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GENERAL SEMICONDUCTOR INDUSTRIES, INC.

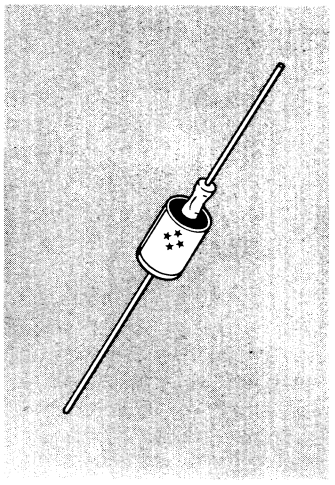
TRANSZORB™
ICT-5 THRU ICT-45

TRANSZORB I.C. Transient Protector

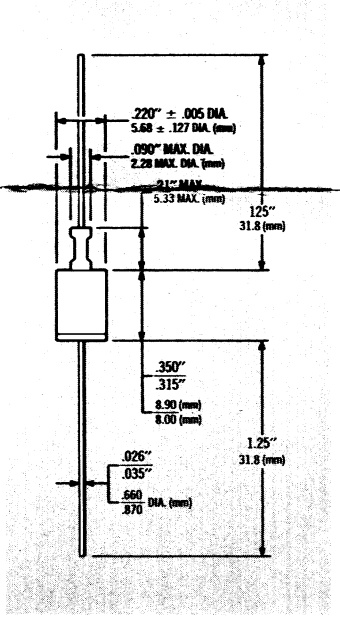
The ICT series of transient voltage suppressors are designed to protect bi-polar, MOS and Schottky improved integrated circuits from electrical disturbances. Transients and noise pulses are generated by electromechanical switching, electromagnetic coupling, capacitive or inductive load switching, voltage reversals, and electrostatic discharge. The TransZorb is desired over and above a crowbar circuit, an LC or RC network and a catch or clamping diode because of fewer components, speed of response, high power or energy absorption and low clamping ratio.

Internal system disturbances, such as the electromechanical type, carry large current transients that may result in voltage levels exceeding 1000 volts. MOS circuits are more prone to damage from these pulses as excess current passes through the high immunity circuit, therefore, additional input protection is required, such as the TransZorb to prevent both catastrophic failure or slow degradation of the input circuit. Other disturbances, such as generated by MOS switching transistors or through crosstalk, tend to create transients between V_{CC} and the ground plane temporarily interrupting circuit or system performance. These transients are superimposed on existing lines as damped high frequency oscillations requiring TransZorb protection.

External system disturbances, such as electrostatic discharges, result in transient voltages exceeding 10,000 volts. Integrated circuits protection is provided by placing a TransZorb in the power supply line. This series of TransZorbs, having a low "on" resistance will effectively short out unwanted transients while maintaining the circuit voltage level for continuous system operation.



- **Transient protection for CMOS, MOS, BIPOLAR, ICs, (TTL, ECL, DTL, RTL and Linear Functions)**
- **Voltage range of 5.0 to 45 volts**
- **Low clamping ratio**



MAXIMUM RATINGS

- 1500 Watts of Peak Pulse Power dissipation at 25°C
- $t_{clamping}$ (0 volts to BV min): Less than 1 x 10^{-12} seconds
- ~~Operating and Storage temperatures: −65° to +175°C~~
- Forward surge rating: 200 amps, 1/120 second at 25°C
- Steady State power dissipation: 1.0 watt
- Repetition rate (duty cycle): .01%

ELECTRICAL CHARACTERISTICS

- Clamping Ratio: 1.33 @ Full rated power
  1.20 @ 50% rated power
  (See figure 3 for test pulse wave shape) The clamping ratio of the actual Vc (Clamping Voltage) to the actual BV (Breakdown Voltage) as measured on a specific device.

MECHANICAL CHARACTERISTICS

- Body marked with Logo* and type number
- Weight: 1.5 grams (approximate)
- Positive terminal marked with band
- Standard DO-13 package — glass and metal hermetically sealed

