



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001/ISO 45001 Certified Company



1500W Transient Voltage Suppressors

1.5KEXXA/CA



DO-201AD
Axial Leaded
Plastic Package
RoHS compliant

DEVICE MARKING

Full part number e.g. **1.5KE10A/CA**

FEATURES:

1. Peak power dissipation 1500W @10 x 1000 us Pulse
 2. Low profile package
 3. Excellent clamping capability and Low reverse leakage.
 4. Glass passivated chip.
 5. Fast response time: typically less than 1ps from 0 Volts to BV min
 6. Typical I_R less than 1uA when V_{BR} min above 12V
 7. IEC 61000-4-2 ESD 30KV(Air), 30KV(Contact)
 8. ESD protection of data lines in accordance with IEC 61000-4-2
 9. EFT protection of data lines in accordance with IEC 61000-4-4
 10. RoHS compliant
 11. Lead-free finish
 12. This product is available in AEC-Q101 Qualified and PPAP Capable also.
- Note:** For AEC-Q101 qualified products, please use suffix -AQ in the part number while ordering.

APPLICATIONS;

AC line protection and high-power DC bus clamping.

ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Peak Pulse Power Dissipation on 10/1000 us Waveform ¹ (FIG.1)	P_{PPM}	Min 1500	W
Power Dissipation on Infinite Heat Sink at $T_L=75^{\circ}\text{C}$	P_D	6.5	W
Peak Pulse Current of on 10/1000us Waveform ¹ (FIG.2)	I_{PPM}	See Table 1	A
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave ²	I_{FSM}	200	A
Maximum instantaneous forward voltage at 50 A for unidirectional only ³	V_F	3.5/6.5	V
Operating Junction Temperature Range	T_J	-55 to +175	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +175	$^{\circ}\text{C}$

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ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

Type Number		Reverse Stand-Off Voltage	Breakdown Voltage Min. @I _T	Breakdown Voltage Max. @ I _T	Test Current	Maximum Clamping Voltage @I _{PP}	Peak Pulse Current	Reverse Leakage @V _{RMW}
