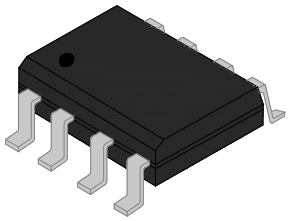
UP61089H Dual Programmable Thyristor Transient Voltage Suppressor Rev.1.2

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 10/1000μs surge.
- ✧ Holding current: I_H=150mA min.

APPLICATION:

UP61089H 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.20/21and K.45	Voltage	10/700μs	6000V
	Current	5/310μs	150A

ABSOLUTE MAXIMUM RATINGS (T_A=25℃, RH=45%-75%, unless otherwise noted)

Parameter		Symbol	Value	Unit
Storage temperature range		T_{STG}	-40 to +150	℃
Operating junction temperature		T_J	-40 to +150	℃
Non-repetitive peak on-state pulse current				
10/1000μs	(Telcordia (Bellcore) GR-1089-CORE,Issue 2, February)	I_{TSP}	100	A
5/310μs	(ITU-T K.20/21& K.45/44 open-circuit voltage 10/700μs)		150	
1.2/50μs	(Telcordia (Bellcore) GR-1089-CORE, Issue 2, February)		500	
Non-repetitive peak pulse voltage（10/700μs）		V_{PP}	6000	V
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

Note1：5/310μs means current wave, and its rise time is 5μs, fall time is 310μs.
10/700μs means voltage wave, and its rise time is 10μs, fall time is 700μs.

Note2：Initially the protector must be in thermal equilibrium with T_J = 25 °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℃)

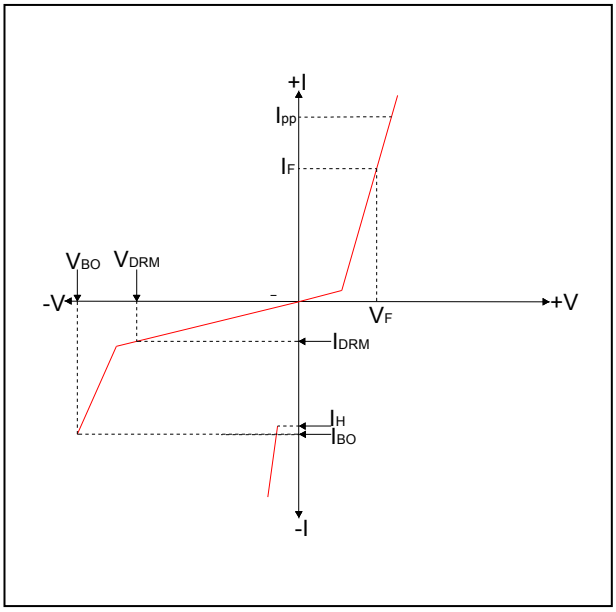
Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Parameters related to the diode						
V_F	Forward voltage	I_F=5A, t_w=200μs	-	-	3	V
V_{FRM}	Peak forward recovery voltage	2/10μs, I_F=200A, V_{GG}=-100V	-	-	10	V
Parameters related to the protection thyristor						
I_{DRM}	Off-state current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

ELECTRICAL CHARACTERISTICS (T_A=25℃,contuined)

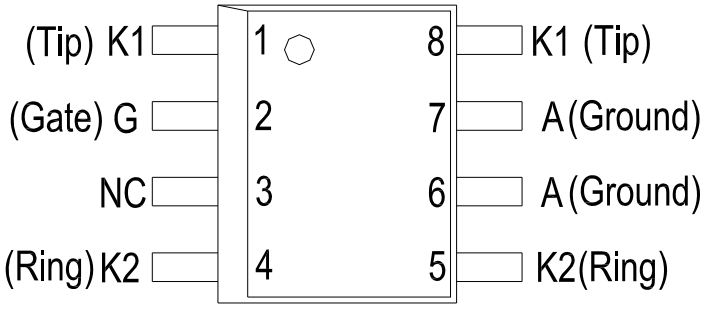
I_{GKS}	Gate reverse current	V_{GG}=V_{GK}=-167V, V_{KA}=0,T_J=25℃	-	-	-5	μA
I_{GT}	Gate trigger current	I_T=-3A, tp(g)≥20μs, V_{GG}=-100V	-	-	5	mA
V_{GT}	Gate trigger voltage	I_T=-3A, tp(g)≥20μs, V_{GG}=-100V	-	-	2.5	V
C_{AK}	Anode-cathode off-state capacitance	f=1MHz,V_D=1V,I_G=0A, V_D=-3V	-	-	170	pF

