

1. General description

Ultrafast diode in a TO3PF package.

2. Features and benefits

- Isolated plastic package
- Low leakage current
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- Active PFC in air conditioner
- S.M.P.S Power Factor Correction (PFC)
- Half-bridge / full-bridge switched-mode power supplies

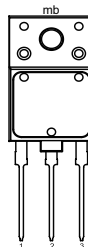
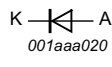
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_R	repetitive peak reverse voltage	DC	600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_n \leq 73\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	30			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; square-wave pulse	60			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; Fig. 4	170			A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse	190			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 30\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 6	-	1.35	1.8	V
		$I_F = 30\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; Fig. 6	-	0.96	-	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7	-	37	65	ns
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $dI_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7	-	85	-	ns
		$I_F = 30\text{ A}$; $V_R = 200\text{ V}$; $dI_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 7	-	138	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	K	cathode		
3	A	anode		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYV30JT-600P	TO3PF	BYV30JT-600PQ	Tube	30	SOT1293	16-Mar-2006

7. Marking

Table 4. Marking codes

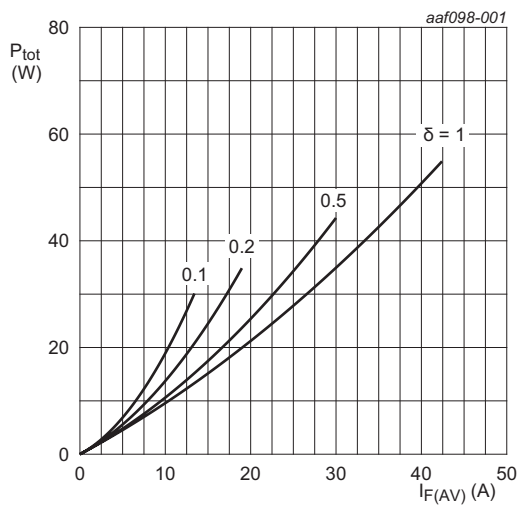
Type number	Marking codes
BYV30JT-600P	BYV30JT 600P

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

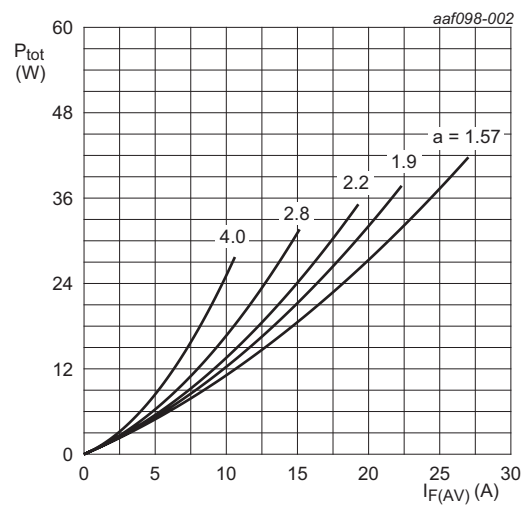
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_n \leq 73^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; square-wave pulse	60	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; Fig. 4	170	A
		$t_p = 8.3\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse	190	A
T_{stg}	storage temperature		-65 to 175	$^\circ\text{C}$
T_j	junction temperature		-65 to 175	$^\circ\text{C}$



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 0.854\ \text{V}; R_s = 0.0104\ \Omega$$

Fig. 1. Forward power dissipation as a function of average forward current; square waveform; typical values



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 0.854\ \text{V}; R_s = 0.0104\ \Omega$$

Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; typical values

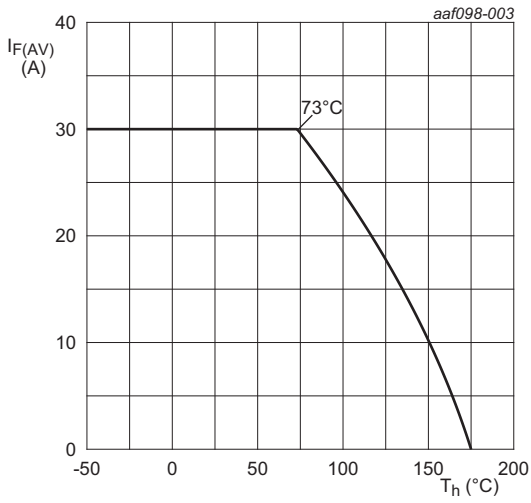


Fig. 3. Average forward current as a function of heatsink temperature; typical values

