

# PROTECTION STANDARDS APPLICABLE TO TERMINALS

C. Politano

## 1. INTRODUCTION

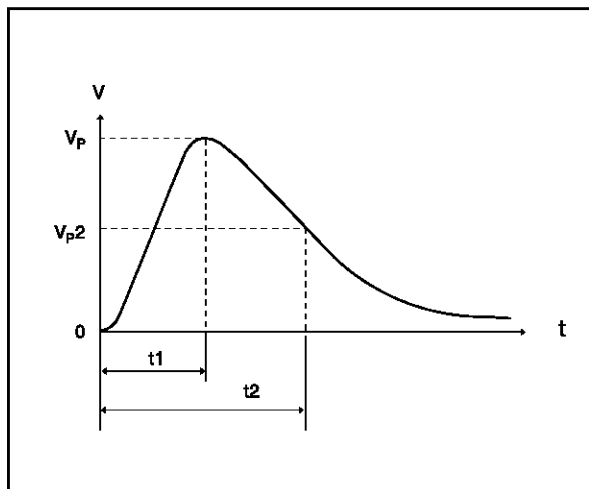
The purpose of this document is to summarize the main telecommunication standards with regard to the protection requirements against two types of overvoltage :

- lightning surges
- power crossing perturbations

## 2. LIGHTNING SURGES

The lightning overvoltage is simulated by a biexponential wave, which is defined by the rise time  $t_1$  and the duration  $t_2$  between the start and the time at which the falling edge crosses half the peak value (fig.1)

Figure 1 : Standard wave



Each country publishes its standard, which can be summarized by the times  $t_1$  and  $t_2$ , the peak voltage of the wave and the surge generator diagram. Table 1 gives an exhaustive list of the standards :

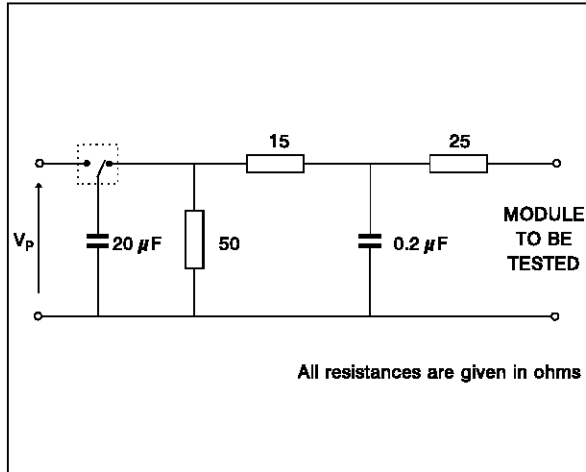
Table 1 : Lightning surges standards.		
COUNTRY	AUTHORITY	WAVEFORM ( $\mu$ s)
ENGLAND	CCITT-417 BRITISH TELECOM	10/700
		10/700
FRANCE	PTT	0.5/700
GERMANY	BUNDESPOST	10/700
ITALY	SIP	10/700 1/1000
SPAIN	COMPANY TELEFONICA DE ESPANA	1/1000
SWEDEN	TELEVERKET	10/700
SWITZERLAND	PTT - BETRIEBE	10/700 1.2/50
USA	BELL  FCC	10/1000 10/360 2/10
		10/560
		10/160
		2/10

The peak voltage value varies from 1 kV to 2 kV according to the country.

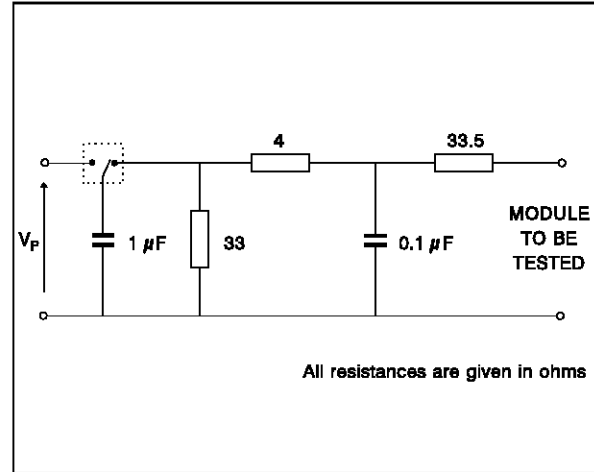
# APPLICATION NOTE

The following figures give the schematics of the surge generators mainly used :

