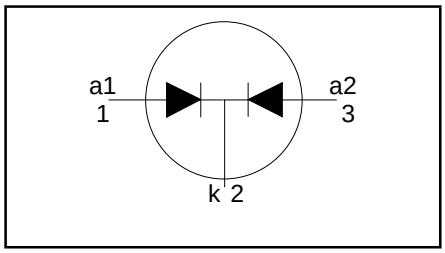
Dual rectifier diodes ultrafast

BYV74F series

FEATURES

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

SYMBOL



QUICK REFERENCE DATA

V_R = 300 V/ 400 V/ 500 V

$V_F \leq 1.12$ V

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

$t_{rr} \leq 60$ ns

GENERAL DESCRIPTION

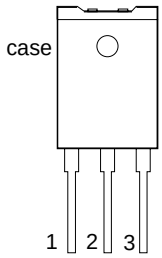
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV74F series is supplied in the conventional leaded SOT199 package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	isolated

SOT199



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
		BYV74F		**-300**	**-400**	**-500**	
V_{RRM}	Peak repetitive reverse voltage		-	300	400	500	V
V_{RWM}	Crest working reverse voltage		-	300	400	500	V
V_R	Continuous reverse voltage	$T_{mb} \leq 117$˚C	-	300	400	500	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)[1]	square wave; $\delta = 0.5$; $T_{hs} \leq 54$ ˚C	-	20			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{hs} \leq 54$ ˚C	-	30			A
I_{FSM}	Non-repetitive peak forward current per diode.	t = 10 ms	-	150			A
		t = 8.3 ms sinusoidal; with reapplied $V_{RRM(max)}$	-	160			A
T_{stg}	Storage temperature		-40	150			˚C
T_j	Operating junction temperature		-	150			˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65 % ; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	22	-	pF

1 Neglecting switching and reverse current losses.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	both diodes conducting				
		with heatsink compound	-	-	4.0	K/W
		without heatsink compound	-	-	8.0	K/W
		per diode				
		with heatsink compound	-	-	5.0	K/W
		without heatsink compound	-	-	9.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	35	-	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 = 15 A; T_j = 150˚C	-	0.95	1.12	V
		I_F = 15 A	-	1.08	1.25	V
		I_F = 30 A	-	1.15	1.36	V
I_R	Reverse current	$V_R = V_{RRM}$	-	10	50	µA
		$V_R = V_{RRM}$; T_j = 100 ˚C	-	0.3	0.8	mA
Q_s	Reverse recovery charge	I_F = 2 A to $V_R \geq$ 30 V; dI_F/dt = 20 A/µs	-	40	60	nC
t_{rr}	Reverse recovery time	I_F = 1 A to $V_R \geq$ 30 V; dI_F/dt = 100 A/µs	-	50	60	ns
I_{rrm}	Peak reverse recovery current	I_F = 10 A to $V_R \geq$ 30 V; dI_F/dt = 50 A/µs; T_j = 100˚C	-	4.2	5.2	A
V_{fr}	Forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs	-	2.5	-	V

