

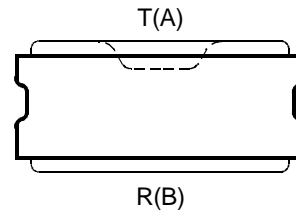
2EL2, 2EL3, 2EL4 BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS

TELECOMMUNICATION SYSTEM PRIMARY PROTECTION

- **Ion-Implanted Breakdown Region**
Precise and Stable Voltage
Low Voltage Overshoot under Surge

DEVICE	$V_{(BR)}$	$V_{(BO)}$	$V_{(BO)}$
	MINIMUM V	MINIMUM V	MAXIMUM V
2EL2	±245	±265	±400
2EL3		±200	±265
2EL4		±215	±265

CELL PACKAGE
(SIDE VIEW)



MD4XANA

- **Rated for International Surge Wave Shapes**

DEVICE	ITU-T K28 (10/700)	GR-974-CORE (10/1000)
	I_{TSP} A	I_{TSP} A
2EL2	±125	±100
2EL3	±125	±100
2EL4	±125	±100

device symbol



Terminals T and R correspond to the alternative line designators of A and B

- **Gas Discharge Tube (GDT) Replacement**
- **Planar Passivated Junctions in a Protected Cell Construction**
Low Off-State Current
Extended Service Life
- **Soldered Copper Electrodes**
High Current Capability
Cell Construction Short Circuits Under Excessive Current Conditions

description

These devices are primary protector components for semiconductor arrester assemblies intended to meet the generic requirements of Bellcore GR-974-CORE (November 1994) or ITU-T Recommendation K28 (03/93). To conform to the specified environmental requirements, the 2ELx must be installed in a housing which maintains a stable microclimate during these tests (e.g. FIGURE I.1/K28).

The protector consists of a symmetrical voltage-triggered bidirectional thyristor. Overvoltages are initially clipped by breakdown clamping until the voltage rises to the breakover level, which causes the device to crowbar into a low-voltage on state. This low-voltage on state causes the current resulting from the overvoltage to be safely diverted through the device. The high crowbar holding current prevents d.c. latchup as the diverted current subsides. This 2ELx range consists of three voltage variants to meet various maximum system voltage levels. They are guaranteed to voltage limit and withstand the listed international lightning surges in both polarities.

These monolithic protection devices are constructed using two nickel plated copper electrodes soldered to each side of the silicon chip. This packaging approach allows heat to be removed from both sides of the silicon, resulting in the doubling of the devices thermal capacity, enabling a power line cross current capability of 10 A rms for 1 second. One of the 2ELx's copper electrodes is specially shaped to promote a progressive shorting action (at 50/60 Hz currents greater than 60 A). The assembly must hold the 2ELx in compression, so that the cell electrodes can be forced together during overstress testing. Under excessive power line cross conditions the 2ELx will fail short circuit, providing maximum protection to the equipment.

PRODUCT INFORMATION

Information is current as of publication date. Products conform to specifications in accordance with the terms of Power Innovations standard warranty. Production processing does not necessarily include testing of all parameters.

Manufactured by TI using silicon designed and manufactured by Power Innovations, Bedford, UK.



2EL2, 2EL3, 2EL4 BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS

AUGUST 1998

absolute maximum ratings, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

RATING		SYMBOL	VALUE	UNIT	
Non-repetitive peak on-state pulse current (see Notes 1 and 2) 5/310 μs (ITU-T K28, 10/700 μs voltage wave shape)	2EL2 -20°C to 65°C	I_{TSP}	125	A	
	2EL3 -20°C to 65°C		125		
	2EL4 -20°C to 65°C		125		
	10/1000 μs (GR-974-CORE, 10/1000 μs voltage wave shape)		2EL2 -20°C to 65°C		100
			2EL3 -20°C to 65°C		100
			2EL4 -20°C to 65°C		100
Non-repetitive peak on-state current (see Note 1) full sine wave, 50/60 Hz, 1 s	2EL2 -40°C to 65°C	I_{TSM}	10	A rms	
	2EL3 -20°C to 65°C		10		
	2EL4 -40°C to 65°C		10		
Junction temperature		T_J	-40 to +150	$^\circ\text{C}$	
Storage temperature range		T_{stg}	-40 to +150	$^\circ\text{C}$	

- NOTES: 1. The surge may be repeated after the device has returned to thermal equilibrium.
2. Most PTT's quote an unloaded voltage waveform. In operation the 2ELx essentially shorts the generator output. The resulting loaded current waveform is specified.

