

## 1. General description

Dual ultrafast power diodes in a TO3PF plastic package.

## 2. Features and benefits

- Very low on-state loss
- Reduces switching losses in associated MOSFET or IGBT
- Low leakage current
- Isolated plastic package

## 3. Applications

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

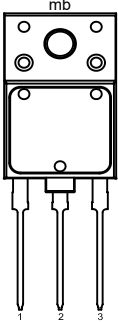
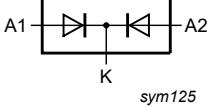
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V <sub>R</sub>	reverse voltage	DC		-	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>h</sub> ≤ 101 °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	-	15	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>h</sub> ≤ 101 °C; Square-wave pulse		-	-	30	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; per diode; <a href="#">Fig. 4</a>		-	-	150	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; per diode		-	-	165	A
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.17	1.4	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1	-	V
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	38	-	ns
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	67	-	ns
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	106	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 <p>TO3PF</p>	
2	K	cathode		
3	A2	anode 2		
mb	mb	mounting base		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV415J-600P	TO3PF	Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-3P ‘full pack’	TO3PF

7. Limiting values

Table 4. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>RRM</sub>	repetitive peak reverse voltage		-	600	V
V <sub>RWM</sub>	crest working reverse voltage		-	600	V
V <sub>R</sub>	reverse voltage	DC	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>h</sub> ≤ 101 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	15	A
I <sub>O(AV)</sub>	average output current	δ = 0.5 ; T <sub>h</sub> ≤ 90 °C; square-wave pulse; both diodes conducting	-	30	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>h</sub> ≤ 101 °C; Square-wave pulse	-	30	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; per diode; Fig. 4	-	150	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; per diode	-	165	A
T <sub>stg</sub>	storage temperature		-65	175	°C
T <sub>j</sub>	junction temperature		-	175	°C

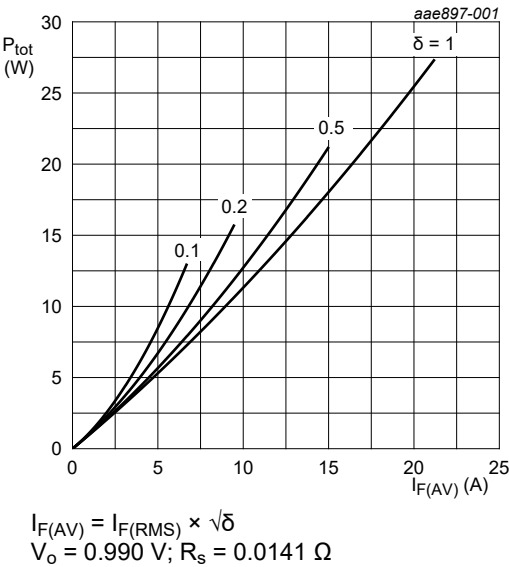


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode

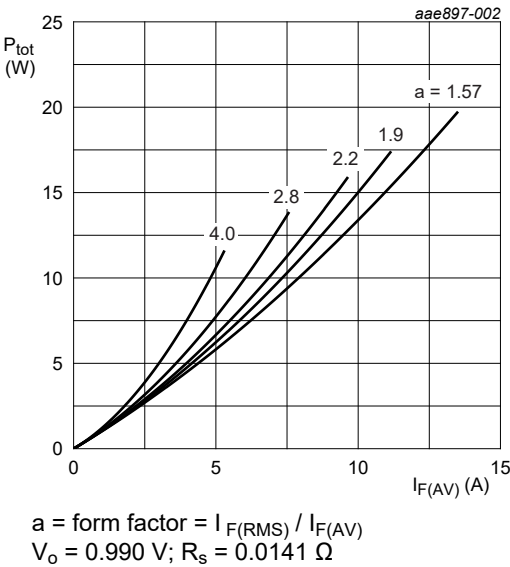


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values; per diode

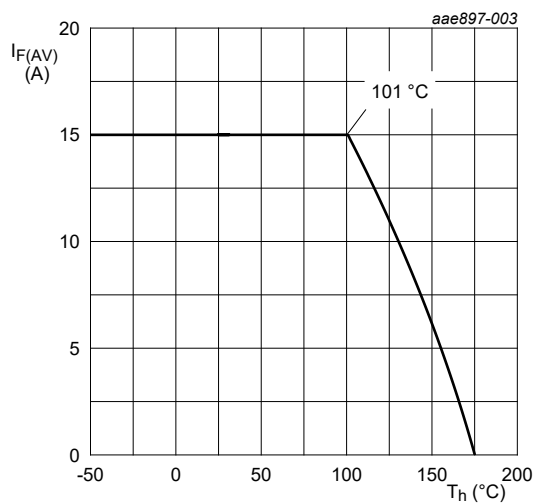


Fig. 3. Average forward current as a function of heatsink temperature; maximum values; per diode

