

## Description

This device has been especially designed to protect 2 new high voltage, as well as classical SLICs, against transient over-voltages.

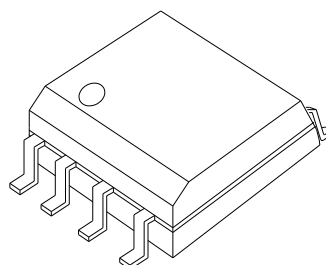
Positive over-voltages are clamped by 2 diodes. Negative surges are suppressed by 2 thyristors, their breakdown voltage being referenced to  $-V_{BAT}$  through the gate.

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.

This devices are not subject to ageing and provide a fail safe mode in short circuit for a better protection. TS61089X are used to help equipment to meet various standards such as UL1950, IEC950 / CSA C22.2, UL1459 and FCC part68.

## Features

- Dual line programmable transient voltage suppressor
- Wide negative firing voltage range:  
 $V_{MGL} = -75V$  ( TS61089 )  
 $V_{MGL} = -100V$  (TS61089A)  
 $V_{MGL} = -155V$  (TS61089B)
- Low dynamic switching voltages:  $V_{FP}$  and  $V_{DGL}$
- Low gate triggering current:  $I_{GT} = 5$  mA max
- Peak pulse current:  $I_{PP} = 30$  A (10/1000 s)
- Holding current:  $I_H > 150$  mA
- Solid-state silicon technology
- Meets MSL 3 Requirements
- ROHS compliant



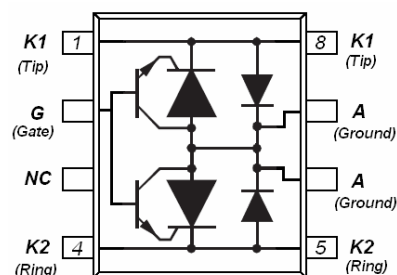
Device package type SOP-8

## Main applications

- T-1/E-1, ISDN, and xDSL transmission equipment
- Telecommunications infrastructure
- PBX's and other switches
- Set-top box
- VoIP

## Protection solution to meet

- TIA-968-A/TIA-968-B
- ITU K.20/21 Enhanced Level\*/Basic Level
- GR 1089 Inter-building\*/Intra-building
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950



## Ordering Information

Device	Qty per Reel	Reel Size
TS61089X	3000	13 Inch
TS61089AX	3000	13 Inch
TS61089BX	3000	13 Inch

<b>Maximum ratings (Tamb=25°C Unless Otherwise Specified)</b>				
<b>Parameter</b>		<b>Symbol</b>	<b>Value</b>	<b>Unit</b>
Repetitive peak off-state voltage, $V_{GK}=0$	TS61089X	$V_{DRM}$	-90	V
	TS61089AX		-120	
	TS61089BX		-170	
Repetitive peak gate-cathode voltage, $V_{KA}=0$	TS61089X	$V_{GKRM}$	-85	V
	TS61089AX		-120	
	TS61089BX		-170	
Non-repetitive peak on-state current 10/1000 us (Telcordia(Bellcore)Gr-1089-CORE.Issue 2.February 1999,Section4) 5/320 us (ITU-T K.20, K.21& K.45, K.44 open-circuit voltage wave shape 10/700us) 1.2/50 us (Telcordia(Bellcore)Gr-1089-CORE.Issue 2.February 1999,Section4) 2/10 us (Telcordia(Bellcore)Gr-1089-CORE.Issue 2.February 1999,Section4)		$I_{PPSM}$	30	A
			40	
			100	
			120	
Non-repetitive peak on-state current. $V_{GG}=-75V$ 50Hz to 60Hz 0.1 s 1 s 5 s 300 s 900 s		$I_{TSM}$	11	A
			4.8	
			2.7	
			0.95	
			0.93	
Lead Soldering Temperature		$T_L$	260 (10 sec.)	°C
Operating Temperature Range		$T_J$	-40 ~ 85	°C
Storage Temperature Range		$T_{STG}$	-55 ~ 150	°C
Lead Solder Temperature – Maximum (10 Second Duration)		$T_L$	260	°C
Junction To ambient		$R_{\theta JA}$	170	°C/W

