

**HF RoHS SDP Series - SOT23-5**



**Description**

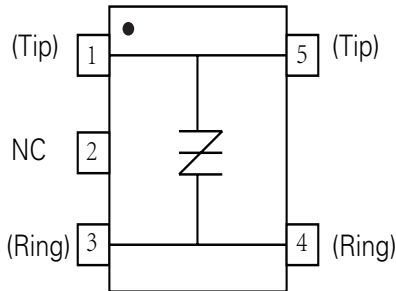
This new SIDACtor series is targeted for the tertiary or line driver side protection position for VDSL2+, ADSL2 applications and general I/O protection functions. This new low capacitance over voltage protection does not require a bias voltage and is sufficiently robust for the chip-side position behind the coupling transformer.

This SOT23-5 solution, with its flow-through design, minimizes PCB trace layout routing, while its four different stand-off voltage values offer compatibility with a variety of line drivers. Its low capacitance makes it compatible with ADSL2 and VDSL2, and the 30MHz bandplan of VDSL2+.

**Agency Approvals**

Agency	Agency File Number
	E133083

**Schematic Symbol**



**Features & Benefits**

- Lower overshooting protection than clamping
- Bidirectional transient voltage protection
- SOT23-5 surface mount package
- Robust surge rating
- Low insertion loss
- Starts to switch in nanoseconds
- Low capacitance
- RoHS compliant

**Applicable Global Standards**

- YD/T 950
- IEC 61000-4-5
- YD/T 993
- ITU K.20/21 Basic Level
- YD/T 1082
- ITU K.20/21 Enhanced Level
- GR 1089 Inter-building
- TIA-968-A
- GR 1089 Intra-building
- TIA-968-B
- IEC 61000-4-2

**Surge Ratings**

Series	$I_{PP}$
	8/20 $\mu$ s
	Amps min
G	50

**Electrical Characteristics**

Part Number	Marking	$V_{DRM}@I_{DRM}=5\mu A$	$V_S@250V/\mu s$	$I_H$	$I_S$	$V_T@I_T=1.0$ Amps	$Co@f=1MHz,2V$
		V min	V max	mA typ	mA max	V max	pF typ
SDP0080T023G5RP	P08G	8	15	30	500	4.0	6.5
SDP0120T023G5RP	P12G	12	20	30	500	4.0	6.0
SDP0180T023G5RP	P18G	18	25	30	500	4.0	5.5
SDP0240T023G5RP	P24G	24	35	30	500	4.0	5.0

Notes:

- All measurement are made at an ambient temperature of 25°C.
- $I_{pp}$  applies to -40°C through +85°C temperature range.
- $I_{pp}$  is repetitive surge rating and is guaranteed for the life of the product.

- SIDACtor devices are bidirectional. All electrical parameters and surge rating apply to forward and reverse polarities.

**Maximum Ratings**

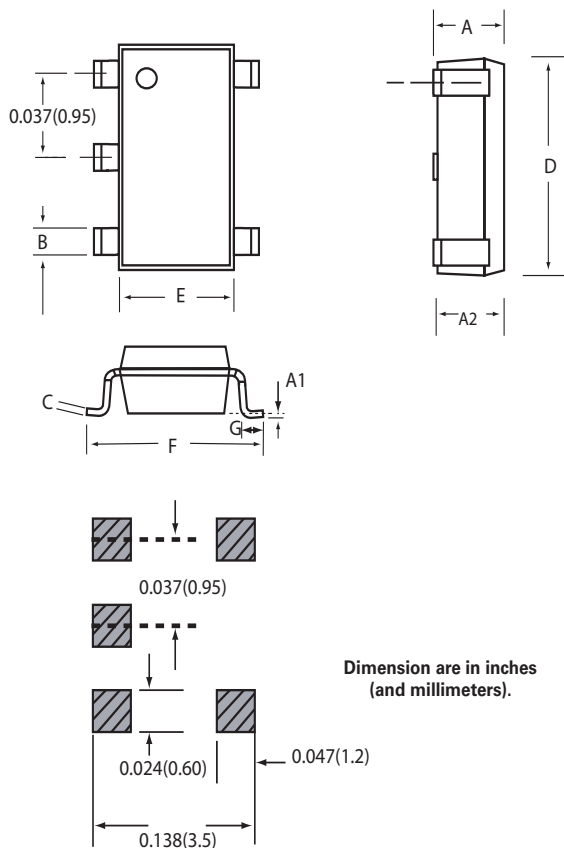
Parameter Name	Symbol	Test Conditions	Value		Units
Lightning surge waveforms	$I_{pp}$	8/20 $\mu$ s	50		A
			min	max	
Operating Free Temperature Range	$T_A$		-40	+85	°C
Junction temperature	$T_J$		-40	+150	°C
Storage temperature	$T_{STG}$		-40	+150	°C

Notes:

- The device also complies with IEC 61000-4-2 ESD  $\pm 15$ kV (air discharge),  $\pm 8$  kV(contact discharge) and IEC 61000-4-4 EFT 40A(5/50nS) in equipment level ESD test when used behind the xDSL transformer.
- The device must initially be in thermal equilibrium with  $-40^\circ\text{C} \leq T_J \leq +150^\circ\text{C}$
- The lightning surge may be repeated after the device returns to its initial conditions.

