

400W, 5.8V - 376V Transient Voltage Suppressor

FEATURES

- AEC-Q101 qualified available
- Excellent clamping capability
- Low impedance surge resistance
- 400W surge capability at 10/1000µs waveform
- Very fast response time
- Typical I_R less than 1µA above 10V
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

- Protect sensitive circuit from damage by high voltage transients
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system

MECHANICAL DATA

- Case: DO-204AL (DO-41)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Pure tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.300g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
V_{WM}	5.8 - 376	V
V_{BR} (uni - directional)	6.45 - 462	V
V_{BR} (bi - directional)	6.45 - 462	V
P_{PK}	400	W
T_{JMAX}	175	°C
Package	DO-204AL (DO-41)	



DO-204AL (DO-41)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation at $T_A = 25^\circ\text{C}$, $T_p = 1\text{ms}^{(1)}$	P_{PK}	400	W
Steady state power dissipation at $T_L = 75^\circ\text{C}$ lead lengths .375", 9.5mm ⁽²⁾	P_D	1	W
Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load ⁽³⁾	I_{FSM}	40	A
Operating junction temperature range	T_J	-55 to +175	°C
Storage temperature range	T_{STG}	-55 to +175	°C

Note:

1. Non-repetitive current pulse per Fig.3 and Derated above $T_A = 25^\circ\text{C}$ per Fig.2
2. Mounted on 5 x 5 mm copper pads to each terminal
3. 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

THERMAL PERFORMANCE

PARAMETER	SYMBOL	TYP	UNIT
Junction-to-lead thermal resistance	$R_{\theta JL}$	60	°C/W
Junction-to-ambient thermal resistance on printed circuit, L lead=10mm	$R_{\theta JA}$	100	°C/W

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)									
Device ⁽¹⁾		Breakdown voltage V _{BR} @I _T (V)		Test current I _T (mA)	Working stand-off voltage V _{WM} (V)	Reverse leakage current @ V _{WM} I _D (uA) ⁽³⁾	Maximum peak impulse current I _{PP} (A)	Maximum clamping voltage V _C @I _{PP} (V)	Maximum temperature coefficient
		V _{BR}		I _T	V _{WM}	I _D	I _{PPM}	V _C	V _{BR}
		V		mA	V	μA	A	V	%/°C
Unidirectional	Bidirectional	Min	Max						
BZW04-5V8	BZW04-5V8B	6.45	7.14	10	5.80	1000	38.0	10.5	0.057
BZW04-6V4	BZW04-6V4B	7.13	7.88	10	6.40	500	35.4	11.3	0.061
BZW04-7V0	BZW04-7V0B	7.79	8.61	10	7.02	200	33.0	12.1	0.065
BZW04-7V8	BZW04-7V8B	8.65	9.55	1	7.78	50	30.0	13.4	0.068
BZW04-8V5	BZW04-8V5B	9.50	10.5	1	8.55	10	27.6	14.5	0.073
BZW04-9V4	BZW04-9V4B	10.5	11.6	1	9.40	5	25.7	15.6	0.075
BZW04-10	BZW04-10B	11.4	12.6	1	10.2	5	24.0	16.7	0.078
BZW04-11	BZW04-11B	12.4	13.7	1	11.1	5	22.0	18.2	0.081
BZW04-13	BZW04-13B	14.3	15.8	1	12.8	5	19.0	21.2	0.084
BZW04-14	BZW04-14B	15.2	16.8	1	13.6	1	17.8	22.5	0.083
BZW04-15	BZW04-15B	17.1	18.9	1	15.3	1	16.0	25.2	0.088
BZW04-17	BZW04-17B	19.0	21.0	1	17.1	1	14.5	27.7	0.090
BZW04-19	BZW04-19B	20.9	23.1	1	18.8	1	13.0	30.6	0.092
BZW04-20	BZW04-20B	22.8	25.2	1	20.5	1	12.0	33.2	0.094
BZW04-23	BZW04-23B	25.7	28.4	1	23.1	1	10.7	37.5	0.096
BZW04-26	BZW04-26B	28.5	31.5	1	25.6	1	9.6	41.5	0.097
BZW04-28	BZW04-28B	31.4	34.7	1	28.2	1	8.8	45.7	0.098
BZW04-31	BZW04-31B	34.2	37.8	1	30.8	1	8.0	49.9	0.099
BZW04-33	BZW04-33B	37.1	41.0	1	33.3	1	7.4	53.9	0.100
BZW04-37	BZW04-37B	40.9	45.2	1	36.8	1	6.7	59.3	0.101
BZW04-40	BZW04-40B	44.7	49.4	1	40.2	1	6.2	64.8	0.101
BZW04-44	BZW04-44B	48.5	53.6	1	43.6	1	5.7	70.1	0.102
BZW04-48	BZW04-48B	53.2	58.8	1	47.8	1	5.2	77.0	0.103
BZW04-53	BZW04-53B	58.9	65.1	1	53.0	1	4.7	85.0	0.104
BZW04-58	BZW04-58B	64.6	71.4	1	58.1	1	4.3	92.0	0.104
BZW04-64	BZW04-64B	71.3	78.8	1	64.1	1	3.9	103	0.105
BZW04-70	BZW04-70B	77.9	86.1	1	70.1	1	3.5	113	0.105
BZW04-78	BZW04-78B	86.5	95.5	1	78.0	1	3.2	125	0.105
BZW04-85	BZW04-85B	95	105	1	85.5	1	2.9	137	0.106
BZW04-94	BZW04-94B	105	116	1	94.0	1	2.6	152	0.107
BZW04-102	BZW04-102B	114	126	1	102	1	2.4	165	0.107
BZW04-110	BZW04-110B	124	137	1	111	1	2.2	179	0.107
BZW04-128	BZW04-128B	143	158	1	128	1	2.0	207	0.108
BZW04-136	BZW04-136B	152	168	1	136	1	1.8	219	0.108

