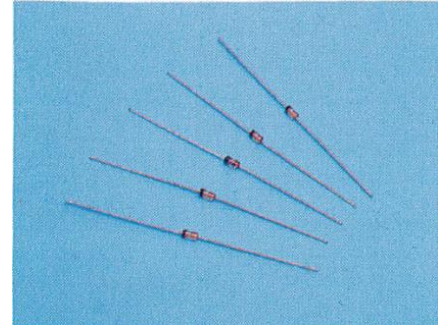


## Introduction to Toshiba Switching Diode Line-up

Toshiba offers a wide range of switching diodes (Switching Diodes) mounted in small packages, including single-type and combined-type diodes.

### Toshiba, a leading company in diodes

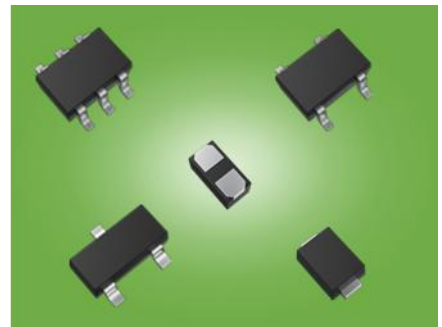
Since Toshiba started mass production of diodes in 1956, it has been one of the major diode vendors who have continued to market products as a pioneer in the industry since the early days of semiconductors. Developed in 1966, M8555, our typical switching diode, is compact, high-performance, and low-cost, and has contributed to the times as the diode in terms of both name and reality. We will continue to provide a wide range of highly reliable diode products based on our experience in delivering products to many customers.



Switching diode : M8555

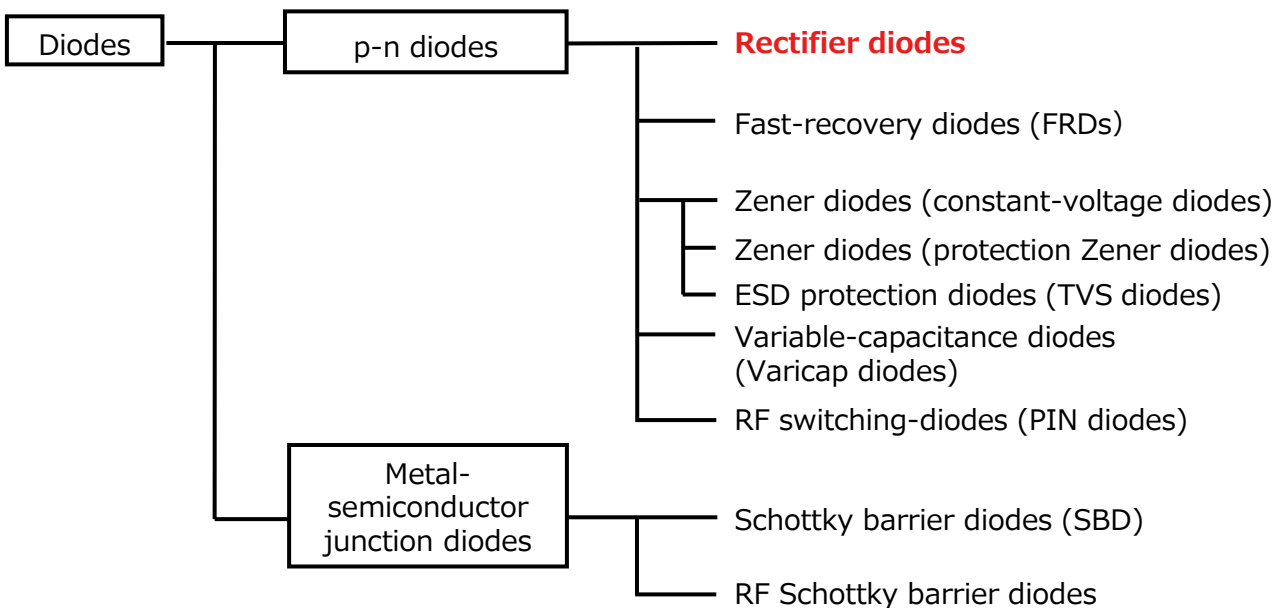
### High-quality, safe and secure delivery at plants in Japan and Thailand

Our diode products are mainly surface-mount type small packages. High-quality, stable production at plants in Japan and Thailand enables safe and safety delivery. We will respond quickly and seriously to sudden delivery problems as well.



