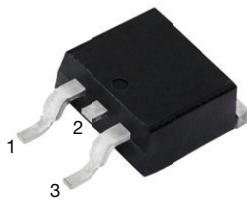
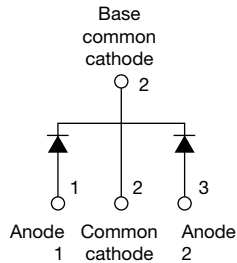
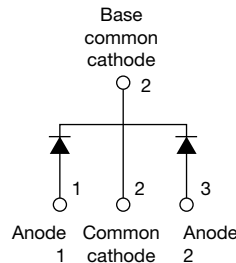


## Ultrafast Rectifier, 2 x 5 A FRED Pt<sup>®</sup>


**D<sup>2</sup>PAK (TO-263AB)**

**TO-262AA**

**VS-MURB1020CT-M3**

**VS-MURB1020CT-1-M3**

### FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction temperature
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

### DESCRIPTION / APPLICATIONS

MUR.. series are the state of the art ultrafast recovery rectifiers specifically designed with optimized performance of forward voltage drop and ultrafast recovery time.

The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

### PRIMARY CHARACTERISTICS

|                       |   |
|-----------------------|---|
| $I_{F(AV)}$           | 2 x 5 A                                 |
| $V_R$                 | 200 V                                   |
| $V_F$ at $I_F$        | 0.87 V                                  |
| $t_{rr}$              | 25 ns                                   |
| $T_J$ max.            | 175 °C                                  |
| Package               | D <sup>2</sup> PAK (TO-263AB), TO-262AA |
| Circuit configuration | Common cathode                          |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                   | SYMBOL         | TEST CONDITIONS                                   | MAX.        | UNITS |
|---|----------------|---|-------------|-------|
| Peak repetitive reverse voltage             | $V_{RRM}$      |   | 200         | V     |
| Average rectified forward current           | $I_{F(AV)}$    | per leg   | 5           | A     |
|   |                | total device                                      | 10          |       |
| Non-repetitive peak surge current per leg   | $I_{FSM}$      | Rated $V_R$ , $T_C = 149$ °C                      | 50          |       |
| Peak repetitive forward current per leg     | $I_{FM}$       | Rated $V_R$ , square wave, 20 kHz, $T_C = 149$ °C | 10          |       |
| Operating junction and storage temperatures | $T_J, T_{Stg}$ |   | -65 to +175 | °C    |

### ELECTRICAL SPECIFICATIONS ( $T_J = 25$ °C unless otherwise specified)

| PARAMETER                           | SYMBOL        | TEST CONDITIONS                              | MIN. | TYP. | MAX. | UNITS   |
|-------------------------------------|---------------|--|------|------|------|---------|
| Breakdown voltage, blocking voltage | $V_{BR}, V_R$ | $I_R = 100$ $\mu$ A                          | 200  | -    | -    | V       |
| Forward voltage                     | $V_F$         | $I_F = 5$ A, $T_J = 25$ °C                   | -    | 0.99 | 1.08 |         |
|                                     |               | $I_F = 5$ A, $T_J = 125$ °C                  | -    | 0.87 | 0.99 |         |
|                                     |               | $I_F = 10$ A, $T_J = 25$ °C                  | -    | 1.12 | 1.25 |         |
| Reverse leakage current             | $I_R$         | $V_R = V_R$ rated                            | -    | -    | 10   | $\mu$ A |
|                                     |               | $T_J = 150$ °C, $V_R = V_R$ rated            | -    | -    | 250  |         |
| Junction capacitance                | $C_T$         | $V_R = 200$ V                                | -    | 8    | -    | pF      |
| Series inductance                   | $L_S$         | Measured lead to lead 5 mm from package body | -    | 8.0  | -    | nH      |



| <b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified) |           |  |      |      |      |       |
|--|-----------|--|------|------|------|-------|
| PARAMETER  | SYMBOL    | TEST CONDITIONS  | MIN. | TYP. | MAX. | UNITS |
| Reverse recovery time  | $t_{rr}$  | $I_F = 1.0\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ | -    | -    | 35   | ns    |
|  |           | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{REC} = 0.25\text{ V}$          | -    | -    | 25   |       |
|  |           | $T_J = 25\text{ }^\circ\text{C}$   | -    | 24   | -    |       |
|  |           | $T_J = 125\text{ }^\circ\text{C}$  | -    | 35   | -    |       |
| Peak recovery current  | $I_{RRM}$ | $T_J = 25\text{ }^\circ\text{C}$   | -    | 3.3  | -    | A     |
|  |           | $T_J = 125\text{ }^\circ\text{C}$  | -    | 5.0  | -    |       |
| Reverse recovery charge  | $Q_{rr}$  | $T_J = 25\text{ }^\circ\text{C}$   | -    | 33   | -    | nC    |
|  |           | $T_J = 125\text{ }^\circ\text{C}$  | -    | 76   | -    |       |

