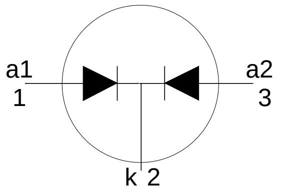
Rectifier diodes ultrafast, rugged

BYV32F, BYV32EX series

FEATURES

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

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.85$ V

$I_{O(AV)}$ = 12 A

I_{RRM} = 0.2 A

$t_{rr} \leq 25$ ns

GENERAL DESCRIPTION

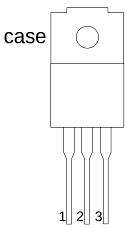
Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV32F series is supplied in the SOT186 package.
The BYV32EX series is supplied in the SOT186A package.

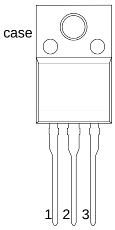
PINNING

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
tab	isolated

SOT186



SOT186A



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYV32F / BYV32EX		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	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)[1]	square wave δ = 0.5; $T_{hs} \leq 95$ ˚C	-	12		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; δ = 0.5; $T_{hs} \leq 95$ ˚C	-	20		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	125		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	137		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; δ = 0.001	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

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[1] Neglecting switching and reverse current losses

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚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	SOT186A package; f = 50-60 Hz; sinusoidal waveform; R.H. $\leq$ 65%; clean and dustfree	-		2500	V
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	SOT186 package; R.H. $\leq$ 65%; clean and dustfree	-		1500	V
C_{isol}	Capacitance from pin 2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink (per diode)	with heatsink compound	-	-	5.0	K/W
		without heatsink compound	-	-	7.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics are per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 8 A; T_j = 150˚C	-	0.72	0.85	V
		I_F = 20 A	-	1.00	1.15	V
I_R	Reverse current	$V_R = V_{RWM}$; T_j = 100 ˚C	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	6	30	µA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; -dI_F/dt = 20 A/µs	-	8	12.5	nC
t_{rr1}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 100 A/µs	-	20	25	ns
t_{rr2}	Reverse recovery time	I_F = 0.5 A to I_R = 1 A; I_{rec} = 0.25 A	-	10	20	ns
I_{rrm}	Peak reverse recovery current	I_F = 1 A; $V_R \geq$ 30 V; -dI_F/dt = 50 A/µs; T_j = 100˚C	-	1.5	2	A
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	1	-	V