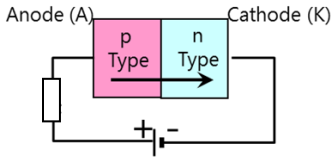
### Diode overview

A diode is a two-terminal semiconductor device with one PN junction or an alternate junction. Roughly speaking, they are classified as shown in the figure below. It is divided into rectifier diode, constant voltage diode, etc. according to structure and application, and it is widely used. This document mainly introduces switching diodes used as rectifier diodes.

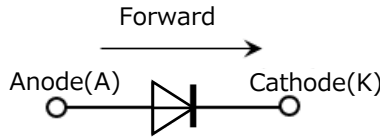


## Basic structure and operation of the switching diode

It has the property that current flows (in the forward direction) and current does not flow (in the reverse direction) according to the direction of the applied voltage. This function changes the alternating current (AC) voltage to direct current (DC). The electrode terminals are called the anode (Anode: A) and cathode (Cathode: K), and current flows when the anode electrode has a positive potential.



Schematic diagram of a diode



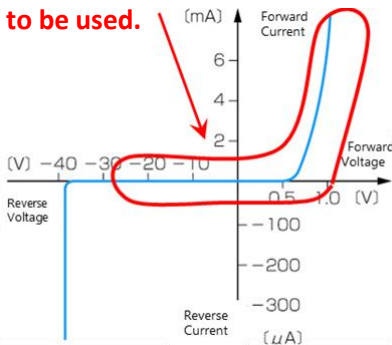
Symbol mark on the diode

Marking of cathode

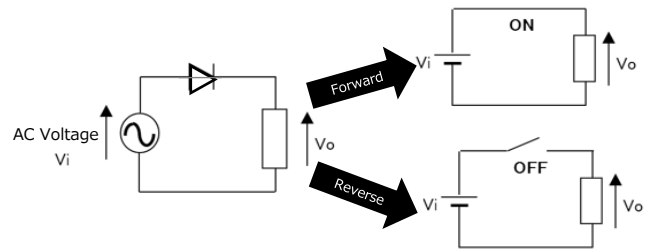


Example of a switching diode package

With a switching diode area to be used.

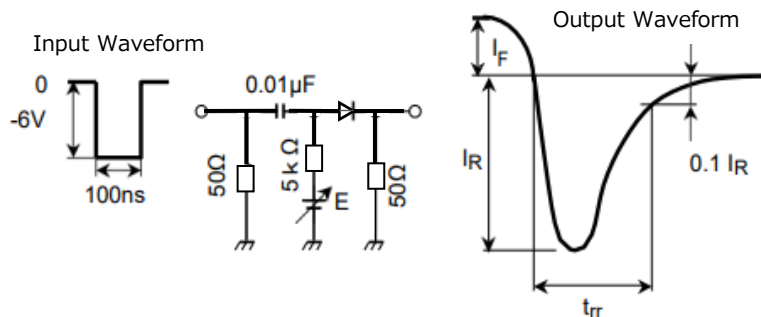


Current vs. Voltage Characteristics of Switching Diodes



Forward and reverse voltage operation

Even if a forward current  $I_F$  is applied to the diode and a reverse voltage  $V_R$  is applied to the diode, P. While the minority carriers stored in the junction remain, the reverse direction is low impedance and a large reverse current  $I_R$  flows. The time from this cutoff until 10 % of the reverse current  $I_R$  is recovered is called the reverse recovery time  $t_{rr}$ , which represents the switching time of the diode. An example of the measurement circuit is shown in the figure below. The switching diode has a short reverse recovery time ( $t_{rr}$ ) and superior switching characteristics compared to other diodes. It also has a smaller reverse current  $I_R$  compared to other diodes. We offer a wide range of products for each package and rating. We would be happy if you could select the best product for your customer from the selection table of the following switching diodes.