*5 point — 4 star cluster

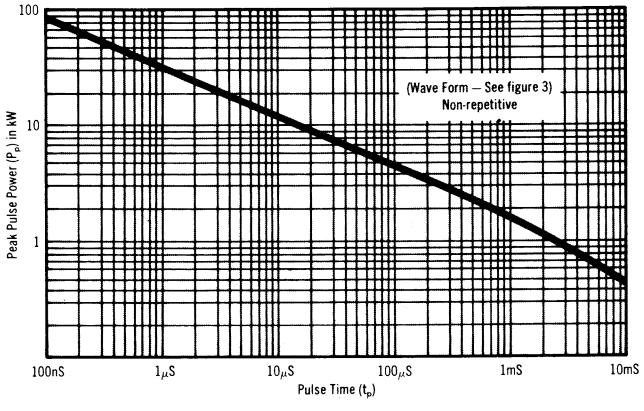


FIGURE 1 — Peak Pulse Power vs Pulse Time

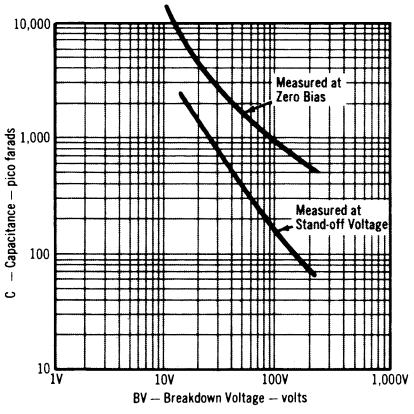


FIGURE 2
Typical Capacitance vs Breakdown Voltage

ABBREVIATIONS & SYMBOLS

V_R Stand-Off Voltage. Maximum rated reverse voltage which can be applied to the TransZorb with non-conducting condition. Cathode terminal positive.

I_{PP} Peak Pulse Current

P_P Peak Pulse Power

I_R Reverse Leakage

BV(min) Minimum Breakdown Voltage

V_C Maximum Clamping Voltage
The maximum peak voltage appearing across the TransZorb when subjected to the peak pulse current in a one millisecond time interval. The peak pulse voltages are the combination of voltage rise due to both the internal impedance and thermal rise.

ELECTRICAL CHARACTERISTICS @ 25°C

GS TYPE NUMBER	STAND-OFF VOLTAGE V_R Volts	MAXIMUM REVERSE LEAKAGE @ V_R I_R μA	MINIMUM BREAKDOWN VOLTAGE* @ ImA BV(min) Volts	MAXIMUM CLAMPING VOLTAGE @ $I_{PP1} = 1A$ (FIG. 3) V_C Volts	MAXIMUM CLAMPING VOLTAGE @ $I_{PP2} = 10A$ (FIG. 3) V_C Volts	MAXIMUM PEAK PULSE CURRENT (FIG. 3) I_{PP3} Amps
ICT-5	5.0	300	6.0	7.1	7.5	160
ICT-8	8.0	25	9.4	11.3	11.5	100
ICT-10	10.0	2	11.7	13.7	14.1	90
ICT-12	12.0	2	14.1	16.1	16.5	70
ICT-15	15.0	2	17.6	19.6	20.4	60
ICT-18	18.0	2	21.2	24.2	25.2	50
ICT-22	22.0	2	25.9	29.8	32	40
ICT-36	36.0	2	42.4	50.6	54.3	23
ICT-45	45.0	2	52.9	63.3	70	19

*The minimum breakdown voltage as shown takes into consideration the ±1 volt tolerance normally specified for power supply regulation on most integrated circuit manufacturers data sheet. Similar TransZorb devices are available with reduced clamping voltages where tighter regulated power supply voltages are employed.

BIPOLAR APPLICATIONS:
Bipolar TransZorbs are available in all voltage types except the ICT-5.