| <b>THERMAL - MECHANICAL SPECIFICATIONS</b>      |                   |   |              |      |            |                           |
|---|-------------------|---|--------------|------|------------|---------------------------|
| PARAMETER                                       | SYMBOL            | TEST CONDITIONS                             | MIN.         | TYP. | MAX.       | UNITS                     |
| Maximum junction and storage temperature range  | $T_J$ , $T_{Stg}$ |   | -65          | -    | 175        | $^\circ\text{C}$          |
| Thermal resistance, junction to case per leg    | $R_{thJC}$        |   | -            | -    | 5          | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, junction to ambient per leg | $R_{thJA}$        |   | -            | -    | 50         |                           |
| Thermal resistance, case to heatsink            | $R_{thCS}$        | Mounting surface, flat, smooth, and greased | -            | 0.5  | -          |                           |
| Weight  |                   |   | -            | 2.0  | -          | g                         |
|   |                   |   | -            | 0.07 | -          | oz.                       |
| Mounting torque                                 |                   |   | 6.0<br>(5.0) | -    | 12<br>(10) | kgf · cm<br>(lbf · in)    |
| Marking device                                  |                   | Case style D <sup>2</sup> PAK (TO-263AB)    | MURB1020CT   |      |            |                           |
|   |                   | Case style TO-262                           | MURB1020CT-1 |      |            |                           |