(Uni)	(Bi)	V _{RMW} (V)	V _{BR MIN} (V)	V _{BR MAX} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (uA)
1.5KE6.8A	1.5KE6.8CA	5.80	6.45	7.14	10	10.5	144.8	1000
1.5KE7.5A	1.5KE7.5CA	6.40	7.13	7.88	10	11.3	134.5	500
1.5KE8.2A	1.5KE8.2CA	7.02	7.79	8.61	10	12.1	125.6	200
1.5KE9.1A	1.5KE9.1CA	7.78	8.65	9.55	1	13.4	113.4	50
1.5KE10A	1.5KE10CA	8.55	9.50	10.50	1	14.5	104.8	10
1.5KE11A	1.5KE11CA	9.40	10.50	11.60	1	15.6	97.4	5
1.5KE12A	1.5KE12CA	10.20	11.40	12.60	1	16.7	91.0	5
1.5KE13A	1.5KE13CA	11.10	12.40	13.70	1	18.2	83.5	1
1.5KE15A	1.5KE15CA	12.80	14.30	15.80	1	21.2	71.7	1
1.5KE16A	1.5KE16CA	13.60	15.20	16.80	1	22.5	67.6	1
1.5KE18A	1.5KE18CA	15.30	17.10	18.90	1	25.2	60.3	1
1.5KE20A	1.5KE20CA	17.10	19.00	21.00	1	27.7	54.9	1
1.5KE22A	1.5KE22CA	18.80	20.90	23.10	1	30.6	49.7	1
1.5KE24A	1.5KE24CA	20.50	22.80	25.20	1	33.2	45.8	1
1.5KE27A	1.5KE27CA	23.10	25.70	28.40	1	37.5	40.5	1
1.5KE30A	1.5KE30CA	25.60	28.50	31.50	1	41.4	36.7	1
1.5KE33A	1.5KE33CA	28.20	31.40	34.70	1	45.7	33.3	1
1.5KE36A	1.5KE36CA	30.80	34.20	37.80	1	49.9	30.5	1
1.5KE39A	1.5KE39CA	33.30	37.10	41.00	1	53.9	28.2	1
1.5KE43A	1.5KE43CA	36.80	40.90	45.20	1	59.3	25.6	1
1.5KE47A	1.5KE47CA	40.20	44.70	49.40	1	64.8	23.5	1
1.5KE51A	1.5KE51CA	43.60	48.50	53.60	1	70.1	21.7	1
1.5KE56A	1.5KE56CA	47.80	53.20	58.80	1	77.0	19.7	1
1.5KE62A	1.5KE62CA	53.00	58.90	65.10	1	85.0	17.9	1
1.5KE68A	1.5KE68CA	58.10	64.60	71.40	1	92.0	16.5	1
1.5KE75A	1.5KE75CA	64.10	71.30	78.80	1	103.0	14.8	1
1.5KE82A	1.5KE82CA	70.10	77.90	86.10	1	113.0	13.5	1
1.5KE91A	1.5KE91CA	77.80	86.50	95.50	1	125.0	12.2	1
1.5KE100A	1.5KE100CA	85.50	95.00	105.00	1	137.0	11.1	1
1.5KE110A	1.5KE110CA	94.00	105.00	116.00	1	152.0	10.0	1
1.5KE120A	1.5KE120CA	102.00	114.00	126.00	1	165.0	9.2	1
1.5KE130A	1.5KE130CA	111.00	124.00	137.00	1	179.0	8.5	1
1.5KE150A	1.5KE150CA	128.00	143.00	158.00	1	207.0	7.3	1
1.5KE160A	1.5KE160CA	136.00	152.00	168.00	1	219.0	6.9	1
1.5KE170A	1.5KE170CA	145.00	162.00	179.00	1	234.0	6.5	1

