



# IMPORTANT NOTICE

10 December 2015

## 1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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Thank you for your cooperation and understanding,

WeEn Semiconductors



# DATA SHEET

## **BTA216X series B** Three quadrant triacs high commutation

Product specification

October 1997



# Three quadrant triacs high commutation

# BTA216X series B

## GENERAL DESCRIPTION

Glass passivated high commutation triacs in a full pack, plastic envelope intended for use in circuits where high static and dynamic  $dV/dt$  and high  $dI/dt$  can occur. These devices will commute the full rated rms current at the maximum rated junction temperature, without the aid of a snubber.

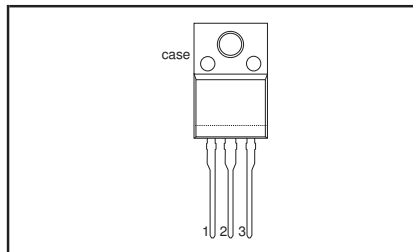
## QUICK REFERENCE DATA

| SYMBOL       | PARAMETER                            | MAX.            | MAX.        | MAX.        | UNIT        |
|--------------|--------------------------------------|-----------------|-------------|-------------|-------------|
| $V_{DRM}$    | Repetitive peak off-state voltages   | <b>BTA216X-</b> | <b>500B</b> | <b>600B</b> | <b>800B</b> |
|              |                                      |                 | 500         | 600         | 800         |
|              |                                      |                 |             |             |             |
| $I_{T(RMS)}$ | RMS on-state current                 | 16              | 16          | 16          | A           |
| $I_{TSM}$    | Non-repetitive peak on-state current | 140             | 140         | 140         | A           |

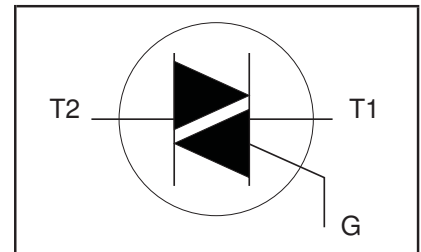
## PINNING - SOT186A

| PIN  | DESCRIPTION     |
|------|-----------------|
| 1    | main terminal 1 |
| 2    | main terminal 2 |
| 3    | gate            |
| case | isolated        |

## PIN CONFIGURATION



## SYMBOL



## LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

| SYMBOL       | PARAMETER  | CONDITIONS   | MIN. | MAX.                     |                          |             | UNIT             |
|--------------|--|--|------|--------------------------|--------------------------|-------------|------------------|
|              |  |  |      | -500<br>500 <sup>1</sup> | -600<br>600 <sup>1</sup> | -800<br>800 |                  |
| $V_{DRM}$    | Repetitive peak off-state voltages                           |  | -    |                          |                          |             | V                |
| $I_{T(RMS)}$ | RMS on-state current   | full sine wave;<br>$T_{hs} \leq 38^\circ\text{C}$                              | -    | 16                       |                          |             | A                |
| $I_{TSM}$    | Non-repetitive peak on-state current                         | full sine wave;<br>$T_j = 25^\circ\text{C}$ prior to surge                     | -    | 140                      |                          |             | A                |
| $I^2t$       | $I^2t$ for fusing  | $t = 20\text{ ms}$   | -    | 140                      |                          |             | A                |
| $dI_T/dt$    | Repetitive rate of rise of on-state current after triggering | $t = 16.7\text{ ms}$   | -    | 150                      |                          |             | A                |
|              |  | $t = 10\text{ ms}$   | -    | 98                       |                          |             | A <sup>2</sup> s |
|              |  | $I_{TM} = 20\text{ A}; I_G = 0.2\text{ A}; dI_G/dt = 0.2\text{ A}/\mu\text{s}$ | -    | 100                      |                          |             | A/ $\mu\text{s}$ |
| $I_{GM}$     | Peak gate current  |  | -    | 2                        |                          |             | A                |
| $V_{GM}$     | Peak gate voltage  |  | -    | 5                        |                          |             | V                |
| $P_{GM}$     | Peak gate power  |  | -    | 5                        |                          |             | W                |
| $P_{G(AV)}$  | Average gate power   | over any 20 ms period  | -    | 0.5                      |                          |             | W                |
| $T_{stg}$    | Storage temperature  |  | -40  | 150                      |                          |             | $^\circ\text{C}$ |
| $T_j$        | Operating junction temperature                               |  | -    | 125                      |                          |             | $^\circ\text{C}$ |

<sup>1</sup> Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/ $\mu\text{s}$ .