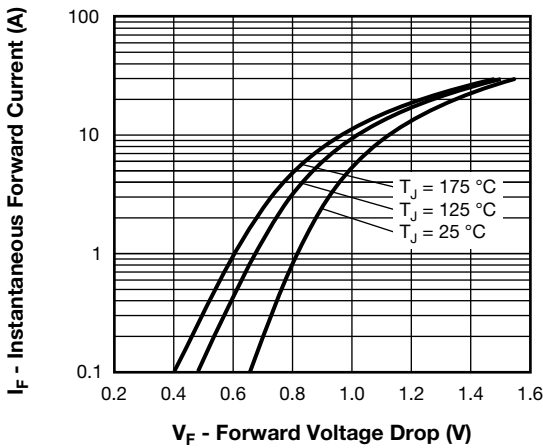


Fig. 1 - Typical Forward Voltage Drop Characteristics

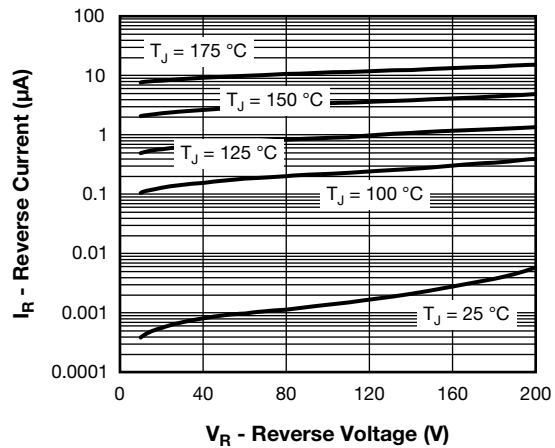


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

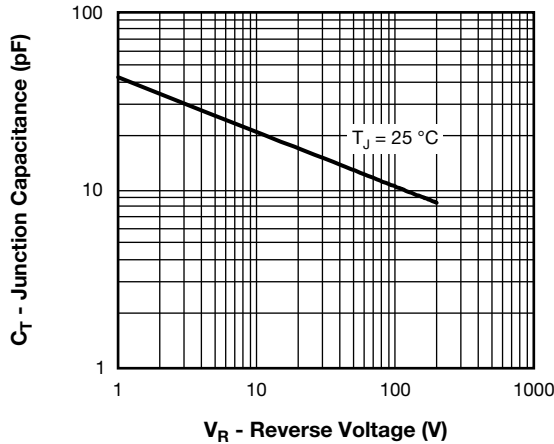


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

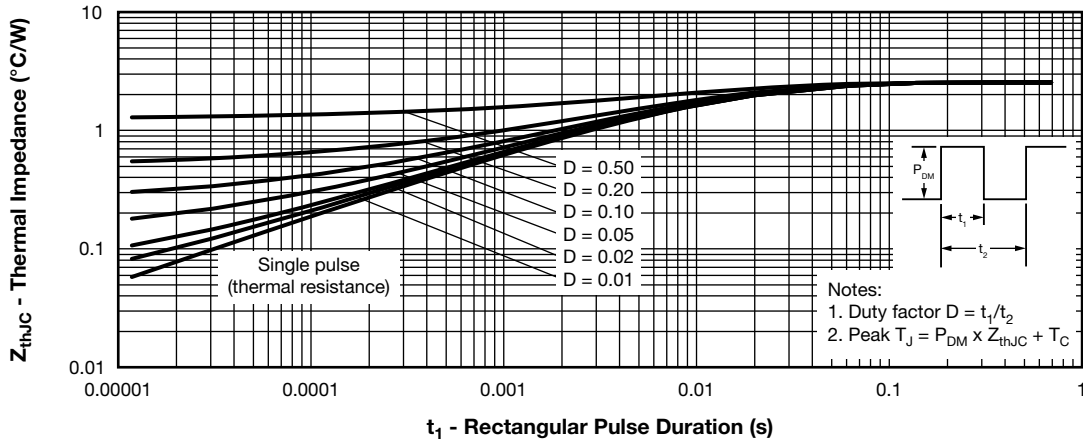


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

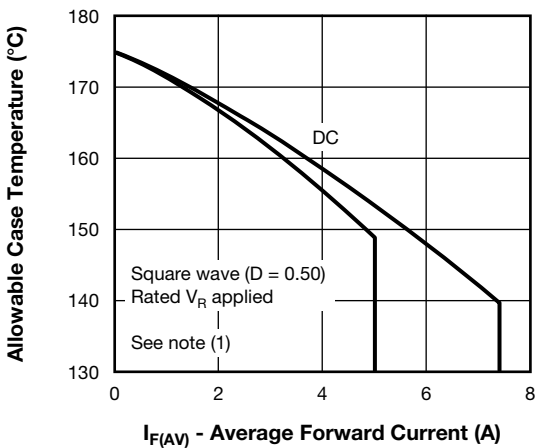


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

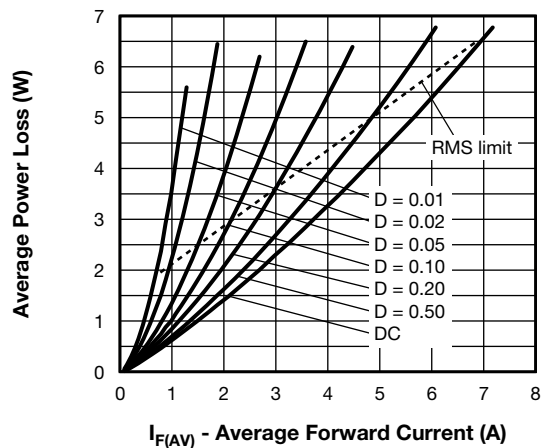


Fig. 6 - Forward Power Loss Characteristics

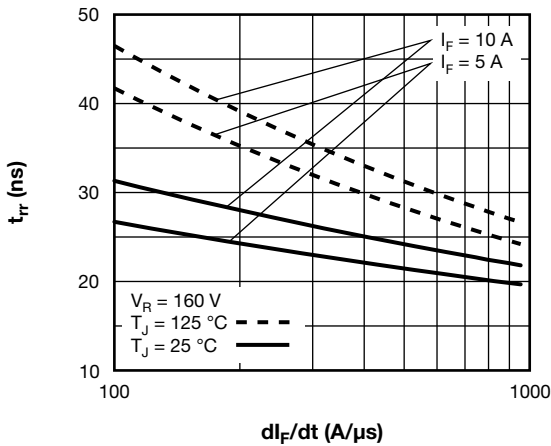


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

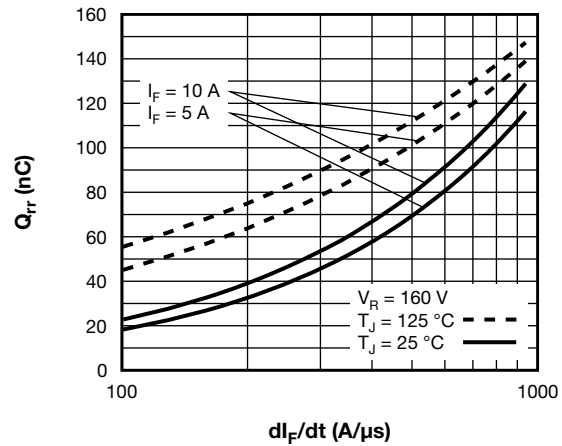


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

**Note**

- (1) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;
- $Pd$  = forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);
- $Pd_{REV}$  = inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = rated  $V_R$

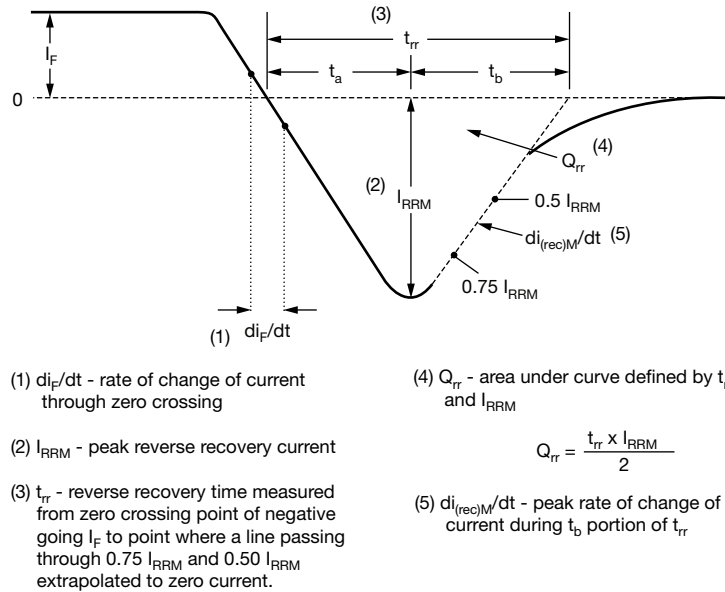
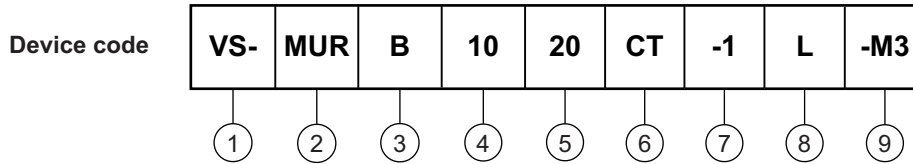


