

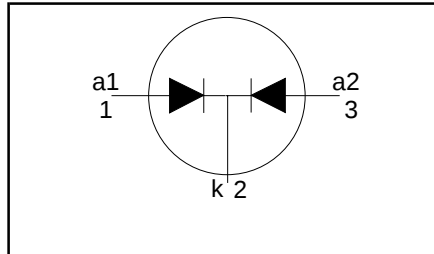
## Rectifier diodes ultrafast, rugged

## BYV32E, BYV32EB series

### FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

### SYMBOL



### QUICK REFERENCE DATA

$$V_R = 150 \text{ V} / 200 \text{ V}$$

$$V_F \leq 0.85 \text{ V}$$

$$I_{O(AV)} = 20 \text{ A}$$

$$I_{RRM} = 0.2 \text{ A}$$

$$t_{rr} \leq 25 \text{ ns}$$

### GENERAL DESCRIPTION

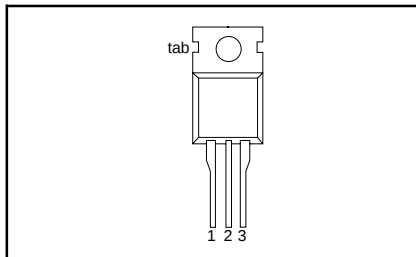
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV32E series is supplied in the SOT78 conventional leaded package.  
The BYV32EB series is supplied in the SOT404 surface mounting package.

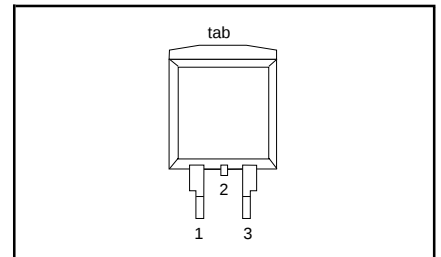
### PINNING

| PIN | DESCRIPTION              |
|-----|--------------------------|
| 1   | anode 1 (a)              |
| 2   | cathode (k) <sup>1</sup> |
| 3   | anode 2 (a)              |
| tab | cathode (k)              |

### SOT78 (TO220AB)



### SOT404



### LIMITING VALUES

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

| SYMBOL      | PARAMETER                                                 | CONDITIONS                                                                                                                                                                                                                                                                                                                                                                              | MIN. | MAX.        |             | UNIT               |
|-------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|-------------|--------------------|
| $V_{RRM}$   | Peak repetitive reverse voltage                           | BYV32E / BYV32EB<br><br>square wave; $\delta = 0.5$ ;<br>$T_{mb} \leq 115\text{ }^{\circ}\text{C}$<br>$t = 25\text{ }\mu\text{s}$ ; $\delta = 0.5$ ;<br>$T_{mb} \leq 115\text{ }^{\circ}\text{C}$<br>$t = 10\text{ ms}$<br>$t = 8.3\text{ ms}$<br>sinusoidal; with reapplied<br>$V_{RWM(max)}$<br>$t_p = 2\text{ }\mu\text{s}$ ; $\delta = 0.001$<br><br>$t_p = 100\text{ }\mu\text{s}$ | -    | -150<br>150 | -200<br>200 | V                  |
| $V_{RWM}$   | Crest working reverse voltage                             |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 150         | 200         | V                  |
| $V_R$       | Continuous reverse voltage                                |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 150         | 200         | V                  |
| $I_{O(AV)}$ | Average rectified output current (both diodes conducting) |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 20          |             | A                  |
| $I_{FRM}$   | Repetitive peak forward current per diode                 |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 20          |             | A                  |
| $I_{FSM}$   | Non-repetitive peak forward current per diode             |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 125         |             | A                  |
|             |                                                           |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 137         |             | A                  |
| $I_{RRM}$   | Repetitive peak reverse current per diode                 |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 0.2         |             | A                  |
| $I_{RSM}$   | Non-repetitive peak reverse current per diode             |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 0.2         |             | A                  |
| $T_{stg}$   | Storage temperature                                       |                                                                                                                                                                                                                                                                                                                                                                                         | -40  | 150         |             | $^{\circ}\text{C}$ |
| $T_j$       | Operating junction temperature                            |                                                                                                                                                                                                                                                                                                                                                                                         | -    | 150         |             | $^{\circ}\text{C}$ |

