

**Features**

- RoHS compliant\*
- Protects four I/O lines
- Ultra-low capacitance ~ 0.55 pF
- ESD protection >30 kV
- Surge protection



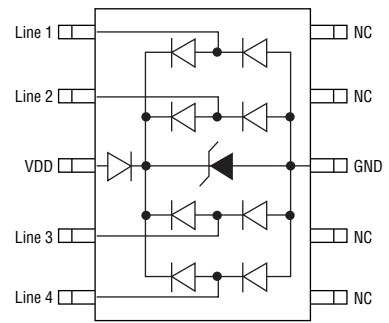
This series is currently available but not recommended for new designs. See [Product Obsolescence Memo](#) for possible replacement part no.

**CDMSP10-0504M – Surface Mount TVS Diode Array**

**General Information**

The CDMSP10-0504M device provides ESD, EFT and Surge protection for high speed data ports meeting IEC 61000-4-2 (ESD), IEC 61000-4-4 (EFT) and IEC 61000-4-5 (Surge) requirements. The Transient Voltage Suppressor array, protecting up to 4 data lines, offers a Working Peak Reverse Voltage of 5 V and Minimum Breakdown Voltage of 6 V.

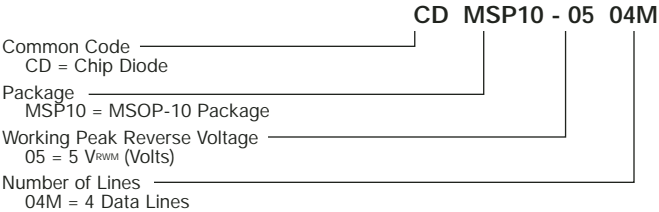
The MSOP-10L packaged device will mount directly onto the industry standard MSOP-10L footprint. Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and their flat configuration minimizes roll away.



**Absolute Maximum Ratings (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)**

Parameter	Symbol	Value	Unit
Operating Supply Voltage	V <sub>DC</sub>	6	V
DC Voltage at any I/O Pin	V <sub>D</sub>	(Gnd - 0.5) to (Vdd + 0.5)	V
ESD Performance per IEC 61000-4-2 (I/O Pins)	Air Discharge	V <sub>ESD</sub> I/O	19 kV
	Contact Discharge	V <sub>ESD</sub> I/O	12 kV
ESD Performance per IEC 61000-4-2 (VDD, GND Pins)	Air Discharge	V <sub>ESD</sub> PW	30 kV
	Contact Discharge	V <sub>ESD</sub> PW	30 kV
Storage Temperature	T <sub>STG</sub>	-55 °C to +150 °C	°C
Operating Temperature	T <sub>OPR</sub>	-55 °C to +150 °C	°C

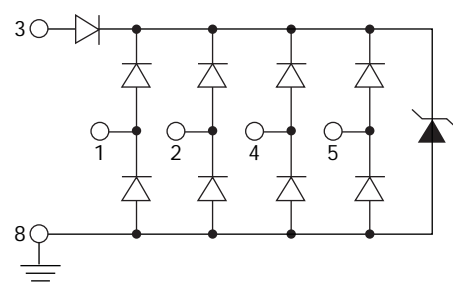
**How To Order**



**Typical Part Marking**

CDMSP10-0504M .....B0504

**Schematic**



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex. Specifications are subject to change without notice. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

## Applications

- High Definition Multimedia Interface (HDMI)
- Digital Visual Interface (DVI)
- Ethernet 10/100/1000 Mb/s
- SATA interface
- Portable electronics

