

## 4-Line Ultra Low Capacitance TVS Diode Array

### Features

- Very low capacitance : 1.5pF typical
- Low operating voltage : 5V
- Low clamping voltage
- Protects one power line and four data lines
- Flow-through package
- Complies with following standards :
  - IEC 61000-4-2(ESD) immunity test  
Air discharge :  $\pm 30\text{kV}$ , Contact discharge :  $\pm 30\text{kV}$
  - IEC61000-4-4 (EFT) 40A (5/50ns)
  - IEC61000-4-5 (Lightning) 12A (8/20us)
- RoHS Compliant

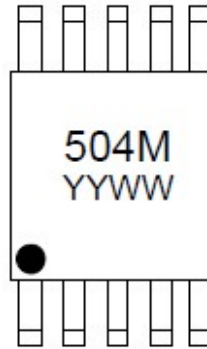
### Mechanical Data

- Package : MSOP-10
- Case Material : "Green" Molding Compound.
- Lead Finish : Matte Tin
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity : Level 3 per J-STD-020
- Terminal Connections : See Diagram Below
- Marking Information : See Below

### Applications

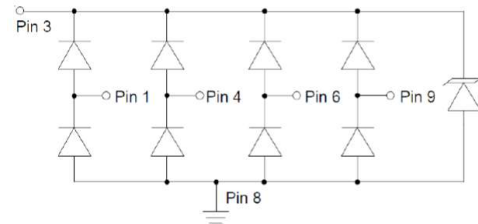
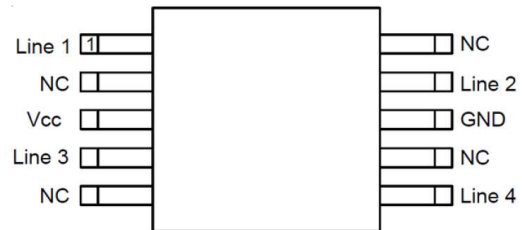
- HDMI Ports
- Monitors and flat panel displays
- Set-top box and Digital TV
- Digital Video Interface (DVI),
- Video graphics cards
- Notebook Computers
- Monitors and Flat Panel Displays

### Marking



504M = Device Marking Code  
YYWW = Date Code  
Dot denotes pin1

### Circuit and Pin Schematic



### Absolute Maximum Ratings (Ta= 25°C unless otherwise specified)

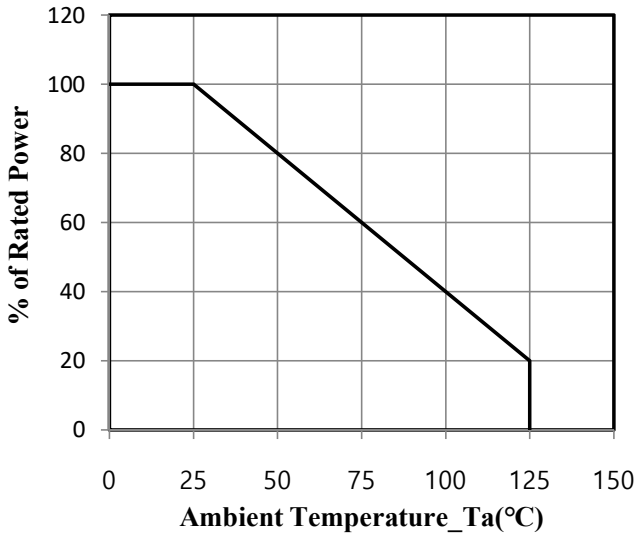
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20us)	Ppk	300	W
Peak Pulse Current (8/20us)	Ipp	12	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Junction Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

### Electrical Characteristics (Ta= 25°C unless otherwise specified)

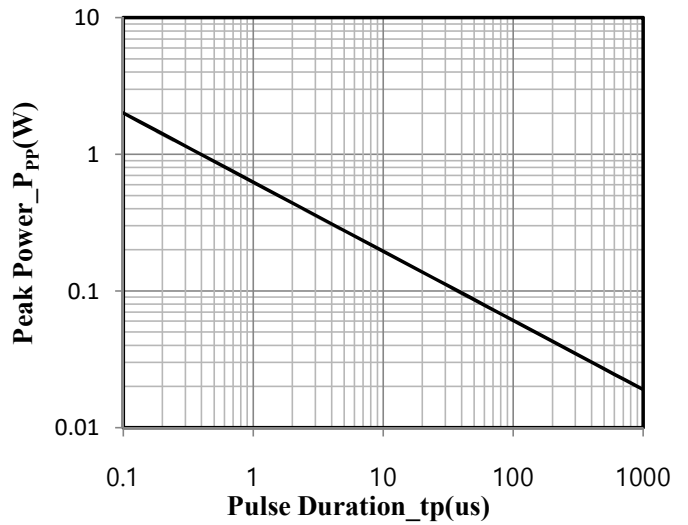
Characteristic	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>	-	-	5.0	V	Pin 3 to 8
Breakdown Voltage	V <sub>BR</sub>	6.0	-	-	V	I <sub>T</sub> = 1mA, Pin 3 to 8
Reverse Leakage Current	I <sub>R</sub>	-	-	0.5	uA	V <sub>RWM</sub> = 5V, Pin 3 to 8
Clamping Voltage (any I/O pin to ground)	V <sub>C</sub>	-	-	12.5	V	I <sub>PP</sub> = 1A (8 × 20us pulse)
Clamping Voltage (any I/O pin to ground)	V <sub>C</sub>	-	-	17.5	V	I <sub>PP</sub> = 5A (8 × 20us pulse)
Clamping Voltage (any I/O pin to ground)	V <sub>C</sub>	-	-	25	V	I <sub>PP</sub> = 12A (8 × 20us pulse)
Junction Capacitance (between I/O pins)	C <sub>J</sub>	-	1.5	-	pF	f = 1MHz, V <sub>R</sub> = 0V
Junction Capacitance (any I/O pin to ground)	C <sub>J</sub>	-	3.0	5.0	pF	f = 1MHz, V <sub>R</sub> = 0V

