

## 1. General description

EEPP™ - Efficiency Enhanced Pt Planar rectifier in a TO247-2L 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

- Switched-Mode Power Supplies
- Power factor correction diode
- Uninterrupted Power Supply

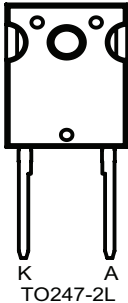

## 4. Quick reference data

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; $T_{mb} \leq 96^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	40			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25 \mu\text{s}$ ; $T_{mb} \leq 96^{\circ}\text{C}$ ; square-wave pulse	80			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>	300			A
		$t_p = 8.3 \text{ ms}$ ; $T_{j(init)} = 25^{\circ}\text{C}$ ; sine-wave pulse;	330			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 40 \text{ A}$ ; $T_j = 25^{\circ}\text{C}$ ; <a href="#">Fig. 6</a>	-	2.8	3.3	V
		$I_F = 40 \text{ A}$ ; $T_j = 150^{\circ}\text{C}$ ; <a href="#">Fig. 6</a>	-	2.2	-	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>	-	52	-	ns
<b>Avalanche energy</b>						
$E_{AS}$	non-repetitive avalanche energy	$T_{j(init)} = 25^{\circ}\text{C}$	30	-	-	mJ

## 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
BYC40W-1200P	TO247-2L	BYC40W-1200PQ	Tube	30	TO247A-2L	23-Jun-2017

## 7. Marking

Table 4. Marking codes

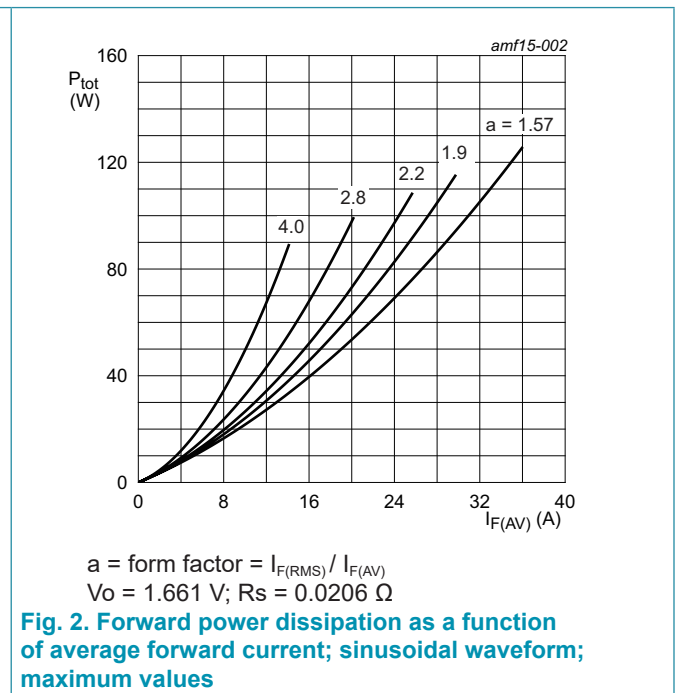
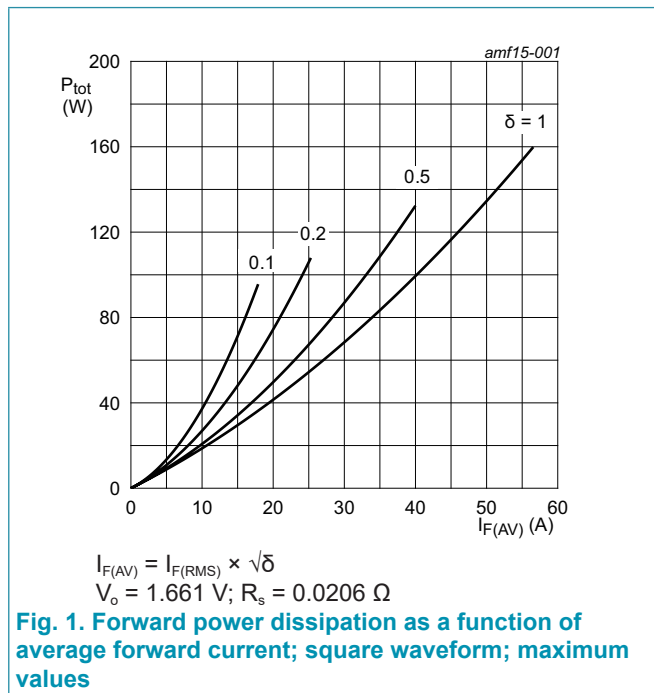
Type number	Marking codes
BYC40W-1200P	BYC40W-1200P

