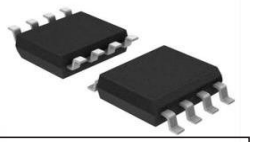
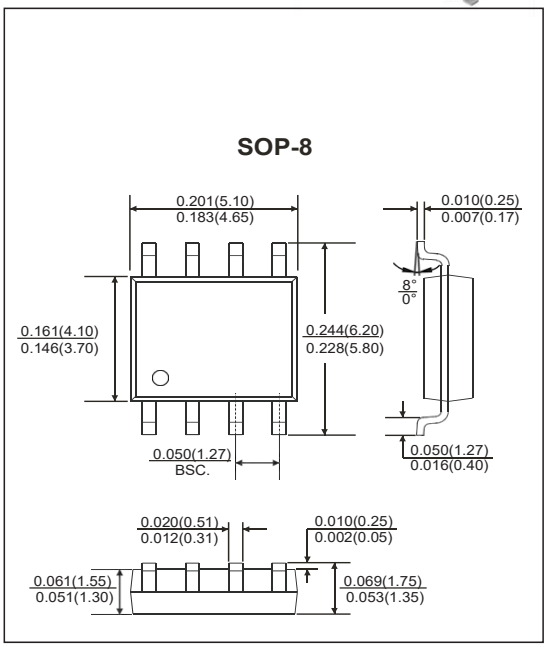
LM61089Q

Quad Programmable Thyristor Transient Voltage Suppressor

Features

- Quad programmable transient suppressor.
- Wide negative firing voltage range: V_{GKRM}=-167V max.
- Low dynamic switching voltage: V_{FRM} and $V_{GK(BO)}$.
- Low gate triggering current: I_{GT}=5mA max.
- Peak pulse current: I_{PP}=30A for 10/1000μs surge.
- Holding current: I_H=150mA min.
- IEC61000-4-2 (ESD) ±30kV (air), ±30kV (contact).





Dimensions in inches and (millimeter)

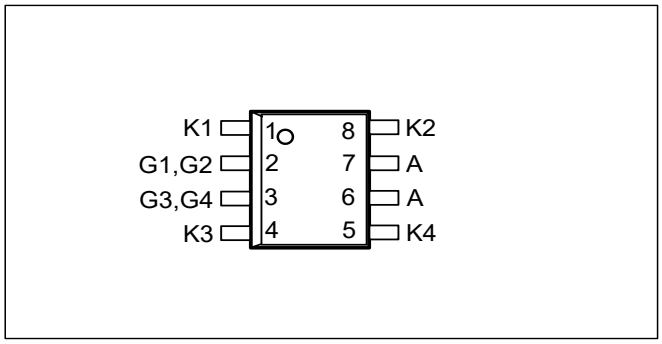
Applications

■ LM61089Q is designed to protect communication equipment such as SPC exchanger from being damaged by transient overvoltages at the second level.

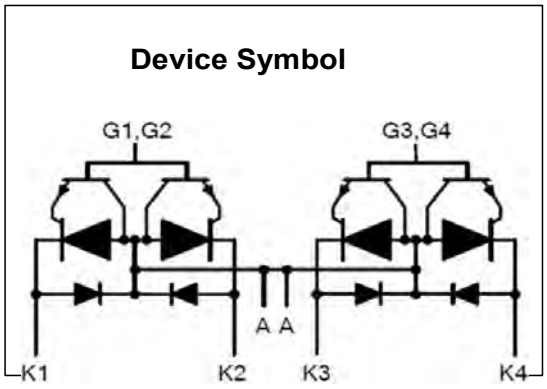
Testing Standards

Type	Wave Sharp		V_{PP}/I_{PP}
ITU-T K.20,21 and K.45	Voltage	10/700μs	2000V
	Current	5/310μs	40A

SOP Package Top View



Device Symbol



Description

LM61089Q 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 LM61089Q 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 LM61089Q 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.