**Ratings and Characteristics Curves (Ta=25°C unless otherwise noted)**

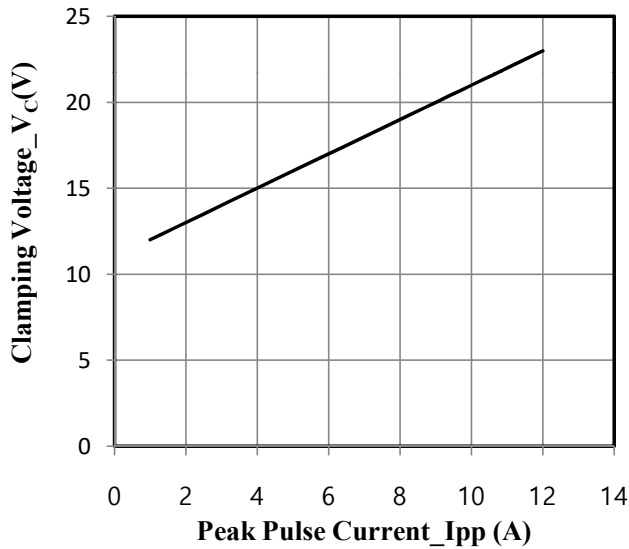
**Fig.1 Power Derating Curve**



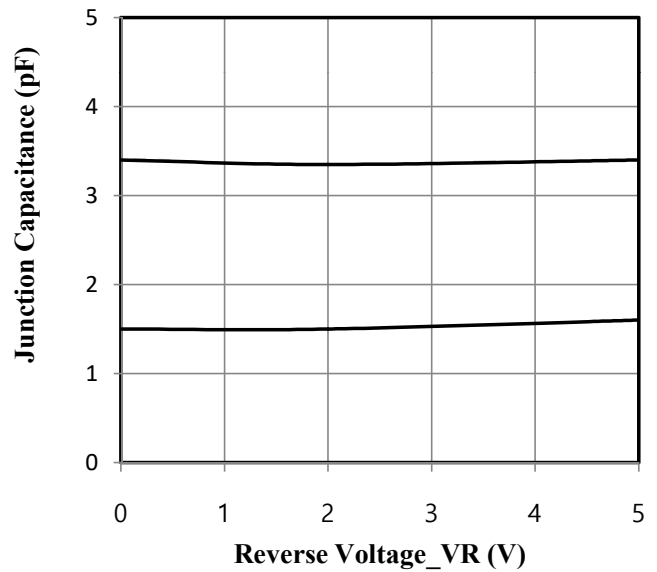
**Fig.2 Peak Pulse Power vs. Pulse Time**



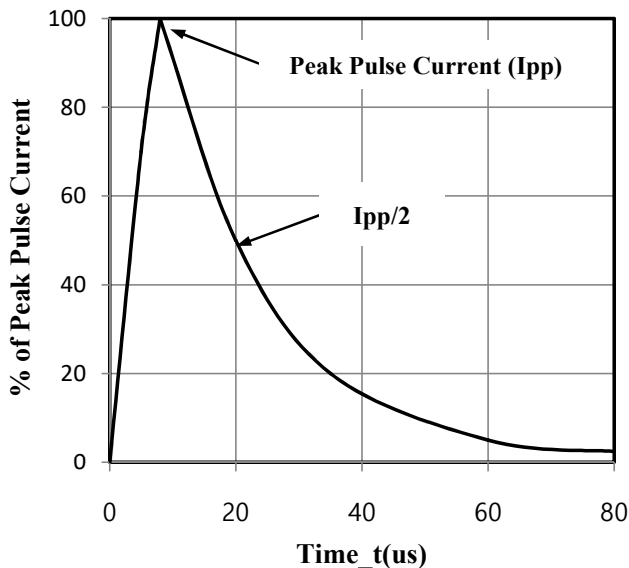
**Fig.3 Clamping Voltage vs. Peak Pulse Current (tp=8/20us)**



