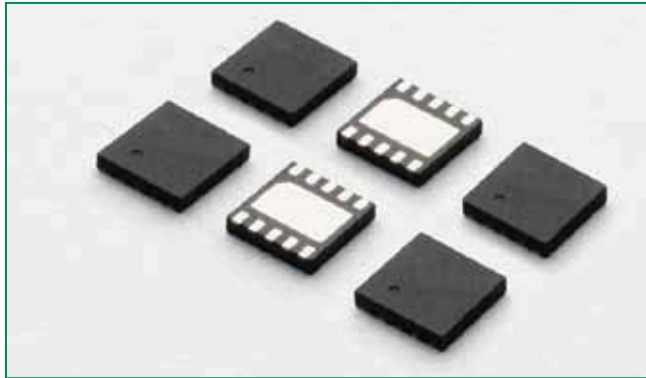
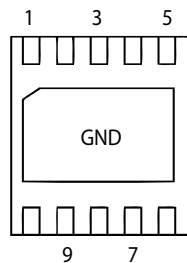


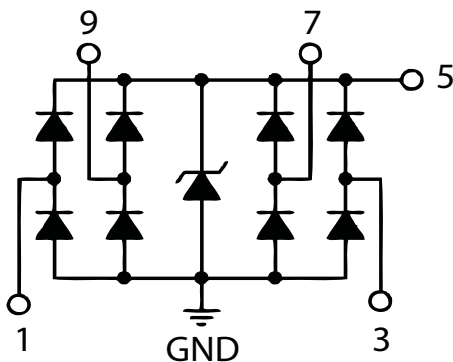
### SP4061 Series 2.5V 20A Diode Array



#### Pinout



#### Functional Block Diagram



Life Support Note:

#### Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

**NOT RECOMMENDED FOR NEW DESIGNS**

SP4061-04UTG is eventually going to be replaced by the SP2504NUTG TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on [Littelfuse.com](http://Littelfuse.com)

#### Description

The SP4061 integrates 4 channels of low capacitance diodes with an additional zener diode to protect sensitive I/O pins against lightning induced surge events and ESD. This robust device can safely absorb up to 20A per IEC61000-4-5 ( $t_p=8/20\mu s$ ) without performance degradation and a minimum  $\pm 30kV$  ESD per IEC61000-4-2 international standard. The low loading capacitance makes the SP4061 ideal for protecting high-speed signal pins.

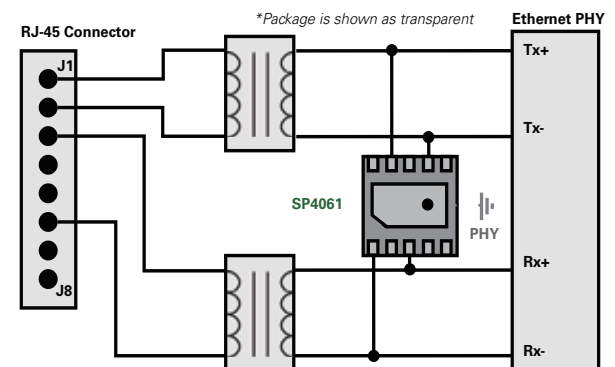
#### Features

- ESD, IEC61000-4-2,  $\pm 30kV$  contact,  $\pm 30kV$  air
- EFT, IEC61000-4-4, 40A ( $t_p=5/50ns$ )
- Lightning, IEC61000-4-5, 20A ( $t_p=8/20\mu s$ )
- Low capacitance of 3.5pF (TYP) per I/O
- Low leakage current of  $1\mu A$  (MAX) at 2.5V

#### Applications

- 10/100/1000 Ethernet Interfaces
- Customer Premise Equipment (CPE)
- VoIP Phones
- Set Top Boxes
- PBX Systems

#### Application Example



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**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	20.0	A
$P_{PK}$	Peak Pulse Power ( $t_p=8/20\mu s$ )	300	W
$T_{OP}$	Operating Temperature	-40 to 85	°C
$T_{STOR}$	Storage Temperature	-50 to 150	°C

