

1. General description

Hyperfast power diode in a SOT429 (3-lead TO247) plastic package.

2. Features and benefits

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

3. Applications

- Active PFC in air conditioner
- Continuous Current Mode (CCM) Power Factor Correction (PFC)
- Half-bridge/full-bridge switched-mode power supplies

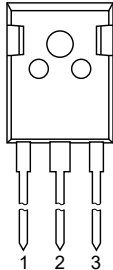
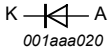
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _R	reverse voltage	DC		-	-	600	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 115 °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	30	A
I _{FSM}	non-repetitive peak forward current	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse; Fig. 4		-	-	270	A
		t _p = 8.3 ms; T _{j(init)} = 25 °C; sine-wave pulse; Fig. 4		-	-	300	A
Static characteristics							
V _F	forward voltage	I _F = 30 A; T _j = 25 °C; Fig. 6		-	2	2.75	V
		I _F = 30 A; T _j = 150 °C; Fig. 6		-	1.38	1.8	V
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	18	22	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 <p>TO-247 (SOT429)</p>	
2	K	cathode		
3	A	anode		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC30WT-600PS	TO-247	plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3 lead TO-247	SOT429

7. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	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	δ = 0.5 ; T _{mb} ≤ 115 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	30	A
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t _p = 25 μs; T _{mb} ≤ 115 °C; square-wave pulse	-	60	A
I _{FSM}	non-repetitive peak forward current	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse; Fig. 4	-	270	A
		t _p = 8.3 ms; T _{j(init)} = 25 °C; sine-wave pulse; Fig. 4	-	300	A
T _{stg}	storage temperature		-65	175	°C
T _j	junction temperature		-	175	°C

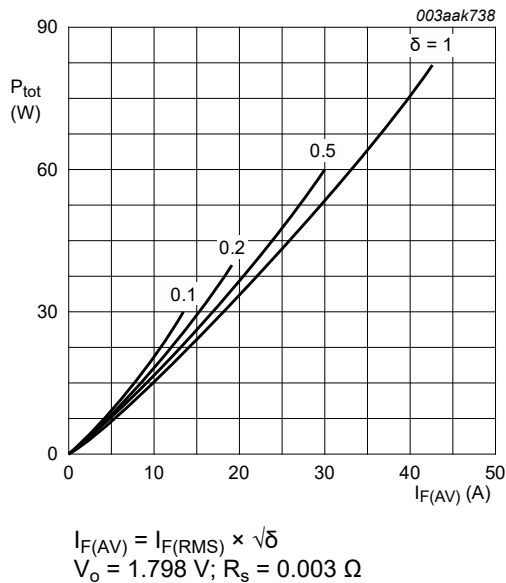


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

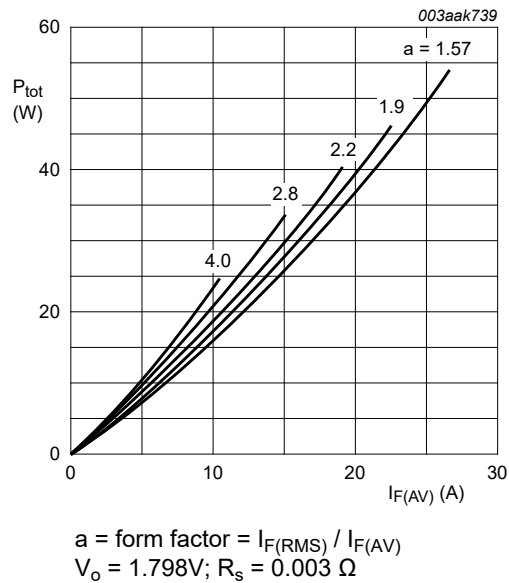


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

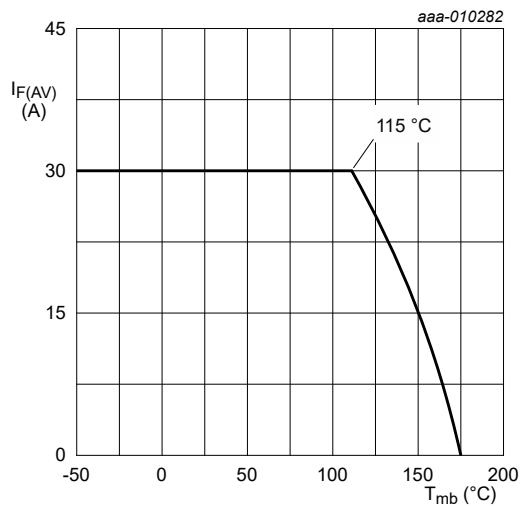


Fig. 3. Forward current as a function of mounting base temperature; maximum values

