T72M series

20 Amp Miniature PC Board Relay for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 20A, 16VDC switching rating.
- 60A inrush at 16VDC.
- 15A continuous contact rating @ 105°C.
- Immersion cleanable plastic case with knock-off nib for ventilation.
- Low profile package has a seated height of only .67'' (17mm).
- 1 Form C arrangement.
- Choice of AgNi 0.15 or AgSnO contacts.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form C (SPDT).
Material: AgNi 0.15 - Recommended for inductive loads.
AgSnO - Recommended for high inrush, lamp and capacitive loads and applications prone to contact material transfer.
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC(1).
Max. Load Current (@ 14VDC Load Voltage):

Load	Form C	
	NO	NC
Max. Continuous Current	**20A**	**10A**
Max. Break Current (1)	**20A**	**20A**
Max. Make Current (2)		
AgNi 0.15	**60A**	**12A**
AgSnO	**80A**	**15A**

Max. Switching Power: 35-320 watts DC (voltage dependent)(1).
Min. Recommended Current: 0.5 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 10 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 5 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 20 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: 0.80 watts @ 23°C coil temp. and rated coil voltage.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 5 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

Environmental Data

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to +105°C(4).
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Immersion cleanable, sealed plastic cover.
Weight: Sealed: 12 gm (0.4 oz.) approximately.
Audible Sound: 95dBA @ 10 cm, 14VDC coil voltage.
77dBA @ 1 M, 14VDC coil voltage.

Abnormal Operation

Overload Current: 40A, 36 sec.(5)
80A, 10 sec.
150A, 2.5 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

Notes

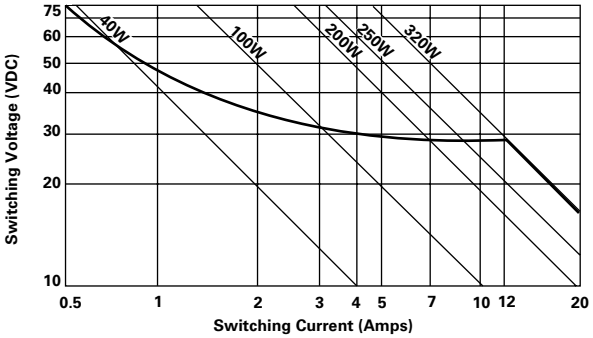
(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature of 23°C and 105°C as stated with a 10A load current flowing through the relay contacts and minimum coil resistance with power applied for 30 sec. max. (20% max. duty cycle.) For continuous duty information, see Figure 2. (Ambient Termerature vs. Coil Voltage for Continuous Duty.)
(4) See Figure 2.
(5) Current and times are compatible with circuit protection by a typical 20A circuit breaker. Relay will make, carry and break the specified current.

Coil Data (@23°C Coil Temperature)

Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable (3) Overdrive (VDC)	
						@ 23°C	@ 105°C
12	12	180	0.9	6.3	1.2	24.6	14.3
24	24	720	3.2	12.6	2.4	49.3	28.7

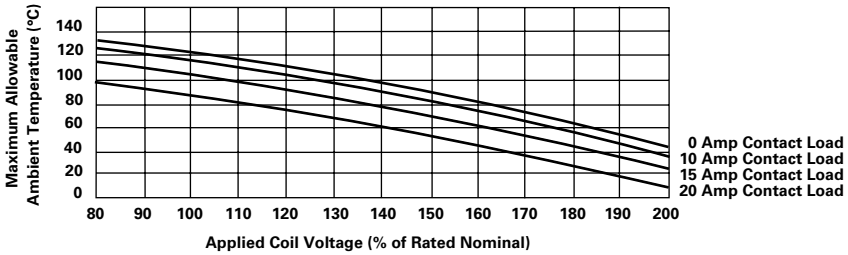
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Figure 1 - Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 - Ambient Temperature vs. Coil Voltage for Continuous Duty



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 155°C
5. Coil temperature rise due to load
   - = 8°C @ 10 amps
   - = 20°C @ 15 amps
   - = 35.5°C @ 20 amps
6. Curves are based on 800mW at 23°C
7. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Contact Arrangement	Enclosure	Contact Materials
T72M5D121-*	1 Form C	Sealed, Plastic Cover	AgNi 0.
T72M5D155-*	1 Form C	Sealed, Plastic Cover	AgSnO

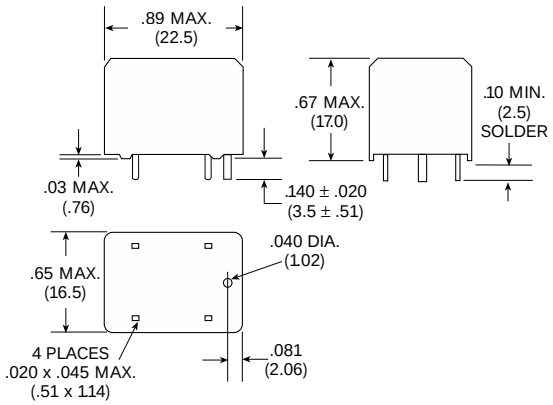
*Standard Coil Voltages: 12 = 12VDC
24 = 24VDC (Consult factory for availability).

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

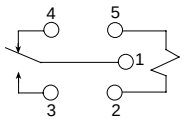
Outline Dimensions

Tolerance (unless otherwise noted): 3 decimal: ± .010 (±.254); 2 decimal: ±.015 (±.381).



Wiring Diagram (Bottom View)

Code 5
1 Form C



Suggested PC Board Layout (Bottom View)