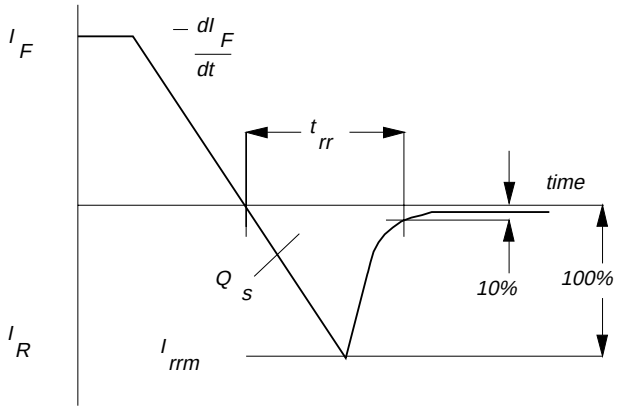


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

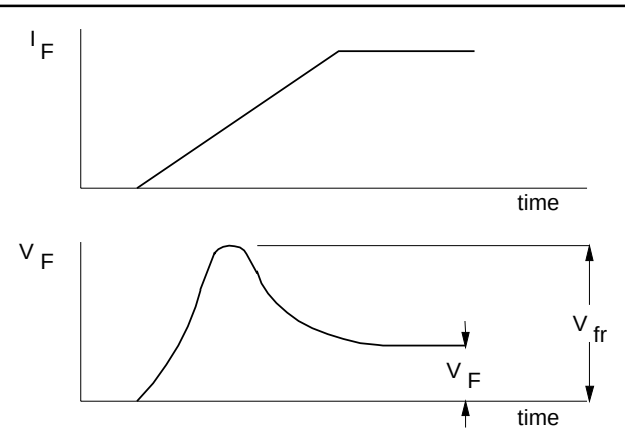


Fig.2. Definition of V_{fr}

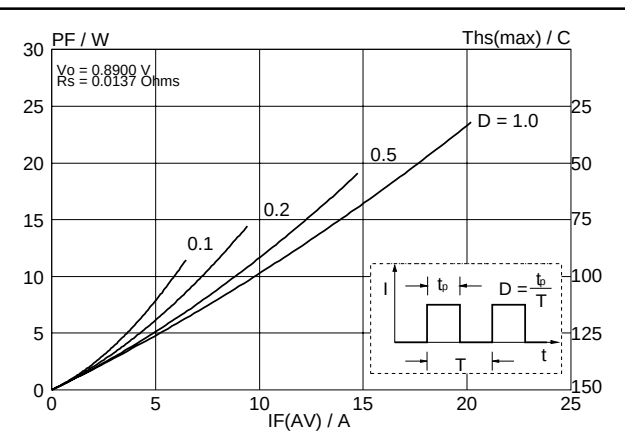


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square wave where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

