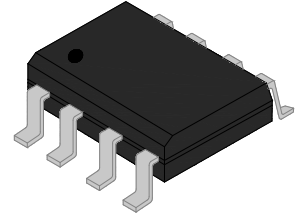




## JIP61089L Dual Programmable Thyristor Transient Voltage Suppressor Rev.3.0

### DESCRIPTION:

JIP61089L is especially designed to protect monolithic SLIC (subscriber line interfaces circuits) 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:  $I_{PP} = 30A$  for 10/1000 $\mu s$  surge .
- ✧ Holding current:  $I_H = 150mA$  min.

### APPLICATION:

JIP61089L 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	10/700 $\mu s$	2000V
	Current	5/310 $\mu s$	40A

**Note 1** :The JIP61089L is intended to be used with a series combination of a 40  $\Omega$  or higher resistance and a suitable overcurrent protector. Power fault compliance requires the series overcurrent element to open-circuit or become high impedance.

For equipment compliant to ITU-T recommendations K.20 or K.21 or K.45 only, the series resistor value is set by the coordination requirements. For coordination with a 400V limit GDT, a minimum series resistor value of 10  $\Omega$  is recommended.

**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 $\mu\text{s}$	(Telcordia (Bellcore) GR-1089-CORE, Issue 2, February)	$I_{TSP}$	30	A	
5/310 $\mu\text{s}$	(ITU-T K.20/21&K.45/44 open-circuit voltage 10/700 $\mu\text{s}$ )		40		
1.2/50 $\mu\text{s}$	(Telcordia (Bellcore) GR-1089-CORE, Issue 2, February)		100		
Non-repetitive peak pulse voltage(10/700 $\mu\text{s}$ )		$V_{PP}$	2000	V	
Non repetitive surge peak on-state current (sinusoidal) 60Hz		$I_{TSM}$	0.5s	6.5	A
			1s	4.6	
			5s	2.3	
			30s	1.3	
			900s	0.73	
Maximum voltage LINE/GROUND		$V_{DRM}$	-170	V	
Maximum voltage GATE/LINE		$V_{GKRM}$	-167	V	

**Note 2:** 5/310 $\mu\text{s}$  means current wave, and its rise time is 5 $\mu\text{s}$ , fall time is 310 $\mu\text{s}$ .  
 10/700 $\mu\text{s}$  means voltage wave, and its rise time is 10 $\mu\text{s}$ , fall time is 700 $\mu\text{s}$ .

**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	$2/10\mu\text{s}$ , $I_F=100\text{A}$ , $R_S=50\Omega$ , $di/dt=80\text{A}/\mu\text{s}$	-	-	10	V
Parameters related to the protection thyristor						
$I_{DRM}$	Off-state current	$V_{DRM}=-170\text{V}$ , $V_{GK}=0\text{V}$	-	-	-5	$\mu\text{A}$
$V_{BO}$	Breakover voltage	$2/10\mu\text{s}$ , $I_{TM}=-100\text{A}$ , $R_S=50\Omega$ , $di/dt=-80\text{A}/\mu\text{s}$ , $V_{GG}=-100\text{V}$	-	-	-112	V

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

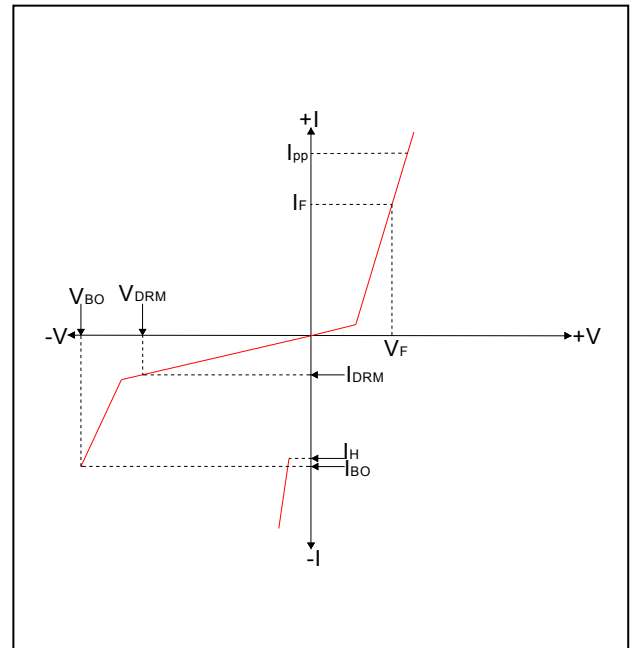
Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$I_H$	Holding current	$I_T=-1\text{A}$ , $di/dt=1\text{A/ms}$ , $V_{GG}=-100\text{V}$	-150	-	-	mA
$I_{GKS}$	Gate reverse current	$V_{GG}=V_{GK}=-167\text{V}$ , $V_{KA}=0$ , $T_J=25^{\circ}\text{C}$	-	-	-5	$\mu\text{A}$
$I_{GT}$	Gate trigger 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	$f=1\text{MHz}$ , $V_d=1\text{V}$ , $I_G=0\text{A}$ , $V_D=-3\text{V}$	-	-	70	pF

