

1. General description

Hyperfast power diode in a TO263 plastic package.



2. Features and benefits

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

3. Applications

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

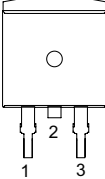
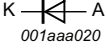
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage			650			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 127\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		8			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 127\text{ }^{\circ}\text{C}$; square-wave pulse		16			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		91			A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; sine-wave pulse		100			A
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 8\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 6		-	2.20	3.20	V
		$I_F = 8\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$; Fig. 6		-	1.45	2.45	V
Dynamic characteristics							
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7		-	13	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	nc	no connected		
2	K	cathode [1]		
3	A	anode		
mb	mb	mounting base; connected to cathod		

[1] It is not possible to connect to pin 2 of the TO-263 package.

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC8MB-650P	TO263	BYC8MB-650PJ	Reel	800	TO263d	17-Mar-2023

7. Marking

Table 4. Marking codes

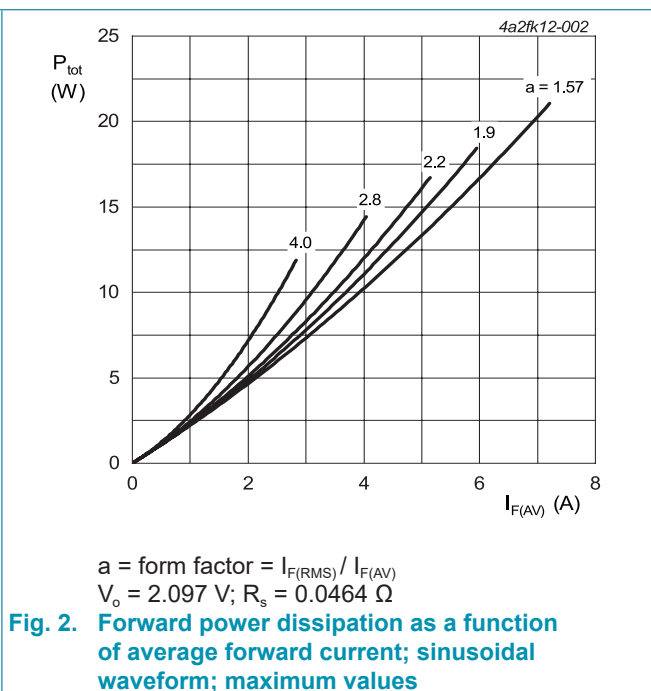
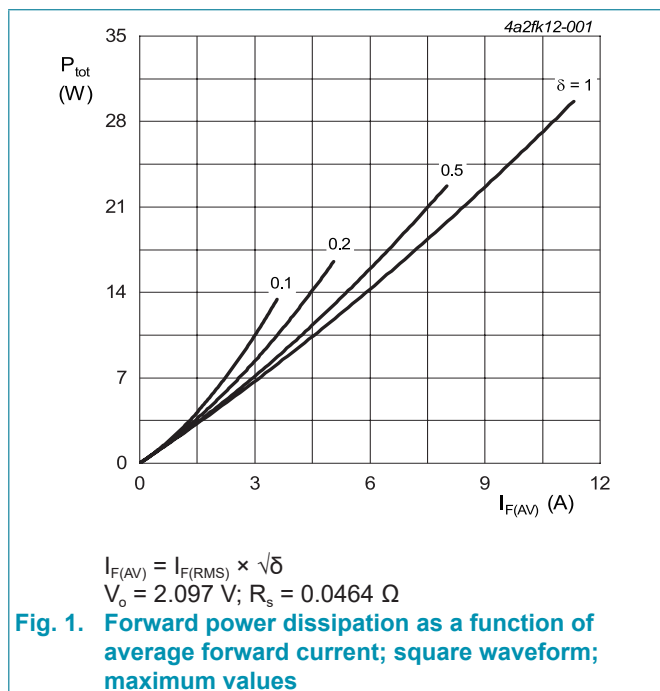
Type number	Marking codes
BYC8MB-650P	BYC8MB 650P

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{RRM}	repetitive peak reverse voltage			650	V
V_{RWM}	crest working reverse voltage			650	V
V_R	reverse voltage	DC		650	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 127\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		8	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 127\text{ }^\circ\text{C}$; square-wave pulse		16	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		91	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse		100	A
T_{stg}	storage temperature			-65 to 175	$^\circ\text{C}$
T_j	junction temperature			-65 to 175	$^\circ\text{C}$



