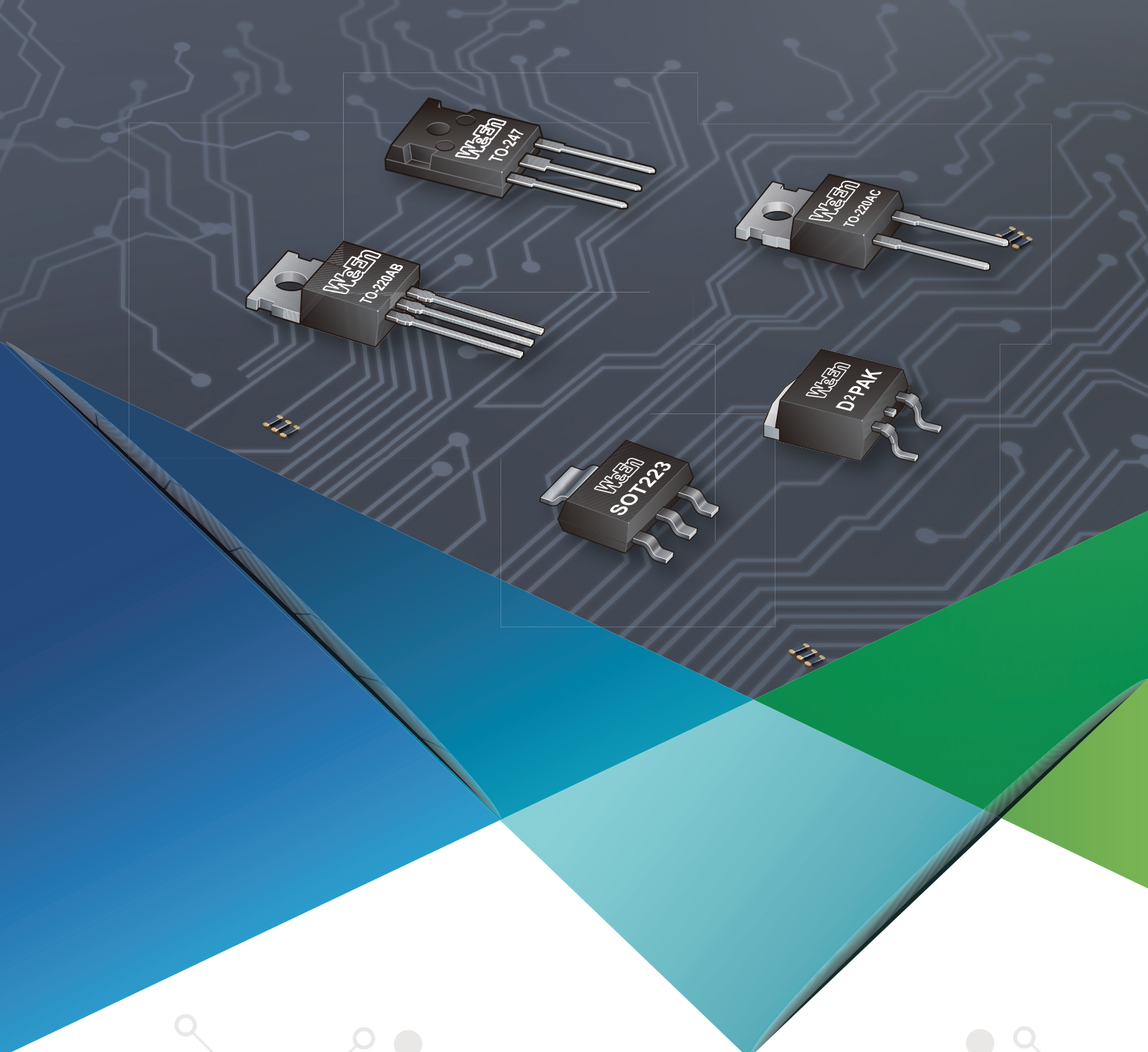
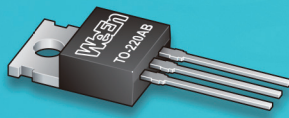




# WeEn Semiconductors Product Selection Guide

# WeEn Semiconductors: 50-Years Leading Experience in Power



## PHILIPS

High Voltage Transistors (HVT)  
Fast, Ultrafast & Hyperfast  
Power Diodes  
Bipolar 4-Quadrant Triacs



**WeEn**

WeEn Semiconductors

Welcome to the 2019 edition of WeEn Semiconductors Selection Guide. Here we present all our devices to give you a complete overview of our portfolio. As a key player in the semiconductor industry, WeEn has focused on developing a large portfolio of industry-leading bipolar power products including thyristors (i.e. silicon controlled rectifiers and triacs), silicon power diodes and high voltage transistors. Additionally, WeEn has developed a state-of-the-art portfolio of silicon carbide diodes and power Schottky diodes as well as making available a number of AECQ products. All these products are widely used in the markets for telecommunications, computers, consumer electronics, intelligent home appliances, lighting, automotive and power management applications.

With over 50 years of design and manufacture experience, WeEn helps to drive up efficiency in your designs with the creative spirit of innovation and desire for quality.



# AC THYRISTOR TRIACS / AC THYRISTORS

## AC THYRISTOR TRIACS

(3Q Hi-Com power switches, overvoltage protection)

Types in **bold red** represent new products

| $I_{T(RMS)}$<br>(A) | $V_{DRM}$<br>(V) | $I_{GT}$<br>(max)<br>(mA) | SOT78<br>(TO220AB) | SOT186A<br>(isolated<br>TO220AB) | SOT223        | SOT226<br>(I <sup>2</sup> PAK) | SOT404<br>(D <sup>2</sup> PAK) | SOT428<br>(DPAK) |
|---------------------|------------------|---------------------------|--------------------|----------------------------------|---------------|--------------------------------|--------------------------------|------------------|
| 2                   | 800              | E                         |                    | ACTT2X                           |               |                                |                                | ACTT2S           |
| 2                   | 800              | ETN                       |                    | <b>ACTT2X</b>                    | <b>ACTT2W</b> |                                |                                | <b>ACTT2S</b>    |
| 4                   | 800              | C/E                       |                    | ACTT4X                           |               |                                |                                | ACTT4S           |
| 6                   | 800              | E                         | ACTT6              | ACTT6X                           |               | ACTT6G                         | ACTT6B                         |                  |
| 6                   | 800              | CN                        | ACTT6              | ACTT6X                           |               |                                | ACTT6B                         |                  |
| 8                   | 800              | C0/C0T                    | ACTT8              | ACTT8X                           |               |                                | ACTT8B                         |                  |
| 8                   | 800              | CTN                       | ACTT8              | ACTT8X                           |               |                                | ACTT8B                         |                  |
| 10                  | 800              | C/CT                      | ACTT10             | ACTT10X                          |               |                                |                                |                  |
| 10                  | 800              | CTN                       | ACTT10             | ACTT10X                          |               |                                | ACTT10B                        |                  |
| 12                  | 800              | C/CT                      | ACTT12             | ACTT12X                          |               |                                | ACTT12B                        |                  |
| 12                  | 800              | CTN                       | ACTT12             | ACTT12X                          |               |                                | ACTT12B                        |                  |
| 16                  | 800              | CTN                       | ACTT16             | ACTT16X                          |               |                                | ACTT16B                        |                  |

$I_{GT}$  key: C = 35 mA; C0 = 5 - 30 mA; E = 10 mA

T: high  $T_j(max)$  150 °C N: Enhanced Dynamic Performance

In the spotlight

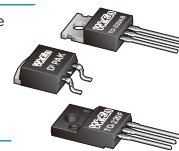
### AC Thyristor Triacs ACTT10 series, ACTT12 series

Planar passivated with overvoltage clamping function

High energy surge handling

Very high  $dV/dt$  for maximum immunity to false triggering

High  $T_j(max)$  to 150 °C



## AC THYRISTORS

(2Q Hi-Com power switches, exclusive negative gate triggering, 'Common' mounting base, overvoltage protection)

| $I_{T(RMS)}$<br>(A) | $V_{DRM}$<br>(V) | $I_{GT}$<br>(max)<br>(mA) | SOT54<br>(TO92) | SOT223  | SO8     |
|---------------------|------------------|---------------------------|-----------------|---------|---------|
| 0.2                 | 600              | D                         |                 |         | ACT102H |
| 0.8                 | 600              | D/E                       | ACT108          | ACT108W |         |
|                     | 800              | E                         | ACT108          | ACT108W |         |

$I_{GT}$  key: D = 5 mA; E = 10 mA

In the spotlight

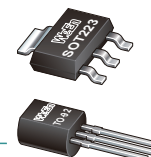
### AC Thyristors ACT108-800E , ACT108W-800E

