

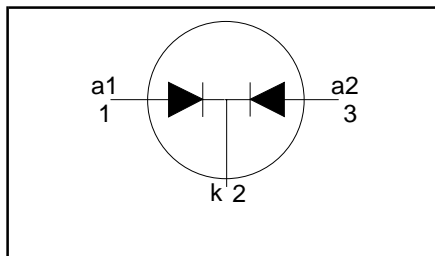
## Rectifier diodes ultrafast, rugged

## BYQ28E, BYQ28EB, BYQ28ED 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

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

$$V_F \leq 0.895 \text{ V}$$

$$I_{O(AV)} = 10 \text{ A}$$

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

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

### GENERAL DESCRIPTION

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

The BYQ28E series is supplied in the SOT78 conventional leaded package.

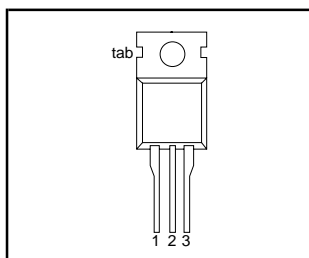
The BYQ28EB series is supplied in the SOT404 surface mounting package.

The BYQ28ED series is supplied in the SOT428 surface mounting package.

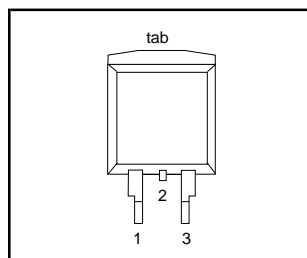
### PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode <sup>1</sup>
3	anode 2
tab	cathode

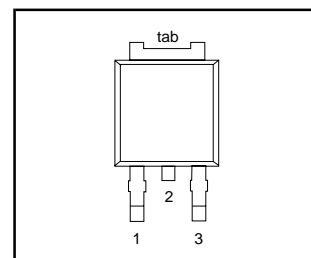
#### SOT78 (TO220AB)



#### SOT404



#### SOT428



### 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	BYQ28E/ BYQ28EB/ BYQ28ED	-	-150 150	-200 200	V
$V_{RWM}$	Working peak reverse voltage		-	150	200	V
$V_R$	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$ ; $T_{mb} \leq 119^\circ\text{C}$	-	10		A
$I_{FRM}$	Repetitive peak forward current per diode	square wave; $\delta = 0.5$ ; $T_{mb} \leq 119^\circ\text{C}$	-	10		A
$I_{FSM}$	Non-repetitive peak forward current per diode	$t = 10 \text{ ms}$	-	50		A
		$t = 8.3 \text{ ms}$	-	55		A
$I_{RRM}$	Peak repetitive reverse surge current per diode	sinusoidal; with reapplied $V_{RRM(max)}$ $t_p = 2 \mu\text{s}$ ; $\delta = 0.001$	-	0.2		A
$I_{RSM}$	Peak non-repetitive reverse surge current per diode	$t_p = 100 \mu\text{s}$	-	0.2		A
$T_j$	Operating junction temperature		-	150		$^\circ\text{C}$
$T_{stg}$	Storage temperature		- 40	150		$^\circ\text{C}$

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

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### ESD LIMITING VALUE

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

### THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th \text{ j-mb}}$	Thermal resistance junction to mounting base	per diode	-	-	4.5	K/W
$R_{th \text{ j-a}}$	Thermal resistance junction to ambient	both diodes	-	-	3	K/W
		SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

