

**Features**

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



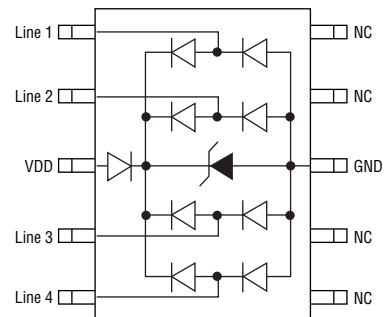
This series is currently available but not recommended for new designs. See [Product Obsolescence Memo](#) for possible replacement part no.

**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.

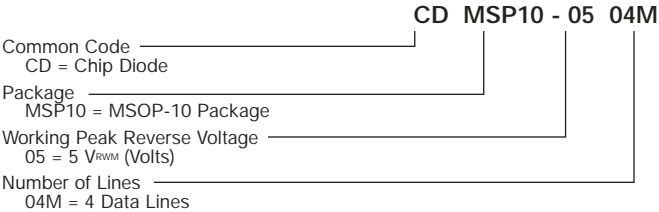
The MSOP-10L packaged device will mount directly onto the industry standard MSOP-10L footprint. Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and their flat configuration minimizes roll away.



**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

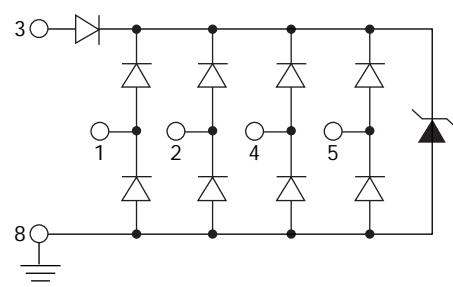
**How To Order**



**Typical Part Marking**

CDMSP10-0504M .....B0504

**Schematic**



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

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## 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

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

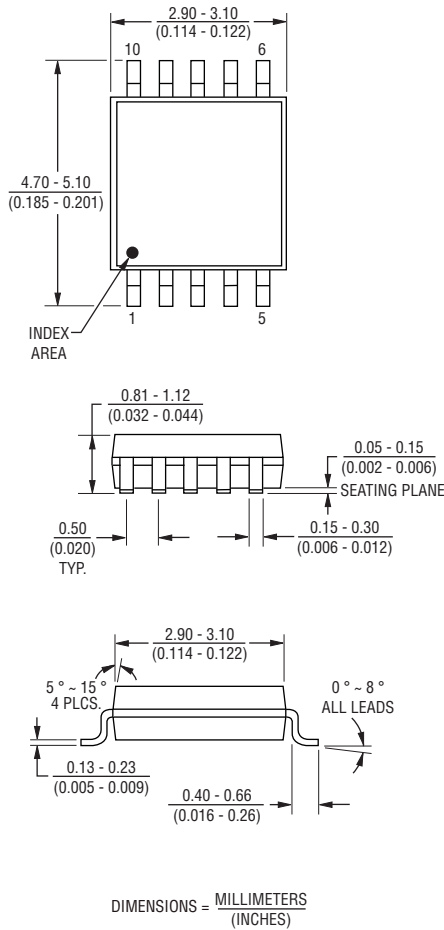
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# CDMSP10-0504M – Surface Mount TVS Diode Array

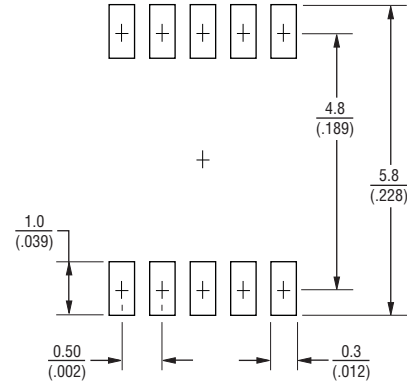


## Product Dimensions

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.



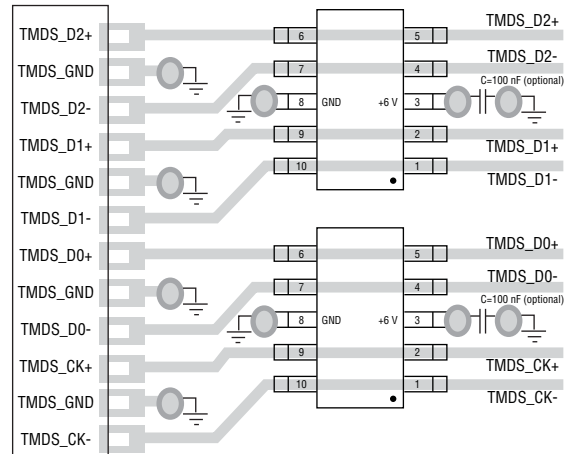
## Recommended Footprint



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.

