

## 1. General description

EEPP™ - Efficiency Enhanced Pt Planar rectifier in a TO-252 (DPAK) surface-mountable plastic package.

## 2. Features and benefits

- Fast switching
- Reduces switching losses with improved lower reverse recovery charge
- Soft recovery characteristics
- Low thermal resistance
- Low leakage current
- Planar termination structure
- High operating temperature capability ( $T_{j(max)} = 175^{\circ}\text{C}$ )
- Higher  $I_{FSM}$  capability

## 3. Applications

- Dual mode (DCM and CCM) Power Factor Correction (PFC)
- Power Factor Correction (PFC) for Interleaved Topology
- U-inverter (DC-AC converter for individual solar panels)
- Motor drive and SMPS freewheeling diode

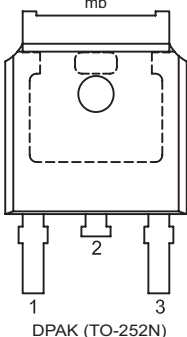
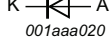
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		1200			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 144^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	5			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25 \mu\text{s}$ ; $T_{mb} \leq 144^{\circ}\text{C}$ ; square-wave pulse	10			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10 \text{ ms}$ ; $T_{j(init)} = 25^{\circ}\text{C}$ ; sine-wave pulse; <a href="#">Fig. 4</a>	55			A
		$t_p = 8.3 \text{ ms}$ ; $T_{j(init)} = 25^{\circ}\text{C}$ ; sine-wave pulse	60			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5 \text{ A}$ ; $T_j = 25^{\circ}\text{C}$ ; <a href="#">Fig. 6</a>	-	1.70	2.2	V
		$I_F = 5 \text{ A}$ ; $T_j = 150^{\circ}\text{C}$ ; <a href="#">Fig. 6</a>	-	1.55	-	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $di_F/dt = 100 \text{ A}/\mu\text{s}$ ; $T_j = 25^{\circ}\text{C}$ ; <a href="#">Fig. 7</a>	-	50	-	ns

## 5. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	no connected	 <p style="text-align: center;">DPAK (TO-252N)</p>	
2	K	cathode[1]		
3	A	anode		
mb	mb	mounting base; connected to cathod		

[1] It is not possible to connect to pin 2 of the TO-252 package.

## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		Version
	Name	Description	
BYR5D-1200P	TO-252	plastic single-ended surface-mounted package (DPAK); 3-leads (one lead cropped)	TO-252N

## 7. Marking

**Table 4. Marking codes**

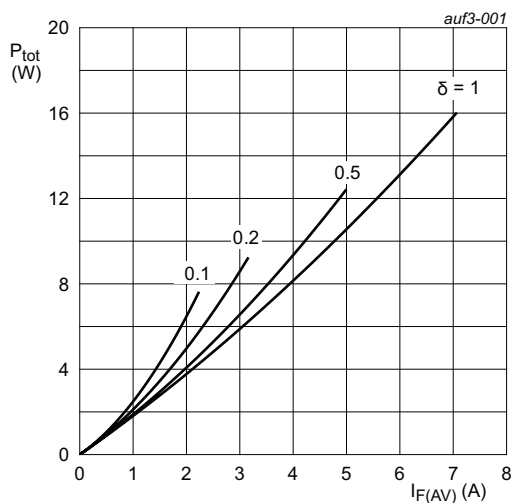
Type number	Marking codes
BYR5D-1200P	BYR5D-1200P

## 8. Limiting values

**Table 5. Limiting values**

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

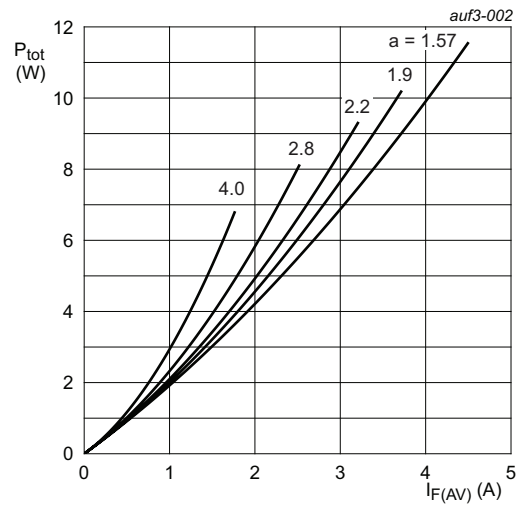
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		1200	V
$V_{RWM}$	crest working reverse voltage		1200	V
$V_R$	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 144$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	5	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 144$ °C; square-wave pulse	10	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; <a href="#">Fig. 4</a>	55	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	60	A
$T_{stg}$	storage temperature		-65 to 175	°C
$T_j$	junction temperature		175	°C