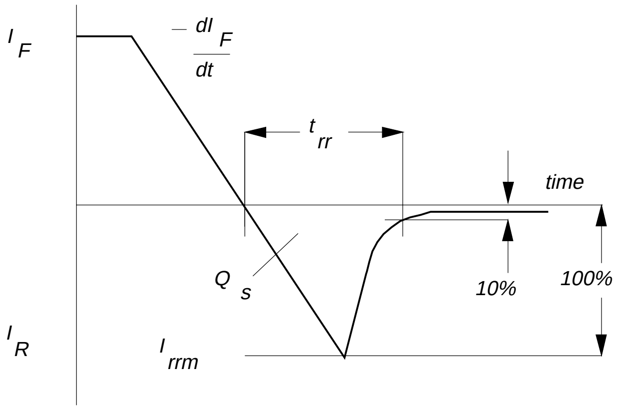

Fig.1. Definition of t_{rr1}, Q_s and I_{rrm}

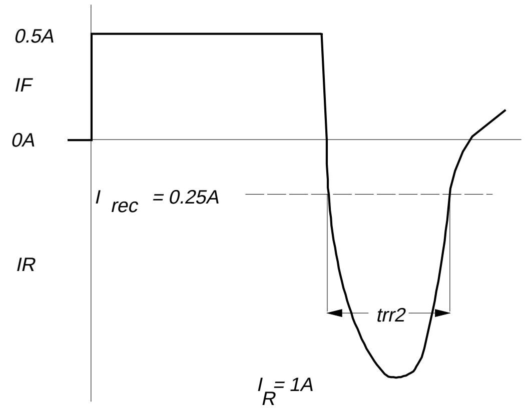

Fig.4. Definition of t_{rr2}

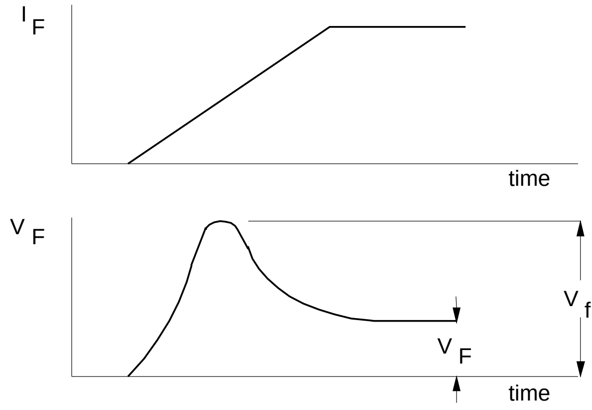

Fig.2. Definition of V_{fr}

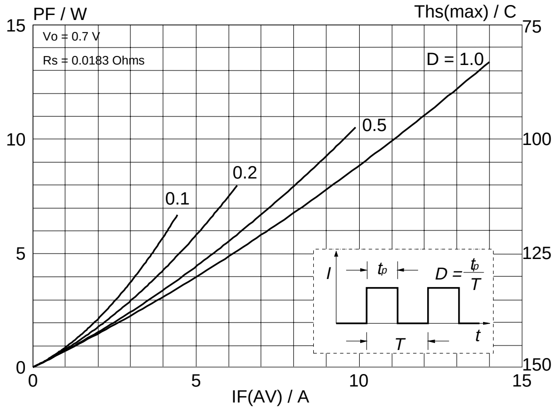

Fig.5. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)}$ x $\sqrt{D}$.

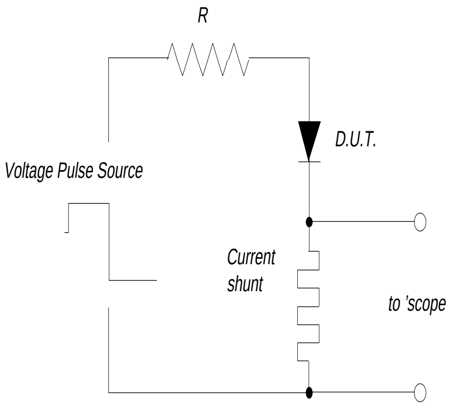

Fig.3. Circuit schematic for t_{rr2}

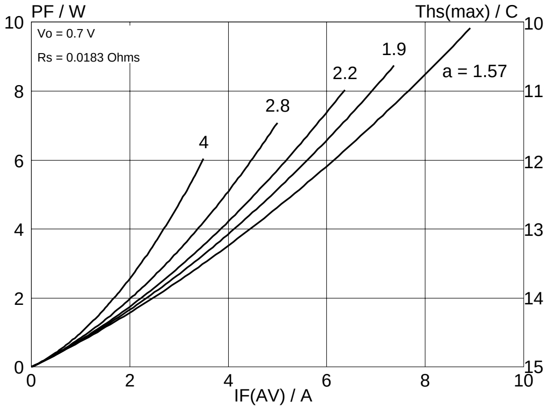

Fig.6. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)}$ / $I_{F(AV)}$.

