

Nano Relay

Description

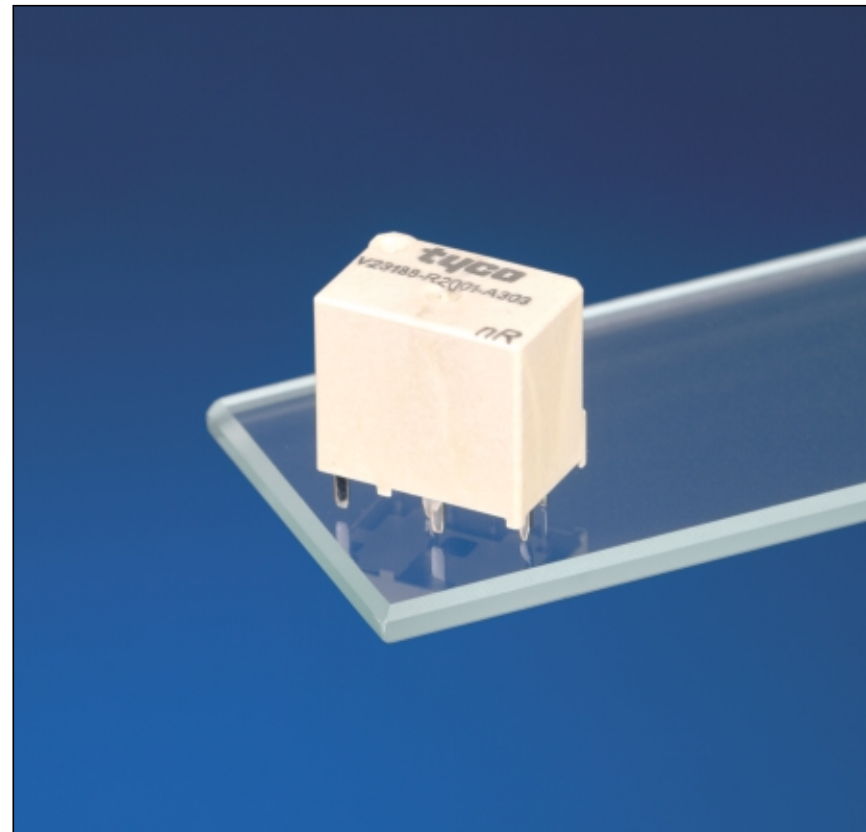
Features

- Smallest automotive PCB relays in their classes. Minimum PCB area requirements:
 - Twin Nano: 157 mm²,
L x H x W (mm) = 15.4 x 14.0 x 10.2
 - Single Nano: 81 mm²,
L x H x W (mm) = 7.9 x 14.0 x 10.2
- Minimal height of 14.0 mm
- Minimal weight (0.09 oz./2.5 g per single relay)
- First automotive relays using insert molding technology
- Highest reliability due to overmolding process
- Single and twin relays available
- Twin relay includes two independent coil systems
- Easy routing of PCB-layout
- Maximum switching current 30 A
- Limiting continuous current 30 A at 23°C (NO contact)
- Power-saving high-impedance coil
- Two mounting technologies: for both wave or reflow soldering
- Low noise
- Lead free

Typical Applications

- Motor reverse units like
 - Window lifter
 - Seat adjustment
 - Door lock
 - Mirror adjustment
- Wipers
- Car alarm
- Single relay for cross carline use

Please contact Tyco Electronics for relay application support.



Benchmark for Successful Miniaturization

Tyco Electronics launches the Nano relay as the benchmark for successful miniaturization of PCB relays. It has been developed as a Twin and a Single version making both the smallest automotive PCB relays in their respective classes.

Due to growing comfort and packaging requirements in modern vehicles, the PCB space in the different relay boxes is limited. The Twin Nano relay requires only 157 mm² of PCB area. Two independent relay coil systems provide maximum performance on very minimum space. The Single Nano relay just requires 81 mm² of PCB area and, due to its size, is predestined for the use in Electronic Control Units with substantial relay shares.

