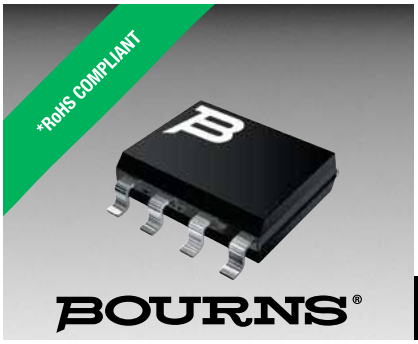


TISP8210MD BUFFERED P-GATE SCR DUAL
TISP8211MD BUFFERED N-GATE SCR DUAL

COMPLEMENTARY BUFFERED-GATE SCRS FOR DUAL POLARITY SLIC OVERVOLTAGE PROTECTION

TISP821xMD Overvoltage Protectors

High Performance Protection for SLICs with +ve & -ve Battery Supplies

TISP8210MD Negative Overvoltage Protector
– Wide 0 to -110 V Programming Range
– Low +5 mA Max. Gate Triggering Current
– High -150 mA Min. Holding Current

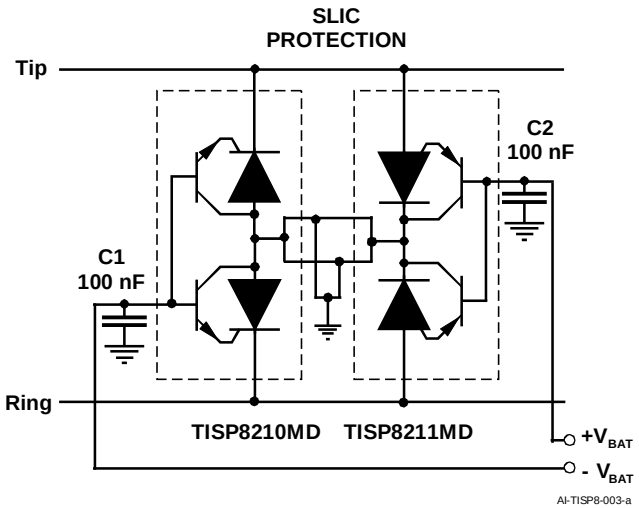
TISP8211MD Positive Overvoltage Protector
– Wide 0 to +110 V Programming Range
– Low -5 mA Max. Gate Triggering Current
– +20 mA Min. Holding Current

Rated for International Surge Wave Shapes

Wave Shape	Standard	I_{PPSM} A
2/10	GR-1089-CORE	167
10/700	ITU-T K.20/21/45	70
10/1000	GR-1089-CORE	60

..... UL Recognized Component

Circuit Application Diagram



Additional Information

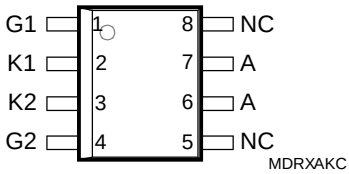
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Agency Recognition

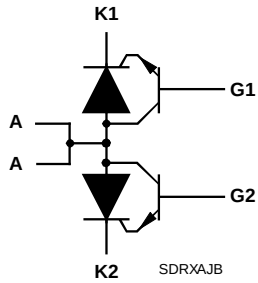
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TISP8210MD 8-SOIC Package (Top View)

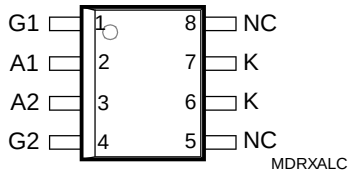


NC - No internal connection

TISP8210MD Device Symbol

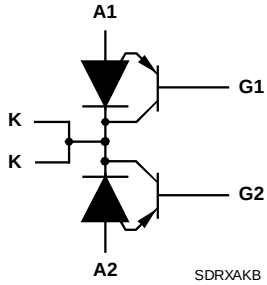


TISP8211MD 8-SOIC Package (Top View)



NC - No internal connection

TISP8211MD Device Symbol



WARNING Cancer and Reproductive Harm
www.P65Warnings.ca.gov

JANUARY 2006 – REVISED JULY 2019

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.
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Description

The TISP8210MD / TISP8211MD protector combination has been designed to protect dual polarity supply rail SLICs (Subscriber Line Interface Circuits) against overvoltages on the telephone line caused by lightning and a.c. power contact and induction. Both devices have been designed using the latest understanding of programmable protector technology to maximize performance.

The TISP8210MD and TISP8211MD are complementary programmable protection devices. The program or gate pins (G1, G2) are connected to the positive and negative SLIC battery supplies to give protection which will track the SLIC supply levels. The integrated transistor buffer is an essential element in this type of device as the current gain of around 150 reduces battery loading to below 5 mA during a.c. power induction or power contact conditions. Additionally the Base-Emitter junction acts as a reverse blocking diode during operation preventing unnecessary loading of the power supply.

