

## 1. General description

Hyperfast power diode in a TO-247 ( True 2- pin) 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

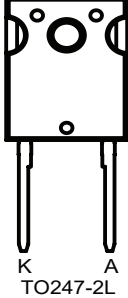
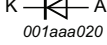
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 87$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	30			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 87$ °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; <a href="#">Fig. 4</a>	260			A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse;	285			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>	-	2.3	3.3	V
		$I_F = 30$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>	-	1.5	2.5	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 200$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	17	-	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	mb	mounting base; connected to cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC30DW-600P	TO247-2L	BYC30DW-600PQ	Tube	30	TO247A-2L	23-Jun-2017

## 7. Marking

Table 4. Marking codes

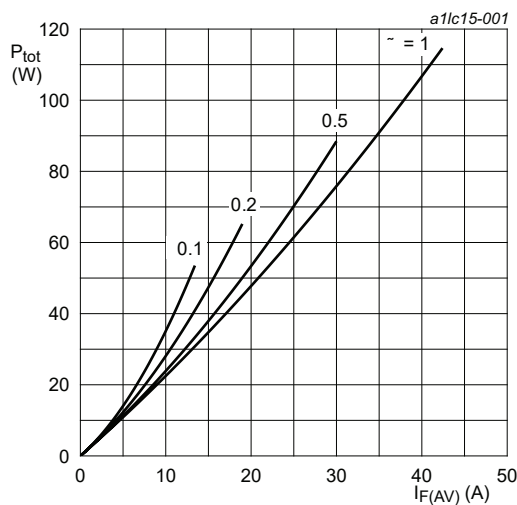
Type number	Marking codes
BYC30DW-600P	BYC30DW-600P

## 8. Limiting values

**Table 5. Limiting values**

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

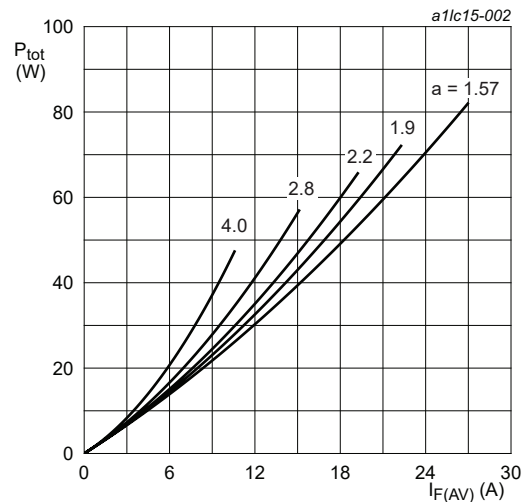
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		600	V
$V_{RWM}$	crest working reverse voltage		600	V
$V_R$	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 87$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	30	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 87$ °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; <a href="#">Fig. 4</a>	260	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse;	285	A
$T_{stg}$	storage temperature		-55 to 175	°C
$T_j$	junction temperature		175	°C



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

$$V_o = 2.107 \text{ V}; R_s = 0.0140 \text{ } \Omega$$

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



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

$$V_o = 2.107 \text{ V}; R_s = 0.0140 \text{ } \Omega$$

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

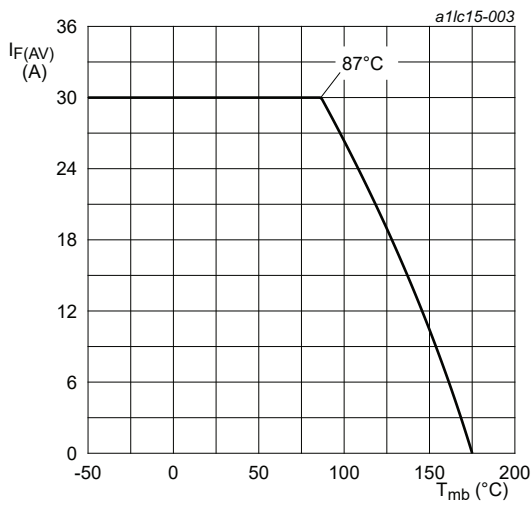


Fig. 3. Forward current as a function of mounting base temperature; maximum values

