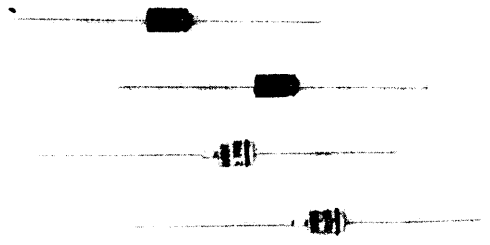
5.0 and 5.4 Volt Logic Clamps



IN5907
S5907

IN5908
S5908

FEATURES

- MOLDED OR METAL CASE
- EPITAXIAL JUNCTION
- LOW LEAKAGE
- LOW $\Delta V_Z/\Delta I_Z$ CHARACTERISTICS

Semicon Logic Clamps have been optimized to provide low stand off power drain and effective voltage transient protection for a wide variety of 5.0 volt logic circuits. Inherent fast response coupled with the low series resistance of epitaxial design make Semicon Logic Clamps ideal for this important application.

MAXIMUM RATINGS

Peak Pulse Power Dissipation (T_A 25°C)	P_P	1500 Watts
Peak Forward Surge Current (T_A 25°C, 8.3 msec)	I_{FM}	200 Amps
Maximum Forward Voltage Drop (100A peak, 8.3 msec sine wave)	V_F	2.0 Volts
D.C. Power Dissipation (T_A = 25°C) IN5907, S5907	P_M	1 Watt
D.C. Power Dissipation (T_L = 75°C, Lead Length 3/8") IN5908, S5908	P_M	5 Watts
Operating and Storage Temperature	Topr, Tstg	−65°C to +175°C

ELECTRICAL CHARACTERISTICS:

Type Number	Stand-Off Voltage V_R	Max. Reverse Leakage $I_R@V_R$	Min. Breakdown Voltage $B_V@1mA$	Max. Clamping Voltage $V_C@I_{PP1}$	Peak Pulse Current (Fig. 2) I_{PP1}	Max. Clamping Voltage $V_C@I_{PP2}$	Peak Pulse Current (Fig. 2) I_{PP2}	Max. Clamping Voltage $V_C@I_{PP3}$	Peak Pulse Current (Fig. 2) I_{PP3}	Case Style
IN5907	5.0V	300μA	6.0V	7.6V	30A	8.0V	60A	8.6V	165A	A
S5907	5.4V	100μA	6.0V	7.6V	30A	8.0V	60A	8.5V	120A	A
IN5908	5.0V	300μA	6.0V	7.6V	30A	8.0V	60A	8.6V	165A	B
S5908	5.4V	100μA	6.0V	7.6V	30A	8.0V	60A	8.5V	120A	B

ABBREVIATIONS AND SYMBOLS

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

I_{PP} Peak Pulse Current

P_P Peak Pulse Power

I_R Reverse Leakage

B_V (min) Minimum Breakdown Voltage

V_C (max) Maximum Clamping Voltage. The maximum peak voltage appearing across the Logiclamp 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.

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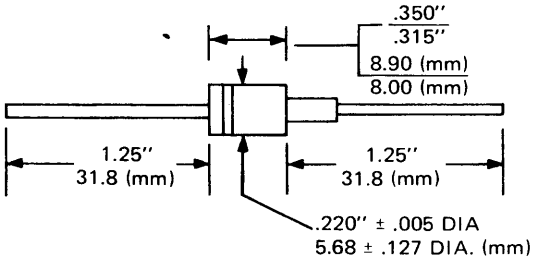
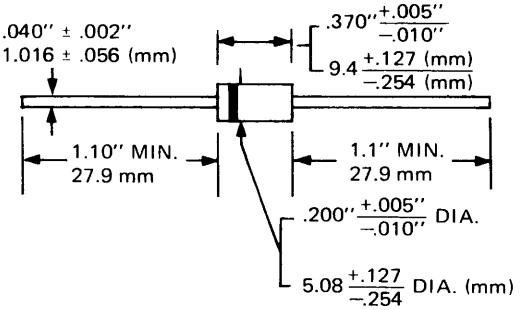
CASE STYLE "A"



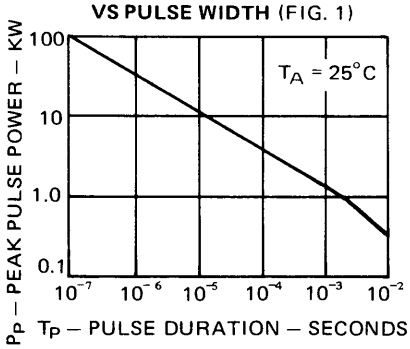
JEDEC DO-13 GLASS TO METAL CASE:
CATHODE IS COMMON TO CASE:

CASE STYLE "B"

