

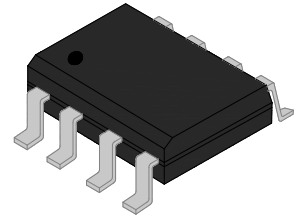


JIP61089H Dual Programmable Thyristor Transient Voltage Suppressor Rev.2.2

DESCRIPTION



This device is especially designed to protect subscriber line card interfaces (SLIC) against transient overvoltages. Positive overloads are clipped with 2 diodes. Negative surges are suppressed by 2 thyristors, their breakdown voltage being referenced to $-V_{BAT}$ through the gate. This component presents a very low gate triggering current (I_{GT}) in order to reduce the current consumption on printed circuit board during the firing phase. A particular attention has been given to the internal wire bonding. The “4-point” configuration ensures reliable protection, eliminating the overvoltage introduced by the parasitic inductances of the wiring (Ldi/dt), especially for very fast transients.



Device package type SOP-8

FEATURES

- ✧ Dual programmable transient suppressor.
- ✧ Wide negative firing voltage range: $V_{GKRM} = -167V$ max.
- ✧ Low dynamic switching voltage: V_{FRM} and $V_{GK(BD)}$.
- ✧ Low gate triggering current: $I_{GT} = 5mA$ max.
- ✧ Peak pulse current: $I_{PP} = 100A$ for 10/1000 μs surge.
- ✧ Holding current: $I_H = 150mA$ min.
- ✧ Moisture sensitivity level: Level 3.
- ✧ UL 497B item recognized. (File No.: E480698).
- ✧ IEC61000-4-2 (ESD) $\pm 30kV$ (air), $\pm 30kV$ (contact).

APPLICATION

JIP61089H is designed to protect communication equipment such as SPC exchanger from being damaged by transient overvoltages at the second level.

TESTING STANDARDS

Type	Wave Sharp		V_{PP}/I_{PP}
	ITU-T K.20/21 and K.45	Voltage	
Current		5/310 μs	150A

ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$, RH=45%-75%, unless otherwise noted)

Parameter		Symbol	Value	Unit
Storage temperature range		T_{STG}	-40 to +150	$^{\circ}\text{C}$
Operating junction temperature		T_J	-40 to +150	$^{\circ}\text{C}$
Operating free-air temperature range		T_A	-40 to +85	$^{\circ}\text{C}$
Non-repetitive peak on-state pulse current				
10/1000 μs	(Telcordia (Bellcore) GR-1089-CORE, Issue 2, February)	I_{TSP}	100	A
5/310 μs	(ITU-T K.20/21& K.45/44 open-circuit voltage 10/700 μs)		150	
Non-repetitive peak pulse voltage	10/700 μs	V_{PP}	6000	V
	1.2/50 μs		1000	
Non repetitive surge peak on-state current (sinusoidal) 60Hz (Note 2)900s		I_{TSM}	2.6	A
Maximum voltage LINE/GROUND		V_{DRM}	-170	V
Maximum voltage GATE/LINE		V_{GKRM}	-167	V

Note1: 5/310 μs means current wave, and its rise time is 5 μs , fall time is 310 μs .

10/700 μs means voltage wave, and its rise time is 10 μs , fall time is 700 μs .

Note2: Initially the protector must be in thermal equilibrium with $T_J=25^{\circ}\text{C}$. EIA/JESD51-2 environment and EIA/JESD51-7 high effective thermal conductivity test board (multi-layer) connected with 0.6 mm printed wiring track widths

ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$)