Fig. 9 - Reverse Recovery Waveform and Definitions



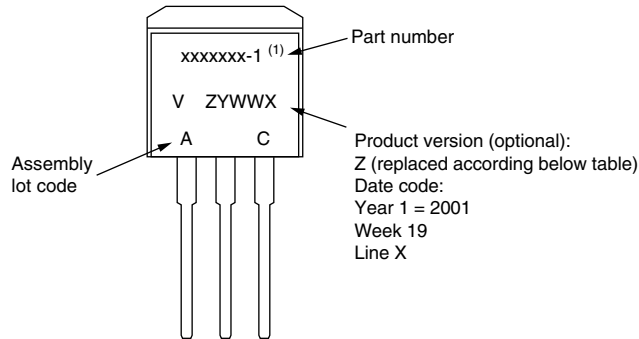
## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Ultrafast MUR series
- 3** - B = D<sup>2</sup>PAK (TO-263AB) / TO-262AA
- 4** - Current rating (10 = 10 A)
- 5** - Voltage rating (20 = 200 V)
- 6** - CT = center tap (dual)
- 7** -
  - None = D<sup>2</sup>PAK (TO-263AB)
  - -1 = TO-262AA
- 8** -
  - None = tube (50 pieces)
  - L = tape and reel (left oriented, for D<sup>2</sup>PAK (TO-263AB) package)
  - R = tape and reel (right oriented, for D<sup>2</sup>PAK (TO-263AB) package)
- 9** - Environmental digit:
  - M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

| LINKS TO RELATED DOCUMENTS |                               |  |
|----------------------------|-------------------------------|--|
| Dimensions                 | D <sup>2</sup> PAK (TO-263AB) | <a href="http://www.vishay.com/doc?96164">www.vishay.com/doc?96164</a> |
|                            | TO-262AA                      | <a href="http://www.vishay.com/doc?96165">www.vishay.com/doc?96165</a> |
| Part marking information   | D <sup>2</sup> PAK (TO-263AB) | <a href="http://www.vishay.com/doc?95444">www.vishay.com/doc?95444</a> |
|                            | TO-262AA                      | <a href="http://www.vishay.com/doc?95443">www.vishay.com/doc?95443</a> |
| Packaging information      | D <sup>2</sup> PAK (TO-263AB) | <a href="http://www.vishay.com/doc?96424">www.vishay.com/doc?96424</a> |

## TO-262



Example: This is a xxxxxx-1 <sup>(1)</sup> with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"

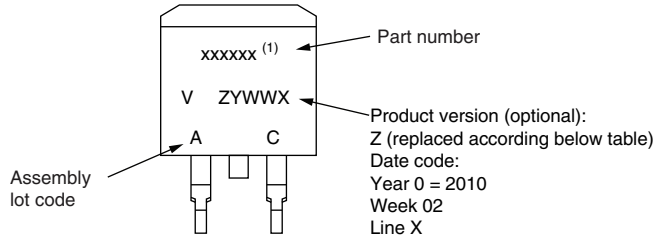
### Note

<sup>(1)</sup> If part number contain "H" as last digit, product is AEC-Q101 qualified

| ENVIRONMENTAL NAMING CODE (Z) | PRODUCT DEFINITION  |
|-------------------------------|---|
| A                             | Termination lead (Pb)-free                                  |
| B                             | Totally lead (Pb)-free                                      |
| E                             | RoHS-compliant and termination lead (Pb)-free               |
| F                             | RoHS-compliant and totally lead (Pb)-free                   |
| M                             | Halogen-free, RoHS-compliant and termination lead (Pb)-free |
| N                             | Halogen-free, RoHS-compliant and totally lead (Pb)-free     |
| G                             | Green   |



## D<sup>2</sup>PAK



Example: This is a xxxxxx <sup>(1)</sup> with assembly lot code AC, assembled on WW 02, 2010