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)									
Device ⁽¹⁾		Breakdown voltage V _{BR} @I _T (V)		Test current I _T (mA)	Working stand-off voltage V _{WM} (V)	Reverse leakage current @ V _{WM} I _D (μ A) ⁽³⁾	Maximum peak impulse current I _{PP} (A)	Maximum clamping voltage V _C @I _{PP} (V)	Maximum temperature coefficient
		V _{BR}		I _T	V _{WM}	I _D	I _{PPM}	V _C	V _{BR}
		V		mA	V	μ A	A	V	%/°C
Unidirectional	Bidirectional	Min	Max						
BZW04-145	BZW04-145B	161	179	1	145	1	1.7	234	0.108
BZW04-154	BZW04-154B	171	189	1	154	1	1.6	246	0.108
BZW04-171	BZW04-171B	190	210	1	171	1	1.5	274	0.108
BZW04-188	BZW04-188B	209	231	1	188	1	1.4	301	0.108
BZW04-213	BZW04-213B	237	263	1	213	1	1.2	344	0.110
BZW04-239	BZW04-239B	266	294	1	239	1	1.1	384	0.110
BZW04-256	BZW04-256B	285	315	1	256	1	1.0	414	0.110
BZW04-273	BZW04-273B	304	336	1	273	1	0.9	438	0.110
BZW04-299	BZW04-299B	332	368	1	299	1	0.8	482	0.110
BZW04-342	BZW04-342B	380	420	1	342	1	0.75	548	0.110
BZW04-376	BZW04-376B	418	462	1	376	1	0.67	603	0.110

Notes:

1. Pulse test : tp<50ms
2. All terms and symbols are consistent with ANSI/IEEE C62.35
3. For bipolar types having V_{WM} of 10 volts and less, the I_D limit is doubled.

ORDERING INFORMATION		
ORDERING CODE ⁽¹⁾⁽²⁾	PACKAGE	PACKING
BZW04-x	DO-204AL (DO-41)	5,000 / Tape & Reel
BZW04-x A0G	DO-204AL (DO-41)	3,000 / Ammo box
BZW04-xH	DO-204AL (DO-41)	5,000 / Tape & Reel
BZW04-xHA0G	DO-204AL (DO-41)	3,000 / Ammo box

Notes:

1. "x" defines voltage from 5.8V (BZW04-5V8) to 376V (BZW04-376)
2. "H" means AEC-Q101 qualified

CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 Peak Pulse Power Rating Curve

