BYC75W-600P

Hyperfast power diode

Rev.02 - 8 August 2019 Product data sheet

1. General description

Hyperfast power diode in a 2-lead TO247 (SOD142) plastic package.

2. Features and benefits

- Fast switching and soft reverse recovery characteristics
- Low forward voltage drop
- Low leakage current
- Low reverse recovery current
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- UPS
- EV Charger
- Welding Machine
- Air Conditioner

4. Quick reference data

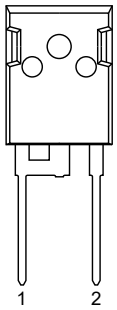
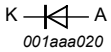
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 56$ °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3		-	-	75	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ µs; $T_{mb} \leq 56$ °C; square-wave pulse		-	-	150	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4		-	-	700	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4		-	-	750	A
Static characteristics							
V_F	forward voltage	$I_F = 75$ A; $T_j = 25$ °C; Fig. 6		-	2.2	2.75	V
		$I_F = 75$ A; $T_j = 150$ °C; Fig. 6		-	1.6	2.1	V
Dynamic characteristics							
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 50$ A/µs; $T_j = 25$ °C; Fig. 7		-	-	50	ns

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	42	-	ns
		I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	106	-	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
BYC75W-600P	TO247-2L	BYC75W-600PQ	Tube	30	SOD142	8-Aug-2019

7. Marking

Table 4. Marking codes

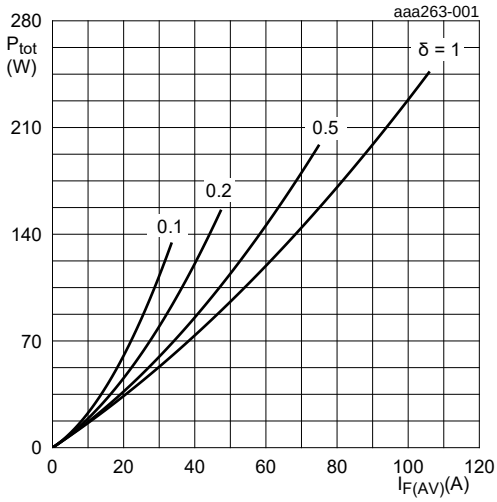
Type number	Marking code
BYC75W-600P	BYC75W-600P

8. Limiting values

Table 5. Limiting values

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

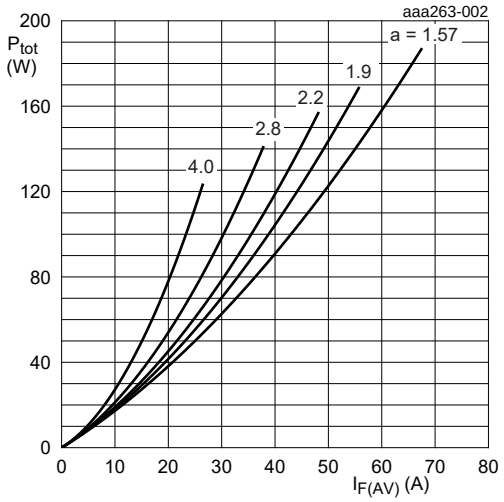
Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	600	V
V_{RWM}	crest working reverse voltage			-	600	V
V_R	reverse voltage	DC		-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 56$ °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3		-	75	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ µs; $T_{mb} \leq 56$ °C; square-wave pulse		-	150	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4		-	700	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4		-	750	A
T_{stg}	storage temperature			-55	175	°C
T_j	junction temperature			-	175	°C



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

$V_o = 1.547$ V; $R_s = 0.007$ Ω

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



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

$V_o = 1.547$ V; $R_s = 0.007$ Ω

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

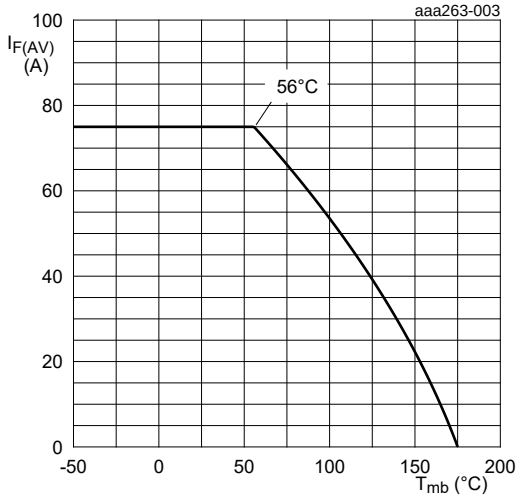


Fig. 3. Forward current as a function of mounting base temperature; maximum values