## CDMSP10-0504M – Surface Mount TVS Diode Array

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### Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Minimum	Nominal	Maximum	Unit
Reverse Standoff Voltage <sup>1</sup>	V <sub>RWM</sub>			5	V
Leakage Current <sup>1</sup> @ V <sub>RWM</sub>	I <sub>D</sub>			5	μA
Channel Leakage Current @ V <sub>RWM</sub>	I <sub>CD</sub>			1	μA
Reverse Breakdown Voltage @ V <sub>RWM</sub>	V <sub>BR</sub>	6		9	V
Forward Voltage <sup>3</sup> @ I <sub>F</sub> = 15 mA	V <sub>F</sub>		0.8	1	V
ESD Clamping Voltage <sup>2</sup> @ IEC 61000-4-2 +6 kV, Contact Mode	V <sub>C</sub>		12.5		V
ESD Clamping Voltage <sup>1</sup> @ IEC 61000-4-2 +6 kV, Contact Mode	V <sub>C</sub>		9.5		V
ESD Dynamic Turn-On Resistance - I/O <sup>2</sup>	R <sub>dyn_io</sub>		0.33		Ohms
ESD Dynamic Turn-On Resistance - V <sub>DD</sub> <sup>1</sup>	R <sub>dyn_VDD</sub>		0.16		Ohms
Channel Input Capacitance <sup>2</sup> - 1 @ V <sub>PIN3</sub> =5 V, V <sub>IN</sub> =2.5 V, f = 1 MHz	C <sub>IN-1</sub>		0.55	0.65	pF
Channel Input Capacitance <sup>2</sup> - 2 @ V <sub>PIN3</sub> =N/C, V <sub>IN</sub> =2.5 V, f = 1 MHz	C <sub>IN-2</sub>		0.70	0.80	pF
Channel to Channel Input Capacitance - 1 @ V <sub>PIN3</sub> =5 V, V <sub>IN</sub> =2.5 V, f = 1 MHz (Between channel pins)	C <sub>CROSS-1</sub>		0.08	0.09	pF
Channel to Channel Input Capacitance - 2 @ V <sub>PIN3</sub> =N/C, V <sub>IN</sub> =2.5 V, f = 1 MHz (Between channel pins)	C <sub>CROSS-2</sub>		0.10	0.11	pF
Variation of Channel Input Capacitance - 1 @ V <sub>PIN3</sub> =5 V, V <sub>IN</sub> =2.5 V, f = 1 MHz (Channel x Pin to GND, Channel y Pin to GND)	ΔC <sub>IN-1</sub>		0.04	0.06	pF
Variation of Channel Input Capacitance - 2 @ V <sub>PIN3</sub> =N/C, V <sub>IN</sub> =2.5 V, f = 1 MHz (Channel x Pin to GND, Channel y Pin to GND)	ΔC <sub>IN-2</sub>		0.05	0.08	pF

#### Notes:

1. Test from V<sub>dd</sub> Pin 3 to Gnd Pin 8
2. Test from Pin 1,2,4 or 5 to Gnd Pin 8
3. Test from Gnd Pin 8 to V<sub>dd</sub> Pin 3

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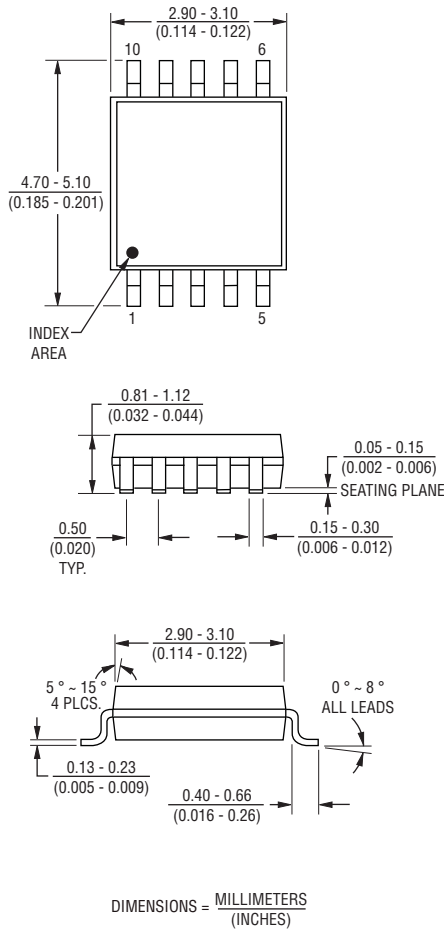
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# CDMSP10-0504M – Surface Mount TVS Diode Array

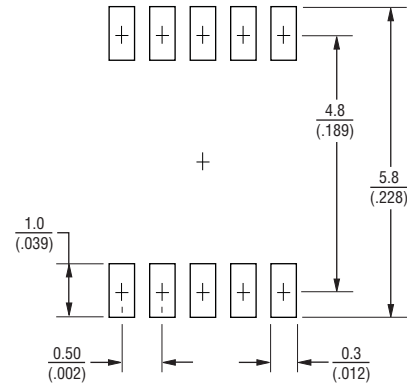


## Product Dimensions

This is a molded JEDEC MSOP-10L package with lead free 100 % Matte Sn on the lead frame. It weighs approximately 7 mg and has a flammability rating of UL 94V-0.



