



**THE DATASHEET OF
BYR5D-1200PJ**



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

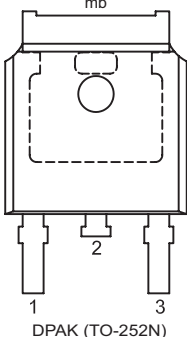
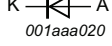
4. Quick reference data

Table 1. Quick reference data

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

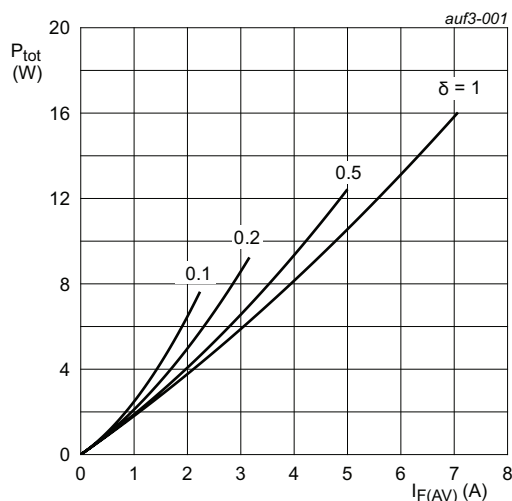
Type number	Marking codes
BYR5D-1200P	BYR5D-1200P

8. Limiting values

Table 5. Limiting values

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

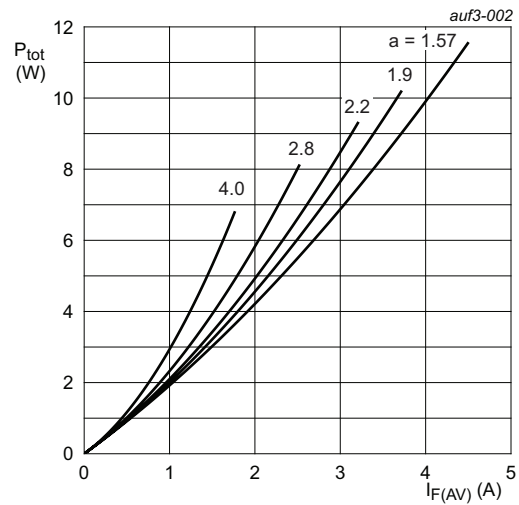
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		1200	V
V_{RWM}	crest working reverse voltage		1200	V
V_R	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 144$ °C; Fig. 1 ; Fig. 2 ; Fig. 3	5	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ 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; Fig. 4	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

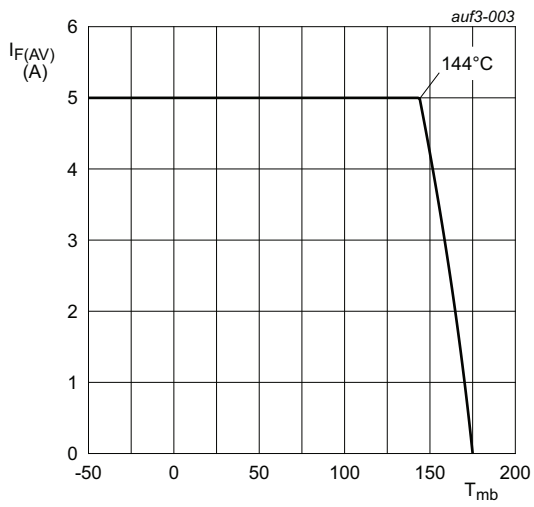


Fig. 3. Forward current as a function of mounting base temperature; maximum values

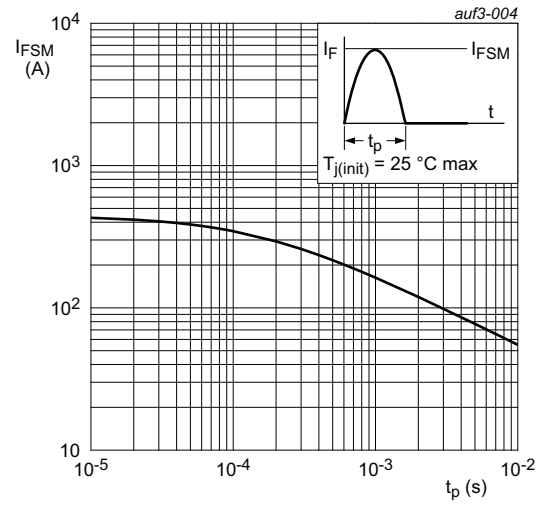


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	Fig. 5	-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W