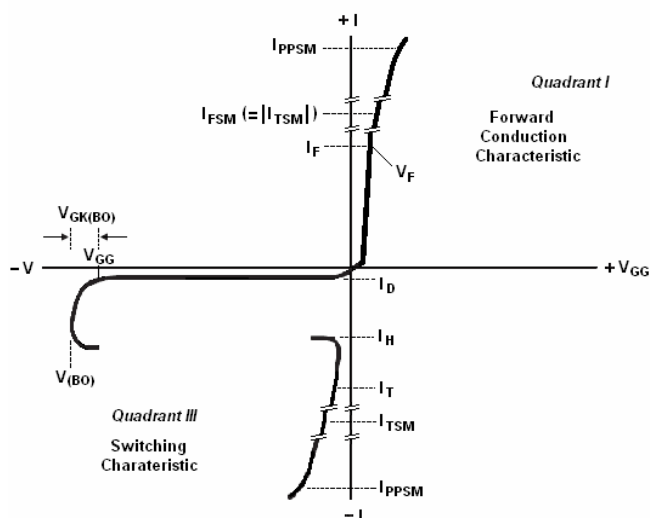
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

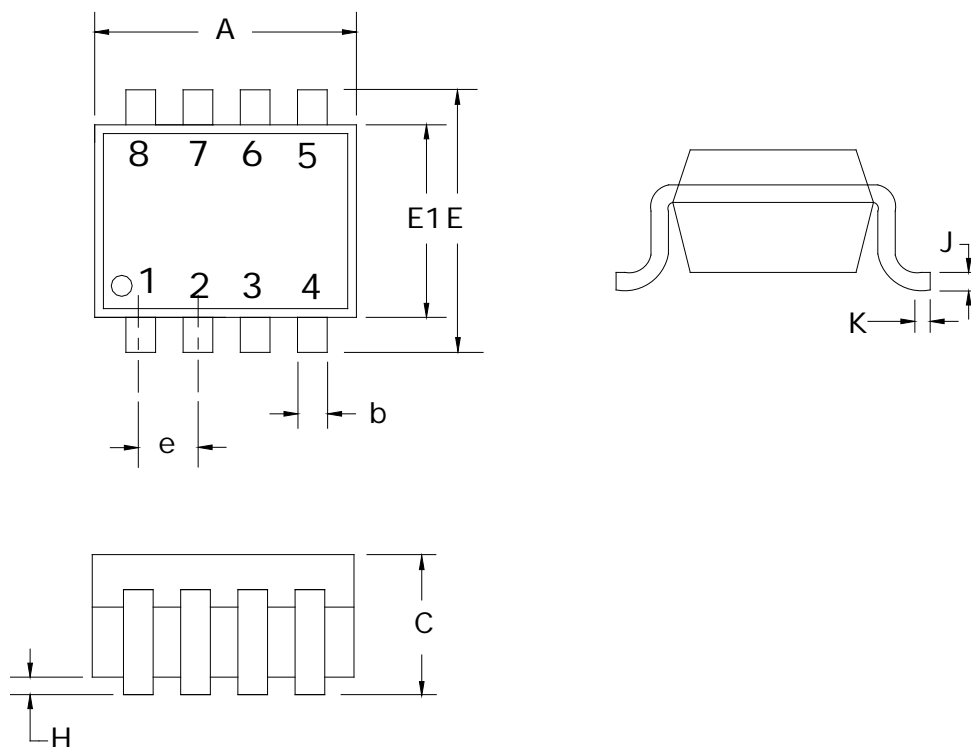
\*Other voltages may be available upon request.

