General Semiconductor Industries, Inc.

TRANSZORB® TRANSIENT VOLTAGE SUPPRESSORS
1N5907 AND 1N5908

FEATURES

- **5.0 volts Reverse Stand-Off voltage**
- **Designed for T²L Logic protection**
- **Each device 100% tested**

MAXIMUM RATINGS

- 1500 watts of Peak Pulse Power dissipation at 25°C (see derating curve)
- $t_{clamping}$ (0 volts to BV min): Less than 1×10^{-9} second
- Operating and Storage temperatures: -65°C to +175°C
- Forward Surge Rating: half cycle 200 amps, 1/120 second at 25°C
- Steady State power dissipation: 1N5907 – 1.0 watt 1N5908 – 5.0 watts at T_L = 75°C, Lead Length = 3/8"
- Repetition rate (duty cycle): 1N5907 – .01%, 1N5908 – .05%

MECHANICAL CHARACTERISTICS

- 1N5907 — Standard DO-13 package, hermetically sealed
- 1N5908 — Molded Case — Case 1
- Weight: 1.5 grams (approximate)
- Positive terminal marked with band
- Body marked with Logo and type number

ELECTRICAL CHARACTERISTICS

Clamping Factor: 1.33 at full rated power
1.20 at 50% rated power

Clamping Factor The ratio of the actual V_C (Clamping Voltage) to the BV (Breakdown Voltage) as measured on a specific device

Capacitance: 15,000 pF at 0 Volts (typical).

APPLICATION

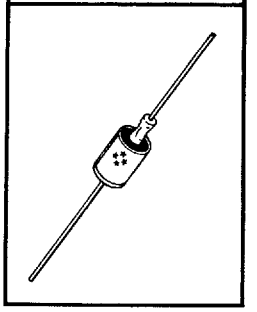
...Silicon Transient Suppressors introduced and registered by General Semiconductor Industries for the protection of 5.0 volt logic circuits. The 1N5907 and 1N5908 protect TTL, ECL, DTL,MOS and MSI integrated circuits requiring 5.0 volt or lower power supplies. These devices are rated for a peak pulse power of 1500 watts for 1 millisecond.

DESCRIPTION

The 1N5907 TransZorb®, packaged in a hermetically sealed glass-to-metal package, is available in JAN, JANTX and JANTXV qualified to MIL-S-19500/500.

These devices are specified at high current pulses, such type that would be seen from inductive switching transients. They provide both protection from line transients as well as preventing transients from being injected onto the line. Both hermetic seal and molded types are available, depending upon the application and environmental conditions.

CASE DO-13



CASE 1

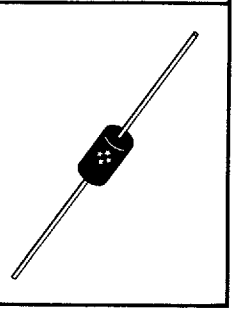


FIGURE 1—Peak Pulse Power vs Pulse Time

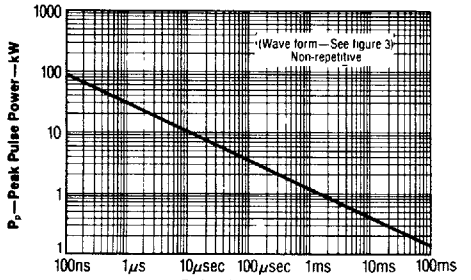
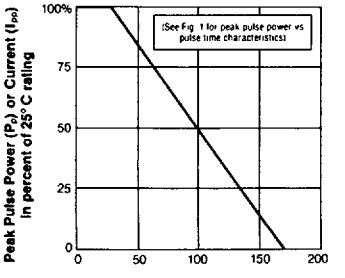


FIGURE 2—Derating Curve



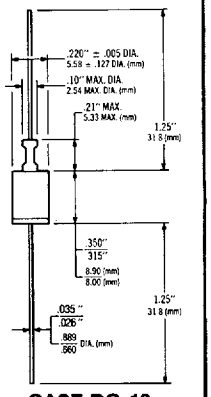
TRANSZORB® UNIDIRECTIONAL 1N5907 AND 1N5908

ELECTRICAL CHARACTERISTICS @ 25°C (JEDEC Registered Data)