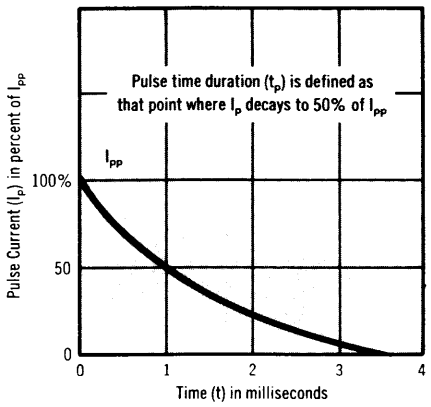


FIGURE 3 — Pulse Wave Form

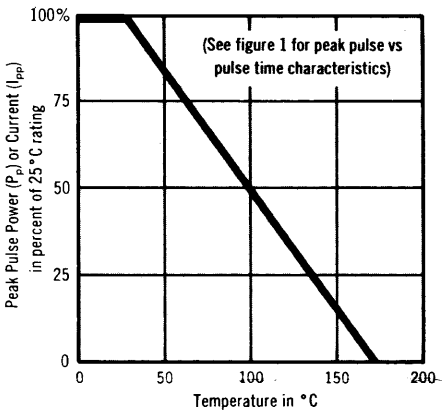


FIGURE 4 — Derating Curve

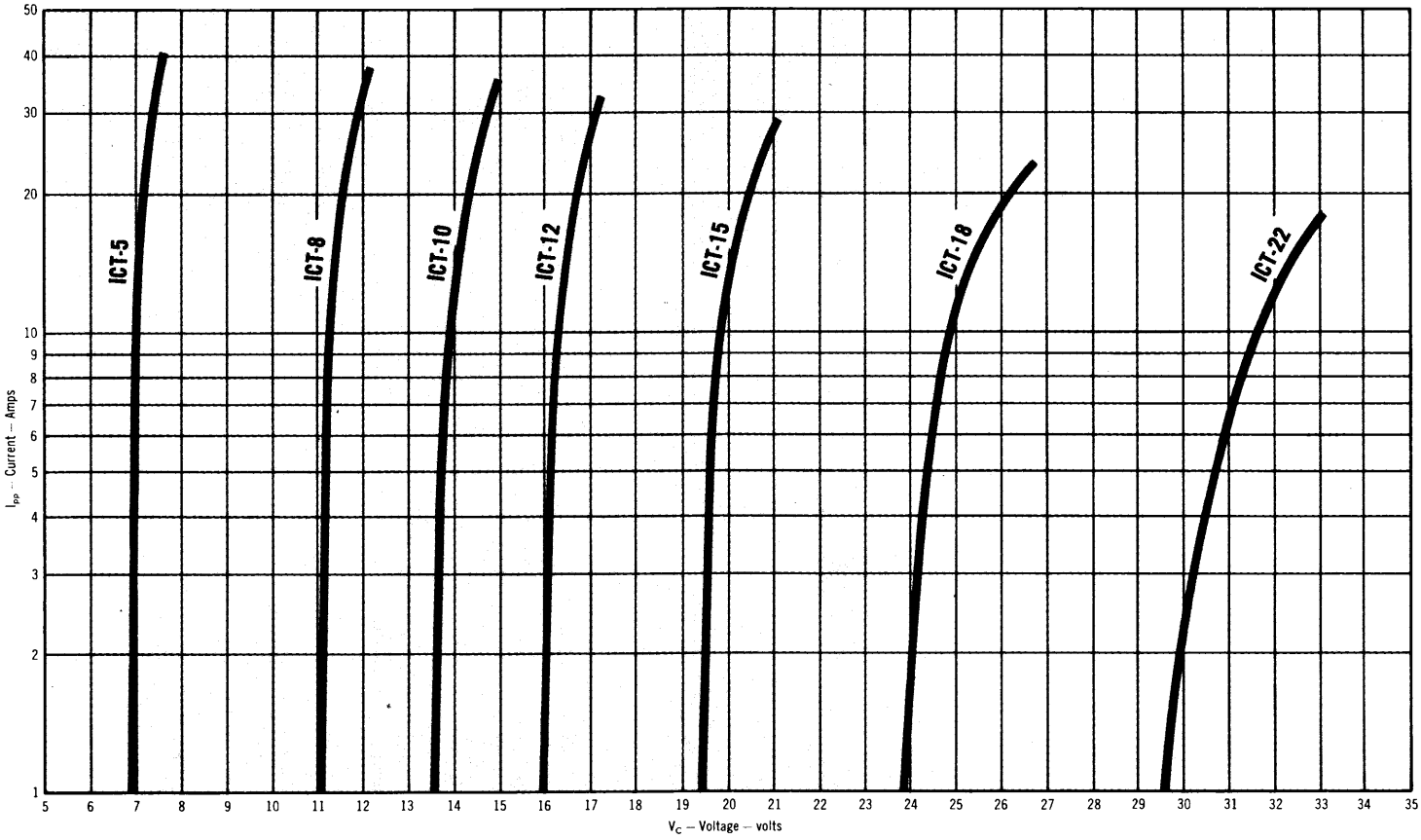


FIGURE 5 — Typical Characteristic Clamping Voltage (V_C) vs Peak Pulse Current (I_{PP})

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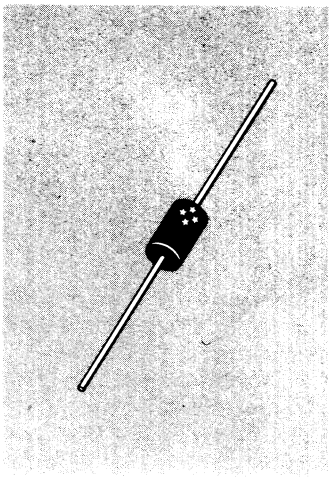

