1N5158 thru 1N5160
1N5779 thru 1N5793

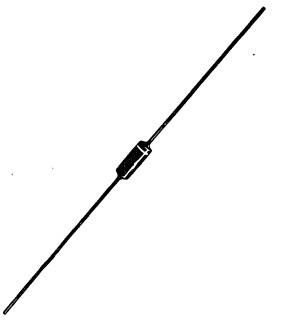
PNPN 4-LAYER DIODES

. . . two terminal, fast-switching devices specifically designed for low voltage applications such as logic circuits, pulse generators, memory and relay drivers, relay replacements, alarm circuits, multivibrators, ring counters, and telephone switching circuits. These devices feature:

- Low Breakover (Switching) Voltage – 10 to 15-Volt Ratings
- Fast Switching Speeds – t_{on} = 75 ns (Typ)
  t_{off} = 250 ns (Typ)
- Low Junction Capacitance – 45 pF (Typ)
- Low Breakover Currents
- Subminiature Glass Package

EPITAXIAL 4-LAYER DIODES

10-15 VOLTS
150 mW

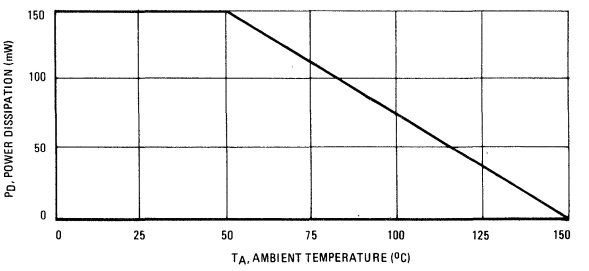


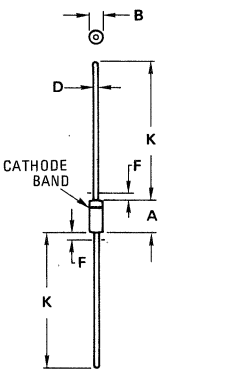
MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
*Reverse Voltage 1N5158, 1N5782, 1N5788 1N5159, 1N5783, 1N5789 1N5160, 1N5784, 1N5790 1N5779, 1N5785, 1N5791 1N5780, 1N5786, 1N5792 1N5781, 1N5787, 1N5793	V_{RM}	10 11 12 13 14 15	Volts
*Continuous Forward Current	I_F	150	mA
*Steady State Power Dissipation @ T_A = 50°C Derate above 50°C	P_D	150 1.5	mW mW/°C
*Peak Pulse Current (50 μs maximum pulse width)	I_{pulse}	10	Amps
*Operating Junction Temperature Range	T_J	-65 to +150	°C
Storage Temperature Range	T_{stg}	-65 to +175	°C

*Indicates JEDEC Registered Data.

FIGURE 1 – POWER-TEMPERATURE DERATING CURVE





DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	5.84	7.62	0.230	0.300
B	2.16	2.72	0.085	0.107
D	0.46	0.56	0.018	0.022
F	–	1.27	–	0.050
K	25.40	–	1.000	–

All JEDEC dimensions and notes apply

CASE 51-02
DO-7

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
*Forward Switching Voltage	1N5158, 1N5782, 1N5788	V_S	8.0	–	10	Volts
	1N5159, 1N5783, 1N5789		9.0	–	11	
	1N5160, 1N5784, 1N5790		10	–	12	
	1N5779, 1N5785, 1N5791		11	–	13	
	1N5780, 1N5786, 1N5792		12	–	14	
	1N5781, 1N5787, 1N5793		13	–	15	
*Forward Switching Current	1N5158 thru 1N5160, 1N5779 thru 1N5781	I_S	–	5.0	50	μA
	1N5782 thru 1N5793		–	10	100	
*Forward Off-State Current (V_F = 0.75 x V_S)		I_{FM}	–	1.0	5.0	μA
*Reverse Current (V_R = V_{RM})		I_{RM}	–	2.0	10	μA
*Holding Current	1N5158 thru 1N5160, 1N5779 thru 1N5781	I_H	1.0	4.0	20	mA
	1N5782 thru 1N5787		10	–	50	
	1N5788 thru 1N5793		0.1	–	2.0	
*Forward On Voltage (I_F = 150 mAdc)		V_F	–	1.0	1.5	Volts
*Critical Rate of Rise of Applied Forward Voltage		dv/dt				V/μs
(V_S = 6.0 Vdc)	1N5158, 1N5782, 1N5788		–	–	0.1	
(V_S = 6.75 Vdc)	1N5159, 1N5783, 1N5789		–	–	0 1	
(V_S = 7.5 Vdc)	1N5160, 1N5784, 1N5790		–	–	0.1	
(V_S = 8.25 Vdc)	1N5779, 1N5785, 1N5791		–	–	0.1	
(V_S = 9.0 Vdc)	1N5780, 1N5786, 1N5792		–	–	0.1	
(V_S = 9.75 Vdc)	1N5781, 1N5787, 1N5793		–	–	0.1	
Junction Capacitance (AC Voltage = 10 mV, V_F = 0, f = 100 kHz)		C_J	–	45	–	pF
Turn-On Time (Figure 2)		t_{on}	–	75(1)	–	ns
Turn-Off Time (Figure 3)		t_{off}	–	250(1)	–	ns

*Indicates JEDEC Registered Data. (1) Time depends on a wide variety of circuit conditions. Consult manufacturer for further information.

