



Continental Device India Pvt. Limited

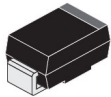
An IATF 16949, ISO9001 and ISO 14001/ISO 45001 Certified Company



SURFACE MOUNT SILICON ZENER DIODES

1SMA59XXA

$V_Z : 3.3 - 240 \text{ Volts}, P_D : 1.5 \text{ Watts}$



DO-214AC (SMA)

DO-214AC(SMA)
Surface Mount
Plastic Package
RoHS compliant

FEATURES:

1. Complete Voltage Range 3.3 to 240 Volts
2. High peak reverse power dissipation
3. High reliability
4. Low leakage current
5. Pb / RoHS Free
6. 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.

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

PARAMETER	SYMBOL	VALUE	UNIT
DC Power Dissipation (Note1)	P_D	1.5	W
Maximum Forward Voltage at $I_F = 200 \text{ mA}$	V_F	1.5	V
Maximum Thermal Resistance Junction to Ambient Air ²	$R_{\theta JA}$	130	K/W
Junction Temperature Range	T_J	-55 to +175	°C
Storage Temperature Range	T_S	-55 to +175	°C

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

Device	Nominal Zener Voltage		Maximum Zener Impedance			Maximum Reverse Leakage Current		Maximum DC Zener Current
	$V_Z @ I_{ZT}$	I_{ZT}	$Z_{ZT} @ I_{ZT}$	$Z_{ZK} @ I_{ZK}$	I_{ZK}	$I_R @ V_R$		I_{ZM}
	(V)	(mA)	(Ω)	(Ω)	(mA)	(μA)	(V)	(mA)
1SMA5913A	3.3	113.6	10	500	1.0	100	1.0	454
1SMA5914A	3.6	104.2	9.0	500	1.0	75	1.0	416
1SMA5915A	3.9	96.1	7.5	500	1.0	25	1.0	384
1SMA5916A	4.3	87.2	6.0	500	1.0	5.0	1.0	348
1SMA5917A	4.7	79.8	5.0	500	1.0	5.0	1.5	319
1SMA5918A	5.1	73.5	4.0	500	1.0	5.0	2.0	294

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

Device	Nominal Zener Voltage		Maximum Zener Impedance			Maximum Reverse Leakage Current		Maximum DC Zener Current
	V _Z @ I _{ZT}	I _{ZT}	Z _{ZT} @ I _{ZT}	Z _{ZK} @ I _{ZK}	I _{ZK}	I _R @ V _R		I _{ZM}
	(V)	(mA)	(Ω)	(Ω)	(mA)	(μA)	(V)	(mA)
1SMA5919A	5.6	66.9	2.0	500	1.0	5.0	3.0	267
1SMA5920A	6.2	60.5	2.0	200	1.0	5.0	4.0	241
1SMA5921A	6.8	55.1	2.5	200	1.0	50	5.2	220
1SMA5922A	7.5	50.0	3.0	400	0.5	50	6.0	200
1SMA5923A	8.2	45.7	3.5	400	0.5	50	6.5	182
1SMA5924A	9.1	41.2	4.0	500	0.5	50	7.0	164
1SMA5925A	10	37.5	4.5	500	0.25	50	8.0	150
1SMA5926A	11	34.1	5.5	500	0.25	50	8.4	136
1SMA5927A	12	31.2	6.5	500	0.25	1.0	9.1	125
1SMA5928A	13	28.5	7.0	500	0.25	1.0	9.9	115
1SMA5929A	15	25.0	9.0	600	0.25	1.0	11.4	100
1SMA5930A	16	23.4	10	600	0.25	1.0	12.2	93
1SMA5931A	18	20.8	12	650	0.25	1.0	13.7	83
1SMA5932A	20	18.7	14	650	0.25	1.0	15.2	75
1SMA5933A	22	17.0	17.5	650	0.25	1.0	16.7	68
1SMA5934A	24	15.6	19	700	0.25	1.0	18.2	62
1SMA5935A	27	13.9	23	700	0.25	1.0	20.6	55
1SMA5936A	30	12.5	26	750	0.25	1.0	22.8	50
1SMA5937A	33	11.4	33	800	0.25	1.0	25.1	45
1SMA5938A	36	10.4	38	850	0.25	1.0	27.4	41
1SMA5939A	39	9.6	45	900	0.25	1.0	29.7	38
1SMA5940A	43	8.7	53	950	0.25	1.0	32.7	34
1SMA5941A	47	8.0	67	1000	0.25	1.0	35.8	31
1SMA5942A	51	7.3	70	1100	0.25	1.0	38.8	29
1SMA5943A	56	6.7	86	1300	0.25	1.0	42.6	26
1SMA5944A	62	6.0	100	1500	0.25	1.0	47.1	24
1SMA5945A	68	5.5	120	1700	0.25	1.0	57.7	22
1SMA5946A	75	5.0	140	2000	0.25	1.0	56.0	20
1SMA5947A	82	4.6	160	2500	0.25	1.0	62.2	18
1SMA5948A	91	4.1	200	3000	0.25	1.0	69.2	16
1SMA5949A	100	3.7	250	3100	0.25	1.0	76.0	15
1SMA5950A	110	3.4	300	4000	0.25	1.0	83.6	13
1SMA5951A	120	3.1	380	4500	0.25	1.0	91.2	12
1SMA5952A	130	2.9	450	5000	0.25	1.0	98.8	11
1SMA5953A	150	2.5	600	6000	0.25	1.0	114.0	10
1SMA5954A	160	2.3	700	6500	0.25	1.0	121.6	9.0
1SMA5955A	180	2.1	900	7000	0.25	1.0	136.8	8.0
1SMA5956A	200	1.9	1200	8000	0.25	1.0	152.0	7.0
1SMA5957A	240	1.5	1600	9000	0.25	1.0	182.4	6.0