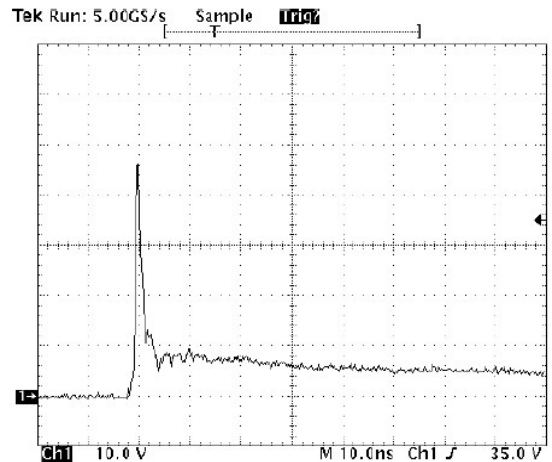
**Fig.4 Junction Capacitance vs. Reverse Voltage**

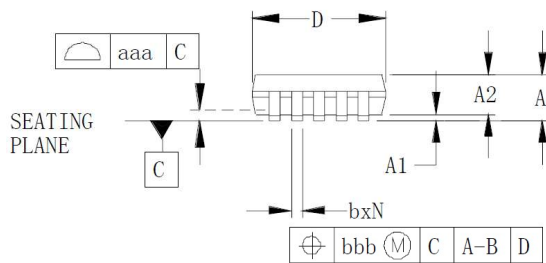
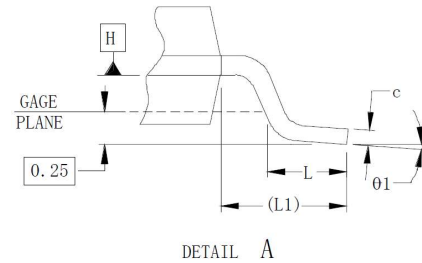
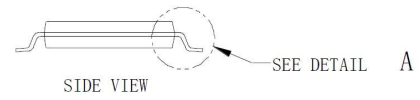
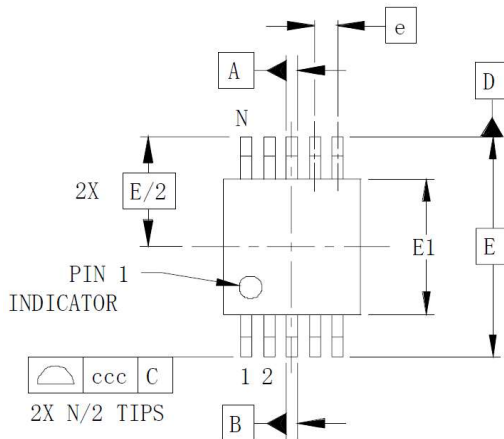


**Fig.5 8 × 20us Pulse Waveform**



**Fig. 6 ESD Clamping Voltage 8kV Contact per IEC61000-4-2**

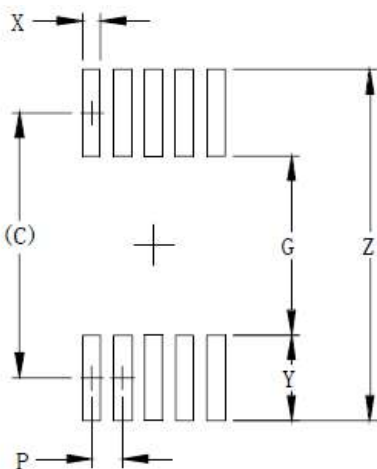


**MSOP-10 Package Outline Drawing**


DIM	Inches			Millimeters		
	MIN	NOM	MAX	MIN	NOM	Max
A	-	-	0.043	-	-	1.10
A1	0.000	-	0.006	0.00	-	0.15
A2	0.03	-	0.037	0.75	-	0.95
b	0.007	-	0.011	0.17	-	0.27
c	0.003	-	0.009	0.08	-	0.23
D	0.114	0.118	0.122	2.90	3.00	3.10
E1	0.114	0.118	0.122	2.90	3.00	3.10
E	0.193 BSC			4.90 BSC		
e	0.020 BSC			0.50 BSC		
L	0.016	0.024	0.032	0.40	0.60	0.80
L1	(0.037)			(0.95)		
N	10			10		
Ø1	0°	-	8°	0°	-	8°
aaa	0.004			0.10		
bbb	0.003			0.08		
ccc	0.010			0.25		

**Notes :**

- Controlling dimensions are in millimeters (Angles in Degrees).
- Datums **A** and **B** to be determined at datum plane **H**
- Dimensions "E1" and "D" do not include mold flash, protrusions or gate burrs.
- Reference JEDEC STD MO-187, Variation BA.

**Suggested Land Pattern**


DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.161)	(4.10)
G	.098	2.50
P	.020	0.50
X	.011	0.30
Y	.063	1.60
Z	.224	5.70

**Notes :**

- This land pattern is for reference purposes only.  
Consult your manufacturing group to ensure your company's manufacturing guidelines are met.