FIGURE 2 – TURN-ON TIME TEST CIRCUIT

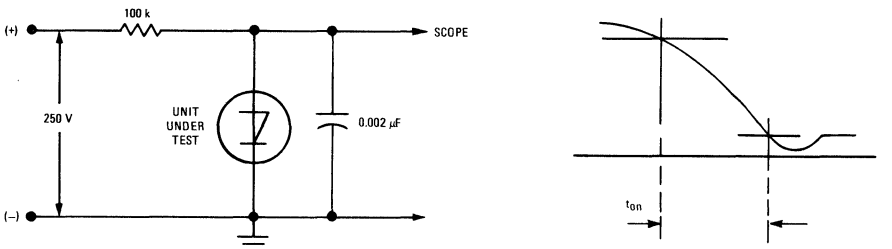


FIGURE 3 – TURN-OFF TIME TEST CIRCUIT

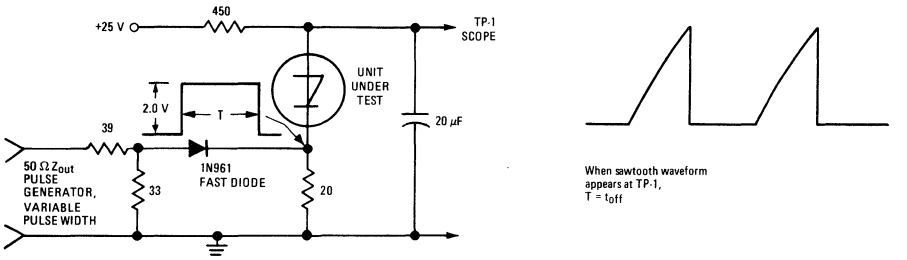


FIGURE 4 – TYPICAL FORWARD CONDUCTION CHARACTERISTICS

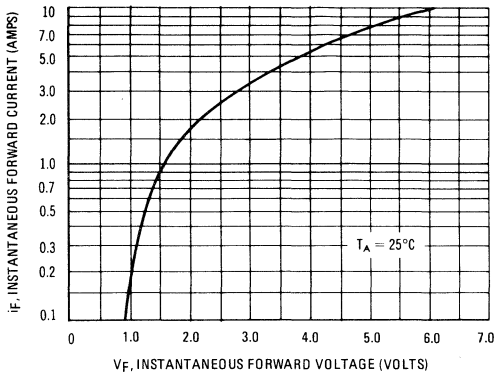
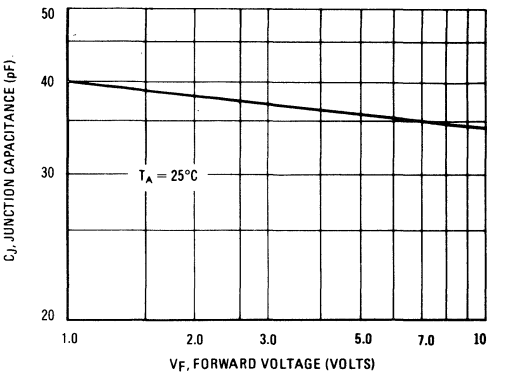


FIGURE 5 – TYPICAL CAPACITANCE



TYPICAL DC CHARACTERISTICS versus TEMPERATURE

(NORMALIZED to 25°C VALUE)