**Mechanical dimensions, recommended layout dimensions**

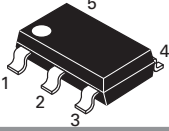
The epoxy meets UL 94V-0 ratings.



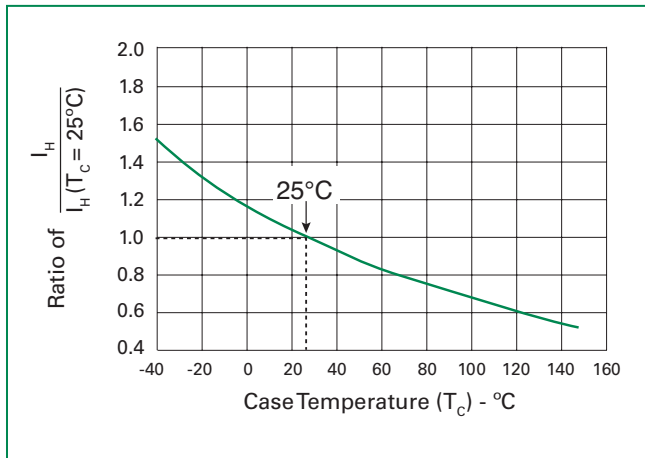
Dimension	Inches		Millimeters	
	Min	Max	Min	Max
<b>A</b>	0.035	0.057	0.90	1.45
<b>A1</b>	0	0.004	0	0.10
<b>A2</b>	0.035	0.051	0.90	1.30
<b>B</b>	0.014	0.020	0.35	0.50
<b>C</b>	0.004	0.008	0.09	0.20
<b>D</b>	0.11	0.118	2.80	3.00
<b>E</b>	0.059	0.069	1.50	1.75
<b>F</b>	0.102	0.118	2.6	3.00
<b>G</b>	0.004	0.024	0.10	0.60

Dimension are in inches  
(and millimeters).

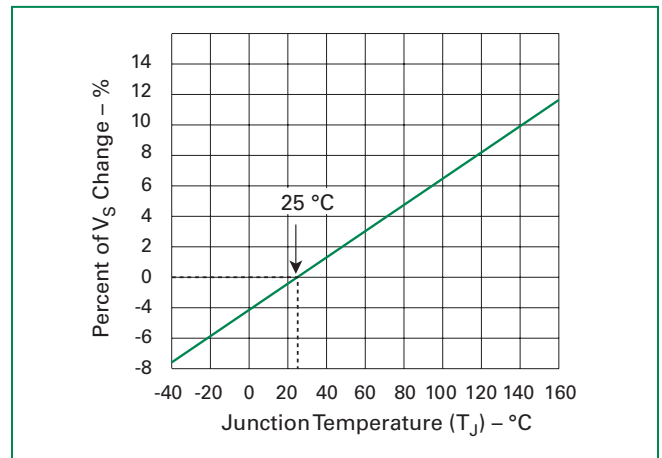
**Thermal Considerations**

Package	Symbol	Parameter	Value	Unit
	$T_J$	Operating Junction Temperature Range	-40 to +150	°C
	$T_{STG}$	Storage Temperature Range	-40 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	120	°C/W

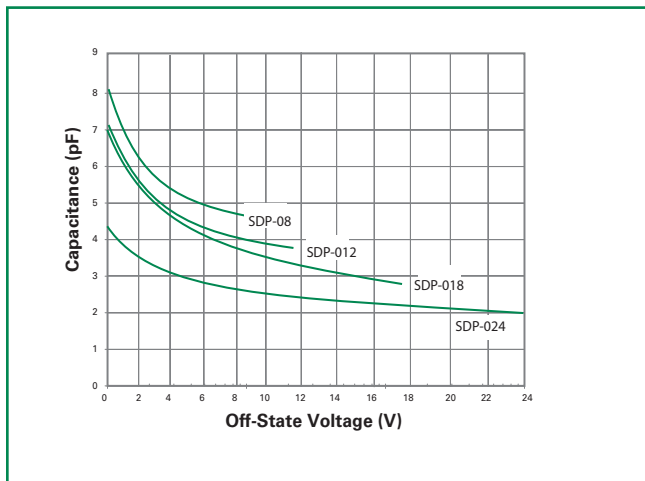
**Holding Current vs. Case Temperature**