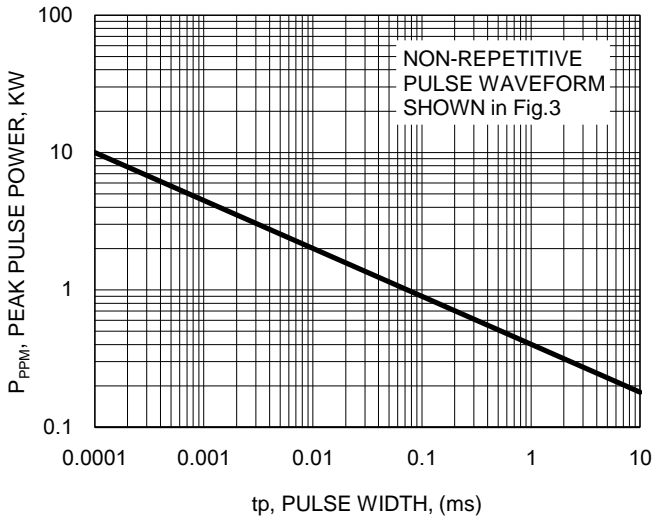


Fig.2 Pulse Derating Curve

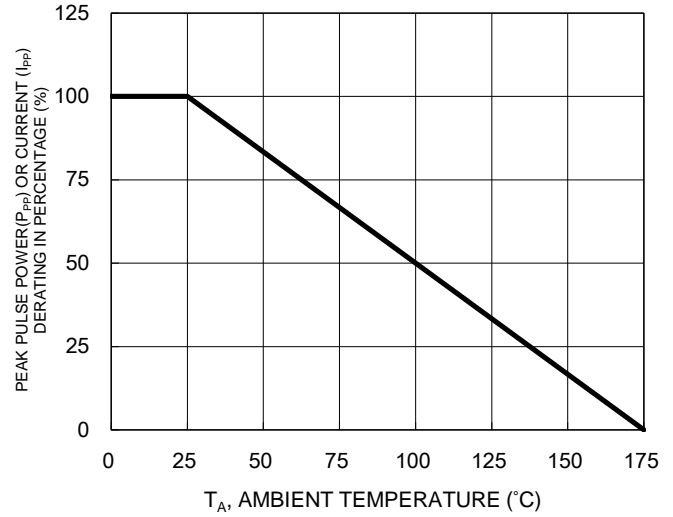


Fig.3 Clamping Power Pulse Waveform

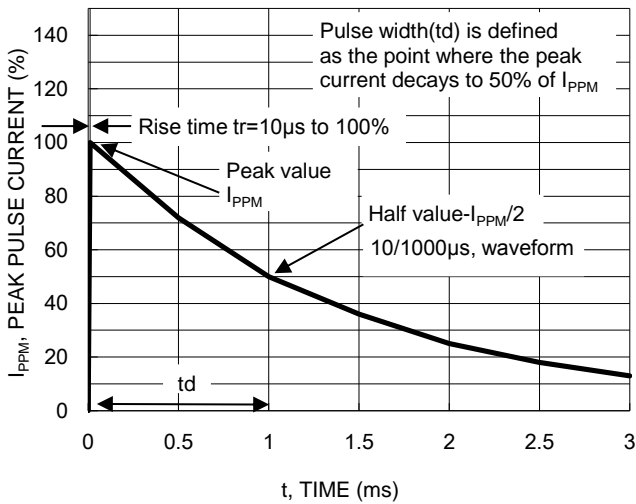
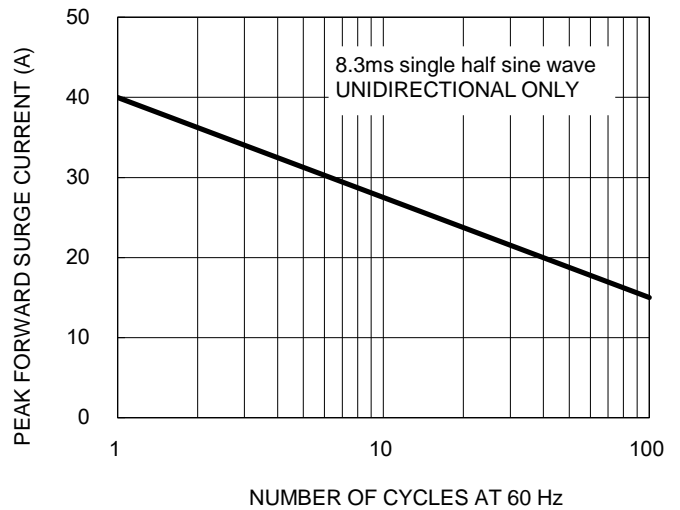


Fig.4 Maximum Non-Repetitive Forward Surge Current



CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.5 Steady State Power Derating Curve