ELECTERICAL CAHRACTERISTIC

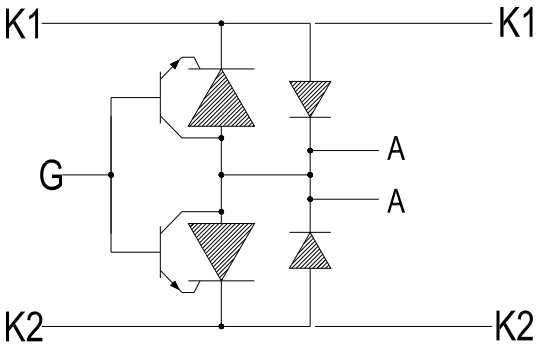
Symbol	Parameters
I_{DRM}	Off-state current
I_H	Holding current
V_{BO}	Break-over voltage
V_F	Forward voltage
V_{FRM}	Peak forward recovery voltage
$V_{GK(BD)}$	Gate-cathode impulse break-over voltage
I_{GKS}	Gate reverse current
I_{GT}	Gate trigger current
V_{GT}	Gate-cathode trigger voltage
C_{KA}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



SOP PACKAGE TOP VIEW AND DEVICE SYMBOL

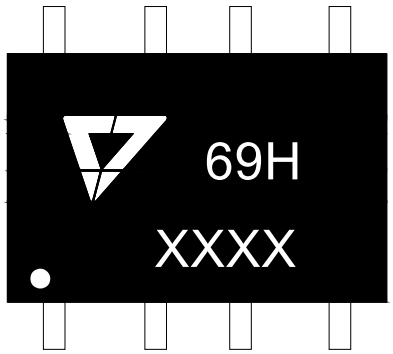


Package (Top view)



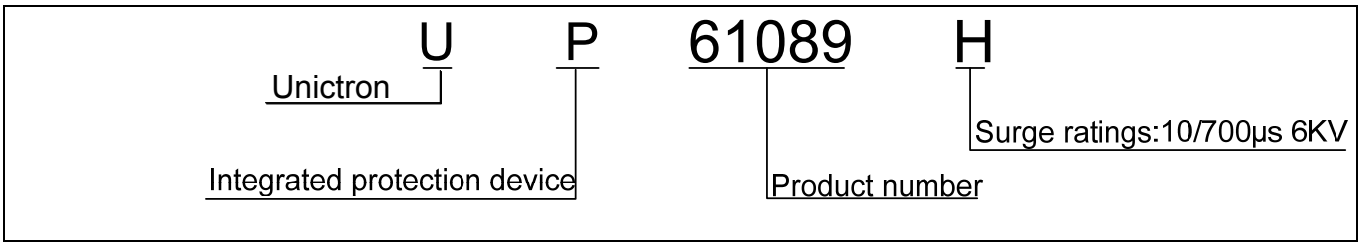
Device symbol

MARKING



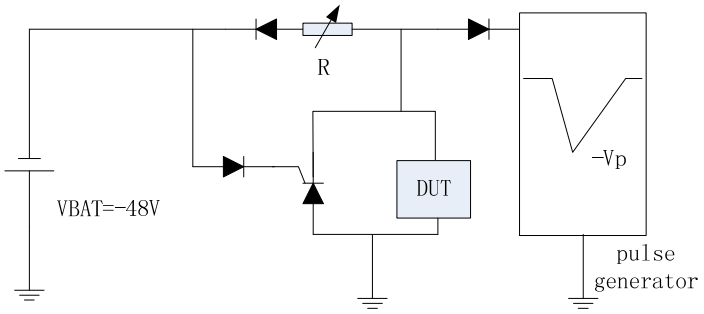
69H：Device marking code
XXXX：Date of manufacture

ORDERING INFORMATION



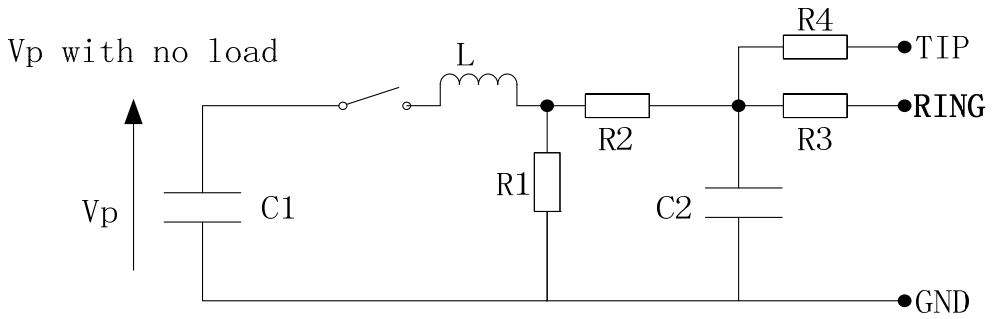
TEST METHOD AND CIRCUIT

Holding current test circuit(test circuit 1)



