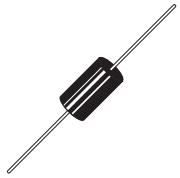
BZW50

Datasheet

5 kW TVS



R6

Features

- Peak pulse power:
  - 5000 W (10/1000 µs)
- Stand off voltage range from 10 V to 180 V
- Unidirectional and bidirectional diode
- Low clamping factor
- Fast response time
- UL497B, file number: QVGQ2.E136224

Description

Transil diodes provide high overvoltage protection by clamping action. Their instantaneous response to transient overvoltages makes them particularly suited to protect voltage sensitive devices such as MOS Technology and low voltage supplied ICs.

Product status link
BZW50

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter	Value	Unit
P_{PP}	Peak pulse power dissipation(1)	5000	W
P	Power dissipation on infinite heatsink	6.5	W
I_{FSM}	Non repetitive surge peak forward current for unidirectional types	500	A
T_{stg}	Storage temperature range	-65 to +175	°C
T_{op}	Maximum operating junction temperature	175	°C
T_L	Maximum lead temperature for soldering during 10 s at 5 mm from case.	260	°C

1. *For a surge greater than the maximum values, the diode will fail in short-circuit.*

Table 2. Thermal resistance parameter

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to leads	15	°C/W
$R_{th(j-a)}$	Junction to ambient on printed circuit. L_{lead} = 10 mm	65	°C/W

Figure 1. Electrical characteristics (definitions)

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current @ V_{RM}
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
V_F	Forward voltage drop
R_D	Dynamic resistance

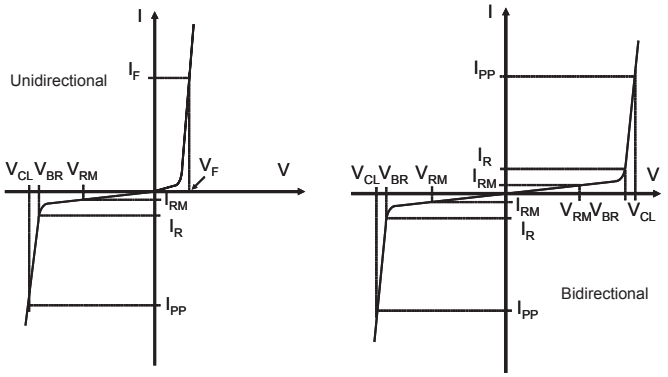


Figure 2. Pulse definition for electrical characteristics

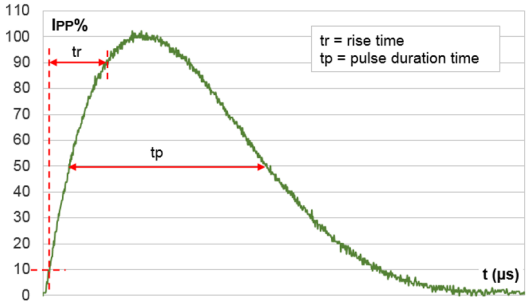


Table 3. Electrical characteristics - values (T_{amb} = 25 °C)

Order code		I_{RM} @ V_{RM} max.		V_{BR} @ I_R[1] min.		V_{CL} @ I_{PP} 10/1000 µs max.		V_{CL} @ I_{PP} 8/20 µs max.		αT[2]	C[3] typ.
Unidirectional	Bidirectional	µA	V	V	mA	V	A	V	A	10^{-4}/°C	pF
BZW50-10	BZW50-10B	5	10	11.1	1	18.8	266	23.4	2564	7.8	24000
BZW50-12	BZW50-12B	5	12	13.3	1	22	227	28	2143	8.4	18500
BZW50-15	BZW50-15B	5	15	16.6	1	26.9	186	35	1714	8.8	13500
BZW50-18	BZW50-18B	5	18	20	1	32.2	155	41.5	1446	9.2	11500
BZW50-22	BZW50-22B	5	22	24.4	1	39.4	127	51	1177	9.6	8500
BZW50-27	BZW50-27B	5	27	30	1	48.3	103	62	968	9.8	7000
BZW50-33	BZW50-33B	5	33	36.6	1	59	85	76	789	10	5750
BZW50-39	BZW50-39B	5	39	43.3	1	69.4	72	90	667	10.1	4800
BZW50-47	BZW50-47B	5	47	52	1	83.2	60.1	108	556	10.3	4100
BZW50-56	BZW50-56B	5	56	62.2	1	99.6	50	129	465	10.4	3400
BZW50-68	BZW50-68B	5	68	75.6	1	121	41	157	382	10.5	3000
BZW50-82	BZW50-82B	5	82	91	1	145	34	189	317	10.6	2600
BZW50-100	BZW50-100B	5	100	111	1	179	28	228	263	10.7	2300
BZW50-120	BZW50-120B	5	120	133	1	215	23	274	219	10.8	1900
BZW50-150	BZW50-150B	5	150	166	1	269	19	343	175	10.8	1700
BZW50-180	BZW50-180B	5	180	200	1	322	16	410	146	10.8	1500