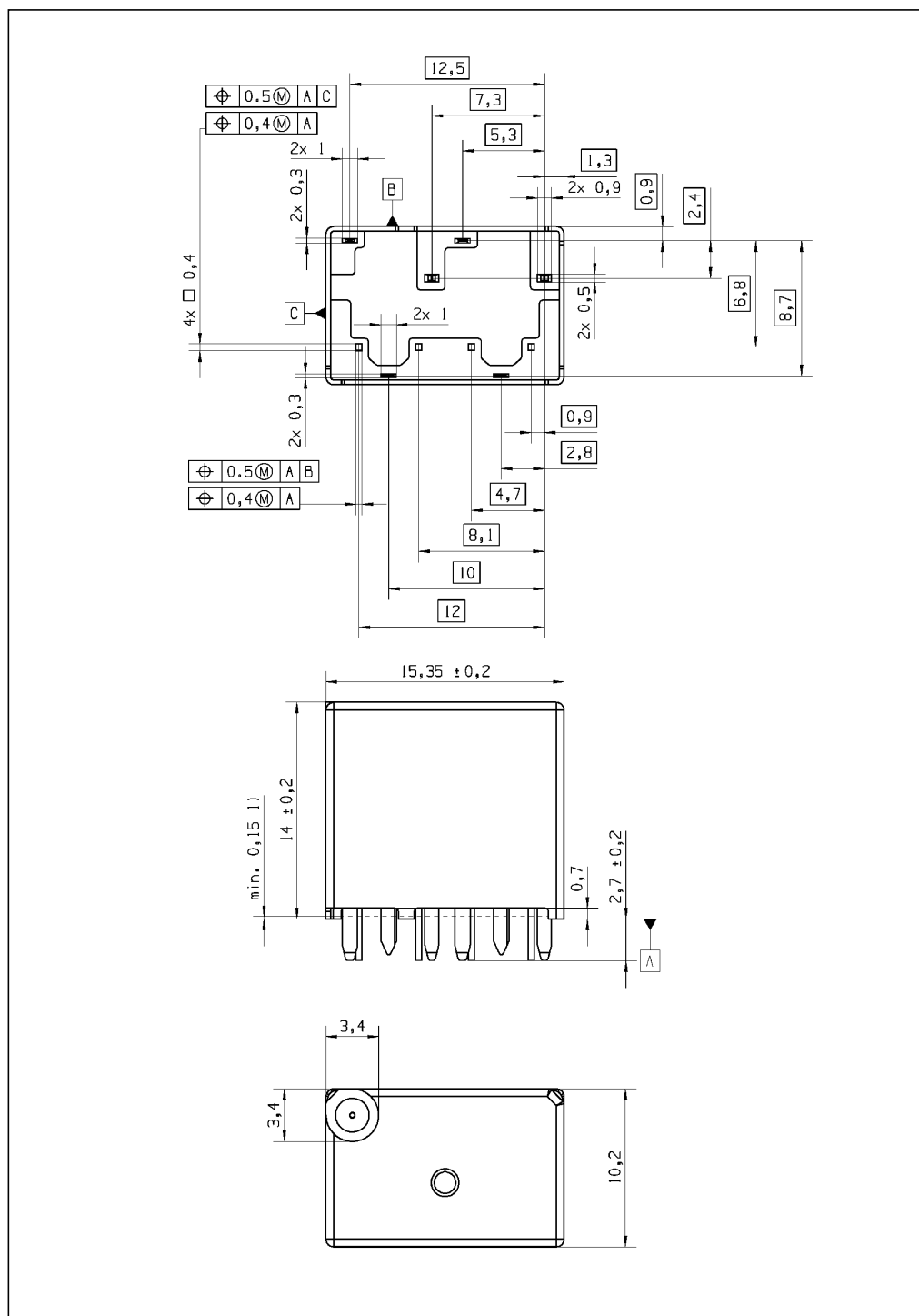
"Design-to-quality" was the basis of this innovative automotive relay design concept. An overmolded relay motor (coil, frame and core) ensures highest precision in the assembly and reduces the contamination risk to the absolute minimum. It also allows most accurate mechanical parameters and adjustment free processes. In addition, the overmolding of the coil system improves the heat dissipation of the relay and maximizes its performance.

All technical performance data apply to the relay as such, specific conditions of the individual application are not considered. Please always check the suitability of the relay for your intended purpose. We do not assume any responsibility or liability for not complying herewith. We recommend to complete our questionnaire and to request our technical service. Any responsibility for the application of the product remains with the customer only. All specifications are subject to change without notification. All rights of Tyco are reserved.

Standard conditions as in EIA RS-407-A (23 °C, 20-50% RH, 29.5 ± 1.0" Hg / 998.9 ± 33.9 hPa) apply unless otherwise noted.