Planar passivated with overvoltage clamping function

Working voltage increased to 800V

Enhanced overvoltage clamping capability

High false trigger immunity



## TEMPERATURE AND OVERLOAD PROTECTED TRIACS (TOPTriac)

2Q Hi-Com power switches, exclusive negative gate triggering, over-temperature protection

Types in **bold red italic** represent products in development

| $I_{T(RMS)}$<br>(A) | $V_{DRM}$<br>(V) | $I_{GT}$<br>(max)<br>(mA) | SOT78<br>(TO220) | TO263<br>(D <sup>2</sup> PAK) |
|---------------------|------------------|---------------------------|------------------|-------------------------------|
| 12                  | 800              | C0                        | TOPT12           |                               |
| 16                  | 800              | C0                        | TOPT16           | <b>TOPT16B</b>                |

$I_{GT}$  key:  
C0 = 5 - 35mA

In the spotlight

### TOPTriac TOPT12, TOPT16

Planar passivated for voltage ruggedness & reliability

Over temperature & over load protection

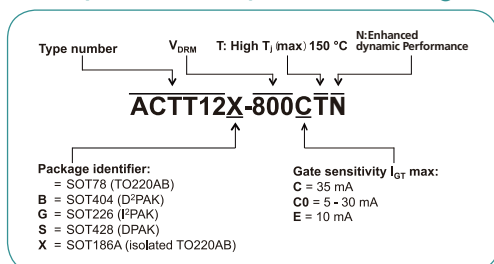
No need to over-specify triac and heatsink

Avoid loss of control at high temperature

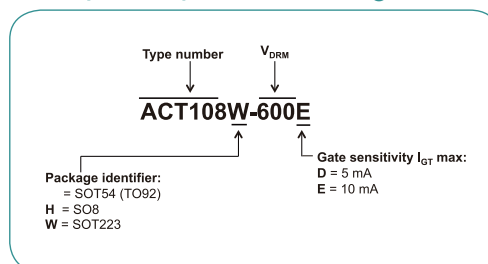
Status monitoring with help of microcontroller



### AC Thyristor Triacs part numbering



### AC Thyristors part numbering



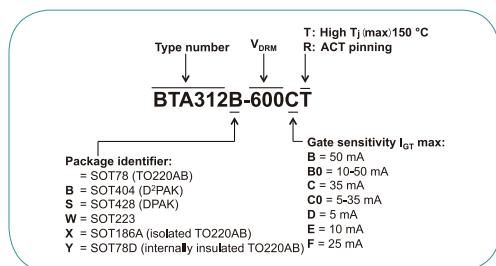
# 3Q Hi-Com TRIACS (0.8A - 45A)

Types in **bold red** represent new products  
Types in **bold red italic** represent products in development

| $I_{T(RMS)}$<br>(A) | $V_{DRM}$<br>(V) | $I_{GT(max)}$<br>(mA) | SOT54<br>(TO92) | SOT78<br>(TO220AB) | SOT78D<br>(internally insulated<br>TO220AB) | SOT186A<br>(isolated<br>TO220AB) | SOT223   | SOT226<br>(I <sup>2</sup> PAK) | SOT404<br>(D <sup>2</sup> PAK) | SOT428<br>(DPAK) | SOT1292<br>(internally insulated<br>TO-3P) |
|---------------------|------------------|-----------------------|-----------------|--------------------|---------------------------------------------|----------------------------------|----------|--------------------------------|--------------------------------|------------------|--------------------------------------------|
|                     |                  |                       |                 |                    |                                             |                                  |          |                                |                                |                  |                                            |
| 0.8                 | 600 / 800        | D                     |                 |                    |                                             |                                  | BTA2008W |                                |                                |                  |                                            |
|                     | 600 / 800        | D/E                   | BTA2008         |                    |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 1000             | D                     | BTA2008         |                    |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 1000             | DN                    | <b>BTA2008</b>  |                    |                                             |                                  |          |                                |                                |                  |                                            |
| 1                   | 600 / 800        | B/E/ER                | BTA201          |                    |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 600 / 800        | E                     |                 |                    |                                             |                                  | BTA201W  |                                |                                |                  |                                            |
|                     | 600              | B/C/D/E/F             |                 |                    |                                             |                                  | BTA204W* |                                |                                |                  |                                            |
|                     | 800              | C/E                   |                 |                    |                                             |                                  | BTA204W* |                                |                                |                  |                                            |
| 2                   | 600 / 800        | D/E                   |                 |                    |                                             | BTA202X                          |          |                                |                                |                  |                                            |
| 3                   | 800              | CT                    | <b>BTA203</b>   |                    |                                             |                                  |          |                                |                                |                  |                                            |
| 4                   | 600              | B/C/D/E/F             |                 | BTA204             |                                             | BTA204X                          |          |                                |                                | BTA204S          |                                            |
|                     | 800              | B/C/E                 |                 | BTA204             |                                             | BTA204X                          |          |                                |                                | BTA204S          |                                            |
|                     | 1000             | C                     |                 |                    |                                             | BTA204X                          |          |                                |                                | BTA204S          |                                            |
| 6                   | 800              | CT/ET                 |                 | BTA206             |                                             | BTA206X                          |          |                                |                                |                  |                                            |
| 8                   | 600              | D                     |                 | BTA208             |                                             | BTA208X                          |          |                                |                                | BTA208S          |                                            |
|                     | 600 / 800        | B/E/F                 |                 | BTA208             |                                             | BTA208X                          |          |                                |                                | BTA208S          |                                            |
|                     | 800              | CT                    |                 |                    |                                             | <b>BTA208X</b>                   |          |                                |                                |                  |                                            |
|                     | 800              | B0/C0                 |                 |                    |                                             | BTA308X                          |          |                                |                                |                  |                                            |
|                     | 800              | C0T                   |                 |                    | <b>BTA308Y</b>                              |                                  |          |                                |                                |                  |                                            |
|                     | 800              | ET                    |                 | BTA308             |                                             | BTA308X                          |          |                                |                                | BTA308S          |                                            |
|                     | 800              | F0                    |                 |                    |                                             | <b>BTA308X</b>                   |          |                                |                                |                  |                                            |
|                     | 1000             | B                     |                 |                    |                                             | BTA208X                          |          |                                |                                |                  |                                            |
|                     | 1000             | C                     |                 |                    |                                             | BTA208X                          |          |                                | BTA208B                        |                  |                                            |
|                     | 1000             | C0                    |                 |                    |                                             | BTA208X                          |          |                                | BTA208B                        |                  |                                            |
|                     | 1000             | C0T                   |                 |                    |                                             | <b>BTA408X*</b>                  |          |                                |                                |                  |                                            |
|                     | 1000             |                       |                 |                    |                                             |                                  |          |                                |                                |                  |                                            |
| 10                  | 600 / 800        | C/D/E                 |                 | BTA310             |                                             | BTA310X                          |          |                                |                                |                  |                                            |
|                     | 600 / 800        | BT/CT/ET              |                 | BTA410*            | BTA410Y*                                    | BTA410X*                         |          |                                |                                |                  |                                            |
| 12                  | 600              | CT                    |                 | BTA312             |                                             |                                  |          | BTA312G                        | BTA312B                        |                  |                                            |
|                     | 600              | D                     |                 | BTA312             |                                             | BTA312X                          |          |                                | BTA312B                        |                  |                                            |
|                     | 600 / 800        | B/C/E                 |                 | BTA312             |                                             | BTA312X                          |          |                                | BTA312B                        |                  |                                            |
|                     | 600 / 800        | C                     |                 |                    | BTA312Y                                     |                                  |          |                                |                                |                  |                                            |
|                     | 600 / 800        | B/C                   |                 |                    | BTA412Y*                                    |                                  |          |                                |                                |                  |                                            |
|                     | 600 / 800        | ET                    |                 |                    | BTA412Y*                                    |                                  |          |                                |                                |                  |                                            |
|                     | 800              | CT                    |                 | BTA312             |                                             | BTA312X                          |          |                                |                                |                  |                                            |
|                     | 800              | ET                    |                 | BTA312             |                                             |                                  |          |                                | BTA312B                        |                  |                                            |
|                     | 600              | BT                    |                 | BTA316             |                                             |                                  |          |                                | BTA316B                        |                  |                                            |
|                     | 600              | B0                    |                 | BTA316             |                                             |                                  |          |                                | BTA316B                        |                  |                                            |
| 16                  | 600              | CT                    |                 |                    |                                             |                                  |          |                                | BTA316B                        |                  |                                            |
|                     | 600              | D                     |                 | BTA316             |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 600 / 800        | B/C/E                 |                 | BTA316             |                                             | BTA316X                          |          |                                | BTA316B                        |                  |                                            |
|                     | 600 / 800        | ET                    |                 | BTA316             |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 600 / 800        | B/C                   |                 |                    | BTA416Y*                                    |                                  |          |                                |                                |                  |                                            |
|                     | 800              | B0                    |                 | BTA316             |                                             | BTA316X                          |          |                                |                                |                  |                                            |
|                     | 800              | BT/CT                 |                 |                    | <b>BTA316Y</b>                              |                                  |          |                                |                                |                  |                                            |
|                     | 800              | CT                    |                 | BTA316             |                                             | BTA316X                          |          |                                |                                |                  |                                            |
|                     | 800              | BT/CT                 |                 | BTA420*            | BTA420Y*                                    | BTA420X*                         |          |                                |                                |                  |                                            |
|                     | 800              |                       |                 |                    |                                             |                                  |          |                                |                                |                  |                                            |
| 20                  | 600              | BT                    |                 | BTA225             |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 600 / 800        | B                     |                 | BTA225             |                                             |                                  |          |                                |                                |                  |                                            |
|                     | 800              | BT                    |                 |                    |                                             |                                  |          |                                | BTA225B                        |                  |                                            |
|                     | 800              | BT/CT                 |                 |                    | BTA425Y*                                    |                                  |          |                                | BTA225B                        |                  |                                            |
| 25                  | 800              | B/BT                  |                 |                    |                                             | BTA425X*                         |          |                                |                                |                  |                                            |
|                     | 800              | BT                    |                 | BTA330             |                                             | BTA330X                          |          |                                |                                |                  |                                            |
| 30                  | 800              | BT/CT                 |                 |                    | BTA330Y                                     |                                  |          |                                |                                |                  |                                            |
| 40                  | 800              | BT                    |                 |                    |                                             |                                  |          |                                |                                |                  | BTA440Z*                                   |
| 45                  | 800              | BT                    |                 |                    |                                             |                                  |          |                                |                                |                  | BTA445Z                                    |

