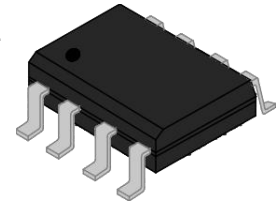


## Description

LMOS61089Q-17 is a quad forward-conducting buffered p-gate overvoltage protector.

This device is especially designed to protect monolithic subscriber line card interfaces (SLIC) against transient overvoltages on the telephone line caused by lightning. The SP61089Q has an array of four buffered thyristors with commoned gates and a common anode connection. Each thyristor cathode has a separate terminal connection. An antiparallel anode-cathode diode is

connected across each thyristor. The buffer transistors reduce the gate supply current. Positive overloads are clipped to common by forward of the antiparallel diodes. Negative surges are suppressed by the four thyristors, their breakdown voltage being referenced to -VBAT through the gate. This component presents a very low gate triggering current (IGT) in order to reduce the current consumption on printed circuit board during the firing phase. If sufficient clipping current flows, the SP61089Q thyristor will regenerate and switch into a low voltage on-state condition. As the overvoltage subsides, the high holding current of the device prevents d.c latch up.



Device package type SOP-8

## Features

- Quad 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:

LMOS61089Q-17 is designed to protect communication equipment such as SPC exchanger from being damaged by transient overvoltages at the second level.

## TESTING STANDARD

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

**ABSOLUTE MAXIMUM RATINGS (TA=25°C, RH=45%-75%, unless otherwise noted)**

Parameter		Symbol	Value	Unit
Storage temperature range		T <sub>STG</sub>	-40 to +150	°C
Operating junction temperature		T <sub>J</sub>	-40 to +150	°C
Non-repetitive peak on-state pulse current				
10/1000μs	(Telcordia (Bellcore) GR-1089-CORE, Issue 2, February)	I <sub>TSP</sub>	30	A
5/310μs	(ITU-T K.20/21& K.45/44 open-circuit voltage 10/700μs)		40	
1.2/50μs	(Telcordia (Bellcore) GR-1089-CORE, Issue 2, February)		100	
Non-repetitive peak pulse voltage ( 10/700μs )		V <sub>PP</sub>	2000	V
Non repetitive surge peak on-state current (sinusoidal) 60Hz (Note 2)900s		I <sub>TSM</sub>	0.5	A
Maximum voltage LINE/GROUND		V <sub>DRM</sub>	-170	V
Maximum voltage GATE/LINE		V <sub>GKRM</sub>	-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<sub>J</sub> = 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 (TA=25°C)**

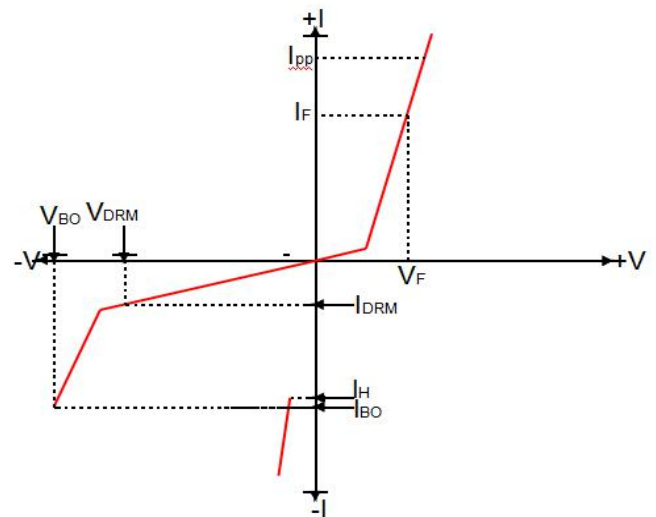
Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Parameters related to the diode						
V <sub>F</sub>	Forward voltage	I <sub>F</sub> =5A, t <sub>w</sub> =200μs	-	-	3	V
V <sub>FRM</sub>	Peak forward recovery voltage	10/700us, I <sub>F</sub> =40A, R <sub>s</sub> =55Ω V <sub>GG</sub> =-48V, C <sub>G</sub> =100nF	-	12	-	V
Parameters related to the protection thyristor						
I <sub>DRM</sub>	Off-state current	V <sub>DRM</sub> =-170V, V <sub>GK</sub> =0V	-	-	-5	μA
V <sub>BO</sub>	Breakover voltage	10/700us, I <sub>F</sub> =-40A, R <sub>s</sub> =55Ω, V <sub>GG</sub> =-48V, C <sub>G</sub> =100nF	-	-	-64	V
I <sub>H</sub>	Holding current	I <sub>T</sub> =-1A, di/dt=1A/ms, V <sub>GG</sub> =-100V	-150	-	-	mA