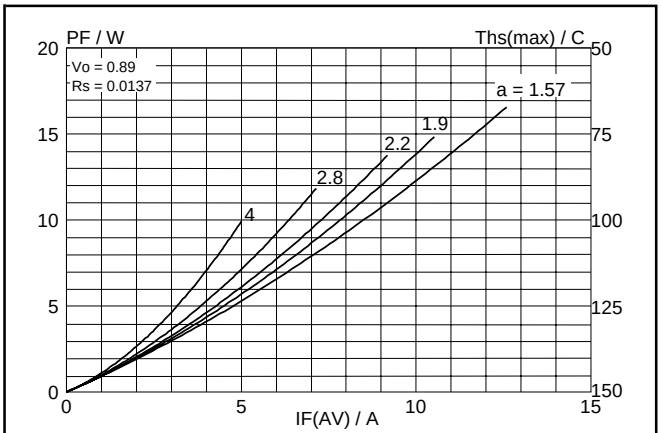


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

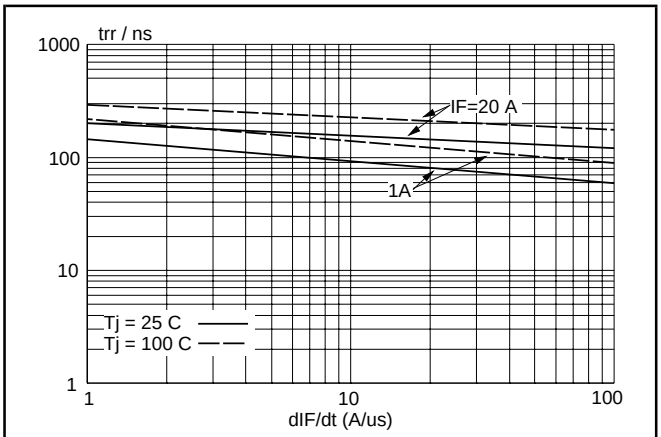


Fig.5. Maximum t_{rr} at T_j = 25˚C and 100˚C; per diode

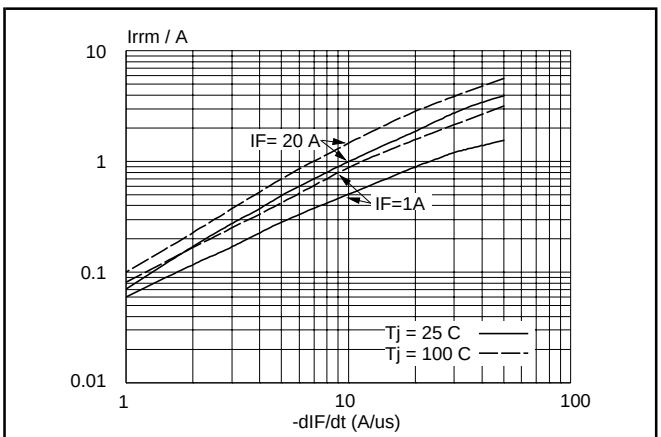


Fig.6. Maximum I_{rrm} at T_j = 25˚C and 100˚C; per diode.

