BYV60W-600PT2

Ultrafast power diode

Rev.01 - 12 June 2020 Product data sheet

1. General description

Ultrafast power diode in a TO247-2L 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
- High operating temperature capability ($T_{j\,(max)}$ = 175°C)

3. Applications

- UPS
- EV Charger
- Welding Machine
- Air Conditioner

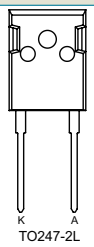
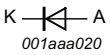
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		600				V
$I_{F(AV)}$	average forward current	δ = 0.5; T_{mb} ≤ 132 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	60				A
I_{FRM}	repetitive peak forward current	δ = 0.5; t_p = 25 µs; T_{mb} ≤ 132 °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	600				A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	660				A
Symbol	**Parameter**	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 60 A; T_j = 25 °C; Fig. 6		-	1.35	1.7	V
		I_F = 60 A; T_j = 150 °C; Fig. 6		-	1.1	1.4	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		-	40	-	ns

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 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
BYV60W-600PT2	TO247-2L	BYV60W-600PT2Q	Tube	30	TO247L-2L	28-Aug-2018

7. Marking

Table 4. Marking codes

Type number	Marking codes
BYV60W-600PT2	BYV60W 600PT2

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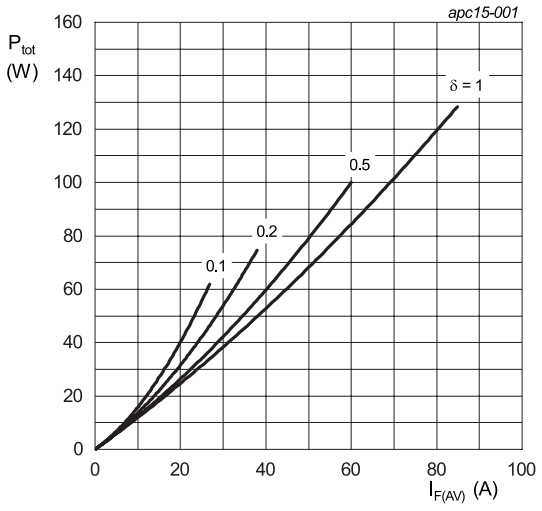
8. Limiting values

Table 5. Limiting values

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

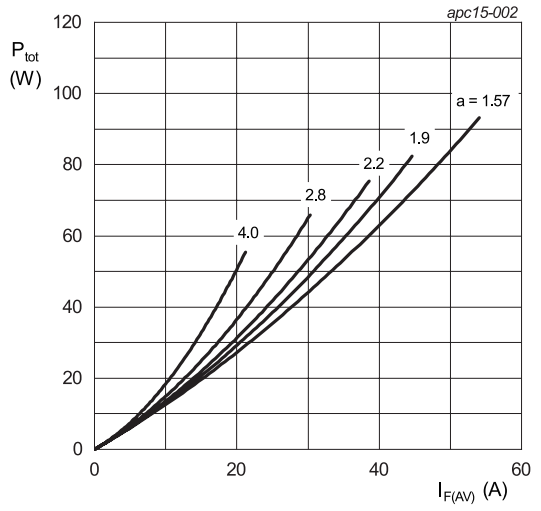
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	δ = 0.5; $T_{mb} \leq 132$ °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	60	A
I_{FRM}	repetitive peak forward current	δ = 0.5; t_p = 25 µs; $T_{mb} \leq 132$ °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	600	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	660	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 = 1.147 V; R_s = 0.0043 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 = 1.147 V; R_s = 0.0043 Ω

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

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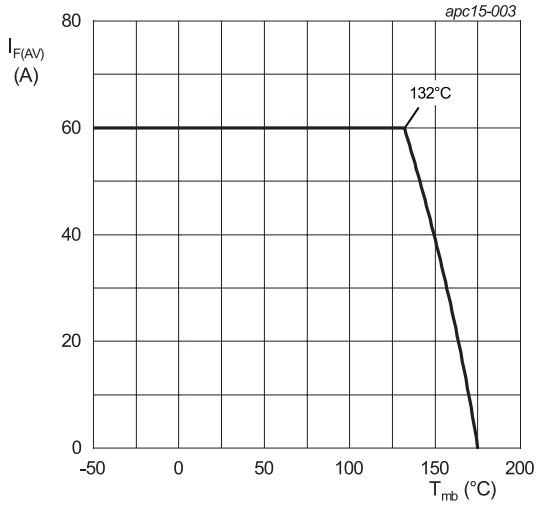

Fig. 3. Average forward current as a function of mounting base temperature; maximum values

