

# MULTILAYER CHIP VARISTOR

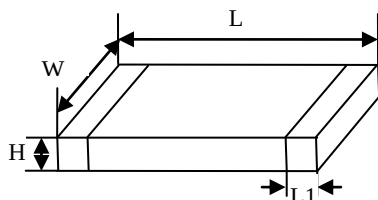
For ESD / Surge Protection

## Features

- Series size from 0402 to 2220, (3220)08CH
- Working Voltage from 2V to 560V dc
- Low cap design (0.2pf) for fast data transmission
- Fast response time ( $<0.5\text{ns}$ )
- Low leakage current
- High surge current ability
- Suitable for ESD protection
- Bidirectional clamping, high energy
- Wide Operating temperature range from  $-55^{\circ}\text{C}$ – $125^{\circ}\text{C}$
- Good Temperature Coefficient

## Size

| Model | 0402 (1005)     | 0603 (1608)     | 0805 (2012)     | 1206 (3216)     | 1210 (3225)     | 1812 (4532)     | 2220 (5650)     | 3220(8050)      |
|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| L     | $1.00 \pm 0.15$ | $1.60 \pm 0.20$ | $2.00 \pm 0.20$ | $3.20 \pm 0.30$ | $3.20 \pm 0.30$ | $4.50 \pm 0.35$ | $5.60 \pm 0.40$ | $8.00 \pm 0.40$ |
| W     | $0.50 \pm 0.15$ | $0.80 \pm 0.20$ | $1.20 \pm 0.20$ | $1.60 \pm 0.20$ | $2.50 \pm 0.30$ | $3.20 \pm 0.30$ | $5.00 \pm 0.40$ | $5.00 \pm 0.40$ |
| H     | 0.70max         | 0.90max         | 1.30max         | 1.60max         | 2.00max         | 2.40max         | 3.50max         | 3.50max         |



## High surge absorption series

| MVR         | 0603                                                                                                                              | — | 8R0                                                                                  | G                               |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------------|---------------------------------|
| Series name | Chip size<br>0603 (1608)<br>0805 (2012)<br>1206 (3216)<br>1210 (3225)<br>1812 (4532)<br>2220 (5750)<br>3220 (8050)<br>4032 (1080) |   | Varistor voltage<br>(Breakdown voltage)<br><br>8R0=8V<br><br>270=27V<br><br>471=470V | High surge<br>absorption series |



## DEVICE RATING AND SPECIFICATIONS

### 0603 Size

| Part Number |              | Working Voltage |                 | Breakdown Voltage |           | Peak Current   | Clamping Voltage |    | Surge Voltage V |
|-------------|--------------|-----------------|-----------------|-------------------|-----------|----------------|------------------|----|-----------------|
|             |              | AC              | DC              | @ 1mA DC          |           | 8/20uS         | 8/20uS           |    |                 |
|             |              | V <sub>AC</sub> | V <sub>DC</sub> | VB                |           | I <sub>p</sub> | A                | V  |                 |
| 0603        | MVR0603-3R3G | 1.4             | 2               | 3.0               | 2.4-3.6   | 20A            | 1                | 9  | 100V            |
|             | MVR0603-5R0G | 2.4             | 3.3             | 5                 | 4.0-6.0   | 20A            | 1                | 12 |                 |
|             | MVR0603-8R0G | 4               | 5.5             | 5.5               | 6.6-9.9   | 30A            | 1                | 18 |                 |
|             | MVR0603-120G | 7               | 9               | 12                | 10.2-13.8 | 30A            | 1                | 24 |                 |
|             | MVR0603-180G | 11              | 14              | 18                | 15.3-21.7 | 30A            | 1-10             | 30 |                 |
|             | MVR0603-220G | 12              | 16              | 22                | 19.8-24.2 | 30A            | 1-10             | 36 |                 |
|             | MVR0603-240G | 14              | 18              | 24                | 21.6-26.4 | 30A            | 1-10             | 38 |                 |
|             | MVR0603-270G | 17              | 22              | 27                | 24.3-29.7 | 30A            | 1-10             | 44 |                 |
|             | MVR0603-300G | 18              | 24              | 30                | 27.2-33.0 | 30A            | 1-10             | 48 |                 |
|             | MVR0603-330G | 20              | 26              | 33                | 29.7-36.3 | 30A            | 1-10             | 54 |                 |
|             | MVR0603-360G | 22              | 28              | 36                | 32.7-39.6 | 30A            | 1-10             | 59 |                 |
|             | MVR0603-390G | 25              | 30              | 39                | 35.1-42.9 | 30A            | 1-10             | 65 |                 |
|             | MVR0603-420G | 26              | 33              | 42                | 38.1-46.2 | 30A            | 1-10             | 72 |                 |
|             | MVR0603-470G | 30              | 38              | 47                | 42.3-51.7 | 30A            | 1-10             | 77 |                 |

