

PROTECTION STANDARDS APPLICABLE TO TERMINALS

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1. INTRODUCTION

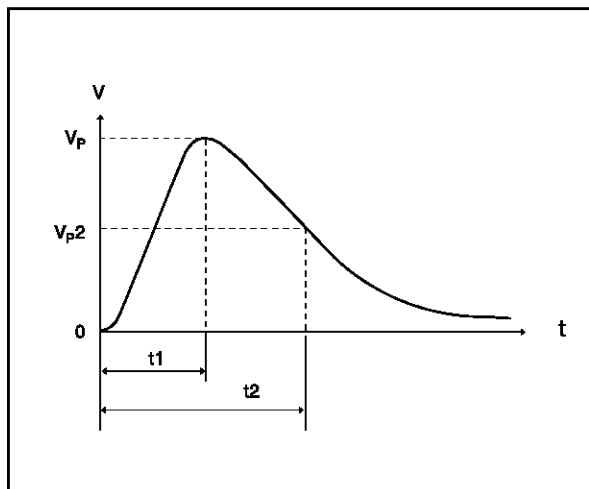
The purpose of this document is to summarize the main telecommunication standards with regard to the protection requirements against two types of overvoltage :

- 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 (μ 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	10/1000	
		10/360	
		2/10	
		FCC	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 μ s wave generator