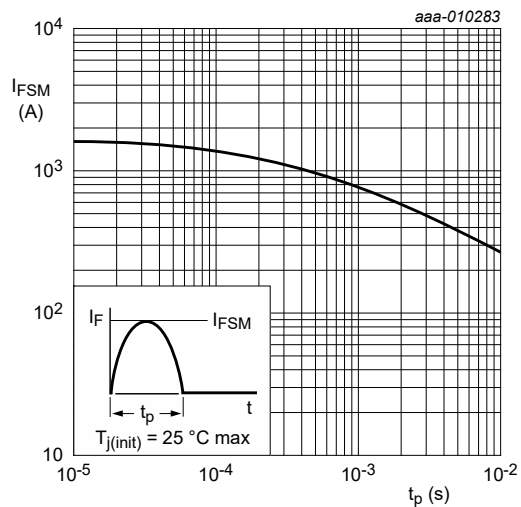


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; Fig. 5	-	-	1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

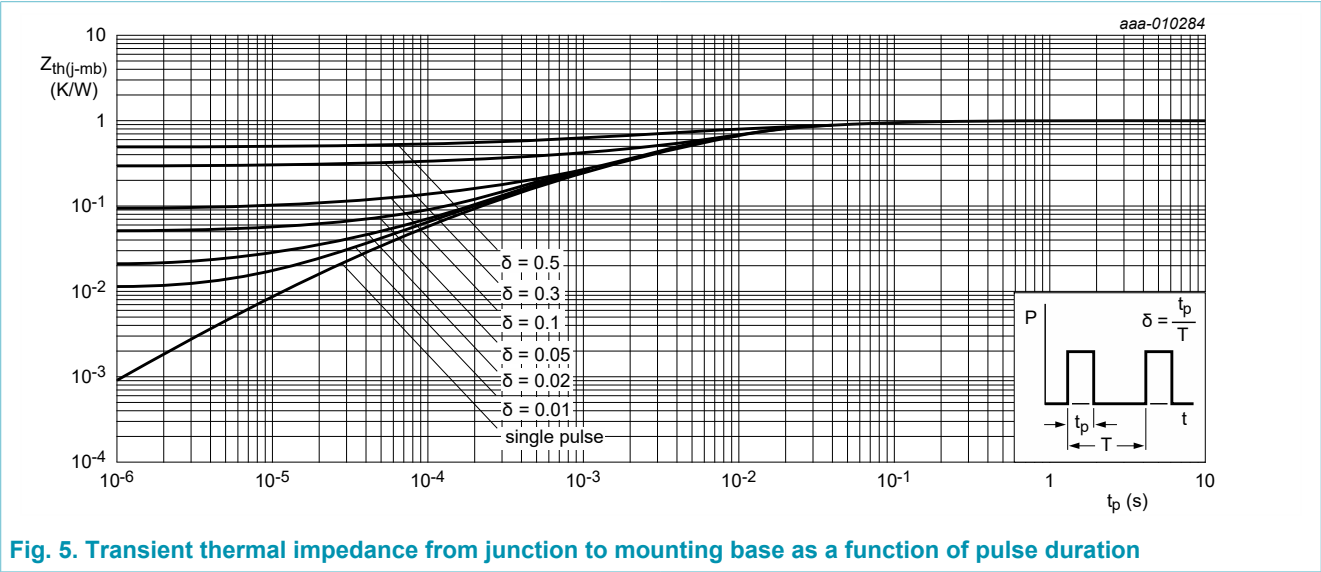
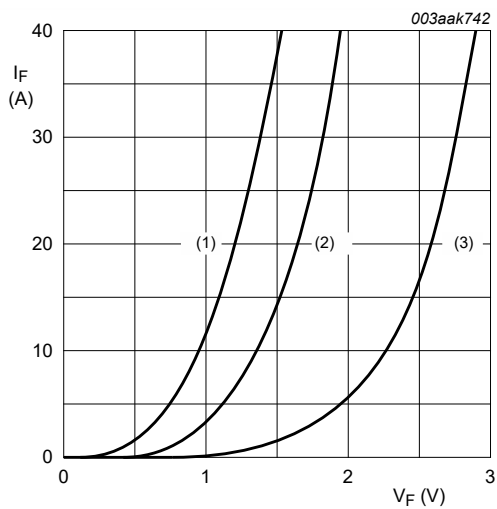


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 30 A; T _j = 25 °C; Fig. 6		-	2	2.75	V
		I _F = 30 A; T _j = 150 °C; Fig. 6		-	1.38	1.8	V
I _R	reverse current	V _R = 600 V; T _j = 25 °C		-	-	10	μA
		V _R = 600 V; T _j = 150 °C		-	-	1	mA
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	18	22	ns
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	35	-	ns
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	70	-	ns
		I _F = 30 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _j = 25 °C; Fig. 7		-	29	-	ns
I _{RM}	peak reverse recovery current	I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	3.5	-	A
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	7.6	-	A
Q _r	recovered charge	I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 25 °C; Fig. 7		-	50	-	nC
		I _F = 30 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	280	-	nC



$V_o = 1.798\text{ V}; R_s = 0.003\text{ }\Omega$
(1) $T_j = 150\text{ }^\circ\text{C}$; typical values
(2) $T_j = 150\text{ }^\circ\text{C}$; maximum values
(3) $T_j = 25\text{ }^\circ\text{C}$; maximum values