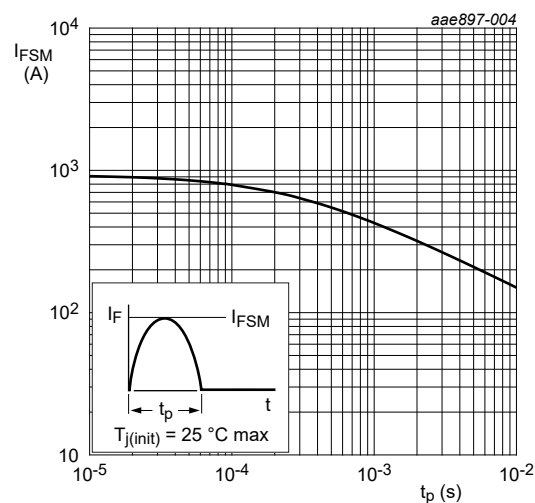


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values; per diode

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; per diode; <a href="#">Fig. 5</a>	-	2.9	3.5	K/W
		with heatsink compound; both diodes conducting	-	1.6	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	35	-	K/W

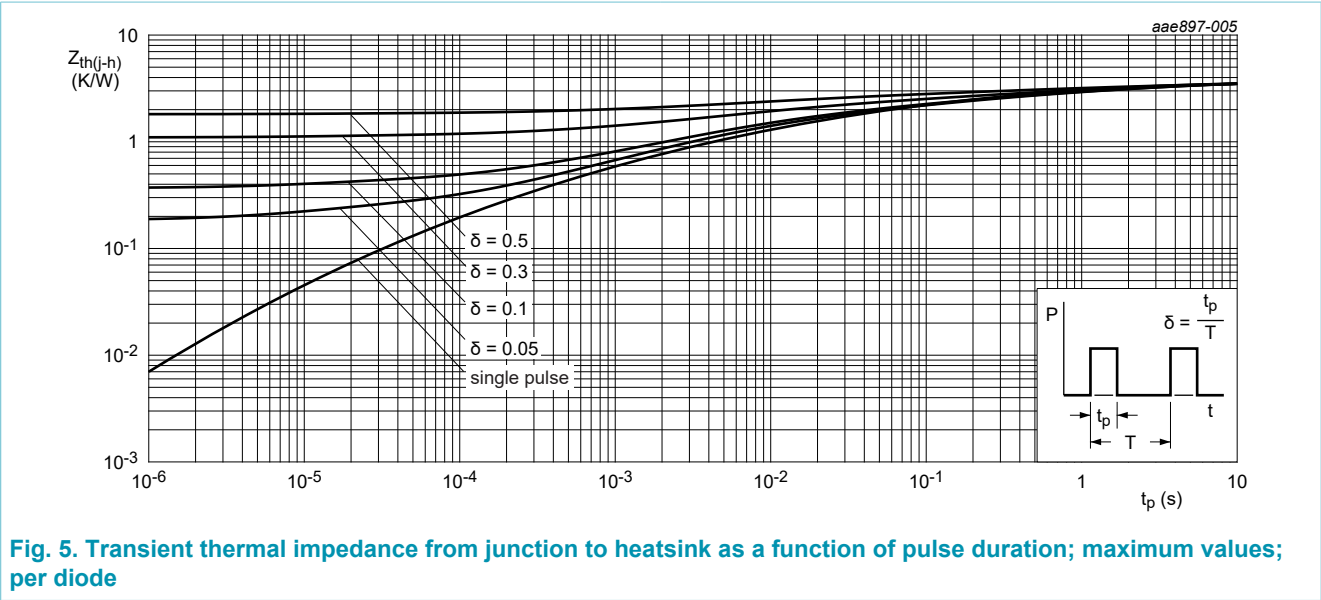


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration; maximum values; per diode

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.17	1.4	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1	-	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C		-	-	10	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 150 °C		-	-	500	μA
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	38	-	ns
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	67	-	ns
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	106	-	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	9.8	-	A
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	16	-	A
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	329	-	nC
		I <sub>F</sub> = 15 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	876	-	nC

