E-SWITCH®

Understanding Sealed Switches, Switch Types and Applications

Product Training Module

Service ◆ Selection ◆ Speed

Introduction

Purpose

- Introduce designers, engineers and customers to E-Switch's wide range of sealed electro-mechanical switches, which includes the definition of process seal and IP rated seal, advantages of sealed switches, features and applications for various types of sealed switches.

Objective

- Define the meaning of process sealed and IP rated seal
- Provide overview of industry standard IP rating system
- Provide advantages of using a sealed switch
- Review E-Switch's categories of sealed switches along with typical applications

Content

- 18 pages

Process Seal or IP Rated Seal

What is the difference between a process sealed switch and an IP rated sealed switch?

PROCESS SEAL
A process sealed switch withstands a typical water washing procedure that takes place during the PCB assembly cleaning process to remove flux and other contaminates from the finished PCB assembly.

IP RATED SEAL
An IP rated sealed switch withstands various predefined levels of protection from dust and moisture. The predefined levels are established by the international classification system specified by the IEC60529 standard, known as the IP Rate.

PROCESS SEALED
Tact Switches

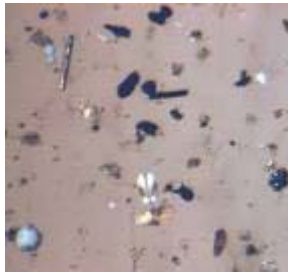
Industry IP Rating Standard

IP Rating Standard

Some switch applications reside in uncontrolled environments where temperature, humidity level and airborne debris fluctuate at any given time. In these types of environments, it is recommended to utilize a sealed switch, which is specifically designed and manufactured to protect against the entry of foreign bodies and moisture.

Electro-mechanical switches can be sealed to different levels of effectiveness against intrusion from moisture and foreign bodies, like tools, fingers, dirt and debris.

The seal effectiveness level is ranked according to the international classification system specified by the IEC60529 standard, known as the IP Rate. **IP** stands for "**International Protection**" Rating or "**Ingress Protection**" Rating.



Code Definitions and Rating Chart

Code Definitions

This code consists of the letters “I” “P” followed by two digits.
The first digit references solids protection, which ranges from 0 to 6.
The second digit refers to liquids protection and ranges from 0 to 8.
As an example, a switch rating would appear as IP67.

Each number is assigned a specific definition. Based on the chart to the right, a switch rated IP67 specifies solids protection as 6, which means that the switch is totally protected from dust penetration. The second digit specifies the liquids protection level as 7, which means that protection against effects of immersion from 15cm to 1m (6" to 40") or will pass a water submersion test at 40" (1 meter), for up to 30 minutes.

This chart can be found at e-switch.com, under Technical Information.

IP Rating Chart

First Number	Definition	Second Number	Definition
Protection against solid objects		*Protection against liquids*	
0	No protection	0	No protection
1	Protected against solid objects over 50mm (e.g. accidental touch by hands)	1	Protected against vertically falling drops of water
2	Protected against solid objects over 12mm (e.g. fingers)	2	Protected against direct sprays up to 15° from the vertical
3	Protected against solid objects over 2.5mm (e.g. tools and wires)	3	Protected against direct sprays up to 60° from vertical
4	Protected against solid objects over 1mm (e.g. tools, wires and small wires)	4	Protected against sprays from all directions - limited ingress permitted
5	Protected against dust - limited ingress (no harmful deposit)	5	Protected against low pressure jets if water from all directions - limited ingress permitted
6	Totally protected against dust	6	Protected against strong jets of water (e.g. for use on shipdecks - limited ingress permitted)
		7	Protected against the effects of temporary immersion between 15cm and 1m. Duration of test 30 min.
		8	Protected against long periods of immersion under pressure

Advantages of Using A Sealed Switch

Why use a sealed switch?

- Protects switch functionality at which it has been rated
- Develop to withstand rugged use and harsh environmental elements
- Prevents premature switch failure
- Protects switch against accidental spillage
- RoHS compliant switch models available

Types of Sealed Switches

Toggle

Rocker

Dip

Slide

Rotary Dip

Pushbutton

Anti-vandal

Tactile

Illuminated Styles

Rocker

Pushbutton

Anti-vandal

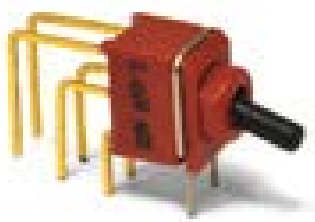
Tactile

Sealed Toggle Switches & Applications

100A

200A

200B



200U

Rated IP67

Mounting Options

- Vertical mount
- Right angle mount
- Surface mount

Applications

- Telecommunication
- Instrumentation
- Medical equipment
- Networking equipment
- Handheld devices