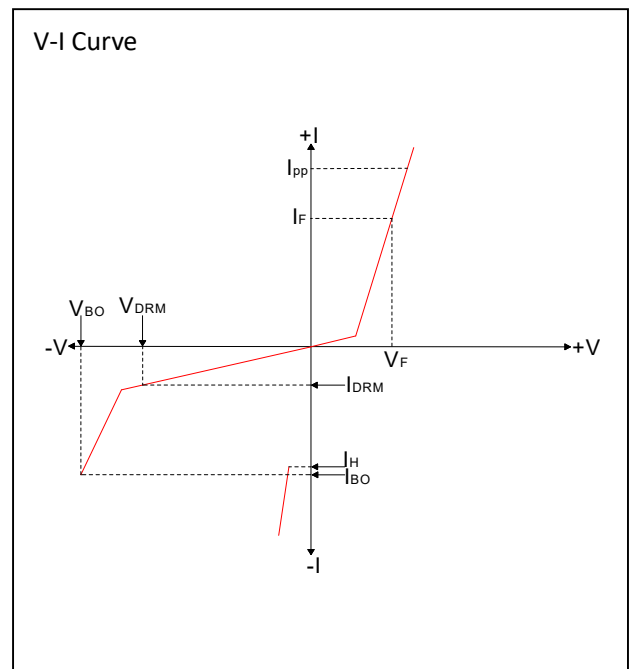
Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Parameters related to the diode						
V_F	Forward voltage	$I_F=5\text{A}$, $t_W=200\mu\text{s}$	-	-	3	V
V_{FRM}	Peak forward recovery voltage	2/10 μs , $I_F=200\text{A}$, $V_{GG}=-100\text{V}$	-	-	10	V
Parameters related to the protection thyristor						
I_{DRM}	Off-state current	$V_{DRM}=-170\text{V}$, $V_{GK}=0\text{V}$	-	-	-5	μA
V_{BO}	Breakover voltage	2/10 μs , $I_F=200\text{A}$, $V_{GG}=-100\text{V}$	-	-	-112	V
I_H	Holding current	$I_T=-1\text{A}$, $di/dt=1\text{A/ms}$, $V_{GG}=-100\text{V}$	-150	-	-	mA

ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, continued)

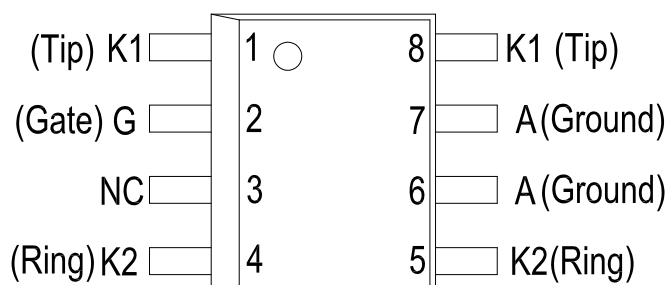
Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
I_{GKS}	Gate reverse current	$V_{GG}=V_{GK}=-167\text{V}$, $V_{KA}=0, T_J=25^{\circ}\text{C}$	-	-	-5	μA
I_{GT}	Gate trigger current	$I_T=-3\text{A}$, $t_p(g)\geq 20\mu\text{s}$, $V_{GG}=-100\text{V}$	-	-	5	mA
V_{GT}	Gate trigger voltage	$I_T=-3\text{A}$, $t_p(g)\geq 20\mu\text{s}$, $V_{GG}=-100\text{V}$	-	-	2.5	V
C_{AK}	Anode-cathode off-state capacitance	$f=1\text{MHz}$, $V_D=1\text{V}$, $I_G=0\text{A}$, $V_D=-3\text{V}$	-	-	170	pF

ELECTERICAL CAHRACTERISTIC

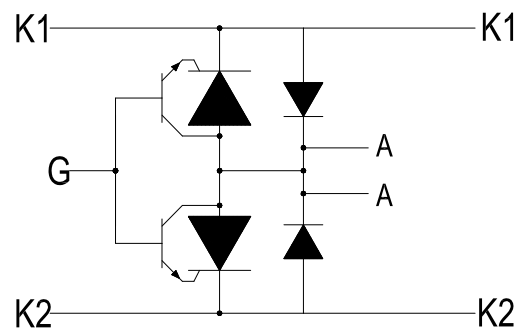
Symbol	Parameters
I_{DRM}	Off-state current
I_H	Holding current
V_{BO}	Break-over voltage
V_F	Forward voltage
V_{FRM}	Peak forward recovery voltage
$V_{GK(BD)}$	Gate-cathode impulse break-over voltage
I_{GKS}	Gate reverse current
I_{GT}	Gate trigger current
V_{GT}	Gate-cathode trigger voltage
C_{KA}	Cathode-anode off-state capacitance



SOP PACKAGE TOP VIEW AND DEVICE SYMBOL

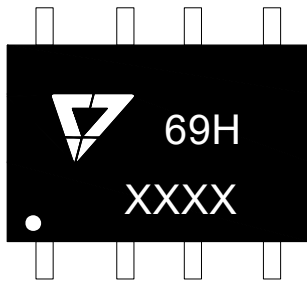


Package (Top view)