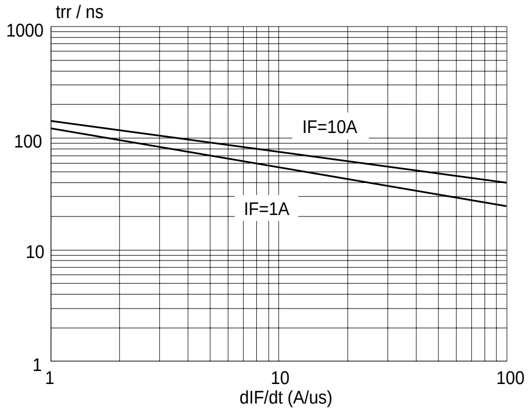

Fig.7. Maximum t_{rr} at T_j = 25 ˚C; per diode

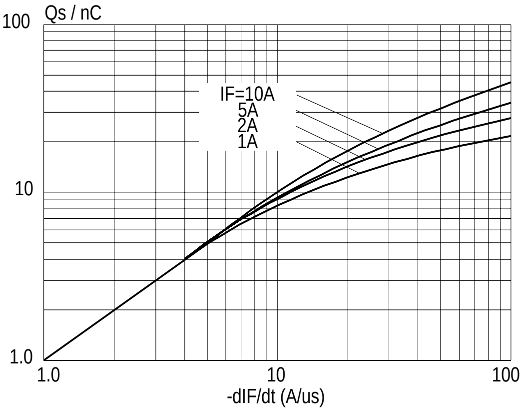

Fig.10. Maximum Q_s at T_j = 25 ˚C; per diode

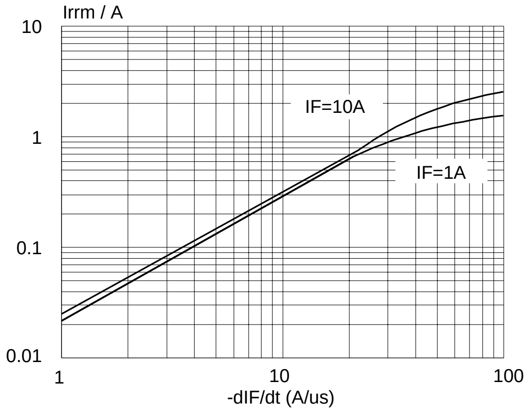

Fig.8. Maximum I_{rrm} at T_j = 25 ˚C; per diode

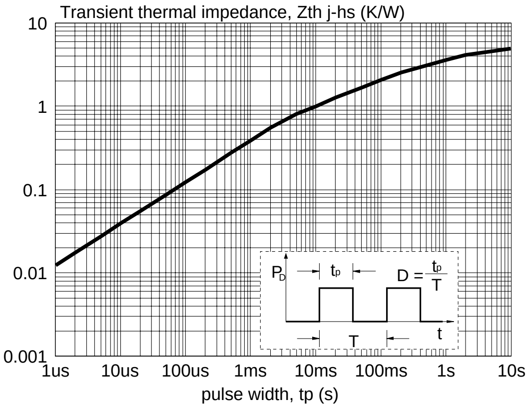

Fig.11. Transient thermal impedance; per diode; $Z_{th\ j\text{-}hs} = f(t_p)$.