### 0805 Size

| Part Number |              | Working Voltage |                 | Breakdown Voltage |           | Peak Current   | Clamping Voltage |    | Surge Voltage V |
|-------------|--------------|-----------------|-----------------|-------------------|-----------|----------------|------------------|----|-----------------|
|             |              | AC              | DC              | @ 1mA DC          |           | 8/20uS         | 8/20uS           |    |                 |
|             |              | V <sub>AC</sub> | V <sub>DC</sub> | VB                |           | I <sub>p</sub> | A                | V  |                 |
| 0805        | MVR0805-3R3G | 1.4             | 2               | 3.0               | 2.4-3.6   | 80A            | 1-10             | 9  | 300V            |
|             | MVR0805-5R0G | 2.4             | 3.3             | 5                 | 4.0-6.0   | 80A            | 1-10             | 12 |                 |
|             | MVR0805-8R0G | 4               | 5.5             | 5.5               | 6.6-9.9   | 80A            | 1-10             | 18 |                 |
|             | MVR0805-120G | 7               | 9               | 12                | 10.2-13.8 | 100A           | 1-10             | 24 |                 |
|             | MVR0805-180G | 11              | 14              | 18                | 15.3-21.7 | 100A           | 1-10             | 30 |                 |
|             | MVR0805-220G | 12              | 16              | 22                | 19.8-24.2 | 100A           | 1-10             | 36 |                 |
|             | MVR0805-240G | 14              | 18              | 24                | 21.6-26.4 | 100A           | 1-10             | 38 |                 |
|             | MVR0805-270G | 17              | 22              | 27                | 24.3-29.7 | 100A           | 1-10             | 44 |                 |
|             | MVR0805-300G | 18              | 24              | 30                | 27.2-33.0 | 100A           | 1-10             | 48 |                 |
|             | MVR0805-330G | 20              | 26              | 33                | 29.7-36.3 | 100A           | 1-10             | 54 |                 |
|             | MVR0805-360G | 22              | 28              | 36                | 32.7-39.6 | 100A           | 1-10             | 59 |                 |
|             | MVR0805-390G | 25              | 30              | 39                | 35.1-42.9 | 100A           | 1-10             | 65 |                 |
|             | MVR0805-420G | 26              | 33              | 42                | 38.1-46.2 | 100A           | 1-10             | 72 |                 |
|             | MVR0805-470G | 30              | 38              | 47                | 42.3-51.7 | 100A           | 1-10             | 77 |                 |
|             | MVR0805-560G | 35              | 45              | 56                | 50.4-61.6 | 80A            | 1-10             | 90 |                 |