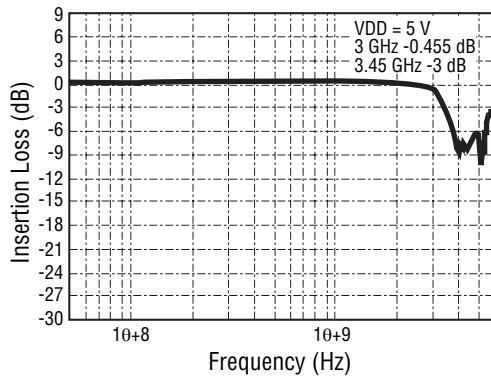


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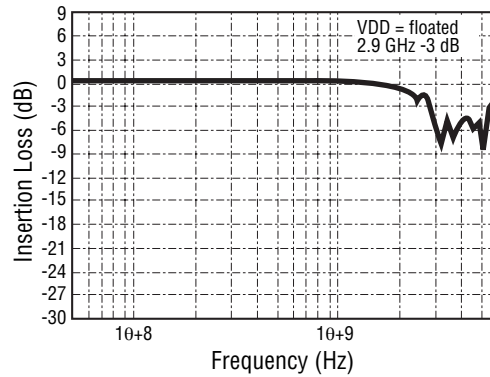
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## Characteristic Curves

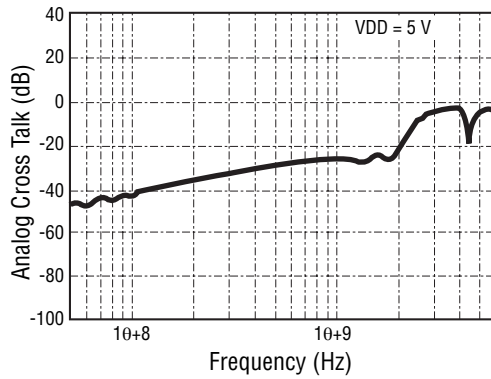
### Insertion Loss S21 (I/O-to-GND)



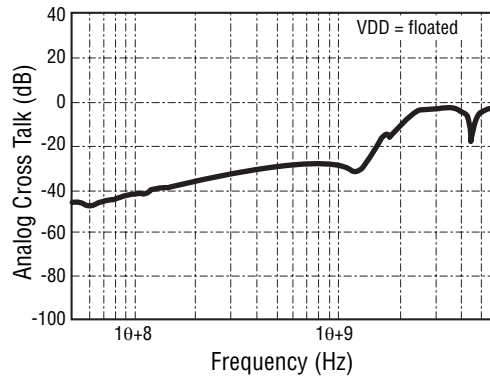
### Insertion Loss S21 (I/O-to-GND)