JEDEC TYPE NUMBER	REVERSE STAND-OFF VOLTAGE (NOTE 1) V_R VOLTS	MINIMUM BREAKDOWN VOLTAGE @ 1 mA V_C VOLTS	MAXIMUM REVERSE LEAKAGE @V_R I_R μA	MAXIMUM CLAMPING VOLTAGE @I_{pp1} (FIG. 3) V_C VOLTS	PEAK PULSE CURRENT (FIG. 3) I_{pp1} A	MAXIMUM CLAMPING VOLTAGE @I_{pp2} (FIG. 3) V_C VOLTS	PEAK PULSE CURRENT (FIG. 3) I_{pp2} A	MAXIMUM CLAMPING VOLTAGE @I_{pp3} (FIG. 3) V_C VOLTS	PEAK PULSE CURRENT (FIG. 3) I_{pp3} A
1N5907	5.0	6.0	300	7.6	30	8.0	60	8.5	120
1N5908	5.0	6.0	300	7.6	30	8.0	60	8.5	120

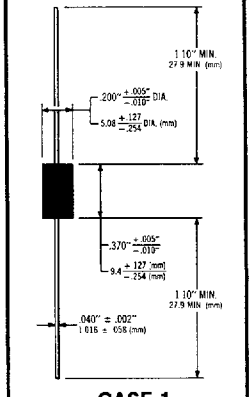
Available in JAN, JTX & JTXV per MIL-S-19500/500.

CASE OUTLINE



CASE DO-13

CASE OUTLINE



CASE 1

FIGURE 3—Pulse Waveform

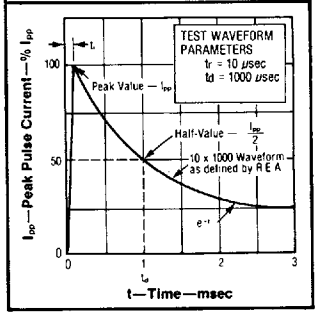
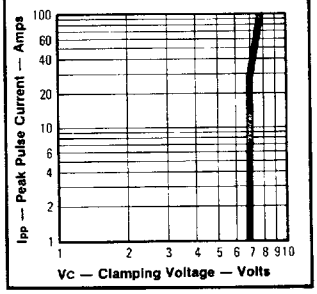


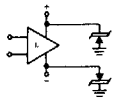
FIG.4—Typical Clamping Voltage (Vc) vs Peak Pulse Current (Ipp)



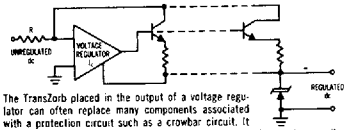
APPLICATION NOTES

The 1N5907 and 1N5908 TransZorbs are characterized by the reverse stand-off voltage (VR). They are compatible with the integrated circuit power supply voltage. The breakdown voltage (BV) is that point at which the TransZorb is in avalanche breakdown. This point is temperature dependent and has a positive temperature coefficient. Allowance has been made in establishing the minimum breakdown voltage at 25°C to provide safe operation over the full military temperature range.

DC LINE APPLICATIONS

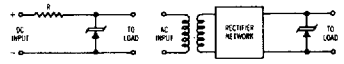


The TransZorb suppressor on the power line prevents IC failure caused by transients (electrostatic discharge), power supply reversals or during switching of the power supply to on or off.



The TransZorb placed in the output of a voltage regulator can often replace many components associated with a protection circuit such as a crowbar circuit. It may also be required to protect the bypass transistor from voltage spikes across the collector to emitter terminals.

Typical power sources employing the TransZorb for Voltage Transient Protection.



The TransZorb is chosen in which the reverse stand-off voltage is equal to or greater than the DC output voltage. For certain applications it may be more desirable to replace the series resistor (R) with an inductor. In most applications, a fuse in the line is desirable. Elimination of a transformer will require an LC filter on the line for most industrial applications, when the TransZorb is placed on the input to the power supply and with an input voltage greater than 40 volts.

NOTES

Note 1: A TransZorb is normally selected according to the reverse "Stand Off Voltage" (V_R) which should be equal to or greater than the DC or continuous peak operating voltage level.

