

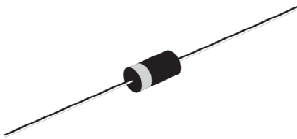
Glass Passivated Junction Transient Voltage Suppressor Rectifiers

Reverse Voltage 5.8 ~ 509 V

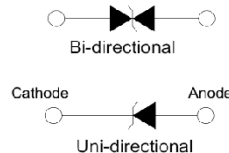
400 Watt Peak Pulse Power

P4KEXXX series

**DO-41P Axial
Leaded Plastic Package
RoHS compliant**



DO-41P



Features:

1. Glass passivated chip
2. 400 W peak pulse power capability with a 10/1000 us waveform, repetitive rate (duty cycle):0.01 %
3. Excellent clamping capability.
4. Low reverse leakage
5. Fast Response Time < 1 ns
6. This product is available in AEC-Q101 Compliant and PPAP Capable also.

NOTE: For AEC-Q101 compliant products, please use suffix -AQ in the part number while ordering

APPLICATION:

1. Communication Systems
2. Power Supplies
3. Medical Equipment
4. Business Machines

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

PARAMETER	SYMBOL	VALUE	UNIT
Peak Pulse Power Dissipation on 10/1000 us Waveform ¹	P _{PP}	400	W
Power Dissipation on Infinite Heat Sink at T _L =75°C	P _D	3.0	W
Peak Pulse Current of on 10/1000us Waveform ¹	I _{PP}	See Next Table	A
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave ²	I _{FSM}	40	A
Maximum instantaneous forward voltage at 15 A for unidirectional only ³	V _F	3.5/6.5	V
Operating Junction Temperature Range	T _J	-55 to +150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C

Notes:

1. Non-repetitive current pulse per Fig.5 and derated above T_A= 25 °C per Fig.1;
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.



Continental Device India Pvt. Limited

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



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)
P4KE6.8A	P4KE6.8CA	5.80	6.45	7.14	10	10.5	39.0	1000
P4KE7.5A	P4KE7.5CA	6.40	7.13	7.88	10	11.3	36.3	500
P4KE8.2A	P4KE8.2CA	7.00	7.79	8.61	10	12.1	33.9	200
P4KE9.1A	P4KE9.1CA	7.80	8.65	9.55	1	13.4	30.6	50
P4KE10A	P4KE10CA	8.60	9.50	10.50	1	14.5	28.3	10
P4KE11A	P4KE11CA	9.40	10.50	11.60	1	15.6	26.3	5
P4KE12A	P4KE12CA	10.20	11.40	12.60	1	16.7	24.6	5
P4KE13A	P4KE13CA	11.10	12.40	13.70	1	18.2	22.5	1
P4KE15A	P4KE15CA	12.80	14.30	15.80	1	21.2	19.3	1
P4KE16A	P4KE16CA	13.60	15.20	16.80	1	22.5	18.2	1
P4KE18A	P4KE18CA	15.30	17.10	18.90	1	25.5	16.1	1
P4KE20A	P4KE20CA	17.10	19.00	21.00	1	27.7	14.8	1
P4KE22A	P4KE22CA	18.80	20.90	23.10	1	30.6	13.4	1
P4KE24A	P4KE24CA	20.50	22.80	25.20	1	33.2	12.3	1
P4KE27A	P4KE27CA	23.10	25.70	28.40	1	37.5	10.9	1
P4KE30A	P4KE30CA	25.60	28.50	31.50	1	41.4	9.9	1
P6KE33A	P4KE33CA	28.20	31.40	34.70	1	45.7	9.0	1
P4KE36A	P4KE36CA	30.80	34.20	37.80	1	49.9	8.2	1
P4KE39A	P4KE39CA	33.30	37.10	41.00	1	53.9	7.6	1
P4KE43A	P4KE43CA	36.80	40.90	45.20	1	59.3	6.9	1
P4KE47A	P4KE47CA	40.20	44.70	49.40	1	64.8	6.3	1
P4KE51A	P4KE51CA	43.60	48.50	53.60	1	70.1	5.8	1
P4KE56A	P4KE56CA	47.80	53.20	58.80	1	77.0	5.3	1
P4KE62A	P4KE62CA	53.00	58.90	65.10	1	85.0	4.8	1
P4KE68A	P4KE68CA	58.10	64.60	71.40	1	92.0	4.5	1
P4KE75A	P4KE75CA	64.10	71.30	78.80	1	103.0	4.0	1
P4KE82A	P4KE82CA	70.10	77.90	86.10	1	113.0	3.6	1
P4KE91A	P4KE91CA	77.80	86.50	95.50	1	125.0	3.3	1
P4KE100A	P4KE100CA	85.50	95.00	105.0	1	137.0	3.0	1
P4KE110A	P4KE110CA	94.00	105.00	116.0	1	152.0	2.7	1
P4KE120A	P4KE120CA	102.00	114.00	126.0	1	165.0	2.5	1
P4KE130A	P4KE130CA	111.00	124.00	137.0	1	179.0	2.3	1
P4KE150A	P4KE150CA	128.00	143.00	158.0	1	207.0	2.0	1
P4KE160A	P4KE160CA	136.00	152.00	168.0	1	219.0	1.9	1
P4KE170A	P4KE170CA	145.00	162.00	179.0	1	234.0	1.8	1