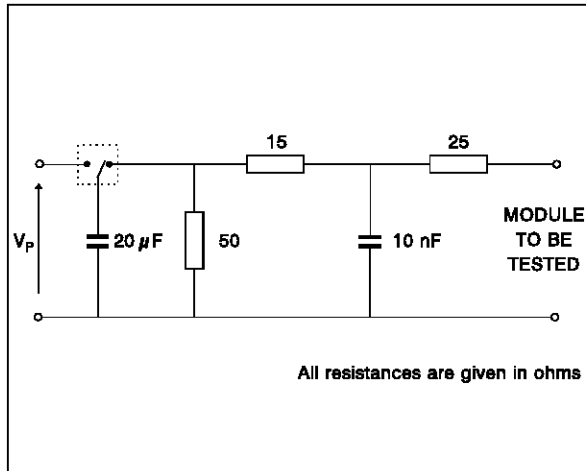
**Figure 2 : 10/700  $\mu$ s wave generator**



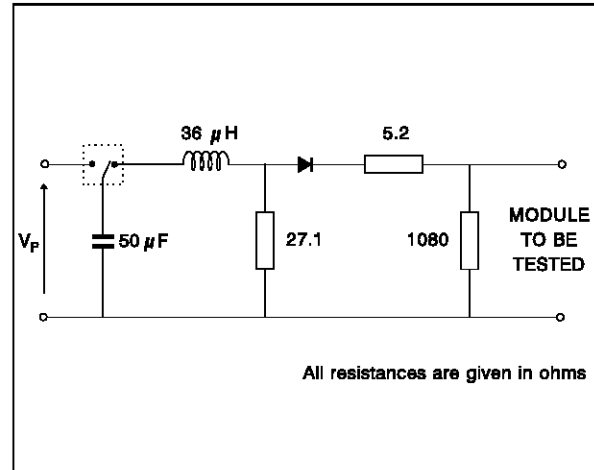
**Figure 3 : 1.2/50  $\mu$ s wave generator**



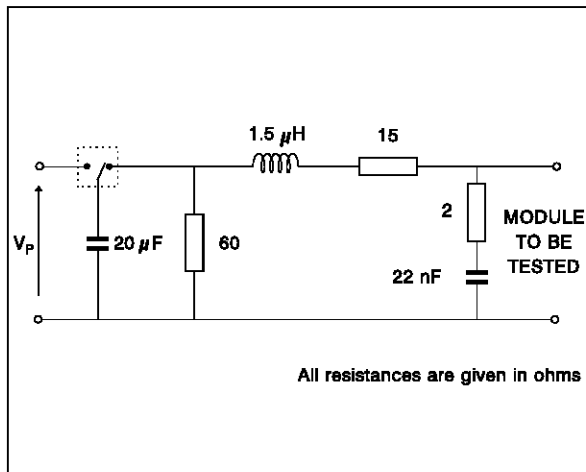
**Figure 4 : 0.5/700  $\mu$ s wave generator**