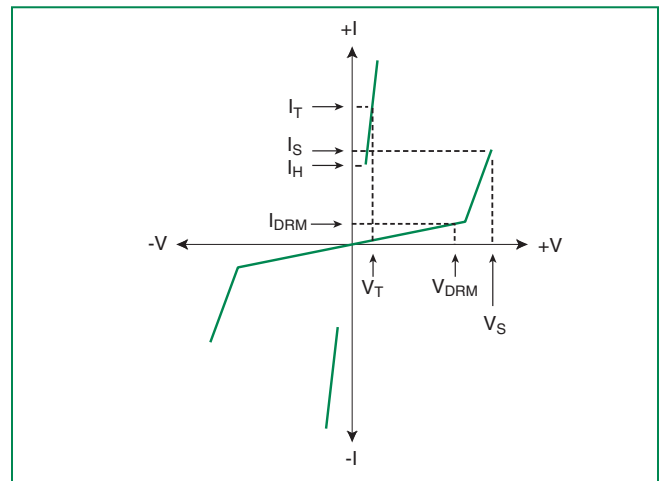
**$V_S$  vs. Junction Temperature**



**Capacitance vs. Bias Voltage**



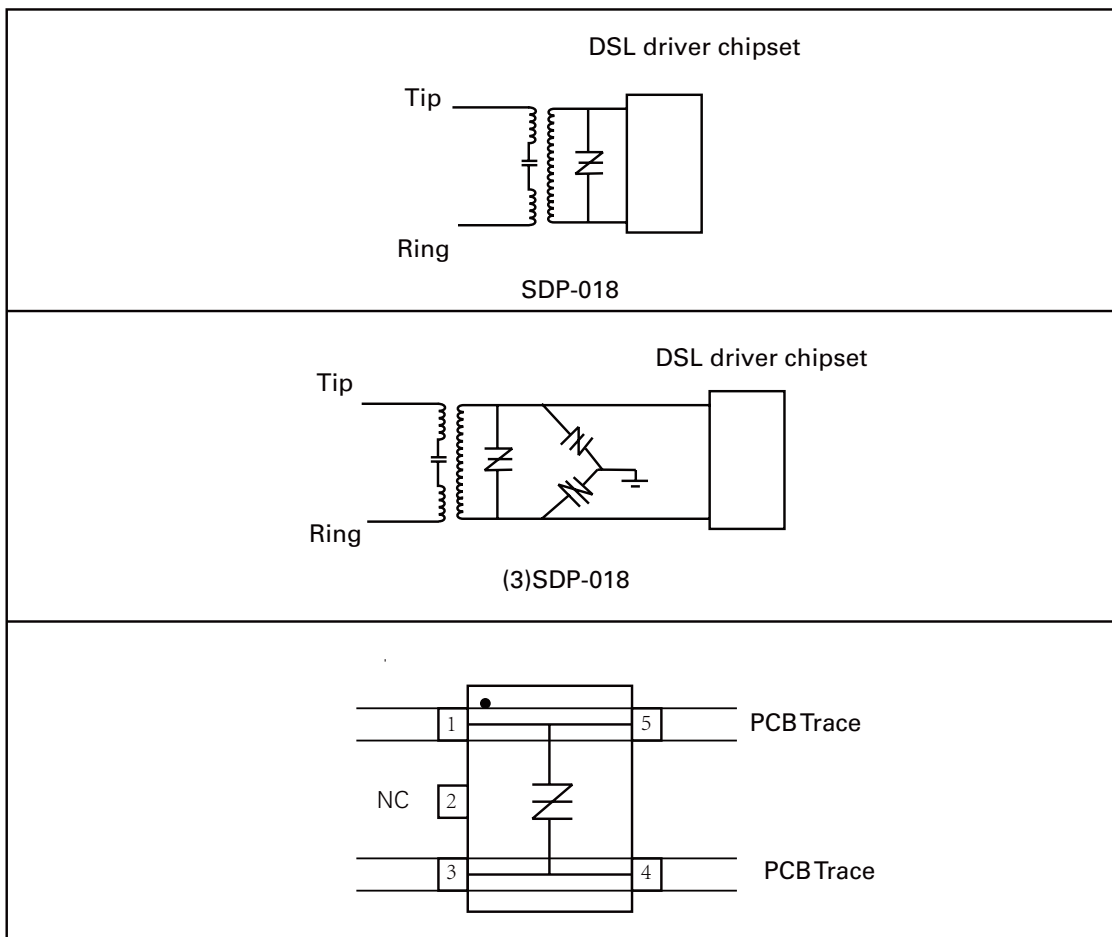
**V-I Characteristics**



**SDP-xxx Application example**

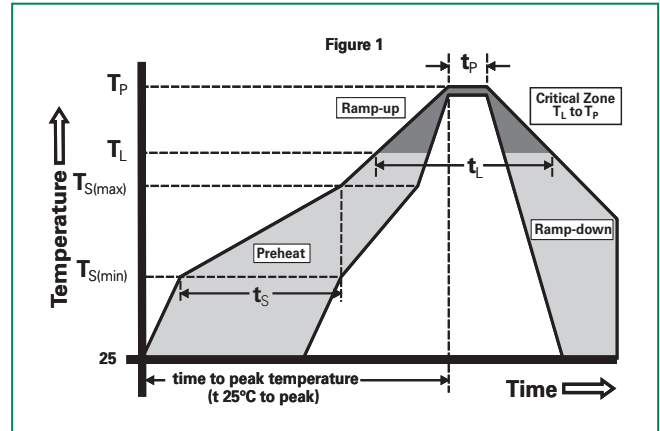
The following schematics show alternate protection solutions for a typical DSL interface that connects to outside wiring. This surface mount SOT23-5 chip-side solution provides a minimum footprint solution appropriate for high density card designs. The SDP-xxx0T023 will protect the interface from lightning induced surges on the chip-side of the coupling transformer. This tertiary protector may be preceded by line-side protection such as the TeleLink over-current protector

and the SDP3500Q38CB overvoltage protector. GDTs may also be used on the line side of the coupling transformer. The flow-through design of the SOT23-5 package is illustrated below. If the inter winding capacitance of the transformer is allowing some common mode events to get coupled across, then the SDP-xxx0T023 can be placed in a three chip mode, as shown below for additional chip-side protection.



**Soldering Parameters**

Reflow Condition		Pb-Free assembly (see Fig. 1)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/sec. Max.
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max.
Reflow	-Temperature ( $T_L$ ) (Liquidus)	+217°C