FIGURE 6 – FORWARD BREAKOVER VOLTAGE

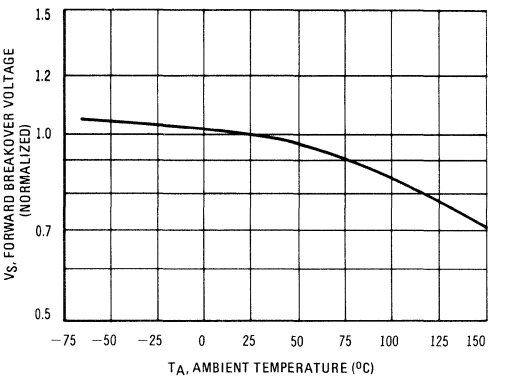


FIGURE 7 – REVERSE BLOCKING VOLTAGE

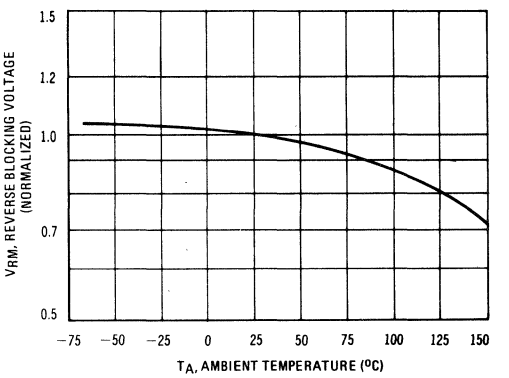


FIGURE 8 – FORWARD BREAKOVER CURRENT

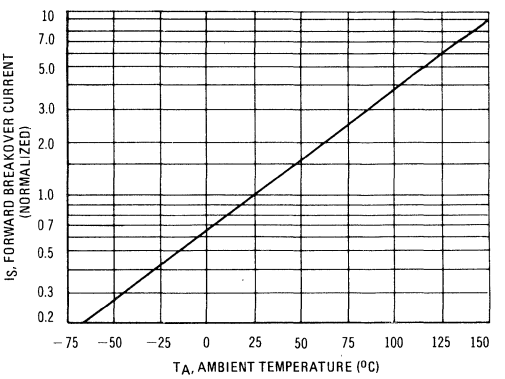
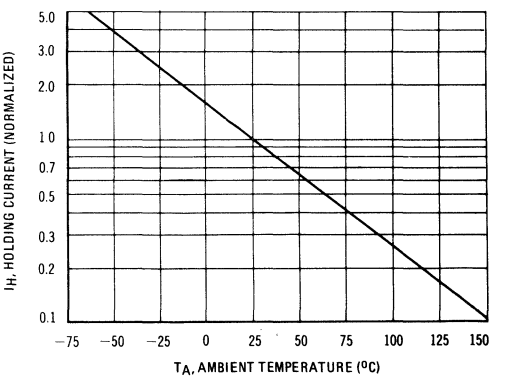
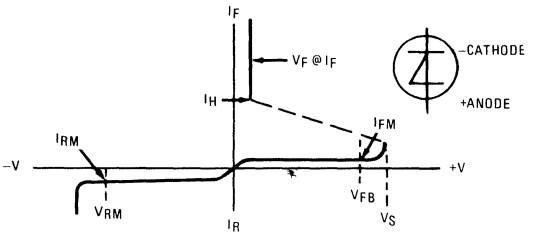


FIGURE 9 – HOLDING CURRENT



4-LAYER DIODE SYMBOLS AND DEFINITIONS



dv/dt **FORWARD VOLTAGE APPLICATION RATE ($V/\mu s$)** – The rate of rise of forward voltage.

I_S **FORWARD BREAKOVER (SWITCHING) CURRENT** – The value of anode current at the instant the device switches from the blocking to the "on" state, specified at a particular junction temperature.

I_F **FORWARD CURRENT** – The continuous or DC value of forward current during the "on" state.

I_{FM} **PEAK FORWARD BLOCKING CURRENT** – The peak anode current when the 4-layer diode is in the "off" state for a stated anode-to-cathode voltage and junction temperture.

I_H **HOLDING CURRENT** – That value of forward anode current below which the 4-layer diode switches from the conducting state to the forward blocking condition.

I_{pulse} **PEAK PULSE CURRENT** – The peak repetitive current that can flow through the device for the time duration stated.

I_{RM} **PEAK REVERSE BLOCKING CURRENT** – The peak current when the 4-layer diode is in the reverse blocking state for a stated anode-to-cathode voltage and junction temperature.

P_D **STEADY-STATE POWER DISSIPATION**

T_A **AMBIENT TEMPERATURE**

T_J **JUNCTION TEMPERATURE**

T_{stg} **STORAGE TEMPERATURE**

t_{on} **TURN-ON TIME** – The time interval between the 90% point (90% of forward blocking voltage) and the point 10% above the "on" voltage under stated conditions.

t_{off} **TURN-OFF TIME** – The time interval required for the device to regain control of its forward blocking characteristic after interruption of forward anode current.

V_S **FORWARD BREAKOVER (SWITCHING) VOLTAGE** – The positive anode voltage with respect to cathode required to switch the device from the high impedance blocking state to the low impedance "on" state, specified at a particular junction temperature.

V_F **FORWARD VOLTAGE** – The forward voltage across the device in the "on" state under stated conditions of current and temperature.

V_{FB} **FORWARD BLOCKING VOLTAGE** – The anode-to-cathode voltage when the 4-layer diode is in the "off" state.

V_{RM} **PEAK REVERSE VOLTAGE** – The maximum allowable instantaneous value of reverse voltage (repetitive or continuous DC) which can be applied to the device at a stated temperature without damage to the device.

MECHANICAL CHARACTERISTICS

CASE: Hermetically sealed all glass case
DIMENSIONS: JEDEC DO-7 Outline
FINISH: All external surfaces are corrosion resistant with readily solderable leads.
POLARITY: Cathode end indicated by color band.
WEIGHT: 0.2 grams (approx.)
MOUNTING POSITION: Any