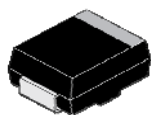
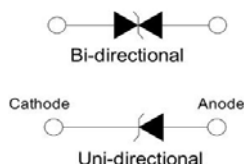


600W SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

SMBJXXX



DO-214AA (SMB)



DO-214AA(SMB)
Surface Mount
Plastic Package
RoHS compliant

FEATURES:

1. Peak power dissipation 600W @ 10 x 1000 μ s pulse
2. Low profile package
3. Excellent clamping capability
4. Glass passivated junction
5. Fast response time: typically less than 1 pS from 0 Volts to BV_{min}
6. IEC 61000-4-2 ESD 30KV(Air), 30KV(Contact)
7. ESD protection of data lines in accordance with IEC 61000-4-2
8. EFT protection of data lines in accordance with IEC 61000-4-4
9. Lead-free finish
10. This device is available in AEC-Q101 complaint also.
11. Note: For AEC-Q101 compliant products, please suffix - AQ in the part number while ordering

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

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|-----------------|-------------|--------------------|
| Peak Pulse Power Dissipation on 10/1000 μ s Waveform ^{1,2} (FIG.1) | P_{PPM} | Min 600 | W |
| Power Dissipation on Infinite Heat Sink at $T_L = 50^\circ\text{C}$ | P_D | 5 | W |
| Peak Pulse Current of on 10/1000 μ s Waveform ¹ (FIG.3) | I_{PPM} | See table 1 | A |
| Peak Forward Surge Current, 8.3ms Single Half Sine-Wave (Note 2, 3) | I_{FSM} | 100 | A |
| Operating Junction Temperature Range | T_J | -55 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to +150 | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 100 | $^\circ\text{C/W}$ |

Note:

1. Non-repetitive current pulse, per Fig.3 and derated above $T_A = 25^\circ\text{C}$ per Fig.2.
2. Mounted on 5.0x5.0mm² (0.03mm thick) Copper Pads to each terminal.
3. Measured on 8.3ms single half sine-wave, or equivalent square wave, for Unidirectional device only



