

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 ($T_{j(max)} = 175^{\circ}\text{C}$)

3. Applications

- UPS
- EV Charger
- Welding Machine
- Air Conditioner

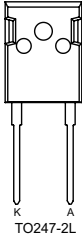

4. Quick reference data

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		
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

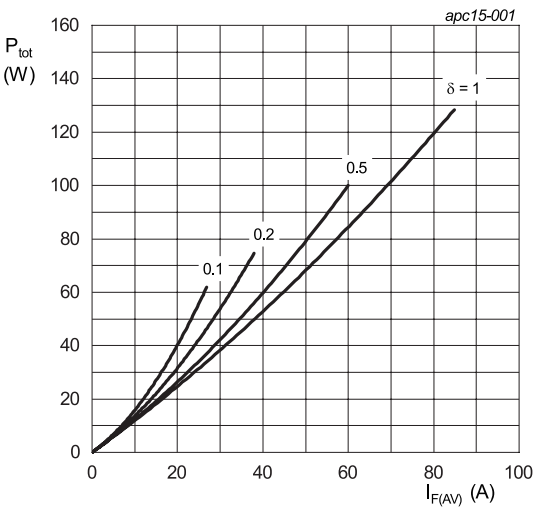
Table 4. Marking codes

Type number	Marking codes
BYV60W-600PT2	BYV60W 600PT2

8. Limiting values

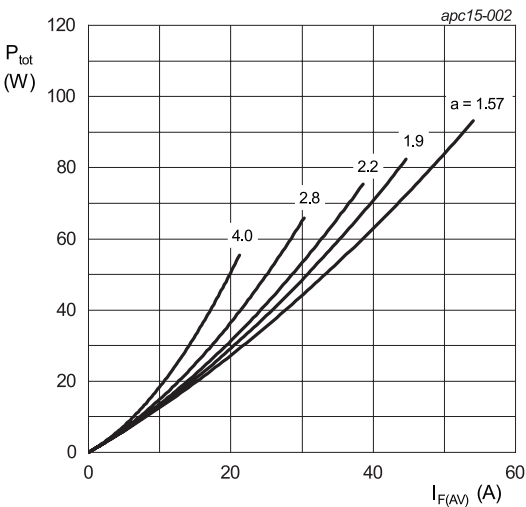
Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	$\delta = 0.5$; $T_{mb} \leq 132\text{ }^{\circ}\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	60	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 132\text{ }^{\circ}\text{C}$; square-wave pulse	120	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	600	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; sine-wave pulse	660	A
T_{stg}	storage temperature		-55 to 175	$^{\circ}\text{C}$
T_j	junction temperature		175	$^{\circ}\text{C}$



$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$
 $V_o = 1.147\text{ V}$; $R_s = 0.0043\text{ }\Omega$

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



$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$
 $V_o = 1.147\text{ V}$; $R_s = 0.0043\text{ }\Omega$

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

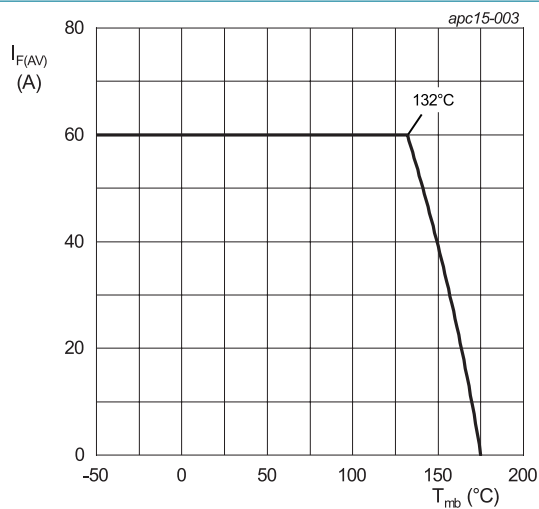


Fig. 3. Average forward current as a function of mounting base temperature; maximum values

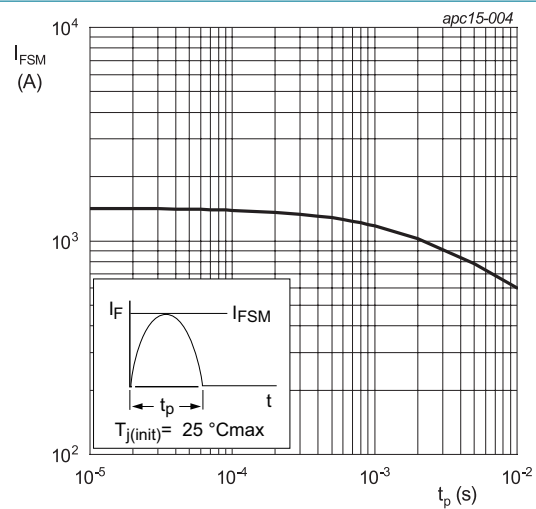


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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