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

**Thermal Information**

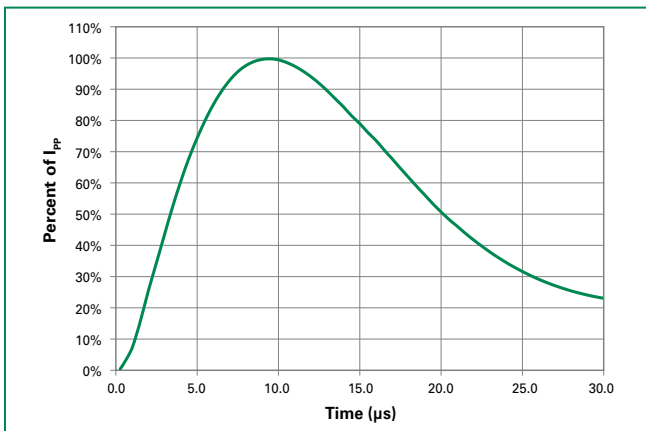
Parameter	Rating	Units
Storage Temperature Range	-65 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

**Electrical Characteristics ( $T_{OP}=25^\circ C$ )**

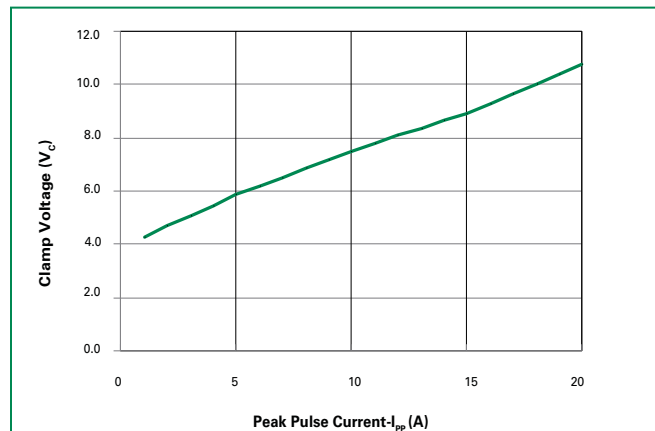
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$				2.5	V
Snap Back Voltage	$V_{SB}$	$I_{SB}=50mA$	2.0			V
Reverse Leakage Current	$I_{LEAK}$	$V_R=2.5V$ , I/O to GND		0.5	1.0	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A$ , $t_p=8/20\mu s$ , Fwd			5.0	V
		$I_{PP}=5A$ , $t_p=8/20\mu s$ , Fwd			6.3	V
		$I_{PP}=10A$ , $t_p=8/20\mu s$ , Fwd			8.0	V
		$I_{PP}=20A$ , $t_p=8/20\mu s$ , Fwd			11.5	V
Dynamic Resistance	$R_{DYN}$	$(V_{C2}-V_{C1})/(I_{PP2}-I_{PP1})$		0.35		$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC61000-4-2 (Contact)	$\pm 30$			kV
		IEC61000-4-2 (Air)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{I/O-GND}$	Reverse Bias=0V		3.5	5.0	pF
Diode Capacitance <sup>1</sup>	$C_{I/O-I/O}$	Reverse Bias=0V		2.0		pF

Note: <sup>1</sup> Parameter is guaranteed by design and/or device characterization.