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

| TYPE NUMBER | | MARKING | | 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) | UNI | BI | V _{RMW} (V) | V _{BR MIN} (V) | V _{BR MAX} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μA) |
| SMBJ5.0A | SMBJ5.0CA | KE | AE | 5.0 | 6.40 | 7.00 | 10 | 9.20 | 65.30 | 800 |
| SMBJ6.0A | SMBJ6.0CA | KG | AG | 6.0 | 6.67 | 7.37 | 10 | 10.30 | 58.30 | 800 |
| SMBJ6.5A | SMBJ6.5CA | KK | AK | 6.5 | 7.22 | 7.98 | 10 | 11.20 | 53.60 | 500 |
| SMBJ7.0A | SMBJ7.0CA | KM | AM | 7.0 | 7.78 | 8.60 | 10 | 12.00 | 50.00 | 200 |
| SMBJ7.5A | SMBJ7.5CA | KP | AP | 7.5 | 8.33 | 9.21 | 1 | 12.90 | 46.60 | 100 |
| SMBJ8.0A | SMBJ8.0CA | KR | AR | 8.0 | 8.89 | 9.83 | 1 | 13.60 | 44.20 | 50 |
| SMBJ8.5A | SMBJ8.5CA | KT | AT | 8.5 | 9.44 | 10.40 | 1 | 14.40 | 41.70 | 20 |
| SMBJ9.0A | SMBJ9.0CA | KV | AV | 9.0 | 10.00 | 11.10 | 1 | 15.40 | 39.00 | 10 |
| SMBJ10A | SMBJ10CA | KX | AX | 10.0 | 11.10 | 12.30 | 1 | 17.00 | 35.30 | 5 |
| SMBJ11A | SMBJ11CA | KZ | AZ | 11.0 | 12.20 | 13.50 | 1 | 18.20 | 33.00 | 1 |
| SMBJ12A | SMBJ12CA | LE | BE | 12.0 | 13.30 | 14.70 | 1 | 19.90 | 30.20 | 1 |
| SMBJ13A | SMBJ13CA | LG | BG | 13.0 | 14.40 | 15.90 | 1 | 21.50 | 27.90 | 1 |
| SMBJ14A | SMBJ14CA | LK | BK | 14.0 | 15.60 | 17.20 | 1 | 23.20 | 25.90 | 1 |
| SMBJ15A | SMBJ15CA | LM | BM | 15.0 | 16.70 | 18.50 | 1 | 24.40 | 24.60 | 1 |
| SMBJ16A | SMBJ16CA | LP | BP | 16.0 | 17.80 | 19.70 | 1 | 26.00 | 23.10 | 1 |
| SMBJ17A | SMBJ17CA | LR | BR | 17.0 | 18.90 | 20.90 | 1 | 27.60 | 21.80 | 1 |
| SMBJ18A | SMBJ18CA | LT | BT | 18.0 | 20.00 | 22.10 | 1 | 29.20 | 20.60 | 1 |
| SMBJ20A | SMBJ20CA | LV | BV | 20.0 | 22.20 | 24.50 | 1 | 32.40 | 18.60 | 1 |
| SMBJ22A | SMBJ22CA | LX | BX | 22.0 | 24.40 | 26.90 | 1 | 35.50 | 16.90 | 1 |
| SMBJ24A | SMBJ24CA | LZ | BZ | 24.0 | 26.70 | 29.50 | 1 | 38.90 | 15.50 | 1 |
| SMBJ26A | SMBJ26CA | ME | CE | 26.0 | 28.90 | 31.90 | 1 | 42.10 | 14.30 | 1 |
| SMBJ28A | SMBJ28CA | MG | CG | 28.0 | 31.10 | 34.40 | 1 | 45.40 | 13.30 | 1 |
| SMBJ30A | SMBJ30CA | MK | CK | 30.0 | 33.30 | 36.80 | 1 | 48.40 | 12.40 | 1 |
| SMBJ33A | SMBJ33CA | MM | CM | 33.0 | 36.70 | 40.60 | 1 | 53.30 | 11.30 | 1 |
| SMBJ36A | SMBJ36CA | MP | CP | 36.0 | 40.00 | 44.20 | 1 | 58.10 | 10.40 | 1 |
| SMBJ40A | SMBJ40CA | MR | CR | 40.0 | 44.40 | 49.10 | 1 | 64.50 | 9.30 | 1 |
| SMBJ43A | SMBJ43CA | MT | CT | 43.0 | 47.80 | 52.80 | 1 | 69.40 | 8.70 | 1 |
| SMBJ45A | SMBJ45CA | MV | CV | 45.0 | 50.00 | 55.30 | 1 | 72.70 | 8.30 | 1 |
| SMBJ48A | SMBJ48CA | MX | CX | 48.0 | 53.30 | 58.90 | 1 | 77.40 | 7.80 | 1 |
| SMBJ51A | SMBJ51CA | MZ | CZ | 51.0 | 56.70 | 62.70 | 1 | 82.40 | 7.30 | 1 |
| SMBJ54A | SMBJ54CA | NE | DE | 54.0 | 60.00 | 66.30 | 1 | 87.10 | 6.90 | 1 |
| SMBJ58A | SMBJ58CA | NG | DG | 58.0 | 64.40 | 71.20 | 1 | 93.60 | 6.50 | 1 |
| SMBJ60A | SMBJ60CA | NK | DK | 60.0 | 66.70 | 73.70 | 1 | 96.80 | 6.20 | 1 |
| SMBJ64A | SMBJ64CA | NM | DM | 64.0 | 71.10 | 78.60 | 1 | 103.00 | 5.90 | 1 |

