

# CM6136

## Single-Channel Transient Voltage Suppressor

### Product Description

ON Semiconductor's CM6136 is an *Application Specific Integrated Passive™* (ASIP™) component in a 2 x 2, 4-bump, 0.4 mm pitch, CSP form factor. This device is designed for:

- Fuse
- Transient Voltage Suppression (TVS)
- Electrostatic Discharge Protection
- Electrical Overstress Protection

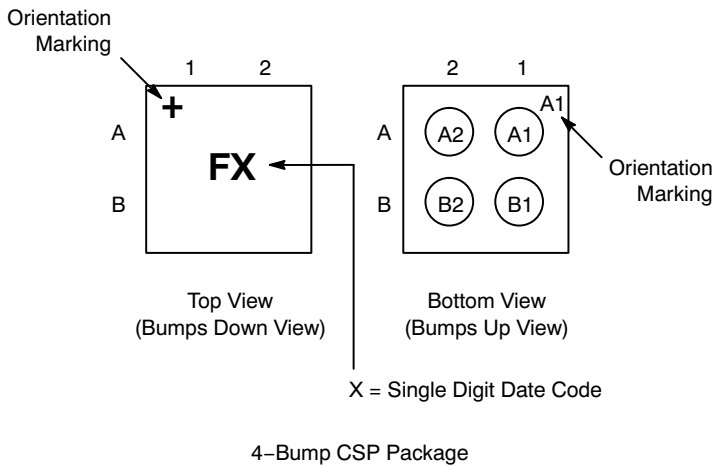
### Features

- 4-Bump, 0.8 mm X 0.8 mm Footprint Chip Scale Package (CSP)
- These Devices are Pb-Free and are RoHS Compliant

**Table 1. PIN DESCRIPTIONS**

4-bump CSP Package	
Pin	Description
A1	Fuse Terminal 1
A2	TVS Channel / Fuse Terminal 2
B1 & B2	Device Ground

### PACKAGE / PINOUT DIAGRAMS



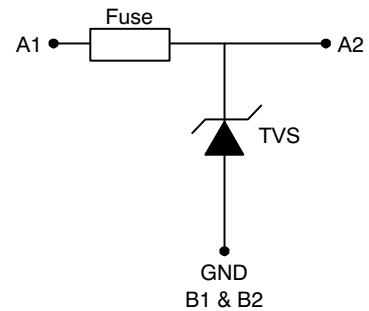
**ON Semiconductor®**

<http://onsemi.com>



**WLCSP4  
CP SUFFIX  
CASE 567CA**

### ELECTRICAL SCHEMATIC



### MARKING DIAGRAM



F = CM6136  
X = Single Digit Date Code

### ORDERING INFORMATION

Device	Package	Shipping†
CM6136	WLCSP4 (Pb-Free)	10,000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# CM6136

## ELECTRICAL SPECIFICATIONS AND CONDITIONS

**Table 2. ABSOLUTE RATINGS**

Parameter	Rating	Units
Failing to nonconductive, $I^2t$ – from <b>A1</b> pin to device ground (Maximum $I_{PP}$ value using 10/1000 $\mu$ s pulse). See Notes 1 and 2.	4	A
Failing to nonconductive, $I^2t$ – from <b>A2</b> pin to device ground (Maximum $I_{PP}$ value using 10/1000 $\mu$ s pulse). See Notes 1 and 2.	50	A

1. The device must not burn to open-circuit, when the value is below maximum  $I_{PP}$ .
2. This parameter is characterized at 25°C using an ON Semiconductor-specific test board.

**Table 3. PARAMETERS AND OPERATING CONDITIONS**

Parameter	Rating	Units
Storage Temperature Range	-55 to +150	°C
Operating Temperature Range	-30 to +85	°C

**Table 4. ELECTRICAL OPERATING CHARACTERISTICS** (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
R	Resistance A1 – A2	B1 and B2 floating (Note 2)			50	m $\Omega$
R <sub>OPEN</sub>	Resistance after open fuse	B1 and B2 floating	1			M $\Omega$
t <sub>FUSE</sub>	Fusing time	B1 and B2 floating; I = 5 A (Note 3)			100	ms
t <sub>LIFE</sub>	Fuse life time	B1 and B2 floating; I = 2 A (Notes 3, 4 and 9)	4000			Hours
I <sub>OFF</sub>	Stand-off quiescent current	From A1 pin to B1 and B2 pins; Stand-off voltage V <sub>OFF</sub> = 12 V			100	nA
V <sub>BR</sub>	Break down voltage	From A1 pin to B1 and B2 pins; Break down current I <sub>BR</sub> = 20 mA (Note 6)	15.5			V
V <sub>CL</sub>	Clamping voltage during transient	From A1 pin to B1 and B2 pins; Clamping current I <sub>CL</sub> = 1 A (Notes 6 and 7)			19.5	V
V <sub>F</sub>	Forward voltage	From A1 pin to B1 and B2 pins; Forward current I <sub>F</sub> = 850 mA			1.3	V
C <sub>L1</sub>	Line capacitance	V <sub>BIAS</sub> = 0 V		190		pF
C <sub>L2</sub>		V <sub>BIAS</sub> = 5 V	73	92		pF
V <sub>ESD</sub>	ESD protection peak discharge Voltage at <b>A1 pin or A2 to B1 and B2</b> a) Contact Discharge per IEC 61000-4-2 standard b) Air Discharge per IEC 61000-4-2 standard	(Note 8)	$\pm$ 30			kV
f <sub>C</sub>	Minimum attenuation Freq = 80 MHz – 1 GHz Freq = 1 – 4 GHz	R <sub>SOURCE</sub> = R <sub>LOAD</sub> = 50 $\Omega$		8 20		dB

