switching applications. This relay utilizes state-of-the-art solid-state circuit technology and manufacturing techniques to provide high reliability, low life cycle cost and exceptional switch performance. The QB00FM is capable of switching AC or DC power. The three output terminals can be configured for DC switching with ON resistance reduced to 25 milliohms and a current rating of 7.5A continuous. Other features include optical coupling to minimize EMI generation and to protect logic circuits from output voltage transients. The QB00FM is packaged in a hermetically sealed low profile package suitable for heat sink or circuit card mounting. Pin 6 is connected to the case for additional safety shielding.

OUTPUT (LOAD) SPECIFICATIONS

DC Configuration (See Fig. 1 and Notes 2 & 6)	Min	Max	Units
Load Current (See Fig. 3) (No Heat Sink)		7.5	Adc
Leakage Current @ V_{LOAD} = ±150 Vdc (25°C)		20	μAdc
Leakage Current @ V_{LOAD} = ±150 Vdc (105°C)		200	μAdc
Output Voltage Drop @ 7.5A		0.45	Vdc
Continuous Operating Load Voltage		150	Vdc
Transient Blocking Voltage (See Note 3)		180	Vdc
ON Resistance R_{ds} (on) at T_J = 25°C I_{LOAD} = 100 mAdc (See Fig. 4 and Note 4)		0.035	Ohm
Turn-On Time (See Fig.5)		8.5	ms
Turn-Off Time (See Fig. 5)		2.0	ms
Output Capacitance at 25 Vdc, 100 KHz		3200	pF

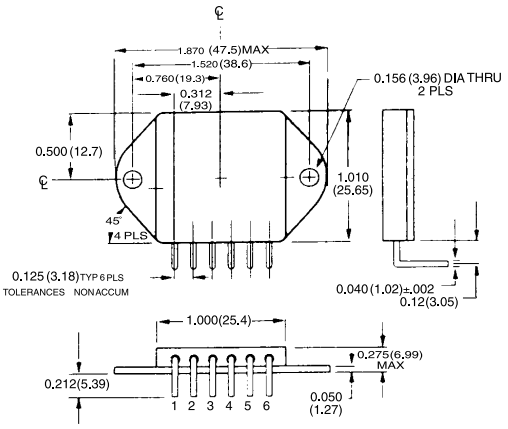
OUTPUT (LOAD) SPECIFICATIONS

All Configurations	Min	Max	Units
Input to Output Capacitance		10	pF
Dielectric Strength	500		Vac
Insulation Resistance @ 500 Vdc	10^9		Ohm
Junction Temperature @ I_{LOAD} = $I_{max\ rated}$		125	°C
Thermal Resistance Junction to Ambient, (θ_{JA})		30	°C/W
Thermal Resistance Junction to Case, (θ_{JC})		2.0	°C/W

ENVIRONMENTAL SPECIFICATIONS

All Configurations	Min	Max	Units
Temperature Range			
Operating	-55	+105	°C
Storage	-55	+125	°C
Vibration (10–2,000 Hz)		100	g
Constant Acceleration		5000	g
Shock (0.5 ms)		1500	g

MECHANICAL SPECIFICATIONS



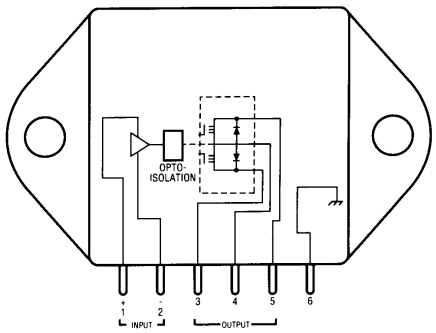
- Weight: 25g (max)
- Case: 6 pin, hermetically sealed
- Pins: Plated, gold

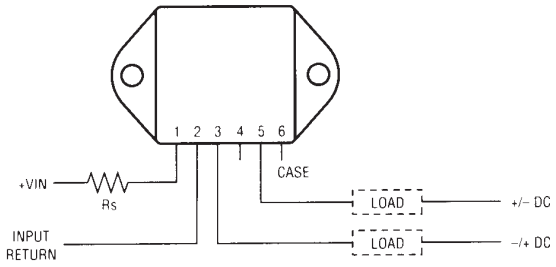
Tolerances:

.XX	± 0.015
.XXX	± 0.010
ANGLE	±1/2°

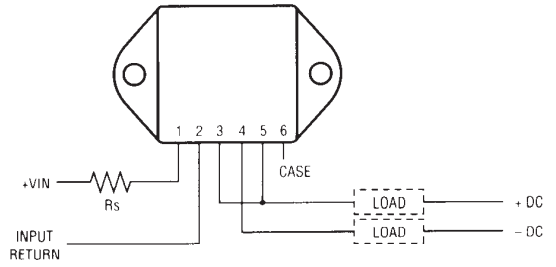
DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)