The ICTE series of transient voltage suppressors are designed to protect bi-polar, MOS and Schottky improved integrated circuits from electrical disturbances. Transients and noise pulses are generated by electromechanical switching, electromagnetic coupling, capacitive or inductive load switching, voltage reversals, and electrostatic discharge. The TransZorb is desired over and above a crowbar circuit, an LC or RC network and a catch or clamping diode because of fewer components, speed of response, high power or energy absorption and low clamping ratio.

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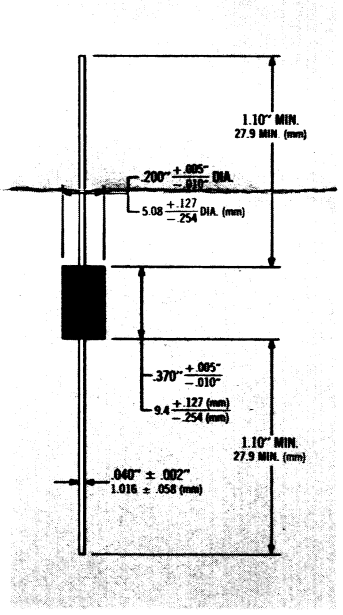

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- 1500 Watts of Peak Pulse Power dissipation at 25°C
- $t_{clamping}$ (0 volts to BV min): Less than 1 x 10^{-12} seconds
- Operating and Storage temperatures: −65° to +175°C
- Forward surge rating: 200 amps, 1/120 second at 25°C
- Steady State power dissipation: 5.0 watts @ T_L = 75°C, Lead Length = ⅜"
- Repetition rate (duty cycle): .01%

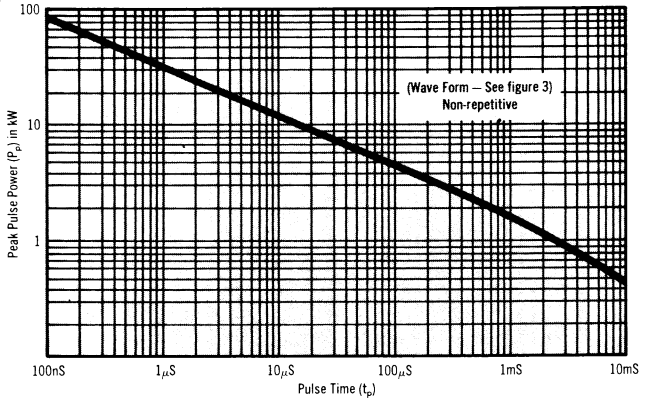
ELECTRICAL CHARACTERISTICS

- Clamping Ratio: 1.33 @ Full rated power
  1.20 @ 50% rated power
  (See figure 3 for test pulse wave shape) The clamping ratio is the difference between BV (Breakdown Voltage) and Vc (Clamping Voltage) as characterized by a specific device.

MECHANICAL CHARACTERISTICS

- Molded case
- Weight: 1.5 grams (approximate)
- Positive terminal marked with band
- Body marked with Logo* and type number

*5 point — 4 star cluster



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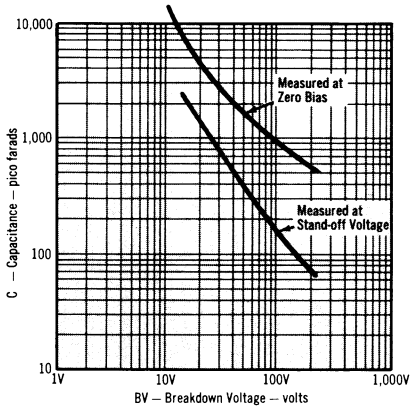

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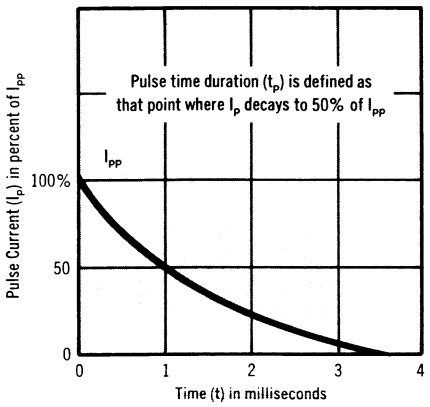