electrical characteristics for the T and R terminals, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{(BR)}$ Breakdown Voltage	$I_{(BR)} = \pm 20 \text{ mA}$, (see Note 3)	± 245			V
$V_{(BO)}$ Breakover voltage	$dv/dt = \pm 0.2 \text{ V/s}$, $R_{SOURCE} > 200 \Omega$	2EL2 +15°C to 25°C	± 265		V
		-40°C to 65°C	± 400		
		2EL3 +15°C to 25°C	± 200		
		-20°C to 65°C	± 265		
$V_{(BO)}$ Impulse breakover voltage	100 V/ $\mu\text{s} \leq dv/dt \leq \pm 1000 \text{ V}/\mu\text{s}$, $di/dt \leq 10 \text{ A}/\mu\text{s}$	2EL2 -20°C to 65°C	± 400		V
		2EL3 -20°C to 65°C	± 350		
Impulse reset	Sources are 52.5 V O.C., 260 mA S.C. and 135 V O.C., 200 mA S.C. on-state current 25 A, 10/1000 μs impulse	2EL2 -20°C to 65°C	20		ms
		2EL3 -20°C to 65°C	20		
		2EL4 -20°C to 65°C	20		
I_D Off-state current	$V_D = \pm 50 \text{ V}$ (see Note 4) $V_D = \pm 200 \text{ V}$	2EL2 -40°C to 65°C	± 0.5		μA
		2EL3 -20°C to 65°C	± 0.5		
		2EL4 -40°C to 65°C	± 0.5		
		2EL2 -40°C to 65°C	± 10		
		2EL3 15°C to 25°C	± 1		
		2EL4 0°C to 65°C	± 10		
C_{off} Off-state capacitance	$f = 1 \text{ MHz}$, $V_d = 1 \text{ Vrms}$, $V_D = 0$,	2EL2 -40°C to 65°C	150		pF
		2EL3 -20°C to 65°C	150		
		2EL4 -40°C to 65°C	150		

- NOTES: 3. Meets Bellcore GR-974-CORE Issue 1, November 1994 - Rated Voltage Test (4.7)
4. This device is sensitive to light. Suggest that this parameter be measured in a dark environment

