

1. General description

Hyperfast power diode in a 2-lead TO247 plastic package.

2. Features and benefits

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

3. Applications

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

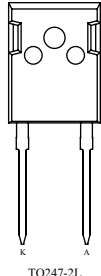
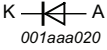
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 117$ °C; Fig. 1 ; Fig. 2 ; Fig. 3	30			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 117$ °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	295			A
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	2	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 200$ A/ μ s; $T_j = 25$ °C; Fig. 7	-	18	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p style="text-align: center;">TO247-2L</p>	
2	A	anode		
mb	mb	mounting base; connected to cathod		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC30W-600PT2	TO247-2L	BYC30W-600PT2Q	Tube	30	TO247P-2L	31-Mar-2023

7. Marking

Table 4. Marking codes

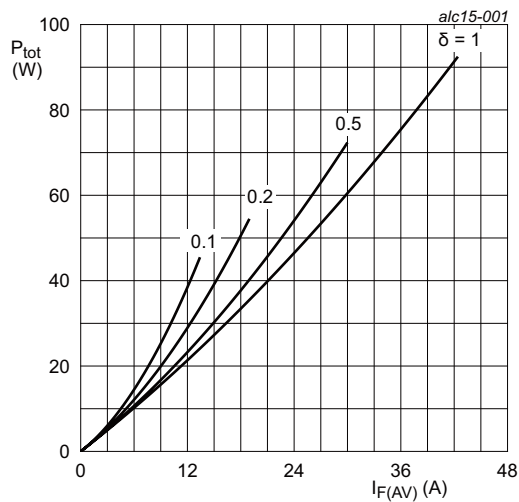
Type number	Marking codes
BYC30W-600PT2	BYC30W 600PT2

8. Limiting values

Table 5. Limiting values

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

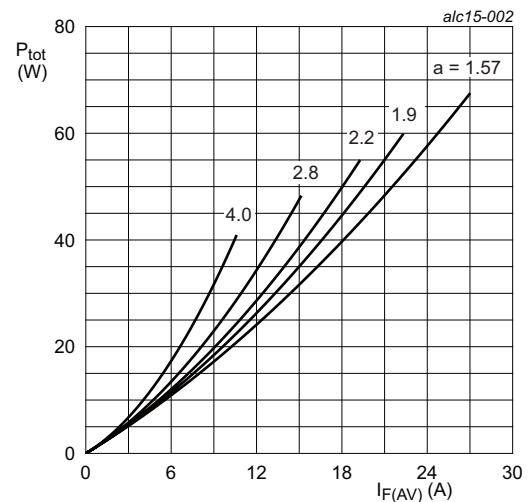
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 117\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 117\text{ }^\circ\text{C}$; 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	270	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse	295	A
T_{stg}	storage temperature		-55 to 175	$^\circ\text{C}$
T_j	junction temperature		175	$^\circ\text{C}$



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

$$V_o = 1.620\text{ V}; R_s = 0.0132\text{ }\Omega$$

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



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

$$V_o = 1.620\text{ V}; R_s = 0.0132\text{ }\Omega$$

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

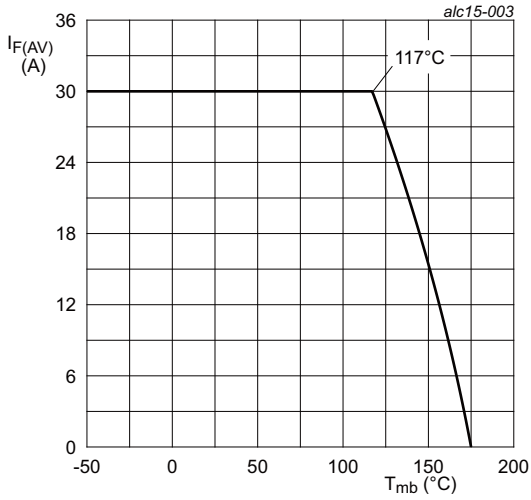


Fig. 3. Forward current as a function of mounting base temperature; maximum values