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

$$V_o = 1.737 \text{ V}; R_s = 0.0750 \Omega$$

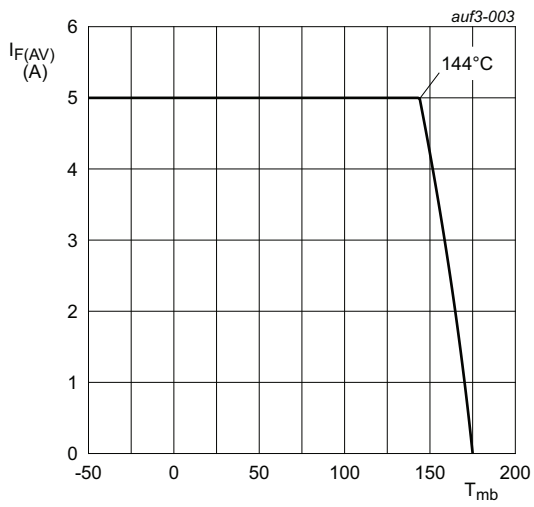
**Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values**



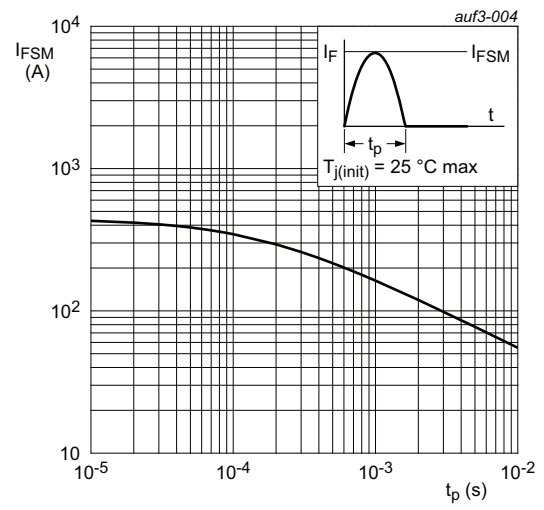
$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 1.737 \text{ V}; R_s = 0.0750 \Omega$$

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



**Fig. 3. Forward current as a function of mounting base temperature; maximum 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
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	<a href="#">Fig. 5</a>	-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W

