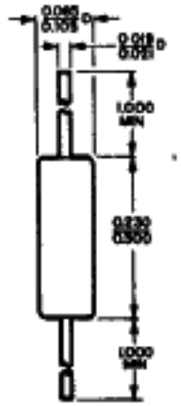
MICROWAVE DIODE CORPORATION

IN3831 THROUGH IN3846

SILICON PLANAR THYRISTOR DIODES

Also known as Four Layer Diodes and Shockley Diodes
Switching Voltage 20 to 100 volts
Holding current .5 to 45 mA.



PACKAGE OUTLINE

ELECTRICAL PARAMETERS

Type	Switching Voltage V_g (V)		Holding Current IH (mA)	
	25°C	-40 to 85 C	25 C	-40 to 85 C
IN3831	20±4	14-25	.5 to 15	40 max.
IN3832	25±4	19-30	.5 – 15	40 max.
IN3833	30±4	23-36	.5 – 15	40 max.
IN3834	35±4	28-41	.5 – 15	40 max.
IN3835	40±4	32-46	.5 – 15	40 max.
IN3836	45±4	37-51	.5 – 15	40 max.
IN3837	50±4	41-57	.5 – 15	40 max.
IN3838	100±10	80-115	.5 – 15	40 max.
IN3839	20±4	14-25	14 – 45	5 min.
IN3840	25±4	19-30	14 – 45	5 min.
IN3841	30±4	23-36	14 – 45	5 min.
IN3842	35±4	28-41	14 – 45	5 min.
IN3843	40±4	32-46	14 – 45	5 min.
IN3844	45±4	37-51	14 – 45	5 min.
IN3845	50±4	41-57	14 – 45	5 min.
IN3846	100±10	80-115	14 – 45	5 min.

PARAMETERS FOR ALL INDUSTRIAL TYPES
A+T=25°C

Switching Current	Is:	<75μA
Holding Voltage	Vh:	.5 to 1.2 volts
On Voltage	Von	<1.2 V at 70 mA
On Impedence	Zon	<2 ohms at 70 mA at 60 c/s
Forward Leakage Current	Ifl	<2 μA at .75 Nominal Vs
Reverse Leakage Current	Irl	<2 μA at .75 Nominal Vs
Reverse Breakdown Voltage	Vrb	>Nominal Vs
Turn on Time	Ton	10 to 500 ns. Dependent on targetted value and circuit.
Turn off Time	Toff	20 to 1000 ns. Dependent on targetted value and circuit.
Capitance	C	10 to 50 pf. Dependent on nominal Vs and applied voltage.
Power Rating	P.	250 mW. Derating 10 25% @ 125°C.
Current Carrying Capacity		250 mA steady dc. Maximum current 10 amps with duty factor, repetition rate, pulse duration and ambient temperature such that power rating is not exceeded.
Ambient Temperature Operating Range		–65°C. to 150°C.
Storage Temperature		–75°C to 200°C

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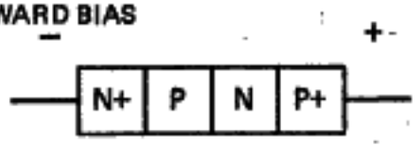
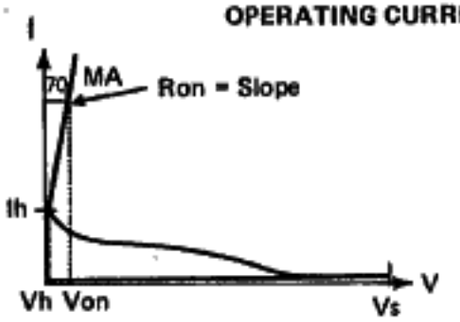
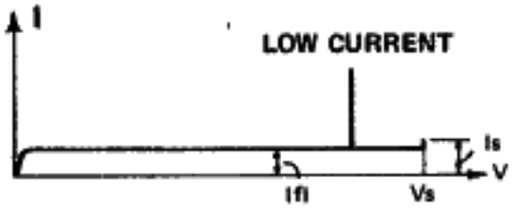
FOUR LAYER DIODE CHARACTERISTICS