The TISP8210MD / TISP8211MD combination is designed to be used in conjunction with the 12.5 Ω Bourns® 4A12P-1AH-12R5 Line Protection Module (LPM). With this solution the application should pass Telcordia GR-1089-CORE testing with the 4A12P-1AH-12R5 acting as the overcurrent protector and coordination element.

The TISP® device plus LPM solution is designed to work in harmony with the system primary protectors. GR-1089-CORE issue 3 lists test to allow for three types of primary protection: Carbon Block (1000 V); Gas Discharge Tube (600 V) and Solid State (400 V). This solution is designed to be used with the GDT and Solid State options. Under lightning conditions the current through the 12.5 Ω LPM will be 48 A (600 V / 12.5 Ω), which is well within the 60 A capability of the TISP8210MD / TISP8211MD combination.

How to Order

Device	Package	Carrier	Order As	Marking Code	Standard Quantity
TISP8210MD	8-SOIC	Embossed Tape Reeled	TISP8210MDR-S	8210M	2500
TISP8211MD			TISP8211MDR-S	8211M	

TISP8210MD Absolute Maximum Ratings, T_A = 25 °C

Rating	Symbol	Value	Unit
Repetitive peak off-state voltage, V_{GK} = 0	V_{DRM}	-120	V
Repetitive peak reverse voltage, V_{GA} = -70 V	V_{RRM}	120	
Non-repetitive peak impulse current (see Note 1)			
2/10 µs (Telcordia GR-1089-CORE, 2/10 µs voltage wave shape)	I_{PPSM}	-167	A
5/310 µs (ITU-T K.44, 10/700 µs voltage wave shape used in K.20/21/45)		-70	
10/1000 µs (Telcordia GR-1089-CORE, 10/1000 µs voltage wave shape)		-60	
Non-repetitive peak on-state current, 50/60 Hz (see Notes 1 and 2)			
100 ms	I_{TSM}	-11	A
1 s		-6.5	
5 s		-3.4	
300 s		-1.4	
900 s		-1.3	
Junction temperature	T_J	-55 to +150	°C
Storage temperature range	T_{stg}	-65 to +150	°C

NOTES: 1. Initially the protector must be in thermal equilibrium with T_J = 25 °C. The surge may be repeated after the device returns to its initial conditions.

2. These non-repetitive rated terminal currents are for the TISP8210MD and TISP8211MD together. Device (A)-terminal positive current values are conducted by the TISP8211MD and (K)-terminal negative current values by the TISP8210MD.

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TISP8211MD Absolute Maximum Ratings, T_A = 25 °C

Rating	Symbol	Value	Unit
Repetitive peak off-state voltage, V_{GA} = 0	V_{DRM}	120	V
Repetitive peak reverse voltage, V_{GK} = 70 V	V_{RRM}	-120	
Non-repetitive peak impulse current (see Note 3)			
2/10 µs (Telcordia GR-1089-CORE, 2/10 µs voltage wave shape)	I_{PPSM}	167	A
5/310 µs (ITU-T K.44, 10/700 µs voltage wave shape used in K.20/21/45)		70	
10/1000 µs (Telcordia GR-1089-CORE, 10/1000 µs voltage wave shape)		60	
Non-repetitive peak on-state current, 50/60 Hz (see Notes 3 and 4)			
100 ms	I_{TSM}	11	A
1 s		6.5	
5 s		3.4	
300 s		1.4	
900 s		1.3	
Junction temperature	T_J	-55 to +150	°C
Storage temperature range	T_{stg}	-65 to +150	°C

NOTES: 3. Initially the protector must be in thermal equilibrium with T_J = 25 °C. The surge may be repeated after the device returns to its initial conditions.

4. These non-repetitive rated terminal currents are for the TISP8210MD and TISP8211MD together. Device (A)-terminal positive current values are conducted by the TISP8211MD and (K)-terminal negative current values by the TISP8210MD.