PRODUCT INFORMATION

PARAMETER MEASUREMENT INFORMATION

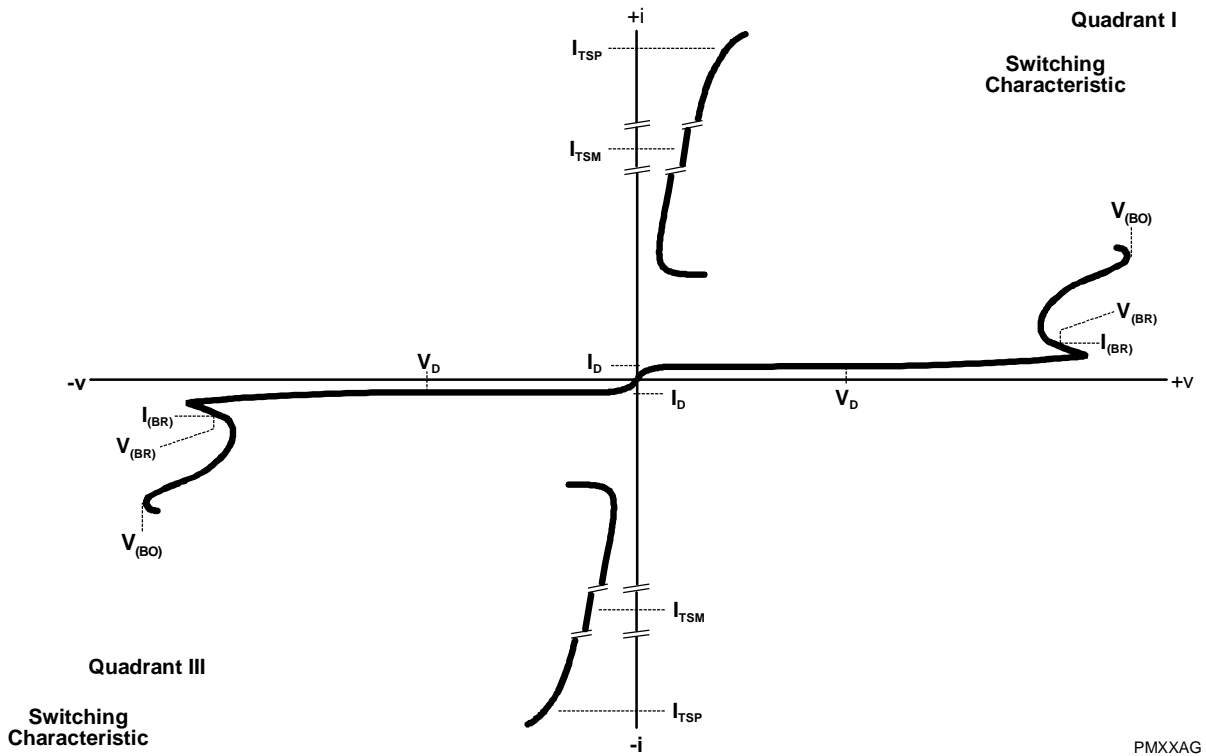


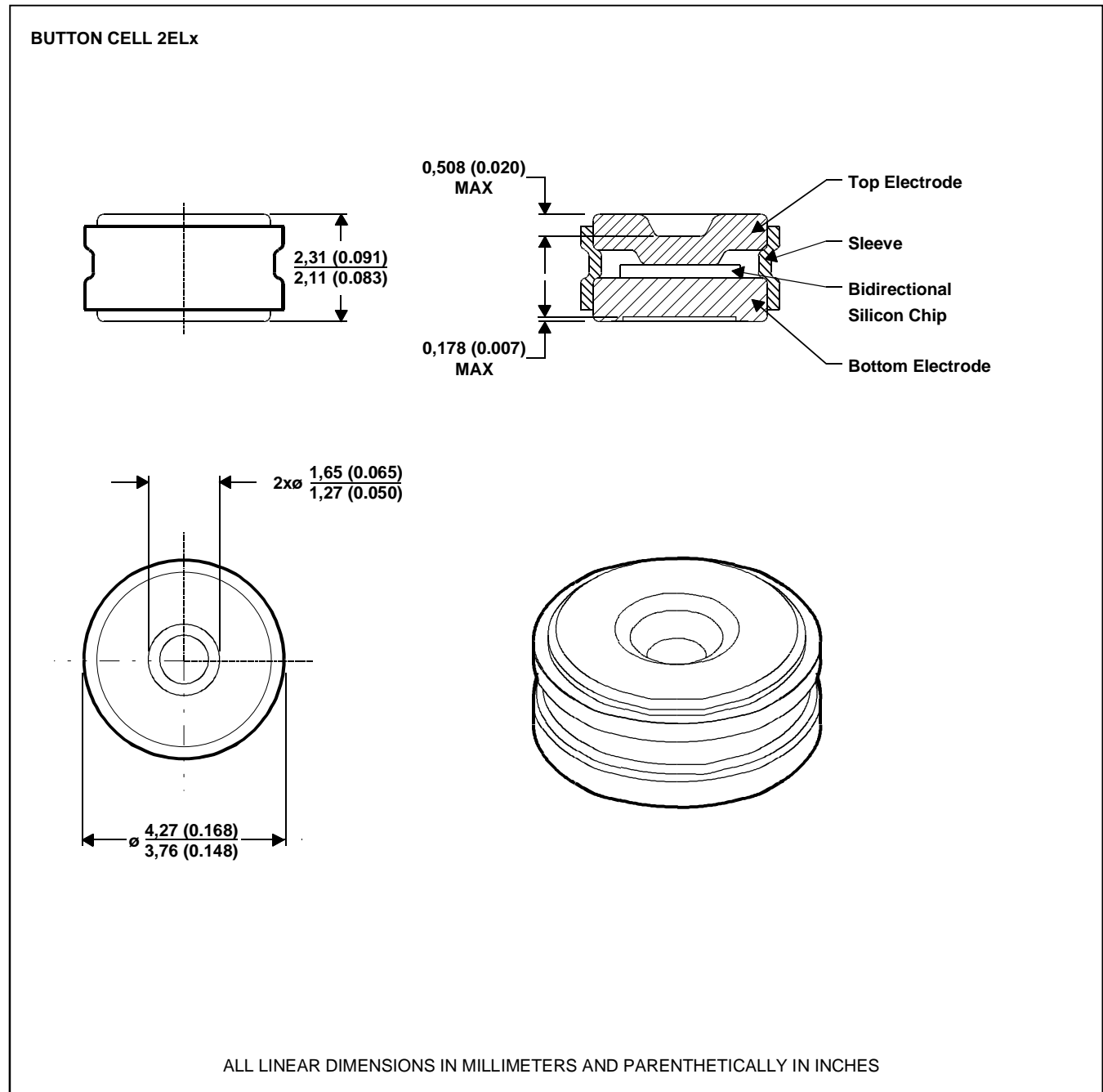
Figure 1. VOLTAGE-CURRENT CHARACTERISTIC FOR T AND R TERMINALS
ALL MEASUREMENTS ARE REFERENCED TO THE R TERMINAL

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AUGUST 1998

MECHANICAL DATA

cell package



MDXXAK

PRODUCT INFORMATION

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