Notes

1. T_L = Lead temperature at 5.0 mm² (0.013 mm thick) copper land area
2. Suffix "A " indicates ± 10% tolerance, suffix " B " indicates ± 5% tolerance. Suffix may be put while ordering

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TYPICAL CHARACTERISTIC CURVES

Fig 1: Steady State Power Derating

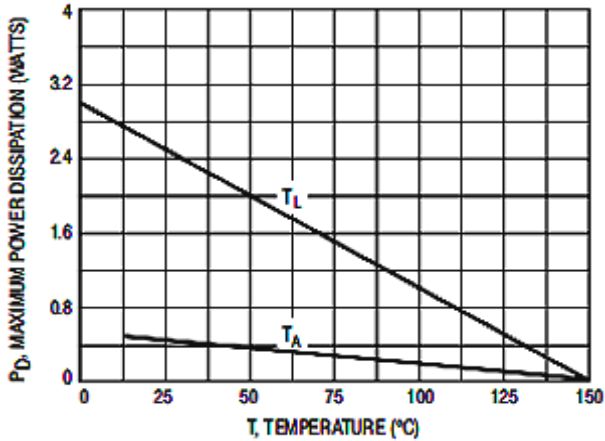


Fig 2: V_Z = 12 thru 68 Volts

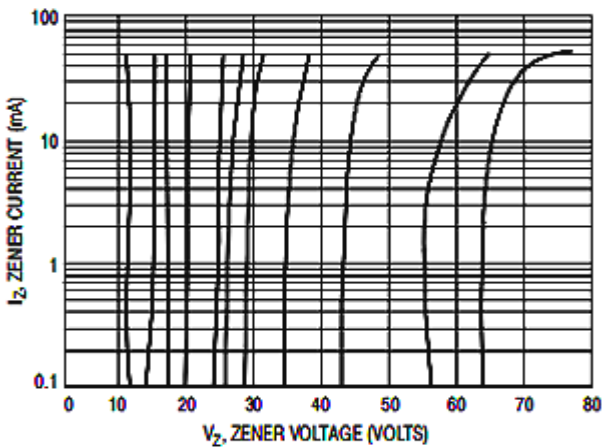


