

INSTRUCTIONS FOR USE OF THE DATA FORMAT

1. For those items indicated by an "M", all existing blanks must be filled in.
  2. The data supplied should adequately define the device in terms of interchangeability in the intended application and should distinguish it from existing registered devices. If it is felt that additional data are absolutely necessary to insure interchangeability, the data may be submitted for consideration as part of the registration.
  3. When preparing a registration data sheet for release, delete all italicized notes, all unused items and all "M's". Where necessary, renumber items in proper sequence.
  4. Existing JEDEC standards for measurement methods, preferred values, definitions, and letter symbols shall be used as applicable.
- N.B. All data submitted for registration, whether designated mandatory or not, becomes part of the formal registration. Upon publication of the release, commercial data sheets must include all data exactly as registered, with all registered data identified by asterisks.

JOINT ELECTRON DEVICE ENGINEERING COUNCIL

REGISTRATION DATA

DIODE, VOLTAGE TRANSIENT SUPPRESSOR FAMILY

M I. GENERAL DESCRIPTION

These devices are a family of \_\_\_\_-watt steady state, \_\_\_\_-watt peak pulse power, silicon, etc. voltage transient suppressor diodes.

*Peak pulse power is maximum instantaneous power in the device occurring during the transient period.*

M II. MECHANICAL DATA

A. Outline: DO-\_\_\_\_

*If no applicable registered outline exists, an outline drawing must be furnished in conformance with "JEDEC Type Registration for Semiconductor Devices, Preparation of Outline Drawings", EIA Standard RS-308.*

B. Polarity

*Indicate polarity and terminal connections here. See definitions in Appendix A.*

*One of the following must be included if applicable:*

These devices are Symmetrical Bidirectional Voltage Transient Suppressor Diodes.

*If this line is used, it is assumed that all electrical limits shown apply in either direction of current flow.*

These devices are Asymmetrical Bidirectional Voltage Transient Suppressor Diodes.

*Indicate cathode terminal.*

- C. Handling Precautions      *Include all necessary handling precautions.*
- D. Mounting Positions      *Include all restrictions on mounting positions.*

III. MAXIMUM RATINGS

*Further limitations brought about by specific uses should be indicated.*

M

A. Temperature

1. Operating temperature range \_\_\_\_\_°C to \_\_\_\_\_°C  
*Ambient temperature ( $T_A$ ) for lead-mounted transient suppressors. Lead temperature ( $T_L$ ) measured on the leads 3/8" from the body of lead-mounted transient suppressors which require heat sinking of the leads to dissipate rated power of Item III.C.1. This applies only to thermally symmetrical devices with equal heat sinking applied to each lead. Case temperature ( $T_C$ ) for stud-mounted transient suppressors.*
2. Lead or terminal temperature at a distance not less than 1/16" from the seated surface (or case) for \_\_\_\_\_ seconds \_\_\_\_\_°C

M

B. Voltage

1. Working peak reverse voltage,  $V_{RWM}$       Column III V

M

C. Power

*Suitable rating schedules or curves may be substituted for Items 1 and 2 below.*

1. Maximum steady state power dissipation at or below \_\_\_\_\_°C free-air, lead, or case temperature \_\_\_\_\_ W

*A rating at 50°C ( $T_A$ ) is recommended for lead-mounted transient suppressors without lead heat sinking. A rating at 100°C ( $T_C$  or  $T_L$ ) is recommended for stud-or base-mounted transient suppressors or heat-sinked lead-mounted transient suppressors.*

Linear derating factor \_\_\_\_\_ W/°C

2. Peak pulse power \_\_\_\_\_ W

*Current waveshape shall be exponentially decaying from the peak value, decaying from peak value to one-half of peak value in 1.0 millisecond. Rise time shall be 10 microseconds maximum, and the waveform shall be maintained for 10 milliseconds minimum.*

Derating factor \_\_\_\_\_ W/°C

D. Current

1. Maximum reverse current, steady state,  
 $I_R$

Column V mAdc

T = \_\_\_\_\_°C Specify free-air, lead, or case.

*A rating at 50°C ( $T_A$ ) is recommended for lead-mounted transient suppressors without lead heat sinking. A rating at 100°C ( $T_C$  or  $T_L$ ) is recommended for stud- or base-mounted transient suppressors or heat-sinked lead-mounted transient suppressors.*

2. Current derating factor

\_\_\_\_\_ mAdc/°C

E. Surge Current

1. Maximum peak nonrecurrent reverse surge current,  $I_{RSM}$

Column VII A

T = \_\_\_\_\_°C Specify free-air, lead or case.