# 深圳市康泰嵩隆电子科技有限公司

|      |              |     |     |     |         |      |      |     |       |
|------|--------------|-----|-----|-----|---------|------|------|-----|-------|
| 0805 | MVR0805-121G | 75  | 100 | 120 | 108-132 | 100A | 1-10 | 200 | ≥600V |
|      | MVR0805-171G | 110 | 140 | 170 | 154-187 | 100A | 1-10 | 300 |       |
|      | MVR0805-201G | 140 | 180 | 220 | 198-242 | 100A | 1-10 | 360 |       |
|      | MVR0805-241G | 150 | 200 | 240 | 216-264 | 100A | 1-10 | 395 |       |
|      | MVR0805-271G | 175 | 225 | 270 | 243-297 | 100A | 1-10 | 455 |       |
|      | MVR0805-361G | 230 | 300 | 360 | 324-396 | 100A | 1-10 | 595 |       |
|      | MVR0805-391G | 250 | 320 | 270 | 351-429 | 200A | 5-10 | 650 |       |
|      | MVR0805-431G | 275 | 350 | 430 | 387-473 | 200A | 5-10 | 710 |       |
|      | MVR0805-471G | 300 | 385 | 470 | 423-517 | 500A | 5-10 | 775 |       |

## 0806 Size

| Part Number |              | Working Voltage |                 | Breakdown Voltage |         | Peak Current   | Clamping Voltage |     | Surge Voltage V |
|-------------|--------------|-----------------|-----------------|-------------------|---------|----------------|------------------|-----|-----------------|
|             |              | AC              | DC              | @ 1mA DC          |         | 8/20uS         | 8/20uS           |     |                 |
|             |              | V <sub>AC</sub> | V <sub>DC</sub> | VB                |         | I <sub>p</sub> | A                | V   |                 |
| 0806        | MVR0806-241G | 150             | 200             | 240               | 216-264 | 200A           | 1-10             | 395 | ≥600            |
|             | MVR0806-271G | 175             | 225             | 270               | 243-297 | 200A           | 1-10             | 455 |                 |
|             | MVR0806-431G | 275             | 350             | 430               | 387-473 | 200A           | 1-10             | 710 |                 |

## 1206 Size

| Part Number |              | Working Voltage |                 | Breakdown Voltage |           | Peak Current   | Clamping Voltage |     | Surge Voltage V |
|-------------|--------------|-----------------|-----------------|-------------------|-----------|----------------|------------------|-----|-----------------|
|             |              | AC              | DC              | @ 1mA DC          |           | 8/20uS         | 8/20uS           |     |                 |
|             |              | V <sub>AC</sub> | V <sub>DC</sub> | VB                |           | I <sub>p</sub> | A                | V   |                 |
| 1206        | MVR1206-5R0G | 2.4             | 3.3             | 5                 | 4.0-6.0   | 100A/200A      | 1-10             | 12  | ≥500V           |
|             | MVR1206-8R0G | 4               | 5.5             | 5.5               | 6.6-9.9   | 100A/200A      | 1-10             | 18  |                 |
|             | MVR1206-120G | 7               | 9               | 12                | 10.2-13.8 | 120A/200A      | 1-10             | 24  |                 |
|             | MVR1206-180G | 11              | 14              | 18                | 15.3-21.7 | 120A/200A      | 1-10             | 30  |                 |
|             | MVR1206-220G | 12              | 16              | 22                | 19.8-24.2 | 120A/200A      | 1-10             | 36  |                 |
|             | MVR1206-240G | 14              | 18              | 24                | 21.6-26.4 | 120A/200A      | 1-10             | 38  |                 |
|             | MVR1206-270G | 17              | 22              | 27                | 24.3-29.7 | 120A/200A      | 1-10             | 44  |                 |
|             | MVR1206-300G | 18              | 24              | 30                | 27.2-33.0 | 120A/200A      | 1-10             | 48  |                 |
|             | MVR1206-330G | 20              | 26              | 33                | 29.7-36.3 | 120A/200A      | 1-10             | 54  |                 |
|             | MVR1206-360G | 22              | 28              | 36                | 32.7-39.6 | 120A/200A      | 1-10             | 59  |                 |
|             | MVR1206-390G | 25              | 30              | 39                | 35.1-42.9 | 120A/200A      | 1-10             | 65  |                 |
|             | MVR1206-420G | 26              | 33              | 42                | 38.1-46.2 | 120A/200A      | 1-10             | 72  |                 |
|             | MVR1206-470G | 30              | 38              | 47                | 42.3-51.7 | 120A/200A      | 1-10             | 77  |                 |
|             | MVR1206-560G | 35              | 45              | 56                | 50.4-61.6 | 120A/200A      | 1-10             | 90  |                 |
|             | MVR1206-680G | 40              | 56              | 68                | 61.2-74.8 | 120A/200A      | 1-10             | 110 |                 |
|             | MVR1206-760G | 45              | 60              | 76                | 69.1-83.6 | 120A/200A      | 1-10             | 126 |                 |
|             | MVR1206-820G | 50              | 65              | 82                | 73.8-90.2 | 120A/200A      | 1-10             | 135 |                 |



