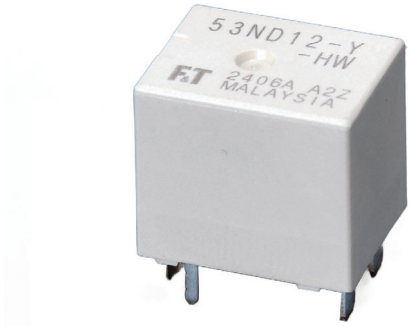
COMPACT HIGH POWER RELAY
1 POLE - 40A (FOR AUTOMOTIVE APPLICATIONS)

FBR53-HW Series

RoHS Compliant

■ FEATURES

- Small 40A relay
- High temperature grade (-40˚C to 125˚C)
- Contact arrangement Form U (form A)
- Surface mount compatible (reflow capability)
- Inrush current 80A
- Coil wire temperature class: H



■ PART NUMBERS

[Example] FBR53 (a) N (b) D12 (c) - Y (d) - HW (e) - RW (f)

(a)	Relay type	FBR53 series	
(b)	Enclosure	N	: Plastic sealed type
(c)	Coil rated voltage	012	: 9...12VDC See coil rating table
(d)	Contact material	Y	: Silver-tin oxide
(e)	Contact rating	HW	: 40A
(f)	Soldering	Nil RW	: Standard (Flow soldering) : Reflow capable (THR)

Actual markings does not carry the type name: "FBR"

E.g.: Ordering code: FBR53ND12-Y-HW Actual marking: 53ND12-Y-HW

■ SPECIFICATIONS

Item			Specifications	Remarks/Conditions
Contact Data	Configuration		1 Form U	
	Material		Silver-tin oxide	
	Voltage drop		Max. 100 mV at 1A, 12VDC. Average 1.2mΩ at 7A, 12VDC	
	Contact rating		40A, 14VDC	Resistive load
	Max. carrying current		40A	
	Max. inrush current		80A	Reference
	Min. switching load *1		1A, 6VDC	Reference
Coil	Rated power consumption		860mW	At 20°C
	Operate power consumption		310mW	At 20°C
	Operating temperature range		-40ºC ~ +125ºC	No frost
Time	Operate		Max. 10ms	At nominal voltage
	Release		Max. 10ms	At nominal voltage
Life	Mechanical		Min. 1 x 10^6 operations	Without contact load
	Electrical		Min. 100 x 10^3 operations	14VDC, 40A resistive load
Insulation	Insulation resistance		Min. 100MΩ	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, acceleration 44m/s^2 (4.4G) constant acceleration	
		Endurance	10 to 200Hz, acceleration 44m/s^2 (4.4G) constant acceleration	
	Shock resistance	Misoperation	100m/s^2 (11±1ms)	Direction X, Y, Z, contact ON/OFF total 36 times
		Endurance	1,000m/s^2 (6±1ms)	Direction X, Y, Z, contact OFF total 18 times
	Dimensions / Weight		12.3 x15.7x14.0 mm / approx. 6g	

*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.

! 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	94	5.4 7.7 (at 125ºC)	0.7 1.0 (at 125ºC)
D10	10	117	6.3 9 (at 125ºC)	0.8 1.2 (at 125ºC)
D12	12	167	7.3 10.4 (at 125ºC)	1.0 1.5 (at 125ºC)

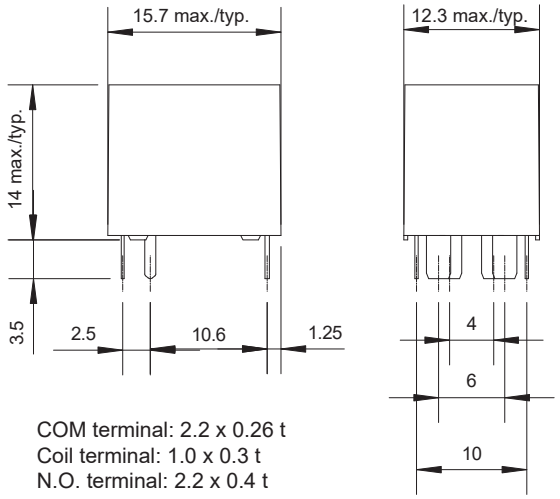
Note: All values in the table are valid at 20oC and zero contact current, unless otherwise specified.