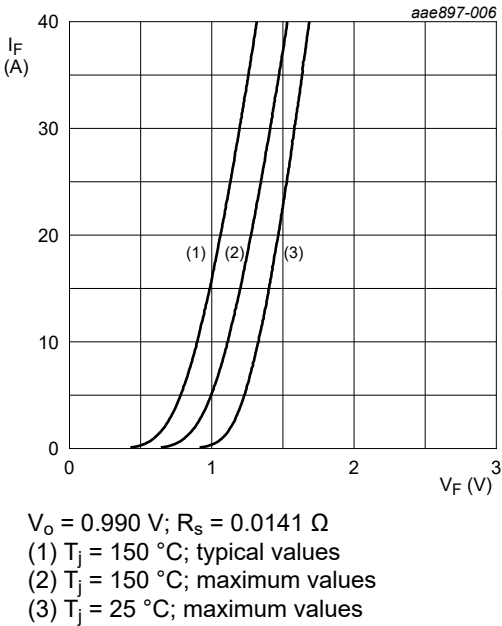


Fig. 6. Forward current as a function of forward voltage, per diode

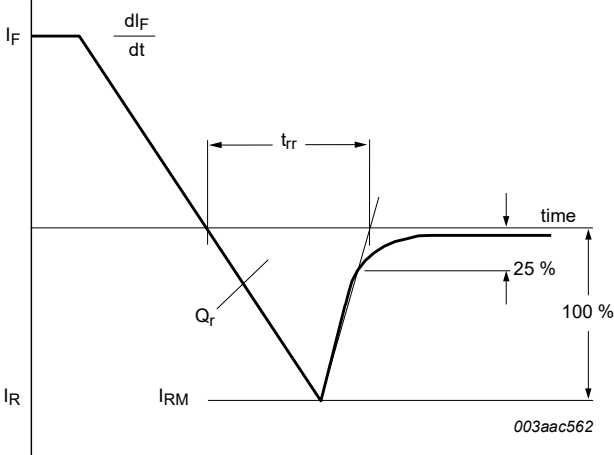


Fig. 7.

10. Package outline

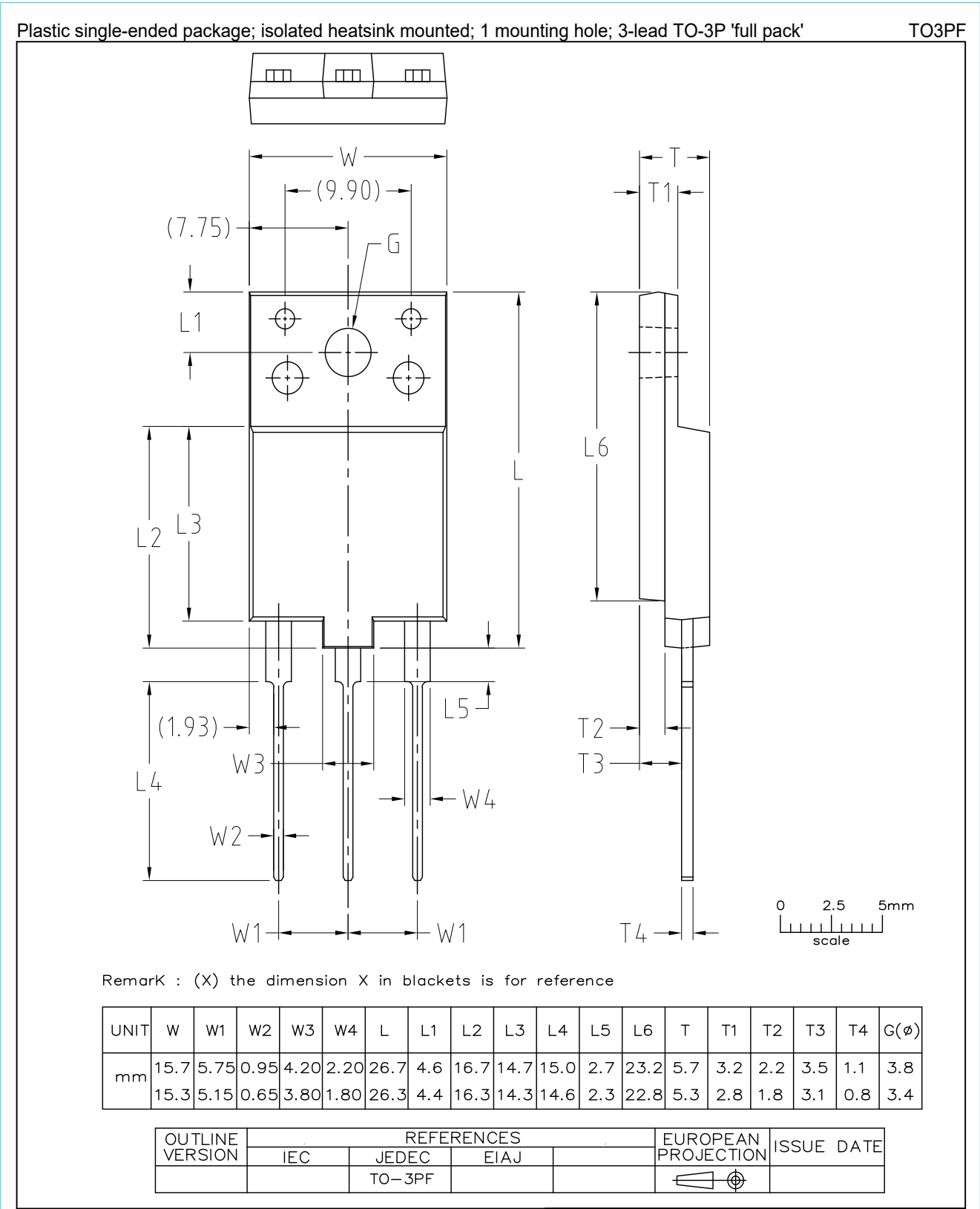


Fig. 8. Package outline TO3PF

## 11. Legal information

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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