## 3Q Triacs part numbering

\*high surge  $I_{TSM}$   $I_{GT}$  key: B = 50 mA, B0 = 10 - 50 mA, C = 35 mA, C0 = 5 - 35 mA, D = 5 mA, E = 10 mA, F = 25 mA T: high  $T_J(max)$  150 °C R: ACT Pinning



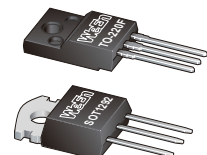
In the spotlight

### 3Q Hi-Com Triacs BTA425, BTA330, BTA440, BTA445

Planar passivated for voltage ruggedness and reliability

High junction operating temperature capability (150 °C)  
Less sensitive gate for high noise immunity

High commutation, high  $dV/dt$  for maximum immunity to false triggering



# 4Q Triacs

(0.6A - 45A)

Types in **bold red** represent new products

| $I_{T(RMS)}$<br>(A) | $V_{DRM}$<br>(V) | $I_{GT(max)}$<br>(mA) | SOT54<br>(TO92)                                                                   | SOT78<br>(TO220AB)                                                                | SOT78D<br>(internally insulated<br>TO220AB)                                       | SOT82                                                                             | SOT186A<br>(isolated<br>TO220AB)                                                   | SOT223                                                                              | SOT404<br>(D <sup>2</sup> PAK)                                                      | SOT428<br>(DPAK)                                                                    | SOT1292<br>(internally insulated<br>TO-3P)                                          |
|---------------------|------------------|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                     |                  |                       |  |  |  |  |  |  |  |  |  |
| 0.6                 | 400              | 5/5/5/7               | MAC97A6                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | 5/5/5/7               | MAC97A8                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | 3/3/3/7               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | BT131W                                                                              |                                                                                     |                                                                                     |                                                                                     |
| 1                   | 600 / 800        | 3/3/3/7               | BT131                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 5/5/5/7               | BT131-D                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 10/10/10/10           | BT131-E                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 3/3/3/5               | Z0103MA/NA                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                    | Z0103MN/NN                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 5/5/5/7               | Z0107MA/NA                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                    | Z0107MN/NN                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 10/10/10/10           | Z0109MA/NA                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                    | Z0109MN/NN                                                                          |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 3/3/3/5               | Z0103MA0/NA0**                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                    | Z0103MN0/NN0**                                                                      |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 5/5/5/7               | Z0107MA0/NA0**                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                    | Z0107MN0/NN0**                                                                      |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | 10/10/10/10           | Z0109MA0/NA0**                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                    | Z0109MN0/NN0**                                                                      |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | 5/5/5/10              | BT132-D*                                                                          |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | D/E/-                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | BT134W*                                                                             |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | -                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | BT134W*                                                                             |                                                                                     |                                                                                     |                                                                                     |
| 4                   | 600              | D/E/-/G               |                                                                                   |                                                                                   |                                                                                   | BT134                                                                             |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | E/-                   |                                                                                   |                                                                                   |                                                                                   | BT134                                                                             |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | D/E                   |                                                                                   | BT234*                                                                            |                                                                                   |                                                                                   | BT234X*                                                                            |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | D/-                   |                                                                                   | BT136                                                                             |                                                                                   |                                                                                   | BT136X                                                                             |                                                                                     |                                                                                     | BT136S                                                                              |                                                                                     |
|                     | 600              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT136X                                                                             |                                                                                     |                                                                                     | BT136S                                                                              |                                                                                     |
|                     | 600 / 800        | E                     |                                                                                   | BT136                                                                             |                                                                                   |                                                                                   | BT136X                                                                             |                                                                                     | BT136B                                                                              | BT136S                                                                              |                                                                                     |
|                     | 800              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | BT136S                                                                              |                                                                                     |
|                     | 800              | -                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT136X                                                                             |                                                                                     |                                                                                     | BT136S                                                                              |                                                                                     |
| 6                   | 600              | F/-/G                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT236X                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | -/G                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT236X                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | D/-/G                 |                                                                                   | BT137                                                                             |                                                                                   |                                                                                   | BT137X                                                                             |                                                                                     |                                                                                     | BT137S                                                                              |                                                                                     |
| 8                   | 600              | E                     |                                                                                   | BT137                                                                             |                                                                                   |                                                                                   | BT137X                                                                             |                                                                                     | BT137B                                                                              | BT137S                                                                              |                                                                                     |
|                     | 600              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT137X                                                                             |                                                                                     | BT137B                                                                              | BT137S                                                                              |                                                                                     |
|                     | 600 / 800        | G0/G0T                |                                                                                   | BT137                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | E                     |                                                                                   | BT137                                                                             |                                                                                   |                                                                                   | BT137X                                                                             |                                                                                     |                                                                                     | BT137S                                                                              |                                                                                     |
|                     | 800              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | BT137B                                                                              | BT137S                                                                              |                                                                                     |
|                     | 800              | -                     |                                                                                   | BT137                                                                             |                                                                                   |                                                                                   | BT137X                                                                             |                                                                                     | BT137B                                                                              | BT137S                                                                              |                                                                                     |
|                     | 800              | G                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | BT137B                                                                              | BT137S                                                                              |                                                                                     |
|                     | 600              | D                     |                                                                                   | BT138                                                                             |                                                                                   |                                                                                   | BT138X                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | -/G                   |                                                                                   | BT138                                                                             |                                                                                   |                                                                                   | BT138X                                                                             |                                                                                     | BT138B                                                                              |                                                                                     |                                                                                     |
|                     | 600              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT138X                                                                             |                                                                                     | BT138B                                                                              |                                                                                     |                                                                                     |
| 12                  | 600              | G0/G0T                |                                                                                   | BT138                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | E                     |                                                                                   | BT138                                                                             | BT138Y                                                                            |                                                                                   | BT138X                                                                             |                                                                                     | BT138B                                                                              |                                                                                     |                                                                                     |
|                     | 800              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT138X                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | -                     |                                                                                   | BT138                                                                             |                                                                                   |                                                                                   | BT138X                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | G                     |                                                                                   | BT138                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | B                     |                                                                                   |                                                                                   | <b>BTA16</b>                                                                      |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | E/-                   |                                                                                   | BT139                                                                             |                                                                                   |                                                                                   | BT139X                                                                             |                                                                                     | BT139B                                                                              |                                                                                     |                                                                                     |
|                     | 600              | F/G                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | BT139X                                                                             |                                                                                     | BT139B                                                                              |                                                                                     |                                                                                     |
| 16                  | 600              | G0/G0T                |                                                                                   | BT139                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 800              | E                     |                                                                                   | BT139                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     | BT139B                                                                              |                                                                                     |                                                                                     |
|                     | 800              | F                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | BT139B                                                                              |                                                                                     |                                                                                     |
|                     | 800              | -                     |                                                                                   | BT139                                                                             |                                                                                   |                                                                                   | BT139X                                                                             |                                                                                     | BT139B                                                                              |                                                                                     |                                                                                     |
|                     | 800              | G                     |                                                                                   | BT139                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     | BT139B                                                                              |                                                                                     |                                                                                     |
|                     | 600              | 50/50/50/75           |                                                                                   |                                                                                   |                                                                                   |                                                                                   | MAC223A8X                                                                          |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| 25                  | 400              | 50/50/50/75           |                                                                                   | MAC223A6                                                                          |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600              | G0/G0T                |                                                                                   | BTA140                                                                            |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                     | 600 / 800        | -                     |                                                                                   | BTA140                                                                            |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| 40                  | 600 / 800        | B                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     | BTA41                                                                               |
| 45                  | 800              | B                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     | BTA45                                                                               |