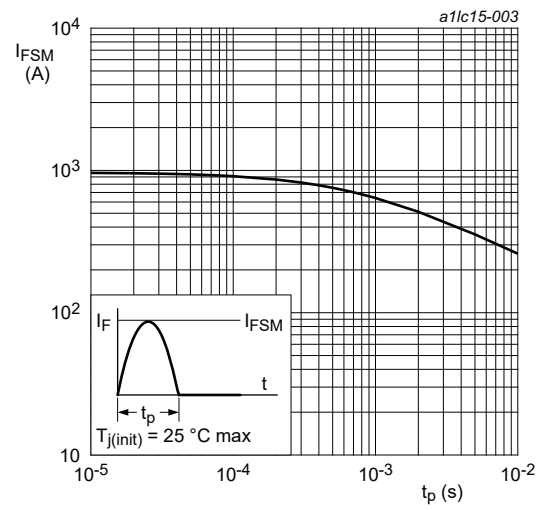


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

### 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	<a href="#">Fig. 5</a>	-	-	1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	40	-	K/W

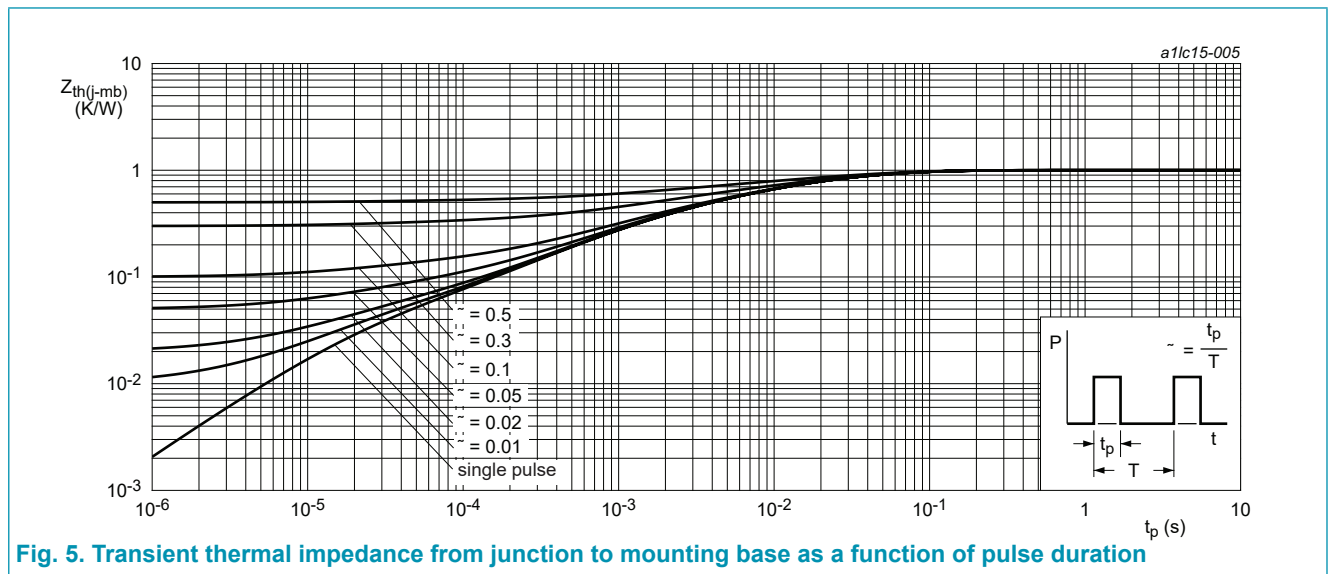
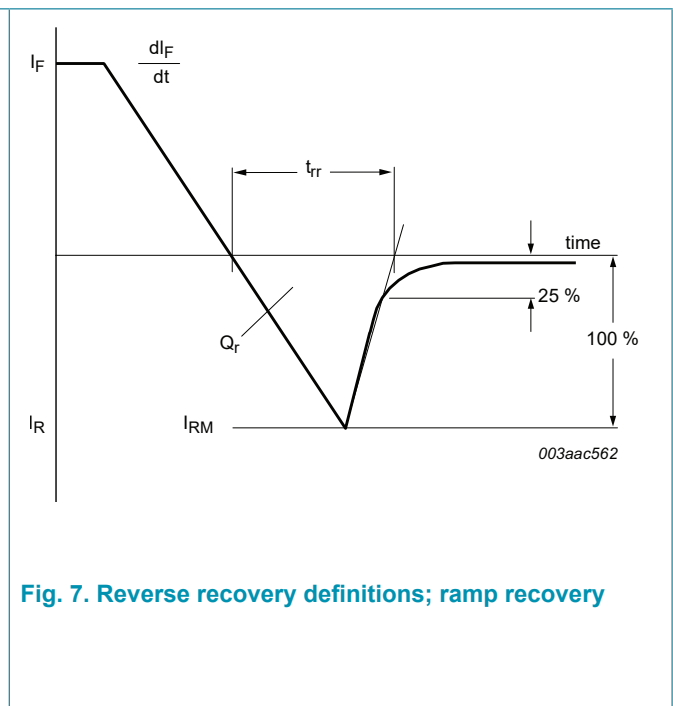
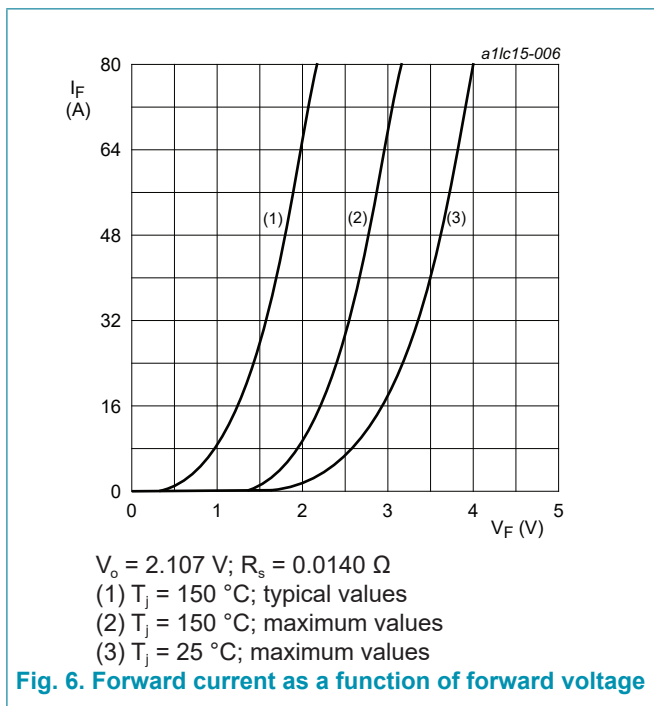