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

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

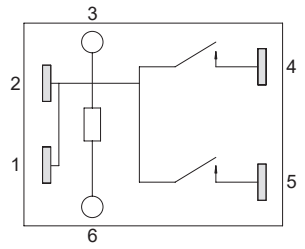
■ DIMENSIONS

Dimensions



COM terminal: 2.2 x 0.26 t
Coil terminal: 1.0 x 0.3 t
N.O. terminal: 2.2 x 0.4 t

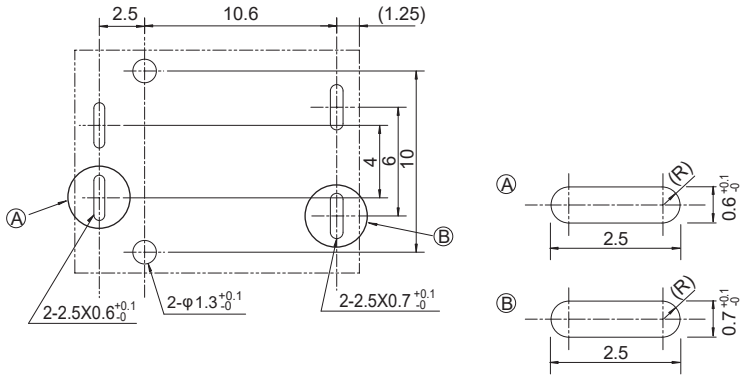
Schematics
(BOTTOM VIEW)



Pattern shall be designed to short-circuit #4 and #5 on the PC board.

Dimensions of the terminals do not include thickness of pre-soldering.

PC board mounting hole layout
(BOTTOM VIEW)



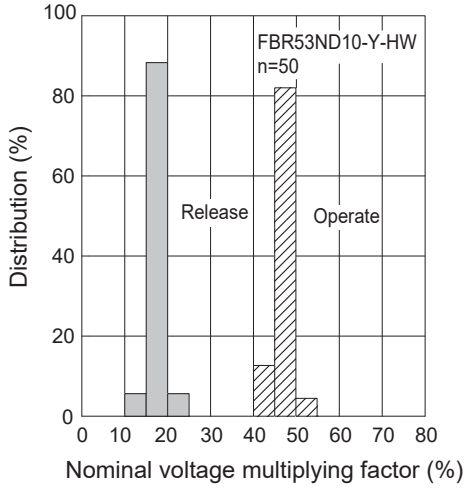
Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.