### Note

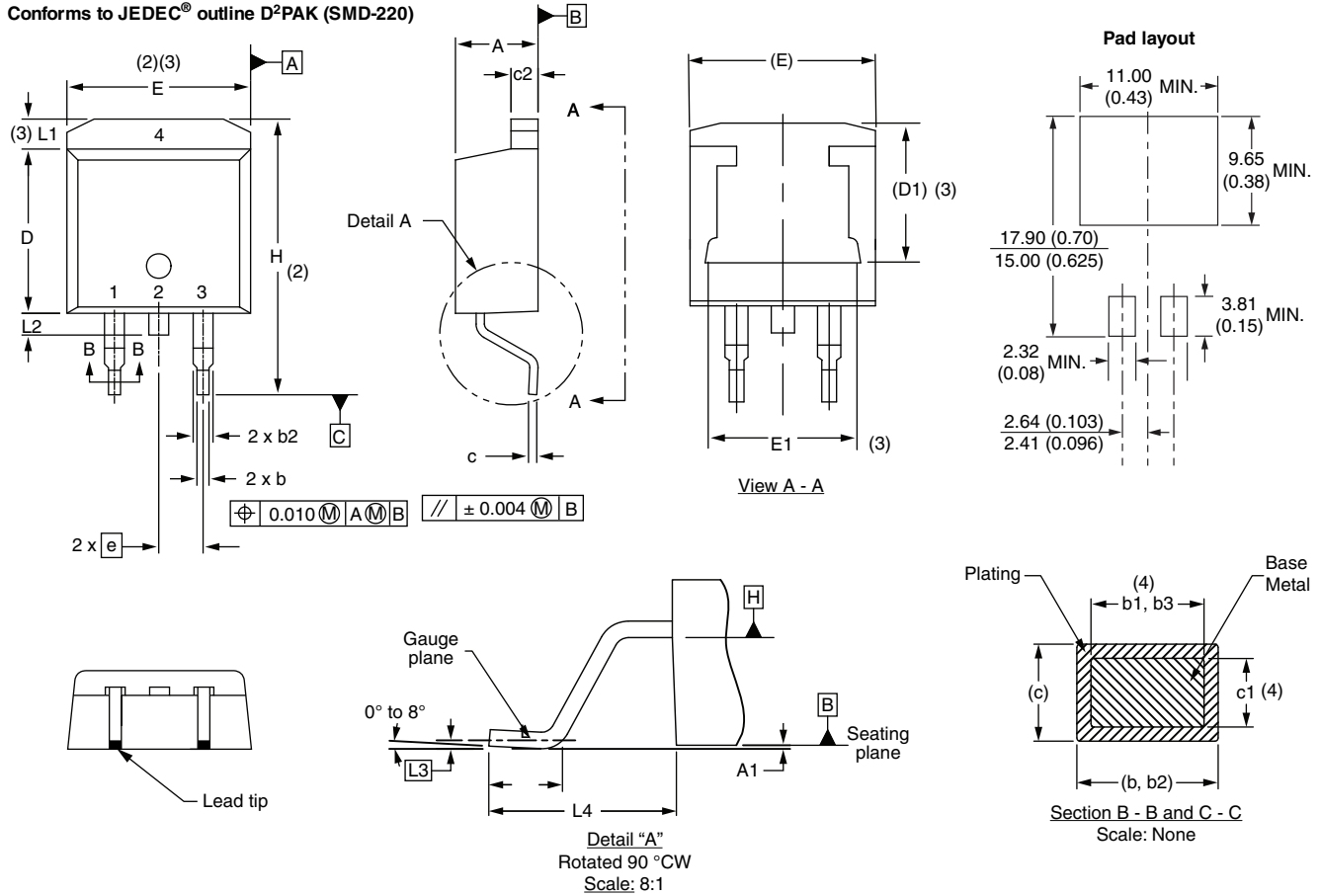
<sup>(1)</sup> If part number contain "H" as last digit, product is AEC-Q101 qualified

| ENVIRONMENTAL NAMING CODE (Z) | PRODUCT DEFINITION   |
|-------------------------------|--|
| A                             | Termination lead (Pb)-free                                   |
| B                             | Totally lead (Pb)-free                                       |
| E                             | RoHS-compliant and termination lead (Pb)-free                |
| F                             | RoHS-compliant and totally lead (Pb)-free                    |
| M                             | Halogen-free, RoHS-compliant, and termination lead (Pb)-free |
| N                             | Halogen-free, RoHS-compliant, and totally lead (Pb)-free     |
| G                             | Green  |

### D<sup>2</sup>PAK

**DIMENSIONS** in millimeters and inches

Conforms to JEDEC<sup>®</sup> outline D<sup>2</sup>PAK (SMD-220)



| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES | SYMBOL | MILLIMETERS |       | INCHES    |       | NOTES |
|--------|-------------|-------|--------|-------|-------|--------|-------------|-------|-----------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |        | MIN.        | MAX.  | MIN.      | MAX.  |       |
| A      | 4.06        | 4.83  | 0.160  | 0.190 |       | D1     | 6.86        | 8.00  | 0.270     | 0.315 | 3     |
| A1     | 0.00        | 0.254 | 0.000  | 0.010 |       | E      | 9.65        | 10.67 | 0.380     | 0.420 | 2, 3  |
| b      | 0.51        | 0.99  | 0.020  | 0.039 |       | E1     | 7.90        | 8.80  | 0.311     | 0.346 | 3     |
| b1     | 0.51        | 0.89  | 0.020  | 0.035 | 4     | e      | 2.54 BSC    |       | 0.100 BSC |       |       |
| b2     | 1.14        | 1.78  | 0.045  | 0.070 |       | H      | 14.61       | 15.88 | 0.575     | 0.625 |       |
| b3     | 1.14        | 1.73  | 0.045  | 0.068 | 4     | L      | 1.78        | 2.79  | 0.070     | 0.110 |       |
| c      | 0.38        | 0.74  | 0.015  | 0.029 |       | L1     | -           | 1.65  | -         | 0.066 | 3     |
| c1     | 0.38        | 0.58  | 0.015  | 0.023 | 4     | L2     | 1.27        | 1.78  | 0.050     | 0.070 |       |
| c2     | 1.14        | 1.65  | 0.045  | 0.065 |       | L3     | 0.25 BSC    |       | 0.010 BSC |       |       |
| D      | 8.51        | 9.65  | 0.335  | 0.380 | 2     | L4     | 4.78        | 5.28  | 0.188     | 0.208 |       |