# 深圳市康泰嵩隆电子科技有限公司

|                   |              |     |     |     |         |           |      |     |        |
|-------------------|--------------|-----|-----|-----|---------|-----------|------|-----|--------|
|                   | MVR1206-101G | 60  | 85  | 100 | 90-110  | 100A/200A | 1-10 | 165 |        |
| 1206<br>High<br>V | MVR1206-121G | 75  | 100 | 120 | 108-132 | 200A      | 1-10 | 200 | ≥600V  |
|                   | MVR1206-171G | 110 | 140 | 170 | 154-187 | 200A      | 1-10 | 300 |        |
|                   | MVR1206-201G | 130 | 170 | 200 | 185-225 | 200A      | 1-10 | 340 |        |
|                   | MVR1206-221G | 140 | 180 | 220 | 198-242 | 200A      | 1-10 | 360 |        |
|                   | MVR1206-241G | 150 | 200 | 240 | 216-264 | 200A      | 1-10 | 395 |        |
|                   | MVR1206-271G | 175 | 225 | 270 | 243-297 | 200A      | 1-10 | 455 |        |
|                   | MVR1206-391G | 250 | 320 | 270 | 351-429 | 200A      | 1-10 | 650 |        |
|                   | MVR1206-431G | 275 | 350 | 430 | 387-473 | 200A      | 1-10 | 710 |        |
|                   | MVR1206-471G | 300 | 385 | 470 | 423-517 | 200A      | 1-10 | 775 |        |
|                   | MVR1206-391H | 250 | 320 | 270 | 351-429 | 350A      | 1-10 | 650 | ≥1000V |
|                   | MVR1206-431H | 275 | 350 | 430 | 387-473 | 350A      | 1-10 | 710 |        |

