BYC60W-1200P

Hyperfast power diode

Rev.02 - 18 May 2023 Product data sheet

1. General description

EEPP™- Efficiency Enhanced Pt Planar diode in a 2-leads 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
- High operating temperature capability ($T_{j\,(max)}$ = 175°C)
- Higher I_{FSM} capability
- Planar termination structure

3. Applications

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

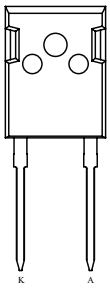
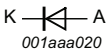
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		1200				V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 80$ °C; Fig. 1; Fig. 2; Fig. 3	60				A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 80$ °C; square-wave pulse	120				A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	500				A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse;	550				A
Symbol	**Parameter**	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 60 A; T_j = 25 °C; Fig. 6		-	2.8	3.3	V
		I_F = 60 A; T_j = 150 °C; Fig. 6		-	2.2	-	V
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 7		-	55	-	ns
Avalanche energy							
E_{AS}	non-repetitive avalanche energy	$T_{j(init)}$ = 25 °C		50	-	-	mJ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 TO247-2L	 *001aaa020*
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
BYC60W-1200P	TO247-2L	BYC60W-1200PQ	Tube	30	TO247P-2L	31-Mar-2023

7. Marking

Table 4. Marking codes

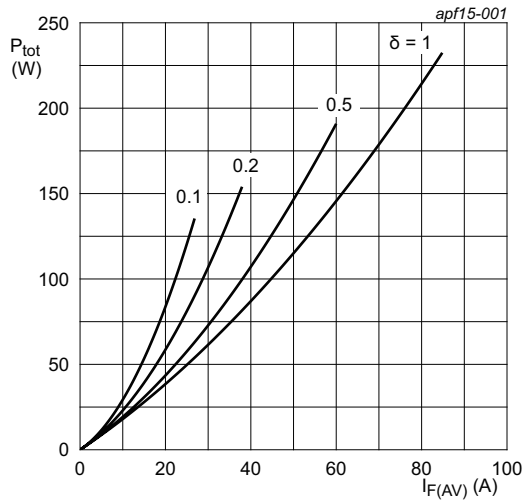
Type number	Marking codes
BYC60W-1200P	BYC60W 1200P

8. Limiting values

Table 5. Limiting values

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

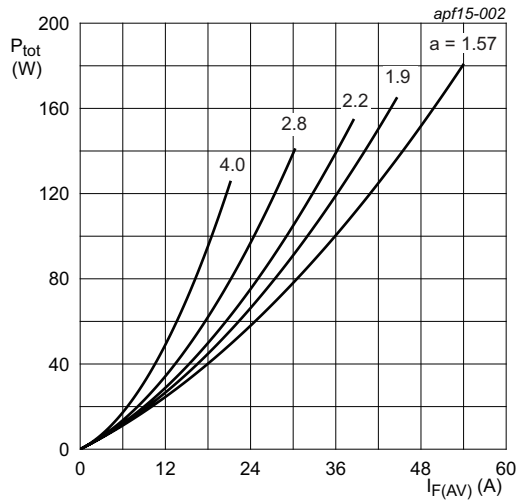
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		1200	V
V_{RWM}	crest working reverse voltage		1200	V
V_R	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 80$ °C; Fig. 1; Fig. 2; Fig. 3	60	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 80$ °C; square-wave pulse	120	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	50	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse;	550	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 = 1.673 V; R_s = 0.0126 Ω

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



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

V_o = 1.673 V; R_s = 0.0126 Ω

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

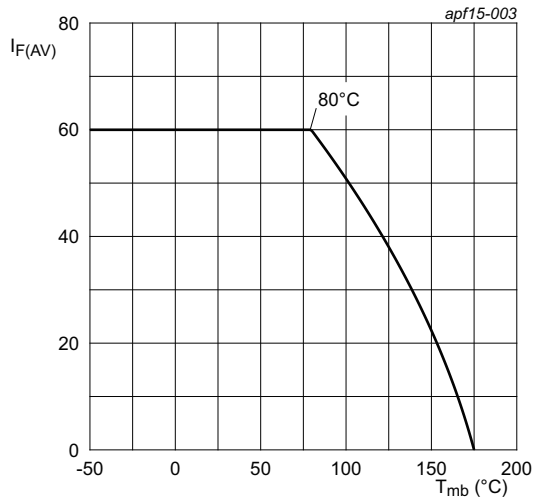


Fig. 3. Forward current as a function of mounting base temperature; maximum values