**RECOMMENDED OPERATING CONDITIONS** ( $T_A=25^{\circ}\text{C}$ )

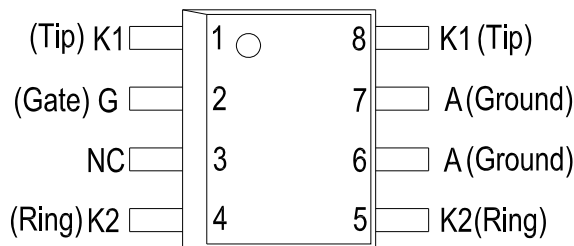
Component		Value			Unit
		Min.	Typ.	Max.	
$C_G$	Gate decoupling capacitor	100	220	-	nF
$R_S$	Resistor for GR-1089-CORE first-level surge survival	25	-	-	$\Omega$
	Resistor for GR-1089-CORE first-level and second-level surge survival	40	-	-	$\Omega$
	Resistor for GR-1089-CORE intra-building port surge survival	8	-	-	$\Omega$
	Resistor for K.20,K.21 and K.45 coordination with a 400V primary protector	10	-	-	$\Omega$

**ELECTERICAL CAHRACTERISTIC**

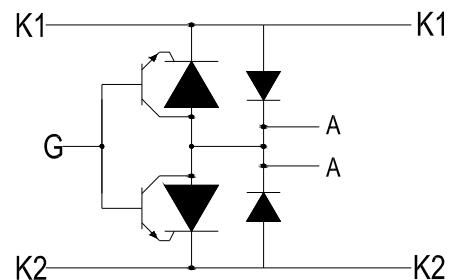
Symbol	Parameters
$I_{DRM}$	Off-state current
$I_H$	Holding current
$V_{BO}$	Breakover voltage
$V_F$	Forward voltage
$V_{FRM}$	Peak forward recovery voltage
$V_{GK(BD)}$	Gate-cathode impulse breakover voltage
$I_{GKS}$	Gate reverse current
$I_{GT}$	Gate trigger current
$V_{GT}$	Gate-cathode trigger voltage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



**SOP PACKAGE TOP VIEW AND DEVICE SYMBOL**

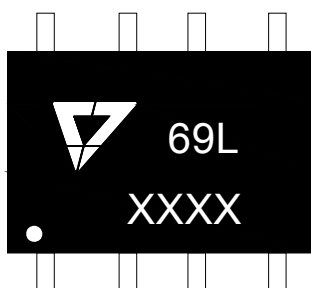


Package (Top view)



Device symbol

**MARKING**



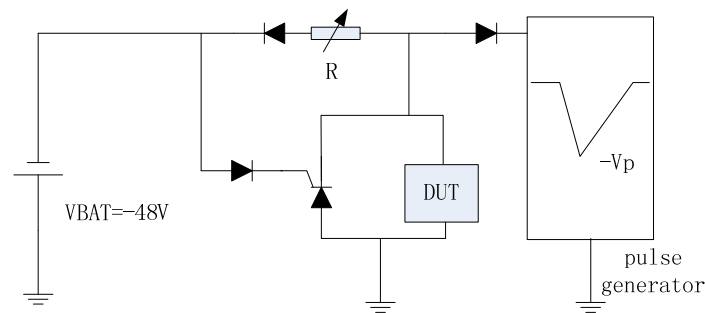
69L: Device marking code  
 XXXX: Date of manufacture

**ORDERING INFORMATION**

<b>J</b>	<b>IP</b>	<b>61089</b>	<b>L</b>
JieJie Microelectronics CO. , Ltd		Surge ratings:10/700μs 2KV	
Integrated protection device		Product number	