$I_{GT}$  key:

D = 5mA (10mA in 3+); E = 10mA (25mA in 3+); F = 25mA (70mA in 3+); - = 35mA (70mA in 3+); G = 50mA (100mA in 3+);

G0 = 50mA (100mA in 3+), 10mA min

\* High  $I_{TSM}$  \*\*: Enhanced immunity to false triggering T: high  $T_J(max)$  150 °C

## 4Q Triacs part numbering

Type number

**BT137X-600D**

Package identifier:

- B = SOT78 (TO220AB)
- S = SOT404 (D<sup>2</sup>PAK)
- S = SOT428 (DPAK)
- W = SOT223
- X = SOT186A (isolated TO220AB)
- Y = SOT78D (internally insulated TO220AB)

$V_{DRM}$

Gate sensitivity  $I_{GT} max$ :

- D = 5 mA ( 10 mA in 3+)
- E = 10 mA (25 mA in 3+)
- F = 25 mA (70 mA in 3+)
- = 35 mA (70 mA in 3+)
- G = 50 mA (100 mA in 3+)
- G0 = 50 mA (100 mA in 3+), 10 mA min

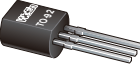
In the spotlight

**4Q Triacs Z010\*\*\*0 series**

Planar passivated for voltage ruggedness and reliability

Improved dynamic performance over Z010\*\*\* series

Best false trigger immunity for sensitive 4Q triacs



# SILICON CONTROLLED RECTIFIERS

(0.8A - 126A)

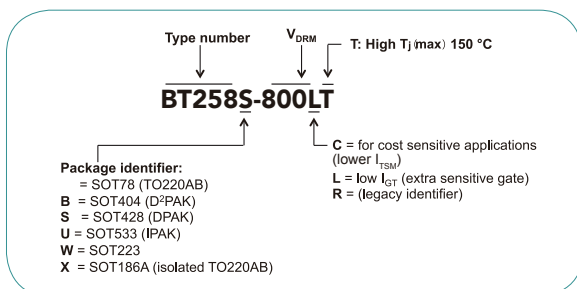
Types in **bold red** represent new products

Types in **bold red italic** represent products in development

| $I_{T(RMS)}$<br>(A) | $I_{T(AV)}$<br>(A) | $V_{DRM}$ & $V_{RSM}$<br>(V) | $I_{GT}$<br>(mA)     | SOT54<br>(TO92) | SOT78<br>(TO220AB) | SOT82   | SOT89             | SOT186A<br>(isolated<br>TO220AB) | SOT223 | SOT404<br>(D <sup>2</sup> PAK) | SOT428<br>(DPAK) | SOT429<br>(TO-247) | SOT533<br>(IPAK) | SOT1259<br>(TO-3P) | SOT1292 |
|---------------------|--------------------|------------------------------|----------------------|-----------------|--------------------|---------|-------------------|----------------------------------|--------|--------------------------------|------------------|--------------------|------------------|--------------------|---------|
| 0.8                 | 0.5                | 200                          | 0.2                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 400                          | 0.012                | EC103D1         |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.5µA min - 7µA max  | N0118GA         |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 200 / 400 / 600              | 0.2                  | BT149B/D/G      |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 200 / 400 / 600              | 0.2                  | BT169B/D/G      |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 400                          | 0.015 min - 0.05 max | BT169D-L        |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 500 / 600                    | 0.02 min - 0.2 max   | BT168E/G        |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.015 min - 0.05 max | BT169G-L        |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.03 min - 0.06 max  | BT169G-M        |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.015 min - 0.1 max  |                 |                    |         | <i>NCR100Q-6M</i> |                                  |        |                                |                  |                    |                  |                    |         |
| 1                   | 0.6                | 800                          | 0.1                  | BT169H          |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 800                          | 0.015 min - 0.05 max | BT169H-L        |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.02 min - 0.2 max   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 1.1                 | 0.7                | 600                          | 0.07 min - 0.45 max  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.2                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 850                          | 0.015 min - 0.05 max |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 1.25                | 0.8                | 850                          | 0.1                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 1000                         | 0.015 min - 0.05 max |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 1000                         | 0.1                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 4                   | 2.5                | 1250                         | 0.1                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 400 / 500 / 600              | 0.2                  |                 |                    | BT148-R |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 500                          | 0.2                  |                 | BT150-R            |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 8                   | 5                  | 600                          | 0.2                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 0.2                  |                 | BT258-R            |         |                   | BT258X-R                         |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 5                    |                 |                    |         |                   |                                  |        |                                |                  |                    |                  | BT258U-R           |         |
|                     |                    | 800                          | 0.05                 |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 800                          | 0.2                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 12                  | 7.5                | 650                          | 0.2                  |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 500 / 650                    | 5                    |                 | BT151-L*           |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 5                    |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 650                          | 1.5-5                |                 | <i>BT151-LTN</i>   |         |                   | <i>BT151X-LTN</i>                |        |                                |                  |                    |                  |                    |         |
|                     |                    | 650                          | 15                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 500 / 650 / 800              | 15                   |                 | BT151-C            |         |                   | BT151X-C                         |        |                                |                  |                    |                  |                    |         |
|                     |                    | 500 / 650 / 800              | 15                   |                 | BT151-R*           |         |                   | BT151X-R*                        |        |                                |                  |                    |                  | BT151U-C           |         |
| 16                  | 10                 | 500 / 1000                   | 15                   |                 | BT151-RT*          |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 15                   |                 | TYN16-CT           |         |                   | TYN16X-CT                        |        | TYN16B-CT                      | TYN16S-CT        |                    |                  |                    |         |
|                     |                    | 600 / 800                    | 25                   |                 | TYN16-RT*          |         |                   | TYN16X-RT*                       |        |                                |                  |                    |                  |                    |         |
| 20                  | 13                 | 400 / 600 / 800              | 32                   |                 | BT152-R            |         |                   | BT152X-R                         |        |                                |                  |                    |                  |                    |         |
|                     |                    | 500                          | 32                   |                 | BT152-RT           |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 600                          | 32                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 25                  | 16                 | 800                          | 32                   |                 | TYN20-T            |         |                   | TYN20X-T                         |        | TYN20B-T                       | TYN20S-T         |                    |                  |                    |         |
|                     |                    | 800                          | 1.5 - 10             |                 | BT145-RT           |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 800                          | 35                   |                 | BT145-R            |         |                   | BT145X-R                         |        |                                |                  |                    |                  |                    |         |
| 31                  | 20                 | 1200                         | 32                   |                 | <i>BT152-T</i>     |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 40                  | 25                 | 800                          | 15                   |                 | <i>TYN40-T</i>     |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 47                  | 30                 | 1200                         | 50                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 79                  | 50                 | 1200                         | 50                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 1200                         | 50                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 1600                         | 80                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 94                  | 60                 | 1400                         | 80                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
| 126                 | 80                 | 1200                         | 70                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |
|                     |                    | 1600                         | 80                   |                 |                    |         |                   |                                  |        |                                |                  |                    |                  |                    |         |

high  $I_{TSM}$  \*\* Hi-Com / fast turn-off T: high  $T_j$  (max) 150 °C A: Automotive qualified AEC-Q101

## Silicon Controlled Rectifiers part numbering



In the spotlight

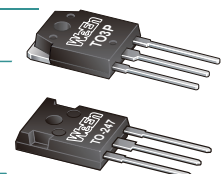
### High Voltage, high surge capability SCR BT155 series, BT158, TYN60

Planar passivated for voltage ruggedness and reliability

Very low on-state voltage ( $V_{ce}$ ) contributes to best efficiency in AC-DC conversion

High junction operating temperature capability ( $T_{jmax}$  150 °C)

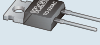
Less sensitive gate for high noise immunity



