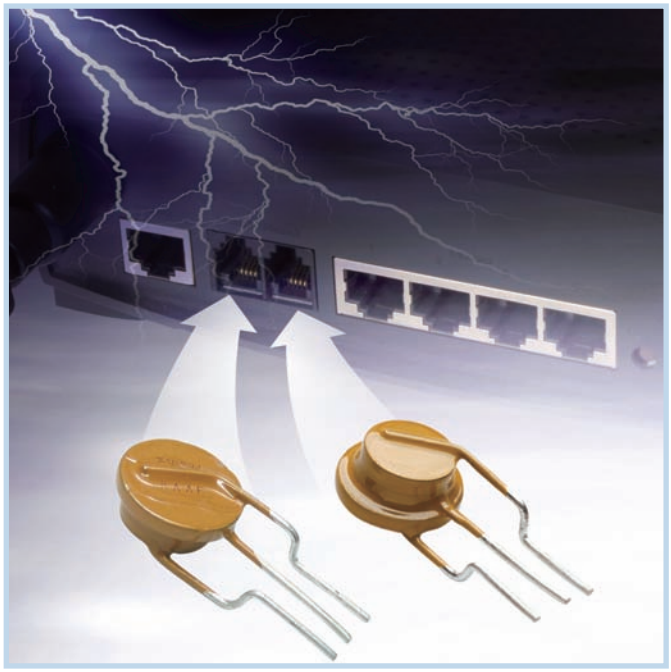


2Pro Devices



The 2Pro product is an integrated overcurrent/overvoltage protection device. The RoHS-compliant component incorporates PolySwitch PPTC (Polymeric Positive Temperature Coefficient) and metal oxide varistor technology in a single device to help reduce board space requirements and component count.

Damage to telephony communications equipment can be caused by various sources including lightning, electrostatic discharge (ESD), power contact and induction with AC lines. The 2Pro TM2P-10271 devices help provide current limiting during overcurrent events, and voltage clamping during overvoltage events. After a fault condition is removed and power is cycled, 2Pro devices will reset so that the equipment remains operational.

The 2Pro device helps address the need for resettable circuit protection devices for use in cost-sensitive PSTN (Public Switched Telephone Network) and VoIP (Voice over Internet Protocol) telephony equipment. The widespread use of VoIP gateways in homes and enterprise environments as the primary means of voice delivery requires the utmost safety and reliability in equipment. 2Pro circuit protection devices help manufacturers comply with global safety standards, including UL 60950, TIA-968-A, IEC 60950, and ITU-T K.20/K.21. The UL 497A listed protector also helps provide ESD protection.

Benefits

- Single device helps reduce component count and footprint
- Helps reduce warranty returns
- Helps equipment comply with surge tests per: TIA-968-A, IEC 60950, ITU-T K.20/K.21
- Helps simplify UL 60950 testing
- Helps equipment comply with UL 60950

Features

- RoHS compliant
- Halogen free
  (refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm)
- Single overcurrent, overvoltage and ESD protection device
- Resettable overcurrent protection
- UL 497A listed protector (#E258475)

Applications

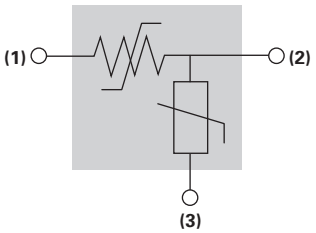
- Cordless telephones
- VoIP gateways
- Fax machines
- Data modems
- Set-top boxes
- Security systems
- MDF modules
- Analog and ISDN linecards

Table 2P1 Electrical Characteristics for 2Pro Devices

Overcurrent (terminals 1 – 2) — Performance ratings @ 20°C

	Part Number	I_{HOLD} (A)	I_{TRIP} (A)	Resistance† (Ω) R_{MIN}	R_{MAX}	R_{1MAX}*	Time to Trip (s)† @ 1A Typ.	Max.
	TM2P-10271	0.15	0.30	6.5	14.0	16.0	0.9	3
NEW	LVM2P-015R10431	0.15	0.30	6.5	14.0	16.0	0.9	3

Electrical Schematic



Overvoltage (terminals 2 – 3)

	Part Number	Varistor Voltage V @ 1mA DC(V)	Tolerance	DC Resistance @ 100V (MΩ)	Maximum Clamping Voltage @ 25A (V)	Rated Wattage (W)
	TM2P-10271	260	+14% -7%	>10	455	0.25
NEW	LVM2P-015R10431	430	+10% -10%	>10	710	0.25

* Maximum device resistance at 20°C measured 1 hour post trip.
† Corresponds to operation below varistor voltages.