Continental Device India Pvt. Limited

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



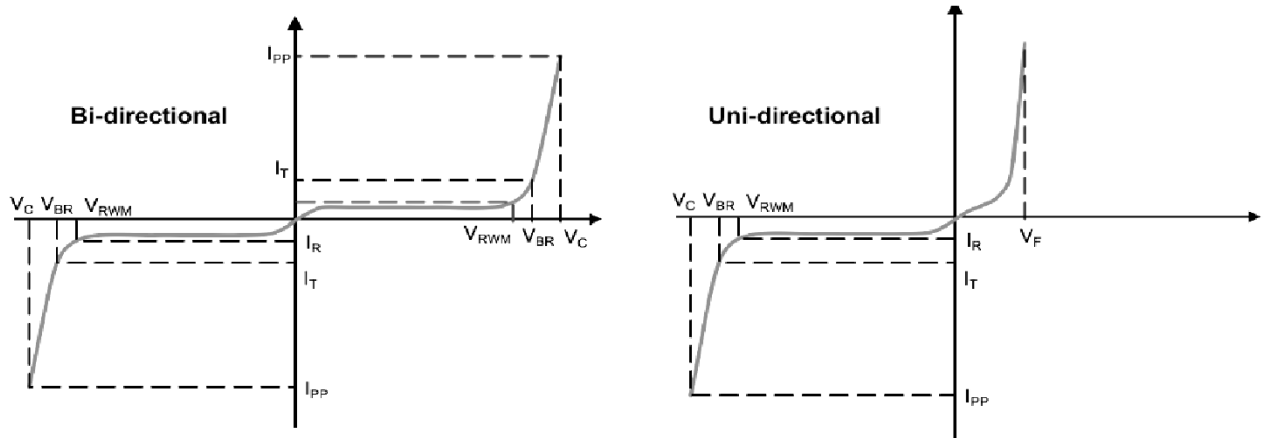
ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

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 _{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 (uA)
P4KE180A	P4KE180CA	154.00	171.00	189.0	1	246.0	1.7	1
P4KE200A	P4KE200CA	171.00	190.00	210.0	1	274.0	1.5	1
P4KE220A	P4KE220CA	185.00	209.00	231.0	1	328.0	1.3	1
P4KE250A	P4KE250CA	214.00	237.00	263.0	1	344.0	1.2	1
P4KE300A	P4KE300CA	256.00	285.00	315.0	1	414.0	1.0	1
P4KE350A	P4KE350CA	300.00	332.00	368.0	1	482.0	0.9	1
P4KE400A	P4KE400CA	342.00	380.00	420.0	1	548.0	0.8	1
P4KE440A	P4KE440CA	376.00	418.00	462.0	1	602.0	0.7	1
P4KE480A	P4KE480CA	408.00	456.00	504.0	1	658.0	0.6	1
P4KE510A	P4KE510CA	434.00	485.00	535.0	1	698.0	0.6	1
P4KE530A	P4KE530CA	450.00	503.50	556.5	1	725.0	0.6	1
P4KE540A	P4KE540CA	459.00	513.00	567.0	1	740.0	0.5	1
P4KE550A	P4KE550CA	467.00	522.50	577.5	1	760.0	0.5	1
P4KE600A	P4KE600CA	509.00	570.00	630.0	1	780.0	0.5	1

Notes:

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

CHARACTERISTICS CURVE



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 VR

V_F : Forward Voltage Drop for Uni-directional

TYPICAL CHARACTERISTICS CURVES

Fig 1: Peak Pulse Power Rating

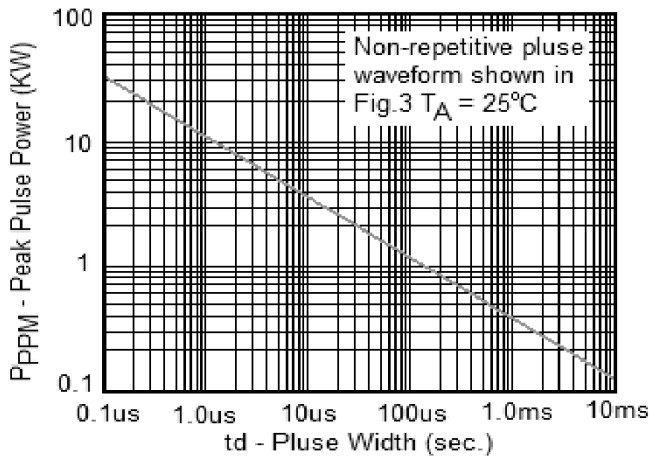


Fig 2 : Pulse Waveform

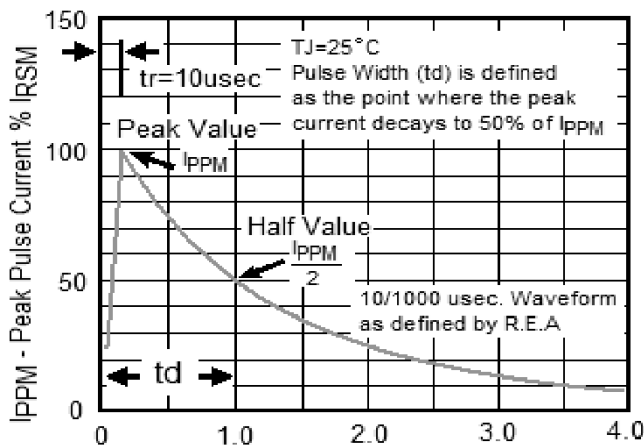


Fig 3: Pulse Derating Curves

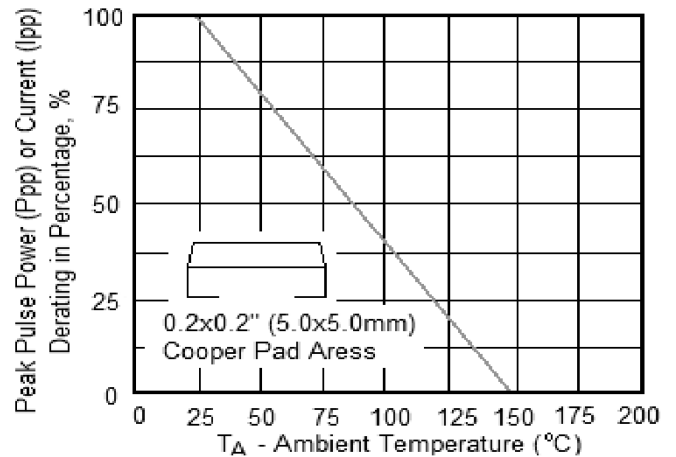
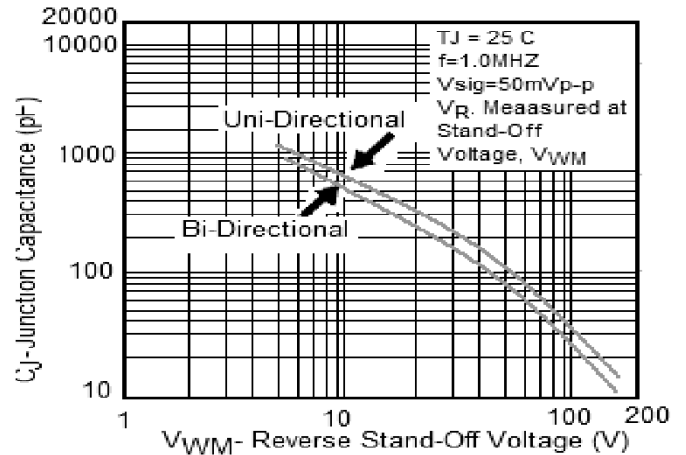
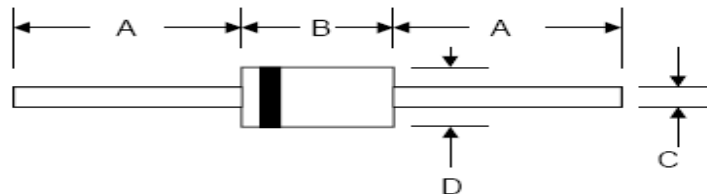


Fig 4: Typical Junction Capacitance



PACKAGE DETAIL

DO-41P Axial Leaded Plastic Package



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	25.40	--	1.000	--
B	4.20	5.20	0.165	0.205
C	0.65	0.90	0.026	0.035
D	2.00	2.85	0.079	0.112