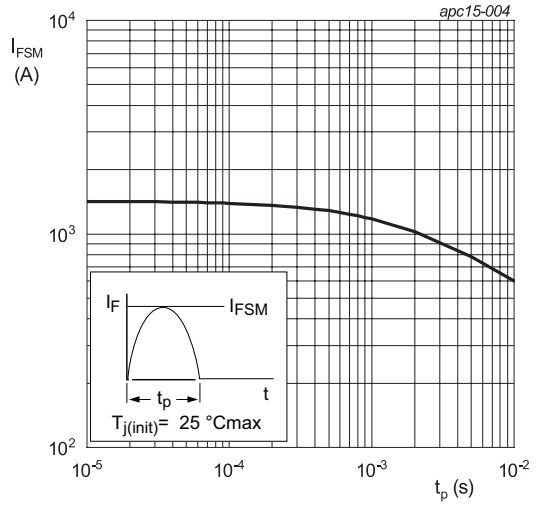

Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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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		-	-	0.43	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	40	-	K/W

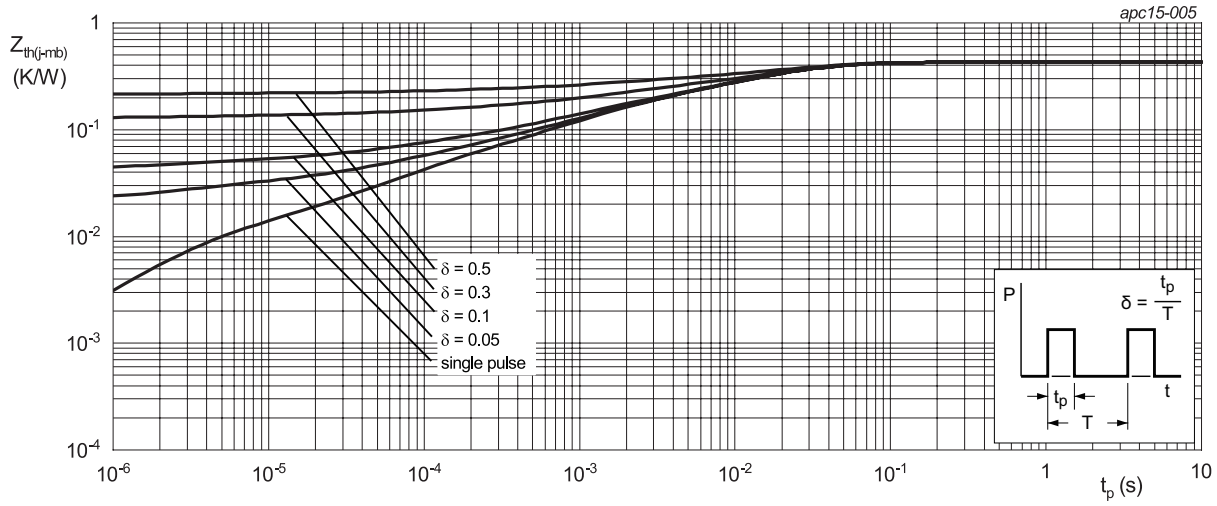

Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values

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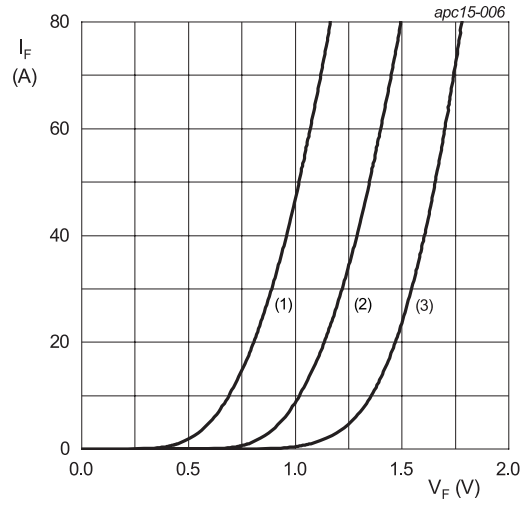
10. Characteristics

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		-	1.35	1.7	V
		I_F = 60 A; T_j = 125 °C; Fig. 6		-	1.2	1.5	V
		I_F = 60 A; T_j = 150 °C; Fig. 6		-	1.1	1.4	V
I_R	reverse current	V_R = 600 V; T_j = 25 °C		-	-	10	µA
		V_R = 600 V; T_j = 125 °C		-	-	500	µA
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		-	40	-	ns
		I_F = 50 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	79	-	ns
		I_F = 50 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	145	-	ns
I_{RM}	peak reverse recovery current	I_F = 50 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	8.3	-	A
		I_F = 50 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	18.5	-	A
Q_r	recovered charge	I_F = 50 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 25 °C; Fig. 7		-	325	-	nC
		I_F = 50 A; V_R = 400 V; dI_F/dt = 200 A/µs; T_j = 125 °C; Fig. 7		-	1345	-	nC



(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values
V_o = 1.147 V; R_s = 0.0043 Ω