Device symbol

MARKING



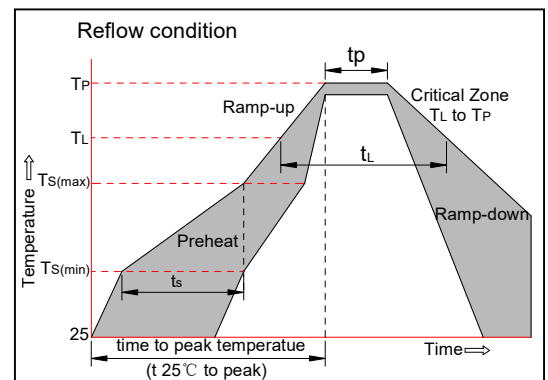
69H: Device marking code
 XXXX: Date of manufacture

ORDERING INFORMATION

J	IP	61089	H
JieJie Microelectronics CO. , Ltd	Integrated protection device	Product number	Surge ratings:10/700µs 6KV

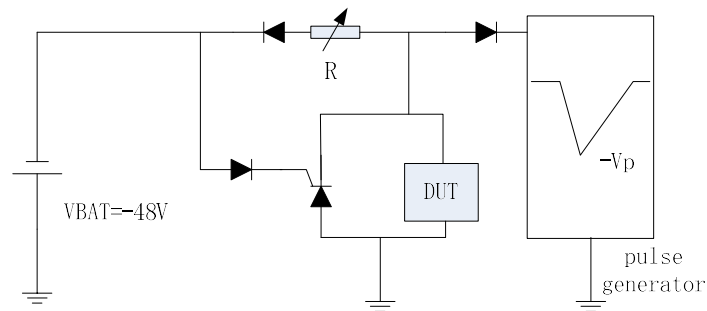
SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquidus Temp (T_L)to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquidus)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30secs.Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_p)		8 min. Max
Do not exceed		+260°C



TEST METHOD AND CIRCUIT

Holding current test circuit(test circuit 1)

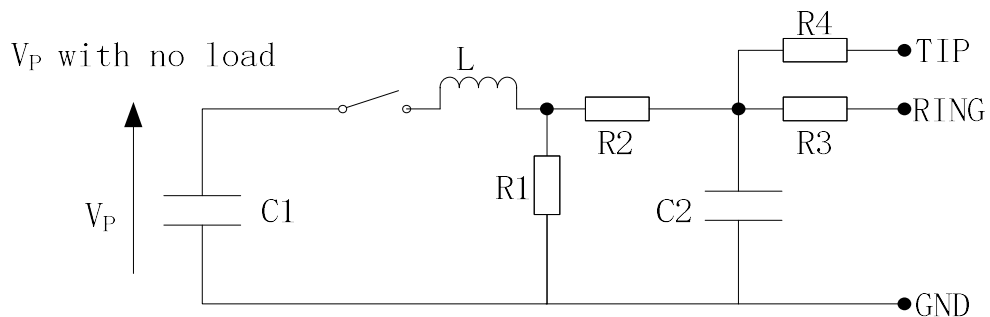


This is a conduction-cutoff test. The test circuit can ascertain the size of holding current.

Test method :

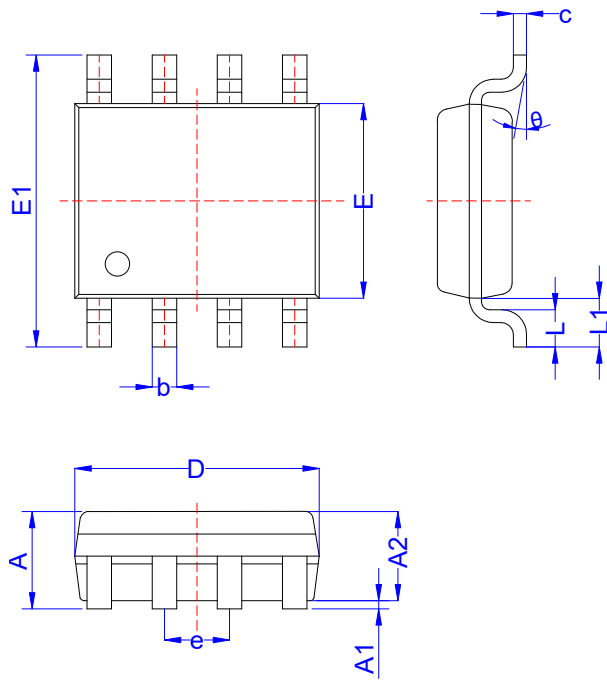
1. Short out DUT, regulating current in I_H range;
2. Triggering DUT with $I_{PP}=10A$, 10/1000 μs surge current;
3. DUT needs to return to the off-state in the maximum 50ms.