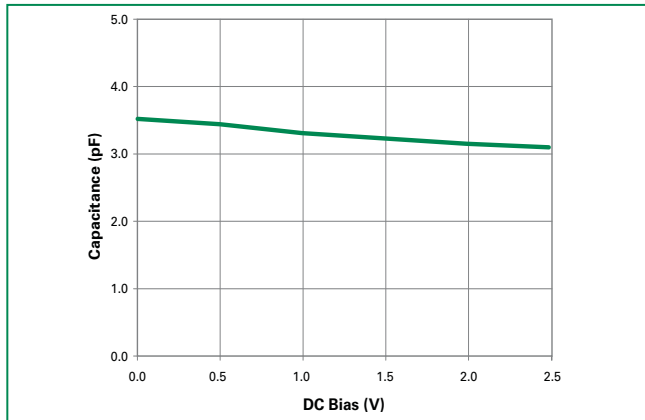
**Pulse Waveform**



**Clamping Voltage vs.  $I_{PP}$**



### Capacitance vs. Bias



### Ordering Information

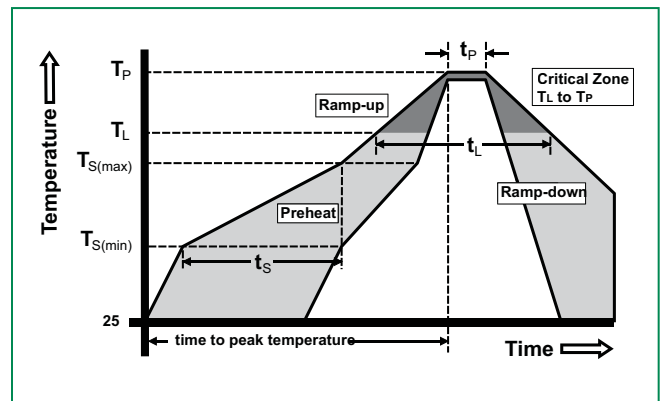
Part Number	Package	Marking	Min. Order Qty.
SP4061-04UTG	μDFN-10	TH4	3000

### NOT RECOMMENDED FOR NEW DESIGNS

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### Soldering Parameters

Reflow Condition	Pb – Free assembly	
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/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		260°C



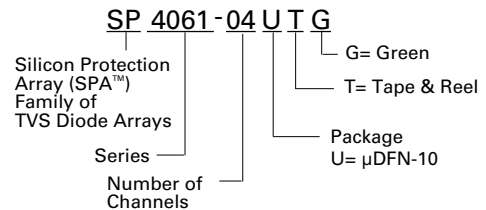
### Product Characteristics

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Lead Coplanarity	0.0004 inches (0.102mm)
Substitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL 94 V-0

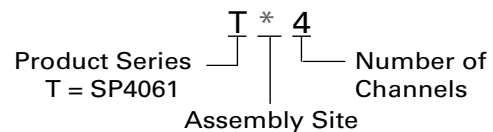
Notes :

1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. . Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
5. Package surface matte finish VDI 11-13.