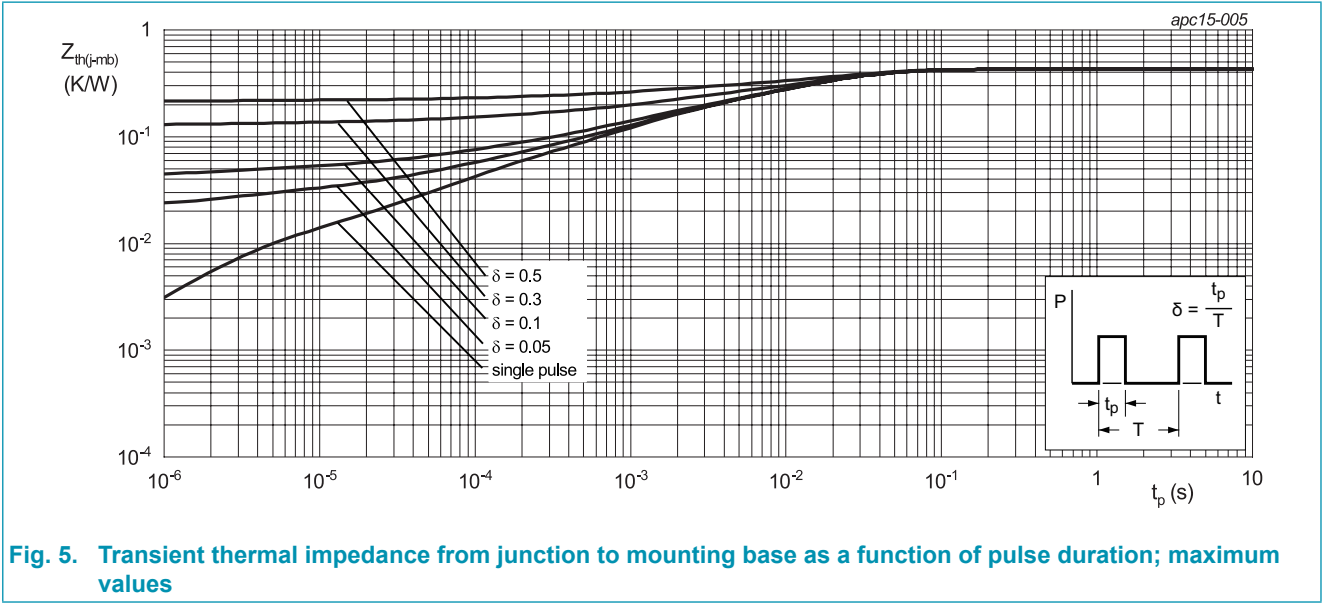
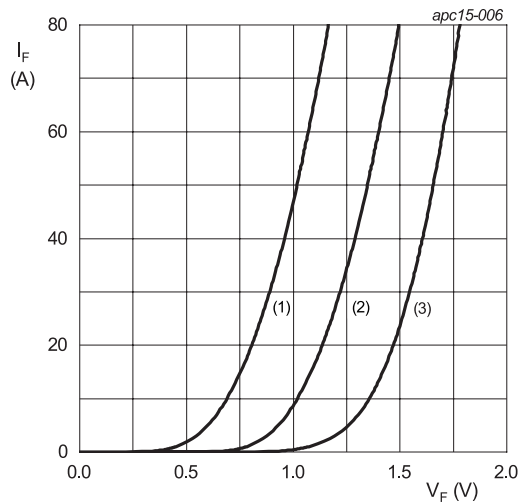


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values

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) $T_J = 150 \text{ }^\circ\text{C}$; typical values
 (2) $T_J = 150 \text{ }^\circ\text{C}$; maximum values
 (3) $T_J = 25 \text{ }^\circ\text{C}$; maximum values
 $V_o = 1.147 \text{ V}; R_s = 0.0043 \text{ } \Omega$