Reverse recovery time ( $t_{rr}$ ) measurement circuit and input/output waveforms















## •Switching diode selection table

### [Single product]

Part Number	VR (Max) (V)	IO (Max) (A)	Internal connection	Pins	Package (Toshiba)	AEC-Q101	Package dimensions (mm)	Buy Online
<a href="#">1SS387CT</a>	80	0.1	Single	2	CST2		1.0 x 0.6 x 0.38	
<a href="#">1SS387</a>	80	0.1	Single	2	ESC	Qualified*	1.6 x 0.8 x 0.6	
<a href="#">1SS403E</a>	200	0.1	Single	2	ESC		1.6 x 0.8 x 0.6	
<a href="#">BAS516</a>	100	0.25	Single	2	ESC		1.6 x 0.8 x 0.6	
<a href="#">1N4148WT</a>	100	0.25	Single	2	ESC		1.6 x 0.8 x 0.6	
<a href="#">1SS187</a>	80	0.1	Single	3	S-Mini	Qualified*	2.9 x 2.5 x 1.1	
<a href="#">1SS190</a>	80	0.1	Single	3	S-Mini		2.9 x 2.5 x 1.1	
<a href="#">1SS193</a>	80	0.1	Single	3	S-Mini	Qualified*	2.9 x 2.5 x 1.1	
<a href="#">1SS196</a>	80	0.1	Single	3	S-Mini	Qualified*	2.9 x 2.5 x 1.1	
<a href="#">1SS250</a>	200	0.1	Single	3	S-Mini		2.9 x 2.5 x 1.1	
<a href="#">1SS427</a>	80	0.1	Single	2	SOD-923		1.0 x 0.6 x 0.4	
<a href="#">TBAS16</a>	80	0.215	Single	3	SOT23		2.9 x 2.4 x 0.9	
<a href="#">1SS352</a>	80	0.1	Single	2	USC	Qualified*	2.5 x 1.25 x 0.9	
<a href="#">1SS403</a>	200	0.1	Single	2	USC	Qualified*	2.5 x 1.25 x 0.9	
<a href="#">BAS316</a>	100	0.25	Single	2	USC		2.5 x 1.25 x 0.9	
<a href="#">1N4148WS</a>	100	0.25	Single	2	USC		2.5 x 1.25 x 0.9	
<a href="#">1SS370</a>	200	0.1	Single	3	USM		2.0 x 2.1 x 0.9	

\*: For detail information, please contact to our sales.

### [2in1 product]

Part Number	VR (Max) (V)	IO (Max) (A)	Internal connection	Pins	Package (Toshiba)	AEC-Q101	Package dimensions (mm)	Buy Online
<a href="#">1SS181</a>	80	0.1	Anode common	3	S-Mini	Qualified*	2.9 x 2.5 x 1.1	
<a href="#">1SS184</a>	80	0.1	Cathode common	3	S-Mini	Qualified*	2.9 x 2.5 x 1.1	
<a href="#">1SS226</a>	80	0.1	Series	3	S-Mini	Qualified*	2.9 x 2.5 x 1.1	
<a href="#">1SS300</a>	80	0.1	Anode common	3	USM	Qualified*	2.0 x 2.1 x 0.9	
<a href="#">1SS301</a>	80	0.1	Cathode common	3	USM	Qualified*	2.0 x 2.1 x 0.9	
<a href="#">1SS302A</a>	80	0.1	Series	3	USM	Qualified*	2.0 x 2.1 x 0.9	
<a href="#">1SS360</a>	80	0.1	Anode common	3	SSM	Qualified*	1.6 x 1.6 x 0.7	
<a href="#">1SS361CT</a>	80	0.1	Cathode common	3	CST3		1.0 x 0.6 x 0.38	
<a href="#">1SS361FV</a>	80	0.1	Cathode common	3	VESM	Qualified*	1.2 x 1.2 x 0.5	
<a href="#">1SS361</a>	80	0.1	Cathode common	3	SSM	Qualified*	1.6 x 1.6 x 0.7	
<a href="#">1SS362FV</a>	80	0.1	Series	3	VESM	Qualified*	1.2 x 1.2 x 0.5	
<a href="#">1SS362</a>	80	0.08	Series	3	SSM		1.6 x 1.6 x 0.7	
<a href="#">BAV70</a>	100	0.215	Cathode common	3	SOT23		2.9 x 2.4 x 0.9	
<a href="#">BAV99W</a>	100	0.15	Series	3	USM		2.0 x 2.1 x 0.9	