# POWER DIODES

## Hyperfast Power Diodes

Types in **bold red italic** represent products in development

| $V_{RRM}$ (V) | $I_{F(AV)}$ (A) | $V_F$ (typ) @ 150C (V) | @ $I_F$ (A) | $t_{rr}$ (typ) @ 25C (ns) | SOD59 (TO220AC)                                                                   | SOD113 (2-pin SOT186A)                                                            | SOD142 (2-pin TO247)                                                              | SOT429 (3-pin TO247)                                                                | SOT78 (TO220AB)                                                                     | SOT186A (TO220FP)                                                                   | SOT404 (D <sup>2</sup> PAK)                                                         |
|---------------|-----------------|------------------------|-------------|---------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 400           | 2 x 5           | 0.85                   | 5           | 30                        |  |  |  |  |  |  |  |
| 500           | 5               | 1.15                   | 5           | 16                        | BYC5D-500                                                                         | BYC5DX-500                                                                        |                                                                                   |                                                                                     |                                                                                     | <b>BYC405X-400P</b>                                                                 |                                                                                     |
| 600           | 5               | 1.4                    | 5           | 19                        |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | BYC5B-600                                                                           |
|               | 5               | 1.55                   | 5           | 13                        | BYC5-600P                                                                         | BYC5X-600P                                                                        |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 8               | 1.4                    | 8           | 20                        | BYC8D-600                                                                         | BYC8DX-600                                                                        |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 8               | 1.4                    | 8           | 19                        | BYC8-600P                                                                         | BYC8X-600P                                                                        |                                                                                   |                                                                                     |                                                                                     |                                                                                     | BYC8B-600P                                                                          |
|               | 10              | 1.4                    | 10          | 19                        |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | BYC10B-600                                                                          |
|               | 10              | 1.3                    | 10          | 19                        | BYC10-600P                                                                        | BYC10X-600P                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 10              | 1.4                    | 10          | 18                        | BYC10D-600                                                                        | BYC10DX-600                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 2 x 5           | 1.4                    | 5           | 19                        |                                                                                   |                                                                                   |                                                                                   |                                                                                     | BYC10-600CT                                                                         |                                                                                     |                                                                                     |
|               | 15              | 1.4                    | 15          | 22                        | BYC15-600P                                                                        | BYC15X-600P                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 20              | 1.4                    | 20          | 19                        | BYC20-600                                                                         |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 20              | 1.2                    | 20          | 26                        | BYC20D-600P                                                                       | BYC20DX-600P                                                                      |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 20              | 1.2                    | 20          | 25                        |                                                                                   | BYC20X-600P                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 30              | 1.5                    | 30          | 26                        |                                                                                   |                                                                                   | BYC30DW-600P                                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 30              | 1.38                   | 30          | 29                        | BYC30-600P                                                                        | BYC30X-600P                                                                       | BYC30W-600P                                                                       | BYC30WT-600P                                                                        |                                                                                     | BYC30B-600P                                                                         | BYC30B-600P                                                                         |
|               | 30              | 1.38                   | 30          | 26                        |                                                                                   |                                                                                   | BYC30W-600PT2                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 60              | 1.55                   | 60          | 40                        |                                                                                   |                                                                                   | BYC60W-600P                                                                       |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|               | 75              | 1.6                    | 75          | 42                        |                                                                                   |                                                                                   | BYC75W-600P                                                                       |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## 1200V Planar Hyperfast Power Diodes

| $V_{RRM}$ (V) | $I_{F(AV)}$ (A) | $V_F$ (typ) @150C (V) | @ $I_F$ (A) | $t_{rr}$ (typ) @25C (ns) | SOD59 (TO220AC)                                                                     | TO247-2L                                                                            |
|---------------|-----------------|-----------------------|-------------|--------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1200V         | 5               | 2.0                   | 5           | 42                       |  |  |
|               | 8               | 2.0                   | 8           | 46                       | BYC8-1200P                                                                          |                                                                                     |
|               | 15              | 2.0                   | 15          | 61                       | BYC15-1200P                                                                         |                                                                                     |
|               | 30              | 2.1                   | 30          | 70                       | BYC30-1200P                                                                         | BYC30W-1200P                                                                        |
|               | 40              | 2.2                   | 40          | 91                       |                                                                                     | BYC40W-1200P                                                                        |
|               | 60              | 2.2                   | 60          | 96                       |                                                                                     | BYC60W-1200P                                                                        |
|               | 75              | 2.2                   | 75          | 113                      |                                                                                     | BYC75W-1200P                                                                        |
|               | 100             | 2.2                   | 100         | 115                      |                                                                                     | BYC100W-1200P                                                                       |