**Notes**

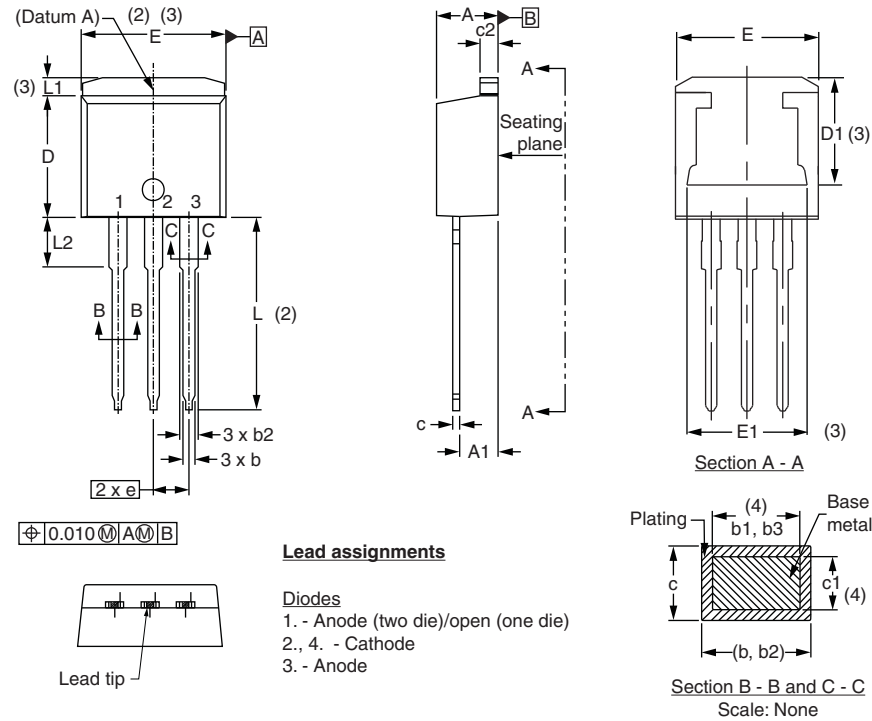
- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inches
- (7) Outline conforms to JEDEC<sup>®</sup> outline TO-263AB



## TO-262AA

**DIMENSIONS** in millimeters and inches

Modified JEDEC® outline TO-262



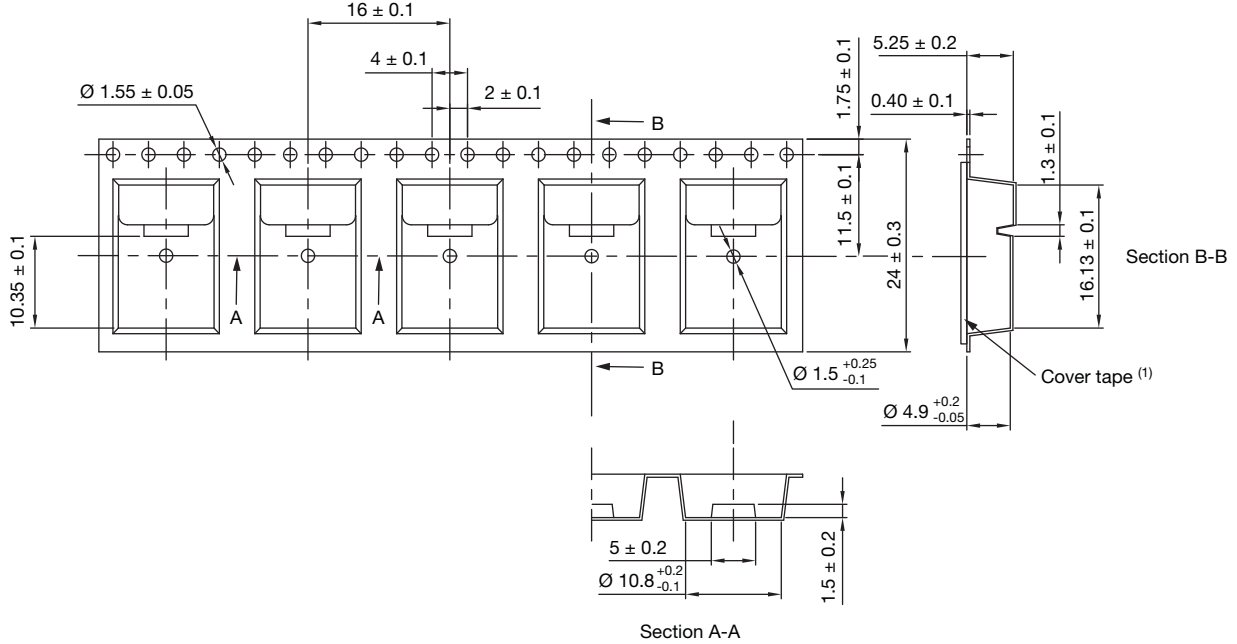
| SYMBOL | MILLIMETERS |       | INCHES    |       | NOTES |
|--------|-------------|-------|-----------|-------|-------|
|        | MIN.        | MAX.  | MIN.      | MAX.  |       |
| A      | 4.06        | 4.83  | 0.160     | 0.190 |       |
| A1     | 2.03        | 3.02  | 0.080     | 0.119 |       |
| b      | 0.51        | 0.99  | 0.020     | 0.039 |       |
| b1     | 0.51        | 0.89  | 0.020     | 0.035 | 4     |
| b2     | 1.14        | 1.78  | 0.045     | 0.070 |       |
| b3     | 1.14        | 1.73  | 0.045     | 0.068 | 4     |
| c      | 0.38        | 0.74  | 0.015     | 0.029 |       |
| c1     | 0.38        | 0.58  | 0.015     | 0.023 | 4     |
| c2     | 1.14        | 1.65  | 0.045     | 0.065 |       |
| D      | 8.51        | 9.65  | 0.335     | 0.380 | 2     |
| D1     | 6.86        | 8.00  | 0.270     | 0.315 | 3     |
| E      | 9.65        | 10.67 | 0.380     | 0.420 | 2, 3  |
| E1     | 7.90        | 8.80  | 0.311     | 0.346 | 3     |
| e      | 2.54 BSC    |       | 0.100 BSC |       |       |
| L      | 13.46       | 14.10 | 0.530     | 0.555 |       |
| L1     | -           | 1.65  | -         | 0.065 | 3     |
| L2     | 3.56        | 3.71  | 0.140     | 0.146 |       |