Recommended Operating Conditions

See Figure 3		Min	Typ	Max	Unit
C1, C2	Gate decoupling capacitor	100	220		nF
R1, R2	Series resistance for Telcordia GR-1089-CORE	10	12.5		Ω

TISP8210MD Electrical Characteristics, T_A = 25 °C

Parameter		Test Conditions	Min	Typ	Max	Unit
I_{DRM}	Repetitive peak off-state current	$V_D = V_{DRM}$, V_{GK} = 0			-5	µA
I_{RRM}	Repetitive peak reverse current	$V_R = V_{RRM}$, V_{GA} = -70 V			5	µA
$V_{(BO)}$	Breakover voltage	dv/dt = -250 V/ms, R_{SOURCE} = 300 Ω, V_{GA} = -80 V			-82	V
I_H	Holding current	(I_K) I_T = -1 A, di/dt = 1 A/ms, V_{GA} = -80 V	-150			mA
I_{GT}	Gate trigger current	(I_K) I_T = -5 A, $t_{p(g)}$ ≥ 20 µs, V_{GA} = -80 V			5	mA
C_O	Off-state capacitance	f = 1 MHz, V_d = 1 V, V_D = ±2 V			40	pF

TISP8211MD Electrical Characteristics, T_A = 25 °C

Parameter		Test Conditions	Min	Typ	Max	Unit
I_{DRM}	Repetitive peak off-state current	$V_D = V_{DRM}$, V_{GA} = 0			5	µA
I_{RRM}	Repetitive peak reverse current	$V_R = V_{RRM}$, V_{GK} = 70 V			-5	µA
$V_{(BO)}$	Breakover voltage	dv/dt = 250 V/ms, R_{SOURCE} = 300 Ω, V_{GK} = 80 V			82	V
I_H	Holding current	(I_A) I_T = 1 A, di/dt = -1 A/ms, V_{GK} = 80 V	20			mA
I_{GT}	Gate trigger current	(I_A) I_T = 5 A, $t_{p(g)}$ ≥ 20 µs, V_{GK} = 80 V			-5	mA
C_O	Off-state capacitance	f = 1 MHz, V_d = 1 V, V_D = ±2 V			30	pF

Thermal Characteristics

Parameter		Test Conditions	Min	Typ	Max	Unit
$R_{\theta JA}$	Junction to ambient thermal resistance	P_{tot} = 0.52 W, T_A = 70 °C, 5 cm^2, FR4 PCB			160	°C/W

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Parameter Measurement Information