## ELECTRICAL CHARACTERISTICS (TA=25°C, continued)

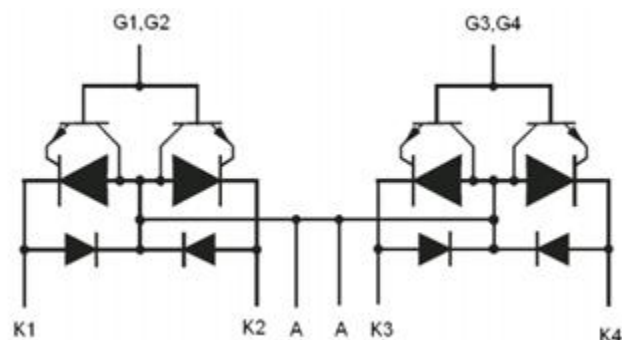
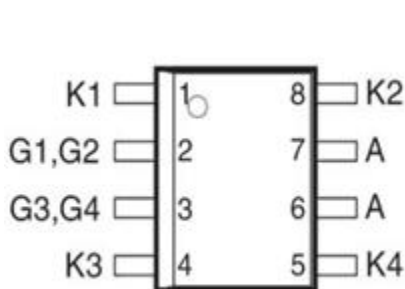
$I_{GKS}$	Gate reverse current	$V_{GG}=V_{GK}=-167V$ , $V_{KA}=0, T_J=25^\circ C$	-	-	-5	$\mu A$
$I_{GT}$	Gate trigger current	$I_T=3A, t_p(g)\geq 20\mu s$ , $V_{GG}=-100V$	-	-	5	mA
$V_{GT}$	Gate trigger voltage	$I_T=3A, t_p(g)\geq 20\mu s$ , $V_{GG}=-100V$	-	-	2.5	V
$C_{AK}$	Anode-cathode off-state capacitance	$f=1MHz, V_d=1V, I_G=0A$ , $V_D=-3V$	-	-	70	pF