### In the Spotlight

#### 1200V Planar Hyperfast Power Diodes

Planar Passivated, Pt doping technology

Fast recovery, System efficiency improvement

Soft recovery, Reduce system EMI

Avalanche ruggedness

Reduces switching losses in associated MOSFET or IGBT



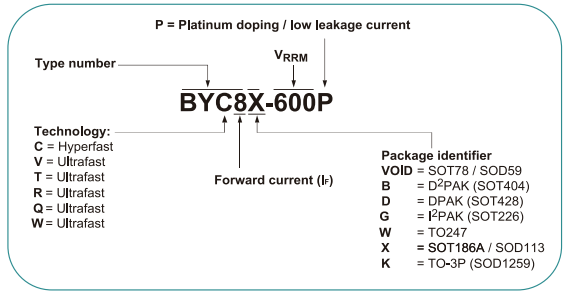
# POWER DIODES

## Ultrafast Power Diodes

Types in **bold red italic** represent products in development

| $V_{\text{RRM}}$ (V) | $I_{\text{FSM}}$ (A) | $V_f$ (typ) @ 150C (V) | $I_T$ (A) | $t_{\text{rr}}$ (typ) @ 25C (ns) | SOD59<br>(TO220AC) | SOD113<br>(2-pin<br>SOT186A) | SOT78<br>(TO220AB) | SOT186A<br>(isolated<br>TO220AB) | SOT223     | SOT226<br>(FPAK) | SOT404<br>(DPAK)    | SOT428<br>(DPAK) | SMA            | SOD132<br>(SMB) | SMC           | SOT1259<br>(TO-3P) | (TO-3PF)     | SOD142<br>(2-pin TO247) | SOT429<br>(3-pin TO247) |
|----------------------|----------------------|------------------------|-----------|----------------------------------|--------------------|------------------------------|--------------------|----------------------------------|------------|------------------|---------------------|------------------|----------------|-----------------|---------------|--------------------|--------------|-------------------------|-------------------------|
| 100                  | 8                    | 0.8                    | 8         | 20                               | BYW29E-100         |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 100                  | 2 x 10               | 0.72                   | 8         | 20                               |                    |                              | BYV32E-100         |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 150                  | 2 x 0.75             | 0.5                    | 0.5       | 10                               |                    |                              |                    |                                  | BYV40E-150 |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 150                  | 8                    | 0.8                    | 8         | 20                               | BYW29E-150         |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 150                  | 2 x 10               | 0.72                   | 8         | 20                               |                    |                              | BYV32E-150         |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 150                  | 2 x 15               | 0.78                   | 15        | 20                               |                    |                              | BYV42E-150         |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 200                  | 8                    | 0.8                    | 8         | 20                               | BYW29E-200         | BYW29EX-200                  |                    |                                  |            |                  |                     | BYW29ED-200      |                |                 |               |                    |              |                         |                         |
| 200                  | 2 x 5                | 0.8                    | 5         | 15                               |                    |                              | BYQ28E-200         | BYQ28X-200                       |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 200                  | 2 x 5                | 0.8                    | 5         | 15                               |                    |                              | BYQ28E-200E        |                                  |            |                  |                     | BYQ28ED-200PL    |                |                 |               |                    |              |                         |                         |
| 200                  | 14                   | 0.83                   | 14        | 20                               | BYV79E-200         |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 200                  | 2 x 8                | 0.84                   | 8         | 20                               |                    |                              | BYQ30E-200         |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 200                  | 2 x 10               | 0.72                   | 8         | 20                               |                    |                              | BYV32E-200P        |                                  |            | BYV32G-200       | BYV32EB-200P        |                  |                |                 |               |                    |              |                         |                         |
| 200                  | 2 x 15               | 0.78                   | 15        | 20                               |                    |                              | BYV42E-200         |                                  |            | BYV42G-200       | BYV42EB-200         |                  |                |                 |               | BYQ72EK-200        |              |                         | BYV72EW-200             |
|                      |                      |                        |           |                                  |                    |                              | BYQ42E-200         |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         | BYQ72EW-200             |
| 300                  | 2 x 5                | 0.95                   | 5         | 50                               |                    |                              | BYT28-300          |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 300                  | 2 x 10               | 0.81                   | 10        | 9                                |                    |                              | <b>BYV32E-300P</b> | <b>BYV32EX-300P</b>              |            |                  | <b>BYV32EB-300P</b> |                  |                |                 |               |                    |              |                         |                         |
| 300                  | 2 x 30               | 0.85                   | 30        | 33                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    | BYV430K-300P |                         | BYV430W-300P            |
| 400                  | 9                    | 0.9                    | 8         | 50                               | BYV29-400          |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 400                  | 2 x 10               | 0.87                   | 10        | 50                               |                    |                              | BYV34-400          |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 400                  | 2 x 15               | 0.95                   | 15        | 35                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         | BYV74W-400              |
| 500                  | 9                    | 0.9                    | 8         | 50                               | BYV29-500          | BYV29X-500                   |                    |                                  |            |                  | BYV29B-500          |                  |                |                 |               |                    |              |                         |                         |
| 500                  | 2 x 5                | 0.95                   | 5         | 50                               |                    |                              | BYT28-500          | BYT28X-500                       |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 500                  | 14                   | 0.9                    | 15        | 50                               | BYT79-500          |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 500                  | 2 x 10               | 0.87                   | 10        | 50                               |                    |                              | BYV34-500          |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 500                  | 2 x 15               | 0.95                   | 15        | 50                               |                    |                              | BYV44-500          |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 1                    | 0.88                   | 1         | 45                               |                    |                              |                    |                                  |            |                  |                     |                  | <b>MURS160</b> | <b>MURS160B</b> |               |                    |              |                         |                         |
| 600                  | 3                    | 0.88                   | 3         | 36                               |                    |                              |                    |                                  |            |                  |                     |                  |                | MURS360B        |               |                    |              |                         |                         |
| 600                  | 5                    | 0.9                    | 5         | 45                               |                    |                              |                    |                                  |            |                  |                     |                  |                | MURS60          |               |                    |              |                         |                         |
| 600                  | 5                    | 1.1                    | 5         | 17.5                             | BYV25F-600         | BYV25FX-600                  |                    |                                  |            |                  | BYV25FB-600         | BYV25FD-600      |                |                 |               |                    |              |                         |                         |
| 600                  | 5                    | 0.97                   | 5         | 50                               |                    | BYV25X-600                   |                    |                                  |            | BYV25G-600       |                     | BYV25D-600       |                |                 |               |                    |              |                         |                         |
| 600                  | 8                    | 1.07                   | 8         | 60                               | BYR29-600          | BYR29X-600                   |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 8                    | 0.8                    | 8         | 65                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 | <b>MUR860</b> |                    |              |                         |                         |
| 600                  | 9                    | 0.97                   | 8         | 50                               | BYV29-600P         | BYV29X-600P                  |                    |                                  |            | BYV29G-600P      | BYV29B-600P         | BYV29D-600P      |                |                 |               |                    |              |                         |                         |
| 600                  | 9                    | 1.25                   | 8         | 17.5                             | BYV29F-600         | BYV29FX-600                  |                    |                                  |            |                  | BYV29FB-600         | BYV29FD-600      |                |                 |               |                    |              |                         |                         |
| 600                  | 10                   | 1.6                    | 10        | 20                               | BYV10-600P         | BYV10X-600P                  |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 10                   | 1.6 max                | 10        | 35                               |                    | BYV10EX-600P                 |                    |                                  |            |                  |                     | BYV10ED-600P     |                |                 |               |                    |              |                         |                         |
| 600                  | 15                   | 1                      | 15        | 50                               | BYT79-600          |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 15                   | 0.96                   | 15        | 50                               |                    | BYT79X-600P                  |                    |                                  |            |                  | BYT79B-600P         |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 2 x 10               | 0.92                   | 10        | 50                               |                    |                              | BYV34-600          | BYV34X-600                       |            | BYV34G-600       |                     |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 2 x 10               | 1.3                    | 10        | 20                               |                    |                              | BYV410-600         | BYV410X-600P                     |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 600                  | 2 x 15               | 1.3                    | 10        | 20                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 |               | BYV415K-600P       | BYV415J-600P |                         | BYV415W-600P            |
| 600                  | 30                   | 0.98                   | 30        | 42                               | BYV30-600P         | BYV30X-600P                  |                    |                                  |            |                  | BYV30B-600P         |                  |                |                 |               |                    |              | BYV30W-600P             |                         |
| 600                  | 40                   | 0.97                   | 40        | 52                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              | BYV40W-600P             |                         |
| 600                  | 2 x 30               | 1.25                   | 30        | 53                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    | BYV430J-600P |                         |                         |
| 600                  | 60                   | 1.2                    | 60        | 53                               |                    |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              | BYV60W-600P             |                         |
| 800                  | 8                    | 1.07                   | 8         | 60                               | BYR29-800          |                              |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 800                  | 8                    | 1.2                    | 8         | 40                               |                    | BYR29X-800P                  |                    |                                  |            |                  |                     |                  |                |                 |               |                    |              |                         |                         |
| 1200                 | 5                    | 1.6                    | 5         | 50                               |                    |                              |                    |                                  |            |                  |                     | BYR5D-1200P      |                |                 |               |                    |              |                         |                         |

### Power Diode part numbering



**In the Spotlight**

**Ultrafast power diodes**

- Fast switching
- High voltage capability
- Low forward voltage drop
- Low leakage current (platinum doped series)
- Low thermal resistance
- Soft recovery characteristic





# SIC SCHOTTKY DIODE

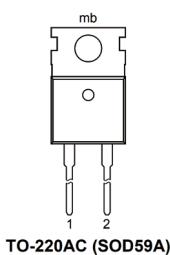
Types in **bold red** represent new products

| $V_{RRM}$<br>(V) | $I_{F(AV)}$<br>(A) | $V_F(\text{typ}) @ 25^\circ\text{C}$<br>(V) | @ $I_F$<br>(A) | $Q_r$ (typ)<br>@ 25°C<br>(nC) | SOD59<br>(TO220AC) | SOD113<br>(2-pin SOT186A) | SOD142<br>(2-pin TO247) | SOT429<br>(3-pin TO247) | SOT428<br>(DPAK) | SOT404<br>(D <sup>2</sup> PAK) |
|------------------|--------------------|---------------------------------------------|----------------|-------------------------------|--------------------|---------------------------|-------------------------|-------------------------|------------------|--------------------------------|
| 650              | 4                  | 1.5                                         | 4              | 7                             | NXPSC04650         | NXPSC04650X               |                         |                         | NXPSC04650D      | NXPSC04650B                    |
|                  | 6                  | 1.5                                         | 6              | 10                            | NXPSC06650         | NXPSC06650X               |                         |                         | NXPSC06650D      | NXPSC06650B                    |
|                  | 8                  | 1.5                                         | 8              | 13                            | NXPSC08650         | NXPSC08650X               |                         |                         | NXPSC08650D      | NXPSC08650B                    |
|                  | 10                 | 1.65                                        | 10             | 12                            | NXPLQSC10650       |                           |                         |                         |                  |                                |
|                  | 10                 | 1.5                                         | 10             | 15                            | NXPSC10650         | NXPSC10650X               |                         |                         | NXPSC10650D      | NXPSC10650B                    |
|                  | 12                 | 1.5                                         | 12             | 20                            | NXPSC12650         |                           |                         |                         |                  | NXPSC12650B                    |
|                  | 16                 | 1.5                                         | 16             | 26                            | NXPSC16650         |                           |                         |                         |                  | NXPSC16650B                    |
|                  | 20                 | 1.5                                         | 20             | 28                            | NXPSC20650         |                           |                         |                         |                  | NXPSC20650B                    |
|                  | 2 x 10             | 1.5                                         | 10             | 14                            |                    |                           |                         | NXPSC20650W             |                  |                                |
|                  | 2 x 10             | 1.65                                        | 10             | 11                            |                    |                           |                         | NXPLQSC20650W           |                  |                                |
|                  | 2 x 15             | 1.75                                        | 15             | 15                            |                    |                           |                         | NXPLQSC30650W           |                  |                                |
| 1200             | 2                  | 1.4                                         | 2              | -                             | <b>WNSC021200</b>  |                           |                         |                         |                  |                                |
|                  | 5                  | 1.4                                         | 5              | -                             | <b>WNSC051200</b>  |                           |                         |                         |                  |                                |
|                  | 10                 | 1.4                                         | 10             | -                             | <b>WNSC101200</b>  |                           |                         |                         |                  |                                |
|                  | 10                 | 1.4                                         | 10             | 24                            |                    |                           | <b>WNSC101200W</b>      |                         |                  |                                |
|                  | 2 x 5              | 1.6                                         | 10             | 12                            |                    |                           |                         | <b>WNSC101200CW</b>     |                  |                                |
|                  | 2 x 10             | 1.4                                         | 20             | 52                            |                    |                           | <b>WNSC201200W</b>      |                         |                  |                                |
|                  | 2 x 10             | 1.4                                         | 20             | 24                            |                    |                           |                         | <b>WNSC201200CW</b>     |                  |                                |

## In the Spotlight

### 650V SiC Schottky Diode

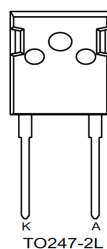
- Highly stable switching performance
- High forward surge capability IFSM
- Extremely fast reverse recovery time
- Superior in efficiency to Silicon Diode alternatives
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant