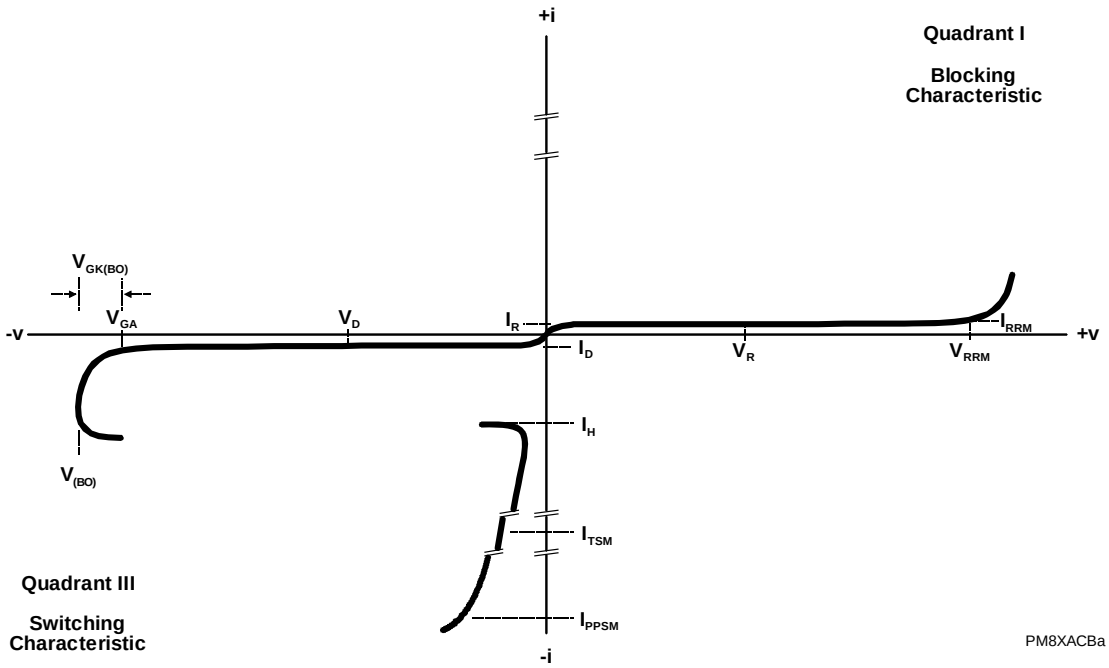


Figure 1. TISP8210MD KA Terminal Characteristic

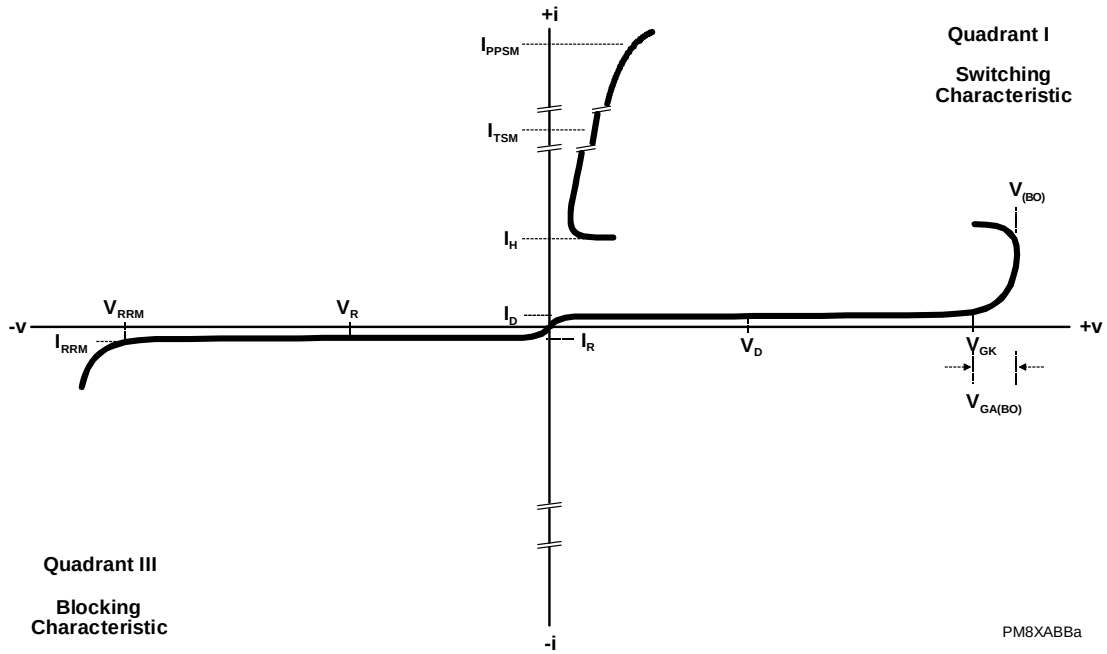


Figure 2. TISP8211MD AK Terminal Characteristic

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Applications Information

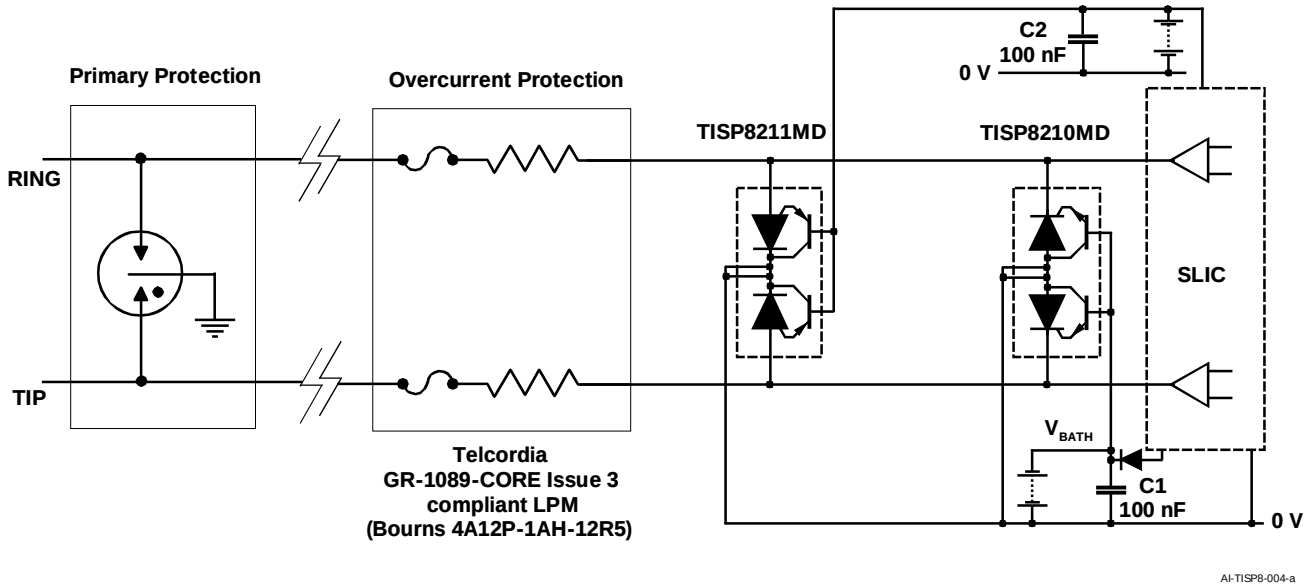


Figure 3. Typical Application Circuit

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