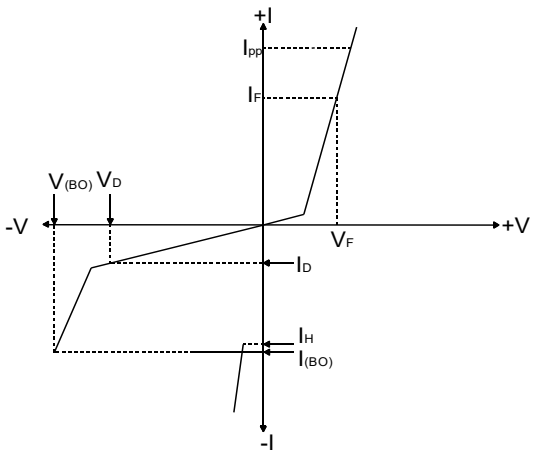
Absolute Maximum Ratings (T_A = 25 °C , RH=45%-75%,unless otherwise noted)

Parameter		Symbol	Value	Unit
Non-repetitive peak on-state pulse current				
10/1000μs	(Telcordia (Bellcore) GR-1089-CORE,Issue 2, February 1999, Section 4)	I_{TSP}	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 1999, Section 4)		100	
Non-repetitive peak pulse voltage(10/700μs)		V_{PP}	2000	V
Non repetitive surge peak on-state current (sinusoidal) 60Hz 900s		I_{TSM}	0.5	A
Maximum voltage LINE/GROUND		V_{DRM}	-170	V
Maximum voltage GATE/LINE		V_{GKRM}	-167	V
Storage temperature range		T_{STG}	-40 to +150	°C
Junction temperature		T_J	-40 to +150	°C
Operating free-air temperature range		T_A	-40 to +85	°C

Note：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.

Voltage -Current Characteristic

Symbol	Parameters
I_D	Off-state current
I_H	Holding current
$V_{(BO)}$	Break-over voltage
V_F	Forward voltage
V_{FRM}	Peak forward recovery voltage
$V_{GK(BO)}$	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