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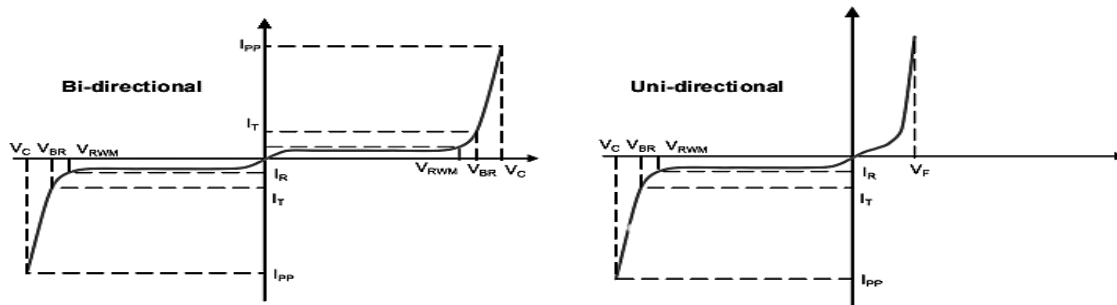
ELECTRICAL CHARACTERISTICS at ($T_A = 25^\circ\text{C}$ Unless otherwise specified)

Type Number		Reverse Stand-Off Voltage	Breakdown Voltage Min. @ I_T	Breakdown Voltage Max. @ I_T	Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
(Uni)	(Bi)	$V_{RWM}(V)$	$V_{BR\ MIN}(V)$	$V_{BR\ MAX}(V)$	$I_T\ (mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
1.5KE180A	1.5KE180CA	154.00	171.00	189.00	1	246.0	6.2	1
1.5KE200A	1.5KE200CA	171.00	190.00	210.00	1	274.0	5.5	1
1.5KE220A	1.5KE220CA	185.00	209.00	231.00	1	328.0	4.6	1
1.5KE250A	1.5KE250CA	214.00	237.00	263.00	1	344.0	4.4	1
1.5KE300A	1.5KE300CA	256.00	285.00	315.00	1	414.0	3.7	1
1.5KE350A	1.5KE350CA	300.00	332.00	368.00	1	482.0	3.2	1
1.5KE400A	1.5KE400CA	342.00	380.00	420.00	1	548.0	2.8	1
1.5KE440A	1.5KE440CA	376.00	418.00	462.00	1	602.0	2.5	1
1.5KE480A	1.5KE480CA	408.00	456.00	504.00	1	658.0	2.3	1
1.5KE510A	1.5KE510CA	434.00	485.00	535.00	1	698.0	2.2	1
1.5KE530A	1.5KE530CA	451.00	503.50	556.50	1	725.0	2.1	1
1.5KE540A	1.5KE540CA	460.00	513.00	567.00	1	740.0	2.1	1
1.5KE550A	1.5KE550CA	468.00	522.50	577.50	1	760.0	2.0	1
1.5KE600A	1.5KE600CA	512.00	570.00	630.00	1	828.0	1.8	1

Note:

1. Non-repetitive current pulse, per Fig.2 and derated above $T_A=25^\circ\text{C}$ per Fig.3.
2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.
3. $V_F < 3.5V$ for devices of $V_{BR} < 200V$ and $V_F < 6.5V$ for devices of $V_{BR} > 201V$.
4. For Bi-directional type having V_{RWM} of 10 Volts and less, the I_R limit is double
5. For parts without A, the V_{BR} is $\pm 10\%$ and V_C is 5% higher than with A parts.

CURVE CHARACTERISTICS



P_{PPM} : Peak Pulse Power Dissipation - Max power dissipation

V_{RWM} : Reverse Stand-off Voltage - Maximum voltage that can be applied to TVS without operation

V_{BR} : Breakdown Voltage – Maximum voltage that flows though the TVS at a specified current (I_T)

V_C : Clamping Voltage – Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)

I_R : Reverse Leakage Current – Current measured at V_R

V_F : Forward Voltage Drop for Uni-directional

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TYPICAL CHARACTERISTICS CURVES