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

| TYPE NUMBER | | MARKING | | 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) | UNI | BI | V _{RMW} (V) | V _{BR} MIN (V) | V _{BR} MAX (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μA) |
| SMBJ70A | SMBJ70CA | NP | DP | 70.0 | 77.8 | 86.00 | 1 | 113.00 | 5.30 | 1 |
| SMBJ75A | SMBJ75CA | NR | DR | 75.0 | 83.30 | 92.10 | 1 | 121.00 | 5.00 | 1 |
| SMBJ78A | SMBJ78CA | NT | DT | 78.0 | 86.70 | 95.80 | 1 | 126.00 | 4.80 | 1 |
| SMBJ85A | SMBJ85CA | NV | DV | 85.0 | 94.40 | 104.00 | 1 | 137.00 | 4.40 | 1 |
| SMBJ90A | SMBJ90CA | NX | DX | 90.0 | 100.00 | 111.00 | 1 | 146.00 | 4.10 | 1 |
| SMBJ100A | SMBJ100CA | NZ | DZ | 100.0 | 111.00 | 123.00 | 1 | 162.00 | 3.70 | 1 |
| SMBJ110A | SMBJ110CA | PE | EE | 110.0 | 122.00 | 135.00 | 1 | 177.00 | 3.40 | 1 |
| SMBJ120A | SMBJ120CA | PG | EG | 120.0 | 133.00 | 147.00 | 1 | 193.00 | 3.10 | 1 |
| SMBJ130A | SMBJ130CA | PK | EK | 130.0 | 144.00 | 159.00 | 1 | 209.00 | 2.90 | 1 |
| SMBJ150A | SMBJ150CA | PM | EM | 150.0 | 167.00 | 185.00 | 1 | 243.00 | 2.50 | 1 |
| SMBJ160A | SMBJ160CA | PP | EP | 160.0 | 178.00 | 197.00 | 1 | 259.00 | 2.30 | 1 |
| SMBJ170A | SMBJ170CA | PR | ER | 170.0 | 189.00 | 209.00 | 1 | 275.00 | 2.20 | 1 |
| SMBJ180A | SMBJ180CA | PT | ET | 180.0 | 201.00 | 222.00 | 1 | 292.00 | 2.10 | 1 |
| SMBJ188A | SMBJ188CA | PV | EV | 188.0 | 209.00 | 231.00 | 1 | 304.00 | 2.00 | 1 |
| SMBJ200A | SMBJ200CA | PX | EX | 200.0 | 224.00 | 247.00 | 1 | 324.0 | 1.9 | 1 |
| SMBJ210A | SMBJ210CA | PZ | EZ | 210.0 | 237.00 | 263.00 | 1 | 340.0 | 1.8 | 1 |
| SMBJ220A | SMBJ220CA | QE | FE | 220.0 | 246.00 | 272.00 | 1 | 356.0 | 1.7 | 1 |
| SMBJ250A | SMBJ250CA | QG | FG | 250.0 | 279.00 | 309.00 | 1 | 405.0 | 1.5 | 1 |
| SMBJ300A | SMBJ300CA | QK | FK | 300.0 | 335.00 | 371.00 | 1 | 486.0 | 1.3 | 1 |
| SMBJ350A | SMBJ350CA | QM | FM | 350.0 | 391.00 | 432.00 | 1 | 567.0 | 1.1 | 1 |
| SMBJ400A | SMBJ400CA | QP | FP | 400.0 | 447.00 | 494.00 | 1 | 648.0 | 0.9 | 1 |
| SMBJ440A | SMBJ440CA | QR | FR | 440.0 | 492.00 | 543.00 | 1 | 713.0 | 0.9 | 1 |