Table 2P2 Dimensions for 2Pro Devices in Millimeters (Inches*)

		A Min.	A Max.	B Min.	B Max.	C Min.	C Max.	D Min.	D Max.	E Nom.	Figure
	TM2P-10271	—	12.0	—	15.0	—	6.6	6.0	—	2.5	2P1
		—	(0.47)	—	(0.59)	—	(0.26)	(0.24)	—	(0.10)	
NEW	LVM2P-015R10431	—	12.0	—	17.0	—	7.4	8.5	11.50	5.1	2P2
		—	(0.47)	—	(0.67)	—	(0.29)	(0.34)	(0.45)	(0.20)	

* The dimensions in inches are rounded approximations.

Figure 2P1-2P2 Dimension Figures for 2Pro Devices

Figure 2P1

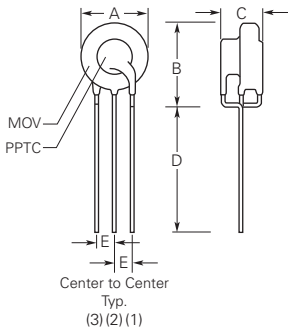


Figure 2P2

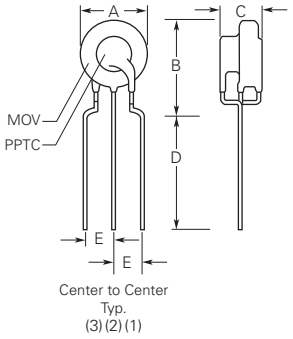


Figure 2P3-2P4 Typical Time-to-Trip at 25°C for 2Pro Devices

Figure 2P3

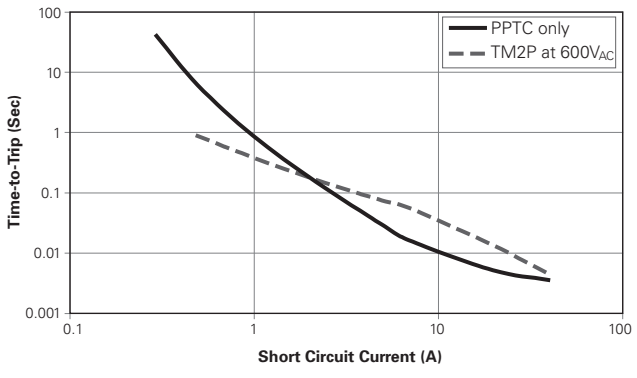
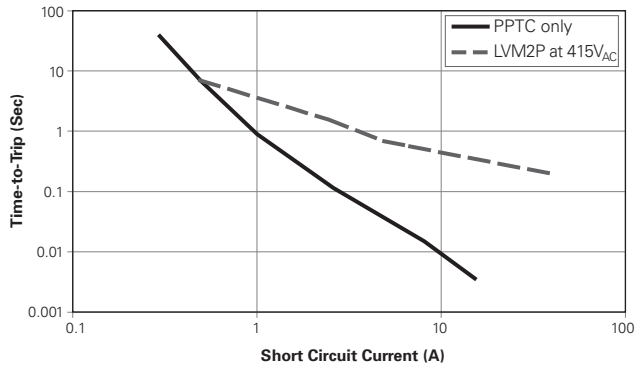


Figure 2P4



RoHS Compliant, ELV Compliant HF Halogen Free

Table 2P3 Physical Characteristics and Environmental Specifications for 2Pro Devices

Physical Characteristics

Lead material	Tin-plated copper, 0.33mm^2 (22AWG), ø0.64mm (0.025in.)
Flammability	IEC 695-2-2 needle flame test for 20s
Soldering characteristics	ANSI approved IPC/EIA/JEDEC J-STD-002, Category 3
Solder heat withstand	per IEC-STD 68-2-20, Test Tb, Method1A, Condition B, can withstand 10 seconds at 260°C ± 5°C

Environmental Specifications

Test	Conditions
Passive aging	60°C, 1000 hours / 85°C, 1000 hours
Humidity aging	85°C, 85% RH, 500 hours
Active aging	60°C, 90% RH, 60V_{DC} bias,1000 hours
Thermal shock	125°C, -55°C (10 times)
Solvent resistance	MIL-STD-202, Method 215K

Note: Storage conditions: 40°C max., 70% RH max., devices should remain in original sealed bag prior to use. Devices may not meet specified values if these storage conditions are exceeded.