Fig 1: Peak Pulse Power Rating

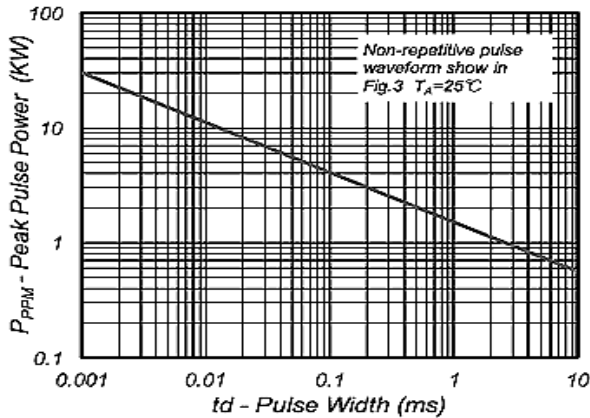


Fig 3: Pulse Derating Curves

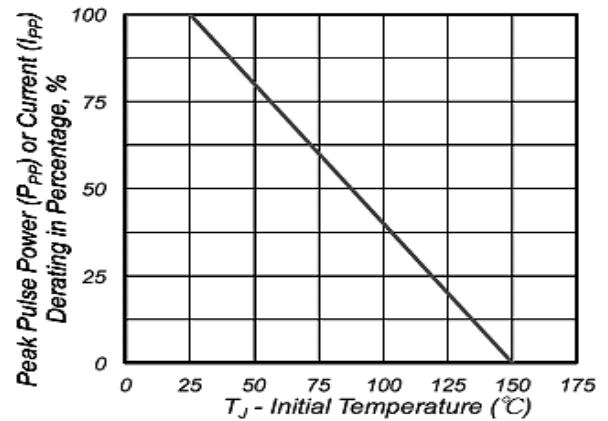


Fig 2: Pulse Waveform

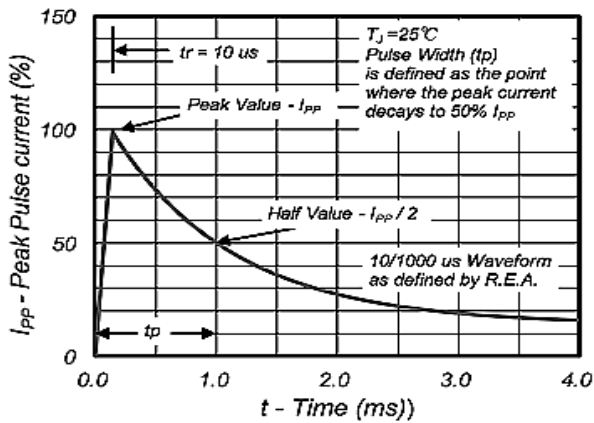
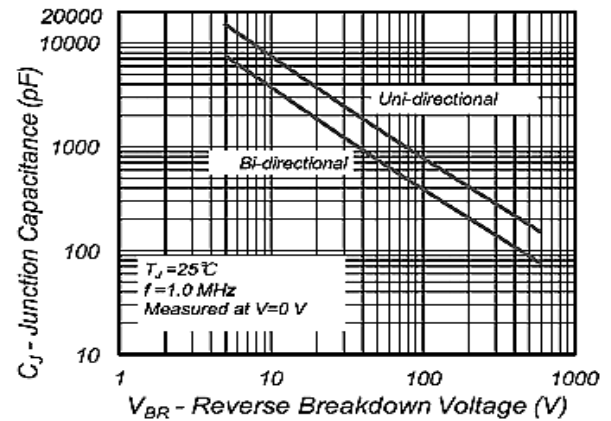


Fig 4: Typical Junction Capacitance





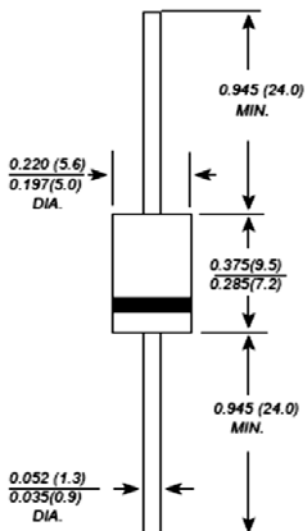
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PACKAGE DETAIL

DO-201AD Axial Leaded Plastic Package



Dimensions in Inches and (Millimeters)

Mechanical Data

Case : Molded plastic body

Terminals : Solder plated, solderable per MIL-STD-750, Method 2026

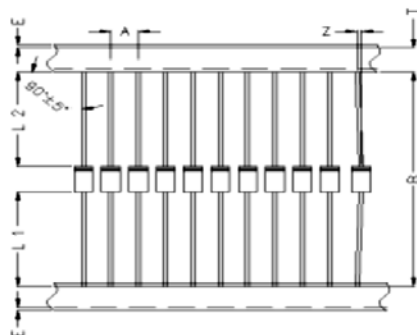
Polarity : Polarity symbol marking on body

Mounting Position : Any

Weight : 0.0345 ounce, 0.98 grams

Packaging Information

Taping Specifications



Item	Symbol	Specifications(mm)
Component Pitch	A	10.0±0.5
Inner Tape Pitch	B	52.4±1.5
Component alignment	Z	1.2 Max
Tape width	T	6.0±0.5
Exposed adhesive	E	0.8 Max
Body eccentricity	L1-L2	1.0 Max

Ammunition Package Specifications

Package	Inner Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
DO - 27	255*150*75	1.25	420*276*312	12.5

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Recommended Reflow Solder Profiles

The recommended reflow solder profiles for Pb and Pb-free devices are shown below.

Figure 1 shows the recommended solder profile for devices that have Pb-free terminal plating, and where a Pb-free solder is used.

Figure 2 shows the recommended solder profile for devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with a leaded solder.