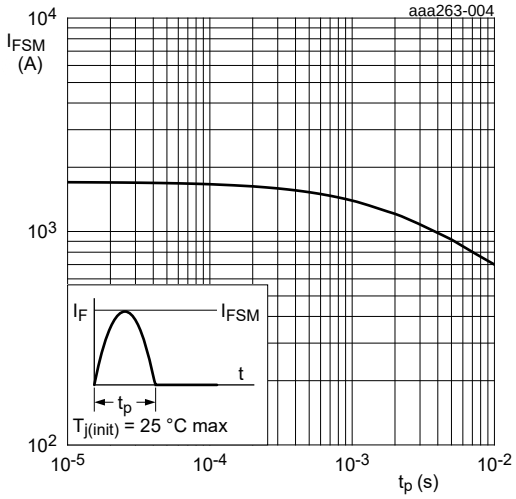


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	full cycles; Fig. 5		-	-	0.6	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient free air	in free air		-	45	-	K/W

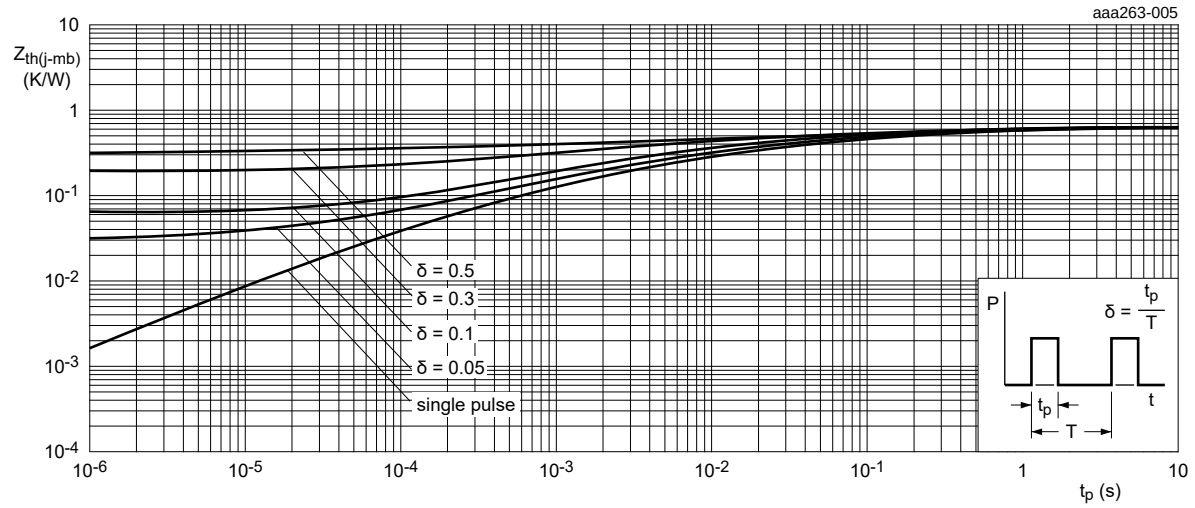
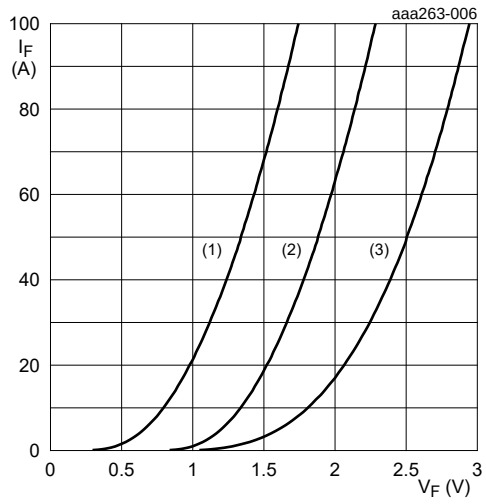


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 75 A; T_j = 25 °C; Fig. 6		-	2.2	2.75	V
		I_F = 75 A; T_j = 150 °C; Fig. 6		-	1.6	2.1	V
I_R	reverse current	V_R = 600 V; T_j = 25 °C		-	-	10	µA
		V_R = 600 V; T_j = 125 °C		-	-	1	mA
Dynamic characteristics							
Q_r	recovered charge	I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	85	-	nC
		I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	640	-	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 25 °C; Fig. 7		-	-	50	ns
		I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	42	-	ns
		I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	106	-	ns
I_{RM}	peak reverse recovery current	I_F = 75 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	4.1	-	A
		I_F = 60 A; V_R = 200 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	12.2	-	A