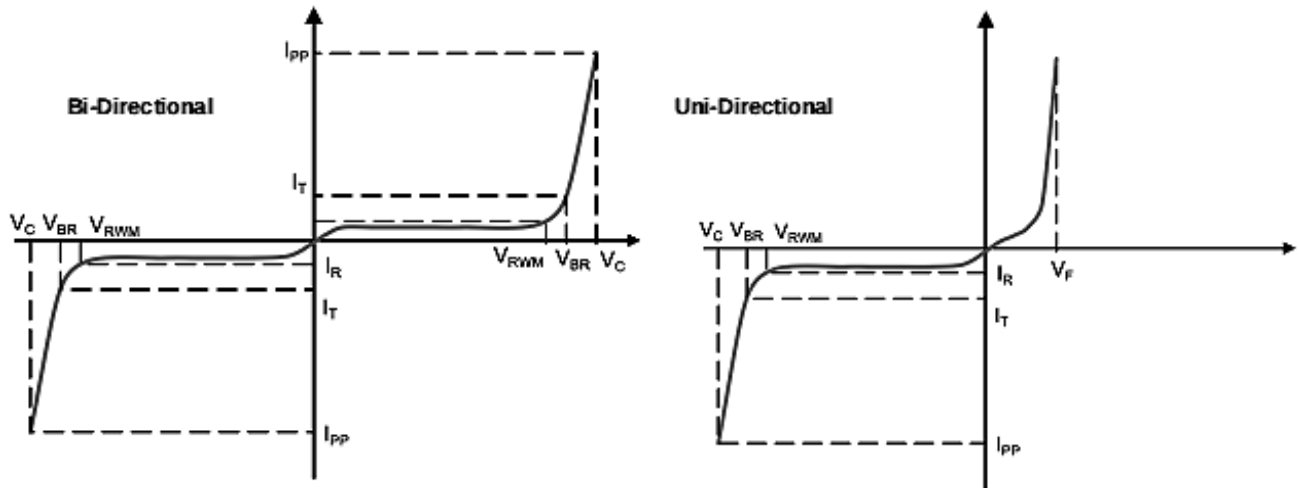
Note:

1. For Bi-directional type having V_{RMW} of 10 Volts and less, the I_R limit is double.
2. For parts without A, the V_{BR} is ± 10% and V_C is 5% higher than with A parts.

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I-V 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

