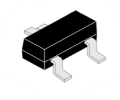
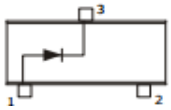
SILICON PLANAR HIGH SPEED DIODES

BAS19, BAS20, BAS21



SOT-23



SOT-23
Surface Mount
Plastic Package
RoHS compliant

FEATURES

1. Small plastic SMD package
2. Switching speed: max. 50 ns
3. General application
4. Continuous reverse voltage: max. 100 V; 150 V; 200 V
5. Repetitive peak reverse voltage: max. 120 V; 200 V; 250 V
6. Repetitive peak forward current: max. 625 mA.

APPLICATION:

1.High-Speed Switching Diodes in a Micro miniature Plastic Envelope..

ABSOLUTE MAXIMUM RATINGS (Ratings at T_A = 25°C Ambient Temperature unless otherwise specified)

PARAMETER		SYMBOL	VALUE			UNIT
			BAS19	BAS20	BAS21	
Continuous Reverse Voltage		V_R	100	150	200	V
Maximum Repetitive Peak Reverse Voltage		V_{RRM}	120	200	250	V
Non Repetitive Peak Forward Current	t=1µs	I_{FSM}	2.5			A
	t=1s		0.5			
Average Rectified Forward Current (averaged over any 20 ms period)		$I_{F(AV)}$	200			mA
Forward Current (DC)[1]		I_F	200			mA
Repetitive Peak Forward Current		I_{FRM}	625			mA
Total Power Dissipation		P_D	250			mW
Storage Temperature Range		T_{STG}	- 55 to +150			°C
Junction Temperature		T_J	150			°C

THERMAL RESISTANCE			
Junction to Ambient in free air	$R_{th\ (j-a)}$	500	K/W

ELECTRICAL CHARACTERISTICS (T_a=25° C unless specified otherwise)						
PARAMETER	**SYMBOL**	**TEST CONDITION**	**VALUE**			**UNIT**
			MIN	**TYP**	**MAX**	
Forward Voltage	V_F	I_F=100mA	--	--	1.00	V
		I_F=200mA	--	--	1.25	
Reverse Breakdown Voltage	$V_{(BR)R}$	I_R=100μ A				V
		BAS19[2]	120	--	--	
		BAS20	200	--	--	
		BAS21[3]	250	--	--	
Reverse Voltage Leakage Current	I_R	V_R= $V_R$max	--	--	100	nA
		V_R= $V_R$max;Tj=150°C	--	--	100	μA
Differential Resistance	r_{diff}	I_F=10mA	--	5	--	Ω
Reverse Recovery Time When Switched from	t_{rr}	I_F=30mA to I_R=30mA,R_L 100Ω, measured at I_R=3mA	--	--	50	ns

NOTES:

1.Mounted on a ceramic substrate 0f 8mm x 10mm x 0.7mm.

2.Measured under pulse conditions; pulse time = t_p=0.3ms.

3.At zero life time measured under pulse conditions to avoid excessive dissipation and voltage limited to 275V.

TYPICAL CHARACTERISTIC CURVES

Figure 1. Forward Current Derating Curve

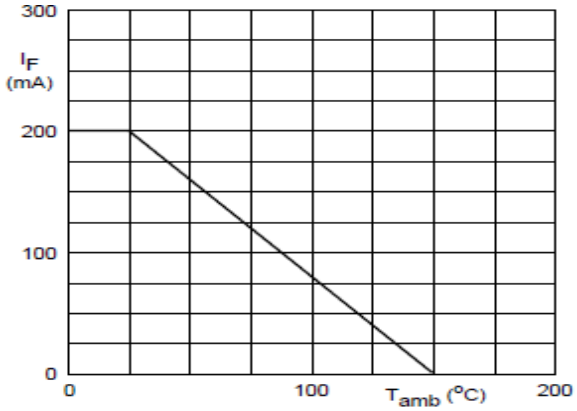


Figure 2. Forward current vs Forward Voltage

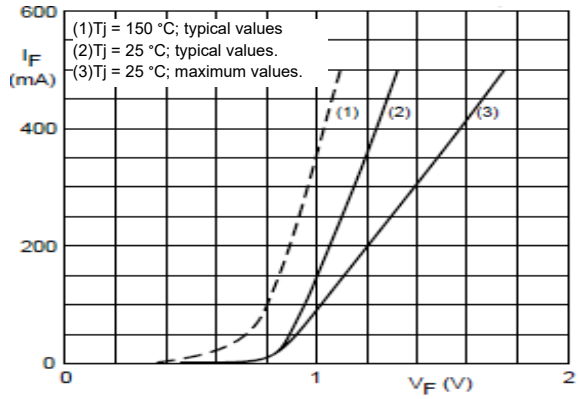


Figure 3. Reverse current vs junction temperature.