1. *Pulse test: t_p < 50 ms.*
2. *To calculate V_{BR} versus T_j: V_{BR} at T_J = V_{BR} at 25 °C x (1 + αT x (T_j - 25))*
3. *V_R = 0 V, F = 1 MHz. For bidirectional types, capacitance value is divided by 2.*

1.1 Characteristics (curves)

Figure 3. Peak power dissipation vs. initial junction temperature (printed circuit board)

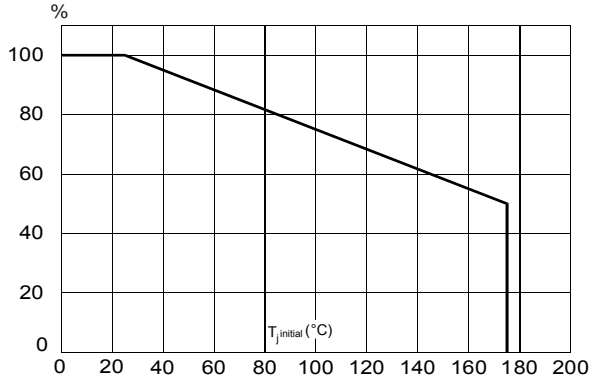


Figure 4. Peak pulse power versus exponential pulse duration

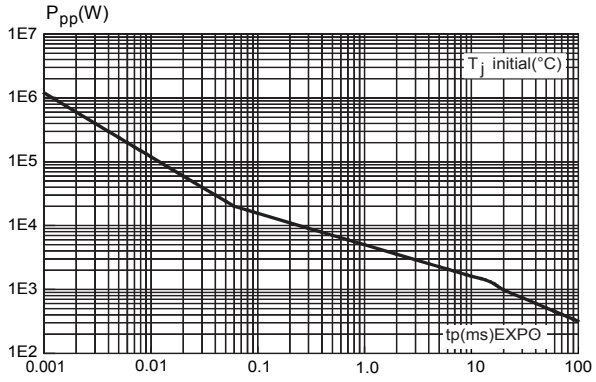


Figure 5. Clamping voltage vs. peak pulse current

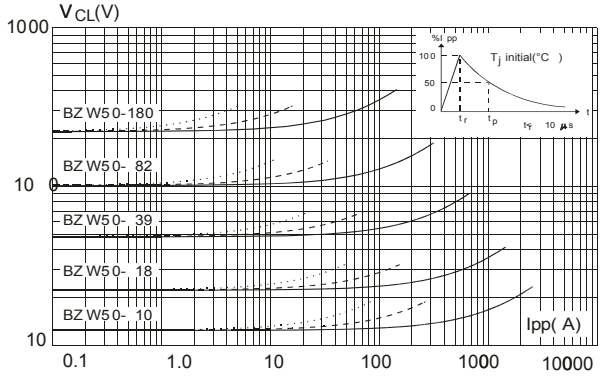
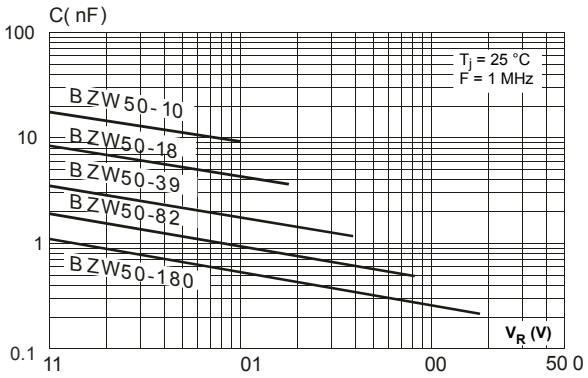


Figure 6. Capacitance vs. reverse applied voltage for unidirectional types (typical values)



Note: The curves in Figure 5. Clamping voltage vs. peak pulse current are specified for a junction temperature of 25 °C before surge. The given results may be extrapolated for other junction temperatures by using the following formula: $\Delta V_{BR} = \alpha T \times [T_{amb} - 25] \times V_{BR}(25\ °C)$. For intermediate voltages, extrapolate the given results.