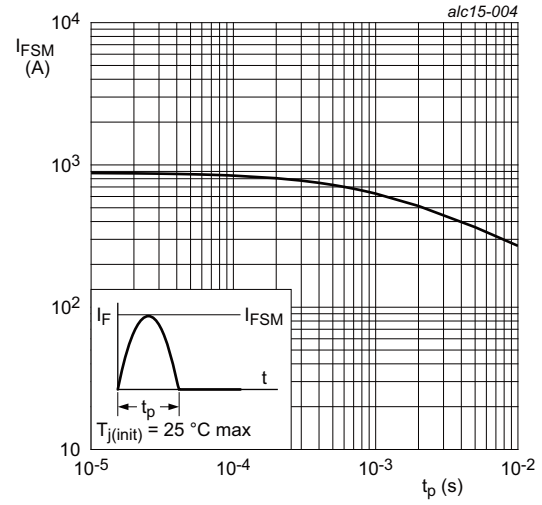


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	-	-	0.8	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	40	-	K/W

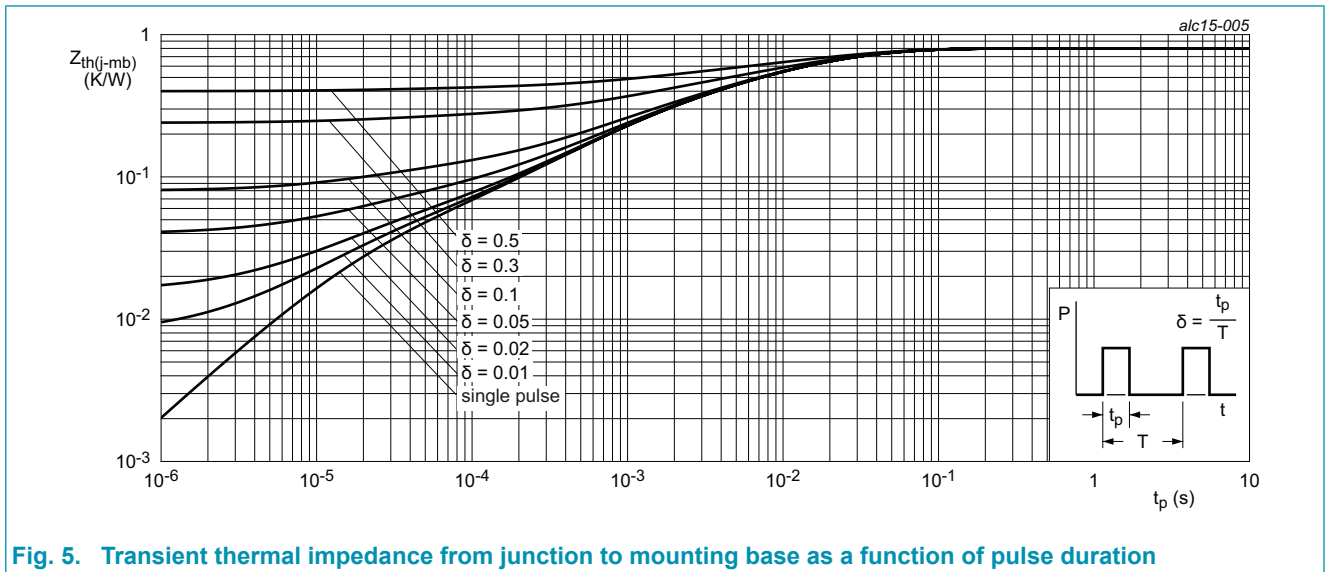
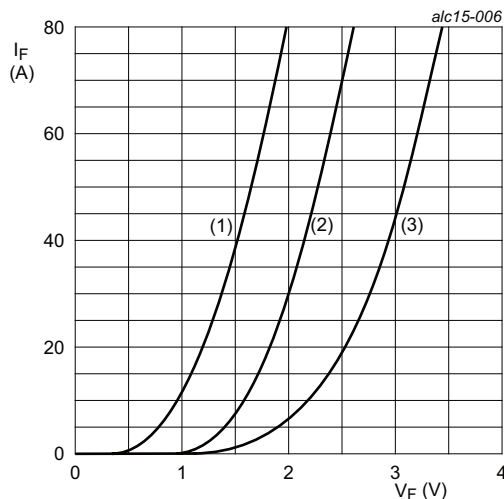


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 30\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$	-	2	2.75	V
		$I_F = 30\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$	-	1.38	2	V
I_R	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	10	μA
		$V_R = 600\text{ V}; T_j = 125\text{ °C}$	-	-	1	mA
Dynamic characteristics						
Q_r	reverse charge	$I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	51	-	nC
		$I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	205	-	nC
t_{rr}	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	18	-	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	34	-	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	54	-	ns
		$I_F = 30\text{ A}; V_R = 400\text{ V}; di_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	26	-	ns
I_{RM}	peak reverse recovery current	$I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	3	-	A
		$I_F = 30\text{ A}; V_R = 200\text{ V}; di_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	7.7	-	A