<a href="#">BAV99</a>	100	0.215	Series	3	SOT23		2.9 x 2.4 x 0.9	<a href="#">Buy Online</a>
<a href="#">TBAV70</a>	80	0.215	Cathode common	3	SOT23		2.9 x 2.4 x 0.9	<a href="#">Buy Online</a>
<a href="#">TBAV99</a>	80	0.1	Series	3	SOT23		2.9 x 2.4 x 0.9	<a href="#">Buy Online</a>
<a href="#">TBAW56</a>	80	0.215	Anode common	3	SOT23		2.9 x 2.4 x 0.9	<a href="#">Buy Online</a>
<a href="#">HN2D01JE</a>	80	0.1	Independent	5	ESV		1.6 x 1.6 x 0.55	<a href="#">Buy Online</a>

\*: For detail information, please contact to our sales.

## [3in1 product]


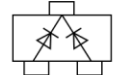

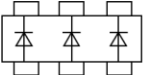

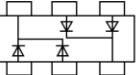
Part Number	VR (Max) (V)	IO (Max) (A)	Internal connection	Pins	Package (Toshiba)	AEC-Q101	Package dimensions (mm)	Buy Online
<a href="#">HN2D01FU</a>	80	0.08	Independent	6	US6	Qualified*	2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>
<a href="#">HN2D01F</a>	80	0.08	Independent	6	SM6		2.9 x 2.8 x 1.1	<a href="#">Buy Online</a>
<a href="#">HN2D02FU</a>	80	0.08	Independent	6	US6	Qualified*	2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>

\*: For detail information, please contact to our sales.

## [4in1 product]

Part Number	VR (Max) (V)	IO (Max) (A)	Internal connection	Pins	Package (Toshiba)	AEC-Q101	Package dimensions (mm)	Buy Online
<a href="#">1SS308</a>	80	0.1	Anode common	5	SMV		2.9 x 2.8 x 1.1	<a href="#">Buy Online</a>
<a href="#">1SS309</a>	80	0.1	Cathode common	5	SMV		2.9 x 2.8 x 1.1	<a href="#">Buy Online</a>
<a href="#">HN1D01FE</a>	80	0.1	Anode common	6	ES6		1.6 x 1.6 x 0.55	<a href="#">Buy Online</a>
<a href="#">HN1D01FU</a>	80	0.1	Anode common	6	US6	Qualified*	2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>
<a href="#">HN1D01F</a>	80	0.1	Anode common	6	SM6		2.9 x 2.8 x 1.1	<a href="#">Buy Online</a>
<a href="#">HN1D02FE</a>	80	0.1	Cathode common	6	ES6		1.6 x 1.6 x 0.55	<a href="#">Buy Online</a>
<a href="#">HN1D02FU</a>	80	0.1	Cathode common	6	US6	Qualified*	2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>
<a href="#">HN1D02F</a>	80	0.1	Cathode common	6	SM6		2.9 x 2.8 x 1.1	<a href="#">Buy Online</a>
<a href="#">HN1D03FU</a>	80	0.1	Cathode common + Anode common	6	US6	Qualified*	2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>
<a href="#">HN1D03F</a>	80	0.1	Cathode common + Anode common	6	SM6		2.9 x 2.8 x 1.1	<a href="#">Buy Online</a>
<a href="#">HN4D01JU</a>	80	0.1	Anode common	5	USV		2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>
<a href="#">HN4D02JU</a>	80	0.1	Cathode common	5	USV		2.0 x 2.1 x 0.9	<a href="#">Buy Online</a>

\*: For detail information, please contact to our sales.

	Single(1in1)	2in1		3in1	4in1	
Connection example		 Ex.: Cathode common	 Ex.: Separate	 Ex.: Separate	 Ex.: Cathode common	
other connection	-	Series Anode common	-	-	Series Anode common	-

## LINK

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