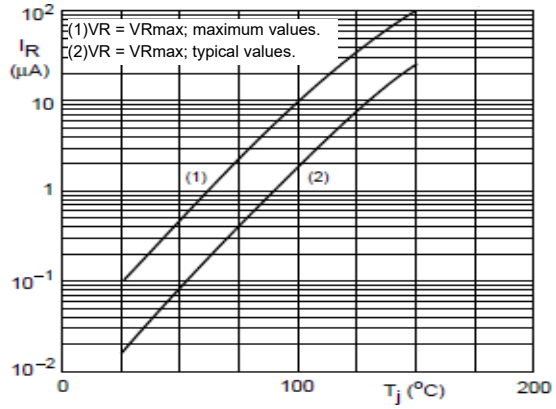


Figure 4. Diode capacitance vs reverse voltage; typical values

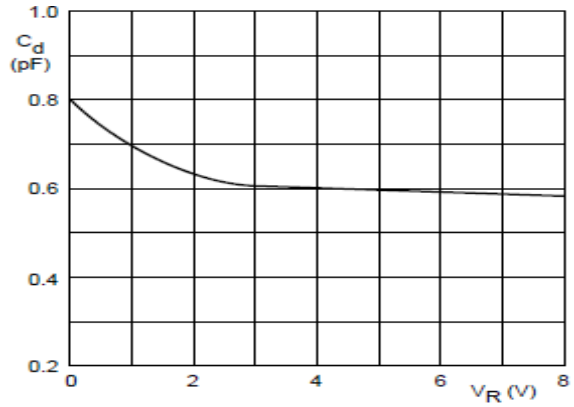


Figure 5. Maximum permissible continuous reverse voltage vs ambient temperature.

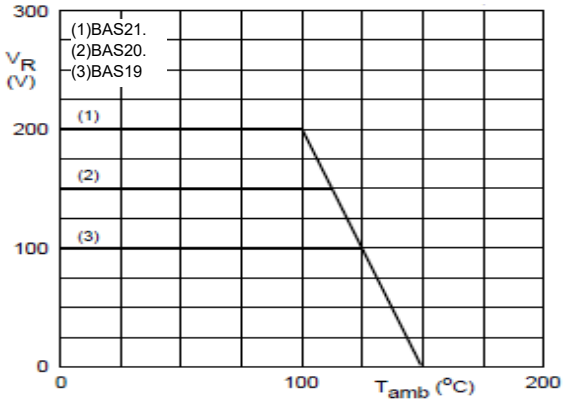
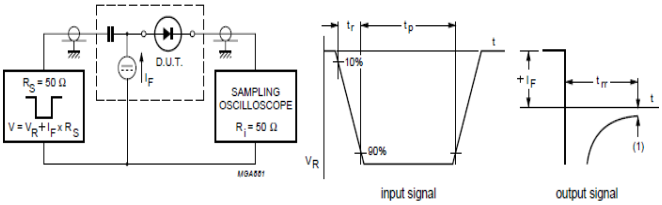


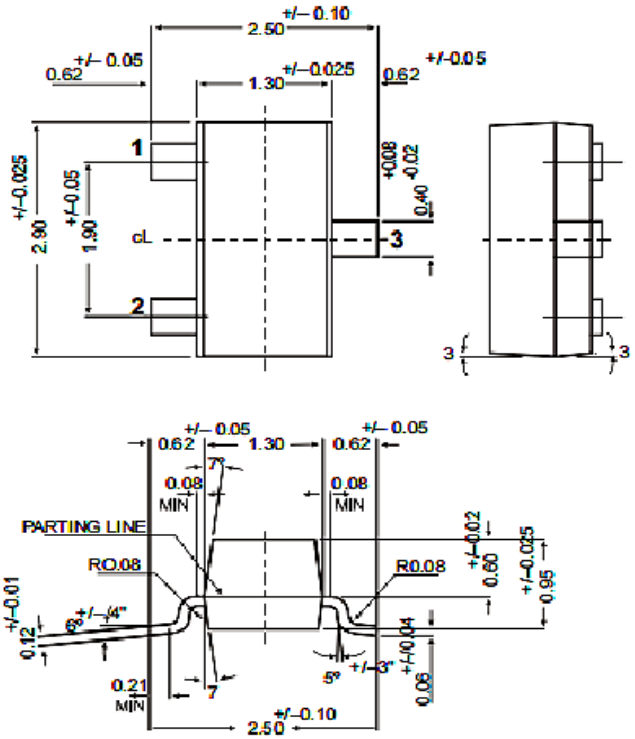
Figure 6. Reverse recovery voltage test circuit and Waveforms.