Fig 3: Zener Voltage – 12 to 68 Volts

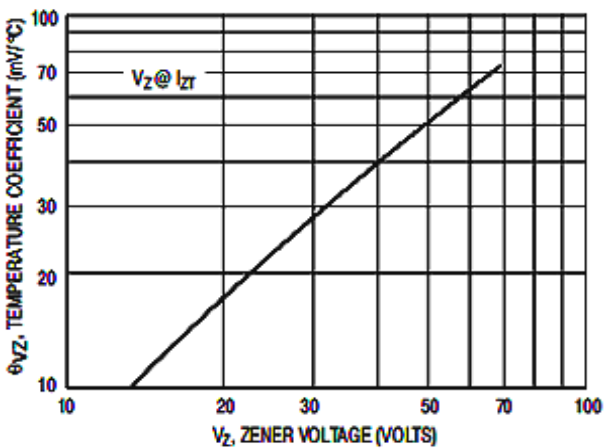


Fig 4: V_Z – 3.3 thru 10 Volts

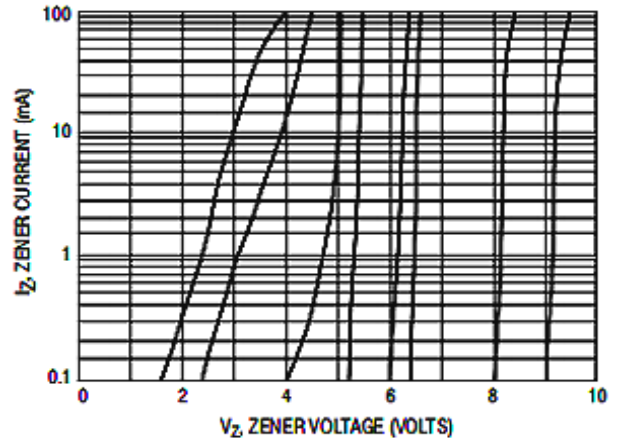


Fig 5: Zener Voltage – 3.3 to 12 Volts

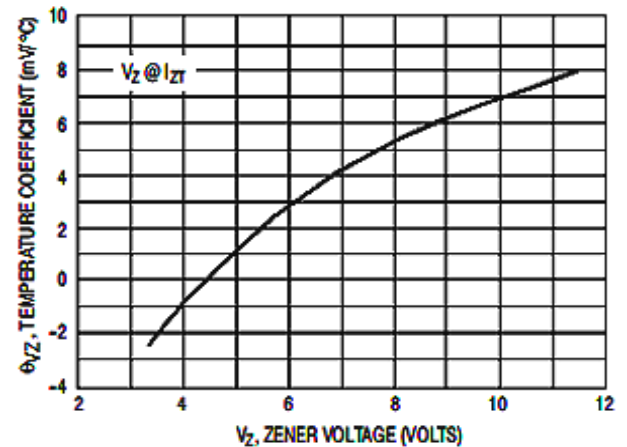
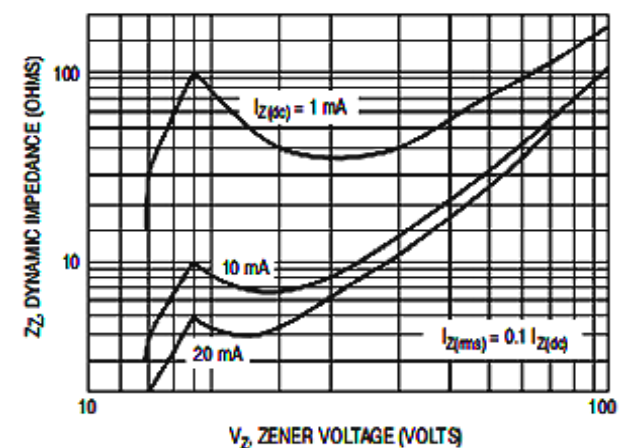


Fig 6: Effect of Zener Voltage



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TYPICAL CHARACTERISTIC CURVES