BLOCK DIAGRAM



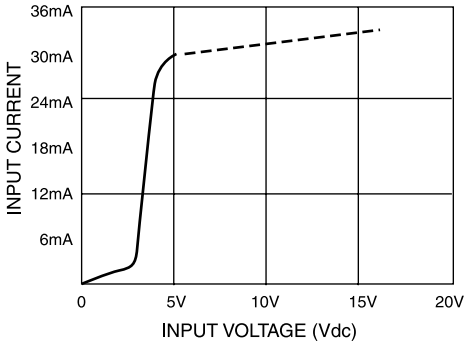


A) BI-DIRECTIONAL AND DC CONFIGURATION
(SEE NOTE 1 & 3)

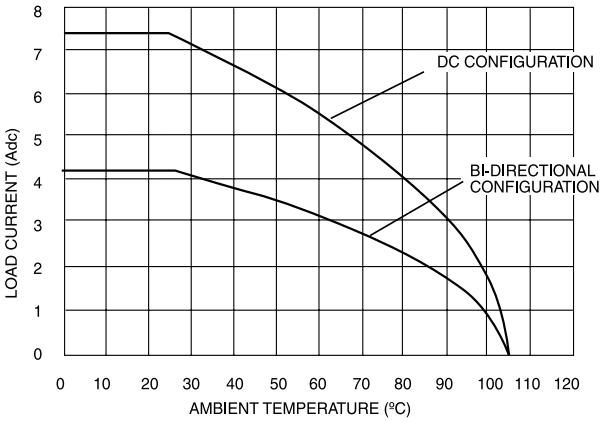


B) DC CONFIGURATION (SEE NOTE 1 & 3)

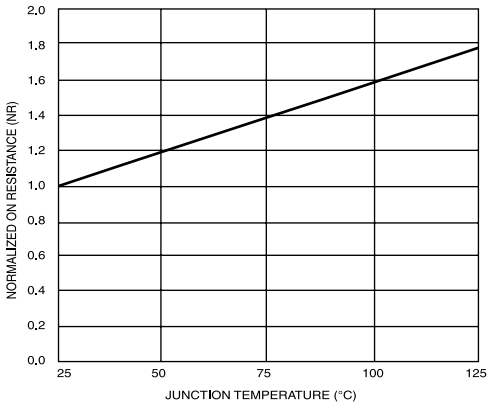
WIRING CONFIGURATIONS
FIGURE 1



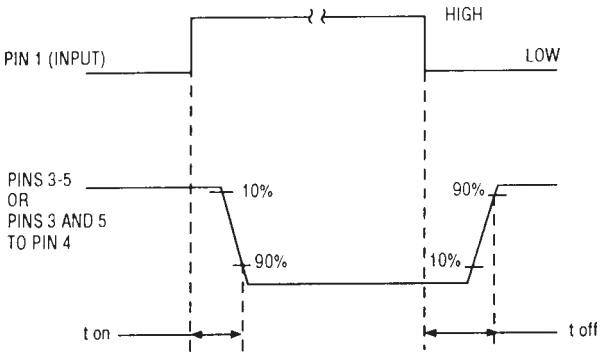
TYPICAL INPUT CURRENT VS INPUT VOLTAGE
FIGURE 2



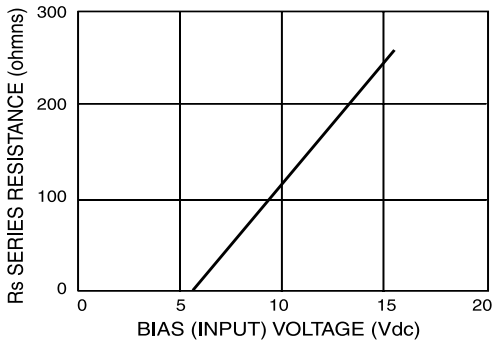
LOAD CURRENT DERATING CURVE
(NO HEAT SINK)
FIGURE 3



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



TURN ON AND TURN OFF TIMING DIAGRAM
FIGURE 5



SERIES RESISTANCE VS INPUT VOLTAGE
FIGURE 6 (SEE NOTE 1)

NOTES:

1. For input voltages above 6V, a series resistor is required. Use the standard resistor value equal to or less than the value found in Figure 6. (V_{INPUT} - 6V) / 0.035 A
   The input voltage should never exceed 16 Vdc.
2. The rated input voltage is 5V for all tests unless otherwise specified.
3. Relays may drive loads connected to either positive or negative reference power supply lines. Inductive loads must be diode suppressed.
4. 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 X $R_{(ON)}$ @ 25°C
5. Input transition should be ≤ 1 ms duration and input drive should be “bounceless contact” type.
6. Relays are tested in the bi-directional configuration only. DC parameters are shown for reference only.