Mini K HV Precharge Relays

- Suitable for voltage levels up to 450VDC
- Precharge currents up to 20A
- Limiting break currents up to 20A
- Available with PCB and plug-in terminals

Typical applications
DC high voltage precharge applications in hybrid, full battery electric vehicles and fuel-cell cars.

Contact Data
Contact arrangement 1 form X (NO DM)
Rated voltage 400VDC
Max. switching voltage1) / power 450VDC / 9kW
Limiting switching current2) normal operation 20A on/0A off: min. 10^5 ops.
fault break operation3) 20A on/20A off: min. 10 ops.3,4)
Initial contact voltage drop at 10A typ. 150mV, max. 300 mV
Operate time at nominal voltage typ. 2.5ms
Release time5) typ. 1ms
Mechanical endurance >10^7 ops.

Insulation Data1)
Initial dielectric strength between open contacts 2800 VDC/1mA
between contact and coil 2800 VDC/1mA
Insulation resistance after 10 fault break ops. (20A)
between open contacts >200MΩ
between contact and coil >200MΩ
Max. altitude 4000m
Clearance / creepage acc. IEC60664-1 (2007) for over voltage category I, pollution degree 2

Other Data
EU RoHS/ELV compliance compliant
Flammability of plastic material acc. UL94-HB
Ambient temperature range -40°C to +85°C
Climatic cycling with condensation EN ISO 6988 6 cycles, storage 8/16h
Temperature cycling (shock) IEC 60668-2-14, Na 10 cycles, -40/+85°C (5°C per min)
Damp heat constant IEC 60668-2-27 (half sine) 11ms, 20g9)
Corrosive gas IEC 60668-2-64 10 to 1000Hz, 30.8 m/s^2 9)
Shock resistance (functional) IEC 60668-2-27 (half sine) 11ms, 20g9)
Terminal type PCB and plug-in/QC
Weight
PCB version: approx. 17g (0.6oz)
Plug-in version: approx. 39g (1.4oz)
Solderability (aging 3: 4h/155°C) PCB version IEC 60668-2-20, Tb, method 1 hot dip 5s, 215°C
Resistance to soldering heat PCB version IEC 60668-2-20, Tb, method 1 hot dip 10s, 260°C with thermal screen

Note: Parameters given in http://relays.te.com/definitions for preheating and sealing and must be observed.
Sealing, IEC 60668-2-17 PCB version Qc, method 2, 1min/70°C
Storage conditions according IEC 6066813)

1) Consult TE Connectivity for insulation compatibility with higher voltages.
2) Load circuit: L/R <14µs.
3) After 10 fault break operations relay must be replaced.
4) Test conditions: on-time 100ms, off-time 10s.
5) Valid for recommended 250Ω suppression resistor (PCB version).
6) Max. continuous activation time is limited and depends on operating conditions. Please contact TE Connectivity for details.
7) All values are given for coil without pre-energization, at ambient temperature +23°C.
8) Coil suppression resistor already included in the relay. No additional suppression component allowed.
9) No change in the switching state >10µs.
10) For general storage and processing recommendations please refer to our Application Notes and especially to Storage in the Definitions or at http://relays.te.com/appnotes/
Automotive Relays
High Voltage Precharge Relays

Mini K HV Precharge Relays (Continued)

Terminal Assignment
1 form X (NO DM)
Pcb version

Terminal Assignment
1 form X (NO DM) with resistor
Plug-in version

Dimensions
Pcb version

Dimensions
Plug-in version

View of the Terminals (bottom view)

View of the Terminals (bottom view)

Detail PCB version: minimum clearance requirements (see note below)

Notes regarding PCB-layout and terminal assignment:
* Pin 4 must not be electrically connected, no solder eye at that pin is allowed, only a drill-hole without via
* Potential assignment of pins:
  - pins 1; 2: low voltage (L) 
  - pins 6; 7; 4*: high voltage (HV) 
  - pin 8a; 8b: no potential but internally connected 
  (* pin 4 is on HV potential in ON-state of relay only.

Notes regarding clearance and creepage distances:
* The required clearance and creepage distances between HV and LV potential must be ensured.
* Layout of the PCB has to ensure min. clearance and creepage distances of conducting relay parts and relay terminal 1 and conducting relay parts and terminal 2 respectively. Refer to detail drawing. Minimum distance to neighboring ferrous parts: 3mm.
### Mini K HV Precharge Relays (Continued)

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<th>Typical product code</th>
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<th>Terminal and enclosure</th>
<th>Design</th>
<th>Coil</th>
<th>Contact type</th>
<th>Contact material</th>
<th>Contact arrangement</th>
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<tr>
<td>V23700-C</td>
<td>V23700</td>
<td>C</td>
<td>PCB</td>
<td>0</td>
<td>001</td>
<td>A</td>
<td>40</td>
<td>8</td>
<td>2-1904058-5</td>
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<tr>
<td>V23700-F</td>
<td>V23700</td>
<td>F</td>
<td>Plug-in, QC</td>
<td>002</td>
<td></td>
<td></td>
<td>1 form X (NO DM)</td>
<td></td>
<td>2-1904058-7</td>
</tr>
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### Terminal/Encl. Design Coil Contact type Contact mat. Arrangement Part number

| Product code | Terminal/Encl. Design Coil Contact type Contact mat. Arrangement Part number |
|--------------|-----------------------------------|-------------------------------|---------------------------|---------------------|---|
| V23700-C 0001-A408 | PCB, sealed Standard without parallel resistor Standard Silver based 1 form X (NO DM) | 2-1904058-5 |
| V23700-F 0002-A408 | Plug-in, QC with parallel resistor Standard with parallel resistor | 2-1904058-7 |

Datasheets and product specification according to IEC 61810-1 and to be used only together with the Definitions section. Datasheets and product data is subject to the terms of the disclaimer and all chapters of the Definitions section, available at http://relays.te.com/definitions. Datasheets, product data, Definitions section, application notes and all specifications are subject to change.
Click to View Pricing, Inventory, Delivery & Lifecycle Information:

**TE Connectivity:**
V23700-F0002-A408  V23700-C0001-A408