## 1210 Size

| Part Number       |                | Working Voltage |                 | Breakdown Voltage |           | Peak Current   | Clamping Voltage |     | Surge Voltage V    |
|-------------------|----------------|-----------------|-----------------|-------------------|-----------|----------------|------------------|-----|--------------------|
|                   |                | AC              | DC              | @ 1mA DC          |           | 8/20uS         | 8/20uS           |     |                    |
|                   |                | V <sub>AC</sub> | V <sub>DC</sub> | VB                |           | I <sub>p</sub> | A                | V   |                    |
| 1210              | MVR1210-5R0G/H | 2.4             | 3.3             | 5                 | 4.0-6.0   | 250A/400A      | 1-10             | 12  | 600V<br>&<br>1000V |
|                   | MVR1210-8R0G/H | 4               | 5.5             | 5.5               | 6.6-9.9   | 250A/400A      | 1-10             | 18  |                    |
|                   | MVR1210-120G/H | 7               | 9               | 12                | 10.2-13.8 | 250A/400A      | 1-10             | 24  |                    |
|                   | MVR1210-180G/H | 11              | 14              | 18                | 15.3-21.7 | 250A/400A      | 1-10             | 30  |                    |
|                   | MVR1210-220G/H | 12              | 16              | 22                | 19.8-24.2 | 250A/400A      | 1-10             | 36  |                    |
|                   | MVR1210-240G/H | 14              | 18              | 24                | 21.6-26.4 | 250A/400A      | 1-10             | 38  |                    |
|                   | MVR1210-270G/H | 17              | 22              | 27                | 24.3-29.7 | 250A/400A      | 1-10             | 44  |                    |
|                   | MVR1210-300G/H | 18              | 24              | 30                | 27.2-33.0 | 250A/400A      | 1-10             | 48  |                    |
|                   | MVR1210-330G/H | 20              | 26              | 33                | 29.7-36.3 | 250A/400A      | 1-10             | 54  |                    |
|                   | MVR1210-360G/H | 22              | 28              | 36                | 32.7-39.6 | 250A/400A      | 1-10             | 59  |                    |
|                   | MVR1210-390G/H | 25              | 30              | 39                | 35.1-42.9 | 250A/400A      | 1-10             | 65  |                    |
|                   | MVR1210-420G/H | 26              | 33              | 42                | 38.1-46.2 | 250A/400A      | 1-10             | 72  |                    |
|                   | MVR1210-470G/H | 30              | 38              | 47                | 42.3-51.7 | 250A/400A      | 1-10             | 77  |                    |
|                   | MVR1210-560G/H | 35              | 45              | 56                | 50.4-61.6 | 250A/400A      | 1-10             | 90  |                    |
|                   | MVR1210-680G/H | 40              | 56              | 68                | 61.2-74.8 | 250A/400A      | 1-10             | 110 |                    |
|                   | MVR1210-760G/H | 45              | 60              | 76                | 69.1-83.6 | 250A/400A      | 1-10             | 126 |                    |
|                   | MVR1210-820G/H | 50              | 65              | 82                | 73.8-90.2 | 250A/400A      | 1-10             | 135 |                    |
|                   | MVR1210-101G/H | 60              | 85              | 100               | 90-110    | 250A/400A      | 1-10             | 165 |                    |
| 1210<br>High<br>V | MVR1210-121G   | 75              | 100             | 120               | 108-132   | 200A           | 5-10             | 200 | 600V<br>&<br>1300V |
|                   | MVR1210-171G   | 110             | 140             | 170               | 154-187   | 200A           | 5-10             | 300 |                    |
|                   | MVR1210-201G   | 130             | 170             | 200               | 185-225   | 200A           | 5-10             | 340 |                    |
|                   | MVR1210-221G   | 140             | 180             | 220               | 198-242   | 200A           | 5-10             | 360 |                    |
|                   | MVR1210-241G   | 150             | 200             | 240               | 216-264   | 200A           | 5-10             | 395 |                    |



# 深圳市康泰嵩隆电子科技有限公司

|              |     |     |     |         |      |      |     |       |
|--------------|-----|-----|-----|---------|------|------|-----|-------|
| MVR1210-271G | 175 | 225 | 270 | 243-297 | 200A | 5-10 | 455 | 1000V |
| MVR1210-391G | 250 | 320 | 270 | 351-429 | 200A | 5-10 | 650 |       |
| MVR1210-431G | 275 | 350 | 430 | 387-473 | 200A | 5-10 | 710 |       |
| MVR1210-471G | 300 | 385 | 470 | 423-517 | 200A | 5-10 | 775 |       |
| MVR1210-221H | 140 | 180 | 220 | 198-242 | 400A | 5-10 | 360 |       |
| MVR1210-241H | 150 | 200 | 240 | 216-264 | 400A | 5-10 | 395 |       |
| MVR1210-271H | 175 | 225 | 270 | 243-297 | 500A | 5-10 | 455 |       |
| MVR1210-391H | 250 | 320 | 270 | 351-429 | 500A | 5-10 | 650 |       |
| MVR1210-431H | 275 | 350 | 430 | 387-473 | 500A | 5-10 | 710 |       |
| MVR1210-471H | 300 | 385 | 470 | 423-517 | 500A | 5-10 | 775 |       |