1. All parameters specified for T<sub>A</sub> = 25°C unless otherwise noted. Characterization data for DC parameters is taken from -30°C to 85°C.
2. This parameter is measured using low current to avoid self-heating.
3. These parameters are characterized using ON Semiconductor-specific test boards.
4. Fuse is considered failed when its resistance is higher than 1  $\Omega$ .
5. Cumulative distribution of V<sub>BR</sub> between 15.5 V and 16.0 V is about 4.5%.
6. Transient: 8 x 20  $\mu$ s current pulse.
7. Cumulative distribution of V<sub>CL</sub> between 19.0 V and 19.5 V is about 4.5%.
8. Standard IEC 61000-4-2 with C<sub>Discharge</sub> = 150 pF, R<sub>Discharge</sub> = 330  $\Omega$ .
9. Fuse lifetime is extrapolated from Accelerated Life Test (ALT) at 125°C.

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## RF CHARACTERISTICS

$T_A = 25^\circ\text{C}$ ,  $50\ \Omega$  Environment

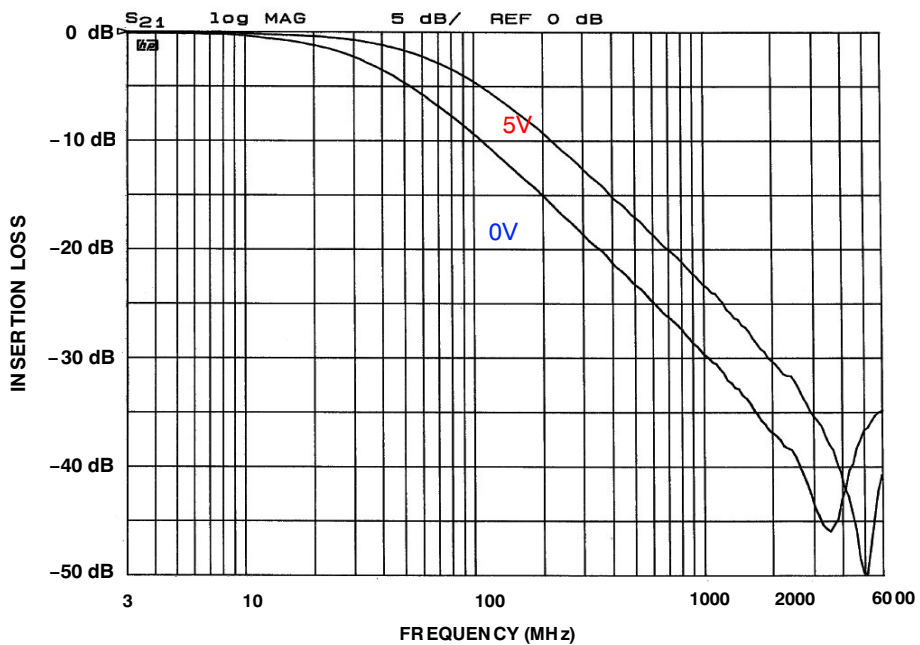
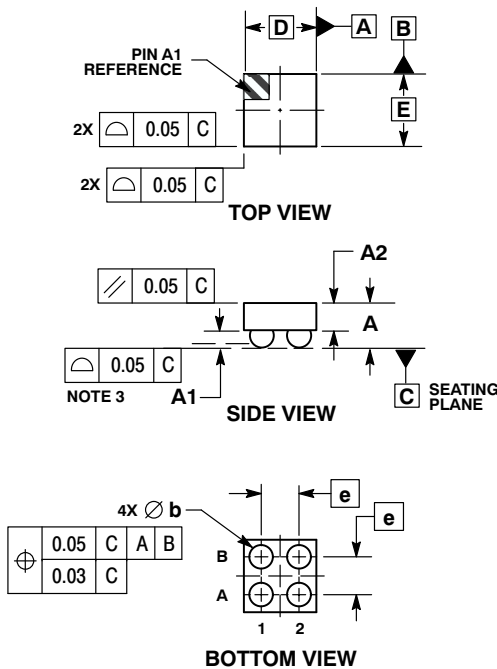


Figure 1. Insertion Loss (0 V and 5 V Bias)

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## PACKAGE DIMENSIONS

WLCSP4, 0.8x0.8  
CASE 567CA-01  
ISSUE O

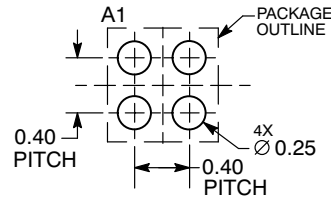


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.47	0.53
A1	0.17	0.24
A2	0.30	REF
b	0.24	0.29
D	0.80	BSC
E	0.80	BSC
e	0.40	BSC

**RECOMMENDED SOLDERING FOOTPRINT\***



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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