FORWARD BIAS

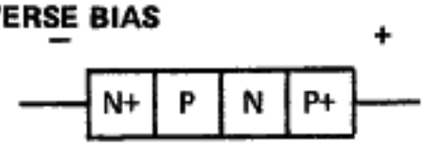


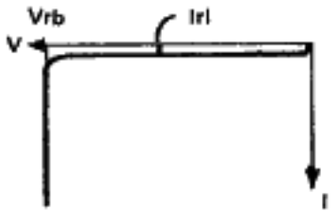
OPERATING CURRENT





REVERSE BIAS

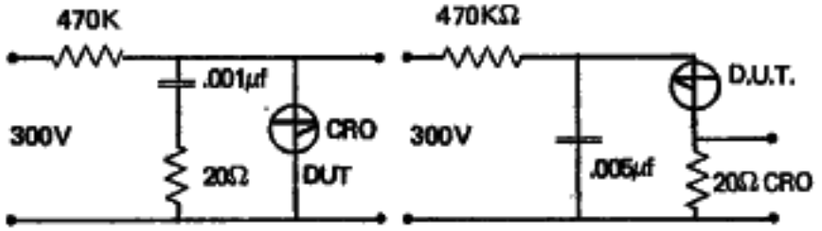




PARAMETER MEASUREMENTS

Vs, Is, Vh, Von, Ih, Zon, Ifl, Irl and Vrb can be measured on a Tektronix 575 curve tracer.
Applied voltage should be 10 volts above the nominal Vs with 1k series resistor. More accurate test procedures are availalbe from A.P.D.

T on and T off Typical Circuits are

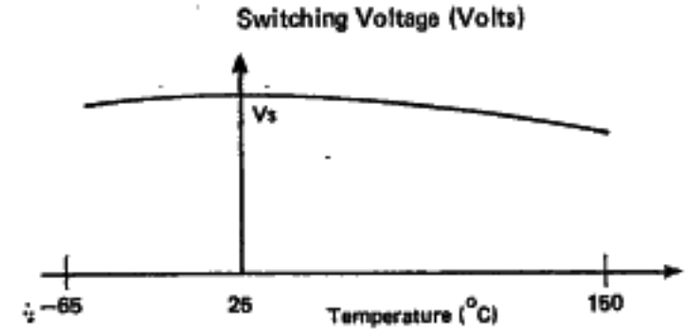


In above circuit typical values of T on and T off are

	T on	T off
20, 30, 40 volts	100 ns.	200 ns.
50, 80, 100, 200 volts	50 ns.	50 ns.

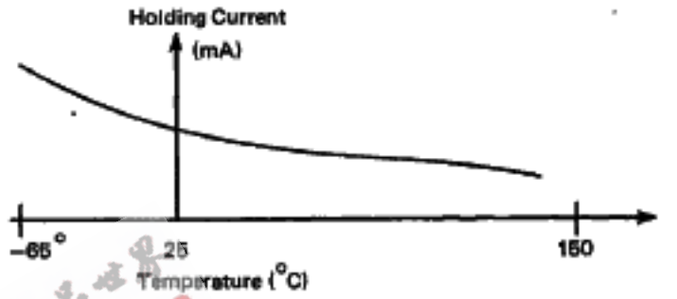
PARAMETER VARIATIONS WITH TEMPERATURE

Switching Voltage Typical variation of Vs with temperature is as follows:



The shape of the above and the temperature at which the voltage is a maximum are design parameters.

HOLDING CURRENT. Typical variations of Ih with temperature is as follows:



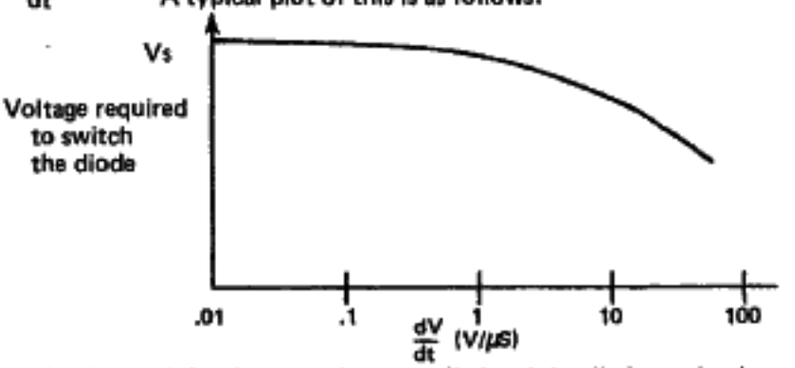
The change in Ih with temperature can be reduced but other parameters e.g. T on are increased.

SWITCHING CURRENT. Switching current can be designed to increase or decrease with increasing temperature.

ON VOLTAGE. Decreases as the temperature is raised.

UNSPECIFIED PARAMETERS

RATE EFFECT. As the rate at which voltage is applied to the diode $\frac{dV}{dt}$ increases, the voltage required to switch the diode decreases: A typical plot of this is as follows:



The shape of the above can be controlled and the diode can be designed with no change up to 10 V/us.

HIGH CURRENT ON IMPEDANCE A typical on impedance value at 5 amps for the diode is .2 ohms, using a 575 curve tracer. Variations in the rate of increase of current $\frac{dI}{dt}$ can add or subtract from this value.

HIGH FREQUENCY POWER TRANSMISSION At frequencies of 100 mHz the diode can transmit power of 100 watts with greater than 99% efficiency.

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