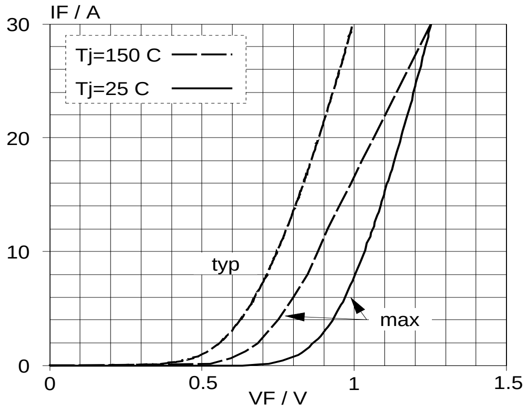

Fig.9. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

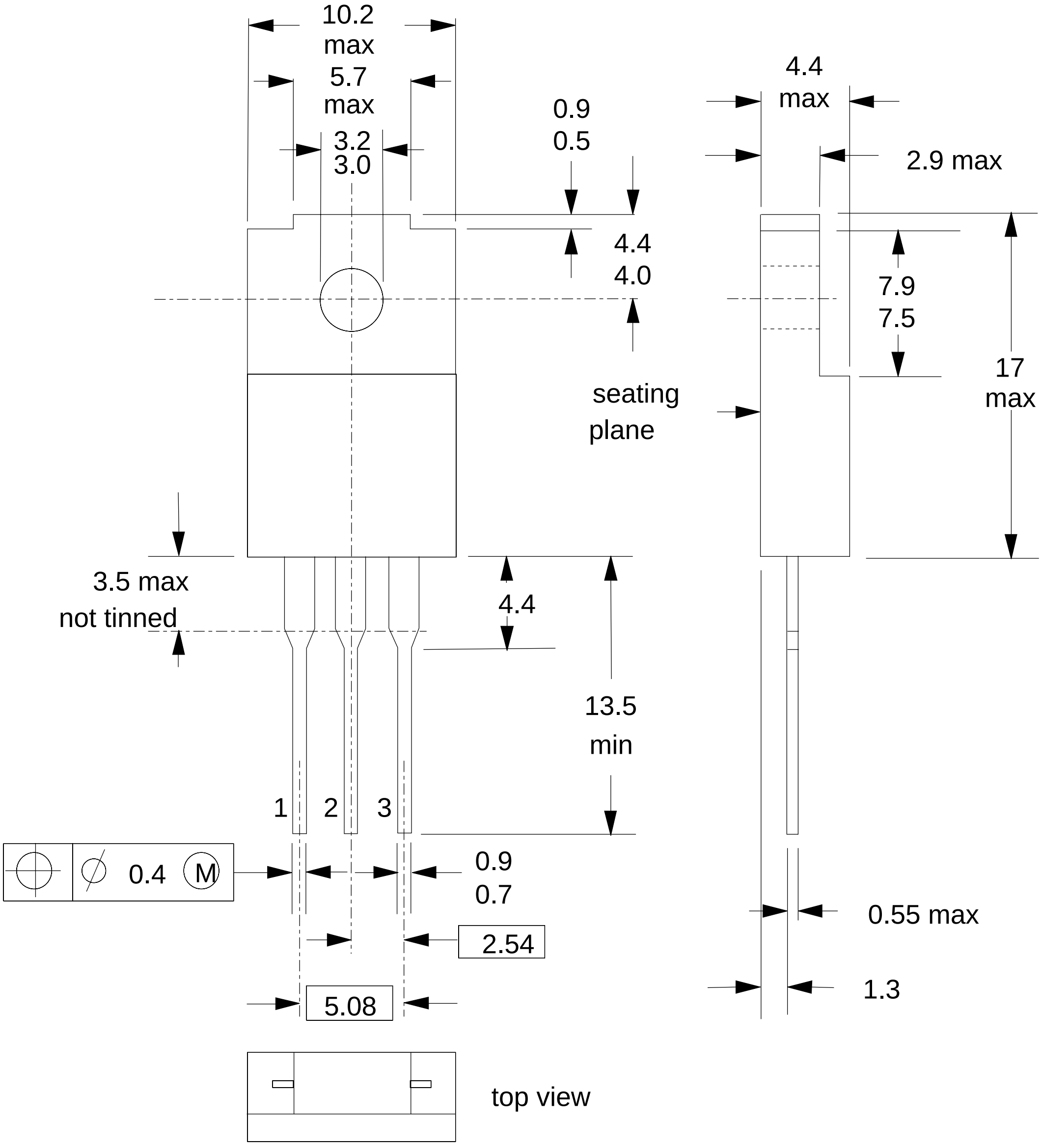

Fig.12. SOT186; The seating plane is electrically isolated from all terminals.

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

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

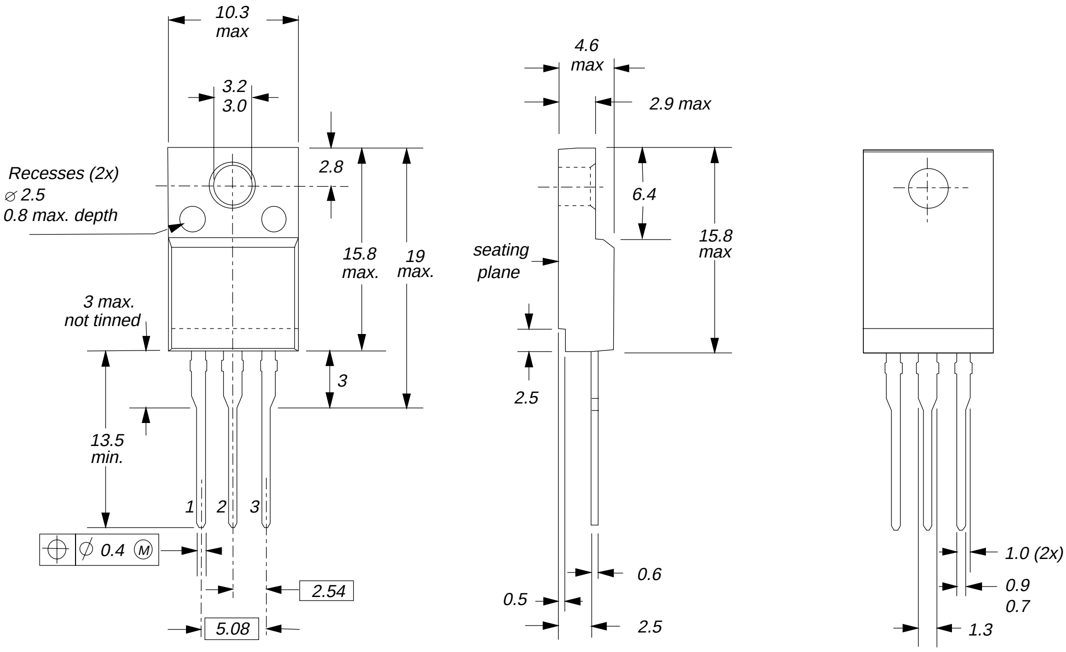

Fig.13. SOT186A; The seating plane is electrically isolated from all terminals.

Notes

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

DEFINITIONS

Data sheet status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
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