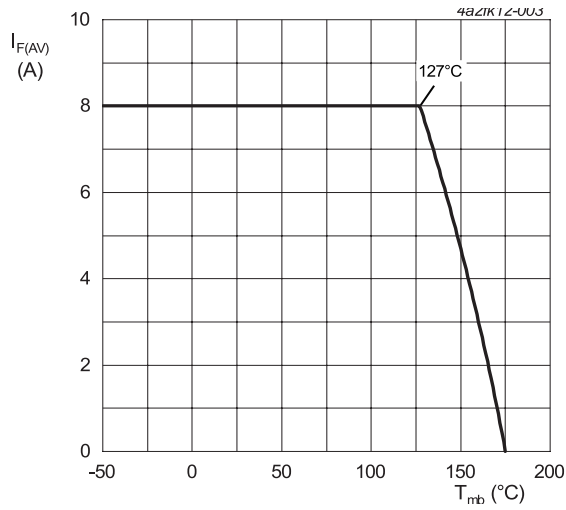


Fig. 3. Forward current as a function of mounting base temperature; maximum values

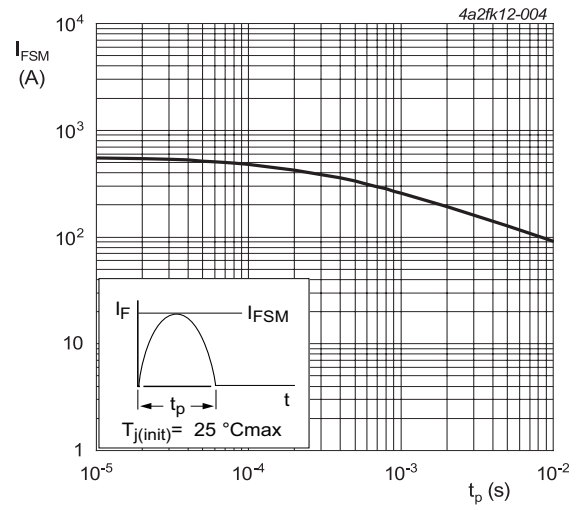


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 5		-	-	2.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

