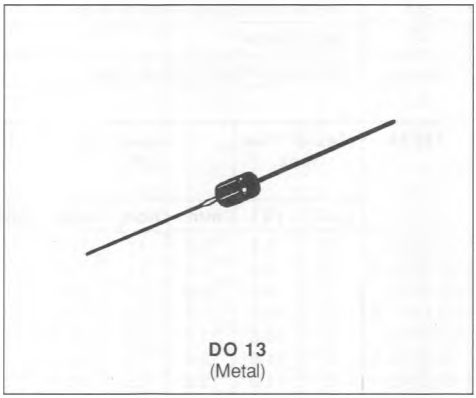
BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

- HIGH SURGE CAPABILITY : 1.5 kW/1 ms EXPO
- VERY FAST CLAMPING TIME : 5 ns
- LARGE VOLTAGE RANGE : 8.5 V → 185 V



DO 13
(Metal)

DESCRIPTION

Transient voltage suppressor diodes especially useful in protecting integrated circuits, MOS, hybrids and other voltage-sensitive semiconductors and components.

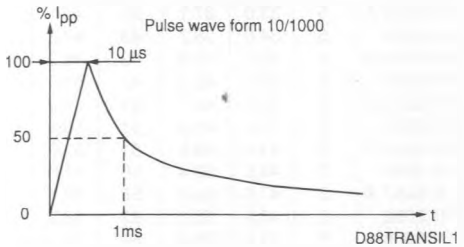
ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
P_p	Peak Pulse Power for 1 ms Exponential Pulse	T_j Initial = 25 °C See note 1	1500	W
P	Power Dissipation on Infinite Heatsink	T_{amb} = 75 °C	5	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 175 175	°C °C
T_L	Maximum Lead Temperature for Soldering During 10 s at 4 mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction-leads on Infinite Heatsink for L_{lead} = 10 mm	20	°C/W

Note : 1. For surges upper than the maximum values, the diode will present a short-circuit anode-cathode.



ELECTRICAL CHARACTERISTICS (T_j = 25°C)

Symbol	Parameter	Value
V_{RM}	Stand-off Voltage	See table
$V_{(BR)}$	Breakdown Voltage	
$V_{(CL)}$	Clamping Voltage	
I_{pp}	Peak Pulse Current	
α_T	Temperature Coefficient of $V_{(BR)}$	
C	Capacitance	
$t_{clamping}$	Clamping Time (0 volt to $V_{(BR)}$)	5 ns max.

