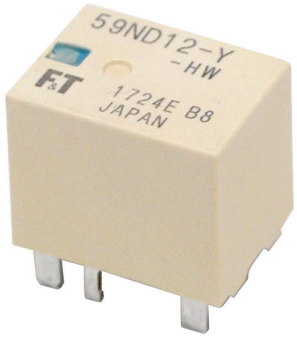
COMPACT HIGH POWER RELAY
1 POLE - 70A (FOR 12V CAR BATTERY)
For Automotive Applications

FBR59-HW Series

RoHS Compliant

■ FEATURES

- 1 pole, 70A, 1 form U
- High temperature grade (-40˚C to 125˚C)
- Comparable capability with Power Mini ISO plug-in relays
- Through hole reflow type available
- RoHS compliant, lead free



■ APPLICATIONS

Junction box (cooling fan, blower fan, ignition switch, DC-DC converter, head light etc.)
Electric power steering

■ PART NUMBERS

[Example] FBR59 N D12 - Y - HW - RW
(a) (b) (c) (d) (e) (f)

(a)	Relay type	FBR59 series
(b)	Enclosure	N : Plastic sealed type
(c)	Coil rated voltage	D12 : 9...12VDC Please refer to coil rating table
(d)	Contact material	Y : Silver tin oxide
(e)	Contact rating	HW : 70A
(f)	Soldering	Nil : Standard RW : Through hole reflow (THR)

Actual marking does not carry the type name: “FBR”

E.g.: Ordering code: FBR59ND12-Y-HW Actual marking: 59ND12-Y-HW

■ SPECIFICATIONS

Item			Specifications	Remarks/Conditions
Contact Data	Configuration		1 Form U	
	Construction		Single	
	Material		Silver tin oxide	
	Voltage drop		Max. 100mV	At 1A, 12VDC
	Contact rating		70A, 14VDC (resistive load) 45A, 14VDC (motor load)	
	Max. carrying current		70A/1h	At 25°C, rated load
	Max. inrush current		220A	Capacitor inrush based
	Min. switching load *1		1A, 6VDC	Reference
	Max. switching load *2		70A, 14VDC (resistive load) 45A, 14VDC (motor load)	
Coil	Operating temperature range		-40ºC to +125ºC	No frost
	Storage temperature/humidity		-40°C to +125°C, 45 to 85RH	No frost
Time	Operate		Max. 10ms (without diode, without bounce)	At nominal voltage
	Release		Max. 10ms (without diode, without bounce)	At nominal voltage
Life	Mechanical		Min. 1 x 10^6 operations	Without contact load
	Electrical (resistive)		Min. 50 x 10^3 operations at 70A Min. 100 x 10^3 operations at 60A	resistive load
Insulation	Insulation resistance		Min. 100MΩ	At 500VDC, initial
	Dielectric withstanding voltage	Open contacts	500VAC (50/60Hz), 1 minute	
		Coil to contacts	500VAC (50/60Hz), 1 minute	
Others	Vibration resistance	Misoperation	10 to 200Hz, 44m/s^2 (4.5G), constant acceleration	
		Endurance	10 to 200Hz, 44m/s^2 (4.5G), constant acceleration	
	Shock resistance	Misoperation	Min. 100m/s² (11 ± 1ms)	
		Endurance	Min. 1,000m/s² (6 ± 1ms)	
	Dimensions / Weight		15.0 x 20.0 x 16.8 mm / approx. 13g	

*1: Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

*2: Maximum switching loads mentioned above are reference values. Please refer to operation range graph for continuous current.

Note: Values of electrical characteristics are under 15 to 35°C, 25 to 75%RH (JIS standard condition) unless otherwise specified.

Note: Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A. Please perform the confirmation test with actual conditions.

■ COIL DATA

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ω)	Must Operate Voltage*1 (VDC)	Must Release Voltage*1 (VDC)
D09	9	170	5.4 (at 20ºC) 7.7 (at 125ºC)	0.7 (at 20ºC) 1.0 (at 125ºC)
D10	10	220	6.3 (at 20ºC) 9 (at 125ºC)	0.8 (at 20ºC) 1.2 (at 125ºC)
D12	12	320	7.3 (at 20ºC) 10.4 (at 125ºC)	1.0 (at 20ºC) 1.5 (at 125ºC)