## Three quadrant triacs high commutation

BTA216X series B

### ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs} = 25\text{ °C}$  unless otherwise specified

| SYMBOL     | PARAMETER  | CONDITIONS   | MIN. | TYP. | MAX. | UNIT |
|------------|--|--|------|------|------|------|
| $V_{isol}$ | R.M.S. isolation voltage from all three terminals to external heatsink | $f = 50\text{-}60\text{ Hz}$ ; sinusoidal waveform;<br>$R.H. \leq 65\%$ ; clean and dustfree | -    |      | 2500 | V    |
| $C_{isol}$ | Capacitance from T2 to external heatsink                               | $f = 1\text{ MHz}$   | -    | 10   | -    | pF   |

### THERMAL RESISTANCES

| SYMBOL         | PARAMETER                               | CONDITIONS                                   | MIN. | TYP. | MAX. | UNIT |
|----------------|---|--|------|------|------|------|
| $R_{th\ j-hs}$ | Thermal resistance junction to heatsink | full or half cycle<br>with heatsink compound | -    | -    | 4.0  | K/W  |
| $R_{th\ j-a}$  | Thermal resistance junction to ambient  | without heatsink compound<br>in free air     | -    | 55   | 5.5  | K/W  |

### STATIC CHARACTERISTICS

$T_j = 25\text{ °C}$  unless otherwise stated

| SYMBOL   | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|----------|-----------------------------------|---|------|------|------|------|
| $I_{GT}$ | Gate trigger current <sup>2</sup> | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$                          |      |      |      |      |
|          |                                   | T2+ G+  | 2    | 18   | 50   | mA   |
|          |                                   | T2+ G-  | 2    | 21   | 50   | mA   |
|          |                                   | T2- G-  | 2    | 34   | 50   | mA   |
| $I_L$    | Latching current                  | $V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$                       |      |      |      |      |
|          |                                   | T2+ G+  | -    | 31   | 60   | mA   |
|          |                                   | T2+ G-  | -    | 34   | 90   | mA   |
|          |                                   | T2- G-  | -    | 30   | 60   | mA   |
| $I_H$    | Holding current                   | $V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$                       | -    | 31   | 60   | mA   |
| $V_T$    | On-state voltage                  | $I_T = 20\text{ A}$   | -    | 1.2  | 1.5  | V    |
| $V_{GT}$ | Gate trigger voltage              | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$                          | -    | 0.7  | 1.5  | V    |
|          |                                   | $V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ °C}$ | 0.25 | 0.4  | -    | V    |
| $I_D$    | Off-state leakage current         | $V_D = V_{DRM(max)}$ ; $T_j = 125\text{ °C}$                        | -    | 0.1  | 0.5  | mA   |