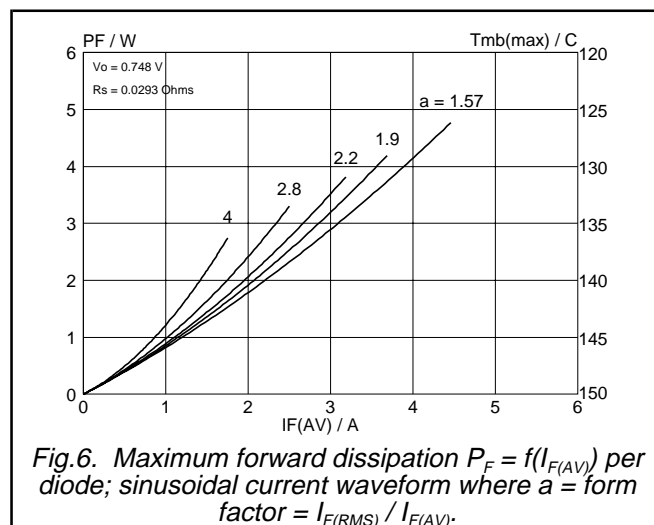
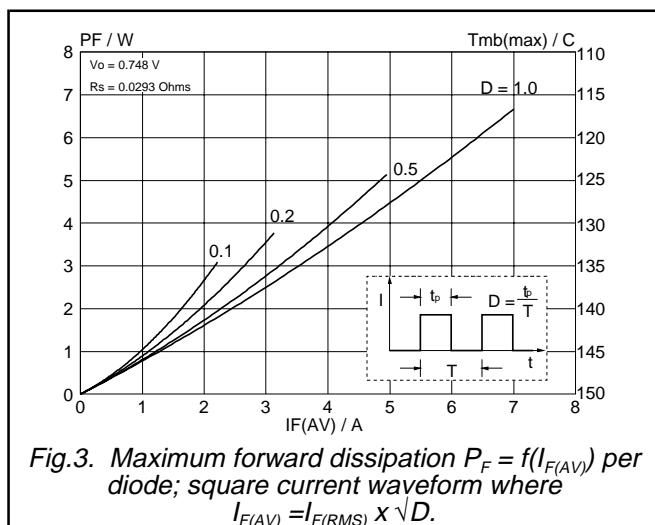
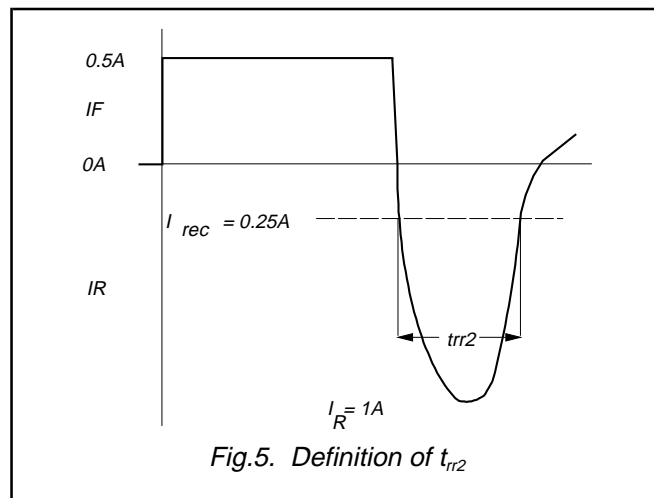
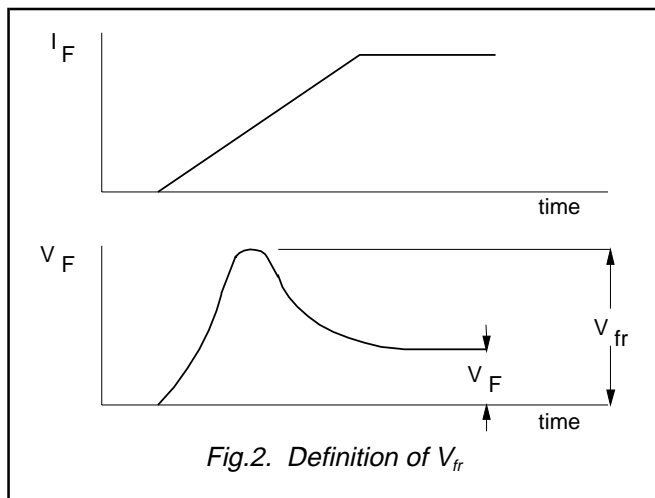
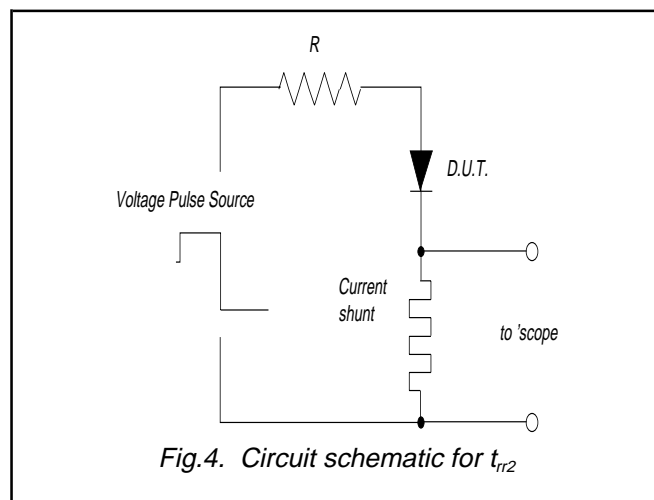
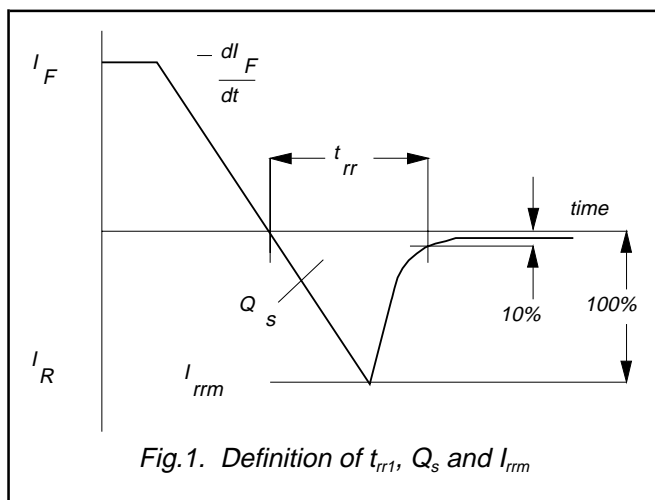
### ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_F$	Forward voltage	$I_F = 5 \text{ A}$ ; $T_j = 150^\circ\text{C}$	-	0.8	0.895	V
		$I_F = 5 \text{ A}$	-	0.95	1.1	V
		$I_F = 10 \text{ A}$	-	1.1	1.25	V
$I_R$	Reverse current	$V_R = V_{RWM}$	-	2	10	$\mu\text{A}$
		$V_R = V_{RWM}$ ; $T_j = 100^\circ\text{C}$	-	0.1	0.2	mA
$Q_{rr}$	Reverse recovered charge	$I_F = 2 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-dI_F/dt = 20 \text{ A}/\mu\text{s}$	-	4	9	nC
$t_{rr1}$	Reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-dI_F/dt = 100 \text{ A}/\mu\text{s}$	-	15	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
$I_{rrm}$	Peak reverse recovery current	$I_F = 5 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-dI_F/dt = 50 \text{ A}/\mu\text{s}$	-	0.5	0.7	A
$V_{fr}$	Forward recovery voltage	$I_F = 1 \text{ A}$ ; $dI_F/dt = 10 \text{ A}/\mu\text{s}$	-	1	-	V