Table 2P4 Packaging and Marking Information for 2Pro Devices

Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package	Part Marking	Agency Recognition
TM2P-10271	500	-	10,000	1027 & Batch #	UL 497A/File No. E258475
TM2P-10271-2	-	1,000	5,000	1027 & Batch #	UL 497A/File No. E258475
NEW LVM2P-015R10431	500	-	10,000	C431 & Batch #	

Table 2P5 Ordering Information for 2Pro Devices

Bulk	500 pieces/bag
	10,000 pieces/box
Tape & Reel	1,000 pieces/reel
	5,000 pieces/box

Wave Soldering and Rework Recommendations for 2Pro Devices

Recommended Wave Soldering for Radial-leaded Devices

- Soldering temperature profile
  Temperature characteristic at component terminal with dual wave soldering

Rework

- If a device is removed from the board, it should be discarded and replaced with a new device.

Figure 2P5

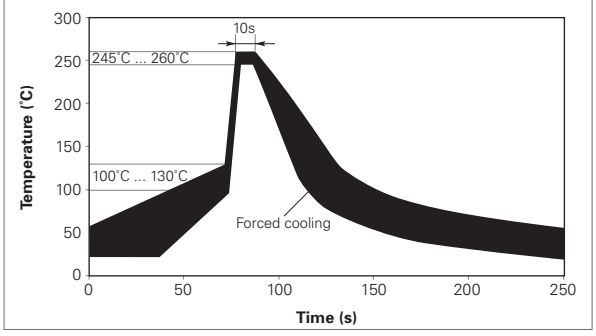


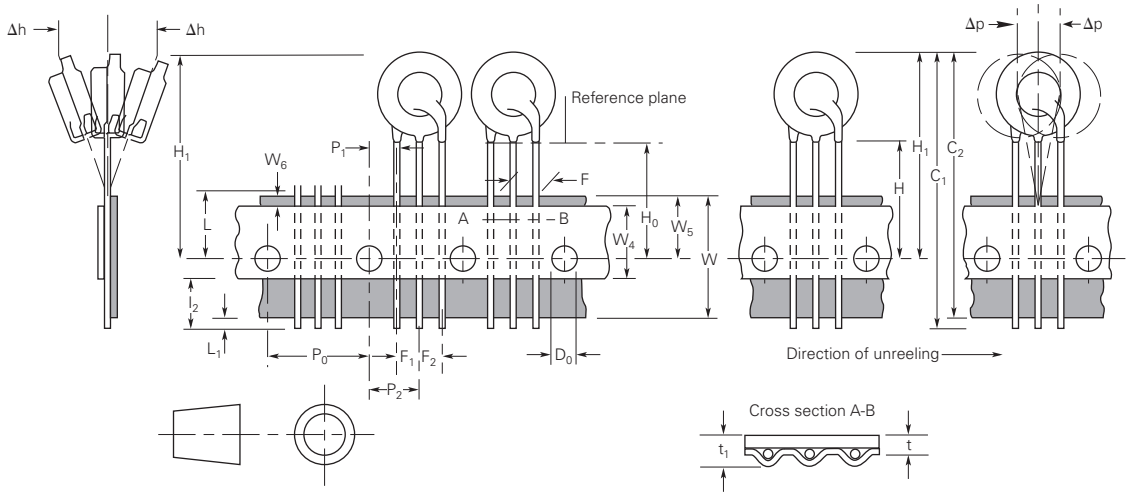
Table 2P6 Tape and Reel Specifications for 2Pro Devices (in Millimeters)

2Pro devices are available in tape and reel packaging per EIA 468-B standard. See Figures 2P6 and 2P7 for details.