*Waveshape shall be exponentially decaying from the peak value, decaying from peak value to one-half of peak value in 1.0 millisecond. Rise time shall be 10 microseconds maximum and the waveform shall be maintained for 10 milliseconds minimum.*

M

2. Maximum peak nonrecurrent reverse surge current,  $I_{RSM}$  \_\_\_\_\_ A

*Current waveshape shall be square. Recommended pulse width is 1.0, 2.0, or  $5.0 \times 10^n$  where n is an integer.*

3. Forward surge current,  $I_{FSM}$  \_\_\_\_\_ A  
 Maximum peak, average, etc.,  
recurrent, nonrecurrent

$T_C =$  \_\_\_\_\_ °C *Specify free-air, lead, or case.*

*Waveshape and time duration must be specified.*

IV. ELECTRICAL CHARACTERISTICS

MIN      MAX

A. Static

M

1. Breakdown voltage,  $V_{(BR)}$       Column I      Vdc

$I_R =$  Column II mAdc,

$T = 25^\circ\text{C}$  *Specify free-air, lead, or case.*

*Specify thermal stability criteria (time and mounting) used when measuring voltage.*

		<u>MIN.</u>	<u>MAX.</u>
M	2. Temperature coefficient of breakdown voltage  $I_R = \text{Item IV.A.1 mA}_{dc}$ , $T = \text{ }^\circ\text{C}$ to $\text{ }^\circ\text{C}$ Specify free-air, lead, or case.		$\text{ }^\circ\text{C}$
M	3. Reverse current, $I_R$  $V_R = \text{Item III.B.1 V}$ , $T = \text{ }^\circ\text{C}$ Specify free-air, lead or case.	<u>Column IV</u>	$\mu\text{A}_{dc}$
	4. Forward Voltage, $V_F$  $I_F = \text{ } \text{A}$ , $T = \text{ }^\circ\text{C}$  <i>Waveshape and time duration must be specified. Recommended test current, temperature, waveshape and time duration are the conditions of Item III.E.3.</i>		$\text{ } \text{V}$
M	B. <u>Dynamic</u>		
	1. Peak reverse voltage during reverse surge, $V_{RSM}$  $I_{RSM} = \text{Item III.E.1 A}$ , $T = \text{Item III.E.1 }^\circ\text{C}$  <i>Waveshape shall be exponentially decaying from the peak value, decaying from peak value to one-half of peak value in 1.0 millisecond. Rise time shall be 10 microseconds maximum and the waveform shall be maintained for 10 milliseconds minimum.</i>	<u>Column VI</u>	$\text{ } \text{V}$

T A B U L A T E D D A T A

	COLUMN I	COLUMN II	COLUMN III	COLUMN IV	COLUMN V	COLUMN VI	COLUMN VII
Type Number	Minimum Breakdown Voltage V (BR)	Test Current ( $I_R$ )	Working Peak Reverse Voltage ( $V_{RWM}$ )	Maximum Reverse Current ( $I_R$ )	Maximum Reverse Current ( $I_R$ )	Maximum Peak Reverse Voltage ( $V_{PRM}$ )	Maximum Surge Current ( $I_{RSM}$ )
	Vdc	mAdc	V	$\mu$ Adc	mAdc	V	A

## APPENDIX A

### POLARITY DESIGNATION OF VOLTAGE TRANSIENT SUPPRESSOR DIODES - DEFINITIONS

- \* 1. Semiconductor Diode. A semiconductor diode is a semiconductor device having two terminals and exhibiting a nonlinear voltage-current characteristic.
2. Voltage Transient Suppressor Diode. A voltage transient suppressor diode is a semiconductor diode which is normally biased to operate in the reverse region of its voltage-current characteristic.
- \* 3. Electrode (of a Semiconductor Device). An electrode is an electrical and mechanical contact to a region of a semiconductor device.
4. Cathode (of a Voltage Transient Suppressor Diode). The cathode of a voltage transient suppressor diode is the electrode from which the current flows within the cell when it is biased to operate as a voltage transient suppressor.
5. Anode (of a Voltage Transient Suppressor Diode). The anode of a voltage transient suppressor diode is the electrode to which the current flows within the cell when it is biased to operate as a voltage transient suppressor.
- \* 6. Terminal (of a Semiconductor Device). A terminal is the externally available point of connection to one or more electrodes.
7. Cathode Terminal. The cathode terminal of a voltage transient suppressor diode is the terminal to which current flows from the external circuit when the device is biased to operate as a voltage transient suppressor.
8. Anode Terminal. The anode terminal of a voltage transient suppressor diode is the terminal from which current flows when the device is biased to operate as a voltage transient suppressor.
9. Symmetrical Bidirectional Voltage Transient Suppressor Diode. A symmetrical bidirectional voltage transient suppressor diode is a semiconductor diode which will demonstrate an equivalent breakdown voltage (within the specified limits) for either direction of current flow.
10. Asymmetrical Bidirectional Voltage Transient Suppressor Diode. An asymmetrical bidirectional voltage transient suppressor diode is a semiconductor diode which will demonstrate a breakdown voltage characteristic in either direction of current flow but is indicated by a cathode designation in the direction for which breakdown voltage is specified by the manufacturer.

\* An asterisk preceding a definition indicates a JEDEC approved standard originally taken from AIEE Publication No. 61-1076.