Types	I_{RM} @ V_{RM} max.		$V_{(BR)}$* @ (V)			I_R	$V_{(CL)}$ @ I_{pp} max. 1 ms expo.		V_{CL} @ I_{pp} max. 8-20 µs expo.		α_T max.	C typ. V_R = 0 f = 1 MHz
	(µA)	(V)	min.	nom.	max.	(mA)	(V)	(A)	(V)	(A)	(10^{-4}/°C)	(pF)
1N 6040	10	8.5	9.9	11	12.1	1	16.2	93	21.2	849	7.5	3200
1N 6040 A	10	9.0	10.5	11	11.6	1	15.6	96	20.3	887	7.5	3200
1N 6041	5	9.0	10.8	12	13.2	1	17.3	87	22.7	793	7.8	3000
1N 6041 A	5	10.0	11.4	12	12.6	1	16.7	90	21.7	829	7.8	3000
1N 6042	5	10.0	11.7	13	14.3	1	19	79	24.6	732	8.1	2750
1N 6042 A	5	11.0	12.4	13	13.7	1	18.2	82	23.6	763	8.1	2750
1N 6043	5	11.0	13.5	15	16.7	1	22	68	28.7	627	8.4	2500
1N 6043 A	5	12.0	14.3	15	15.8	1	21.2	71	27.2	662	8.4	2500
1N 6044	5	12.0	14.4	16	17.6	1	23.5	64	30.3	594	8.6	2350
1N 6044 A	5	13.0	15.2	16	16.8	1	22.5	67	28.9	623	8.6	2350
1N 6045	5	14.0	16.2	18	19.8	1	26.5	56.5	34	529	8.8	2150
1N 6045 A	5	15.0	17.1	18	18.9	1	25.2	59.5	32.5	554	8.8	2150
1N 6046	5	16.0	18	20	22	1	29.1	51.5	37.8	476	9	2000
1N 6046 A	5	17.0	19	20	21	1	27.7	54	36.1	498	9	2000
1N 6047	5	17.0	19.8	22	24.2	1	31.9	47	41.1	438	9.2	1850
1N 6047 A	5	18.0	20.9	22	23.1	1	30.6	49	39.3	458	9.2	1850
1N 6048	5	19.0	21.6	24	26.4	1	34.7	43	44.9	401	9.4	1750
1N 6048 A	5	20.0	22.8	24	25.2	1	33.2	45	42.8	421	9.4	1750
1N 6049	5	21.0	24.3	27	29.7	1	39.1	38.5	50.5	356	9.6	1600
1N 6049 A	5	22.0	25.7	27	28.4	1	37.5	40	48.3	373	9.6	1600
1N 6050	5	24.0	27	30	33	1	43.5	34.5	56.1	321	9.7	1450
1N 6050 A	5	25.0	28.5	30	31.5	1	41.4	36	53.6	336	9.7	1450
1N 6051	5	26.0	29.7	33	36.3	1	47.7	31.5	61.7	292	9.8	1350
1N 6051 A	5	28.0	31.4	33	34.7	1	45.7	33	59	305	9.8	1350
1N 6052	5	29.0	32.4	36	39.6	1	52	29	67	269	9.9	1250
1N 6052 A	5	30.0	34.2	36	37.8	1	49.9	30	64	281	9.9	1250
1N 6053	5	31.0	35.1	39	42.9	1	56.4	26.5	73	246	10	1200
1N 6053 A	5	33.0	37.1	39	41	1	53.9	28	70	257	10	1200
1N 6054	5	34.0	38.7	43	47.3	1	61.9	24	80	225	10.1	1100
1N 6054 A	5	36.0	40.9	43	45.2	1	59.3	25.3	77	234	10.1	1100
1N 6055	5	38.0	42.3	47	51.7	1	67.8	22.2	88	204	10.1	1025
1N 6055 A	5	40.0	44.7	47	49.4	1	64.8	23.2	84	214	10.1	1025
1N 6056	5	41.0	45.9	51	56.1	1	73.5	20.4	95	189	10.2	975
1N 6056 A	5	43.0	48.5	51	53.6	1	70.1	21.4	91	198	10.2	975
1N 6057	5	45.0	50.4	56	61.6	1	80.5	18.6	105	171	10.3	900
1N 6057 A	5	47.0	53.2	56	58.8	1	77	19.5	100	180	10.3	900
1N 6058	5	48.0	55.8	62	68.2	1	89	16.9	116	155	10.4	850
1N 6058 A	5	53.0	58.9	62	65.1	1	85	17.7	111	162	10.4	850

* Pulse test $t_p \leq 50ms$ $\delta < 2\ \%$.

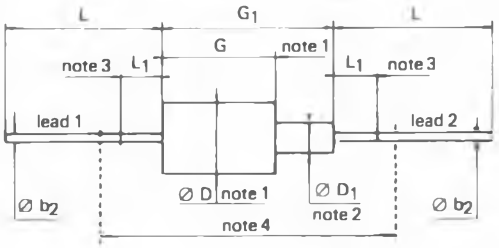
(continued)