## ELECTRICAL CHARACTERISTIC

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

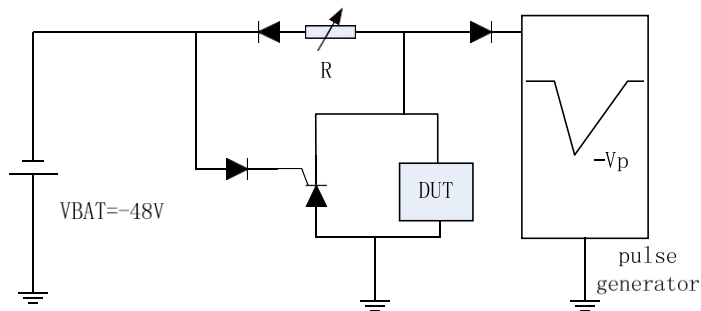


## SOP PACKAGE TOP VIEW AND DEVICE SYMBOL



## TEST METHOD AND CIRCUIT

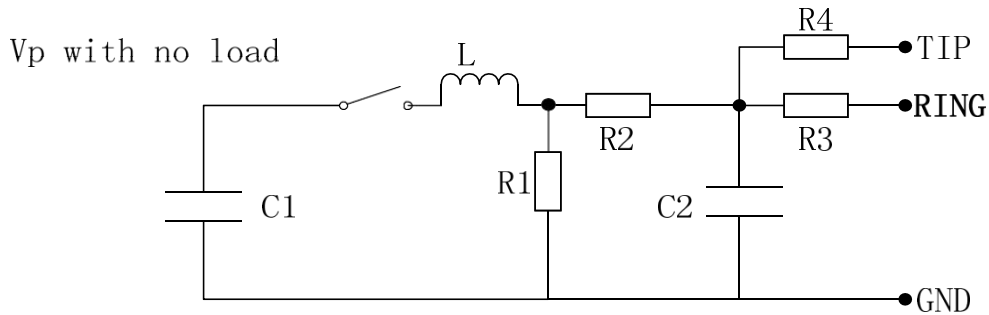
### Holding current test circuit(test circuit 1)



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

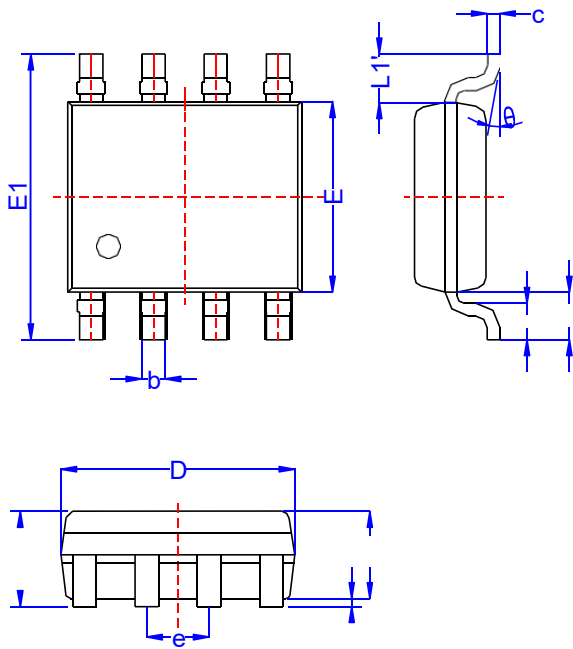
- 1.Short out DUT, regulating current in IH range;
- 2.Triggering DUT with IPP=10A, 10/1000 $\mu$ s surge current;  
DUT needs to return to the off-state in the maximum 50ms

## Typical Characteristics



Pulse(μs)		V <sub>P</sub> (V)	C1 (μF)	C2 (nF)	L (μH)	R1 (Ω)	R2 (Ω)	R3 (Ω)	R4 (Ω)	I <sub>PP</sub> (A)	R <sub>P</sub> (Ω)
T <sub>rise</sub>	T <sub>fall</sub>										
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

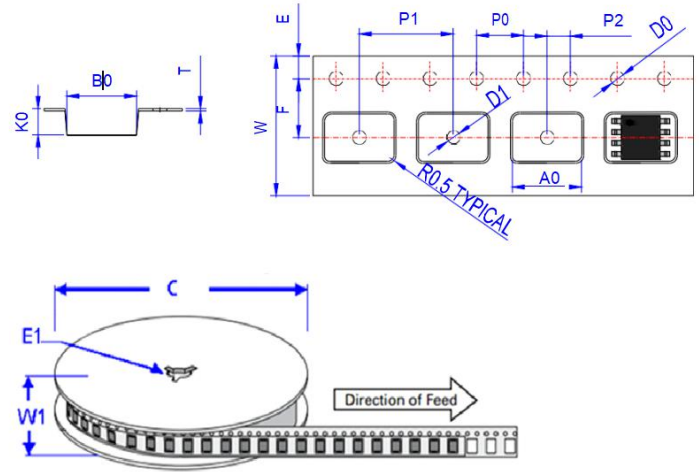


SOP-8

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

Shanghai Leiditech Electronic Co.,Ltd  
 Email: sale1@leiditech.com  
 Tel : +86- 021 50828806  
 Fax : +86- 021 50477059