## In the Spotlight

### 1200V SiC Schottky Diode

- Highly stable switching performance
- High forward surge capability IFSM
- Extremely fast reverse recovery time
- Superior in efficiency to Silicon Diode alternatives
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant
- High junction operating temperature capability ( $T_{j(max)} = 175^\circ\text{C}$ )



## POWER SCHOTTKY DIODES

Types in **bold red** represent new products

| $V_{RRM}$<br>(V) | $I_{F(AV)}$<br>(A) | $V_F$ (typ) @120C<br>(V) | @ $I_F$<br>per diode<br>(A) | SOD78<br>(TO220AB) | SOD404<br>(D <sup>2</sup> PAK) | SOT186A<br>(isolated TO220AB) | TO262              |
|------------------|--------------------|--------------------------|-----------------------------|--------------------|--------------------------------|-------------------------------|--------------------|
| 100              | 2 x 10             | 0.73                     | 10                          |                    |                                | <b>WNS20S100CX</b>            |                    |
|                  | 2 x 10             | 0.63                     | 10                          | WNS20H100C         | WNS20H100CB                    | WNS20H100CX                   |                    |
|                  | 2 x 10             | 0.73                     | 10                          | WNS20S100C         | WNS20S100CB                    | WNS20S100CX                   |                    |
|                  | 2 x 15             | 0.6                      | 15                          | WNS30H100C         | WNS30H100CB                    | WNS30H100CX                   |                    |
|                  | 2 x 20             | 0.61                     | 20                          | WNS40H100C         | WNS40H100CB                    | WNS40H100CX                   |                    |
|                  | 2 x 20             | 0.64                     | 20                          |                    |                                |                               | <b>WNS40H100CG</b> |
|                  | 2 x 20             | 0.61                     | 20                          | <b>WNS40100C</b>   |                                |                               |                    |

## CASCO DIODES

employing series die technology for the lowest possible trr

| $V_{RRM}$<br>(V) | $I_{F(AV)}$<br>(A) | $V_F$ (typ) @25C<br>(V) | @ $I_F$<br>(A) | $t_{rr}$ (typ)<br>@25C<br>(ns) | SOD113<br>(2-pin SOT186A) |
|------------------|--------------------|-------------------------|----------------|--------------------------------|---------------------------|
| 600V             | 8                  | 2                       | 8              | 12.5                           | BYC58X-600                |

## 600V - 1600V Standard Power Diodes

Types in **bold red** represent new products

Types in **bold red italic** represent products in development

| $V_{RRM}$<br>(V) | $I_{F(AV)}$<br>(A) | $V_F$ (typ) @150C<br>(V) | @ $I_F$<br>(A) | $I_{FSM}$<br>@10ms<br>(A) | SOT186A<br>(isolated<br>TO220AB) | TO247-2L         | SOT428<br>(DPAK) | SOD132<br>(SMB) |
|------------------|--------------------|--------------------------|----------------|---------------------------|----------------------------------|------------------|------------------|-----------------|
| 600V             | 10                 | 0.89@25C                 | 10             | -                         | <b>WND10M600X</b>                |                  |                  |                 |
| 800V             | 8                  | 0.84                     | 8              | 150                       |                                  |                  | SK8D             |                 |
|                  | 10                 | 1.07                     | 10             | -                         | <b>WND10P08X</b>                 |                  |                  |                 |
| 1000V            | 3                  | 1.15@25C                 | 3              | -                         |                                  |                  |                  | <b>WND03M10</b> |
| 1600V            | 8                  | 1.0                      | 8              | 150                       |                                  |                  | WND08P16D        |                 |
|                  | 8                  | 1.02                     | 8              | -                         | <b>WND08P16X</b>                 |                  |                  |                 |
|                  | 45                 | 1                        | 45             | 475                       |                                  | WND45P16W        |                  |                 |
|                  | 60                 | 1.08                     | 60             | -                         |                                  | <b>WND60P16W</b> |                  |                 |

## POWER DIODE BRIDGE

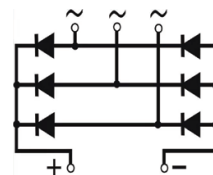
Types in **bold red italic** represent products in development

| $V_{RRM}$<br>(V) | $I_{F(AV)}$<br>(A) | $V_F$ (typ) @25C<br>(V) | $I_{FSM}$<br>@10ms<br>(A) | GBJ             | WMM01            |
|------------------|--------------------|-------------------------|---------------------------|-----------------|------------------|
| 600V             | 25                 | 0.87                    | 300                       | <b>WNB2560M</b> |                  |
| 1600V            | 75                 | 1.6 <sub>MAX</sub>      | 750                       |                 | <b>WDMF75M16</b> |

In the Spotlight

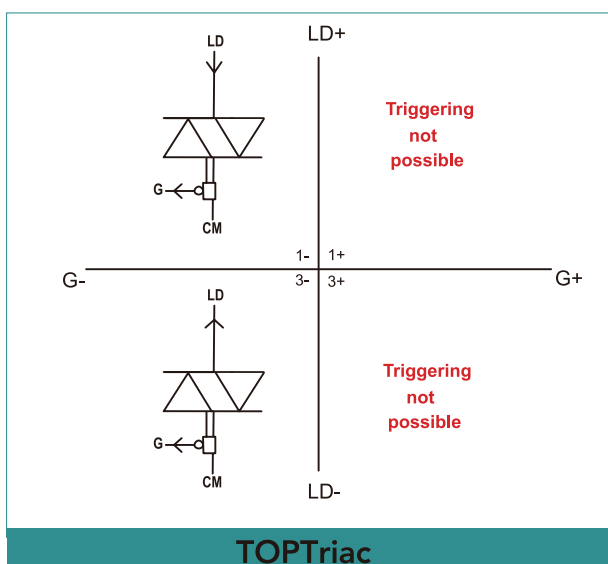
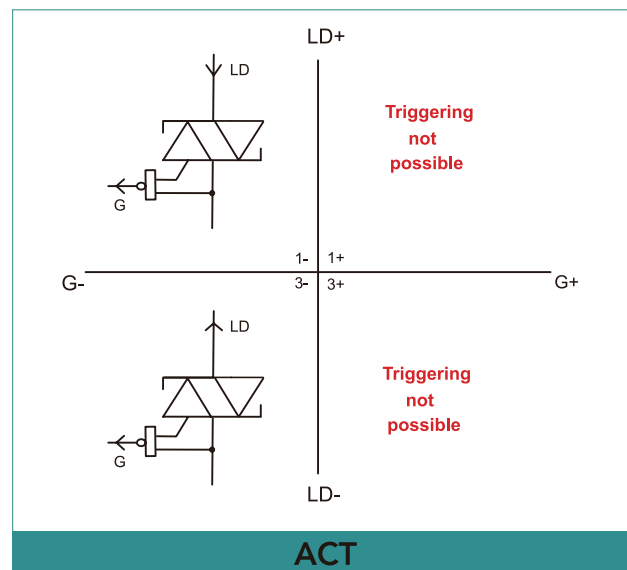
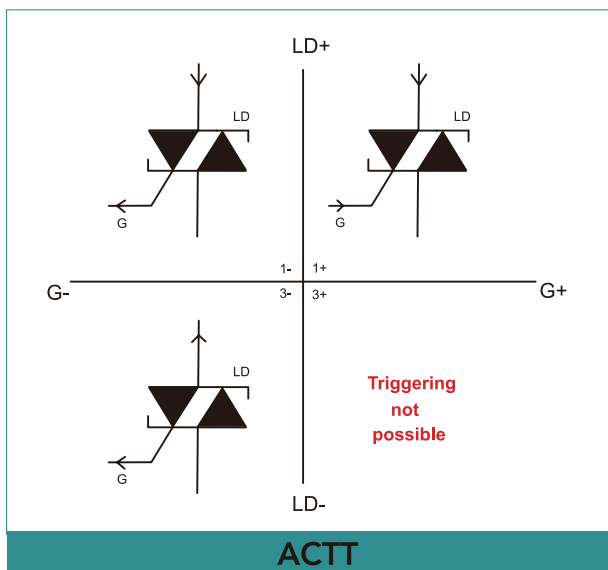
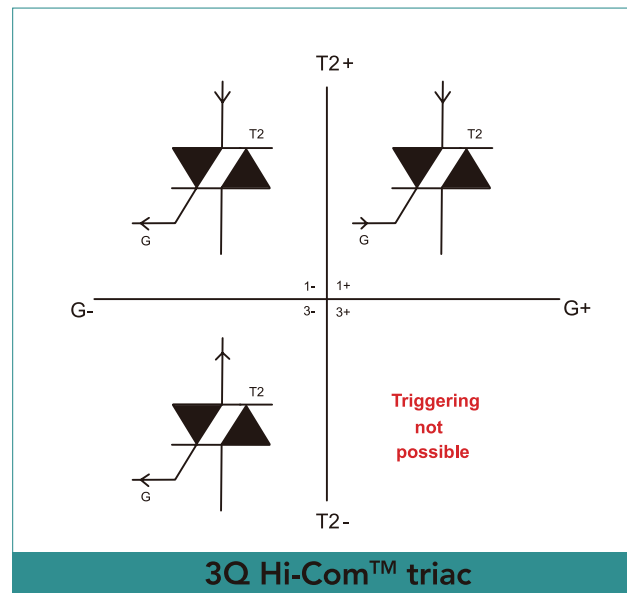
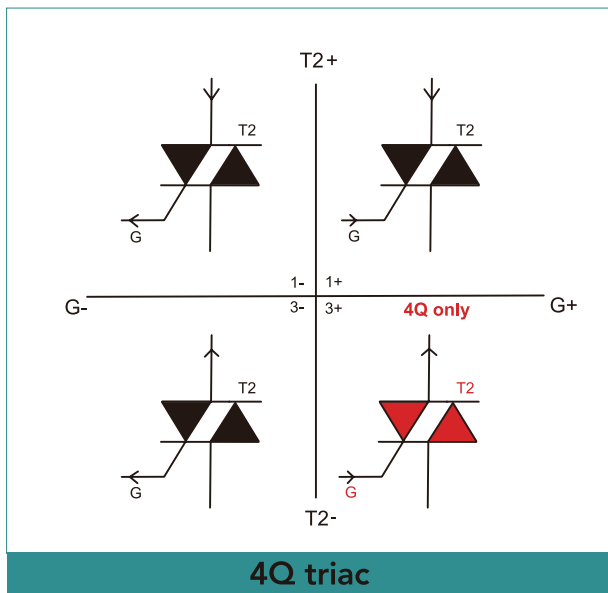
### WDMF75M16

