Keymodule MX.

Modern Technology for ergonomic Keyboards.
Main Advantages
- The MX is a modern full-travel low-profile keyswitch.
- "Gold Crosspoint" Contacts ensure highest reliability.
- The keyswitch module is designed to meet all current ergonomic standards demanded for word and data processing applications.
- High reliability also during quick actuation.
- Switch options include integrated color LED, de-coupling diode and wire jumper.
- MCBF = $1 \times 10^9$

Important Features
- Switch versions include momentary and alternate action as well as linear or tactile feel.
- 4 mm full travel.
- Circuitry S.P.S.T. – N.O.
- Connector pins constructed for machine soldering.
- Switches can be snapped into a frame or mounted directly onto the printed circuit board.
- Low contact resistance.
- Standard spacing 19.05 mm (upon request ≥ 16 mm).
- Low-profile height from base of keyboard to top of keycaps in homerow using cylindrical keycaps < 30 mm.

Technical Data
Material – plastic parts Thermoplastic UL 94V-0 comp.
- contacts AuAg 10
- spring Stainless steel
Protection DIN 40050 IP40.
Storage Temperature $-40^\circ$C ($-40^\circ$F) to $+70^\circ$C ($+158^\circ$F).
Operating Temperature $-10^\circ$C ($+14^\circ$F) to $+70^\circ$C ($+158^\circ$F).
Humidity 5%–95% w/o cond.
Solderability applicable for machine soldering 5 sec. at 260°C.
**Mechanical Data**

<table>
<thead>
<tr>
<th></th>
<th>Keyswitch with linear actuation</th>
<th>Keyswitch with soft tactile feel</th>
<th>Keyswitch with click tactile feel</th>
<th>Keyswitch with alternate action</th>
<th>Keyswitch with tactile feel (ergonomic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total travel</td>
<td>4 – 0.4 mm</td>
<td>4 – 0.5 mm</td>
<td>4.2 ± 0.3 mm</td>
<td>4 – 0.4 mm</td>
<td></td>
</tr>
<tr>
<td>Pretravel</td>
<td>2 ± 0.6 mm</td>
<td>2.0 ± 0.6 mm</td>
<td>2.2 ± 0.6 mm</td>
<td>2 ± 0.6 mm</td>
<td></td>
</tr>
<tr>
<td>Operating force</td>
<td>60 ± 20 cN</td>
<td>55 ± 20 cN</td>
<td>50 + 15 cN</td>
<td>60 ± 20 cN</td>
<td></td>
</tr>
<tr>
<td>Tactile force</td>
<td>–</td>
<td>65 ± 20 cN</td>
<td>60 ± 15 cN</td>
<td>45 + 20 cN</td>
<td></td>
</tr>
</tbody>
</table>

**Electrical Data**

- Voltage: 12 V max. AC/DC; 2 V min. DC
- Current: 10 mA max. AC/DC; 10 µA min. DC
- Insulation resistance: new/100 MΩ
- Capacity at 1kHz: < 2 pF
- Bounce time at actuation speed 0.4 m/s: ≤ 5 ms
- Cycle life w/o electrical load at 5 V, 1 mA
  - MX linear: 50 x 10⁶ operations
  - MX soft: 20 x 10⁶ operations
  - MX click: 20 x 10⁶ operations
  - MX alternate action: 500 000 alternate operations
  - MX ergonomic: 50 x 10⁶ operations
- Initial contact resistance: 200 mΩ (typ. 25 mΩ)

**Keyswitch Assembly**

Direct PCB-Mounting onto metal frame

![Keyswitch Assembly Diagram](image)

**Force/Travel Diagram**

- MX linear actuation
- MX with soft tactile feel
- MX with click tactile feel
- MX with alternate action
- MX with tactile feel (ergonomic)
Spacebar Mechanism

with frame

Cutout of frame for keycap sizes
1x3, 1x7, 1x8, 1x9, 1x10

<table>
<thead>
<tr>
<th>Size of keycap</th>
<th>1x3</th>
<th>1x7</th>
<th>1x8</th>
<th>1x9</th>
<th>1x10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of keycap</td>
<td>8mm Cylinder</td>
<td>8mm Cylinder</td>
<td>8mm Cylinder</td>
<td>8mm Cylinder</td>
<td>8mm Cylinder</td>
</tr>
<tr>
<td>'A' (in mm)</td>
<td>23.8</td>
<td>38.1</td>
<td>133.35</td>
<td>114.3</td>
<td></td>
</tr>
<tr>
<td>Part No. w/ frame</td>
<td>G99-0224</td>
<td>G99-0225</td>
<td>G99-0226</td>
<td>G99-0279</td>
<td></td>
</tr>
<tr>
<td>Part No. w/o frame</td>
<td>G99-0742</td>
<td>G99-0743</td>
<td>G99-0744</td>
<td>G99-0745</td>
<td></td>
</tr>
</tbody>
</table>

Keycaps

Cylindrical type (7 mm)
- 17.9 Row 3
- 18.7 Row 2
- 18.8 Row 4
- 20.8 Row 1

Standard type (8 mm)
- 17.5

Cutout of frame for keycap sizes
1x2, 1x2.25, 1x2.75
Layout of P.C.B.

Locking Unit

Locking Device for the following Keycaps

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Qty.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>604-0323</td>
<td>X</td>
<td>8 mm</td>
</tr>
<tr>
<td>604-0324</td>
<td>X</td>
<td>8 mm</td>
</tr>
</tbody>
</table>

Index System

Errors, omissions and technical modifications excepted. Technical specifications provided herein constitute specifications only, they do not guarantee that actual products do possess these characteristics. Exact figures can only be taken from drawings in connection with product specifications.
Keymodule

Type

<table>
<thead>
<tr>
<th>Contact</th>
<th>Current Material</th>
<th>Number of Contacts</th>
<th>Operating Characteristics</th>
<th>Keystem Configuration</th>
<th>LED/DIODE</th>
<th>Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10mA max/12V max Au Ag 10</td>
<td>A</td>
<td>Special</td>
<td>Momentary single Pole 60 cN Standard black Keystem</td>
<td>Standard straight Cyl + 8mm Keycap</td>
<td>N = No LED no Diode</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>B</td>
<td></td>
<td>Momentary single Pole 80 cN Space Bar grey 37 Keystem</td>
<td></td>
<td>R = Red LED no Diode</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>C</td>
<td>Special</td>
<td>Alt. Action, single Pole 60 cN</td>
<td></td>
<td>G = Green LED no Diode</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>D</td>
<td></td>
<td>Momentary single Pole with tactile Feel, 80 cN Standard, Movement Differential, white Keystem</td>
<td></td>
<td>Y = Yellow LED no Diode</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>E</td>
<td></td>
<td>Momentary single Pole with tactile Feel, 80 cN Space Bar, Movement Differential, grey 36 Keystem</td>
<td></td>
<td>D = No LED with Diode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td></td>
<td>Momentary single Pole with tactile Feel, 60 cN Standard clear Keystem</td>
<td></td>
<td>J = Without LED (Diode) with Jumper (wire Connection)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td></td>
<td>Momentary single Pole with tactile Feel, 80 cN 'Click' Movement Differential, blue Keystem</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Momentary single Pole with tactile Feel, 80 cN 'Click' Movement Differential Space Bar, green Keystem</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Momentary single Pole with tactile Feel, ergonomic, 65 cN Standard brown Keystem</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identification by Keystem with a Cam

With Pins

Without Pins

No Faceplate required connected PCB

Faceplate required