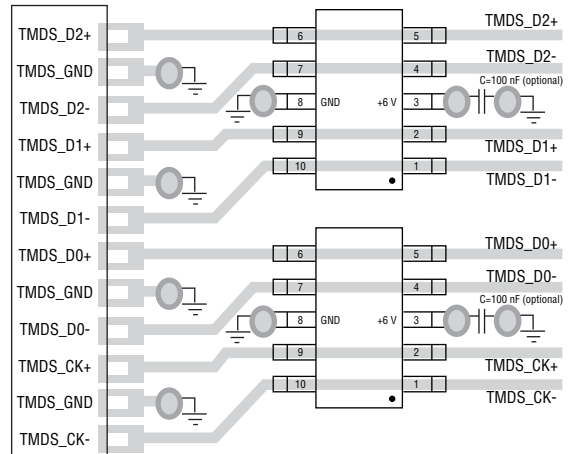
## Recommended Footprint



This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

## Typical Application

This ESD protection device is ideal in high speed data port protection such as HDMI where capacitance per line is critical parameter. See example connection below.



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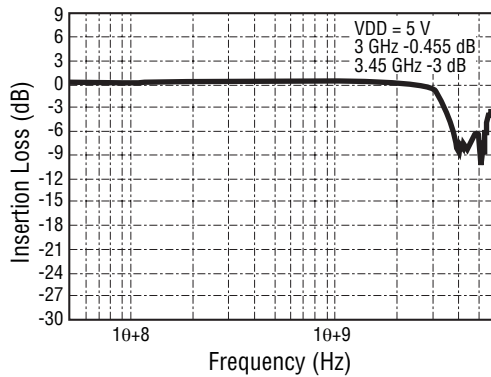
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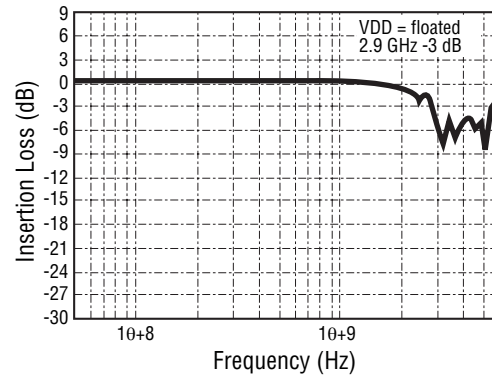
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## Characteristic Curves

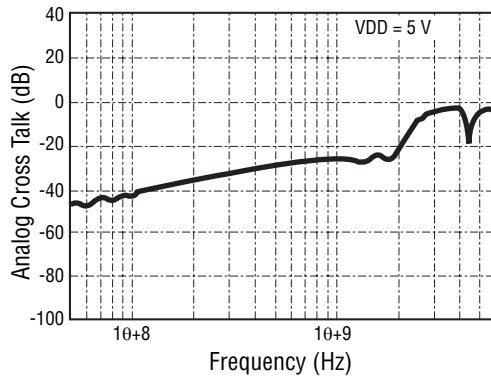
### Insertion Loss S21 (I/O-to-GND)