Sealed Rocker Switches & Applications

400A/IP67

400B/IP67

R7/IP67

Rated IP55 to IP67

RBW2/IP66

WB2/IP55

Applications

400A / 400B / R7

- Industrial Equipment
- Marine Transportation
- Construction Equipment
- Agricultural Equipment
- Recreational Vehicles
- Lawn and Garden Equipment

RBW2 and WB2

- Commercial Appliances
- Electrical Housewares
- Floor Care Appliances
- Industrial Controls
- Medical Equipment
- Household Appliances/White Goods

Sealed Slide Switch & Applications

500R

Rated IP67

Applications

- Telecommunication
- Instrumentation
- Medical equipment
- Computer Peripherals
- Audio/Visual equipment
- Consumer Electronics

Sealed Dip Switches & Applications

KAE*
Low Profile

KAN*
Low Profile

KAP*
Piano

KAS*
Slide Dip

Process Sealed

*Top Tape Seal Optional

Style Options

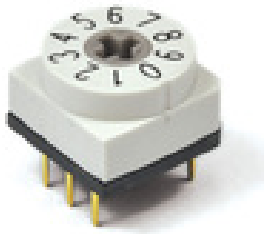
- Low profile
- Piano
- Slide

Applications

- Garage door openers
- Controllers
- Telecommunication
- Test and Instrumentation equipment
- Audio/Visual equipment
- Medical equipment

Sealed Rotary Dip Switches & Applications

RDM



RDT

Rated IP67

SRJ*

SRM*

SRT*

Process Sealed

*Top Tape Seal Optional

Applications

- Telecommunication
- Test and instrumentation devices
- Medical equipment
- Networking equipment
- Handheld devices

Sealed Pushbutton Switches & Applications

LA / IP65

700A

800A

800B

800U

Rated IP67

RP8100

RP8200

RP8300

RP8400

RP8500

RP8600

Applications

- Telecommunication
- Networking equipment
- Audio/Visual equipment
- Instrumentation
- Medical equipment
- Houseware appliances

Sealed Anti-vandal Switches & Applications


PV0


PV1


PV2


PV3


PV4


PV5


PV6


PV7


PV8


PV9

Rated IP65


PVL


ULV4


ULV7


ULV8

Rated IP67

Applications

- Vending kiosk
- Ticket dispensers
- Security Devices
- Industrial controls
- Medical equipment
- Audio/Visual equipment

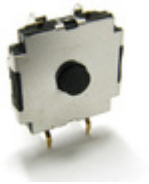
Sealed Tactile Switches & Applications

TL6100

TL6105

TL6110

TL6120



TL6190

TL6700

Process Sealed

TL52

TL6200

TL6210

TL6215

Rated IP67

Styles

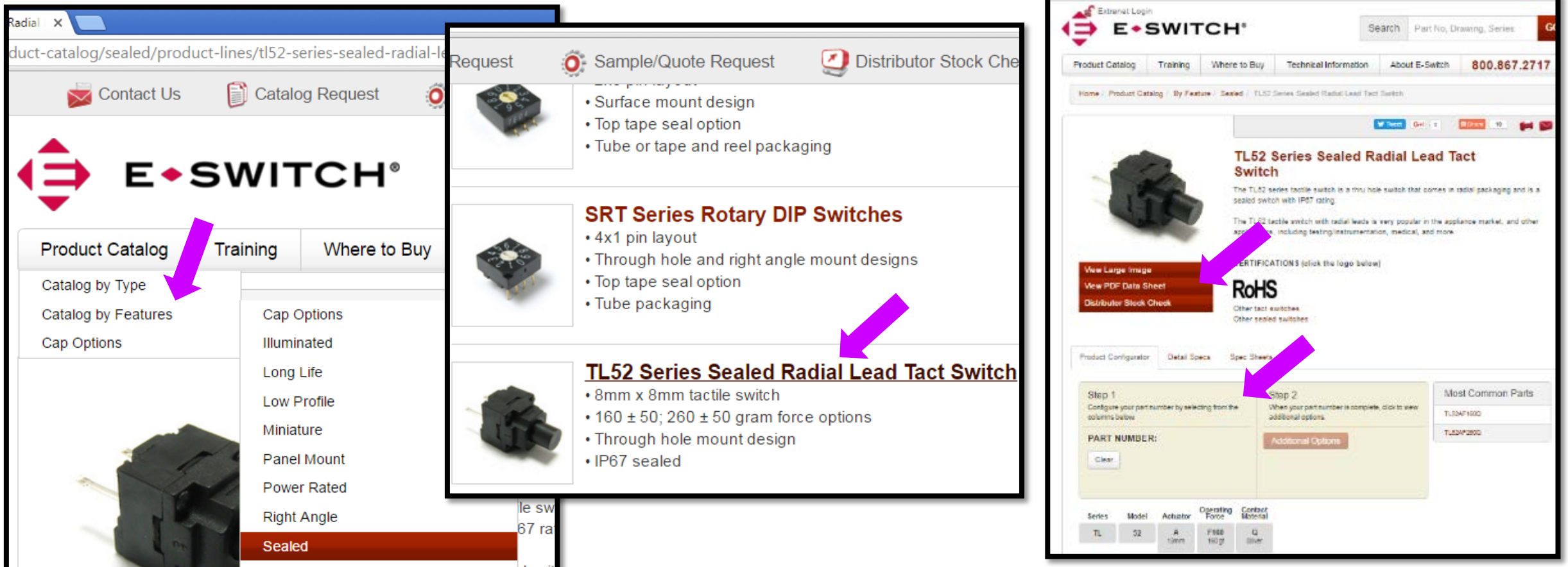
- Through hole
- Earth ground terminal
- Right angle mount
- Surface mount
- Illumination