### Part Numbering System



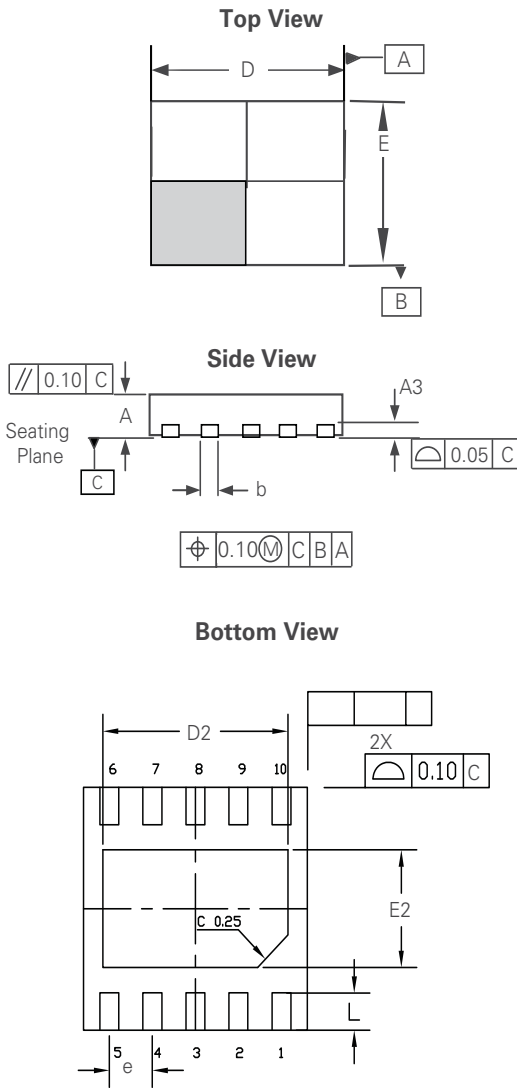
### Part Marking System



**NOT RECOMMENDED FOR NEW DESIGNS**

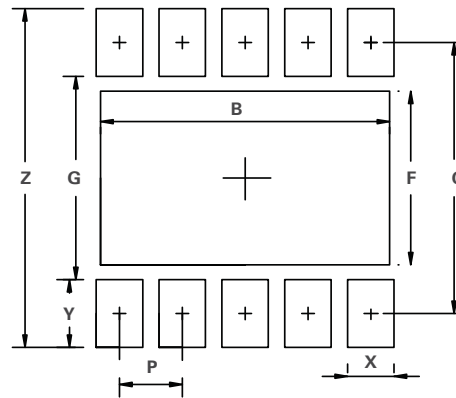
SP4061-04UTG is eventually going to be replaced by the SP2504NUTG TVS Diode Array with identical form, fit, and function. Please use this device for new or future designs and more detail can be found on [Littelfuse.com](http://Littelfuse.com)

**Package Dimensions —  $\mu$ DFN-10**



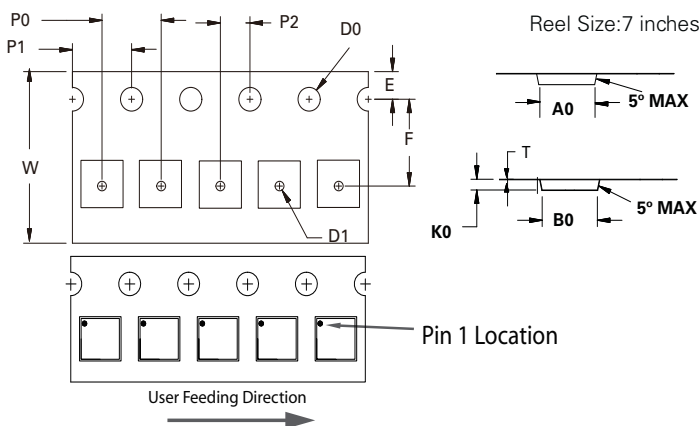
Package	$\mu$ DFN-10 (2.6x2.6mm)					
JEDEC	MO-229					
Symbol	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.45	0.50	0.55	0.018	0.020	0.022
A3	0.130 Ref			0.005 Ref		
b	0.17	0.22	0.27	0.006	0.008	0.010
D	2.50	2.60	2.70	0.097	0.101	0.105
D2	2.10	2.15	2.20	0.081	0.083	0.085
E	2.50	2.60	2.70	0.097	0.101	0.105
E2	1.21	1.26	1.31	0.046	0.049	0.051
e	0.50 BSC			0.020 BSC		
L	0.35	0.40	0.45	0.014	0.016	0.018

Recommended Solder Pads  $\mu$ DFN-10L 2.6x2.6mm



Dimension		
Symbol	Millimeters	Inches
B	2.30	0.091
C	2.20	0.087
F	1.41	0.056
G	1.65	0.065
P	0.50	0.020
X	0.37	0.015
Y	0.55	0.022
Z	2.75	0.108

**Embossed Carrier Tape & Reel Specification —  $\mu$ DFN-10 (2.6x2.6mm)**



Symbol	Millimeters
A0	2.82 +/- 0.05
B0	2.82 +/- 0.05
D0	Ø1.50 + 0.10
D1	Ø 0.50 + 0.05
E	1.75 +/- 0.10
F	3.50 +/- 0.05
K0	0.76 +/- 0.05
P0	4.00 +/- 0.10
P1	4.00 +/- 0.10
P2	2.00 +/- 0.05
T	0.25 +/- 0.02
W	8.00 + 0.30 /- 0.10