**Notes**

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Outline conform to JEDEC® TO-262 except A1 (max.), b (min., max.), b1 (min.), b2 (max.), c (min.), c1(min.), c2 (max.), D (min.), E (max.), L1 (max.), L2 (min., max.)

## D<sup>2</sup>PAK (TO-263AB)

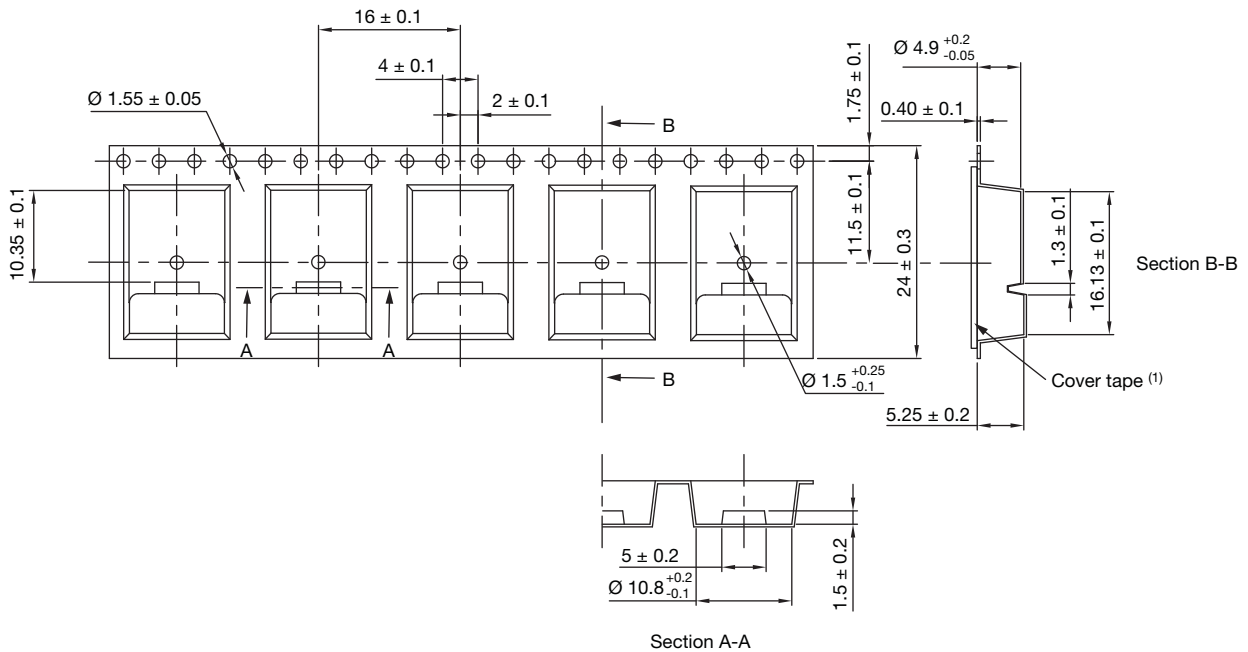
### CARRIER TAPE FOR TAPE AND REEL LEFT in millimeters