Types	I_{RM} @ V_{RM} max.		$V_{(BR)}$* @ (V)			I_R	$V_{(CL)}$ @ I_{pp} max. 1 ms expo.		V_{CL} @ I_{pp} max. 8-20 µs expo.		α_T max.	C typ. V_R = 0 f = 1 MHz
	(µA)	(V)	min.	nom.	max.	(mA)	(V)	(A)	(V)	(A)	(10^{-4}/°C)	(pF)
1N 6059	5	55.0	61.2	68	74.8	1	98	15.3	127	142	10.4	775
1N 6059 A	5	58.0	64.6	68	71.4	1	92	16.3	121	148	10.4	775
1N 6060	5	60.0	67.5	75	82.5	1	108	13.9	140	128	10.5	725
1N 6060 A	5	64.0	71.3	75	78.8	1	103	14.6	134	134	10.5	725
1N 6061	5	66.0	73.8	82	90.2	1	118	12.7	153	117	10.5	675
1N 6061 A	5	70.0	77.9	82	86.1	1	113	13.3	146	123	10.5	675
1N 6062	5	73.0	81.9	91	100.1	1	131	11.4	170	106	10.6	625
1N 6062 A	5	75.0	86.5	91	95.5	1	125	12	162	111	10.6	625
1N 6063	5	81.0	90	100	110	1	144	10.4	187	96	10.6	575
1N 6063 A	5	82.0	95	100	105	1	137	11	178	101	10.6	575
1N 6064	5	90.0	99	110	121	1	158	9.5	203	89	10.7	525
1N 6064 A	5	94.0	105	110	116	1	152	9.9	195	92	10.7	525
1N 6065	5	95.0	108	120	132	1	176	8.5	222	81	10.7	500
1N 6065 A	5	100	114	120	126	1	168	8.9	212	85	10.7	500
1N 6066	5	105	117	130	143	1	191	7.8	240	75	10.7	475
1N 6066 A	5	110	124	130	137	1	182	8.2	230	78	10.7	475
1N 6067	5	121	135	150	165	1	223	6.7	277	65	10.8	425
1N 6067 A	5	128	143	150	158	1	213	7.0	265	68	10.8	425
1N 6068	5	137	153	170	187	1	258	5.8	314	57.5	10.8	375
1N 6068 A	5	145	162	170	179	1	245	6.1	301	60	10.8	375
1N 6069	5	145	162	180	198	1	274	5.5	332	54	10.8	362
1N 6069 A	5	150	171	180	189	1	261	5.7	317	57	10.8	362
1N 6070	5	155	171	190	210	1	292	5.1	353	51	10.8	350
1N 6070 A	5	160	181	190	200	1	278	5.4	336	53.5	10.8	350
1N 6071	5	165	180	200	220	1	308	4.9	370	48.5	10.8	337
1N 6071 A	5	170	190	200	210	1	294	5.1	353	51	10.8	337
1N 6072	5	175	198	220	242	1	344	4.3	406	44.5	10.8	312
1N 6072 A	5	185	209	220	231	1	328	4.6	388	46.5	10.8	312

* Pulse test $t_p \leq 50ms$ $\delta < 2\%$.

PACKAGE MECHANICHAL DATA

DO13 Metal



Ref.	Millimeters		Inches		Notes
	Min.	Max.	Min.	Max.	
Ø b_2	0.64	0.88	0.025	0.035	
Ø D	5.47	5.96	0.215	0.235	1 - Ø D is substantially constant along the length G.
Ø D_1	1.15	2.54	0.045	0.100	
G	7.45	9.06	0.293	0.357	2 - This dimension limits any pinch or seal deformation along the tubulation.
G_1	–	14.47	–	0.570	
L	25.4	41.2	1.000	1.625	3 - The lead diameter Ø b_2 is not controlled over zone L_1.
L_1	–	4.77	–	0.188	
Code IEC : A 19 Code France : DO 13/F 61 Code USA : DO 13					4 - The minimum axial length within which the device may be placed with its leads bent at right angles is 1.00" (25.4 mm).

Cooling method : by convection (method A).
Marking : type number
Weight : 1.5 g.
Lead 1 connected electrically to case.

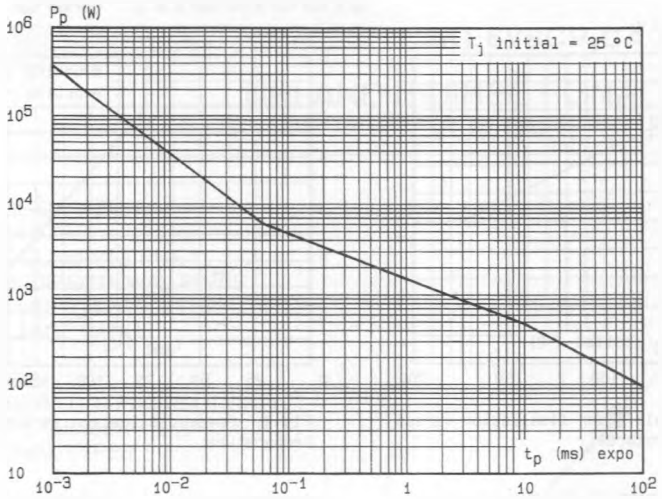


Fig.1 - Peak pulse power versus exponential pulse duration.