Fig. 6. Forward current as a function of forward voltage

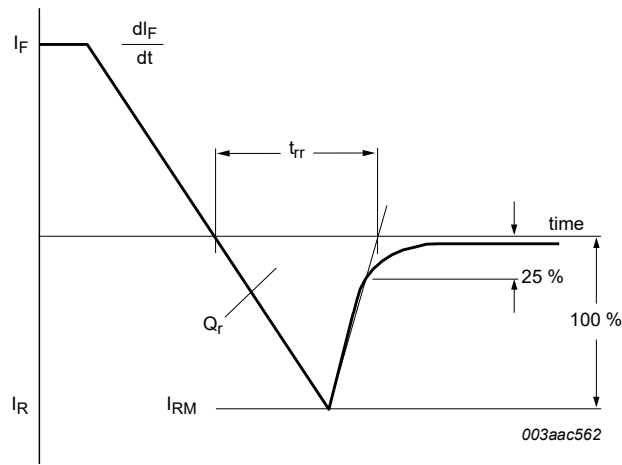


Fig. 7. Reverse recovery definitions; ramp recovery

10. Package outline

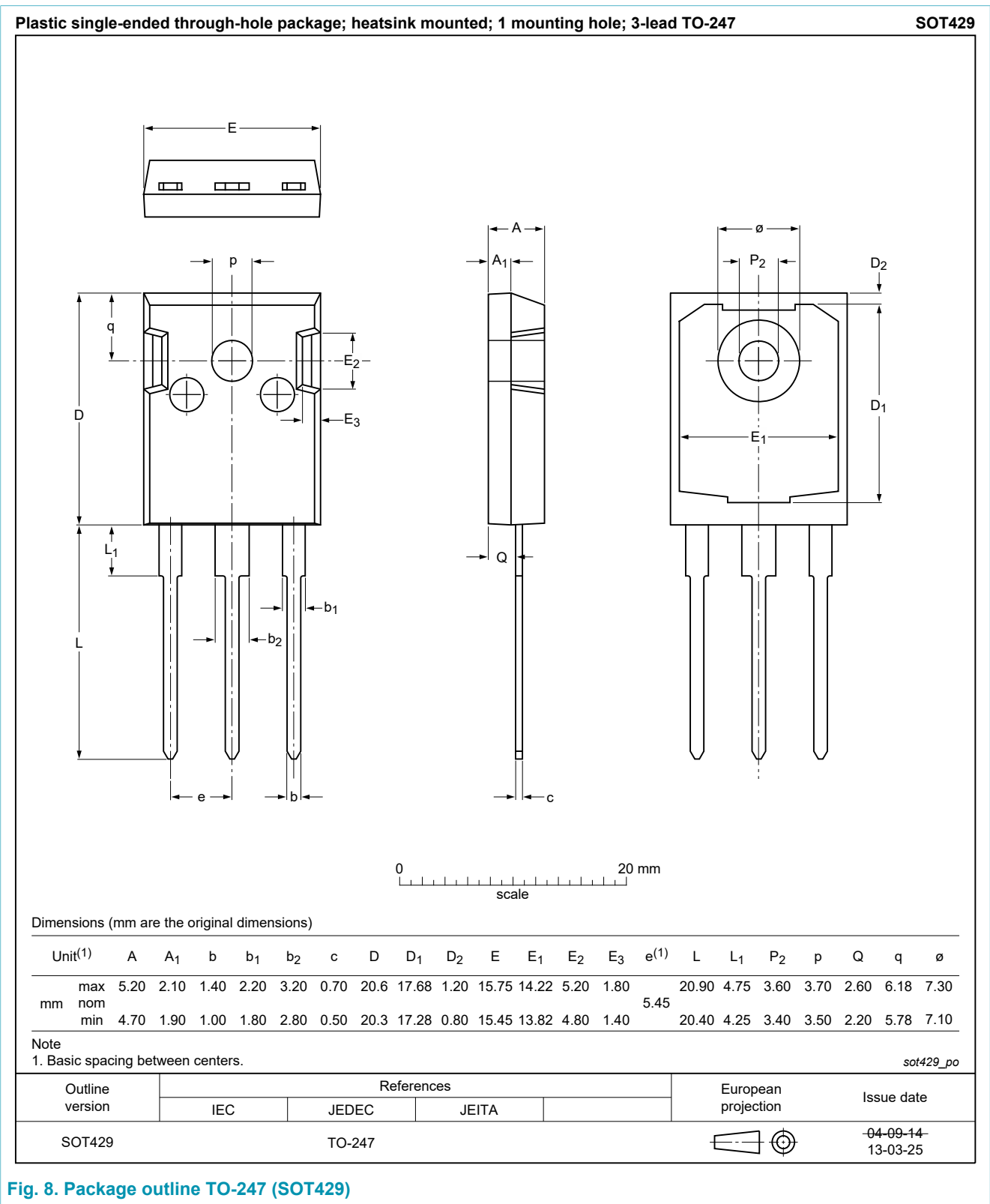


Fig. 8. Package outline TO-247 (SOT429)

11. 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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