Fig 7: Capacitance Curve

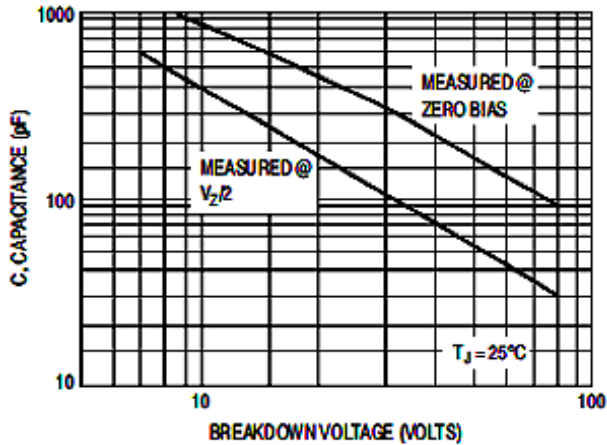


Fig 9: Typical Pulse Rating Curve

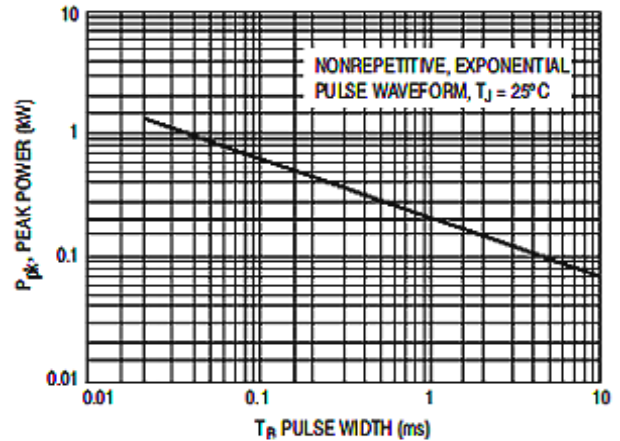


Fig 8: Pulse Waveform

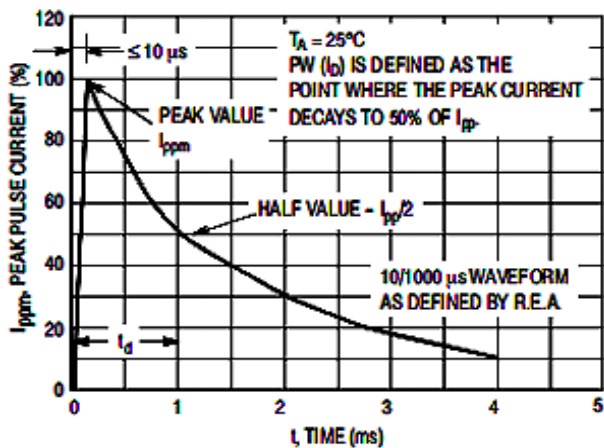
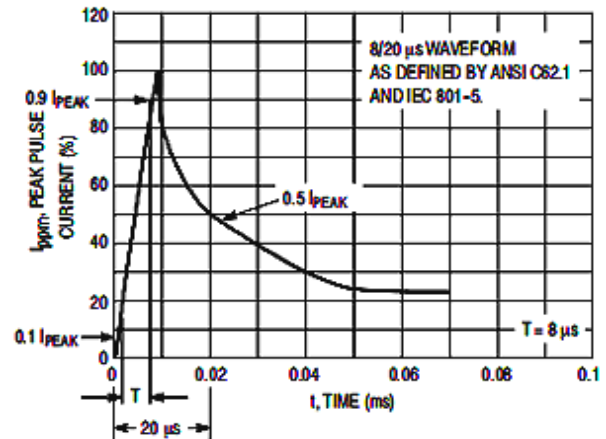
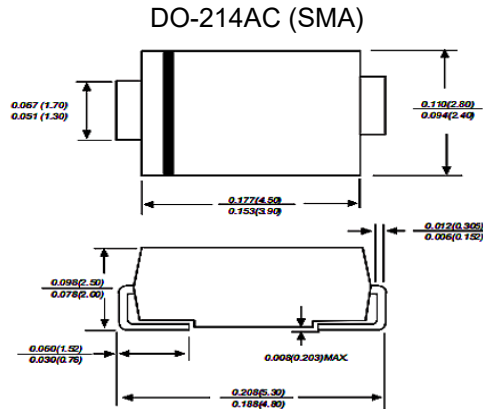


Fig 10: Pulse Waveform



PACKAGE DETAILS

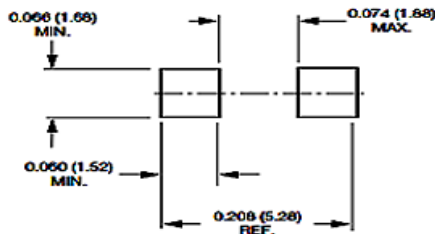


Dimensions in inches and (millimeters)