**Note**

(1) For dimensions, see next pages

### CARRIER TAPE FOR TAPE AND REEL RIGHT in millimeters

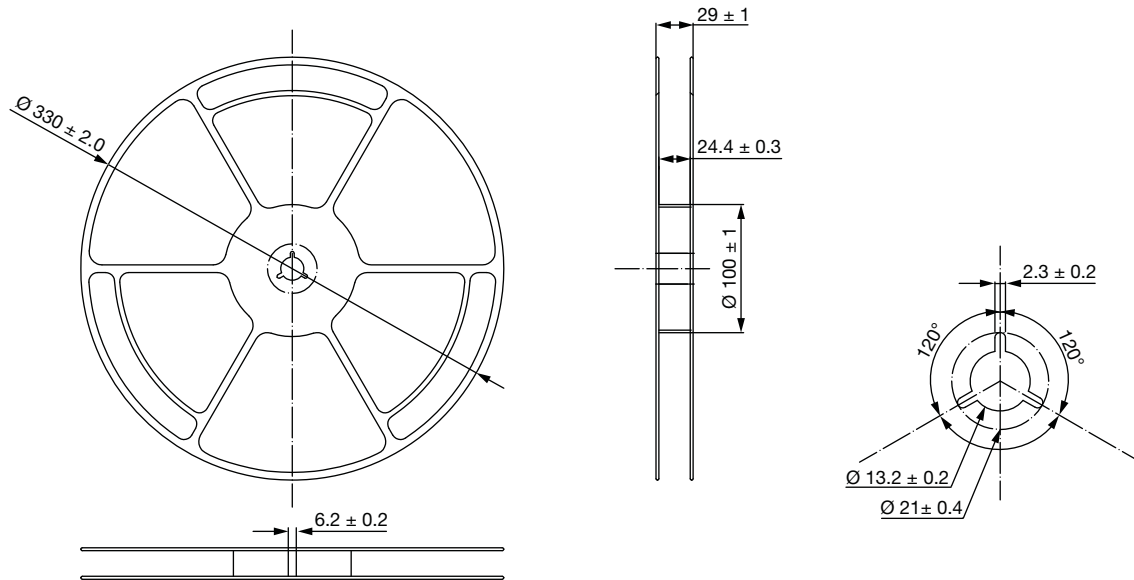


**Note**

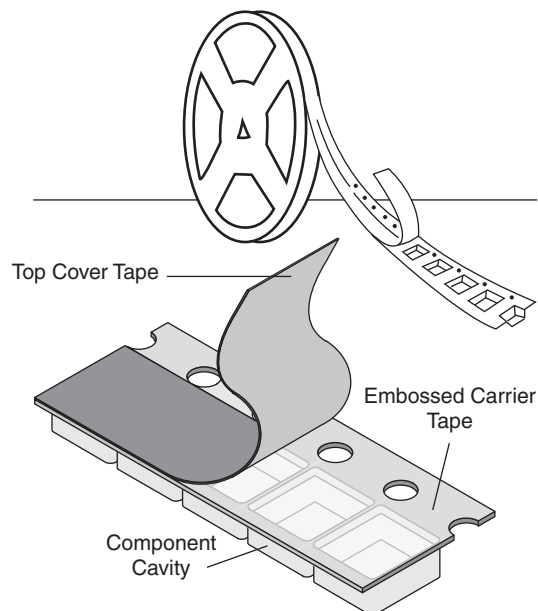
(1) For dimensions, see next pages



## REEL FOR CARRIER TAPE in millimeters

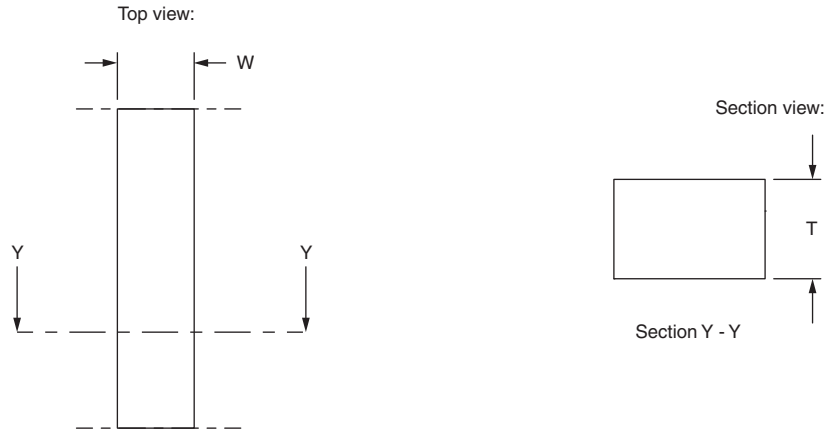


## CARRIER TAPE AND REEL PACKAGING D<sup>2</sup>PAK (TO-263AB)





### COVER TAPE FOR CARRIER TAPE in millimeters



| APPLICATION                      | COVER TAPE WIDTH<br>W | COVER TAPE THICKNESS<br>T | CARRIER TAPE WIDTH | MATERIAL                                 |
|----------------------------------|-----------------------|---------------------------|--------------------|--|
| D <sup>2</sup> PAK<br>(TO-263AB) | 21.3 ± 0.1            | 0.060 ± 0.01              | 24                 | Antistatic/treated/transparent/polyester |



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<http://moschip.ru/get-element>

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Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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