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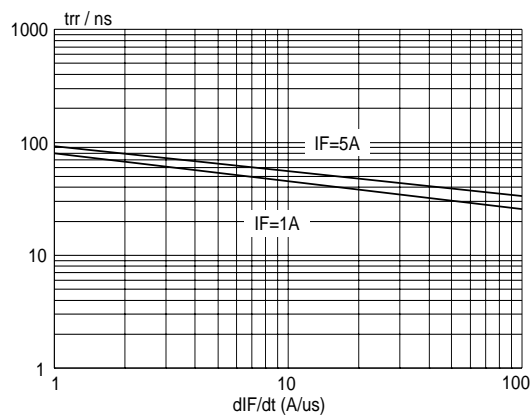


Fig.7. Maximum  $t_{rr}$  at  $T_j = 25\text{ }^{\circ}\text{C}$ ; per diode

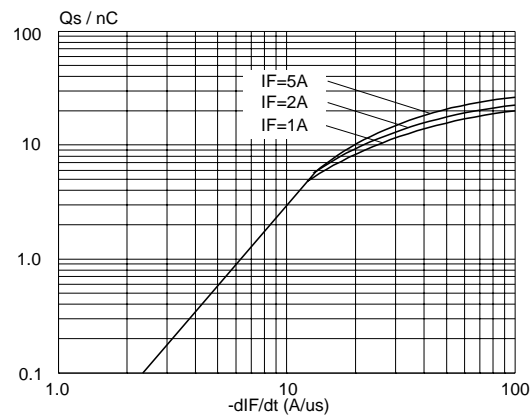


Fig.10. Maximum  $Q_s$  at  $T_j = 25\text{ }^{\circ}\text{C}$ ; per diode

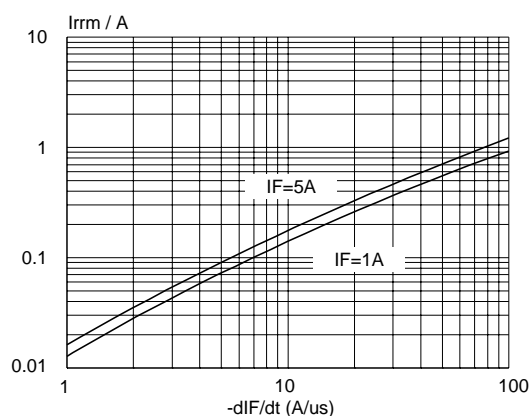


Fig.8. Maximum  $I_{rrm}$  at  $T_j = 25\text{ }^{\circ}\text{C}$ ; per diode

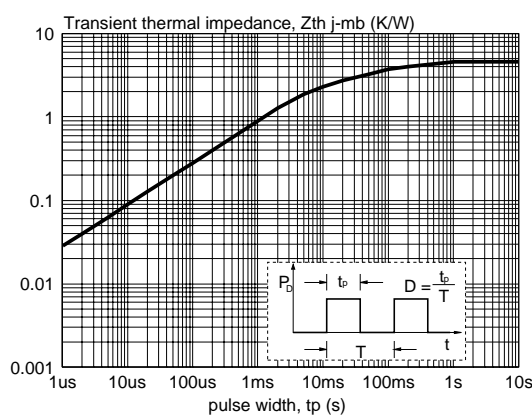


Fig.11. Transient thermal impedance; per diode;  
 $Z_{th\ j-mb} = f(t_p)$ .

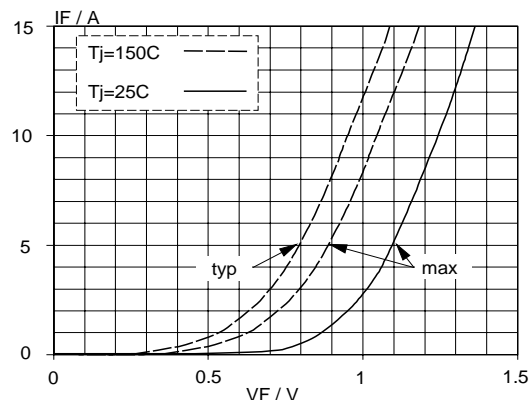


Fig.9. Typical and maximum forward characteristic  
 $I_F = f(V_F)$ ; parameter  $T_j$

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### MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