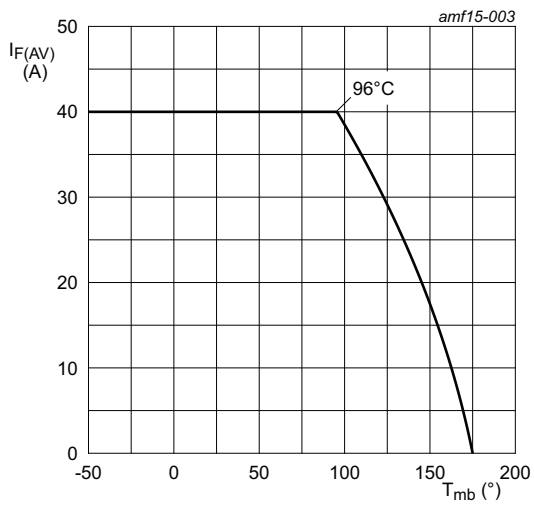
## 8. Limiting values

**Table 5. Limiting values**

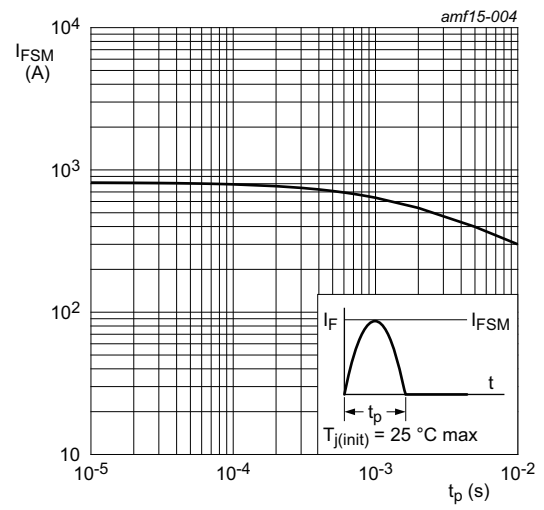
In accordance with the Absolute Maximum Rating System (IEC 60134).

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; $T_{mb} \leq 96 \text{ }^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	40	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25 \text{ } \mu\text{s}$ ; $T_{mb} \leq 96 \text{ }^\circ\text{C}$ ; square-wave pulse	80	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; <a href="#">Fig. 4</a>	300	A
		$t_p = 8.3 \text{ ms}$ ; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$ ; sine-wave pulse;	330	A
$T_{stg}$	storage temperature		-65 to 175	$^\circ\text{C}$
$T_j$	junction temperature		175	$^\circ\text{C}$