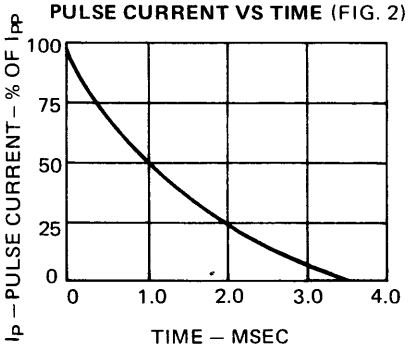


EPOXY MOLDED CASE:
POLARITY INDICATED BY BAND OR SYMBOL

MAXIMUM ALLOWABLE PEAK PULSE POWER VS PULSE WIDTH (FIG. 1)



PULSE CURRENT VS TIME (FIG. 2)



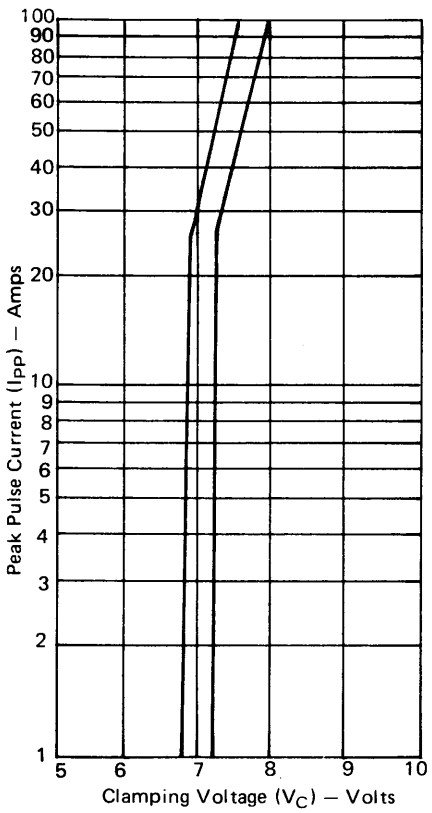
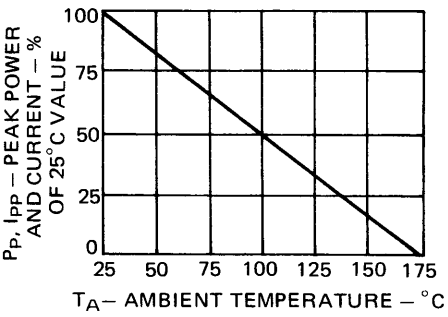


FIGURE 3 – Typical Characteristic Clamping Voltage (V_C) vs Peak Pulse Current (I_{PP})

MAXIMUM ALLOWABLE PEAK PULSE CURRENT POWER VS AMBIENT TEMPERATURE (FIG. 4)



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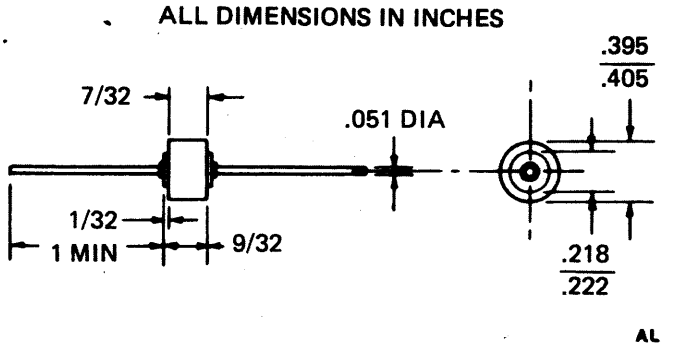
5000 Watt Silicon Voltage Transient Suppressor Diodes



S5KP5
THRU
S5KP110A

5000 WATTS (PEAK – 1 MSEC) 6.8 THRU 110 VOLTS

The Semicon S5K series of transient suppressor diodes are designed to protect electronic equipment from failure due to voltage transients. In addition they are intended to perform as voltage clamps under sustained over voltage stress until slower forms of conventional fusing open the circuit. Their initial failure mode under sustained avalanche current overload is short circuit. Their avalanche characteristics coupled with special internal design for rapid junction cooling under pulse power stress makes them most useful in airborne, telephone and other equipments where large transients are frequent.

The inherent fast response of these devices and broad choice of stand-off voltage ratings enables the designer to protect a wide range of both active and passive circuit components which may be damaged by voltage transients.