Mechanical Data

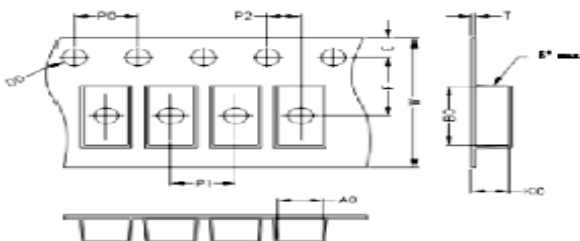
- Case : SMA Molded plastic
- Epoxy : UL94V-O rate flame retardant
- Polarity : Color band denotes cathode end
- Mounting position : Any
- Weight : 0.060 gram (Approximately)

SOLDER PAD LAYOUT



Package Information

Carrier Dimensions(mm)



A0	B0	K0	D0	E	F
2.80	5.30	2.36	1.55	1.75	5.50
P0	P1	P2	T	W	Tolerance
4.0	4.0	2.0	0.25	12	0.1

Package Specifications

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
SMA	11'	278	5	285	10	355*310*310	80
	13'	330	7.5	340	15	360*360*360	120

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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

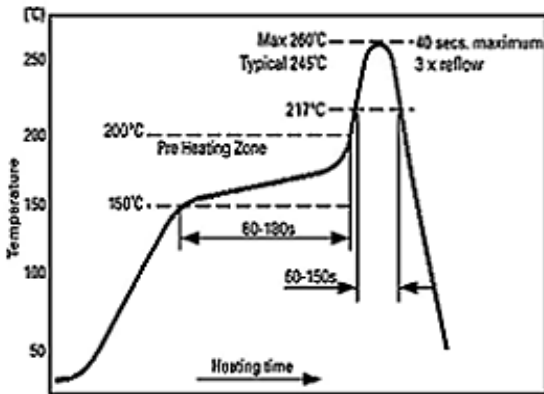
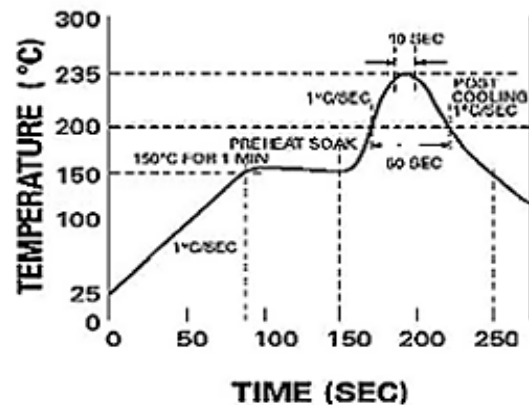


Figure 2

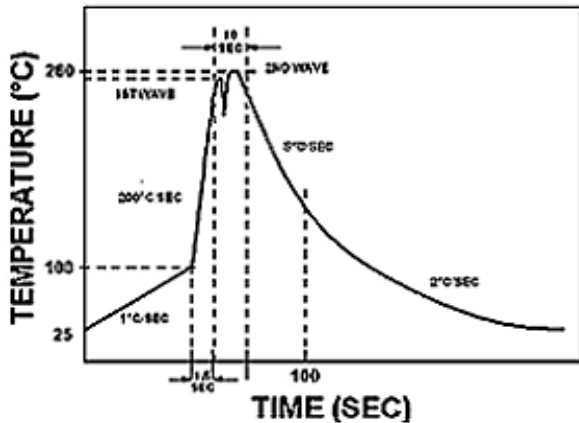


Reflow profiles in tabular form

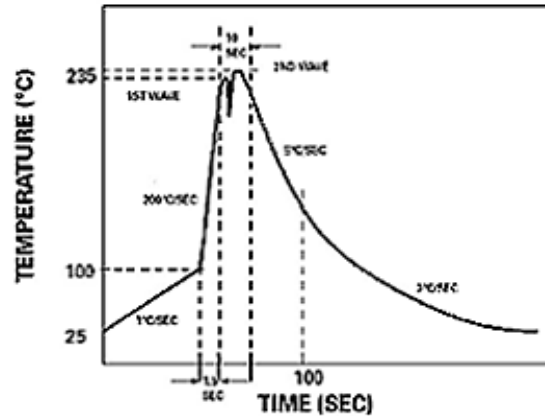
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat		
– Temperature Range	150-170°C	150-200°C
– Time	60-180 seconds	60-180 seconds
Time maintained above:		
– Temperature	200°C	217°C
– Time	30-50 seconds	60-150 seconds
Peak Temperature	235°C	260°C max.
Time 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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