Description	EIA Mark	IEC Mark	Dimension (mm)	Tolerance
Carrier tape width	W	W	18	-0.5/ +1.0
Hold down tape width	W_4	W_0	5	Minimum
Top distance between tape edges	W_6	W_2	3	Maximum
Sprocket hole position	W_5	W_1	9	-0.5/ +0.75
Sprocket hole diameter	D_0	D_0	4	±0.2
Abcissa to plane (kinked lead)*	H_0	H_0	16	-0.5/0.6
Abcissa to top	H_1	H_1	32.2	Maximum
Overall width with lead protrusion	-	C_1	43.2	Maximum
Overall width without lead protrusion	-	C_2	42.5	Maximum
Lead protrusion	L_1	I_1	1.0	Maximum
Protrusion of cut-out	L	L	11	Maximum
Protrusion beyond hold down tape	I_2	I_2	Not specified	-
Sprocket hole pitch	P_0	P_0	12.7	±0.3
Pitch tolerance	-	-	20 consecutive	±1
Tape thickness	t	t	0.9	Maximum
Tape thickness with splice*	t_1	-	2.0	Maximum
Splice sprocket hole alignment	-	-	0	±0.3
Body lateral deviation	Δh	Δh	0	±0.1
Body tape plane deviation	Δp	Δp	0	±1.3
Ordanate to component center lead	P_2	P_2	6.35	±0.7
Lead spacing*	F_1, F_2	F_1, F_2	2.54	-0.1/+0.4
Reel width	w_2	w	56	Maximum
Reel diameter	a	d	370	Maximum
Space between flanges	w_1	-	51.2	Maximum
Arbor hole diameter	c	f	26	±12.0
Core diameter	n	h	80	Maximum
Box	-	-	56/372/372	Maximum
Consecutive missing pieces*	-	-	3 maximum	-
Empty places per reel*	-	-	Not specified	-

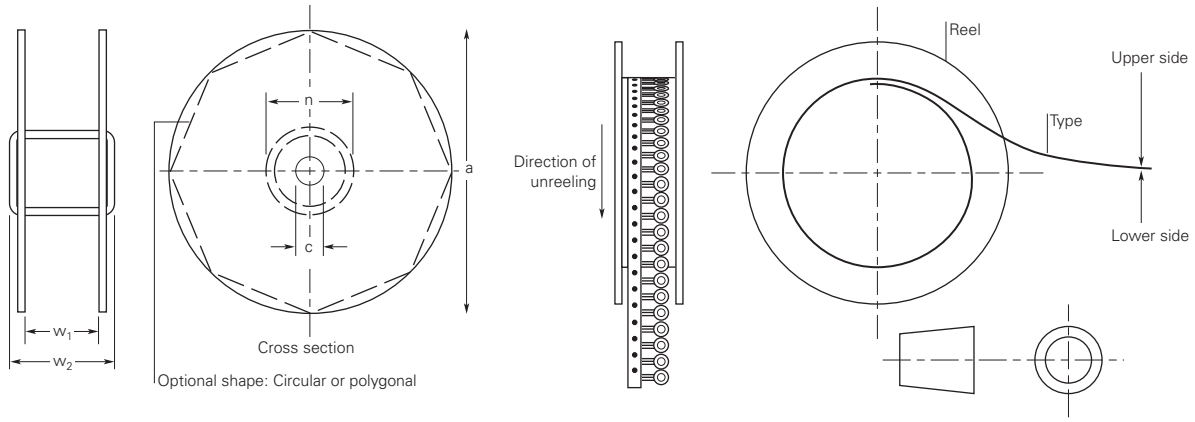
Note: *Differs from EIA specification.

Figure 2P6 EIA Referenced Taped Component Dimensions for 2Pro Devices



RoHS Compliant, ELV Compliant HF Halogen Free

Figure 2P7 EIA Referenced Reel Dimensions for 2Pro Devices



Part Numbering System for 2Pro Devices

TM 2P - 10 271 -2

Packaging
Blank : Bulk
-2 : Tape & reel

Varistor voltage indicator
The first two digits indicate voltage.
The third digit signifies the power of ten.
For example : 220 : 22 x 10^0 = 22V
221 : 22 x 10^1 = 220V
112 : 11 x 10^2 = 1100V

Typical PPTC resistance (ohms)

2Pro series

Telecom module

LVM 2P - 015 R 10 431

MOV breakover voltage at 1mA expressed as
431: 43 x 10^1

MOV diameter in mm

Radial leaded

PTC hold current

2Pro series

Line voltage module

⚠ Warning :

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