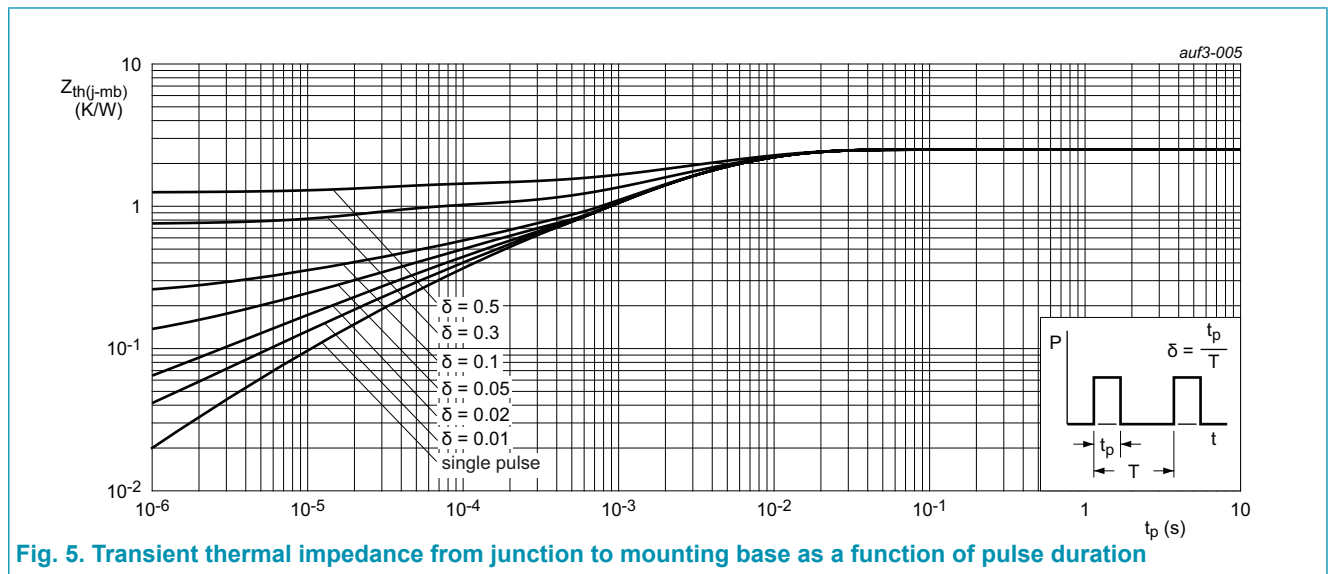
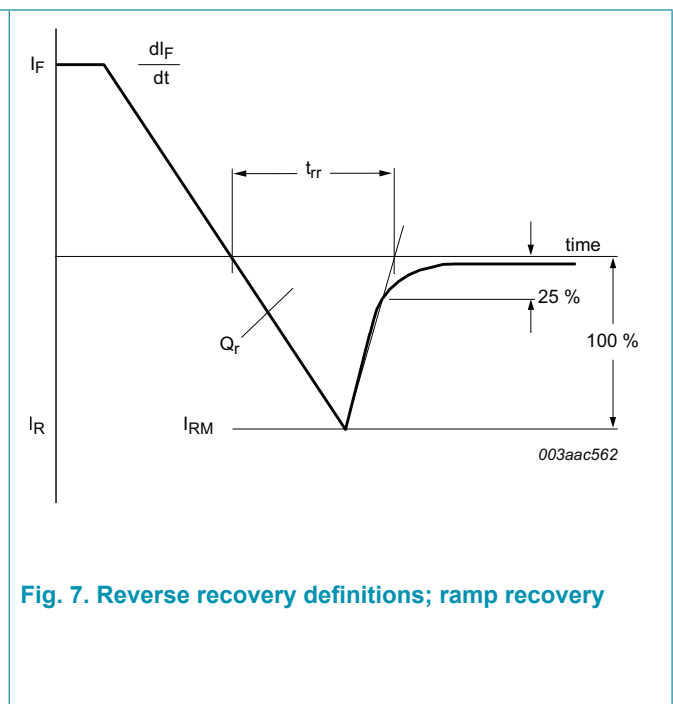
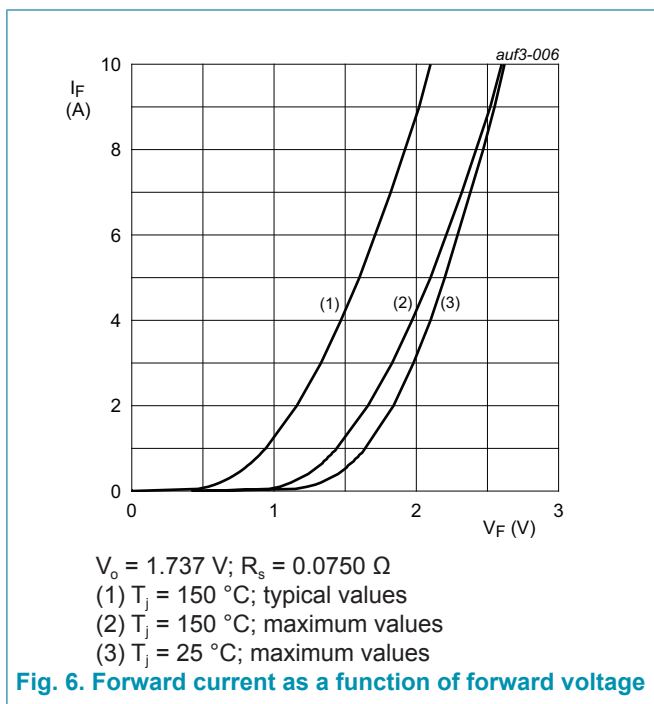