Applications

- Portable handheld devices
- Consumer electronics
- Telecommunication
- Medical equipment
- Audio/visual equipment
- Test equipment and Instrumentation

Resources

www.e-switch.com



Resources

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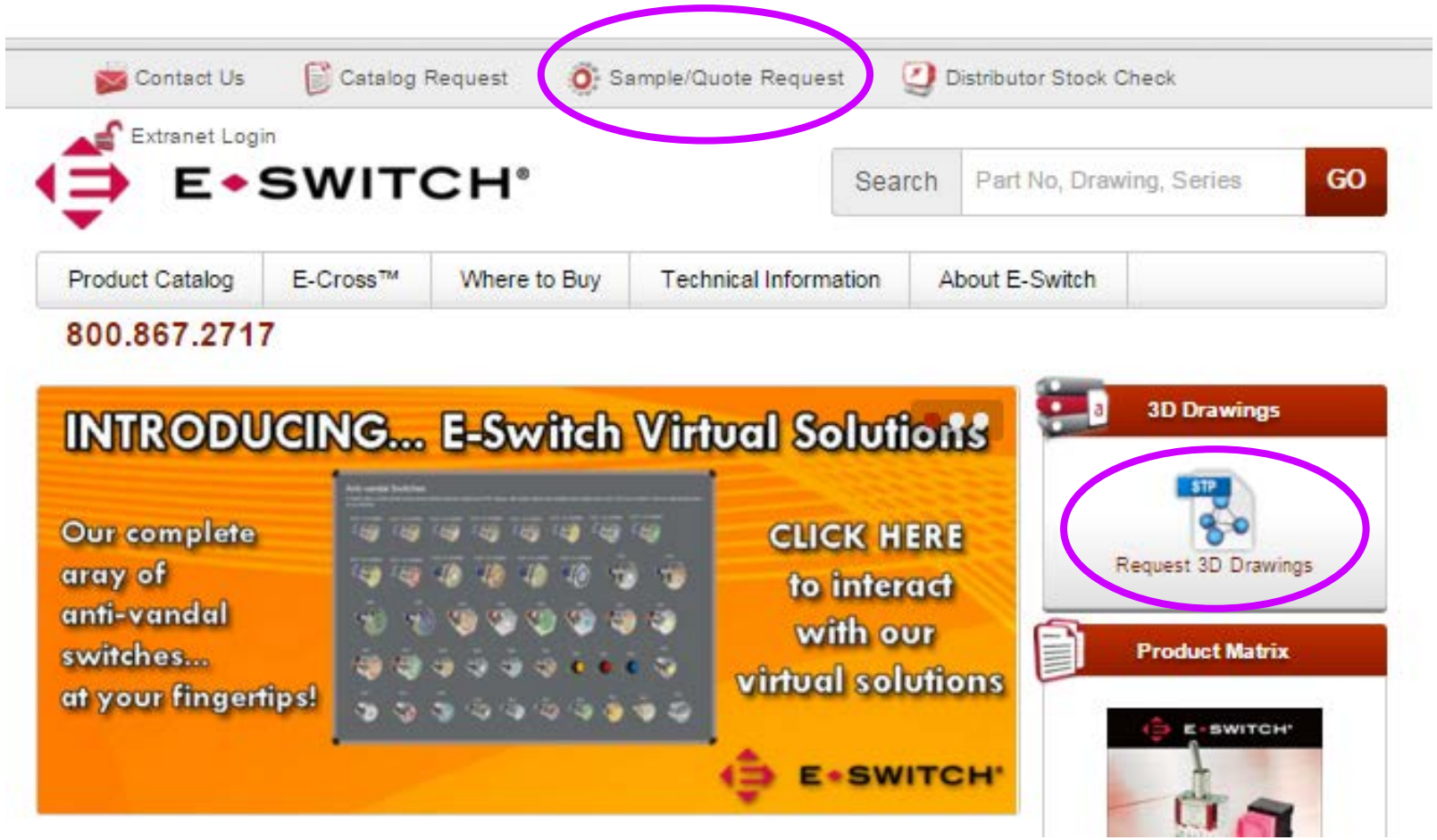
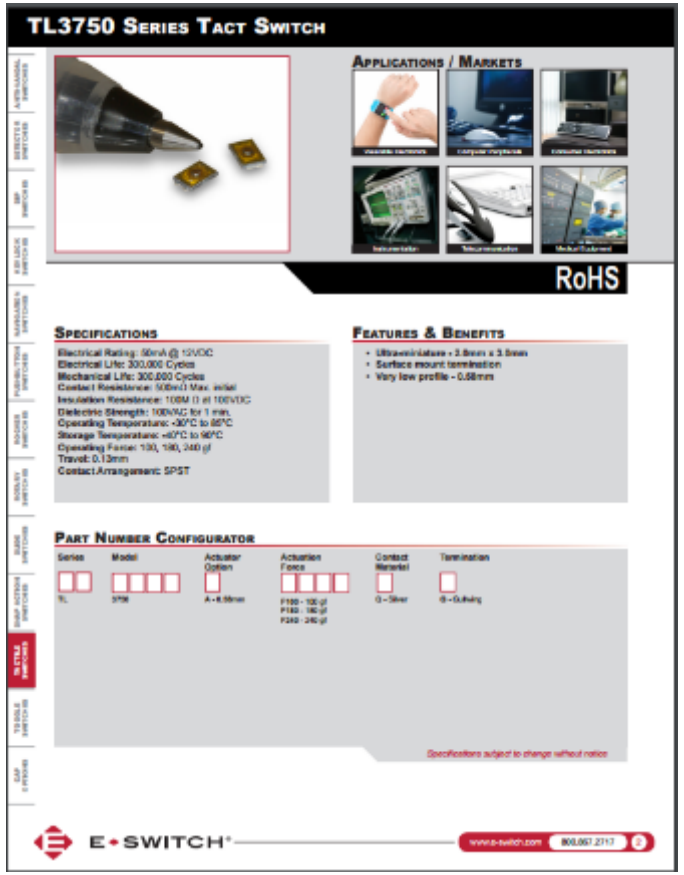