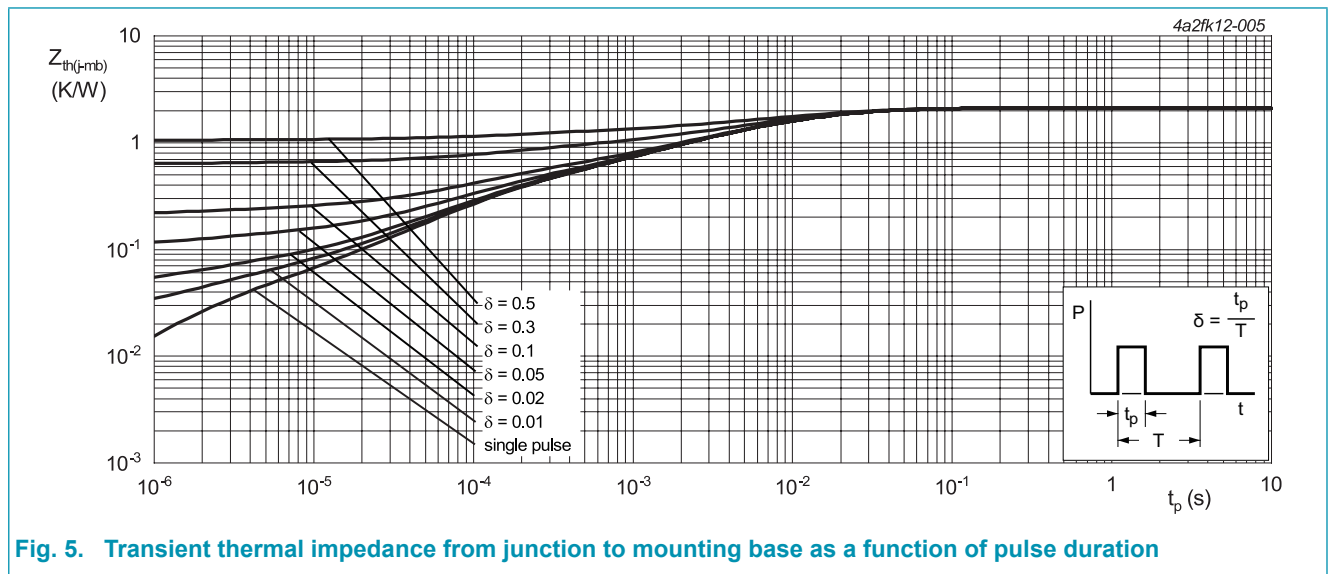


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 8\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$		-	2.20	3.20	V
		$I_F = 8\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$		-	1.45	2.45	V
I_R	reverse current	$V_R = 650\text{ V}; T_j = 25\text{ °C}$		-	0.6	30	μA
		$V_R = 650\text{ V}; T_j = 150\text{ °C}$		-	0.07	0.8	mA
Dynamic characteristics							
Q_r	reverse charge	$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$		-	38	-	nC
		$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$		-	93	-	nC
T_{rr}	reverse recovery time	$I_F = 0.5\text{ A}; I_R = 1\text{ A}; I_{RR} = 0.25\text{ A}; T_j = 25\text{ °C}$		-	20	-	ns
		$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$		-	13	-	ns
		$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$		-	28	-	ns
		$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$		-	45	-	ns
I_{RM}	peak reverse recovery current non-repetitive avalanche energy	$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$		-	2.7	-	A
		$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$		-	4.2	-	A
E_{as}	non-repetitive avalanche energy	$T_{j(\text{init})} = 25\text{ °C}$		10.8	-	-	mJ