( ): Reference value
Unit: mm

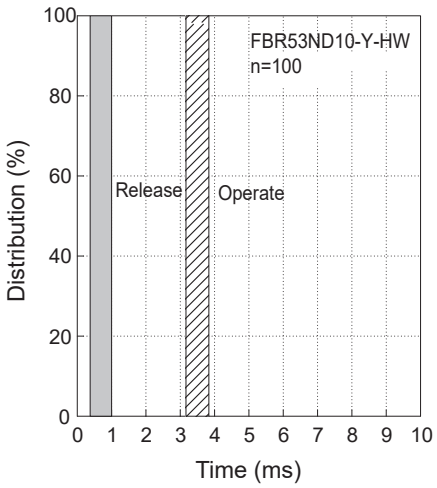
■ CHARACTERISTIC DATA

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

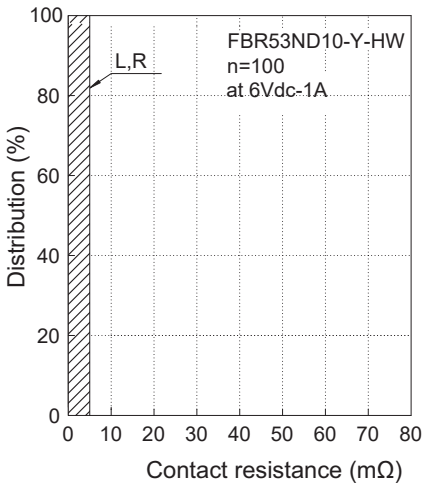
Distribution of operate/release voltage



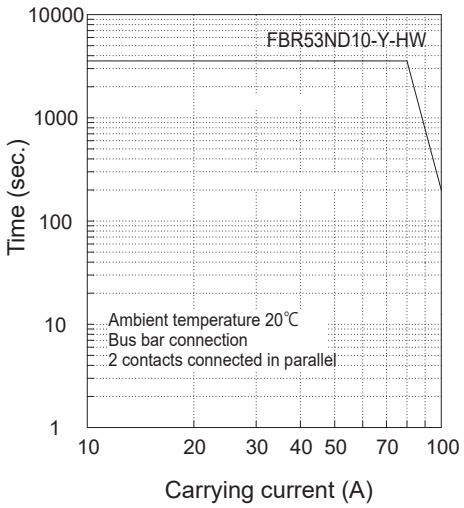
Distribution of operate/release time



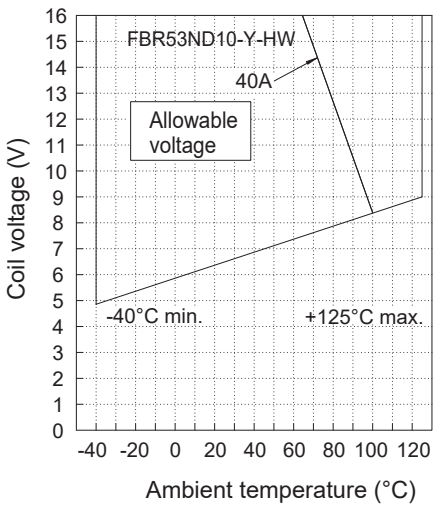
Distribution of contact resistance



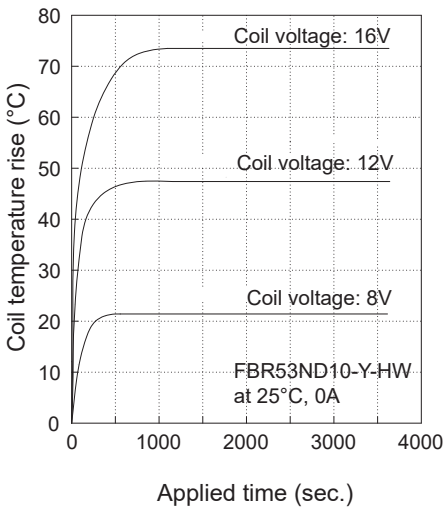
Contact current



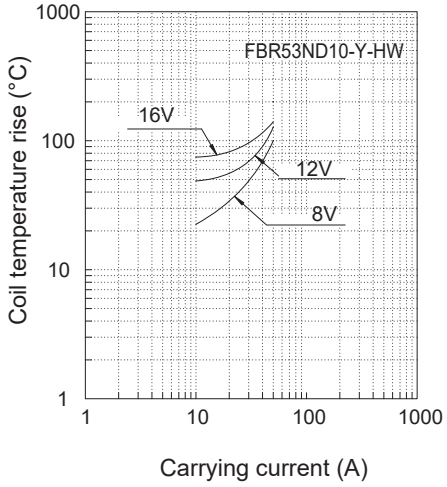
Ambient temperature/voltage



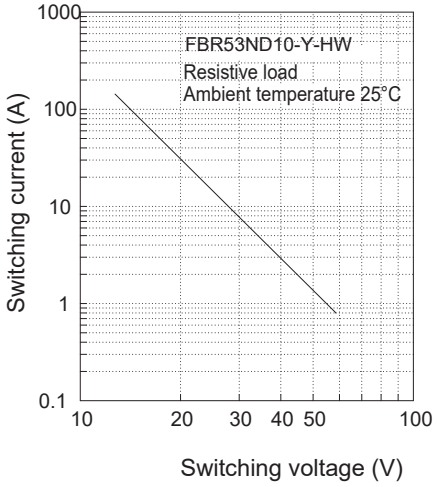
Coil temperature rise (1)



Coil temperature rise (2)



Max. allowable switching



CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited for flow soldering type.
- 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

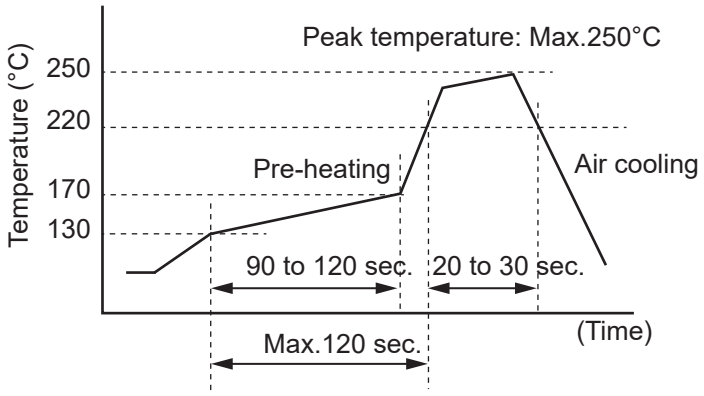
Solder by Soldering Iron:

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

Reflow Solder Condition:

(Applicable only for reflow capable type)

Recommended reflow soldering profile
IRS (infrared reflow soldering)



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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