1 It is not possible to make connection to pin 2 of the SOT404 package

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### ESD LIMITING VALUE

| SYMBOL | PARAMETER                                 | CONDITIONS                                                            | MIN. | MAX. | UNIT |
|--------|-------------------------------------------|-----------------------------------------------------------------------|------|------|------|
| $V_C$  | Electrostatic discharge capacitor voltage | Human body model;<br>$C = 250 \text{ pF}$ ; $R = 1.5 \text{ k}\Omega$ | -    | 8    | kV   |

### THERMAL RESISTANCES

| SYMBOL                | PARAMETER                                    | CONDITIONS                                                            | MIN. | TYP. | MAX. | UNIT |
|-----------------------|----------------------------------------------|-----------------------------------------------------------------------|------|------|------|------|
| $R_{th \text{ j-mb}}$ | Thermal resistance junction to mounting base | per diode                                                             | -    | -    | 2.4  | K/W  |
| $R_{th \text{ j-a}}$  | Thermal resistance junction to ambient       | both diodes                                                           | -    | -    | 1.6  | K/W  |
|                       |                                              | SOT78 package, in free air                                            | -    | 60   | -    | K/W  |
|                       |                                              | SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board | -    | 50   | -    | K/W  |

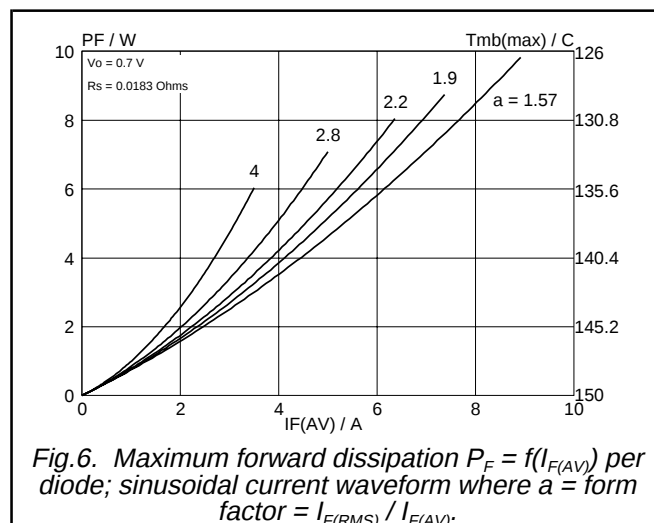
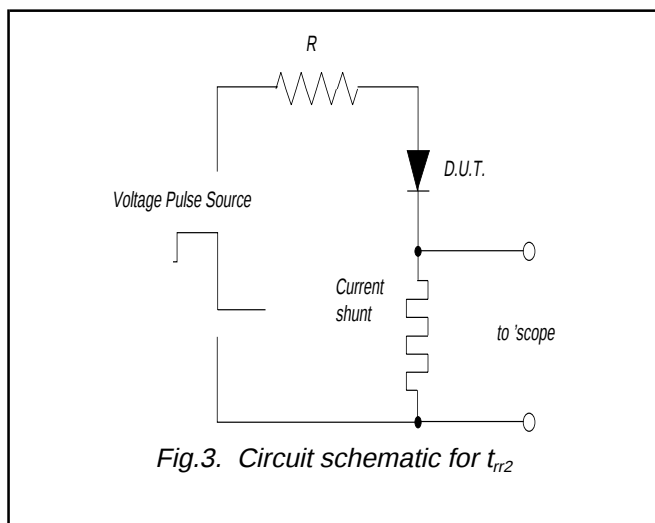
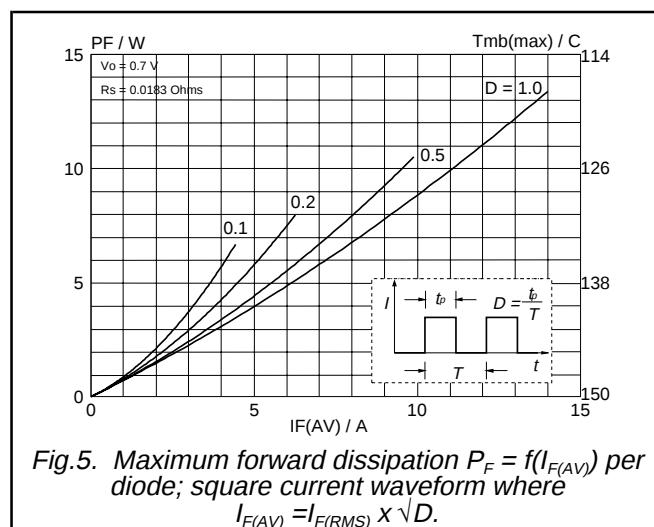
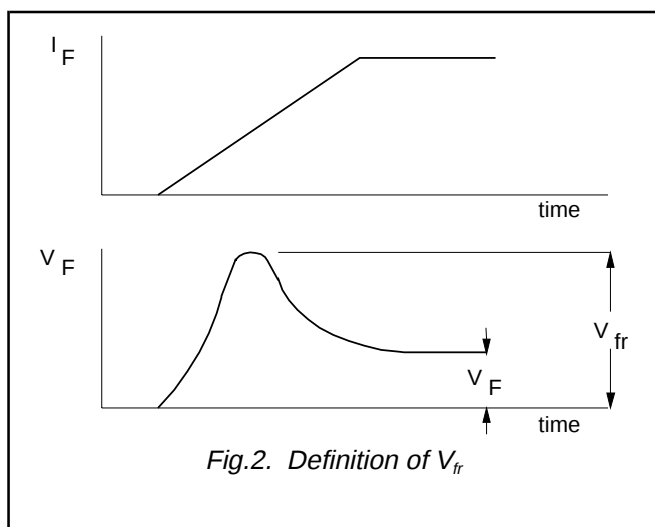
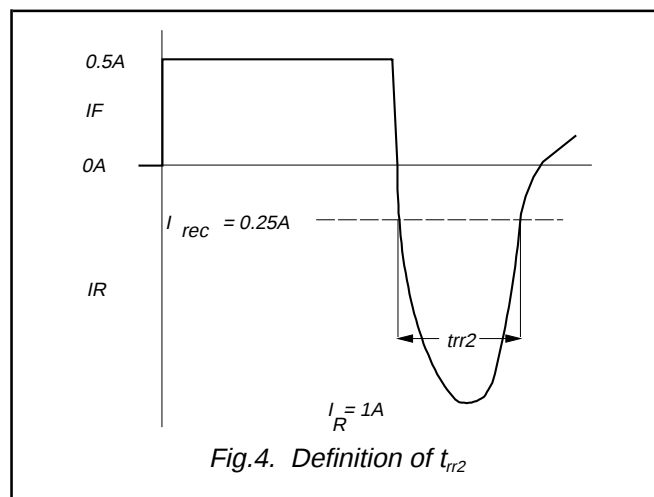
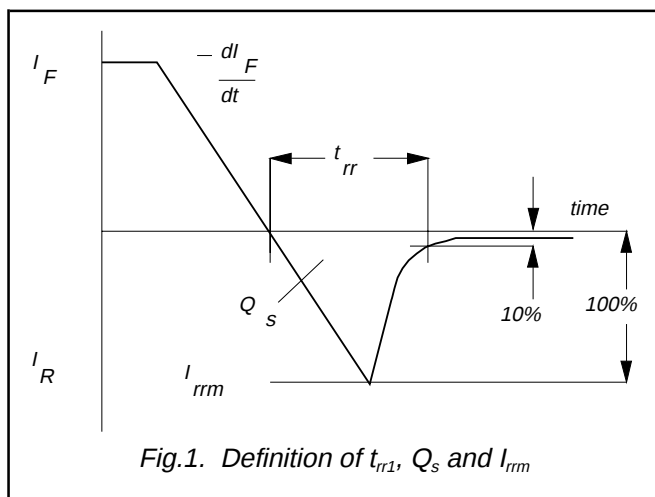
### ELECTRICAL CHARACTERISTICS

characteristics are per diode at  $T_j = 25^\circ\text{C}$  unless otherwise stated