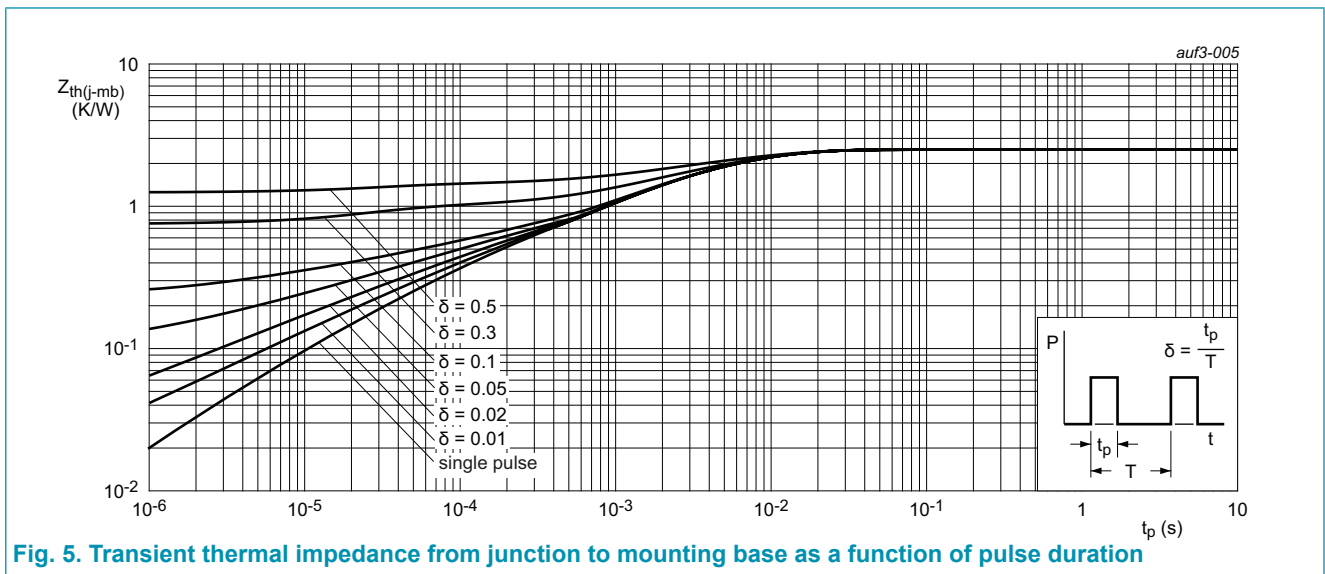
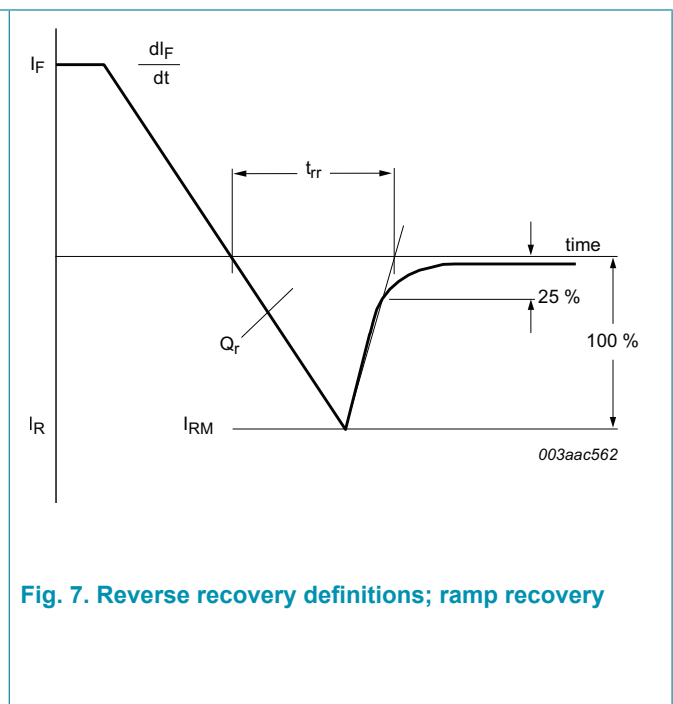
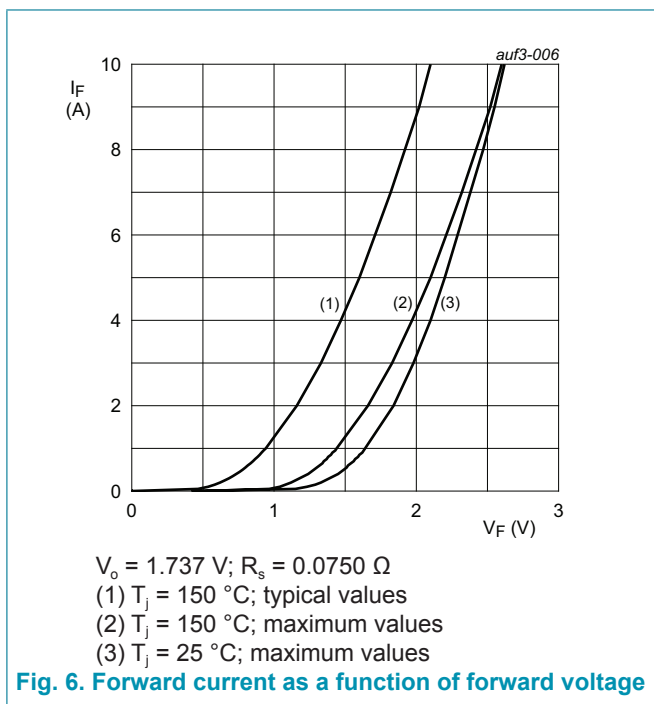