V_{FP} and V_{DGL} test circuit(test circuit 2)



Pulse(μs)		V_P (V)	C1 (μF)	C2 (nF)	L (μH)	R1 (Ω)	R2 (Ω)	R3 (Ω)	R4 (Ω)	I_{PP} (A)	R_P (Ω)
T_{rise}	T_{fall}										
10	700	1500	20	200	0	50	15	25	25	30	10
1.2	50	1500	1	33	0	76	13	25	25	30	10
2	10	2500	10	0	1.1	1.3	0	3	3	38	62

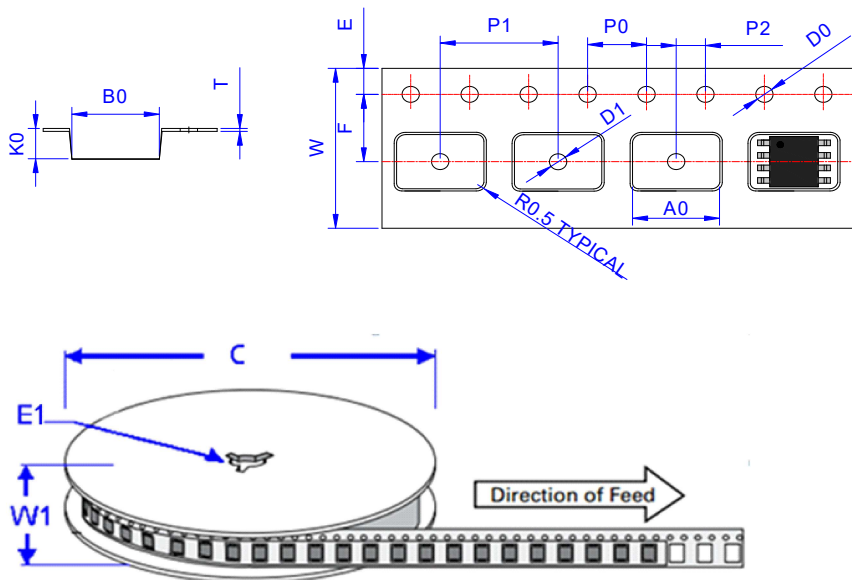
PACKAGE MECHANICAL DATA



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35		1.70	0.053		0.067
A1	0.04		0.18	0.002		0.007
A2	1.30		1.55	0.051		0.061
b	0.31		0.51	0.012		0.020
c	0.17		0.25	0.007		0.010
D	4.65		5.10	0.183		0.201
E	3.70		4.10	0.146		0.161
E1	5.80		6.20	0.228		0.244
e	1.14	1.27	1.40	0.045	0.050	0.055
L	0.40		0.77	0.016		0.030
L1	0.825		1.225	0.032		0.048
θ	0°		8°	0°		8°

SOP-8

TAPE AND REEL SPECIFICATION-SOP-8



Ref.	Dimensions	
	Millimeters	Inches
A0	6.6±0.10	0.260 ± 0.004
B0	5.3±0.10	0.209 ± 0.004
C	330	13.0
D0	1.50±0.10	0.059 + 0.004
D1	1.50±0.10	0.059 + 0.004
E1	13.3±0.3	0.524± 0.012
E	1.75±0.1	0.069± 0.004
F	5.5±0.05	0.217 ± 0.002
K0	2.1±0.1	0.083 ± 0.004
P0	4.0±0.1	0.157± 0.004
P1	8.0±0.1	0.315± 0.004
P2	2.0±0.05	0.079 ± 0.002
T	0.24±0.1	0.009 ± 0.002
W	12.0±0.3	0.472 ± 0.012
W1	15.7±2.0	0.618 ± 0.079

PART No.	UNIT WEIGHT (g/PCS) TYP	REEL (PCS)	PER CARTON (PCS)	DESCRIPTION
JIP61089H	0.077	4,000	64,000	13 inch reel pack


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