| SYMBOL    | PARAMETER                | CONDITIONS                                                                                | MIN. | TYP. | MAX. | UNIT          |
|-----------|--------------------------|-------------------------------------------------------------------------------------------|------|------|------|---------------|
| $V_F$     | Forward voltage          | $I_F = 8 \text{ A}$ ; $T_j = 150^\circ\text{C}$                                           | -    | 0.72 | 0.85 | V             |
|           |                          | $I_F = 20 \text{ A}$                                                                      | -    | 1.00 | 1.15 | V             |
| $I_R$     | Reverse current          | $V_R = V_{RWM}$ ; $T_j = 100^\circ\text{C}$                                               | -    | 0.2  | 0.6  | mA            |
|           |                          | $V_R = V_{RWM}$                                                                           | -    | 6    | 30   | $\mu\text{A}$ |
| $Q_s$     | Reverse recovery charge  | $I_F = 2 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 20 \text{ A}/\mu\text{s}$     | -    | 8    | 12.5 | nC            |
| $t_{rr1}$ | Reverse recovery time    | $I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ;<br>$-di_F/dt = 100 \text{ A}/\mu\text{s}$ | -    | 20   | 25   | ns            |
| $t_{rr2}$ | Reverse recovery time    | $I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$ ; $I_{rec} = 0.25 \text{ A}$                 | -    | 10   | 20   | ns            |
| $V_{fr}$  | Forward recovery voltage | $I_F = 1 \text{ A}$ ; $di_F/dt = 10 \text{ A}/\mu\text{s}$                                | -    | 1    | -    | V             |

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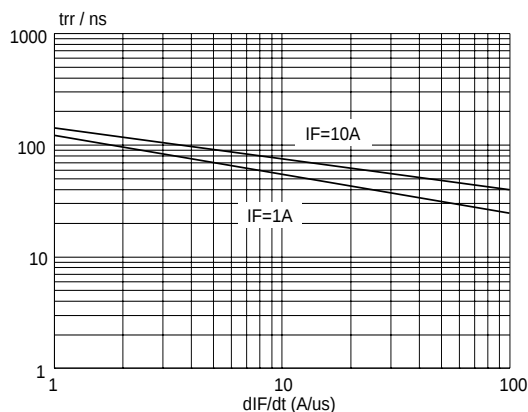


Fig.7. Maximum  $t_{rr}$  at  $T_j = 25^\circ C$ ; per diode

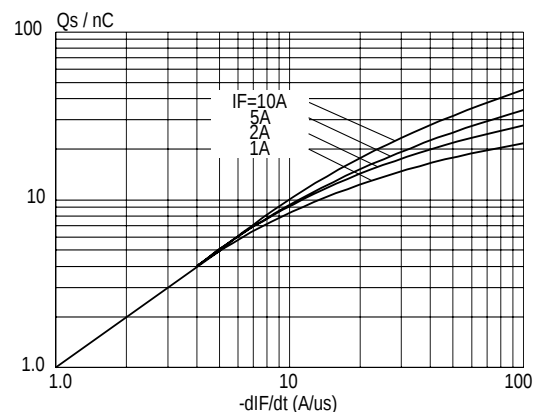


Fig.10. Maximum  $Q_s$  at  $T_j = 25^\circ C$ ; per diode

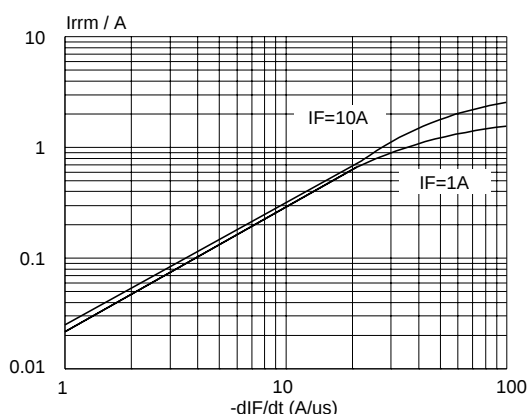


Fig.8. Maximum  $I_{rrm}$  at  $T_j = 25^\circ C$ ; per diode

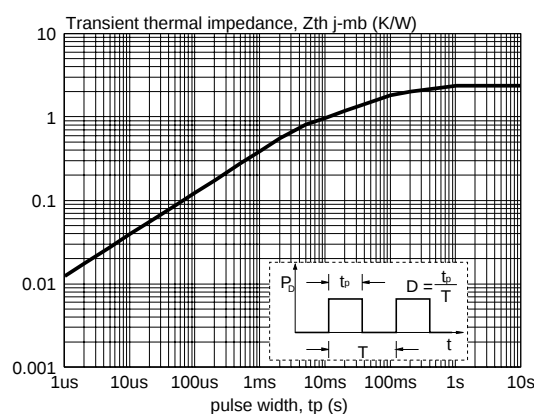


Fig.11. Transient thermal impedance; per diode;  
 $Z_{th j-mb} = f(t_p)$ .