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Dimensional Drawing



1) Height of tinning

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Contact Data

Typical areas of application	Resistive/inductive load
Contact configuration	2 Changeover contacts/ 2 Form C
Circuit symbol (see also Pin assignment)	
Rated voltage	12 V
Rated current at 85°C	NC/NO 15 A/20 A
Contact material	Silver based
Max. switching voltage/power	Load limit curve in progress
Max. switching current ¹⁾	NC/NO
On ²⁾	40 A
Off	30 A
Min. recommended load ³⁾	1 A at 5 V
Voltage drop at 10 A (initial) for NC/NO contacts	Typ. 30 mV, 300 mV max.
Mechanical endurance (without load)	> 5 x 10 ⁶ operations
Electrical endurance at cyclic temperature -40 /+23 /+85°C and 13.5 V	Motor reverse blocked: > 1 x 10 ⁶ operations max. 30 A L = max. 1.1 mH

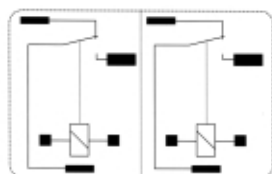
¹⁾ The values apply to a resistive or inductive load with suitable spark suppression and at maximum 13.5 V for 12 V or 27 V for 24 V load voltages.

²⁾ For a load current duration of maximum 3 s for a make/break ratio of 1:10.

³⁾ See chapter Diagnostics in the Application Recommendations of catalog no 1308028 or consult the internet.

Pin Assignment

2 Changeover contacts/
2 Form C



Coil Data

Available for nominal voltages	12 V
Nominal power consumption of the unsuppressed coil at nominal voltage	0.72 W
Test voltage winding/contact	500 VAC _{rms}
Maximum ambient temperature range ¹⁾	- 40 to + 125°C
Operate time at nominal voltage	Typ. 3 ms
Release time at nominal voltage ²⁾	Typ. 1.5 ms

¹⁾ Applies to typical intermittent.

²⁾ For unsuppressed relay coil.

N.B.

A low resistive suppression device in parallel to the relay coil increases the release time and reduces the lifetime caused by increased erosion and/or higher risk of contact tack welding.

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Operating Conditions

Temperature range, storage	-40°C to +150°C			
Test	Relevant standard	Testing as per	Dimension	Comments
Cold storage	IEC 68-2-1		1000 h	-40°C
Dry heat	IEC 68-2-2	Ba	1000 h	125°C
Climatic cycling with condensation	EN ISO 6988		20 cycles	Storage 8/16 h
Thermal change	IEC 68-2-14	Nb	35 cycles	-40/+125°C
Thermal shock	IEC 68-2-14	Na	1000 cycles	-40/+125°C Dwell time 1 h
Damp heat				
cyclic	IEC 68-2-30	Db, Variant 2	6 cycles	40°C/55°C/93%
constant	IEC 68-2-3	Ca	56 days	40°C/93%
Corrosive gas	IEC 68-2-42	—	10 days	
	IEC 68-2-43		10 days	
Vibration resistance	IEC 68-2-6 (sine pulse form)		10 ... 500 Hz 6 g	No change in the switching state >10 µs
Shock resistance	IEC 68-2-27 (half-sine pulse form)		6 ms up to 30 g	No change in the switching state >10 µs
Solderability	IEC 68-2-58			215°C; 3 s wetting
Resistance to soldering heat	IEC 68-2-58			260°C 10 s (see soldering profile)
Sealing	IEC 68-2-17	Qc, Method 2		1 min/70°C

Sample Ordering Information

Part Numbers (see table below for coil data)		Contact Arrangement	Contact Material	Enclosure	Terminals
Relay Part Number	Tyco Order Number				
V23138-C2001-A303	0-1413982-1	2 x Form C	Silver based	Sealed	THT
V23138-R2001-A303	0-1413982-1	2 x Form C	Silver based	Vent hole open	THR

Coil Versions

Coil Data for Nano Relay	Rated Coil Voltage (V)	Coil Resistance +/- 10% (Ω)	Must Operate Voltage (V)	Must Release Voltage (V)	Allowable Overdrive ¹⁾ Voltage (V)	
					at 23 °C	at 105 °C
V23138-**001-****	12	200	6.9	1.0	tbd	tbd

¹⁾ Allowable overdrive is stated with no load applied and minimum coil resistance.