

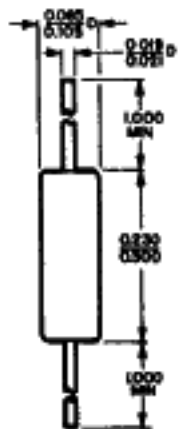
MICROWAVE DIODE CORPORATION



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 I_H (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	I_s :	< 75µA
Holding Voltage	V_h :	.5 to 1.2 volts
On Voltage	V_{on} :	< 1.2 V at 70 mA
On Impedance	Z_{on} :	< 2 ohms at 70 mA at 60 c/s
Forward Leakage Current	I_{fl} :	< 2 µA at .75 Nominal V_s
Reverse Leakage Current	I_{rl} :	< 2 µA at .75 Nominal V_s
Reverse Breakdown Voltage	V_{rb} :	> Nominal V_s
Turn on Time	T_{on} :	10 to 500 ns. Dependent on targetted value and circuit.
Turn off Time	T_{off} :	20 to 1000 ns. Dependent on targetted value and circuit.
Capitance	C :	10 to 50 pf. Dependent on nominal V_s 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		-65°C. to 150°C.
Operating Range		
Storage Temperature		-75°C to 200°C

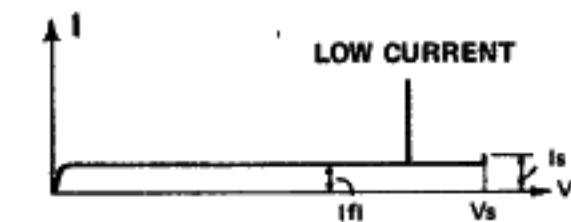
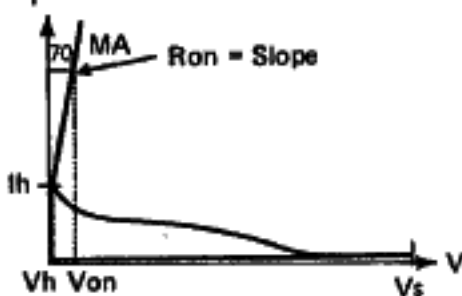
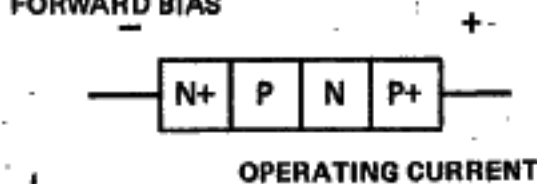
MICROWAVE DIODE CORPORATION