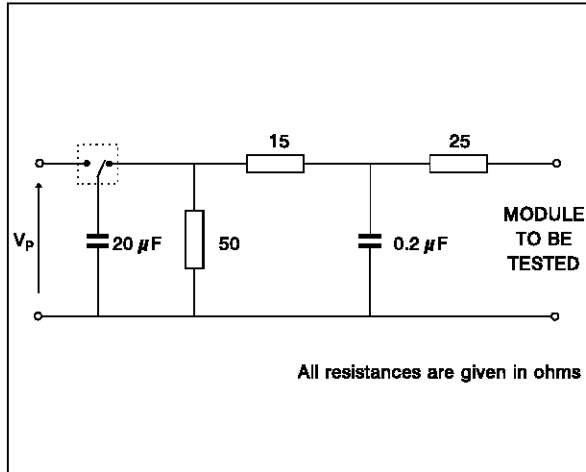


Figure 3 : 1.2/50 μ s wave generator

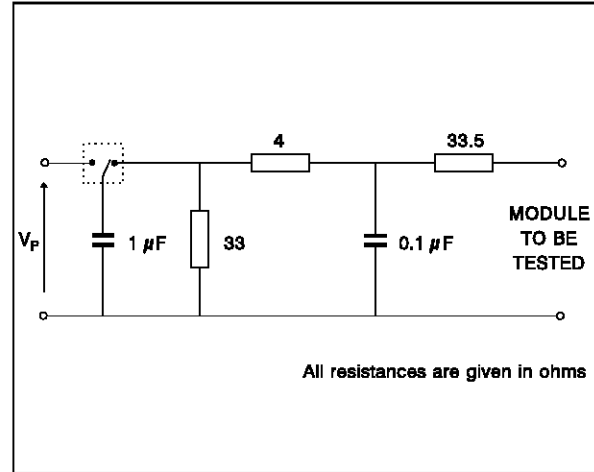


Figure 4 : 0.5/700 μ s wave generator

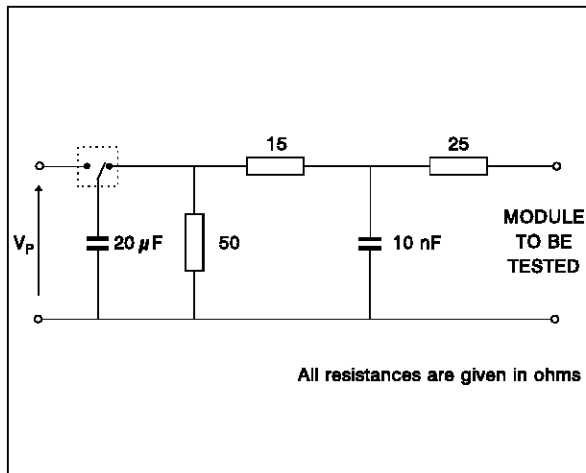


Figure 5 : 10/560 μ s wave generator

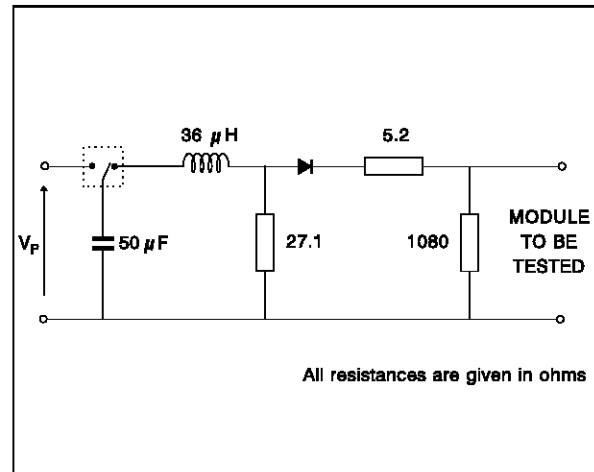


Figure 6 : 1/1000 μ s wave generator

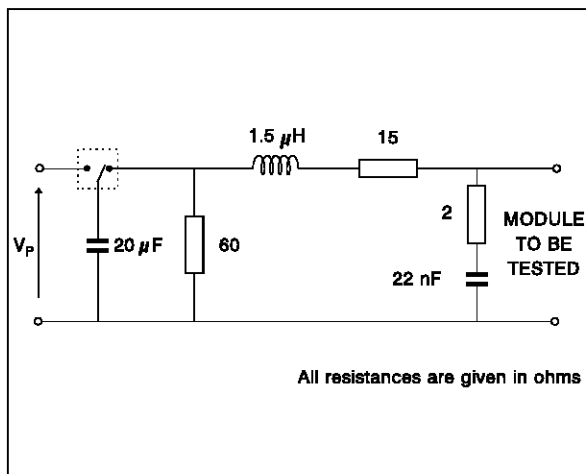


Figure 7 : 10/160 μ s wave generator

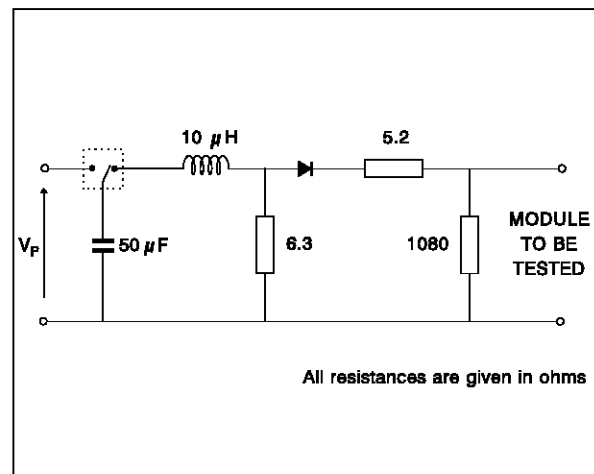
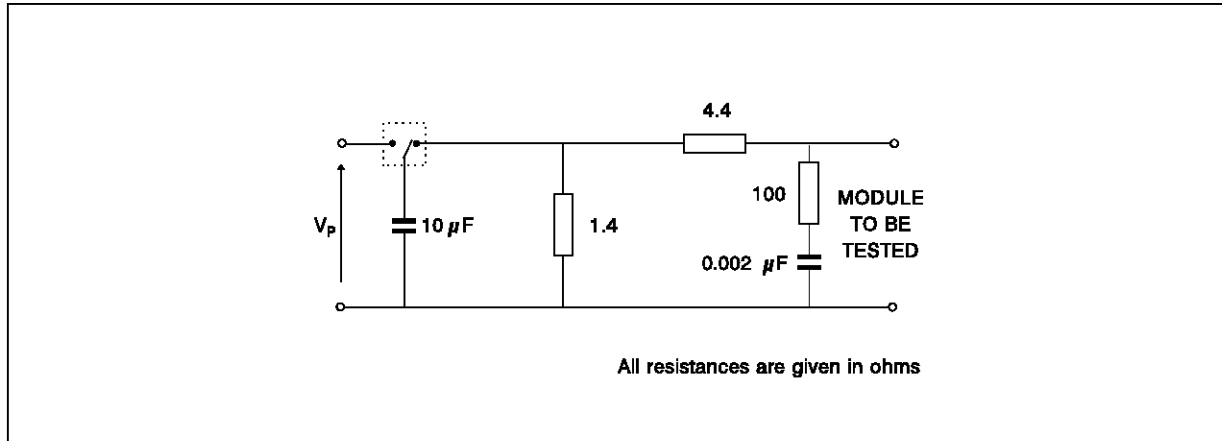
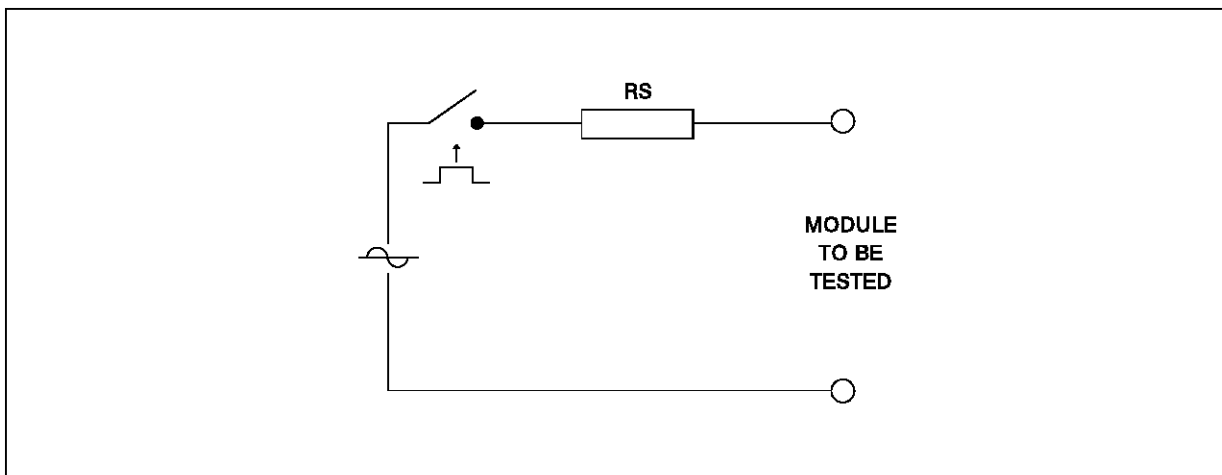


Figure 8 : 2/10 μ s wave generator

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.

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