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

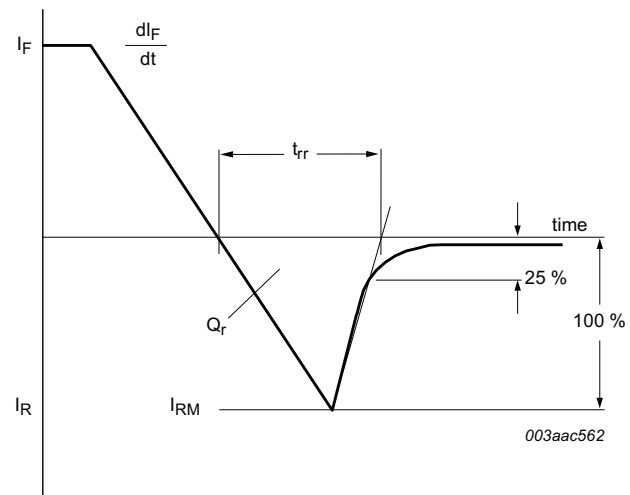
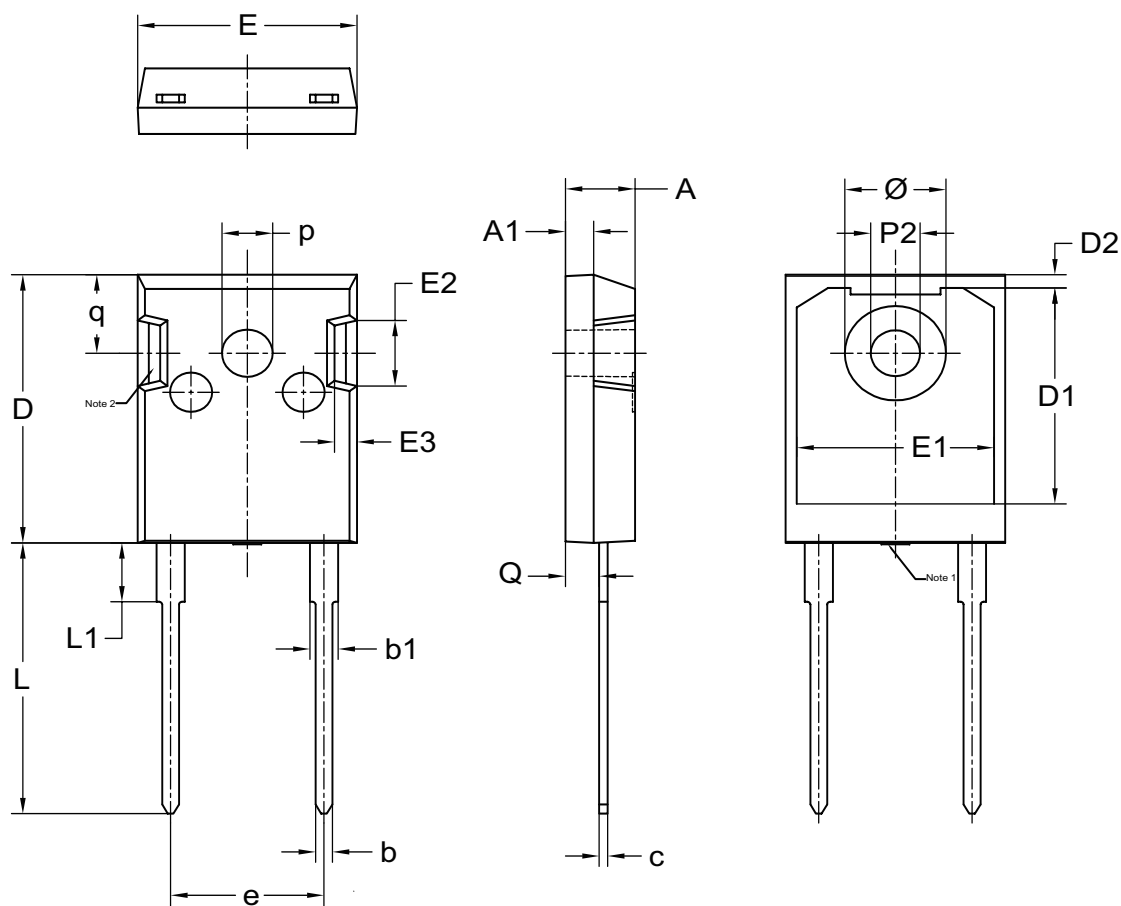


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

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

TO247-2L



UNIT	A	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	2.10	1.40	2.20	0.70	20.60	17.78	1.20	15.75	14.22	5.20	1.80	10.90	20.72	4.75	3.60	3.70	2.60	6.18	7.30
	4.70	1.90	1.00	1.80	0.50	20.30	17.28	0.80	15.45	13.82	4.80	1.40	BSC	20.22	4.25	3.40	3.50	2.20	5.78	7.10

Note:
1. Mold resin protrusion max 0.127mm.
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.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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