Figure 1

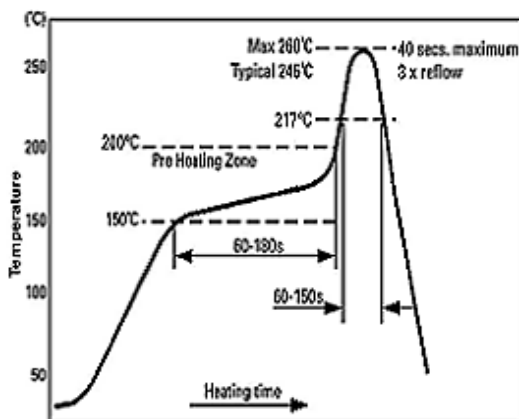
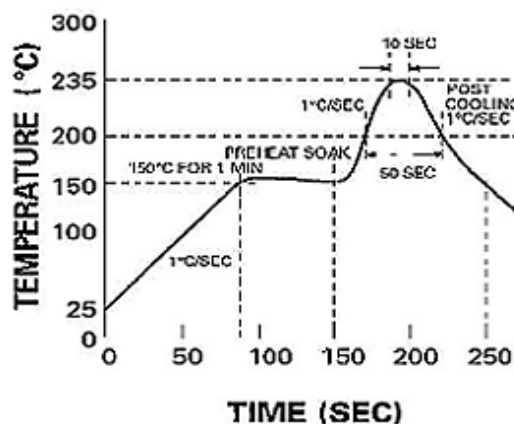


Figure 2



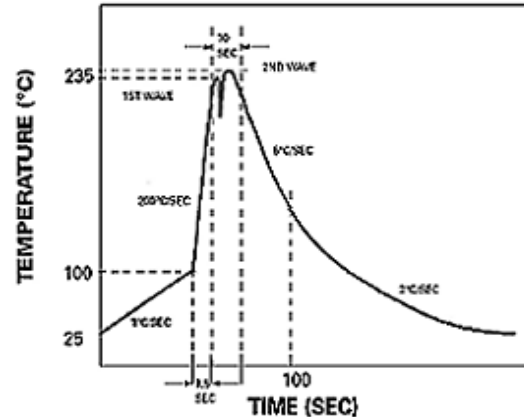
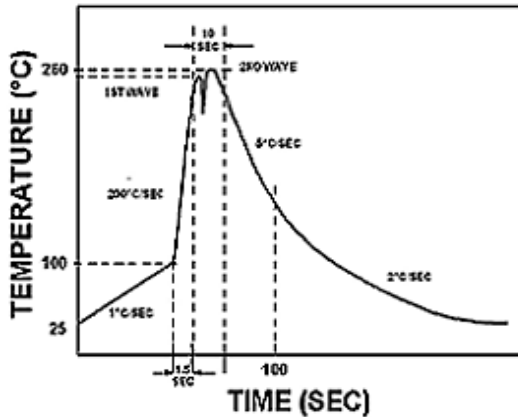
Reflow profiles in tabular form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat		
– Temperature Range	150-170°C	150-200°C
– Time	60-180 seconds	60-180 seconds
Time maintained above:		
– Temperature	200°C	217°C
– Time	30-50 seconds	60-150 seconds
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	40 seconds
Ramp-Down Rate	3°C/second max.	6°C/second max.

Recommended Wave Solder Profiles

The Recommended solder Profile For Devices with Pb-free terminal plating where a Pb-free solder is used

The Recommended solder Profile For Devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with leaded solder



Wave Profiles in Tabular Form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~200°C/second	~200°C/second
Heating rate during preheat	Typical 1-2, Max 4°C/sec	Typical 1-2, Max 4°C/Sec
Final preheat Temperature	Within 125°C of Solder Temp	Within 125°C of Solder Temp
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	10 seconds
Ramp-Down Rate	5°C/second max.	5°C/second max



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Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down.
They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH



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Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s). CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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