**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>	-	-	0.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

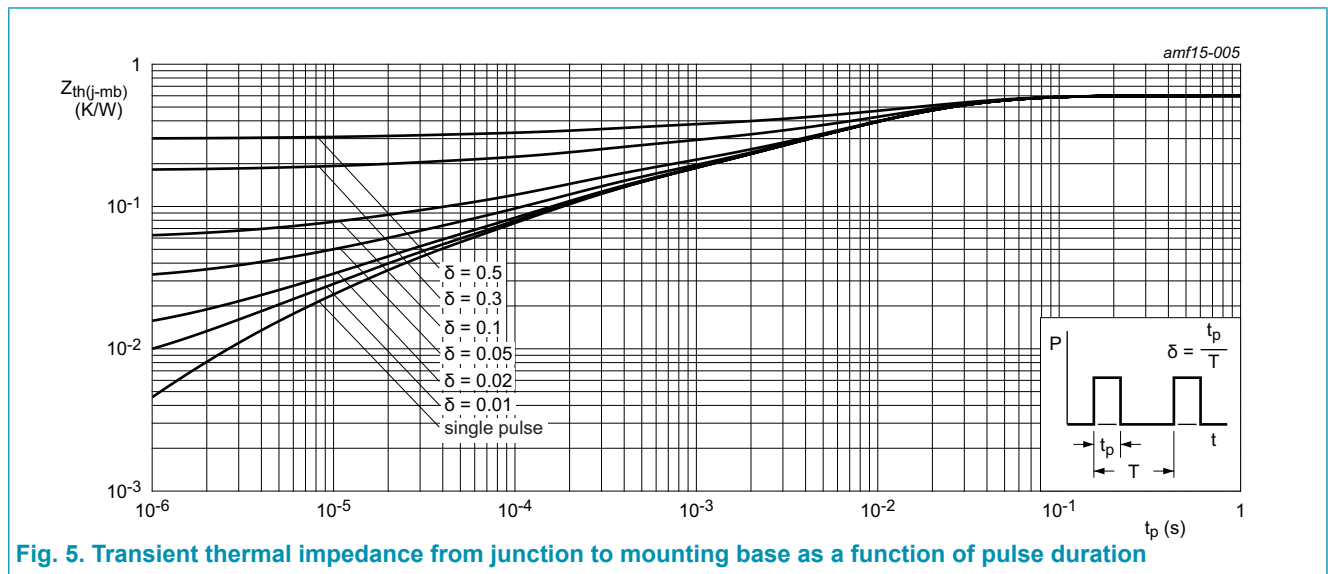
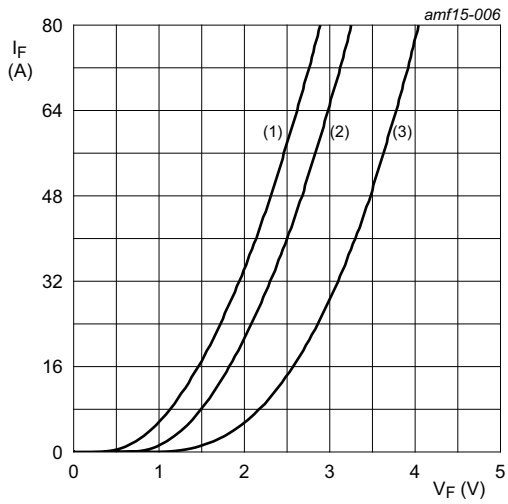


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward current	$I_F = 40 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	2.8	3.3	V
		$I_F = 40 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	2.2	-	V
$I_R$	reverse current	$V_R = 1200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	250	$\mu\text{A}$
		$V_R = 1200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	2	mA
<b>Dynamic characteristics</b>						
$Q_r$	reverse charge	$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	863	-	nC
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	2314	-	nC
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	2637	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; di_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	52	-	ns
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	91	-	ns
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	172	-	ns
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	186	-	ns
$I_{RM}$	peak reverse recovery current	$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	19	-	A
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	27	-	A
		$I_F = 40 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	28.4	-	A
<b>Avalanche energy</b>						
$E_{AS}$	non-repetitive avalanche energy	$T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$	30	-	-	mJ



$V_o = 1.661 \text{ V}; R_s = 0.0206 \ \Omega$   
 (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