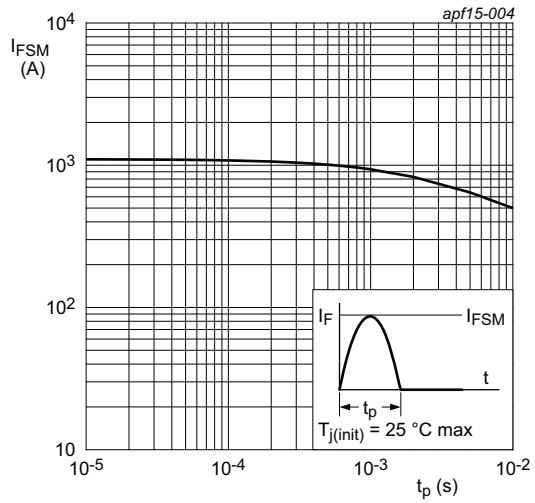


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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

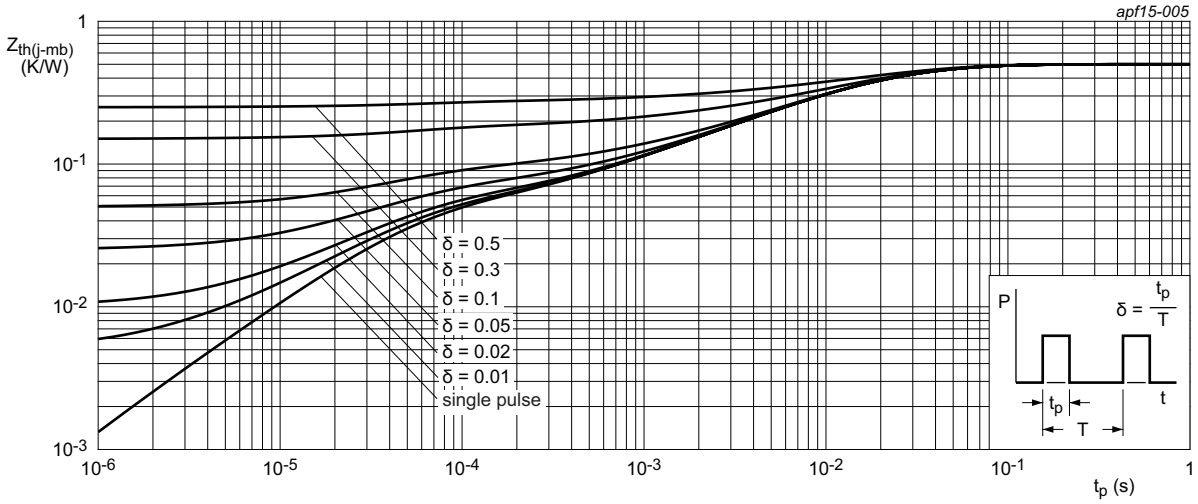
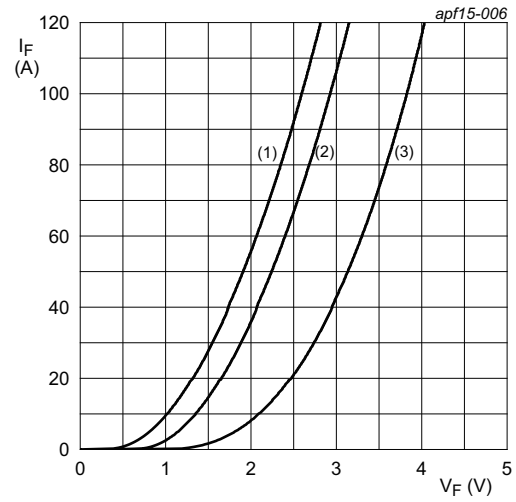