	-Temperature ( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max.
Ramp-down Rate		6°C/sec. Max.
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max.
Do not exceed		+260°C



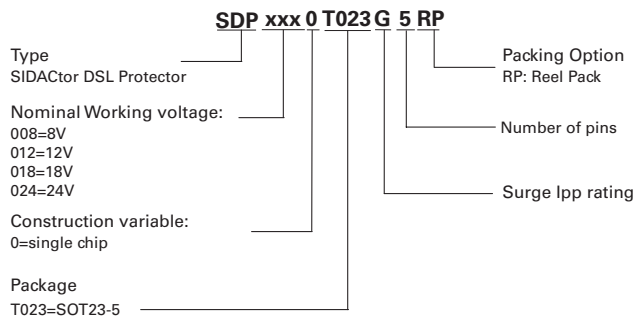
**Physical Specifications**

<b>Terminal Material</b>	100% Matte-Tin Plated
<b>Solderability</b>	EIA J-STD-002, TEST A.

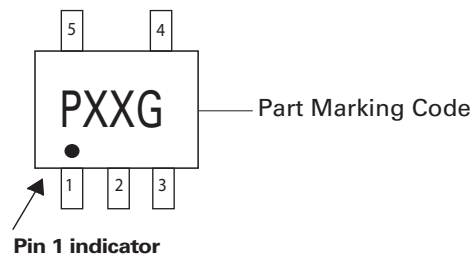
**Environmental Specifications**

<b>Temp Cycling</b>	Mil-STD-883F, Method 1010.8 Condition C, -65°C to +150°C 168 Hrs, 85°C /60%RH+3IR-Reflow, 260°C +5V, -0°C
<b>Bias Humidity</b>	JESD 22-A101-B 85°C, 85%CRH. 50V 168 Hrs, 85°C /60%RH+3IR-Reflow, 260°C +5V, -0°C
<b>Pressure Cooker</b>	JEDEC 22-A102C No Bias, 121°C, 100%RH 96Hrs/192Hrs. 168 Hrs, 85°C /60%RH+3IR-Reflow, 260°C +5V, -0°C
<b>High Temp Storage</b>	JESD 22-A103C Con B. 150°C, no bias 1000Hrs
<b>HTRB</b>	JESD 22-108C 168 Hrs, 85°C /60%RH+3IR-Reflow, 260°C +5V, -0°C
<b>Thermal Shock</b>	Mil-STD-883F, Method 1011.9 Condition A, 0°C to 100°C 168 Hrs, 85°C /60%RH+3IR-Reflow, 260°C +5V, -0°C
<b>C-SAM</b>	As per flow, JSTD-020C pre&post preconditioning test.
<b>Wet Humidity (Tin only)</b>	NEMI standard: 60°C/93%RH

**Part Numbering**



**Part Marking**



**Packing Options**

Package Type	Description	Quantity	Added Suffix	Min. Order Qty.	Industry Standard
T023	SOT23-5 Tape & Reel Pack	3000	RP	3000	EIA-481-A

**Tape and Reel Specification – SOT23-5**

8mm TAPE AND REEL