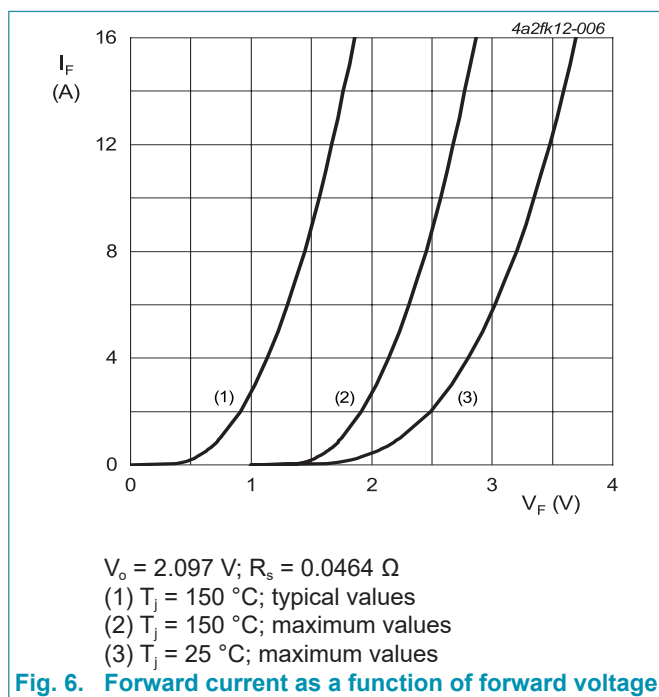


Fig. 6. Forward current as a function of forward voltage

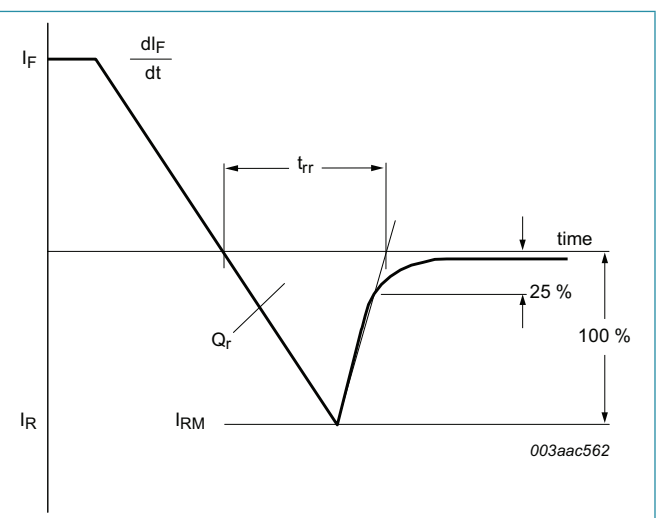
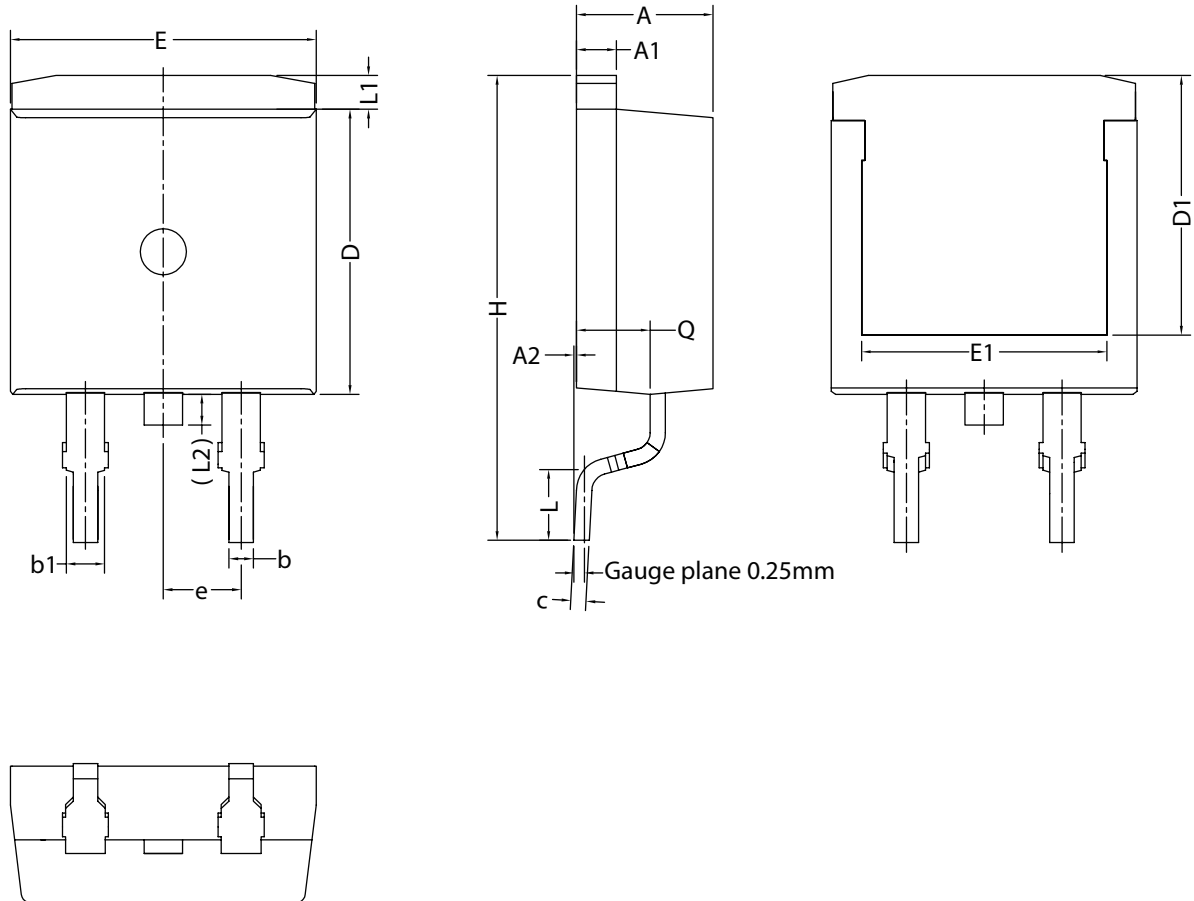


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended surface-mounted package (D2PAK);

TO263



Note:
All dimensions do not include mold flash or protrusion.

Unit	A	A1	A2	b	b1	c	D	D1	e	E	E1	H	L	L1	L2	Q
MM	min	4.30	1.27	0.00	0.75	1.20	0.45	9.00	7.65	9.85	7.80	14.84	1.90	0.90	--	2.20
	max	4.60	1.37	0.25	0.90	1.36	0.60	9.45	8.05	10.10	8.20	15.64	2.60	1.35	1.50	2.40

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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