1. Nonrepetitive current pulse, per Figure 1.

Electrical characteristics ( $T_{amb}=25^{\circ}C$ Unless Otherwise Specified )							
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units	
$I_D$	Off-state current	$V_D=V_{DRM}, V_{GK}=0$			-5	$\mu A$	
			$T_J=25^{\circ}C$				
$V_{(BO)}$	Breakover voltage	$2/10\mu s, I_{PP}=-56A, R_S=45\Omega, V_{GG}=-48V, C_G=220nF$		-57		V	
		$2/10\mu s, I_{PP}=-100A, R_S=50\Omega, V_{GG}=-48V, C_G=220nF$		-60			
		$1.2/50\mu s, I_{PP}=-53A, R_S=47\Omega, V_{GG}=-48V, C_G=220nF$		-60			
		$1.2/50\mu s, I_{PP}=-96A, R_S=52\Omega, V_{GG}=-48V, C_G=220nF$		-64			
$V_{GK(BO)}$	Gate-cathode impulse Breakover voltage	$2/10\mu s, I_{PP}=-56A, R_S=45\Omega, V_{GG}=-48V, C_G=220nF$		9		V	
		$2/10\mu s, I_{PP}=-100A, R_S=50\Omega, V_{GG}=-48V, C_G=220nF$		12			
		$1.2/50\mu s, I_{PP}=-53A, R_S=47\Omega, V_{GG}=-48V, C_G=220nF$		12			
		$1.2/50\mu s, I_{PP}=-96A, R_S=52\Omega, V_{GG}=-48V, C_G=220nF$		16			
$V_F$	Forward voltage	$I_F=5A, T_W=200\mu s$			3	V	
$V_{FRM}$	Peak forward recovery voltage	$2/10\mu s, I_{PP}=-56A, R_S=45\Omega, V_{GG}=-48V, C_G=220nF$		6		V	
		$2/10\mu s, I_{PP}=-100A, R_S=50\Omega, V_{GG}=-48V, C_G=220nF$		8			
		$1.2/50\mu s, I_{PP}=-53A, R_S=47\Omega, V_{GG}=-48V, C_G=220nF$		8			
		$1.2/50\mu s, I_{PP}=-96A, R_S=52\Omega, V_{GG}=-48V, C_G=220nF$		12			
$I_H$	Holding current	$I_T=-1A, di/dt=1A/ms, V_{GG}=-48V$	-150			mA	
$I_{GKS}$	Gate reverse current	$V_{GG}=V_{GK}=V_{GKRM}, V_{KA}=0$			-5	$\mu A$	
			$T_J=25^{\circ}C$				
			$T_J=85^{\circ}C$			-50	$\mu A$
$I_{GT}$	Gate trigger current	$I_T=-3A, t_{p(g)}\geq 20\mu s, V_{GG}=-48V$			5	mA	
$V_{GT}$	Gate-cathode trigger voltage	$I_T=-3A, t_{p(g)}\geq 20\mu s, V_{GG}=-48V$			2.5	V	
$Q_{GS}$	Gate switching charge	$1.2/50\mu s, I_{PP}=-53A, R_S=47\Omega, V_{GG}=-48V, C_G=220nF$		0.1		$\mu C$	
$C_{KA}$	Cathode-anode off-State capacitance	$F=1MHz, V_d=1V, I_G=0$	$V_D=-3V$		100	pF	
			$V_D=-48V$		50	pF	