Figure 7. Capacitance vs. reverse applied voltage for bidirectional types (typical values)

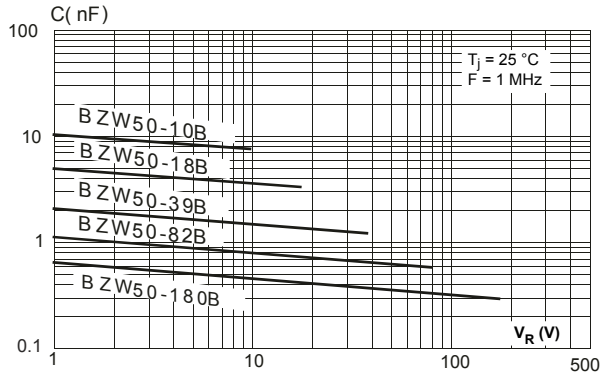
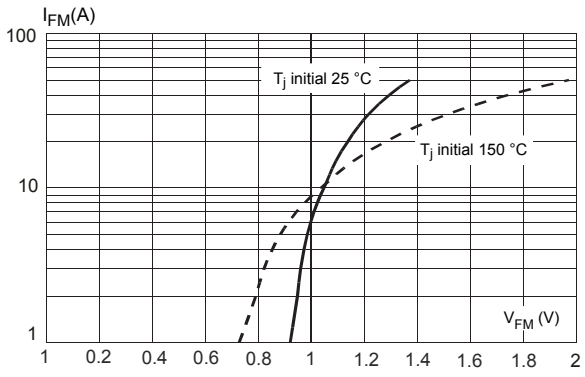


Figure 8. Peak forward voltage drop vs. peak forward current for unidirectional types (typical value)



Note: For Figure 8. Peak forward voltage drop vs. peak forward current for unidirectional types (typical value), multiply by 2 for units with V_{BR} > 220 V.

Figure 9. Transient thermal impedance junction to ambient vs. pulse duration

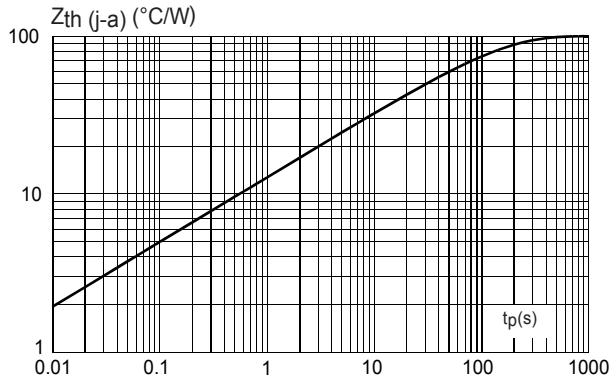
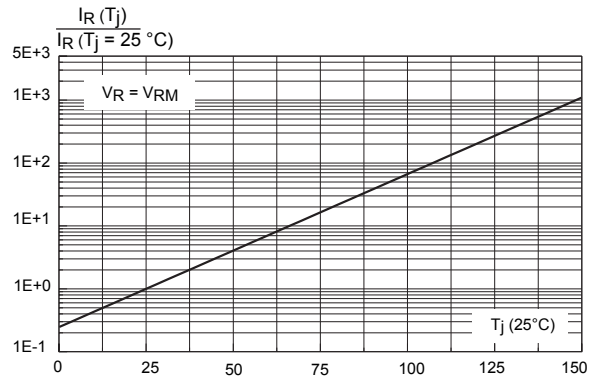


Figure 10. Relative variation of leakage current vs. junction temperature



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

2.1 R6 package information

Figure 11. R6 package outline

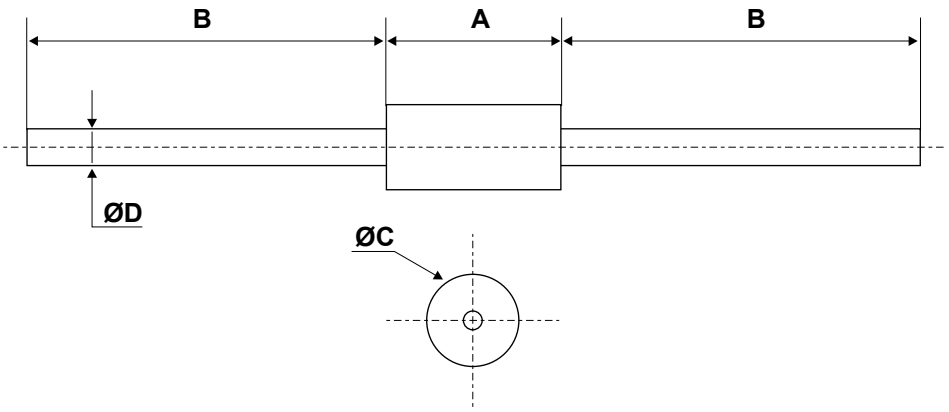


Table 4. R6 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.		Typ.	Max.
A	8.6	-	9.1	0.338	-	0.358
B	25.4	-		1	-	
C	8.6	-	9.1	0.338	-	0.358
D	1.20	-	1.30	0.047	-	0.051