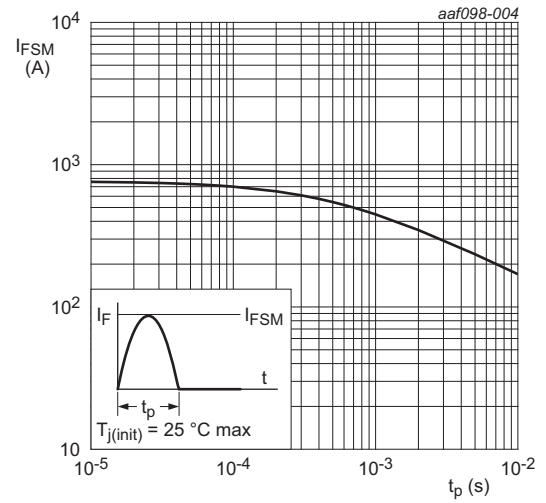
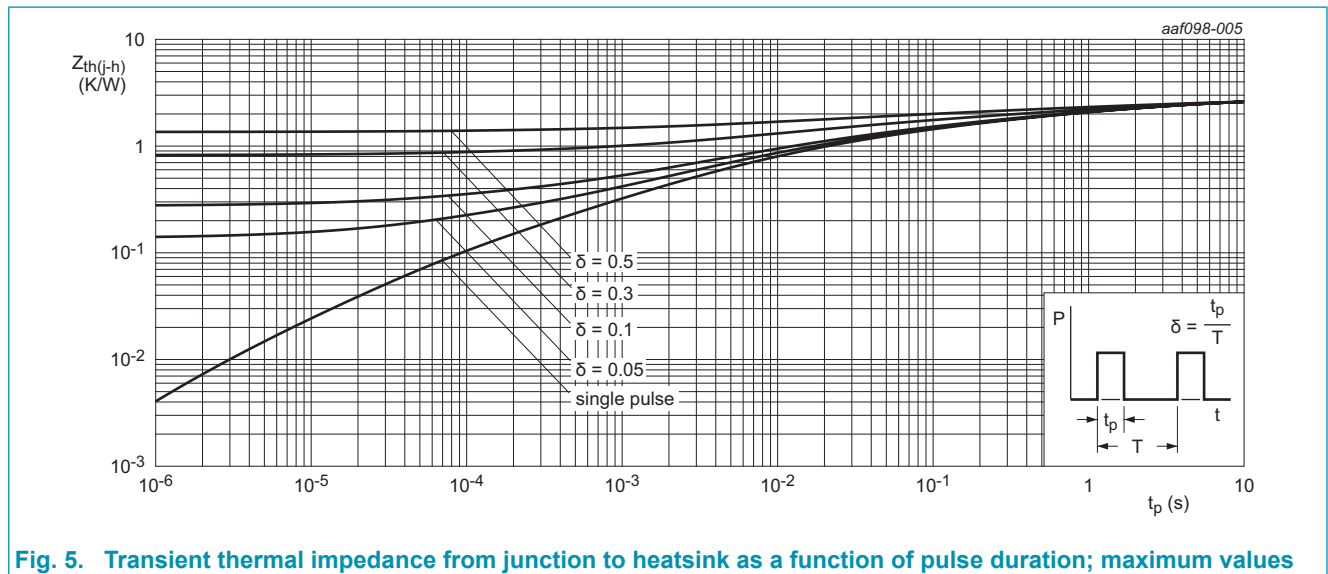


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; Fig. 5	-	2.3	2.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	35	-	K/W



10. Isolation characteristics

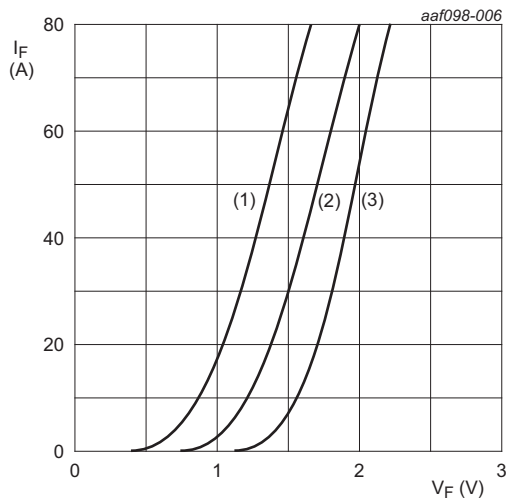
Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz ≤ f ≤ 60 Hz; RH ≤ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink	-	10	-	pF

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 30\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$	-	1.35	1.8	V
		$I_F = 30\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$	-	0.96	-	V
I_R	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	10	μA
		$V_R = 600\text{ V}; T_j = 150\text{ °C}$	-	-	500	μA
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	37	65	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	85	-	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	138	-	ns
I_{RM}	peak reverse recovery current	$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}$	-	11	-	A
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}$	-	18	-	A
Q_r	recovered charge	$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	461	-	nC
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	1227	-	nC



- (1) $T_j = 150\text{ °C}$; typical values
- (2) $T_j = 150\text{ °C}$; maximum values
- (3) $T_j = 25\text{ °C}$; maximum values