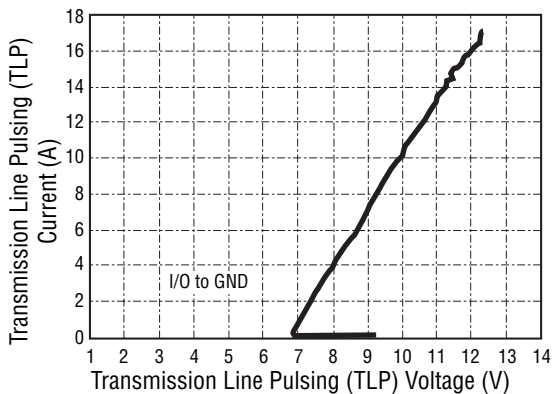
### Analog Cross Talk



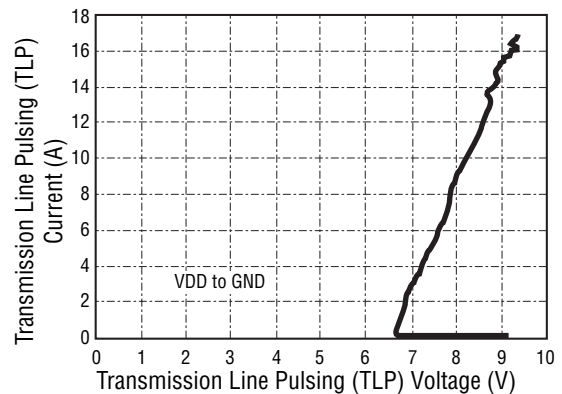
### Analog Cross Talk



### Transmission Line Pulsing (TLP) Measurement



### Transmission Line Pulsing (TLP) Measurement



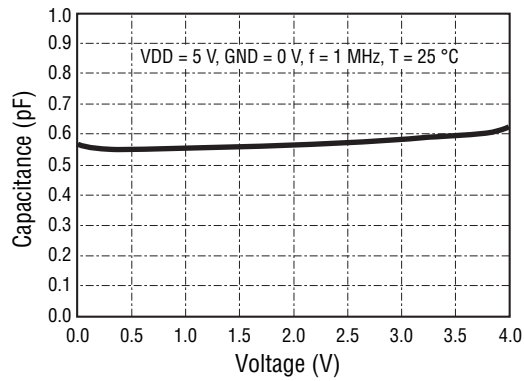
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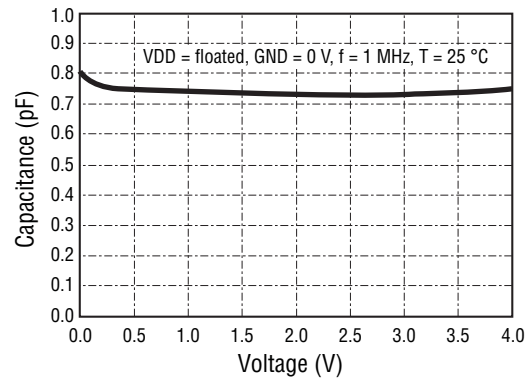
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Characteristic Curves

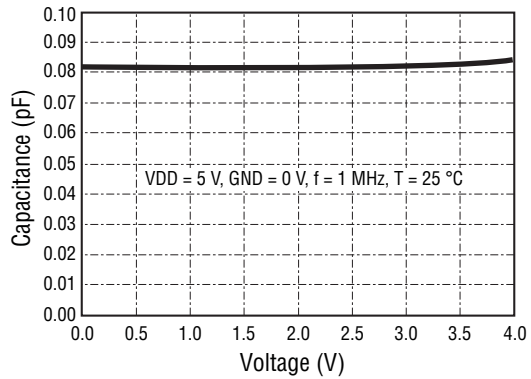
Typical Variation of  $C_{IN}$  vs.  $V_{IN}$



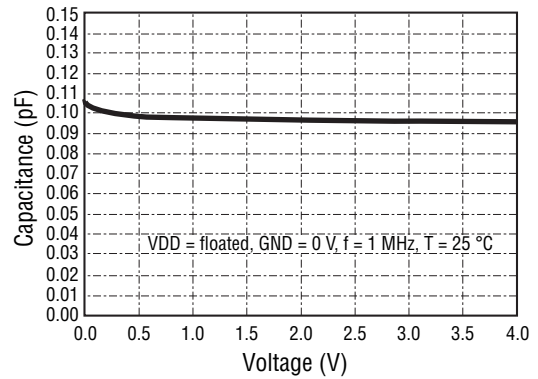
Typical Variation of  $C_{IN}$  vs.  $V_{IN}$



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



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

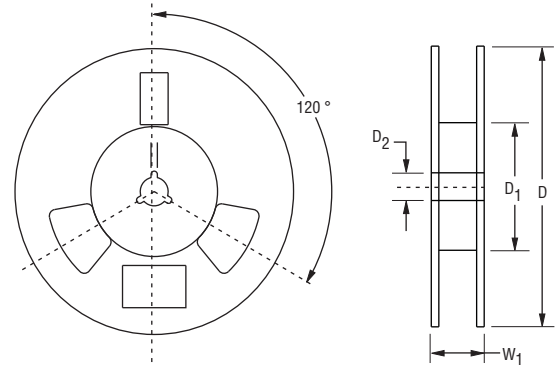
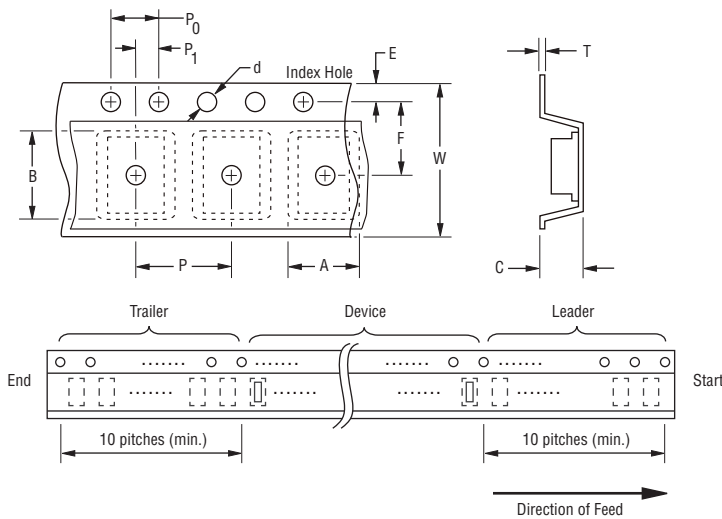


# CDMSP10-0504M – Surface Mount TVS Diode Array

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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

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