### DYNAMIC CHARACTERISTICS

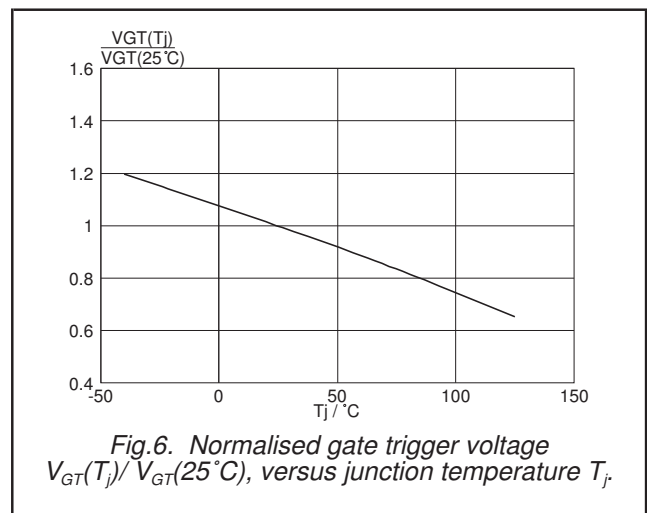
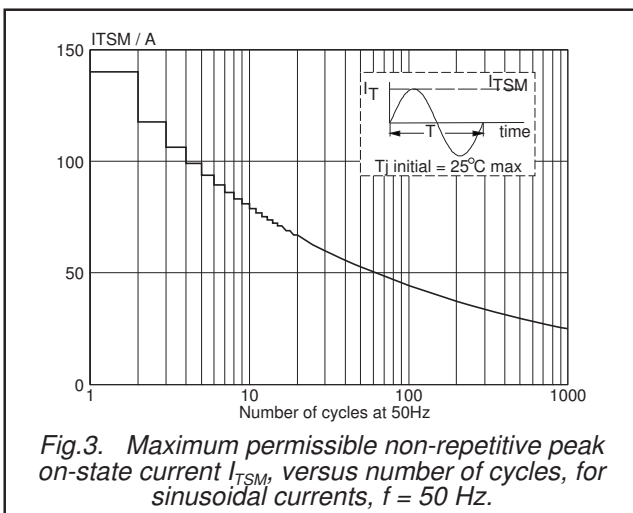
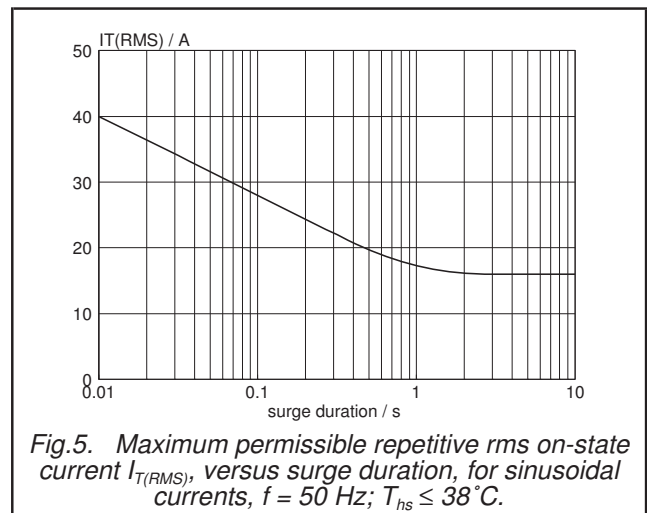
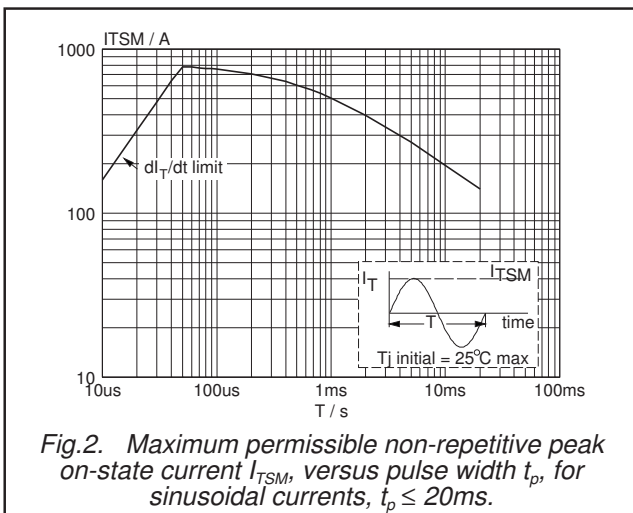
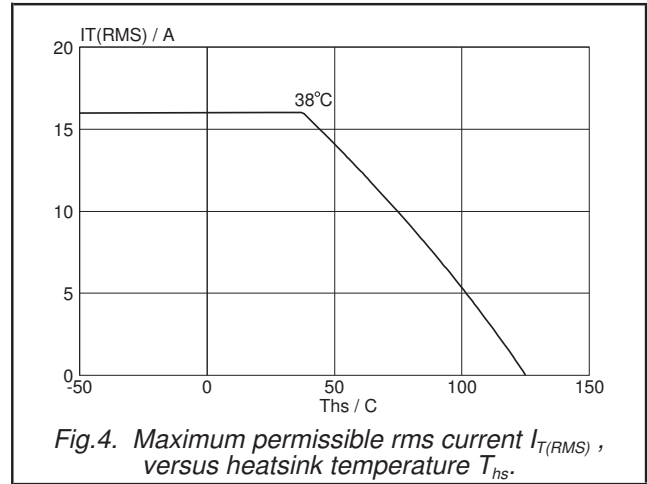
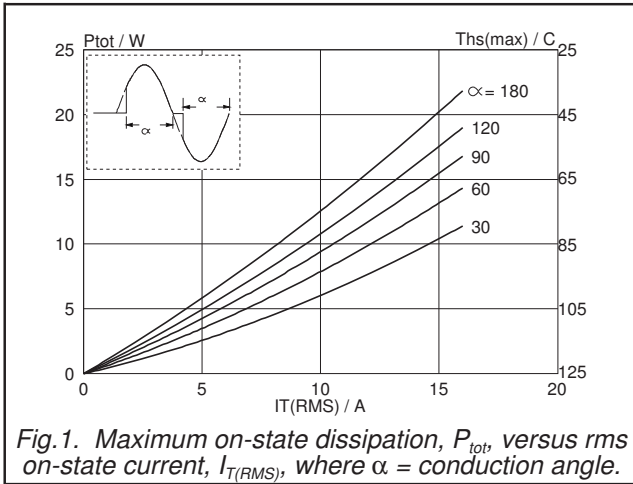
$T_j = 25\text{ °C}$  unless otherwise stated