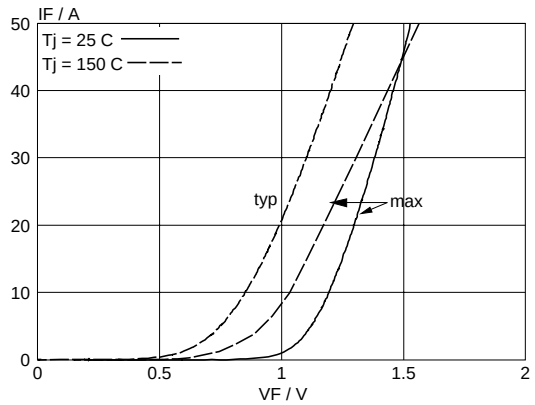


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

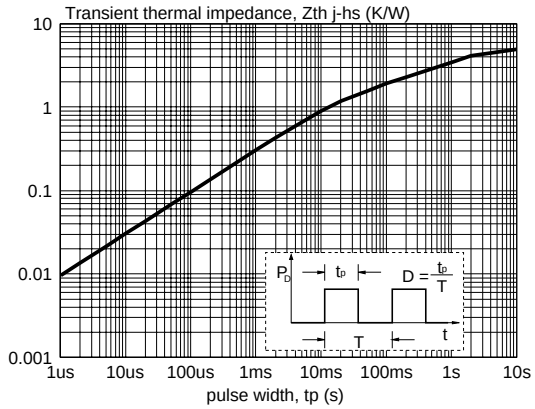


Fig.9. Transient thermal impedance per diode $Z_{th\ j\text{-}hs} = f(t_p)$

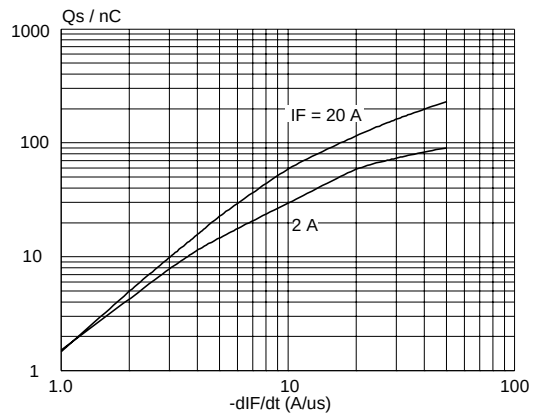


Fig.8. Maximum Q_s at T_j = 25˚C; per diode

MECHANICAL DATA

Dimensions in mm

Net Mass: 5.5 g

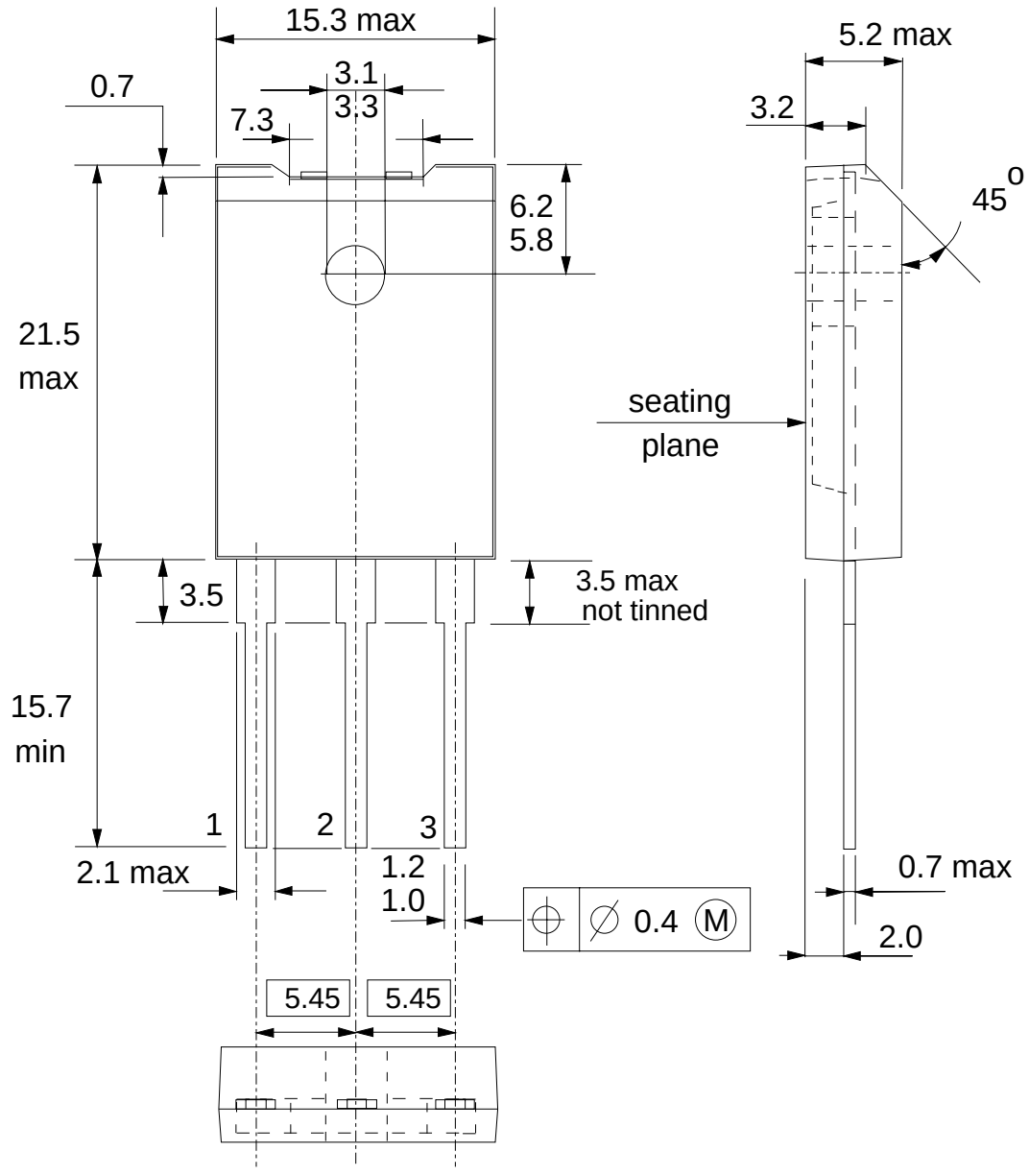


Fig.10. SOT199; The seating plane is electrically isolated from all terminals.

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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