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

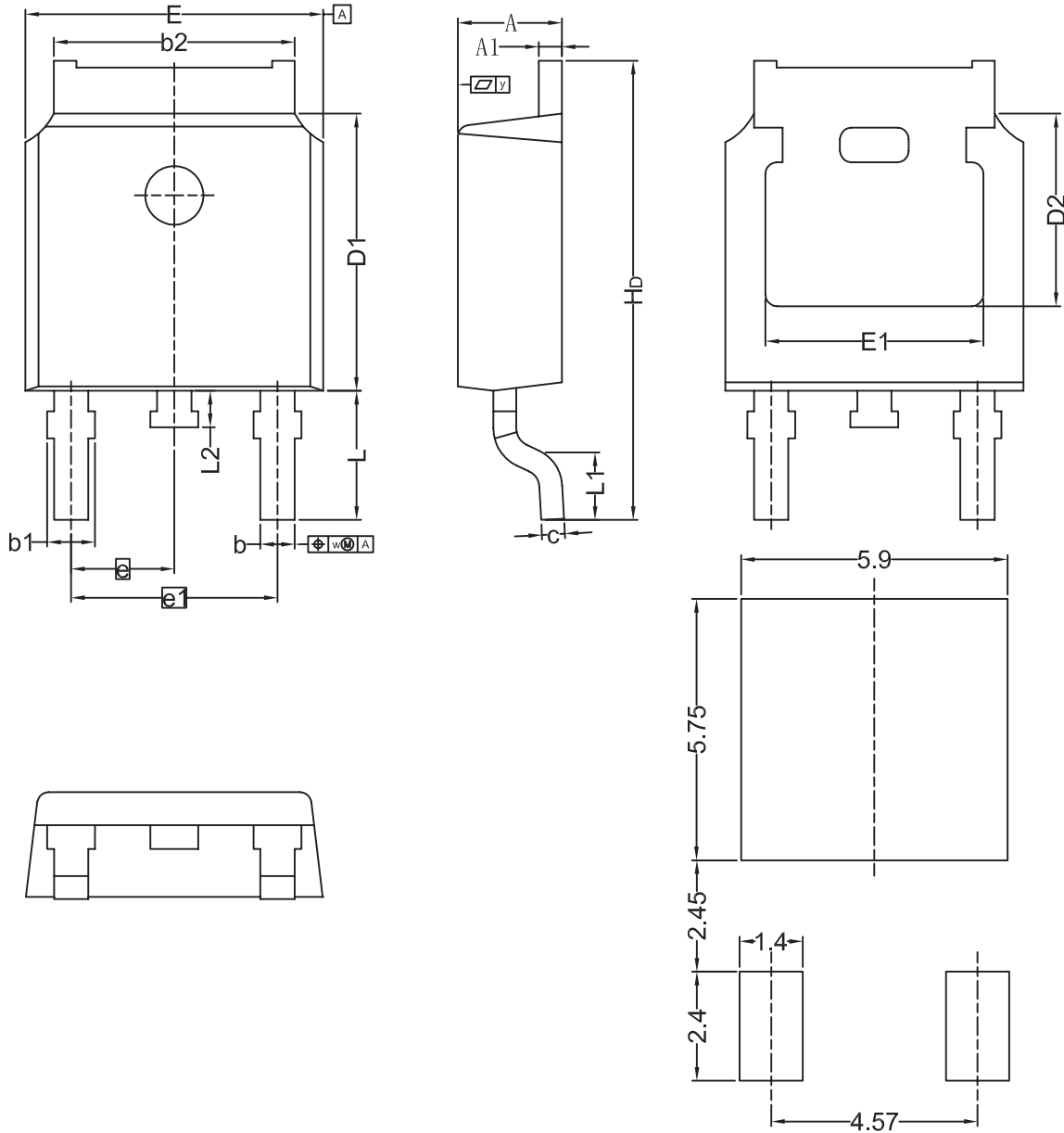
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward current	$I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	1.70	2.2	V
		$I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	1.55	-	V
$I_R$	reverse current	$V_R = 1200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	50	$\mu\text{A}$
		$V_R = 1200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	500	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	reverse charge	$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	252	-	nC
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	406	-	nC
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	450	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	50	-	ns
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	62	-	ns
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	85	-	ns
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	90	-	ns
$I_{RM}$	peak reverse recovery current	$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	8.3	-	A
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	9.7	-	A
		$I_F = 5 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	10.0	-	A



### 11. Package outline

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)

TO252



Recommended Footprint

Unit	A	A1	b	b1	b2	c	D1	D2	E	E1	e	e1	H <sub>D</sub>	L	L1	L2	w	y
mm	min	2.22	0.46	0.71	0.72	5.00	0.20	5.98	4.00	6.47	4.45	2.285	9.60	2.90	0.50	0.50	0.20	
	nom													(Ref.)				
	max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---		10.40	---	0.90		0.20	0.20

## 12. 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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