| SYMBOL        | PARAMETER                                      | CONDITIONS   | MIN. | TYP. | MAX. | UNIT       |
|---------------|--|--|------|------|------|------------|
| $dV_D/dt$     | Critical rate of rise of off-state voltage     | $V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125\text{ °C}$ ;<br>exponential waveform; gate open circuit                    | 1000 | 4000 | -    | V/ $\mu$ s |
| $dI_{com}/dt$ | Critical rate of change of commutating current | $V_{DM} = 400\text{ V}$ ; $T_j = 125\text{ °C}$ ; $I_{T(RMS)} = 16\text{ A}$ ;<br>without snubber; gate open circuit | -    | 28   | -    | A/ms       |
| $t_{gt}$      | Gate controlled turn-on time                   | $I_{TM} = 20\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 0.1\text{ A}$ ;<br>$dI_G/dt = 5\text{ A}/\mu$ s               | -    | 2    | -    | $\mu$ s    |

<sup>2</sup> Device does not trigger in the T2-, G+ quadrant.

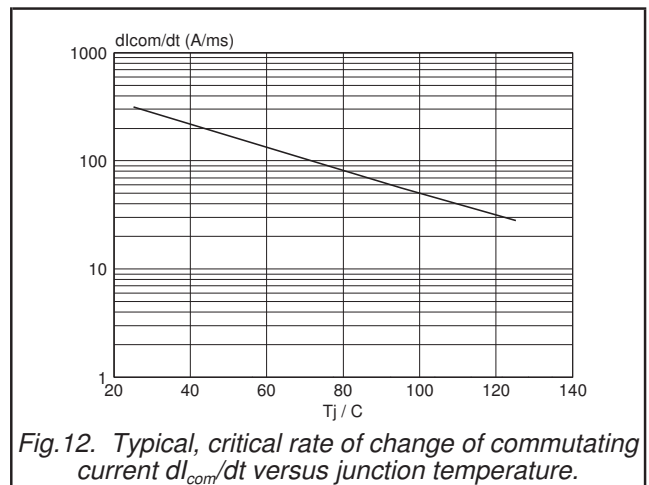
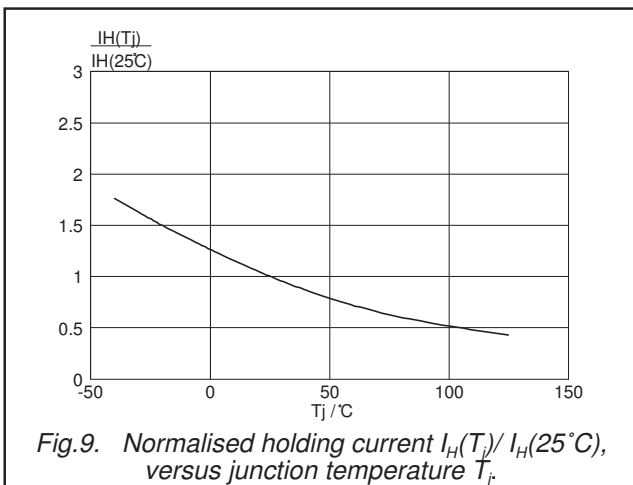
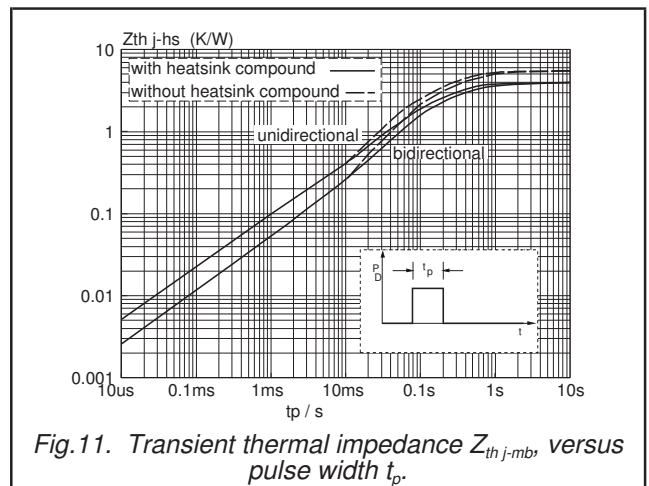
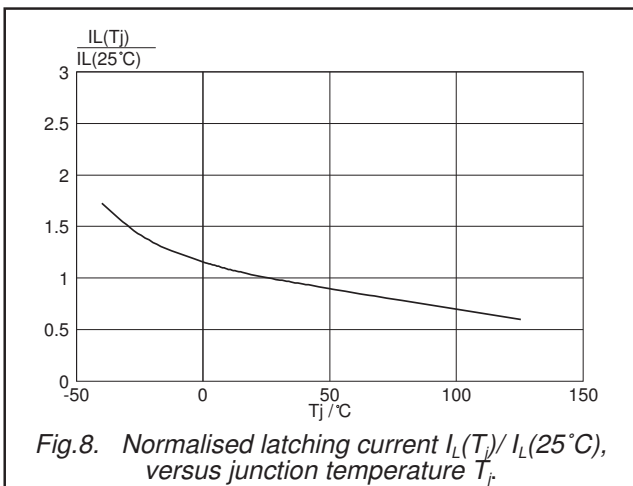
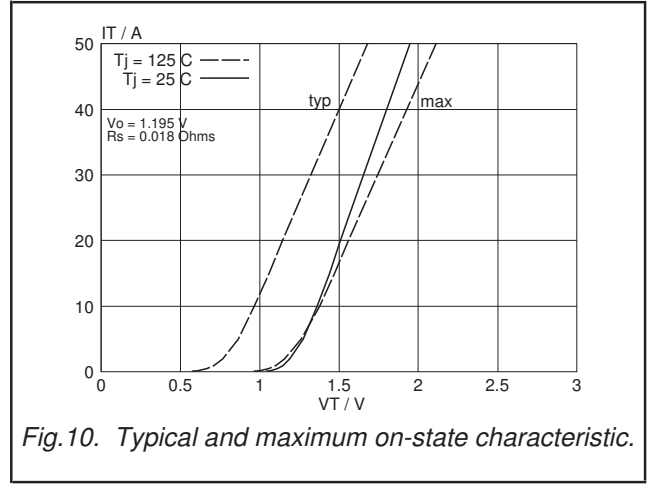
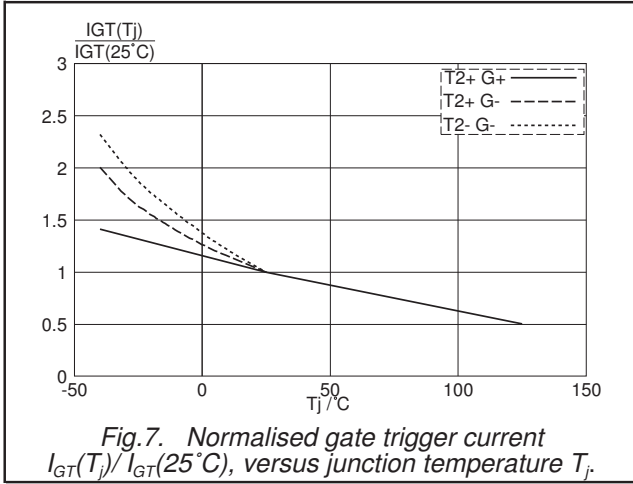
Three quadrant triacs  
high commutation