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

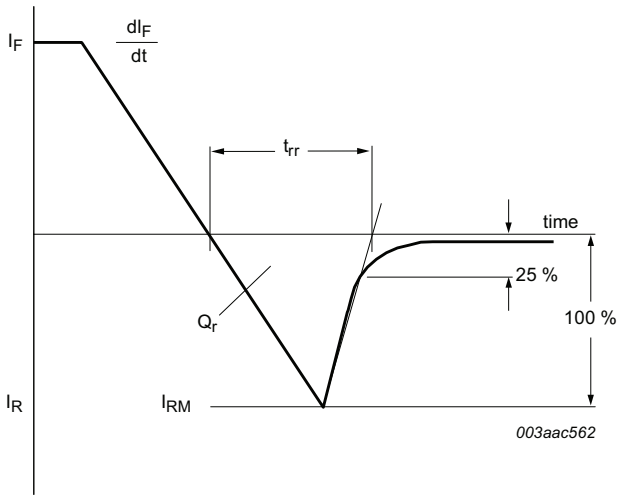


Fig. 7. Reverse recovery definitions; ramp recovery

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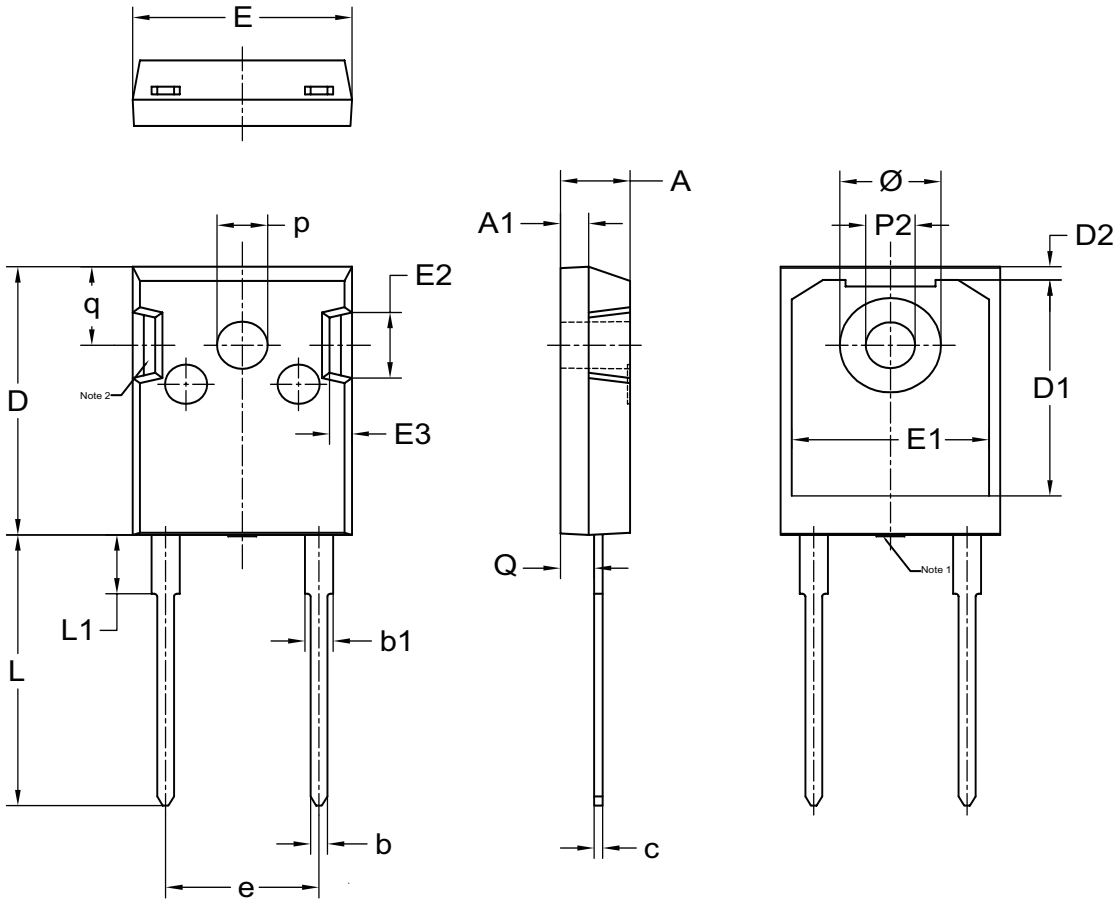
11. Package outline

Plastic single-ended through-hole package; heatsink mounted;1 mounting hole; 2 leads TO-247 TO247-2L



UNIT	A	A_1	b	b_1	c	D	D_1	D_2	E	E_1	E_2	E_3	e	L	L_1	P_2	p	Q	q	Ø
mm	5.20 4.70	2.10 1.90	1.40 1.00	2.20 1.80	0.70 0.50	20.60 20.30	17.78 17.28	1.20 0.80	15.75 15.45	14.22 13.82	5.20 4.80	1.80 1.40	10.90 BSC	20.72 20.22	4.75 4.25	3.60 3.40	3.70 3.50	2.60 2.20	6.18 5.78	7.30 7.10

Note:
1. Mold resin protrusion max 0.127mm.
2. Metal exposed with Sn plating.

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