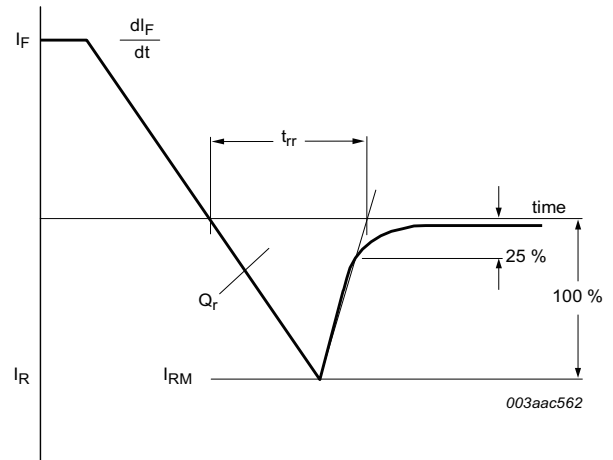
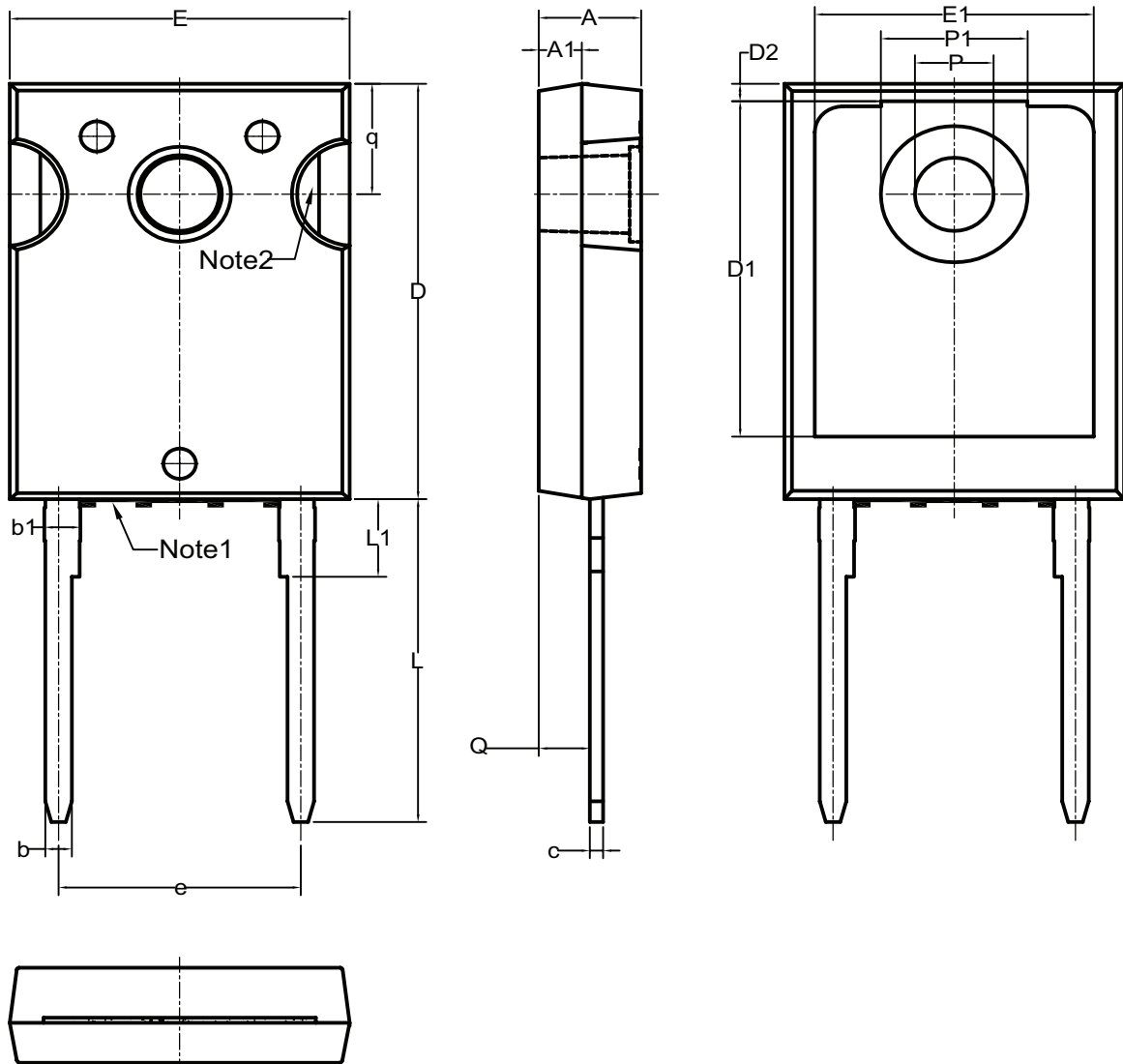


Fig. 7. Reverse recovery definitions; ramp recovery

### 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
min	4.58	1.83	1.17	1.53	0.51	20.32	13.08	0.51	15.37	12.81	11.126 (BSC)	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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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## 13. Contents

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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 .....	8
12. Legal information .....	9
13. Contents .....	11

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