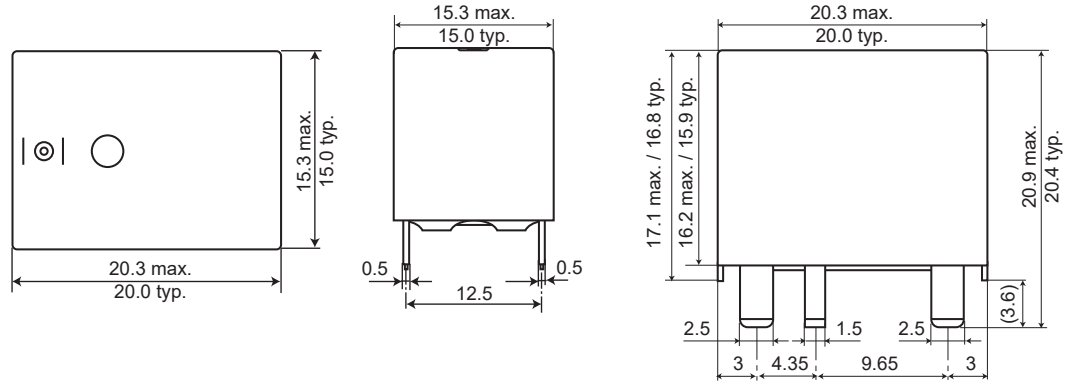
Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

*1: Specified operated values are valid for pulse wave voltage.

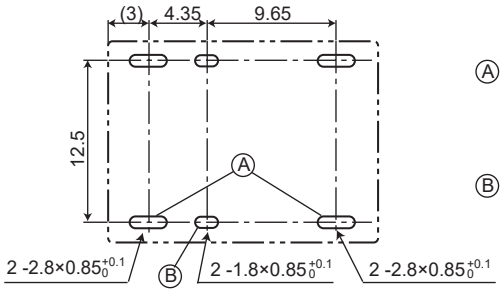
Note: Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

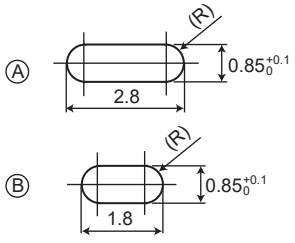
■ DIMENSIONS

● Dimensions

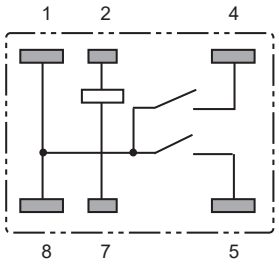


● PC board mounting hole layout
(BOTTOM VIEW)





● Schematics
(BOTTOM VIEW)



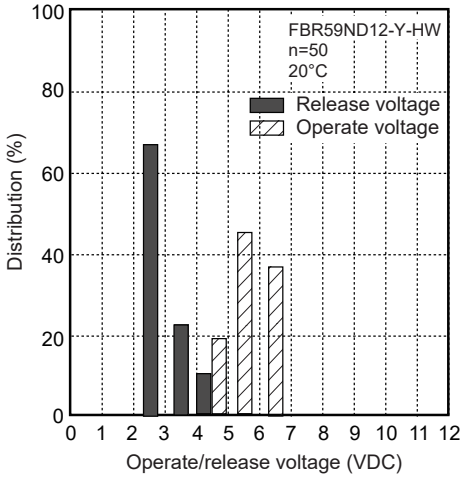
* Dimensions of the terminals do not include thickness of pre-solder.
* Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.

( ): Reference
Unit: mm

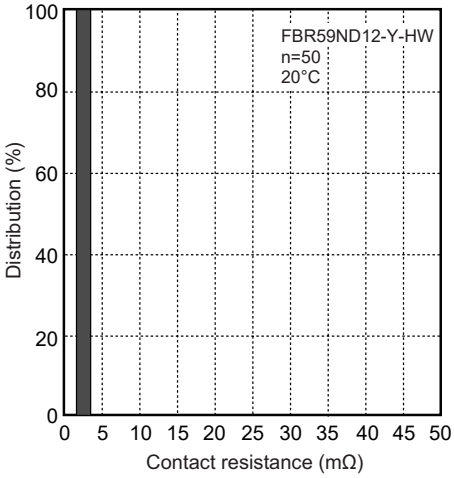
■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)