TYPICAL CHARACTERISTIC CURVES

Fig 1: Peak Pulse Power Rating

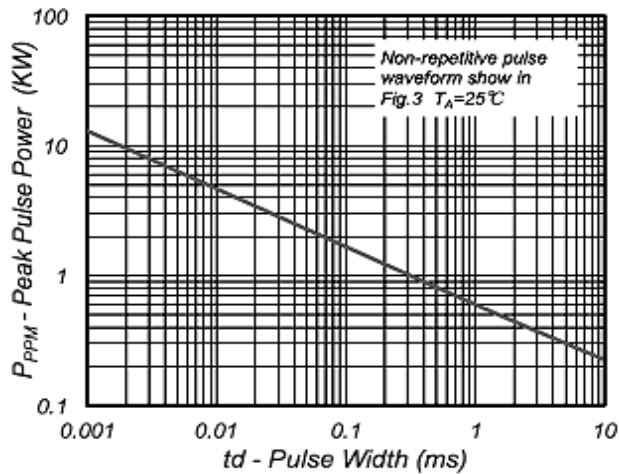


Fig 3: Pulse Derating Curve

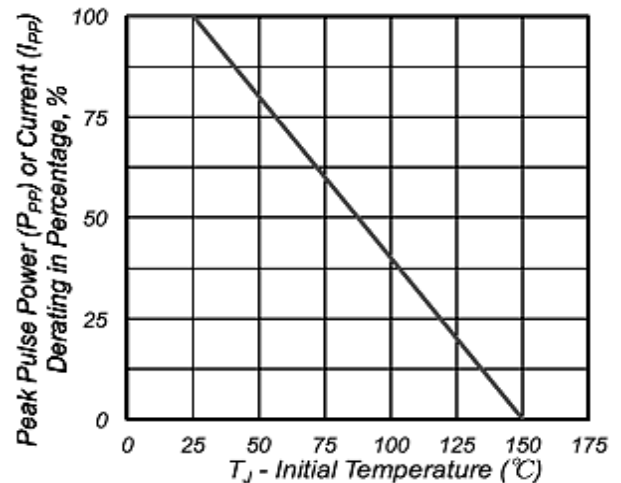


Fig 2: Pulse Waveform

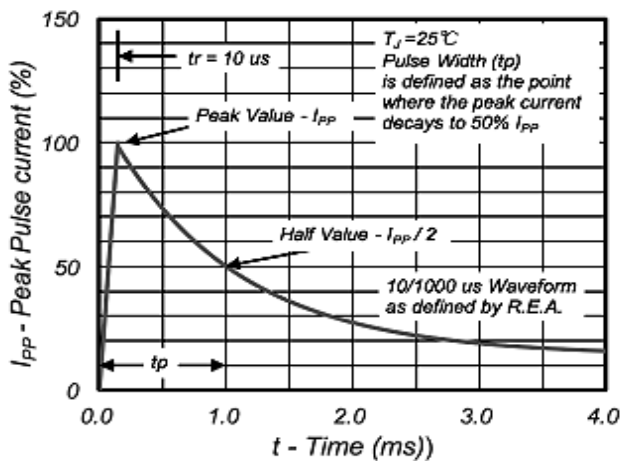
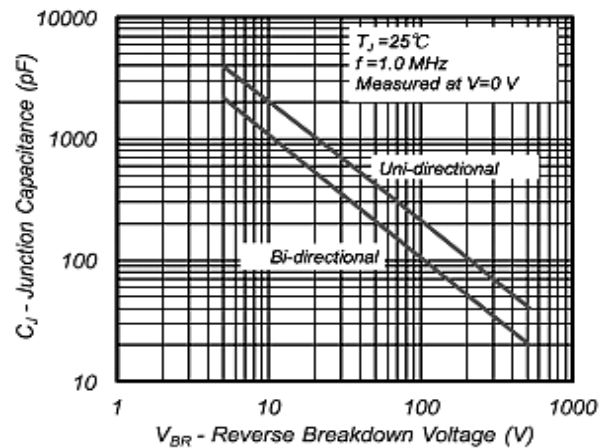
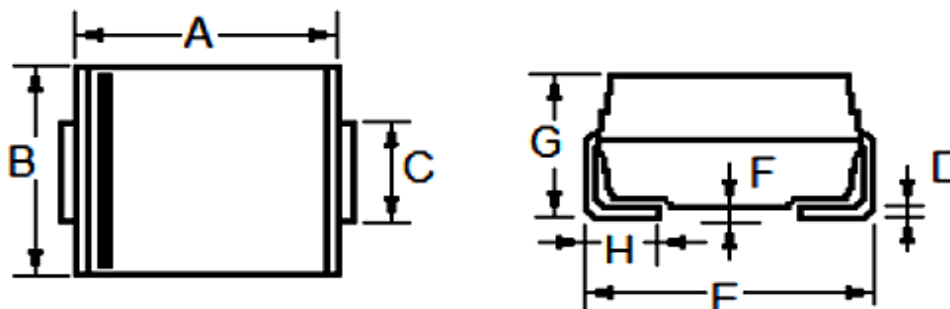


Fig 4: Typical Junction Capacitance



PACKAGE DETAILS

DO-214AA(SMB) PACKAGE OUTLINE AND DIMENSIONS



| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min | Max | Min | Max |
| A | 4.06 | 4.57 | 0.16 | 0.18 |
| B | 3.3 | 3.94 | 0.13 | 0.155 |
| C | 1.78 | 2.2 | 0.07 | 0.086 |
| D | 0.13 | 0.31 | 0.006 | 0.012 |
| E | 5.08 | 5.59 | 0.2 | 0.22 |
| F | -- | 0.2 | -- | 0.008 |
| G | 1.95 | 2.62 | 0.077 | 0.103 |
| H | 0.76 | 1.52 | 0.03 | 0.06 |

MECHANICAL CHARACTERISTICS

1. Polarity: Cathode band denotes uni-directional device, none cathode band denotes bi-directional device.
2. Terminal: Solder plated



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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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