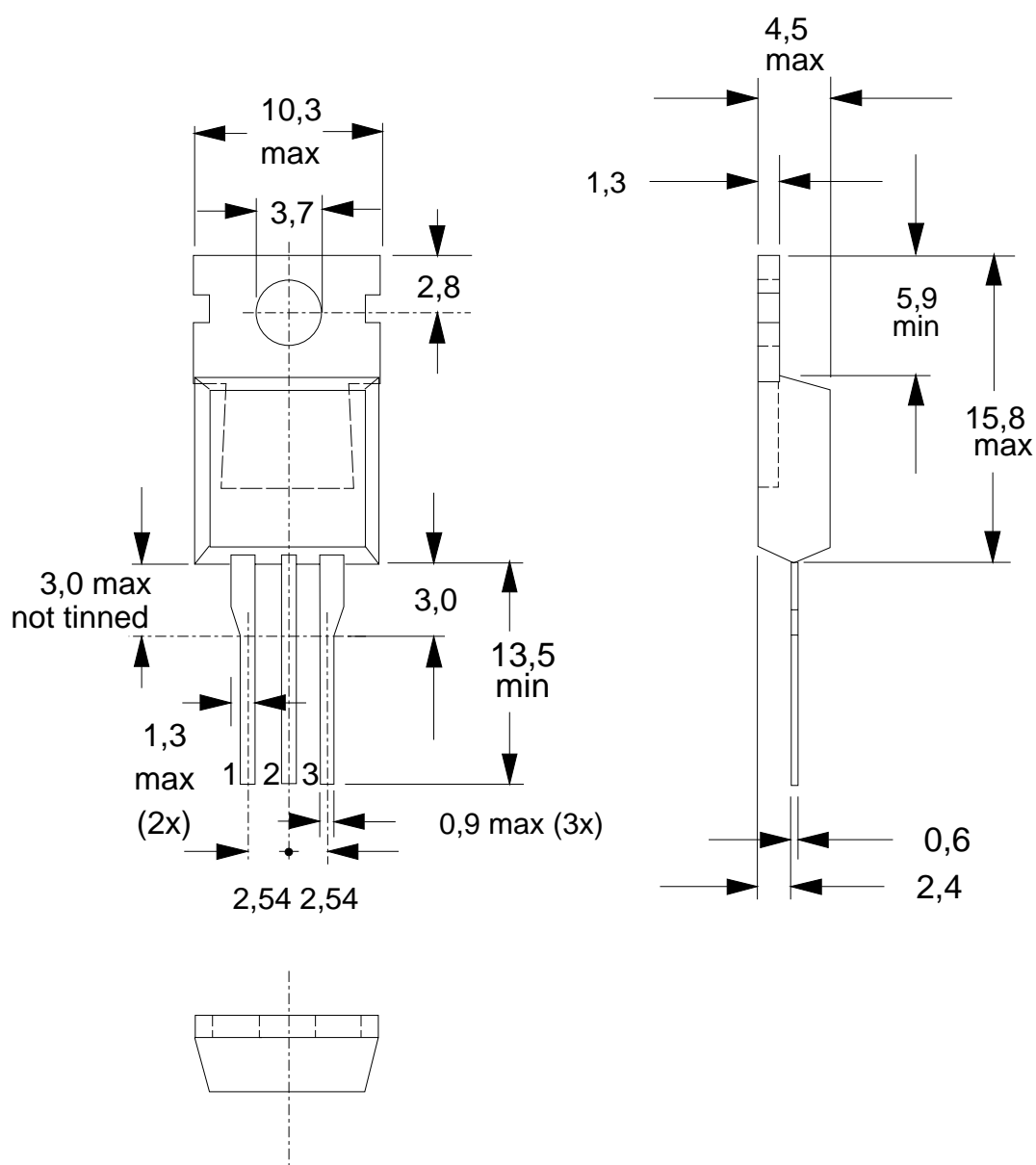


Fig.12. SOT78 (TO220AB); pin 2 connected to mounting base.