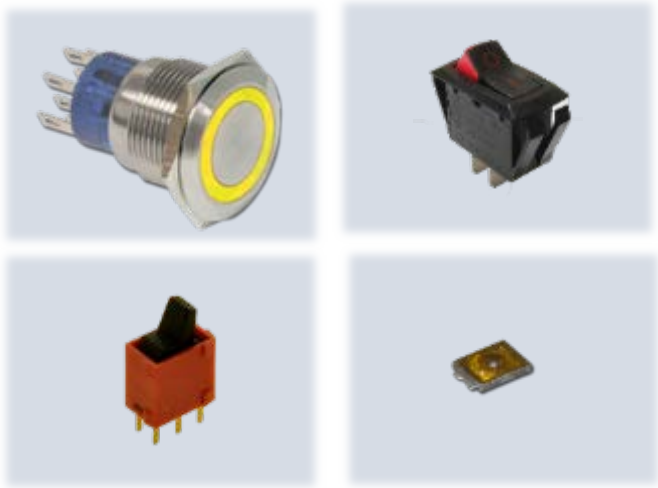
Resources

Data Sheet



3D Models. jpg

Switch Samples



Summary

- E-Switch provides both process sealed and IP rated switches rating from IP55 to IP67.
- A process seal can withstand the normal wash procedure used in the PCB assembly process.
- Seal effectiveness level is ranked according to the international protection rating or ingress protection rating, known at the IP rate.
- The IP code has two digits; the first digit specifies the solids (dust/particles) protection level and the second digit specifies the liquids protection level.
- A sealed switch protects switch functionality, can withstand rugged use and harsh environmental elements, prevents premature failure, prevents against accidental spillage, and several switches are RoHS compliant.
- E-Switch provides numerous sealed switches from toggle, rocker, slide, dip, rotary dip, pushbutton, anti-vandal and tactile. Many of the switch types offer multiple illumination options.
- Specific product details on sealed switches can be found at e-switch.com.