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

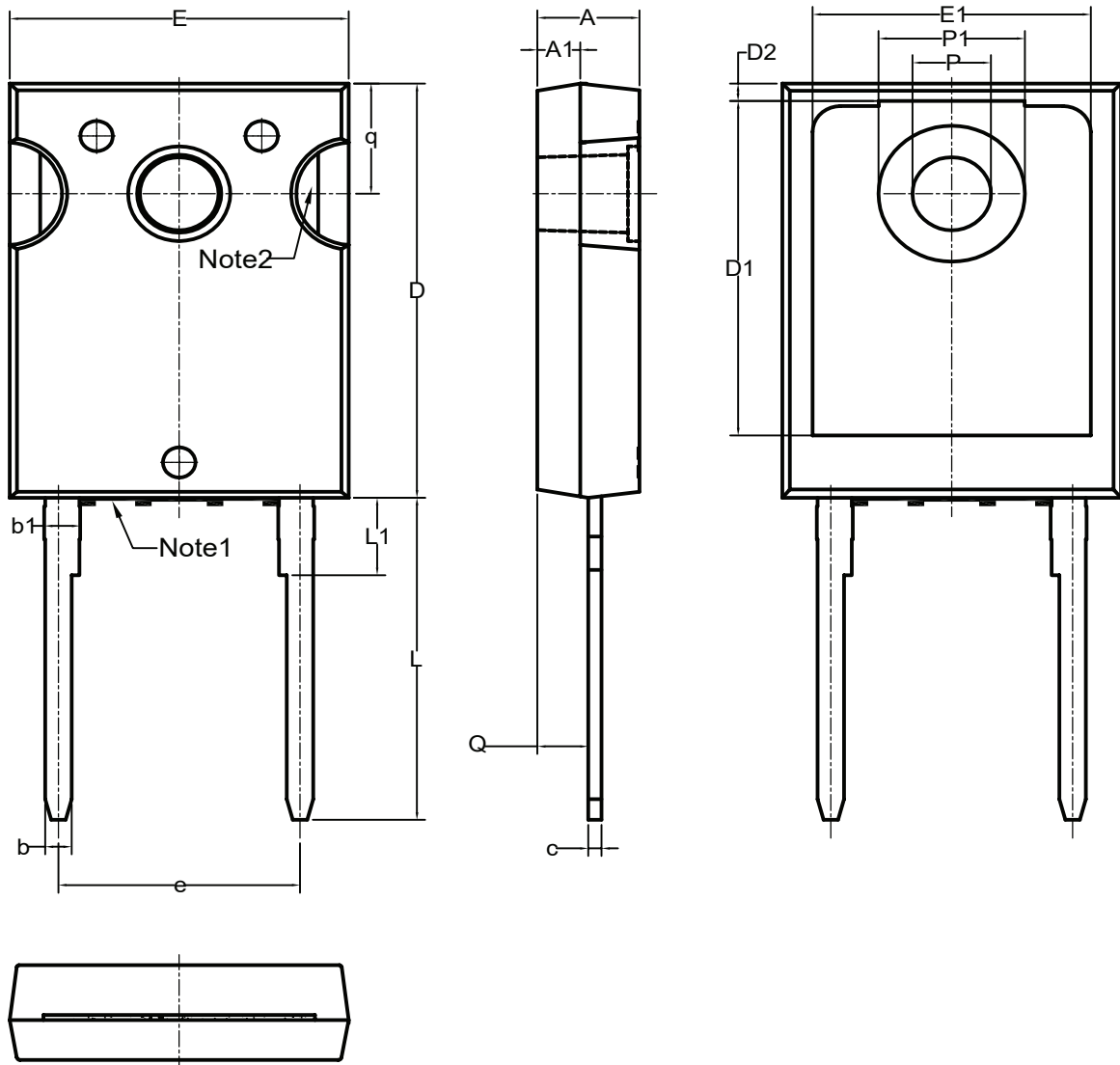
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward current	$I_F = 30\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$	-	2.3	3.3	V
		$I_F = 30\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$	-	1.5	2.5	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	10	$\mu\text{A}$
		$V_R = 600\text{ V}; T_j = 150\text{ °C}$	-	-	1	mA
<b>Dynamic characteristics</b>						
$Q_r$	reverse charge	$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	46	-	nC
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	182	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	17	-	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	33	-	ns
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	51	-	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	$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	2.8	-	A
		$I_F = 30\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	7.1	-	A



### 11. Package outline

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

TO247-2L



Unit	A	A1	b	b1	c	D	D1	D2	E	E1	e	L	L1	P	P1	Q	q
MM	min	4.58	1.83	1.17	1.53	0.51	20.32	13.08	0.51	15.37	12.81	15.75	3.69	3.51	6.61	2.29	5.34
	max	4.82	2.13	1.35	1.77	0.71	20.82	---	1.35	15.87	---	16.25	3.93	3.65	6.85	2.66	5.58

- Note:
1. Mold resin protrusion.
  2. Metal exposed with Sn plating.

## 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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