1)IR = 3 mA.

PACKAGE DETAILS

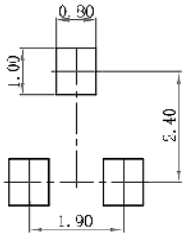
SOT-23 SMD Package



PIN CONFIGURATION (NPN)

1. ANODE
2. NC
3. CATHODE

SOT-23 Suggested Pad Layout



Note

1. Controlling Dimensions: in Millimeters.
2. General Tolerance:±0.05mm
3. The Pad Layout is For Reference Purposes Only.

BAS19_21
Rev2_09082023E

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

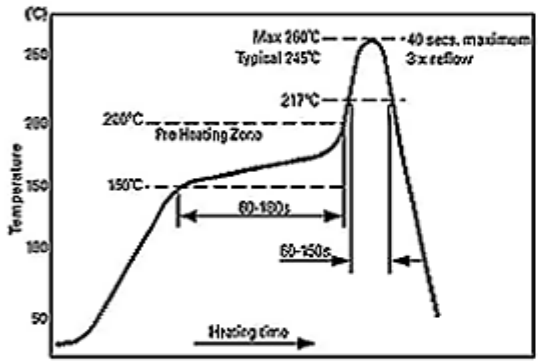
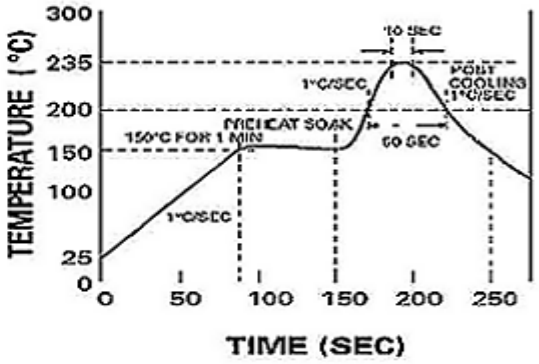


Figure 2

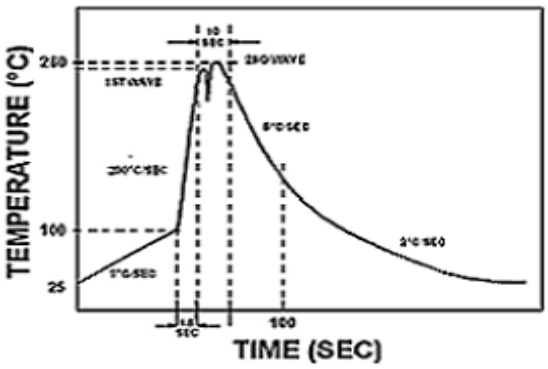


Reflow profiles in tabular form

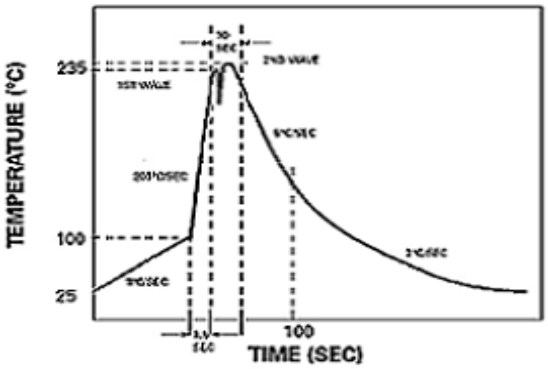
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	 150-170°C 60-180 seconds	 150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	 200°C 30-50 seconds	 217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time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

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

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).
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