Table 5. **Marking**

Unidirectional order code	Marking	Bidirectional order code	Marking
BZW50-10	BZW50-10	BZW50-10B	BZW50-10B
BZW50-12	BZW50-12	BZW50-12B	BZW50-12B
BZW50-15	BZW50-15	BZW50-15B	BZW50-15B
BZW50-18	BZW50-18	BZW50-18B	BZW50-18B
BZW50-22	BZW50-22	BZW50-22B	BZW50-22B
BZW50-27	BZW50-27	BZW50-27B	BZW50-27B
BZW50-33	BZW50-33	BZW50-33B	BZW50-33B
BZW50-39	BZW50-39	BZW50-39B	BZW50-39B
BZW50-47	BZW50-47	BZW50-47B	BZW50-47B
BZW50-56	BZW50-56	BZW50-56B	BZW50-56B
BZW50-68	BZW50-68	BZW50-68B	BZW50-68B
BZW50-82	BZW50-82	BZW50-82B	BZW50-82B
BZW50-100	BZW50-100	BZW50-100B	BZW50-100B
BZW50-120	BZW50-120	BZW50-120B	BZW50-120B
BZW50-150	BZW50-150	BZW50-150B	BZW50-150B
BZW50-180	BZW50-180	BZW50-180B	BZW50-180B

3 Ordering information

Figure 12. Ordering information scheme

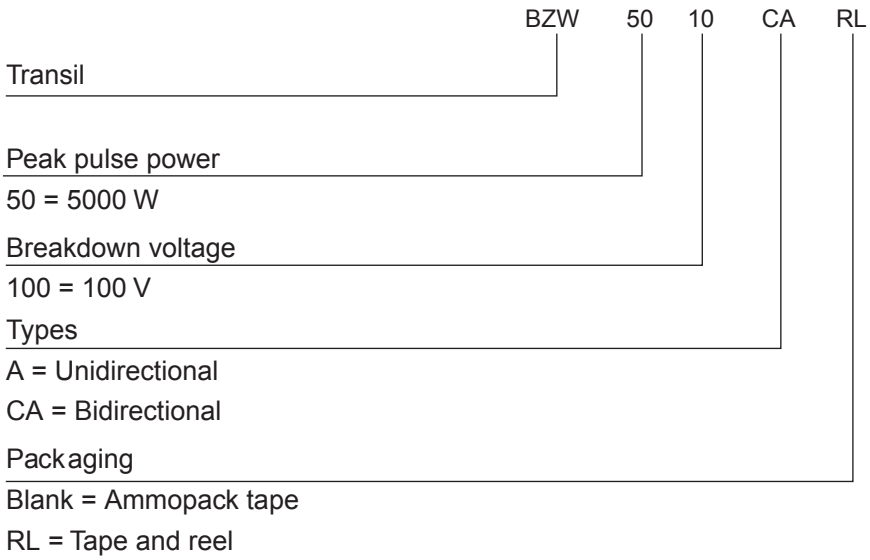


Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
BZW50xxxx	See Table 5. Marking	R6	2.050 g	1000	Ammopack
BZW50xxxxB					
BZW50xxxxRL				100	Tape and reel
BZW50xxxxBRL					

1. *Logo, date code, type code, cathode band (for unidirectional types only).*

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
Feb-2003	1	Last update.
14-Dec-2012	2	Updated ECOPACK statement.
25-May-2018	3	Updated tittle description. Updated Figure 2. Pulse definition for electrical characteristics and Figure 12. Ordering information scheme.

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BZW50-150 BZW50-15B BZW50-12B BZW50-68B BZW50-33B BZW50-120B BZW50-39B BZW50-39 BZW50-22 BZW50-27 BZW50-33 BZW50-68 BZW50-82 BZW50-56 BZW50-15 BZW50-18 BZW50-10 BZW50-180 BZW50-56B BZW50-180B BZW50-47B BZW50-150B BZW50-27B BZW50-82RL BZW50-39BRL BZW50-33BRL BZW50-150RL BZW50-180RL BZW50-100B BZW50-82B BZW50-22B BZW50-100 BZW50-33RL BZW50-15RL BZW50-68RL BZW50-27RL