

HDSL Equipment Application Overview

Problem/Solution

High-bit-rate Digital Subscriber Line (HDSL) technology is a transparent replacement for a T1 repeatered line in the distribution plant. It allows two-way transmission rates of 1.544Mbps (DS-1) over distances of up to 12,000 feet on copper cable without line repeaters. HDSL can eliminate engineering time and reduce the cost and provisioning time associated with conditioning T1 lines, thereby providing an alternative to traditional T1 equipment for

service providers looking to offer high-capacity services. HDSL2 is an upcoming version that delivers the same speed as HDSL using a single copper pair.

Since HDSL equipment connects to the copper infrastructure of the Public Switched Telephone Network (PSTN), it is subject to overcurrent and overvoltage hazards from AC power cross, power induction, and lightning surges. PolySwitch resettable devices and SiBar thyristors provide coordinated

resettable protection against these faults, thereby protecting equipment from damage and minimizing field service and warranty costs.

Typical Protection Requirements

Signaling levels for HDSL are +/- 2.5V maximum. Loop powering is typically under 190V. In general, the HDSL transceivers at the central office and the remote site are grounded equipment, thereby requiring longitudinal protection. Figure 2 shows recommended

3

Figure 1. HDSL Systems Architecture

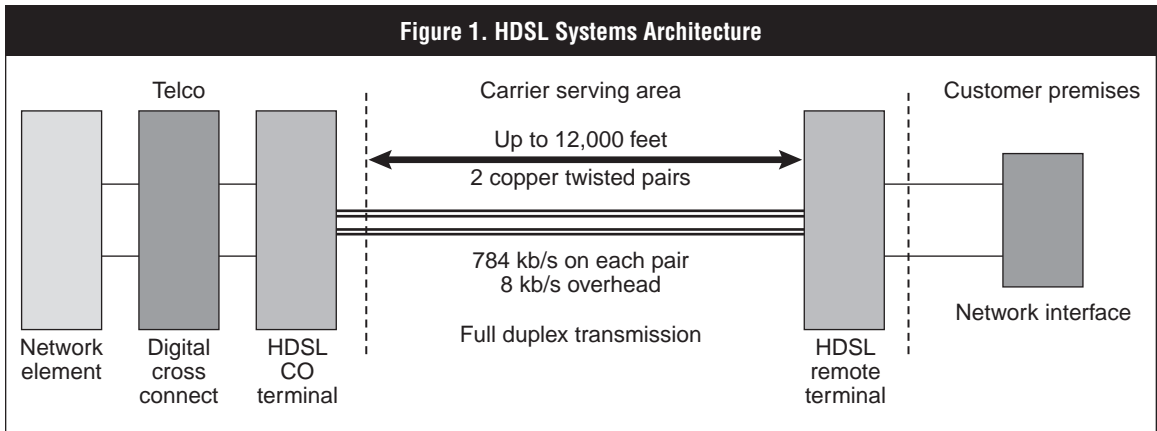
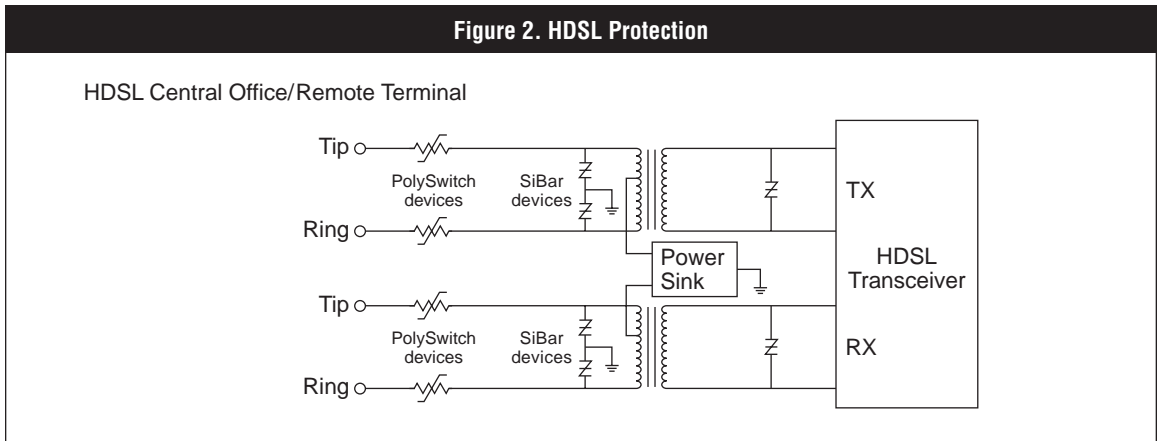


Figure 2. HDSL Protection



protection circuitry for HDSL applications.

Device Selection for Agency Approval Requirements

Protection for telecommunications network equipment is typically designed to meet the requirements of Telcordia GR-1089 for North America installations and of ITU-T K.20 for installations in the rest of the world. Protection for customer premise equipment is typically designed to meet the requirements of UL60950 and TIA-968-A

for North American use and of ITU-T K.21 for rest-of-world use. Overviews of the requirements for each of these standards can be found as separate application notes in this Databook.

PolySwitch devices should be selected with voltage ratings based on the regulatory standards for which the equipment is being designed. Surface-mount TS600 or TSM600 and radial-led TR600 devices are applicable for North American GR-1089 standards and for UL60950 standards,

while surface-mount TS250 and TSV250 and radial-led TR250 devices are applicable for ITU-T K.20/21 standards as well as for Telcordia GR-1089 Intrabuilding level protection.

SiBar TVB200SA, TVB200SB, and TVB200SC devices with V_{DM} ratings of 200V are applicable for systems with loop powering up to 190V. For higher or lower loop voltage requirements, designers should consult the SiBar Thyristor product section.



Table 1. Recommended Circuit Protection Devices for HDSL Applications

Regulatory Standard	PolySwitch Device	SiBar Device
Telcordia GR-1089	TSM600 (SMT)	TVB200SC (with TSM600)
	TS600-200-RA (SMT)	TVB200SB
	TRF600-150 (Thru-hole)	
	TR600-160-RA (Thru-hole)	
UL1459/UL60950, TIA-968-A	TSM600 (SMT)	TVB200SC (with TSM600)
	TS600-170 (SMT)	TVB200SA (ungrounded)
	TRF600-150 (Thru-hole)	TVB200SB (grounded)
	TR600-160-RA (Thru-hole)	
ITU-T K.20/21	TS250-130-RA (SMT)	TVB200SA
Telcordia GR-1089 Intrabuilding	TSV250-130 (SMT)	
	TR250-145 (Thru-hole)	
	TRF250-180 (Thru-hole)	