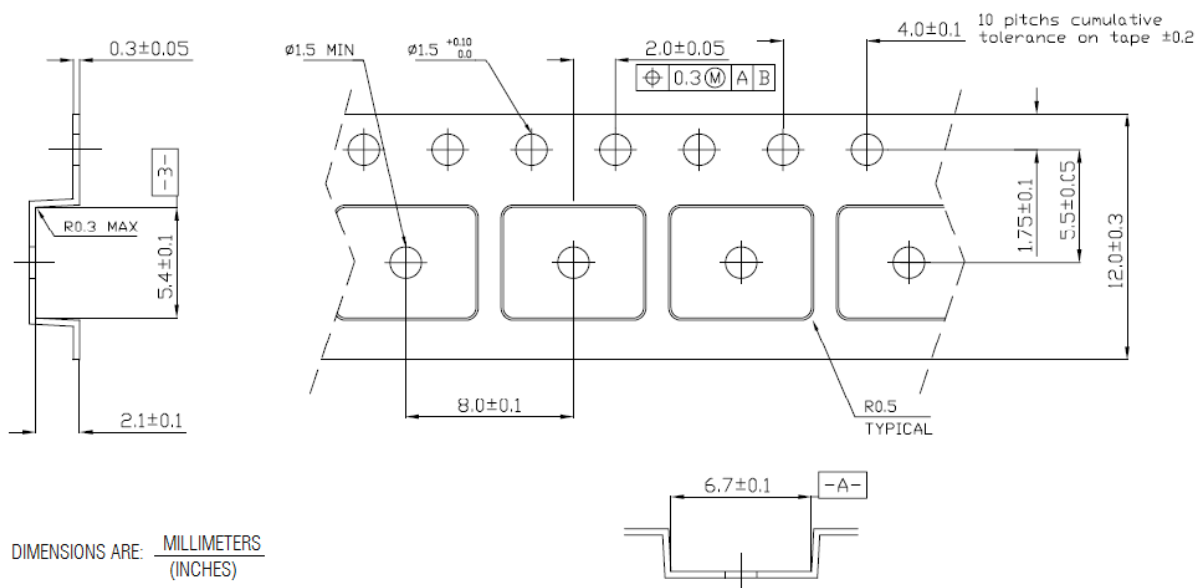
Symbol	Parameter
$I_D$	Off-state current
$I_H$	Holding current
$V_{(BO)}$	Breakover voltage
$V_F$	Forward voltage
$V_{FRM}$	Peak forward recovery voltage
$V_{GK(BO)}$	Gate-cathode impulse breakover voltage
$I_{GKS}$	Gate reverse current
$I_{GT}$	Gate trigger current
$V_{GT}$	Gate-cathode trigger voltage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



**Package information**
**SOP-8**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.80	5.20	0.189	0.205
E	5.90	6.30	0.232	0.248
E1	3.80	4.00	0.150	0.157
b	0.35	0.49	0.014	0.019
C	1.35	1.79	0.054	0.071
J	0.18	0.25	0.007	0.009
e	1.27(BSC)		0.05(BSC)	
K	0.40	1.25	0.016	0.049
H	0.10	0.25	0.004	0.008

## Tape and Reel Specification



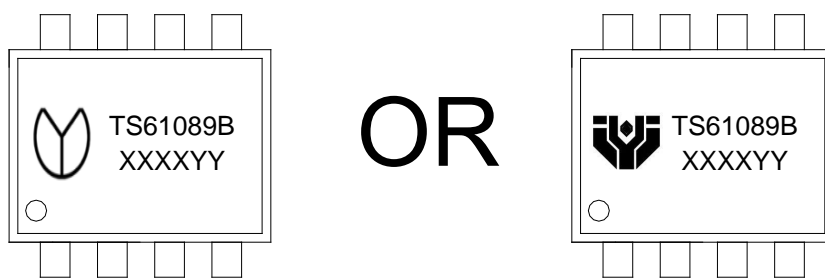
NOTES: A. Taped devices are supplied on a reel of the following dimensions:

$$\text{Reel diameter: } \frac{328 \pm 1.0}{16.8 \pm 0.5a}$$

$$\text{Reel hub diameter: } \frac{100 \pm 1.0}{12.8 \pm 0.5a}$$

B. 3000 devices are on a reel.

## Marking Codes



### Note:

- (1) "TS61089B" is part number, fixed.
- (2) "XXXX" is the last 4 characters of the wafer's Lot No.,  
"YY" is the internal code.