Fig. 6. Forward current as a function of forward voltage, per diode

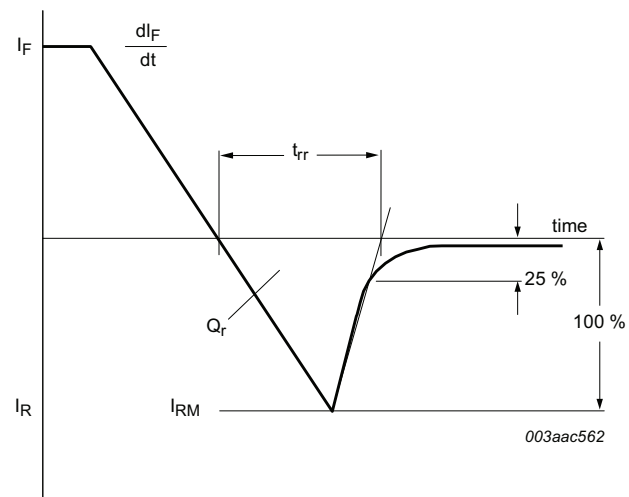
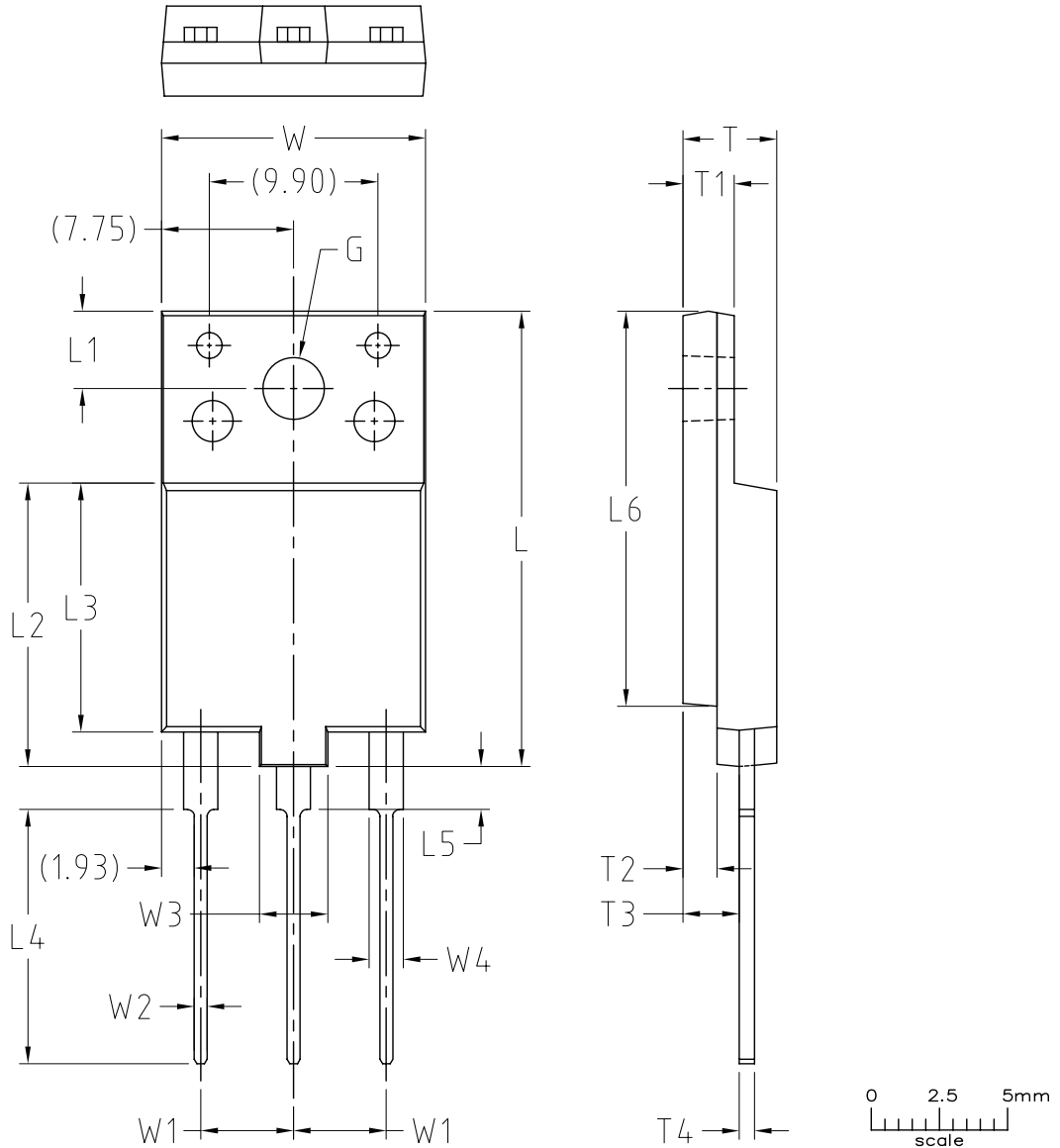


Fig. 7. Reverse recovery definitions; ramp recovery

12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-3P 'full pack' TO3PF



Remark : (X) the dimension X in brackets is for reference

UNIT	W	W1	W2	W3	W4	L	L1	L2	L3	L4	L5	L6	T	T1	T2	T3	T4	G(∅)
mm	15.7	5.75	0.95	4.20	2.20	26.7	4.6	16.7	14.7	15.0	2.7	23.2	5.7	3.2	2.2	3.5	1.1	3.8
	15.3	5.15	0.65	3.80	1.80	26.3	4.4	16.3	14.3	14.6	2.3	22.8	5.3	2.8	1.8	3.1	0.8	3.4

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
		TO-3PF				

13. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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