- Three phase rectifiers
- Heat transfer through aluminium oxide DBC, ceramic isolated metal baseplate
- High voltage capability
- High inrush current capability
- Planar process
- High operating temperature capability ( $T_{j(max)} = 150^{\circ}\text{C}$ )



# Getting to know WeEn Thyristors

## Triac triggering quadrants



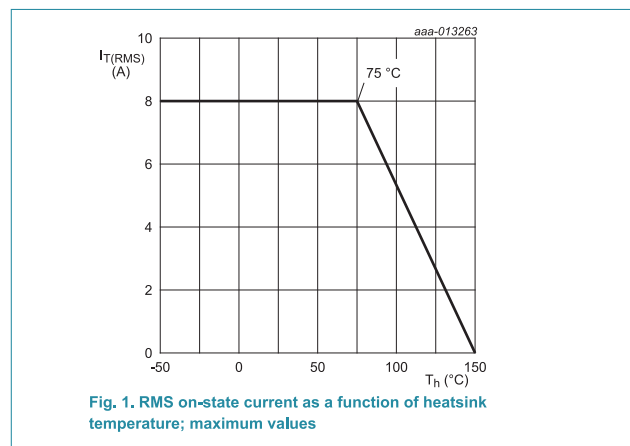
- Only four-quadrant triacs can trigger in the 3+ quadrant (G+, T2-)
- This capability can be more of a disadvantage than an advantage because:
  - 3+ triggering is the most difficult and risky for the triac
  - The ability to trigger in the 3+ quadrant compromises the triac's dynamic performance
  - 4Q triacs are less rugged and easier to false trigger than 3Q triacs

# Thyristor Parameters

## 3.1 Limiting Values – $I_{T(RMS)}$

| Symbol       | Parameter            | Conditions                                                                                                             | Min | Max | Unit |
|--------------|----------------------|------------------------------------------------------------------------------------------------------------------------|-----|-----|------|
| $I_{T(RMS)}$ | RMS on-state current | full sine wave; $T_h \leq 75^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | -   | 8   | A    |

- Maximum allowable current to keep  $T_j$  within  $T_{j(max)}$
- The critical condition in the example shown here (SOT186A Fullpack) is  $T(\text{heatsink}) \leq 75^\circ\text{C}$
- For other packages the condition may be  $T(\text{lead})$ ,  $T(\text{solder point})$  or  $T(\text{mounting base})$ . It is the piece of metal closest to the die whose temperature can be measured.
- The temperature derating curve is shown below



## 3.2 Limiting Values – $I_{TSM}$

| Symbol    | Parameter                            | Conditions                                                                                                                       | Min | Max | Unit |
|-----------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----|-----|------|
| $I_{TSM}$ | non-repetitive peak on-state current | full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a> | -   | 60  | A    |
|           |                                      | full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$ ; $t_p = 16.7\text{ ms}$                                                 | -   | 65  | A    |

- 'T' means Triac on state
- 'S' means Surge
- 'M' means Maximum
- Non-repetitive means single shot with full thermal recovery between surges to avoid cumulative heating. It does not mean once in a lifetime.
- $I_{TSM}$  is strongly influenced by surge duration (pulse width)
  - o More AC mains cycles  $\rightarrow$  lower  $I_{TSM}$
  - o Shorter pulse width higher than AC mains frequency  $\rightarrow$  higher  $I_{TSM}$

## 3.3 Static characteristics – $I_{GT}$

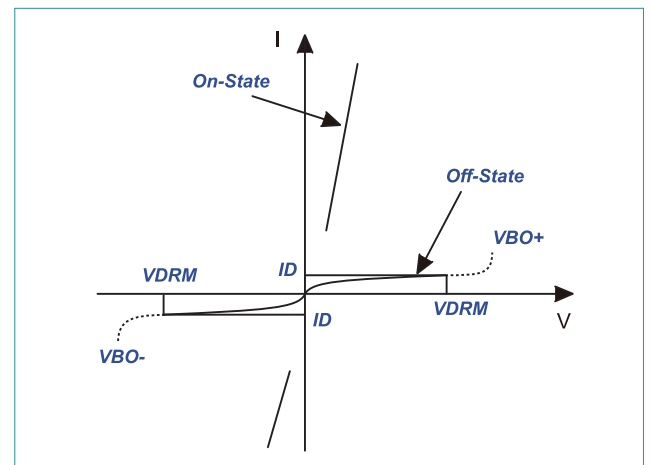
| Symbol   | Parameter            | Conditions                                                                                                  | Min | Typ | Max | Unit |
|----------|----------------------|-------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| $I_{GT}$ | gate trigger current | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_2 + G+$ ; $T_j = 25^\circ\text{C}$ ; <a href="#">Fig. 7</a> | 5   | -   | 35  | mA   |
|          |                      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_2 + G-$ ; $T_j = 25^\circ\text{C}$ ; <a href="#">Fig. 7</a> | 5   | -   | 35  | mA   |
|          |                      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_2 - G-$ ; $T_j = 25^\circ\text{C}$ ; <a href="#">Fig. 7</a> | 5   | -   | 35  | mA   |

- 'G' means Gate
- 'T' means Triac on state
- $I_{GT(max)}$  = highest gate current triac may require to guarantee triggering
- Trigger circuit must supply at least  $I_{GT(max)}$  to guarantee triggering
- Gate current below  $I_{GT(min)}$  is guaranteed not to trigger the triac
- $I_{GT}$  is highly dependent on  $T_j$

## 3.4 Limiting Values – $V_{DRM}$

| Symbol    | Parameter                         | Conditions | Min | Max | Unit |
|-----------|-----------------------------------|------------|-----|-----|------|
| $V_{DRM}$ | repetitive peak off-state voltage |            | -   | 800 | V    |

- 'D' is when the triac is non-conducting in the off state.
- 'R' means Repetitive
- 'M' means Maximum
- Exceeding  $V_{DRM}$  will cause the triac to turn on. This is one cause of false triggering.
- Triac will only be damaged if load current rises too fast (excessive  $dI/dt$ )



## 3.5 Dynamic characteristics – $dV_D/dt$

| Symbol    | Parameter                         | Conditions                                                                                                                      | Min  | Typ | Max | Unit             |
|-----------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|------------------|
| $dV_D/dt$ | rate of rise of off-state voltage | $V_{DM} = 536\text{ V}$ ; $T_j = 150^\circ\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit | 1500 | -   | -   | V/ $\mu\text{s}$ |

- Rate of rise of off-state voltage minimum value is specified
- Externally applied condition below that level is guaranteed not to cause a false trigger
- Triggering the triac by exceeding its  $dV_D/dt$  withstand capability will not, on its own, damage the triac.
- [Current, not voltage, is most likely to damage triacs. The planar passivation of WeEn triacs makes them much more voltage-rugged than traditional older technology glass-passivated triacs.]
- $dV_D/dt$  is inversely proportional to temperature; higher temperature results in worse noise immunity
- Very high  $dV_D/dt$  capability of 3Q Hi-Com triacs means that snubber protection should not be necessary



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Date of release: May 2019

Document order number: 20190501



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