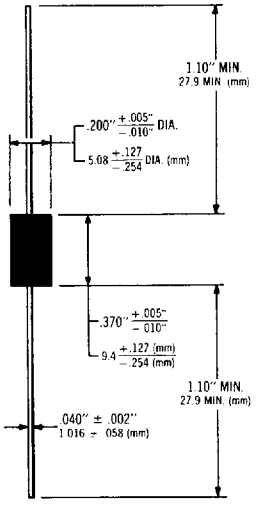
ABBREVIATIONS & SYMBOLS

- V_R Stand-Off Voltage: Applied Reverse Voltage to assure a nonconductive condition. (See Note 1)
- BV(min) This is the minimum Breakdown Voltage the device will exhibit and is used to assure that conduction does not occur prior to this voltage level at 25°C.
- V_C(max) 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 series resistance and thermal rise.
- I_{pp} Peak Pulse Current — See Figure 3
- P_p Peak Pulse Power
- I_R Reverse Leakage

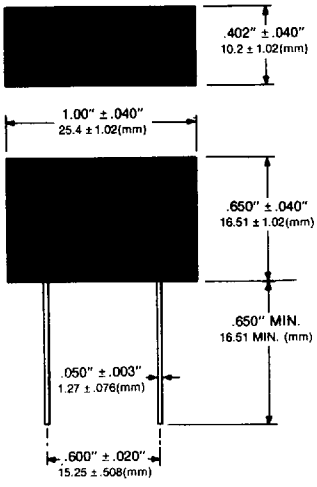
CASE OUTLINES

T-90-20

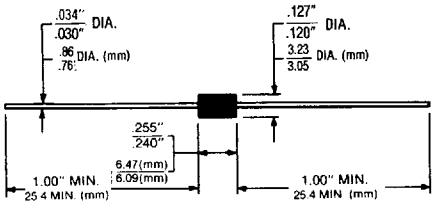
CASE 1



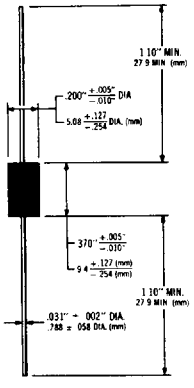
CASE 24



CASE 25



CASE 26



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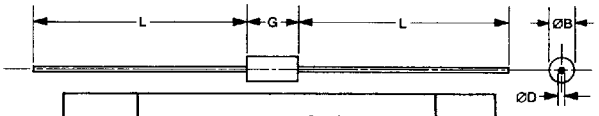
CASE OUTLINES

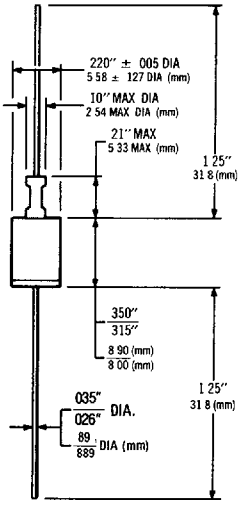
CASE OUTLINES

CASE 27

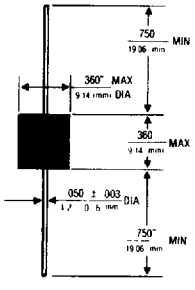


LETTER	DIMENTIONS				NOTES
	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
ØB	.115	.140	2.92	3.56	3
ØD	.037	.042	.94	1.07	4
G	.150	.300	3.81	7.62	4
L	.900	1.300	22.86	33.02	

DO-202AA
(DO-13)

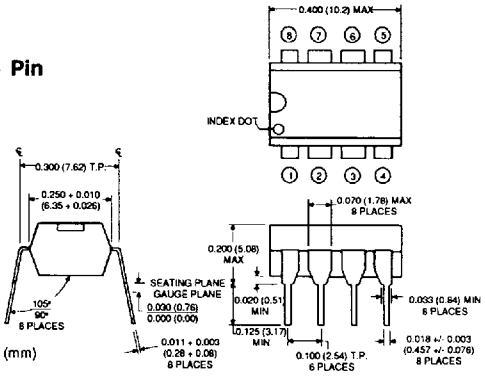


CASE 31



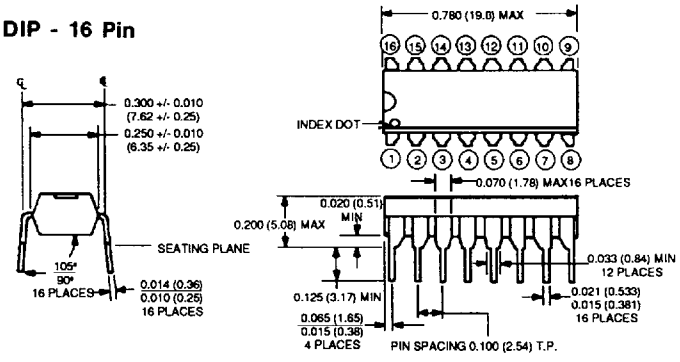
CASE OUTLINES

Plastic DIP - 8 Pin



Measurements in inches (mm)