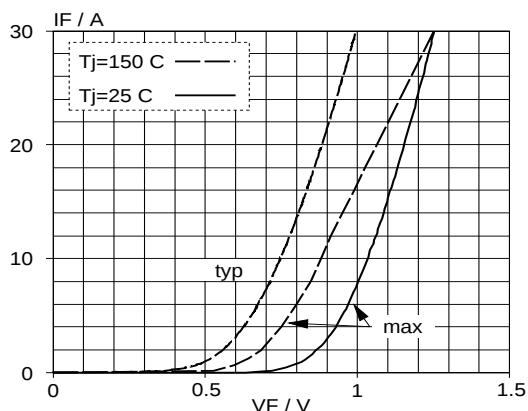


Fig.9. Typical and maximum forward characteristic per diode;  $I_F = f(V_F)$ ; parameter  $T_j$

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## MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

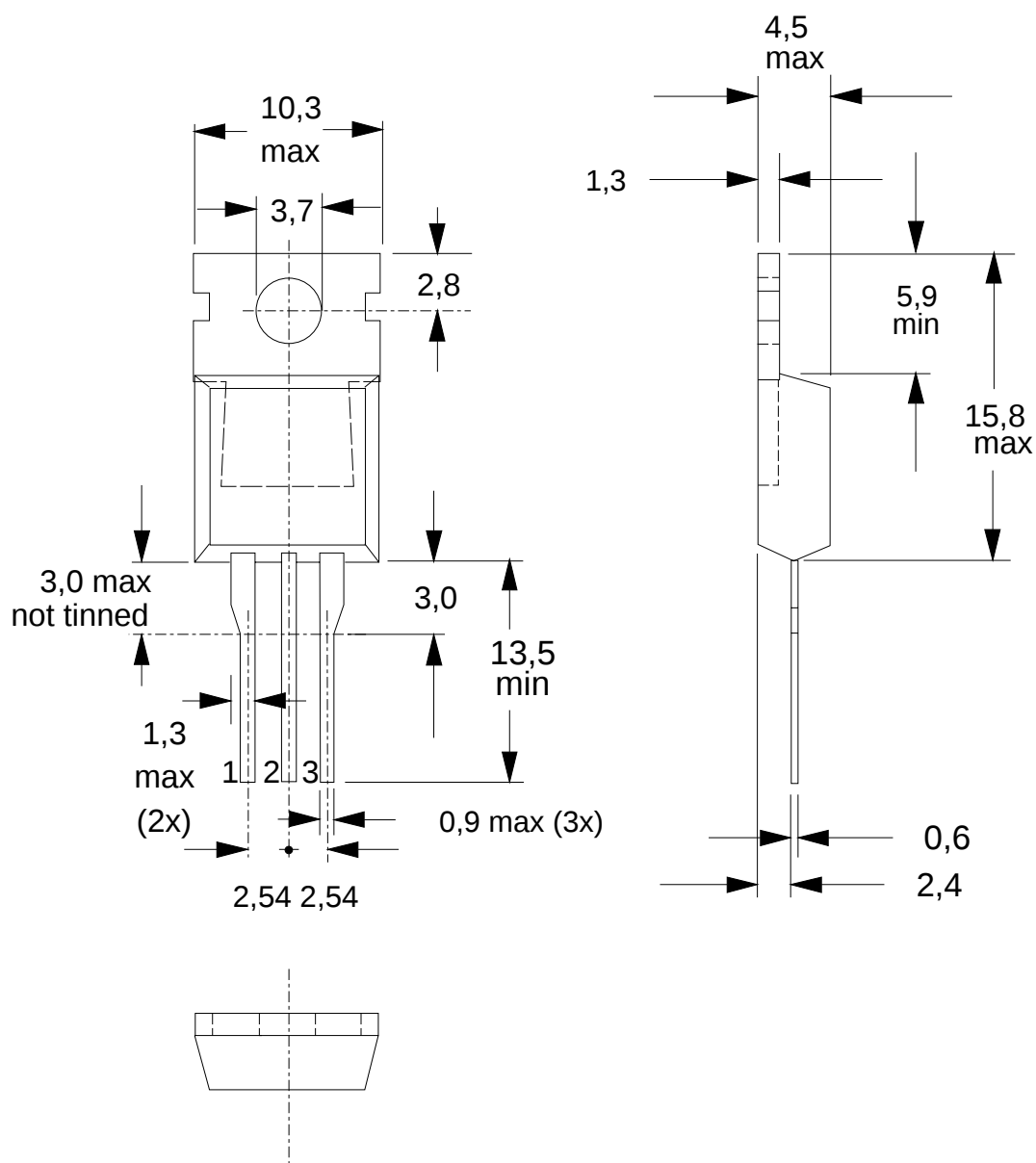


Fig.12. SOT78 (TO220AB); pin 2 connected to mounting base.

## Notes

1. Refer to mounting instructions for SOT78 (TO220) envelopes.
2. Epoxy meets UL94 V0 at 1/8".

# Rectifier diodes ultrafast, rugged

## BYV32E, BYV32EB series

### MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

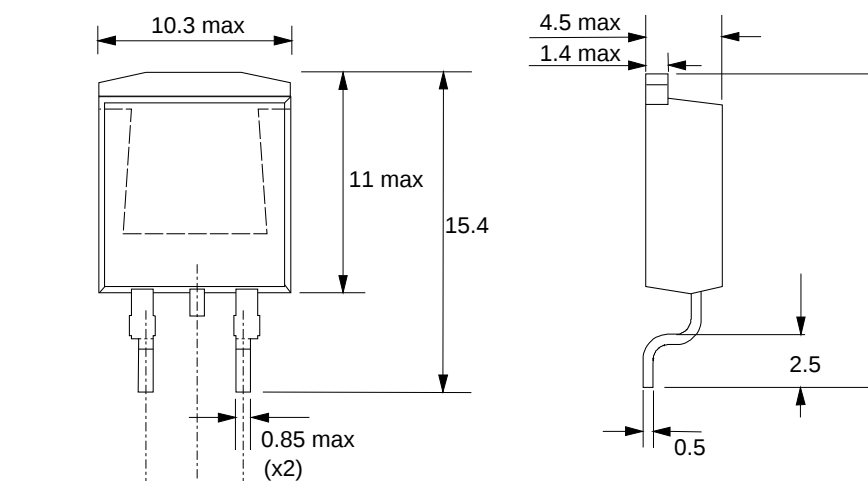


Fig.13. SOT404 : centre pin connected to mounting base.

### MOUNTING INSTRUCTIONS

Dimensions in mm

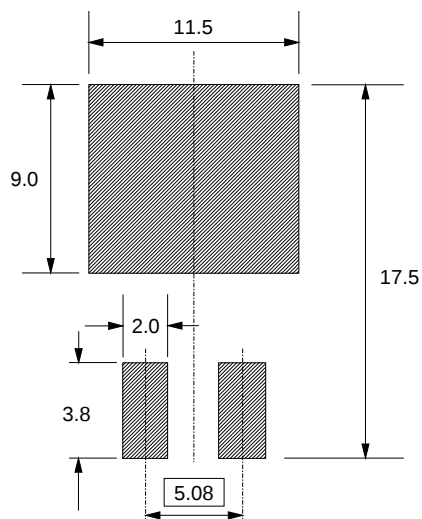


Fig.14. SOT404 : soldering pattern for surface mounting.

#### Notes

1. Epoxy meets UL94 V0 at 1/8".

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### DEFINITIONS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Data sheet status</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                       |
| Objective specification                                                                                                                                                                                                                                                                                                                                                                                                                                    | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification                                                                                                                                                                                                                                                                                                                                                                                                                                  | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification                                                                                                                                                                                                                                                                                                                                                                                                                                      | This data sheet contains final product specifications.                                |
| <b>Limiting values</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                       |
| Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability. |                                                                                       |
| <b>Application information</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                       |
| Where application information is given, it is advisory and does not form part of the specification.                                                                                                                                                                                                                                                                                                                                                        |                                                                                       |
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