$V_o = 1.620\text{ V}; R_s = 0.0132\ \Omega$
 (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

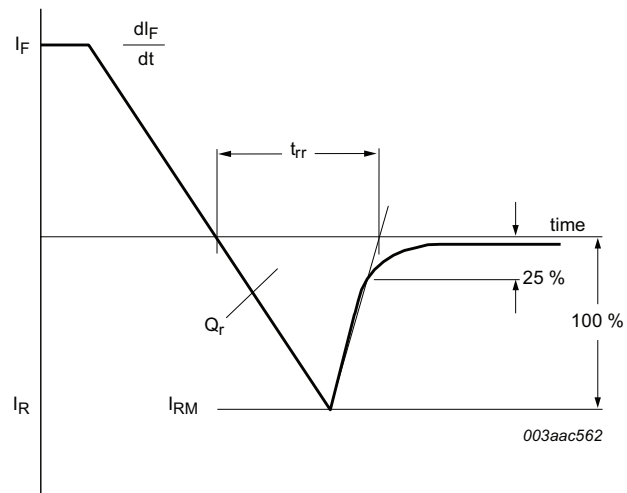
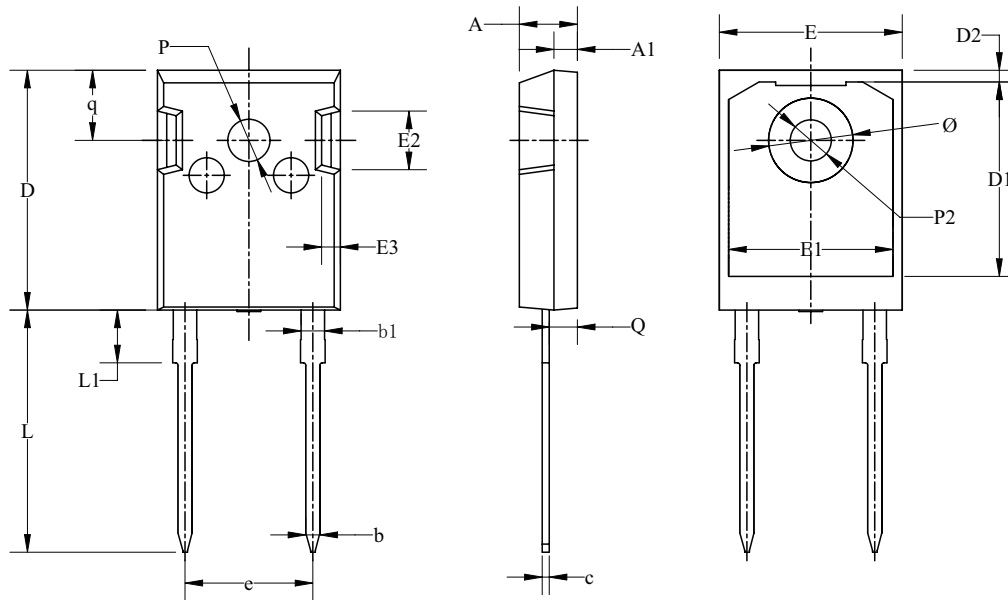


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended through-hole package; headsink mounted; 1 mounting hole; 2 leads TO-247

TO247-2L



Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.70	4.95	5.20
A1	1.90	2.00	2.10
b	1.00	1.20	1.40
b1	1.80	2.00	2.20
c	0.50	0.60	0.70
D	20.30	20.45	20.60
D1	16.20	16.58	16.87
D2	0.80	1.00	1.20
E	15.45	15.60	15.75
E1	13.82	14.02	14.22
E2	4.80	5.00	5.20
E3	1.40	1.60	1.80
e	10.90 BSC		
L	20.40	20.65	20.90
L1	4.25	4.50	4.75
P2	3.40	3.50	3.60
P	3.50	3.60	3.70
Q	2.20	2.40	2.60
q	5.78	5.98	6.18
Ø	7.10	7.19	7.30

12. Legal information

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

1. General description.....	1
2. Features and benefits	1
3. Applications	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values	3
9. Thermal characteristics	5
10. Characteristics.....	6
11. Package outline	7
12. Legal information	8
13. Contents	10

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