Mechanical Characteristics

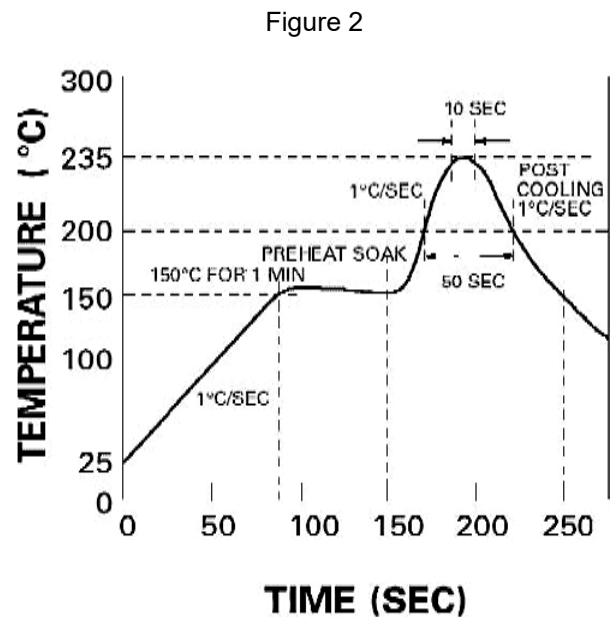
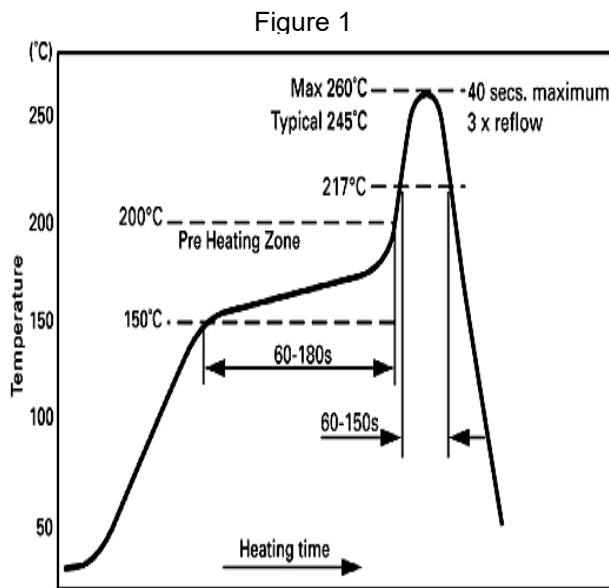
1. CASE: 41P Molded Plastic
2. Lead: Solderable per MIL-STD-750, method 2026
3. Epoxy: UL 94V-0 rate flame retardant
4. Polarity: Color band denotes cathode end except Bipolar
5. Mounting position: Any

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.



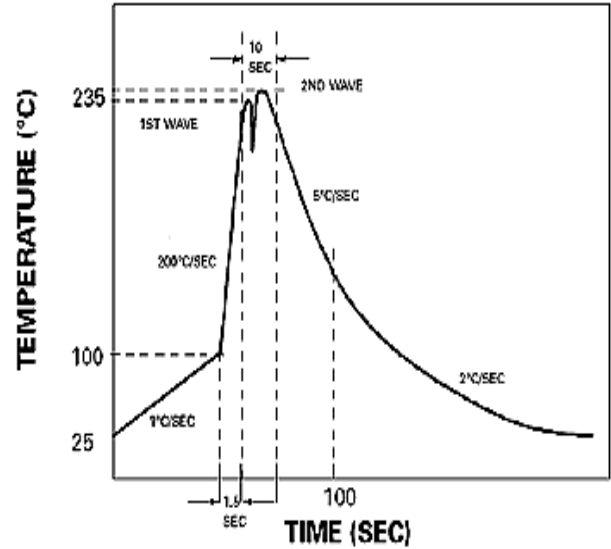
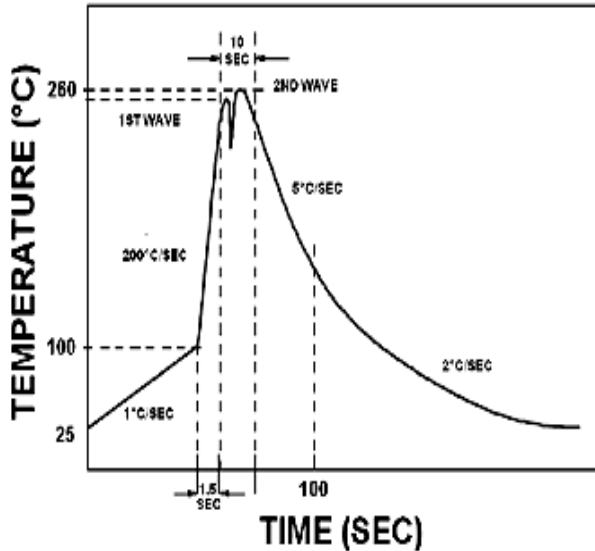
Reflow profiles in tabular form

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
– Tim	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



Continental Device India Pvt. Limited

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



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



Continental Device India Pvt. Limited

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



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.



CDIL is a registered trademark of

Continental Device India Pvt. Limited

C-120 Naraina Industrial Area, New Delhi 110 028, India.

Telephone +91-11-2579 6150, 4141 1112 Fax +91-11-2579 5290, 4141 1119

email@cdil.com www.cdil.com

CIN No. U32109DL1964PTC004291