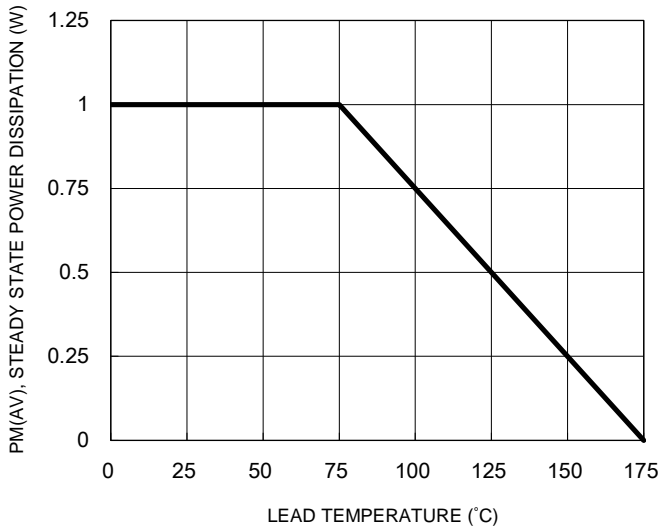


Fig.6 Typical Reverse Characteristics

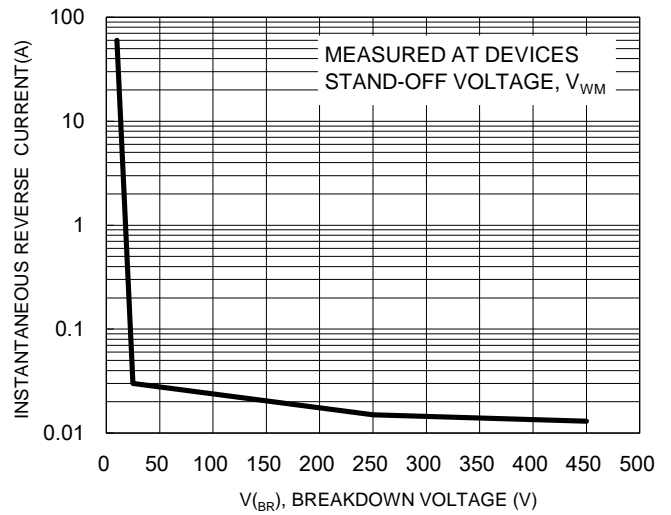
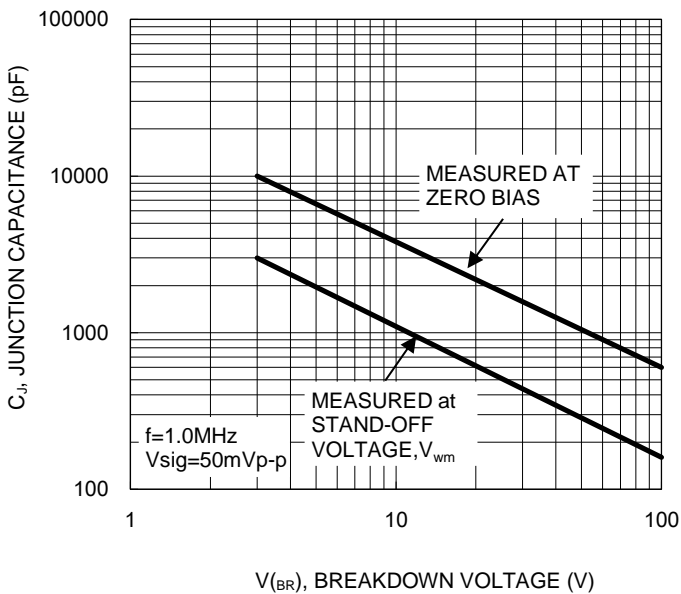
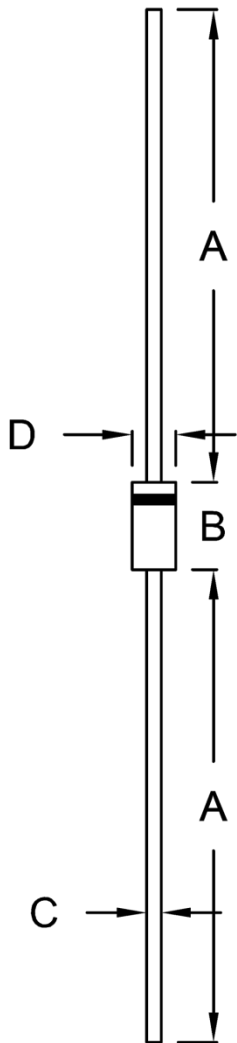


Fig.7 Typical Junction Capacitance



PACKAGE OUTLINE DIMENSIONS

DO-204AL (DO-41)



DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	25.40	-	1.000	-
B	4.20	5.20	0.165	0.205
C	0.71	0.86	0.028	0.034
D	2.00	2.70	0.079	0.106

MARKING DIAGRAM

Cathode band for uni-directional products only



- P/N = Marking Code
- G = Green Compound
- YWW = Date Code
- F = Factory Code

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies.

Purchasers are solely responsible for the choice, selection, and use of TSC products and TSC assumes no liability for application assistance or the design of Purchasers' products.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.