#### Notes

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

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### MECHANICAL DATA

Dimensions in mm

Net Mass: 1.4 g

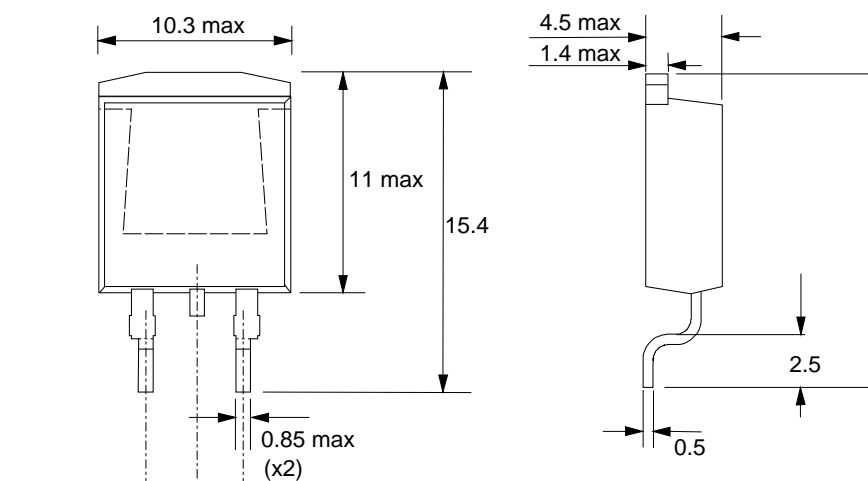


Fig.13. SOT404 : centre pin connected to mounting base.

### MOUNTING INSTRUCTIONS

Dimensions in mm

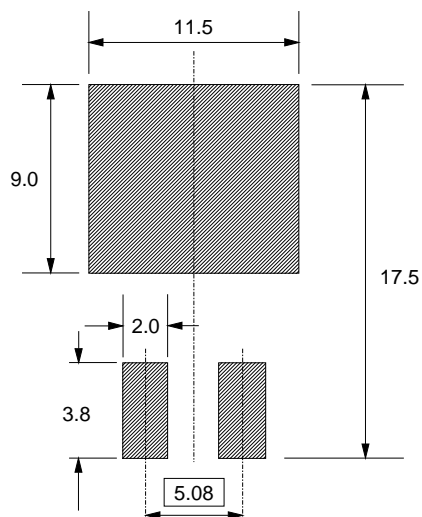


Fig.14. SOT404 : soldering pattern for surface mounting.

#### Notes

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

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### MECHANICAL DATA

Dimensions in mm

Net Mass: 1.1 g

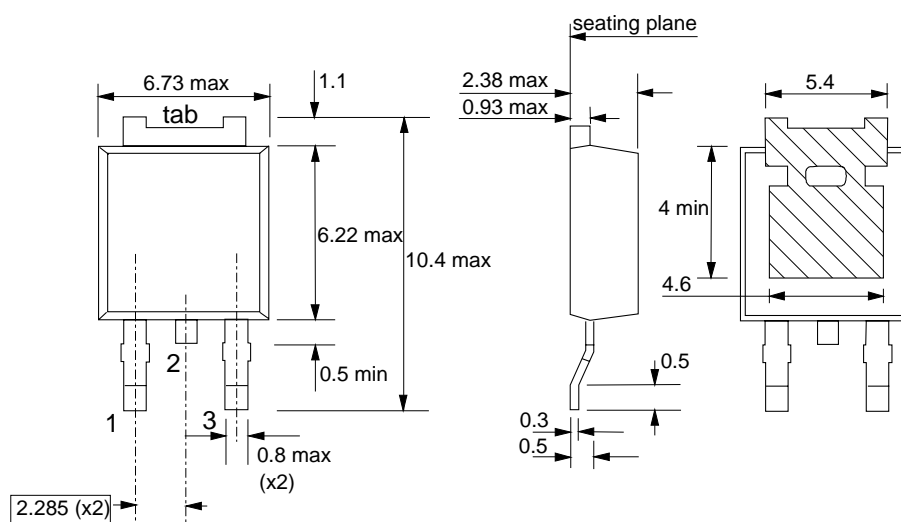


Fig.15. SOT428 : centre pin connected to tab.

### MOUNTING INSTRUCTIONS

Dimensions in mm

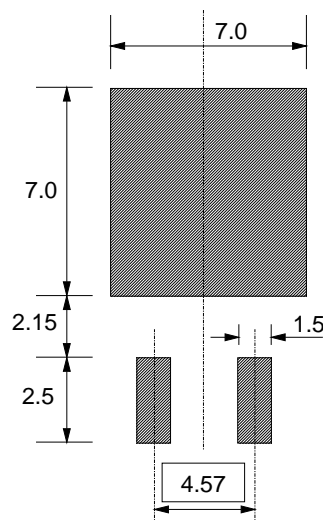


Fig.16. SOT428 : minimum pad sizes for surface mounting.

#### Notes

1. Plastic 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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