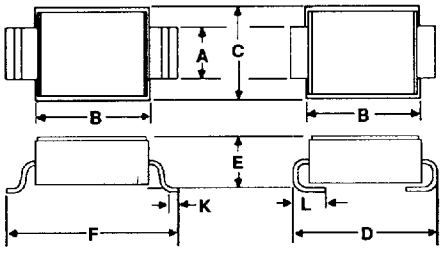
Plastic DIP - 16 Pin



Measurements in inches

HSMC Series Packages

"GULL-WING" "C"BEND (MODIFIED J-BEND)



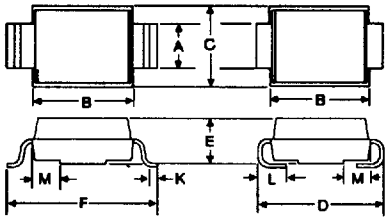
DIMENSIONS IN INCHES								
	A	B	C	D	E	F	K	L
MIN	.108	.260	.225	.330	.087	.380	.024	.018
MAX	.128	.280	.245	.350	.105	.400	.032	.038
DIMENSIONS IN MILLIMETERS								
MIN	2.74	6.60	5.72	9.64	2.21	9.64	.610	.457
MAX	3.25	7.11	6.22	10.16	2.67	10.16	.810	.965

Typical Standoff Height: 0.004" - 0.012" (0.1mm - 0.3mm)

CASE OUTLINES

DO-215AA
"Gull Wing"

DO-214AA
"C Bend"
(Modified J-Bend)

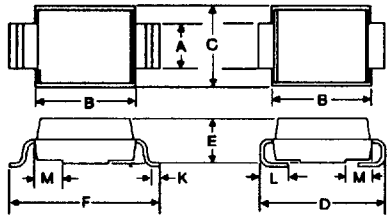


DIMENSIONS IN INCHES									
	A	B	C	D	E	F	K	L	M
MIN	.077	.160	.130	.205	.075	.235	.015	.030	.038
MAX	.083	.180	.155	.220	.095	.255	.030	.060	.058
DIMENSIONS IN MILLIMETERS									
MIN	1.96	4.06	3.30	5.21	1.91	5.97	0.38	0.76	0.97
MAX	2.10	4.57	3.81	5.59	2.41	6.48	0.76	1.52	1.47

Typical Standoff Height: 0.004" - 0.006" (0.1mm 0.2mm)

DO-215AB
"Gull Wing"

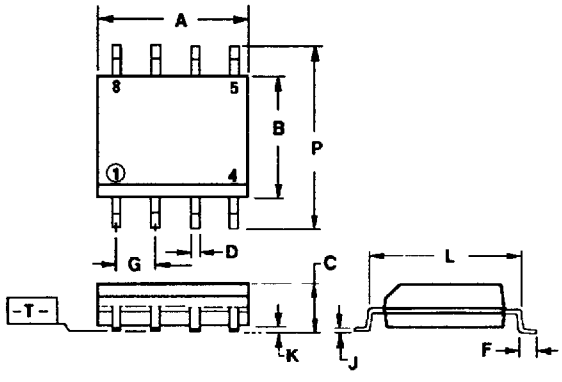
DO-214AB
"C Bend"
(Modified J-Bend)



DIMENSIONS IN INCHES									
	A	B	C	D	E	F	K	L	M
MIN	.115	.260	.225	.305	.075	.380	.025	.030	.038
MAX	.121	.280	.245	.320	.095	.255	.400	.060	.053
DIMENSIONS IN MILLIMETERS									
MIN	2.92	6.60	5.72	7.75	1.91	9.65	0.64	0.76	0.97
MAX	3.07	7.11	6.22	8.13	2.41	10.16	1.02	1.52	1.35

Typical Standoff Height: 0.004" 0.006" (0.1mm 0.2mm)

SO-8



NOTES.
1. -T- IS SEATING PLANE.
2. DIMENSION "A" IS DATUM.
3. POSITIONAL TOLERANCE FOR LEADS:

⌖	0.25 (0.010) Ⓜ	A Ⓢ

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.78	5.00	0.188	0.197
B	3.81	4.01	0.150	0.158
C	1.35	1.75	0.053	0.069
D	0.35	0.46	0.014	0.018
F	0.67	0.77	0.026	0.030
G	1.27 BSC		0.050 BSC	
J	0.19	0.22	0.007	0.009
K	0.10	0.20	0.004	0.008
L	4.82	5.21	0.189	0.206
P	5.79	6.20	0.228	0.244