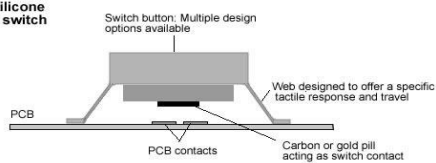


Silicone rubber keypad

Technology

Basic silicone keypad switch design



The technology uses the compression moulding properties of silicone rubber to create angled webbing around a switch center. On depression of the switch the webbing uniformly deforms to produce a tactile response. When pressure is removed from the switch the webbing returns to its neutral position with positive feedback. In order to make an electronic switch a carbon or gold pill is placed on the base of the switch center which contacts onto a PCB when the web has been deformed.

It is possible to vary the tactile response and travel of a key by changing the webbing design and/or the shore hardness of the silicone base material. Unusual key shapes can easily be accommodated as can key travel up to 3mm. Tactile forces can be as high as 500g depending on key size and shape.

The snap ratio of a keypad determines the tactile feel experienced by the user. The recommended snap ratio for designers to maintain is 40%-60%; if dropped below 40% the keys will lose tactile feel but have an increased life. Loss of tactile feel means the user will not receive a 'click' feedback during actuation.

By adding pigments to the natural silicone rubber it is possible to create keys in various colors which can be molded together (Flowing colors) during the compression process to form a multi key keypad. Individual legends can be printed on to a key allowing full customization of the keypad for its application. Techniques have also been developed to allow for keypads to be spray painted and legends then laser etched through the paint coating. This allows individual key to be illuminated using SMT LEDs placed on the printed circuit board. Also several coating materials such as Sealplast coating can be done to ensure a smooth surface where the printed legend last longer with good feeling of touch.

Laser etching is the laser controlled process of removing the top coat layer of a painted keypad (usually black in color) to reveal lighter colored layer below (usually white). The effect is to produce an enhanced backlight effect by only lighting the legends on a keypad. By combining laser etching with either EL backlighting or LED backlighting in a range of color options it is possible to produce an interesting range of effects.

Also the contact resistance can be customized based on electronics need where contact pills can be of different resistance. A general carbon pill can be of around 20 to 100 ohms, a low resistance contact pill can be up to 10 ohms.

Tolerance to small particle contamination with high current/ultra low resistance (demanded for automotive engine start-stop or power window switches) is provided by the so-called Gold Hi-Flex contact pill which has a gold surface with small perforations.

From the available test it can be said SC pill has proven to be most robust contact technology which can be offered with keypad especially in automotive electronics which still shows a good contact on dust, humidity and other climate changes.

For more information please contact us.



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