**TEST METHOD AND CIRCUIT**

**Holding current test circuit (test circuit 1)**

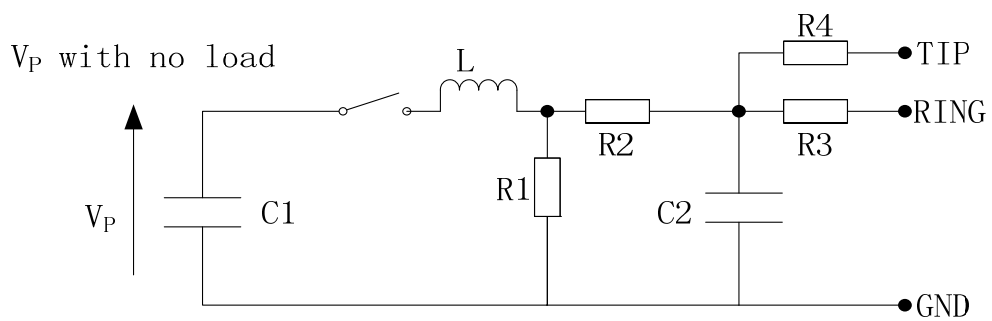


This is a conduction-cutoff test. The test circuit can ascertain the size of holding current.

Test method :

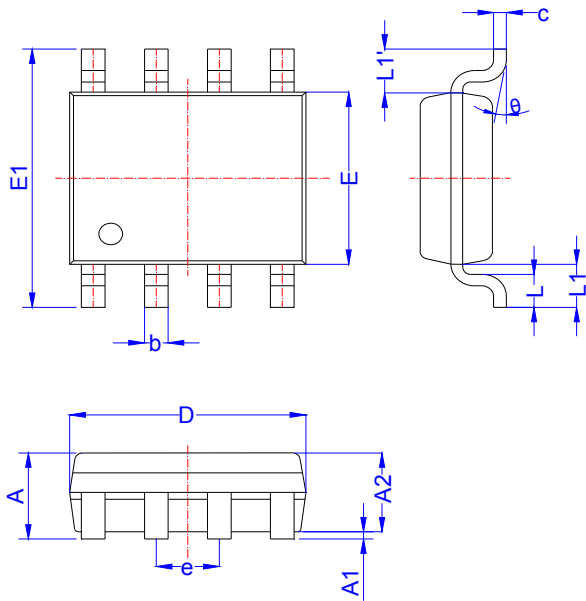
1. Short out DUT, regulating current in  $I_H$  range;
2. Triggering DUT with  $I_{PP}=10A$ , 10/1000μs surge current;
3. DUT needs to return to the off-state in the maximum 50ms.

**$V_{FP}$  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

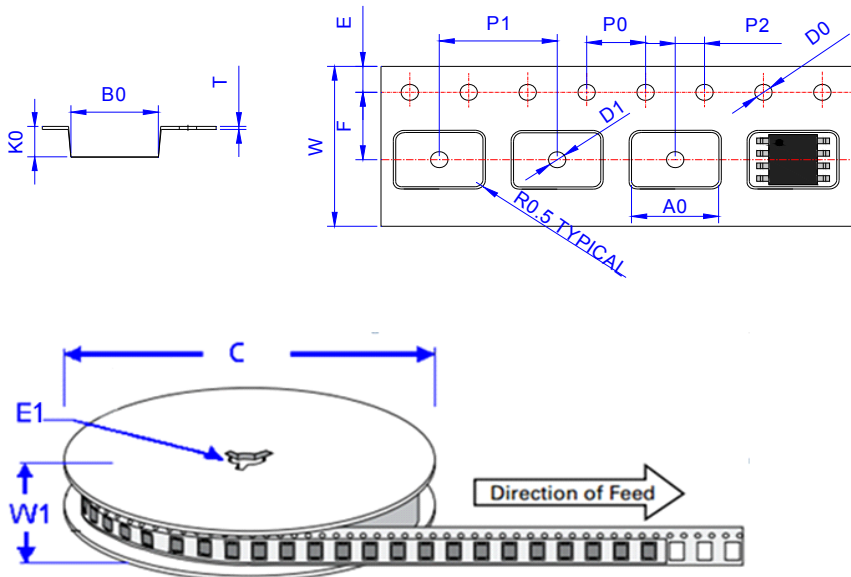
**PACKAGE MECHANICAL DATA**



SOP-8

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.40		1.70	0.055		0.067
A1	0.05		0.15	0.002		0.006
A2	1.35		1.55	0.053		0.061
b	0.31		0.51	0.012		0.020
c	0.17		0.25	0.007		0.010
D	4.70		5.10	0.185		0.201
E	3.80		4.00	0.150		0.157
E1	5.80		6.20	0.228		0.244
e	1.14	1.27	1.40	0.045	0.050	0.055
L	0.62		0.77	0.024		0.030
L1	1.00	1.02	1.04	0.039	0.040	0.041
L1-L1'			0.12			0.005
θ	0°		8°	0°		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
JIP61089L	0.077	4,000	64,000	13 inch reel pack

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