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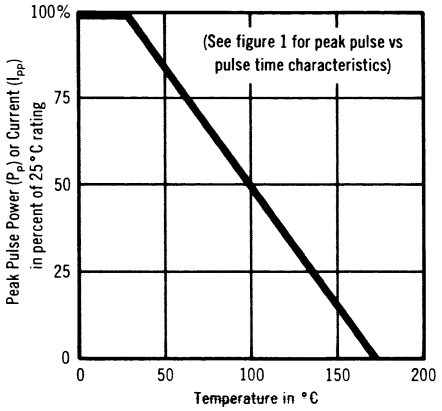

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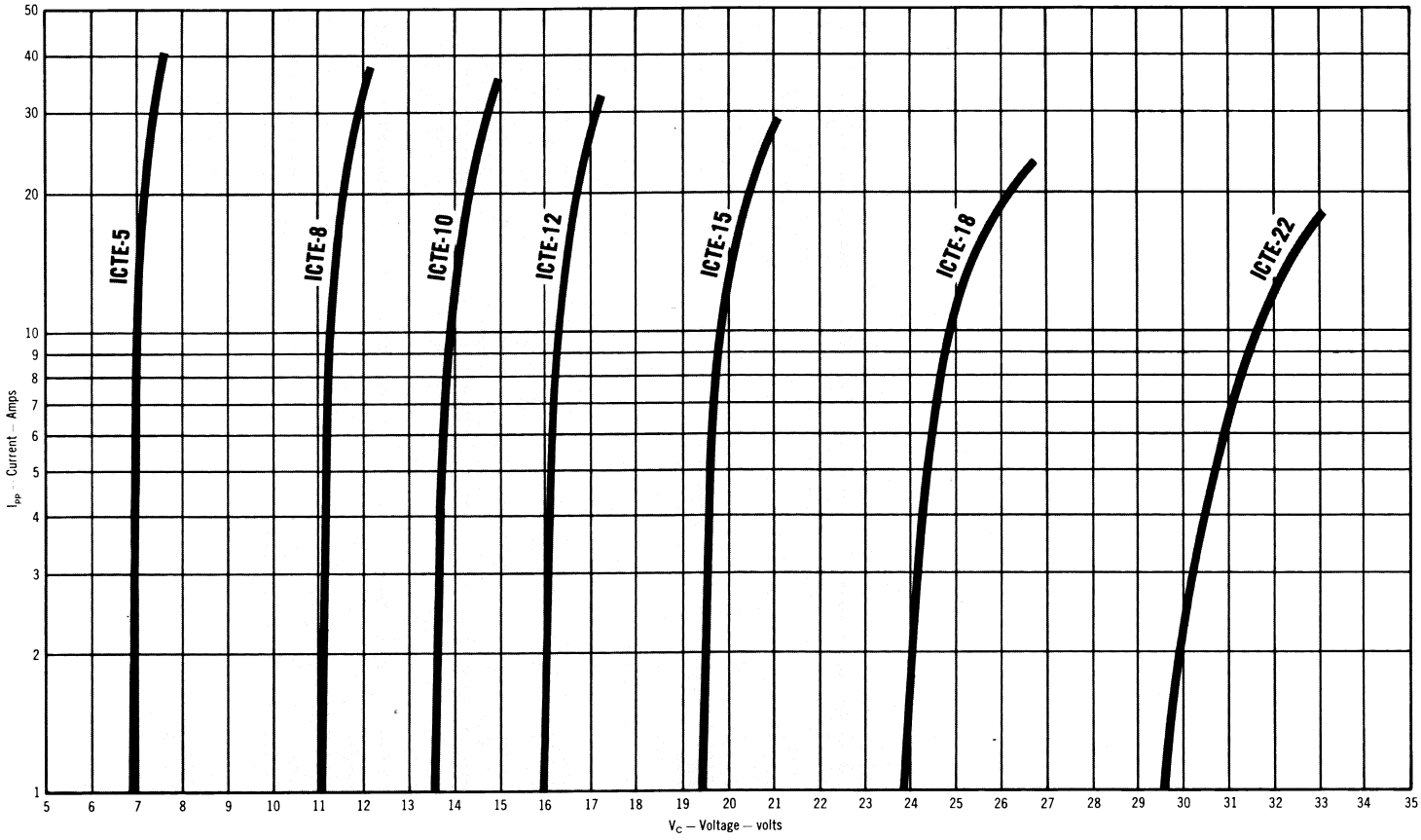

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