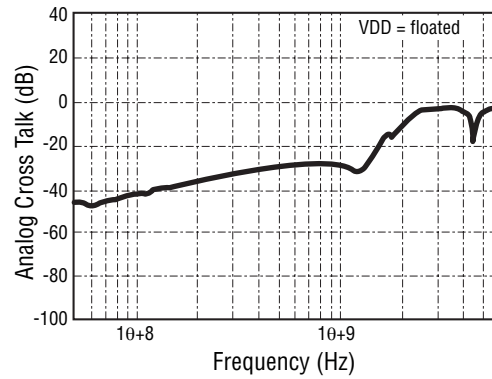
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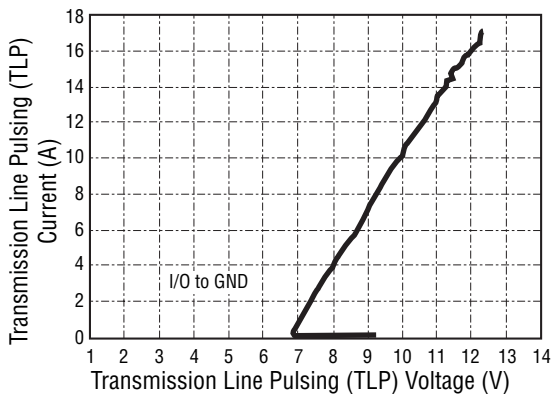
### Analog Cross Talk



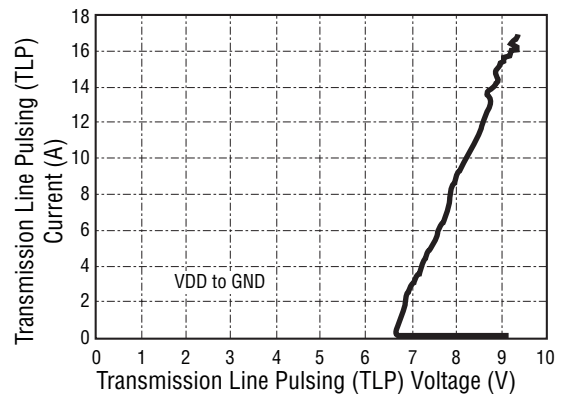
### Analog Cross Talk



### Transmission Line Pulsing (TLP) Measurement



### Transmission Line Pulsing (TLP) Measurement



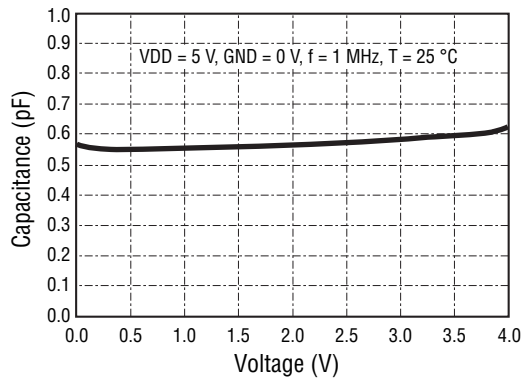
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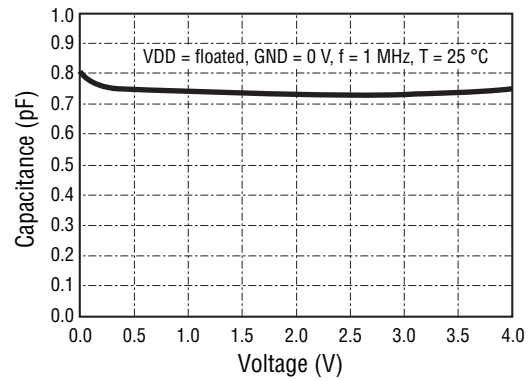
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Characteristic Curves

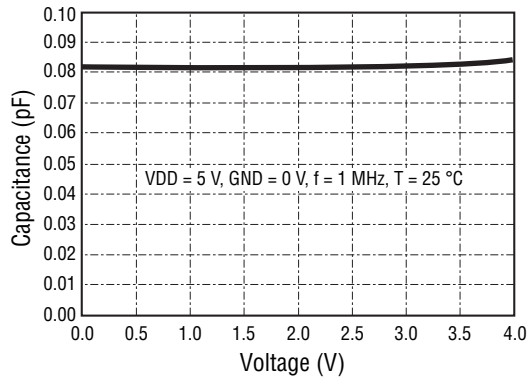
Typical Variation of  $C_{IN}$  vs.  $V_{IN}$