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 60 A; T_j = 25 °C; Fig. 6		-	2.8	3.3	V
		I_F = 60 A; T_j = 150 °C; Fig. 6		-	2.2	-	V
I_R	reverse current	V_R = 1200 V; T_j = 25 °C		-	-	250	µA
		V_R = 1200 V; T_j = 150 °C		-	-	2	mA
Dynamic characteristics							
Q_r	reverse charge	I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	952	-	nC
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125 °C; Fig. 7		-	2920	-	nC
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 150 °C; Fig. 7		-	3425	-	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 7		-	55	-	ns
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	96	-	ns
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125 °C; Fig. 7		-	194	-	ns
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 150 °C; Fig. 7		-	212	-	ns
I_{RM}	peak reverse recovery current	I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	20	-	A
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125 °C; Fig. 7		-	30.2	-	A
		I_F = 50 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 150 °C; Fig. 7		-	32.3	-	A
Avalanche energy							
E_{AS}	non-repetitive avalanche energy	$T_{j(init)}$ = 25 °C		50	-	-	mJ



V_o = 1.673 V; R_s = 0.0126 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

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

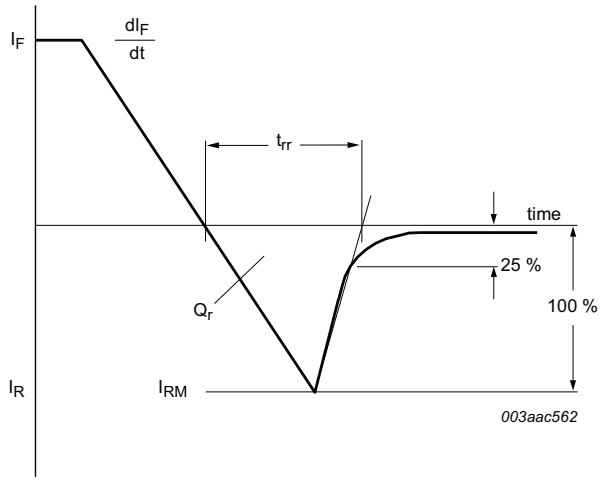
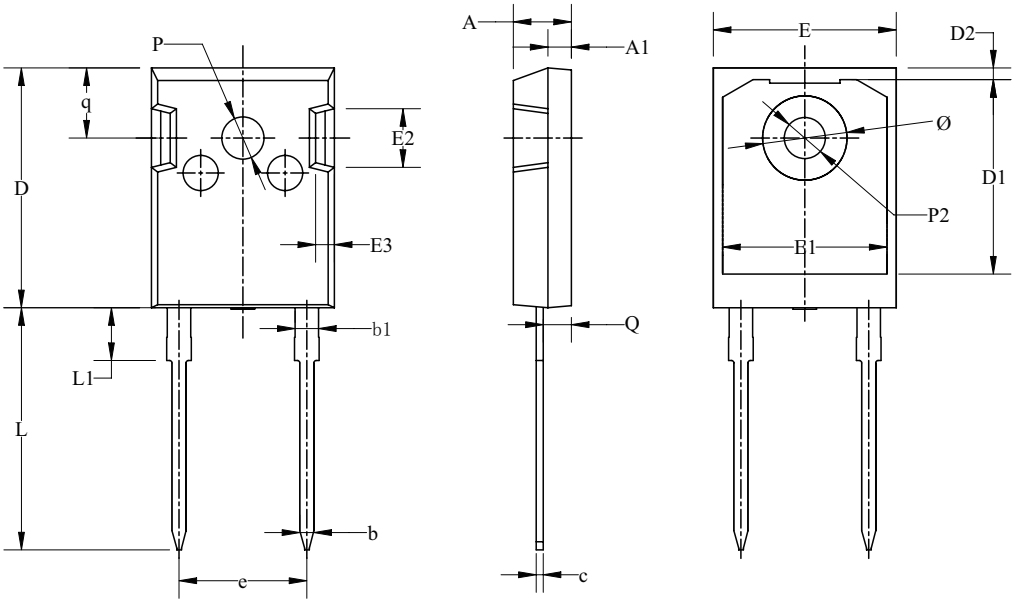


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended through-hole pack age; 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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13. Contents

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