BTA216X series B



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high commutation

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Three quadrant triacs  
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**MECHANICAL DATA**

Dimensions in mm

Net Mass: 2 g

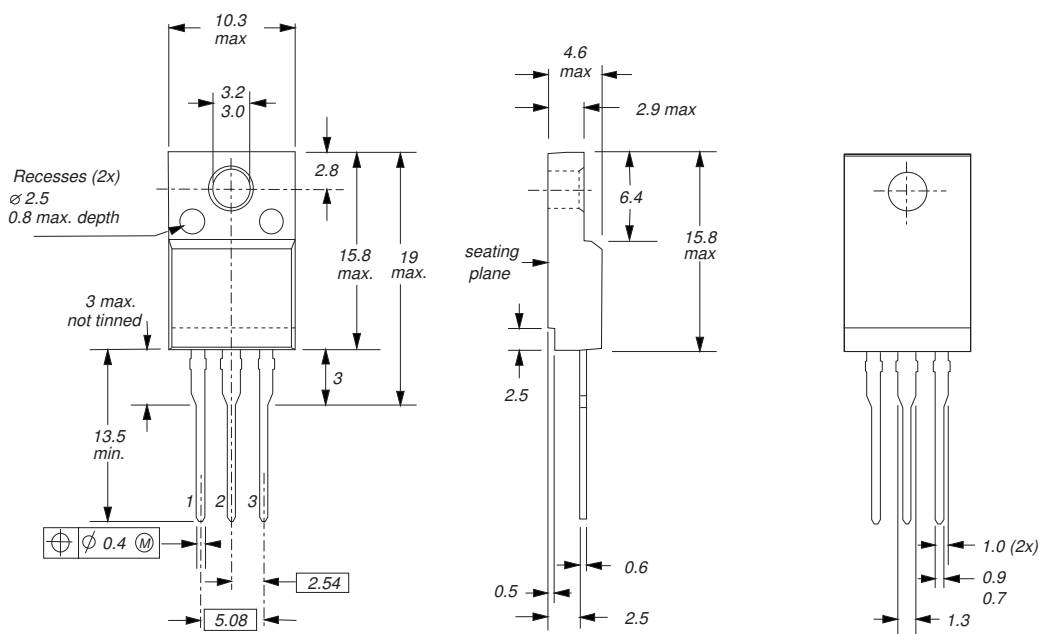


Fig. 13. SOT186A; The seating plane is electrically isolated from all terminals.

**Notes**

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

## Legal information

### DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION  |
|--------------------------------|-------------------------------|---|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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