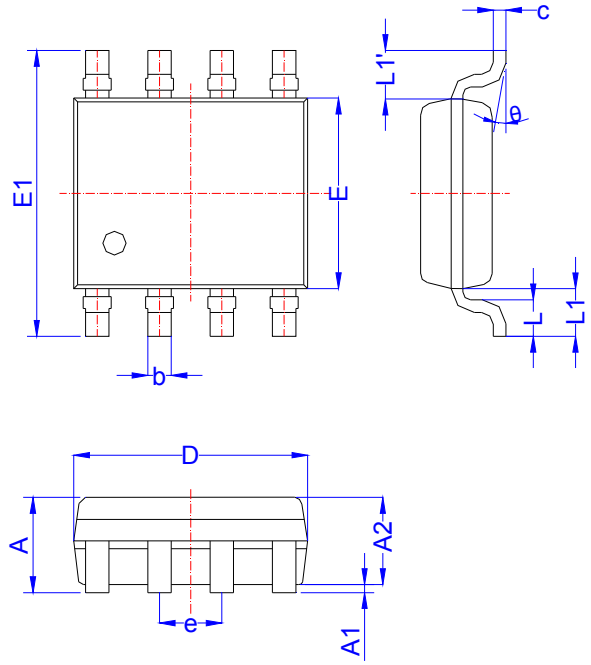
This is a conduction-cutoff test. The test circuit can ascertain the size of holding current.
Test method ：

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.



Pulse(μs)		Vp	C1	C2	L	R1	R2	R3	R4	I_{PP}	R_P
T_{rise}	T_{fall}	(V)	(μF)	(nF)	(μH)	(Ω)	(Ω)	(Ω)	(Ω)	(A)	(Ω)
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

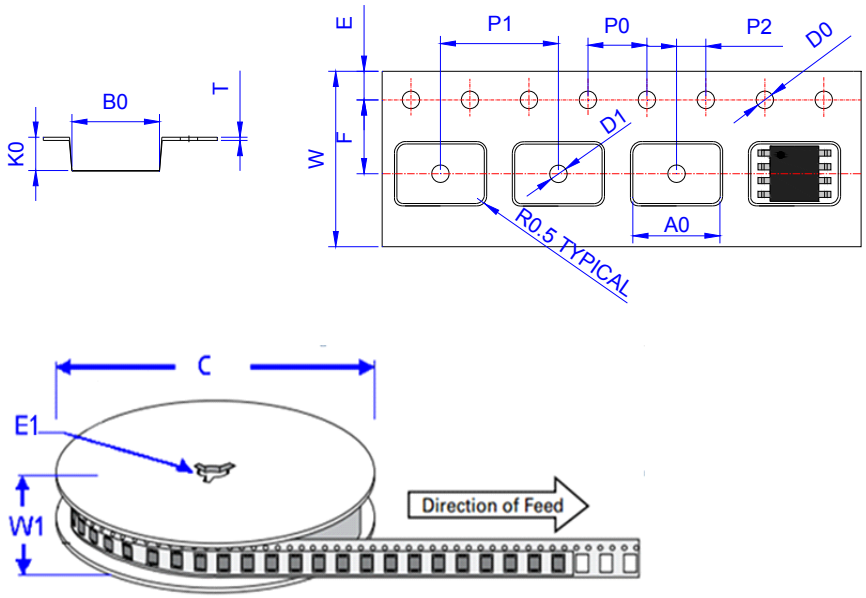
PACKAGE MECHANICAL DATA



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	0.015		0.017
c	0.17		0.25	0.007		0.010
D	4.70		5.10	0.185		0.200
E	3.88		3.93	0.153		0.155
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	0.04	0.048
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
E	13.3±0.3	0.524± 0.012
E1	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

OUTLINE	UNIT WEIGHT (g/PCS) typ.	REEL (PCS)	PER CARTON (PCS)	REEL DIAMETERS (mm)
TAPING	0.077	2,500	40,000	330