**Figure 5 : 10/560  $\mu$ s wave generator**



**Figure 6 : 1/1000  $\mu$ s wave generator**



**Figure 7 : 10/160  $\mu$ s wave generator**

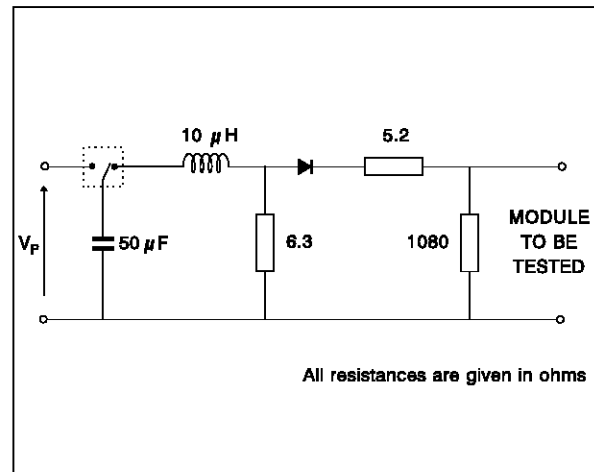
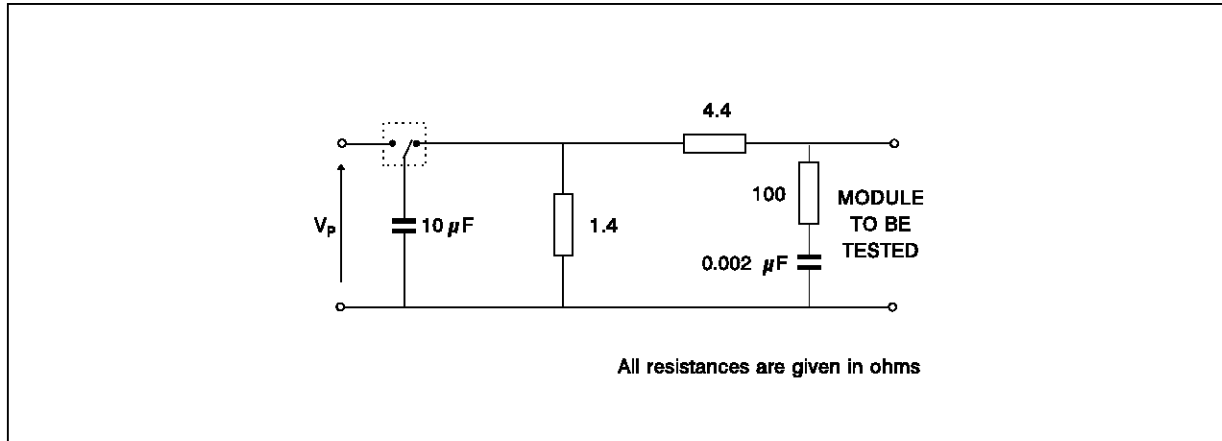
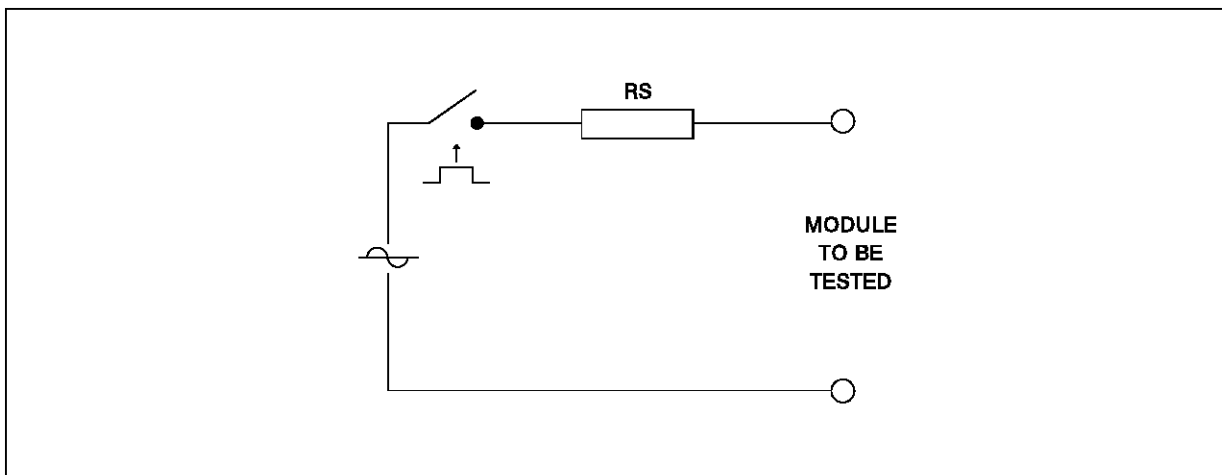


Figure 8 : 2/10  $\mu$ s wave generator

### 3. CROSSING OR PROXIMITY WITH MAINS AC LINES :

Crossing or proximity is simulated by a sine wave generator (50 or 60 Hz) connected through a series resistor for a defined time (fig.9)

Figure 9 : Crossing simulation generator



For terminal applications this power crossing test is not widely required because only a few countries impose this standard.

The typical protection arrangement consists of a crowbar device plus a PTC.

### 4. CONCLUSION

Many different telecommunications protection standards are currently in use around the world. The SGS-THOMSON range of protection devices enables all of these to be covered.

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied.

SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - Printed in Italy - All rights reserved.

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.