V_o = 1.547 V; R_s = 0.007 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

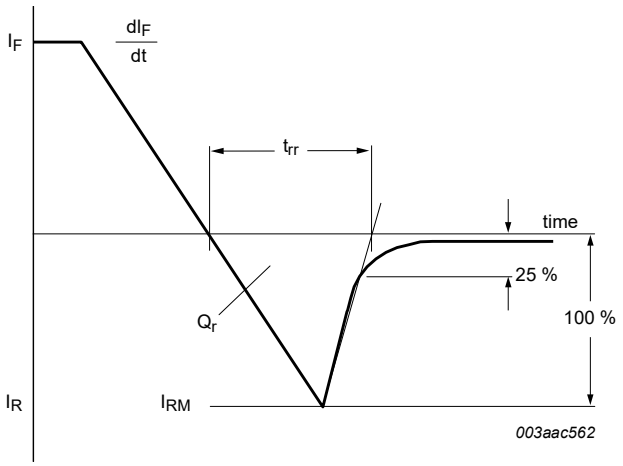
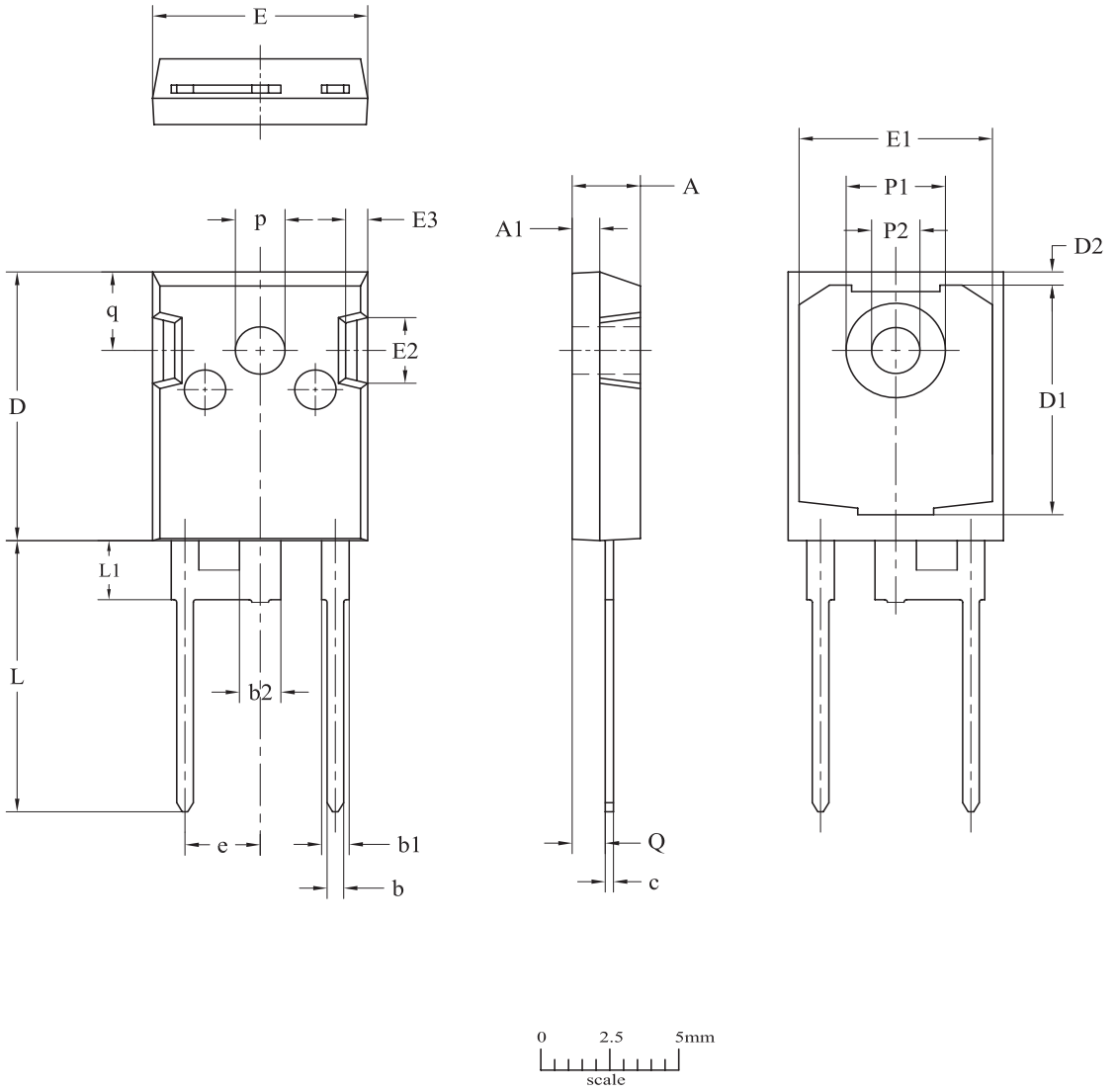


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended through-hole package; heatsink mounted;1 mounting hole; 2 lead TO-247 SOD142



Dimensions(mm are the original dimensions)

Unit		A	A_1	b	b_1	b_2	c	D	D_1	D_2	e	E	E_1	E_2	E_3	L	L_1	p	P_1	P_2	q	Q
mm	max	5.2	2.1	1.4	2.2	3.2	0.7	20.6	17.68	1.2	5.45	15.75	14.22	5.2	1.8	20.9	4.75	3.7	7.3	3.6	6.18	2.6
	nom	4.7	1.9	1.0	1.8	2.8	0.5	20.3	17.28	0.8		15.45	13.82	4.8	1.4	20.4	4.25	3.5	7.1	3.4	5.78	2.2
	min																					

Outline version	References				European projection	Issue date
	IEC	JEDEC	EIAJ			
SOD142		TO-247				19-08-08

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.
Product [short] data sheet	Production	This document contains the product specification.

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13. Contents

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