U.S. ROUTE 3 - BOX 250
WEST STEWARTSTOWN, NEW HAMPSHIRE 03597
(603) 246-3362

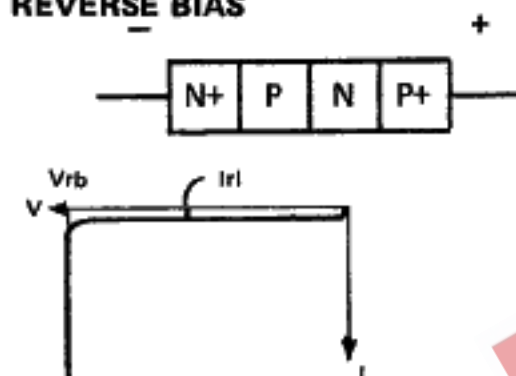


FOUR LAYER DIODE CHARACTERISTICS

FORWARD BIAS



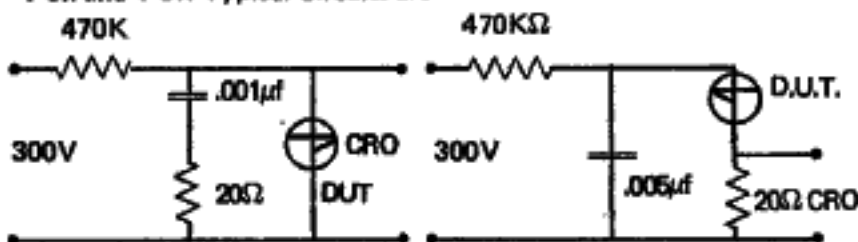
REVERSE BIAS



PARAMETER MEASUREMENTS

V_s , I_s , V_h , V_{on} , I_h , Z_{on} , I_{fi} , I_{rl} and V_{rb} can be measured on a Tektronix 575 curve tracer. Applied voltage should be 10 volts above the nominal V_s with 1k series resistor. More accurate test procedures are available from A.P.D.

T_{on} and T_{off} Typical Circuits are



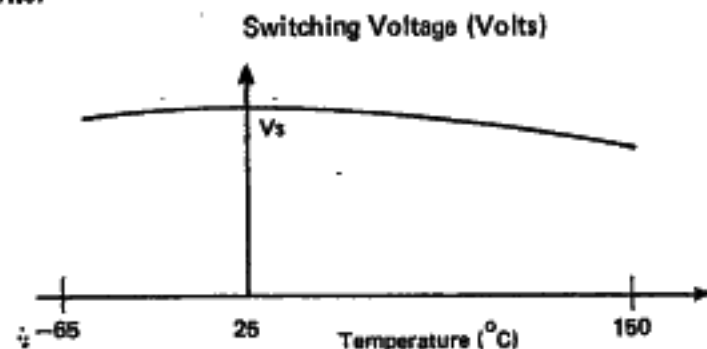
In above circuit typical values of T_{on} and T_{off} are

20, 30, 40 volts
50, 80, 100, 200 volts

T_{on}	T_{off}
100 ns.	200 ns.
80 ns.	50 ns.

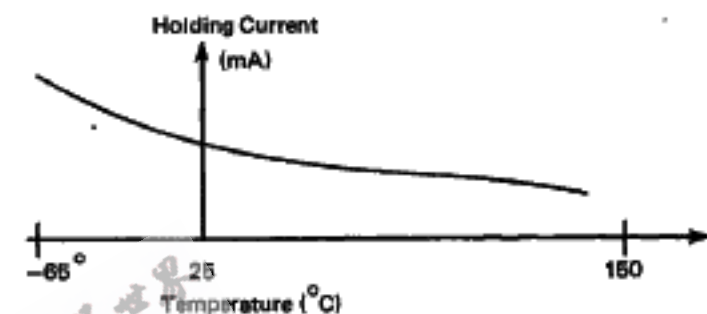
PARAMETER VARIATIONS WITH TEMPERATURE

Switching Voltage Typical variation of V_s 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 I_h with temperature is as follows:



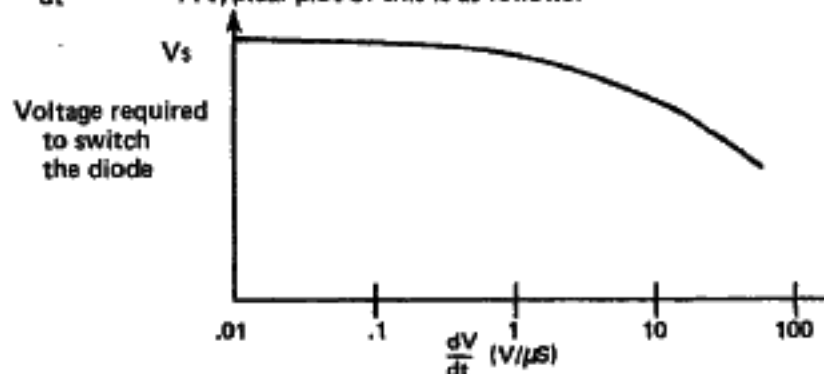
The change in I_h with temperature can be reduced but other parameters e.g. T_{on} are increased.

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 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/μs.

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 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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