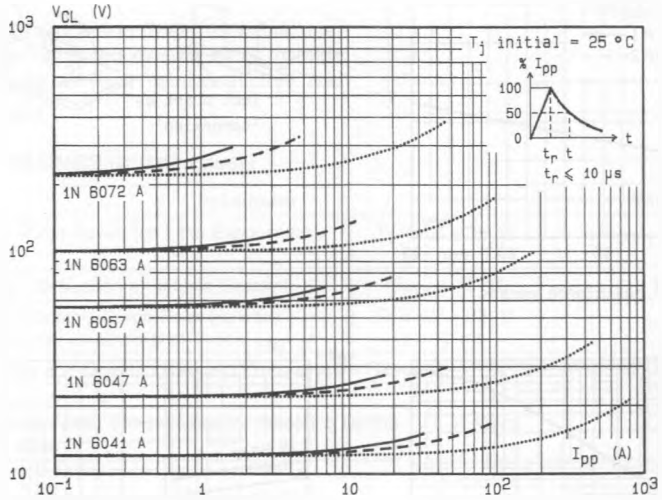


Fig.2 - Clamping voltage versus peak pulse current.
exponential waveform t = 20 µs ·····
t = 1 ms – – – –
t = 10 ms ———

Note : The curves of the figure 2 are specified for a junction temperature of 25 °C before surge. The given results may be extrapolated for other junction temperatures by using the following formula : $\Delta V_{(BR)} = \alpha_{T[V(BR)]} \times [T_j - 25] \times V_{(BR)}$
For intermediate voltages, extrapolate the given results.

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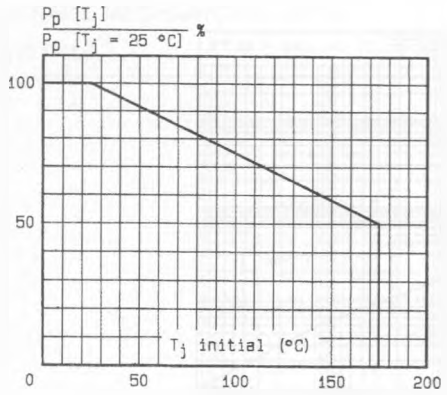


Fig.3 - Allowable power dissipation versus junction temperature.

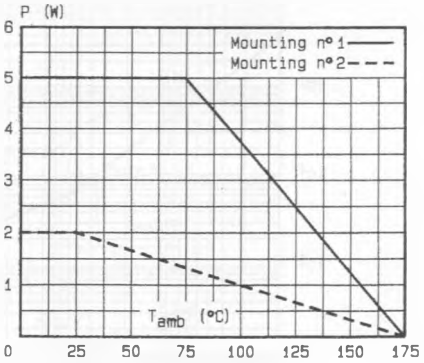


Fig.4 - Power dissipation versus ambient temperature.

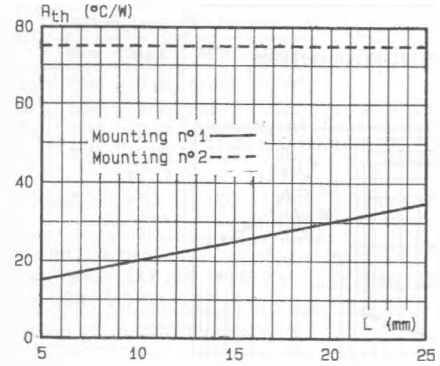
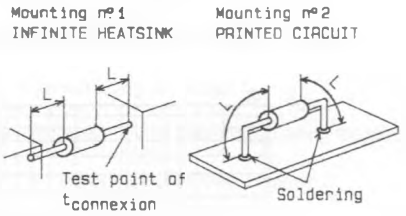


Fig.5 - Thermal resistance versus lead length.



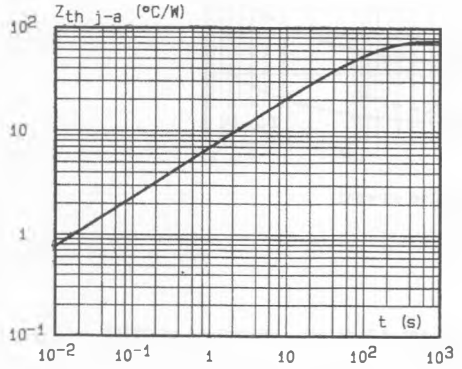


Fig.6 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

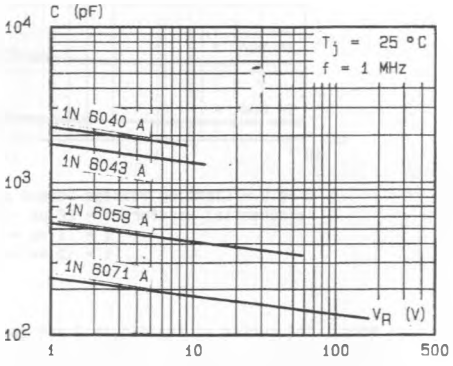


Fig.7 - Capacitance versus reverse applied voltage (typical values).

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