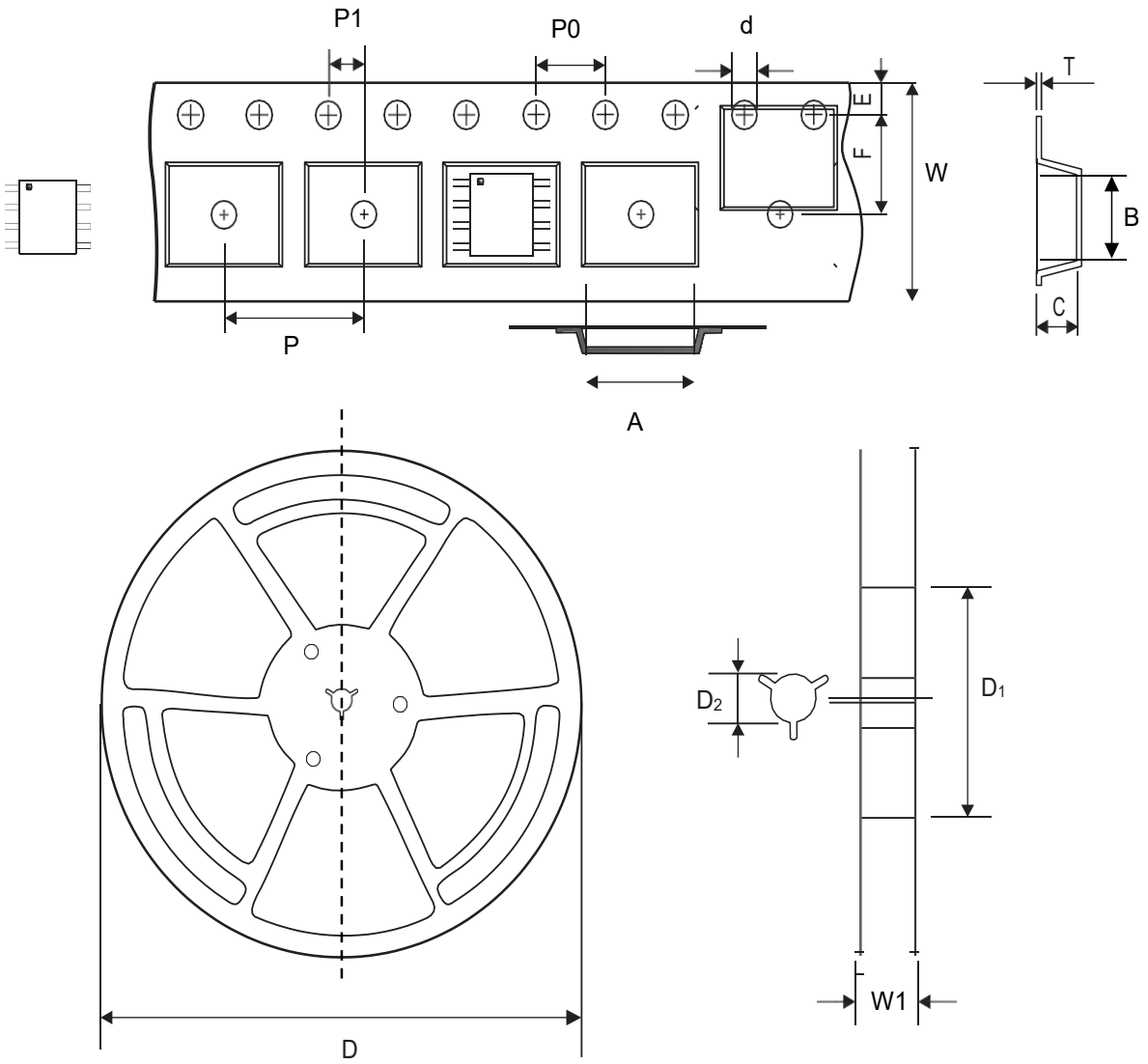


Electrical Characteristics (T_A = 25 °C , RH=45%-75%,unless otherwise noted)

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	10/700μs,I_F=40A, Rs=50Ω,V_{GG}=-48V, C_G=100nF	-	12	-	V
Parameters related to the protection thyristor						
I_D	Off-state current	V_{DRM}=-170V, V_{GK}=0V	-	-	-5	μA
$V_{(BO)}$	Break-over voltage	10/700μs,I_F=-40A, Rs=55Ω,V_{GG}=-48V, C_G=100nF	-	-	-64	V
I_H	Holding current	I_T=-1A, di/dt=1A/ms, V_{GG}=-100V	-150	-	-	mA
I_{GKS}	Gate reverse current	V_{GG}=V_{GK}=-167V, V_{KA}=0,T_J=25°C	-	-	-5	μA
I_{GT}	Gate trigger current	I_T=-3A, $t_{P(g)}$≥20μs, V_{GG}=-100V	-	-	5	mA
V_{GT}	Gate trigger voltage	I_T=-3A, $t_{P(g)}$≥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	-	-	70	pF

Note：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.

Reel Taping Specification

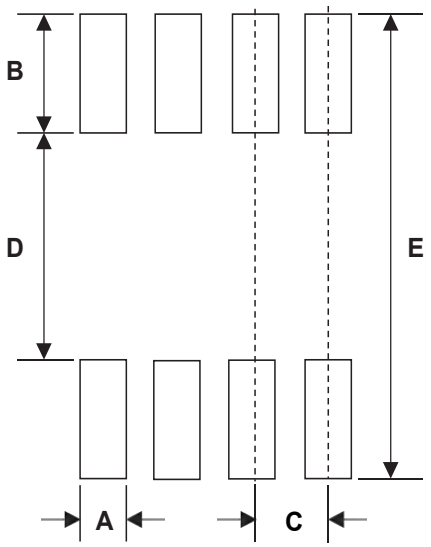


	SYMBOL	A	B	C	d	D	D1	D2
SOP-8	(mm)	6.40 ± 0.10	5.20 ± 0.10	2.10 ± 0.10	1.50 + 0.10 - 0.00	330.00 ± 1.00	100.00 ± 0.50	13.00 ± 1.00
	(inch)	0.252 ± 0.004	0.205 ± 0.004	0.083 ± 0.004	0.059 + 0.004 - 0.000	12.992 ± 0.039	3.937 ± 0.020	0.512 ± 0.039

	SYMBOL	E	F	P	P0	P1	T	W	W1
SOP-8	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.25 ± 0.02	12.00 + 0.30 - 0.10	17.60 + 1.00 - 0.00
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.010± 0.001	0.472 + 0.012 - 0.004	0.693 + 0.039 - 0.000

Suggested PAD Layout

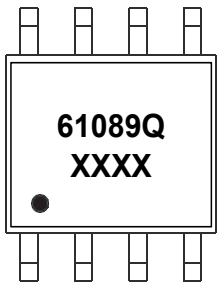
SIZE	SOP-8	
	(mm)	(inch)
A	0.60	0.024
B	1.52	0.060
C	1.27	0.050
D	4.00	0.157
E	7.00	0.276



Marking Code

Part Number	Marking Code
LM61089Q	61089Q

61089Q= Product type marking code
XXXX = Date Code
Dot denotes Pin1



Ordering Information

Part Number	Package	Weight	Base qty	Reel Size	Delivery mode
		grams(approx.)	(pcs)	(inch)	
LM61089Q	SOP-8	0.077	4000	13	Tape and reel

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