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

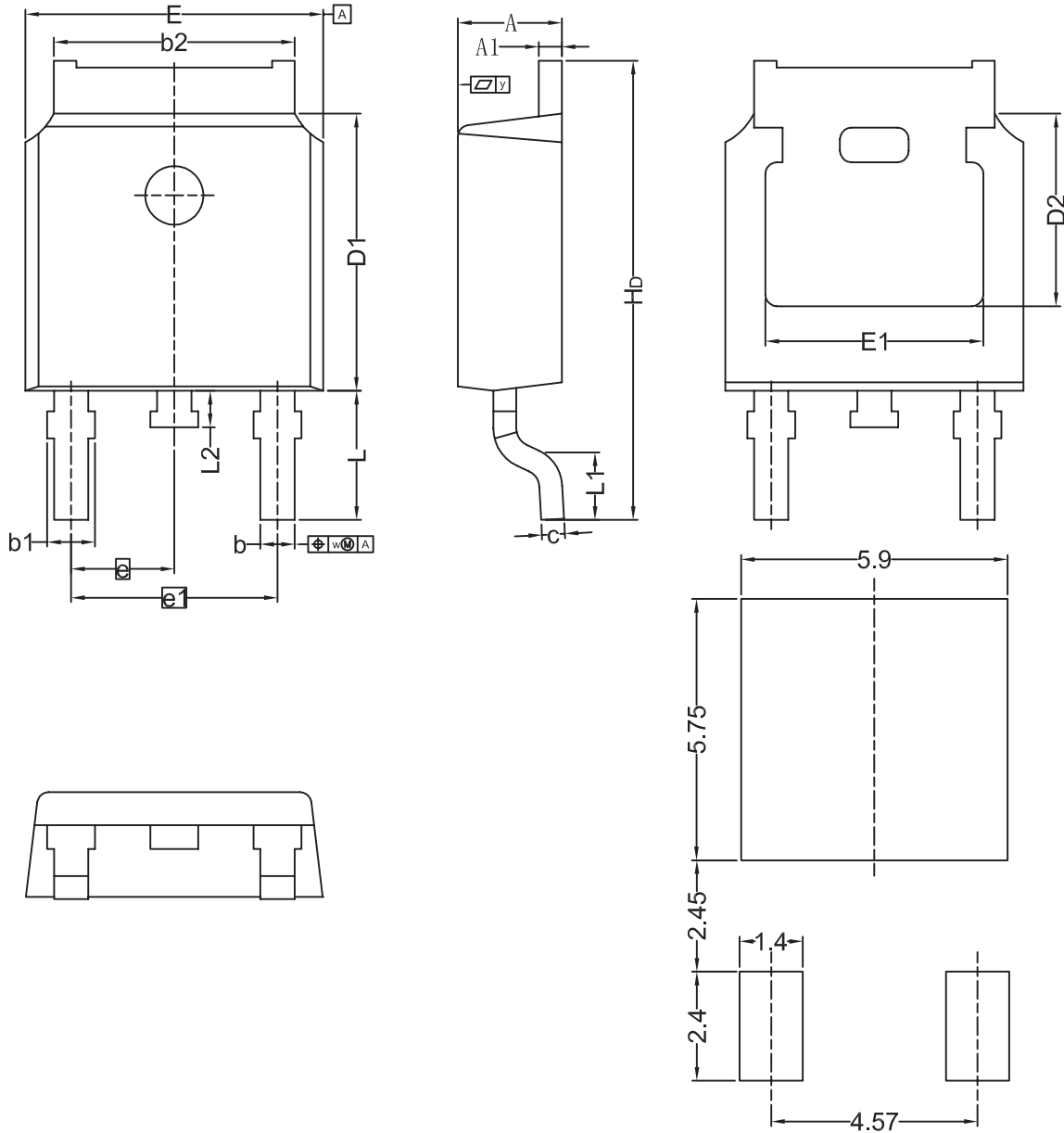
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward current	$I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	1.70	2.2	V
		$I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	1.55	-	V
I_R	reverse current	$V_R = 1200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	50	μA
		$V_R = 1200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	500	μA
Dynamic characteristics						
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 _D	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.
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