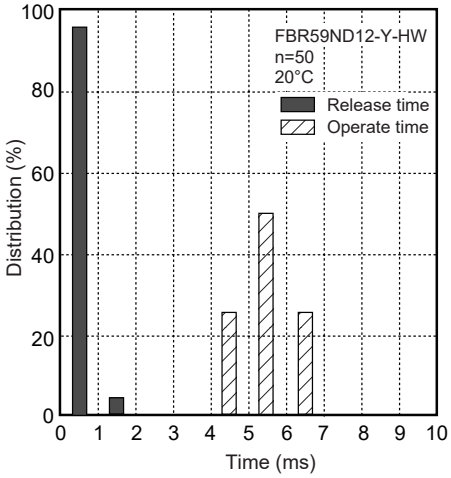
Distribution of operate/release voltage



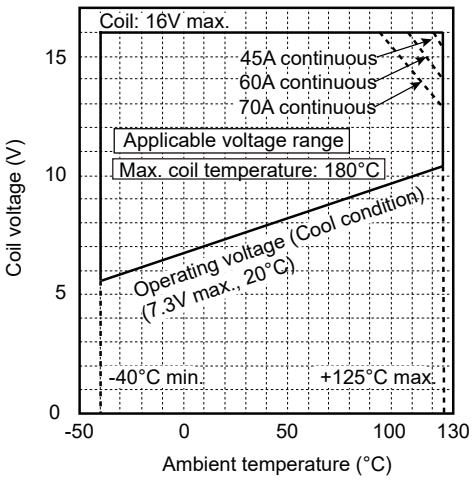
Distribution of contact resistance



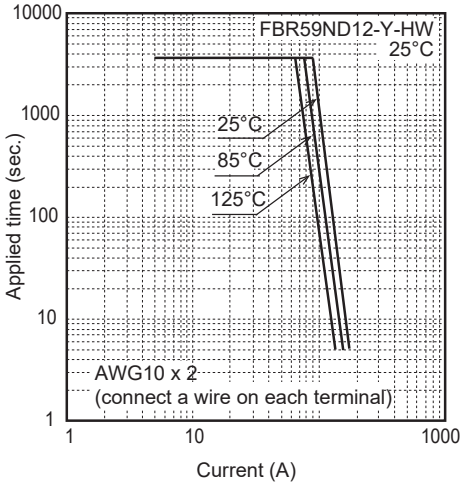
Distribution of operate/release time



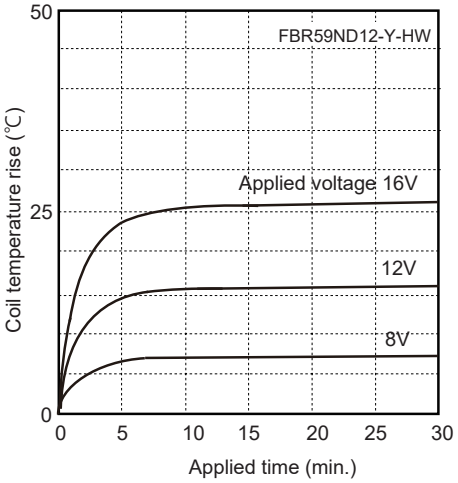
Operating range



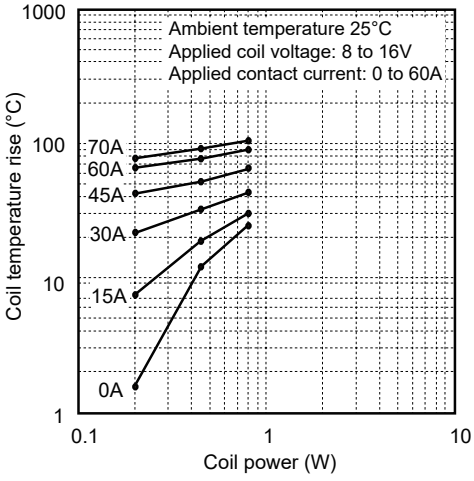
Contact current capacity



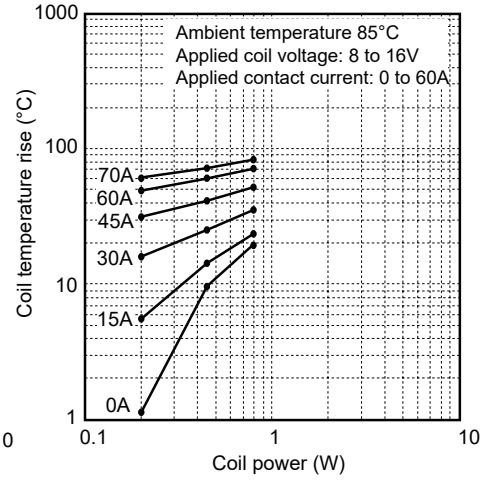
Coil temperature rise
(ambient temperature 25℃)



Coil temperature rise
(ambient temperature 25°C)