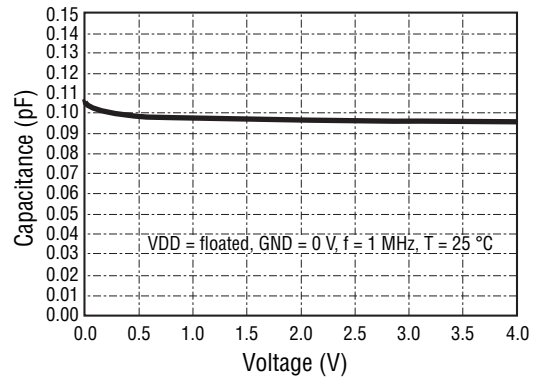
Typical Variation of  $C_{IN}$  vs.  $V_{IN}$



Typical Variation of  $C_{IO-to-IO}$  vs.  $V_{IN}$



Typical Variation of  $C_{IO-to-IO}$  vs.  $V_{IN}$



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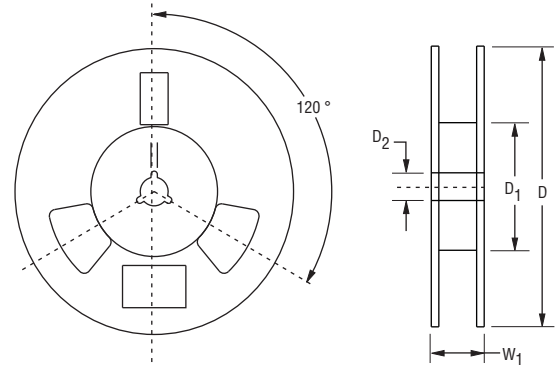
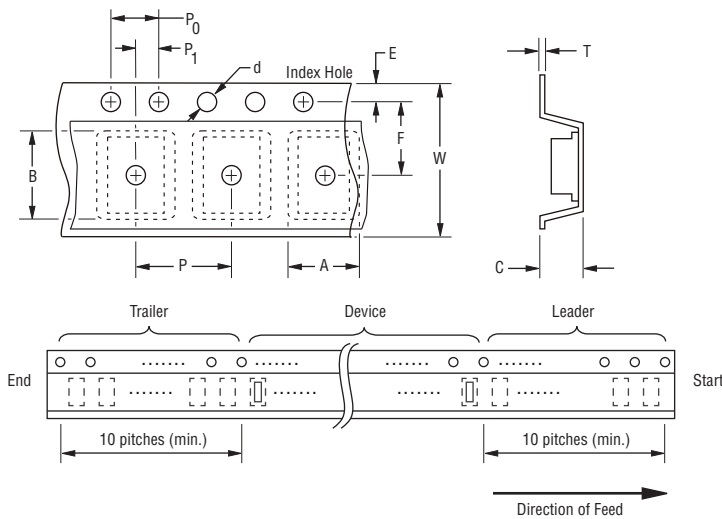
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## Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



Devices are packed in accordance with EIA standard RS-481-A.

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

Item	Symbol	MSOP-10L
Carrier Width	A	$\frac{5.5 \pm 0.10}{(0.216 \pm 0.004)}$
Carrier Length	B	$\frac{3.5 \pm 0.10}{(0.138 \pm 0.004)}$
Carrier Depth	C	$\frac{1.5 \pm 0.10}{(0.059 \pm 0.004)}$
Sprocket Hole	d	$\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$
Reel Outside Diameter	D	$\frac{178}{(7.008)}$
Reel Inner Diameter	D <sub>1</sub>	$\frac{50.0}{(1.969)}$ MIN.
Feed Hole Diameter	D <sub>2</sub>	$\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
Punch Hole Position	F	$\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$
Punch Hole Pitch	P	$\frac{8.00 \pm 0.10}{(0.314 \pm 0.004)}$
Sprocket Hole Pitch	P <sub>0</sub>	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Embossment Center	P <sub>1</sub>	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$
Overall Tape Thickness	T	$\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$
Tape Width	W	$\frac{12.0 \pm 0.20}{(0.470 \pm 0.008)}$
Reel Width	W <sub>1</sub>	$\frac{14.4}{(0.567)}$
Quantity per Reel	--	3000

**BOURNS®**

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