MAXIMUM RATINGS

- 5000 Watts of Peak Pulse Power Dissipation @ T_A = 25°C (see Fig. 3)
- D.C. Power Dissipation: 5.0 Watts @ T_A = 25°C
- Clamping Time $< 1 \times 10^{-12}$ seconds
- 8.3 msec (60 Hz) Forward Surge Current Rating 500 Amps.
- Forward Voltage Drop 2.0 Volts Max. @ 100 Amps.
- T_{opr} and T_{stg} -65°C to +175°C

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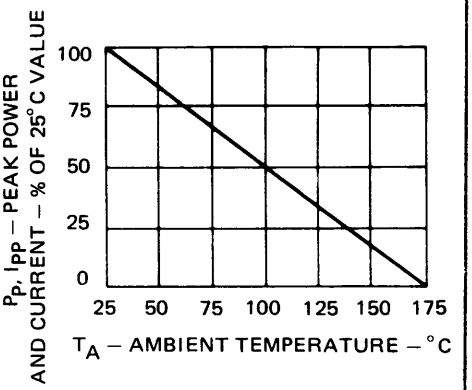
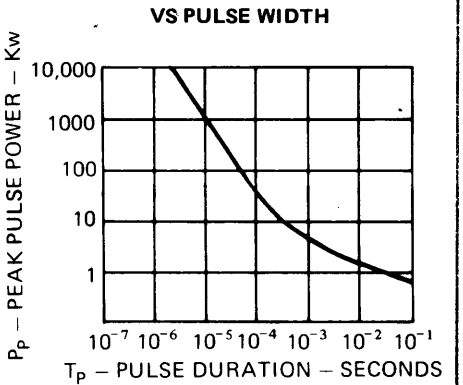
ELECTRICAL CHARACTERISTICS at 25°C:

SEMICON PART NUMBER	REVERSE STAND-OFF VOLTAGE V_R VOLTS	BREAKDOWN VOLTAGE BY @ I_T VOLTS mA	MAXIMUM CLAMPING VOLTAGE @ I_{PP} (1 mSEC) V_C VOLTS	MAXIMUM REVERSE LEAKAGE @ V_R I_R μA	MAXIMUM PEAK PULSE CURRENT (Fig. 3) I_{PP} A	MAXIMUM VOLTAGE TEMPERATURE VARIATION OF 8V mV/eC
S5KP5.0	5.0	6.40 - 7.30 50	9.6	2000	520	4.0
S5KP5.0A	5.0	6.40 - 7.00 50	9.2	2000	543	4.0
S5KP6.0	6.0	6.67 - 8.15 50	11.4	5000	439	4.0
S5KP6.0A	6.0	6.67 - 7.37 50	10.3	5000	485	4.0
S5KP6.5	6.5	7.22 - 8.82 50	12.3	2000	407	4.0
S5KP6.5A	6.5	7.22 - 7.98 50	11.2	2000	447	4.0
S5KP7.0	7.0	7.78 - 9.51 50	13.3	1000	378	5.0
S5KP7.0A	7.0	7.78 - 8.60 50	12.0	1000	417	5.0
S5KP7.5	7.5	8.33 - 10.2 5	14.3	250	350	6.0
S5KP7.5A	7.5	8.33 - 9.21 5	12.9	250	388	6.0
S5KP8.0	8.0	8.89 - 10.9 5	15.0	150	333	6.0
S5KP8.0A	8.0	8.89 - 9.83 5	13.6	150	367	6.0
S5KP8.5	8.5	9.44 - 11.5 5	15.9	50	314	7.0
S5KP8.5A	8.5	9.44 - 10.4 5	14.4	50	347	7.0
S5KP9.0	9.0	10.0 - 12.2 5	16.9	20	295	8.0
S5KP9.0A	9.0	10.0 - 11.1 5	15.4	20	325	8.0
S5KP10	10	11.1 - 13.6 5	18.8	15	266	9.0
S5KP10A	10	11.1 - 12.3 5	17.0	15	294	9.0
S5KP11	11	12.2 - 14.9 5	20.1	10	249	10
S5KP11A	11	12.2 - 13.5 5	18.2	10	274	10
S5KP12	12	13.3 - 16.3 5	22.0	10	227	11
S5KP12A	12	13.3 - 14.7 5	19.9	10	251	11
S5KP13	13	14.4 - 17.6 5	23.8	10	210	12
S5KP13A	13	14.4 - 15.9 5	21.5	10	232	12
S5KP14	14	15.6 - 19.1 5	25.8	10	194	13
S5KP14A	14	15.6 - 17.2 5	23.2	10	215	13
S5KP15	15	16.7 - 20.4 5	26.9	10	188	15
S5KP15A	15	16.7 - 18.5 5	24.4	10	206	15
S5KP16	16	17.8 - 21.8 5	28.8	10	176	18
S5KP16A	16	17.8 - 19.7 5	26.0	10	192	16
S5KP17	17	18.9 - 23.1 5	30.5	10	164	19
S5KP17A	17	18.9 - 20.9 5	27.6	10	181	18
S5KP18	18	20.0 - 24.4 5	32.2	10	155	20
S5KP18A	18	20.0 - 22.1 5	29.2	10	172	19
S5KP20	20	22.2 - 27.1 5	35.8	10	139	24
S5KP20A	20	22.2 - 24.5 5	32.4	10	154	22
S5KP22	22	24.4 - 29.8 5	39.4	10	127	27
S5KP22A	22	24.4 - 26.9 5	35.5	10	141	24
S5KP24	24	26.7 - 32.6 5	43.0	10	116	30
S5KP24A	24	26.7 - 29.5 5	38.9	10	128	27
S5KP26	26	28.9 - 35.3 5	46.6	10	107	33
S5KP26A	26	28.9 - 31.9 5	42.1	10	119	29
S5KP28	28	31.1 - 38.0 5	50.1	10	99	34
S5KP28A	28	31.1 - 34.4 5	45.4	10	110	30
S5KP30	30	33.3 - 40.7 5	53.5	10	93	38
S5KP30A	30	33.3 - 36.8 5	48.4	10	103	35
S5KP33	33	36.7 - 44.9 5	59.0	10	85	41
S5KP33A	33	36.7 - 40.6 5	53.3	10	94	38
S5KP36	36	40.0 - 48.9 5	64.3	10	78	45
S5KP36A	36	40.0 - 44.2 5	58.1	10	86	40
S5KP40	40	44.4 - 54.3 5	71.4	10	70	50
S5KP40A	40	44.4 - 49.1 5	64.5	10	78	45
S5KP43	43	47.8 - 58.4 5	76.7	10	65	54
S5KP43A	43	47.8 - 52.8 5	69.4	10	72	49
S5KP45	45	50.0 - 61.1 5	80.3	10	62	57
S5KP45A	45	50.0 - 55.3 5	72.7	10	69	51
S5KP48	48	53.3 - 65.1 5	85.5	10	58	62
S5KP48A	48	53.3 - 58.9 5	77.4	10	65	55
S5KP51	51	56.7 - 69.3 5	91.1	10	55	65
S5KP51A	51	56.7 - 62.7 5	82.4	10	61	60
S5KP54	54	60.0 - 73.3 5	96.3	10	52	70
S5KP54A	54	60.0 - 66.3 5	87.1	10	57	64
S5KP58	58	64.4 - 78.7 5	103.0	10	49	77
S5KP58A	58	64.4 - 71.2 5	93.6	10	53	69
S5KP60	60	66.7 - 81.5 5	107.0	10	47	79
S5KP60A	60	66.7 - 73.7 5	96.8	10	52	70
S5KP64	64	71.1 - 86.9 5	114.0	10	44	85
S5KP64A	64	71.1 - 78.6 5	103.0	10	49	75
S5KP70	70	77.8 - 95.1 5	125	10	40	93
S5KP70A	70	77.8 - 86.0 5	113	10	44	84
S5KP75	75	83.3 - 102.0 5	134	10	37	100
S5KP75A	75	83.3 - 92.1 5	121	10	41	90
S5KP78	78	86.7 - 106.0 5	139	10	36	104
S5KP78A	78	86.7 - 95.8 5	126	10	40	94
S5KP85	85	94.4 - 115.0 5	151	10	33	113
S5KP85A	85	94.4 - 104.0 5	137	10	36	102
S5KP90	90	100 - 122 5	160	10	31	120
S5KP90A	90	100 - 111 5	146	10	34	109
S5KP100	100	111 - 136 5	179	10	28	134
S5KP100A	100	111 - 123 5	162	10	31	122
S5KP110	110	122 - 149 5	196	10	26	147
S5KP110A	110	122 - 135 5	177	10	28	132

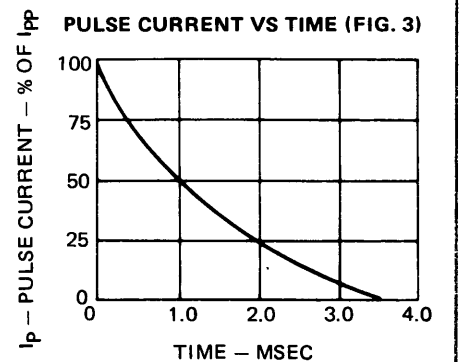
MAXIMUM ALLOWABLE (FIG. 1) PEAK PULSE CURRENT & POWER VS AMBIENT TEMPERATURE



MAXIMUM ALLOWABLE (FIG. 2) PEAK PULSE POWER VS PULSE WIDTH



PULSE CURRENT VS TIME (FIG. 3)



NOTE: The S5KP5.0 Series has large internal heat sinking to facilitate use as direct crowbar replacement. When used as clamp to open breaker or fusing during fault condition, circuit heat sinking is determinant of current/time failure mode. Failure under sustained overload is short circuit.