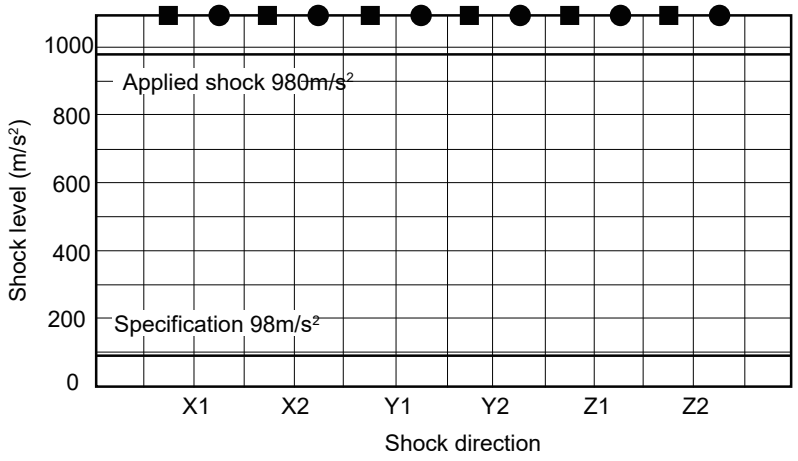
Coil temperature rise
(ambient temperature 85°C)



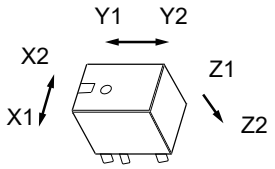
■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)

Shock resistance characteristics

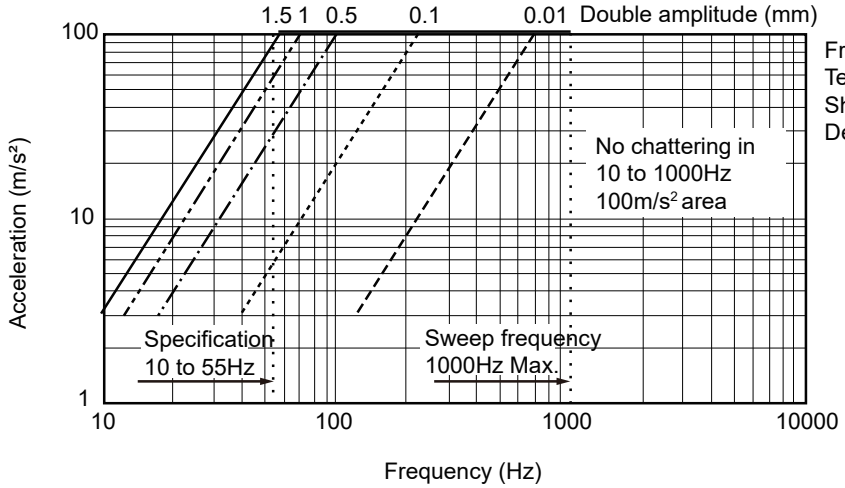


Shock application time: 6±1ms half-sine wave
Test conditions: Coil energized (12VDC) and de-energized
Shock direction: see diagram below
Detection level: chatter >1ms

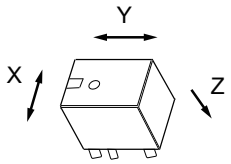


■ Make contact (coil de-energized)
● Make contact (coil energized)

Vibration resistance characteristics



Frequency : 10 to 1000Hz
Test conditions: Coil energized (12VDC) and de-energized
Shock direction: see diagram below
Detection level: chatter >1ms



■ PART NUMBER LIST

Part Number	Contact Configuration	Enclosure	Contact Material	Contact Rating	Soldering
FBR59N( )-Y-HW	1 Form U	Plastic sealed	Silver tin oxide	70A	Standard
FBR59N( )-Y-HW-RW					Through hole reflow

CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

GENERAL INFORMATION

1. **RoHS Compliance**
   - All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

2. **Recommended lead free solder condition**
   - Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.
   - Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

Flow Solder Condition:

Pre-Heating:	Maximum 120˚C within 90 sec.
Soldering:	Dip within 5 sec. at 255°C±5°C solder bath

Relay must be cooled by air immediately after soldering

Solder by Soldering Iron:

Soldering Iron:	30-60W
Temperature:	Maximum 340-360˚C
Duration:	Maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. **Moisture Sensitivity**
   - Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

4. **Tin Whiskers**
   - Dipped SnAgCu solder is known as presenting a low risk to tin whisker development. No considerable length whisker was found by our in-house test.

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