## 1812 Size

| Part Number |                | Working Voltage |                 | Breakdown Voltage |           | Peak Current   | Clamping Voltage |     | Surge Voltage V |
|-------------|----------------|-----------------|-----------------|-------------------|-----------|----------------|------------------|-----|-----------------|
|             |                | AC              | DC              | @ 1mA DC          |           | 8/20uS         | 8/20uS           |     |                 |
|             |                | V <sub>AC</sub> | V <sub>DC</sub> | VB                |           | I <sub>p</sub> | A                | V   |                 |
| 1812        | MVR1812-8R0G/H | 4               | 5.5             | 5.5               | 6.6-9.9   | 500A/800A      | 1-10             | 18  | 1000V & 2000V   |
|             | MVR1812-120G/H | 7               | 9               | 12                | 10.2-13.8 | 500A/800A      | 1-10             | 24  |                 |
|             | MVR1812-180G/H | 11              | 14              | 18                | 15.3-21.7 | 500A/800A      | 1-10             | 30  |                 |
|             | MVR1812-220G/H | 12              | 16              | 22                | 19.8-24.2 | 500A/800A      | 1-10             | 36  |                 |
|             | MVR1812-240G/H | 14              | 18              | 24                | 21.6-26.4 | 500A/800A      | 1-10             | 38  |                 |
|             | MVR1812-270G/H | 17              | 22              | 27                | 24.3-29.7 | 500A/800A      | 1-10             | 44  |                 |
|             | MVR1812-300G/H | 18              | 24              | 30                | 27.2-33.0 | 500A/800A      | 1-10             | 48  |                 |
|             | MVR1812-330G/H | 20              | 26              | 33                | 29.7-36.3 | 500A/800A      | 1-10             | 54  |                 |
|             | MVR1812-360G/H | 22              | 28              | 36                | 32.7-39.6 | 500A/800A      | 1-10             | 59  |                 |
|             | MVR1812-390G/H | 25              | 30              | 39                | 35.1-42.9 | 500A/800A      | 1-10             | 65  |                 |
|             | MVR1812-420G/H | 26              | 33              | 42                | 38.1-46.2 | 500A/800A      | 1-10             | 72  |                 |
|             | MVR1812-470G/H | 30              | 38              | 47                | 42.3-51.7 | 500A/800A      | 1-10             | 77  |                 |
|             | MVR1812-560G/H | 35              | 45              | 56                | 50.4-61.6 | 500A/800A      | 1-10             | 90  |                 |
|             | MVR1812-680G/H | 40              | 56              | 68                | 61.2-74.8 | 500A/800A      | 1-10             | 110 |                 |
|             | MVR1812-760G/H | 45              | 60              | 76                | 69.1-83.6 | 500A/800A      | 1-10             | 126 |                 |
|             | MVR1812-820G/H | 50              | 65              | 82                | 73.8-90.2 | 500A/800A      | 1-10             | 135 |                 |
|             | MVR1812-101G/H | 60              | 85              | 100               | 90-110    | 500A/800A      | 1-10             | 165 |                 |
|             | MVR1812-121G/H | 75              | 100             | 120               | 108-132   | 500A/800A      | 1-10             | 200 |                 |
| 1812 High V | MVR1812-171G   | 110             | 140             | 170               | 154-187   | 500A           | 5-10             | 300 | 1000V           |
|             | MVR1812-201G   | 130             | 170             | 200               | 185-225   | 500A           | 5-10             | 340 |                 |
|             | MVR1812-221G   | 140             | 180             | 220               | 198-242   | 500A           | 5-10             | 360 |                 |
|             | MVR1812-241G   | 150             | 200             | 240               | 216-264   | 500A           | 5-10             | 395 |                 |
|             | MVR1812-271G   | 175             | 225             | 270               | 243-297   | 500A           | 5-10             | 455 |                 |
|             | MVR1812-391G   | 250             | 320             | 270               | 351-429   | 500A           | 5-10             | 650 |                 |
|             | MVR1812-431G   | 275             | 350             | 430               | 387-473   | 500A           | 5-10             | 710 |                 |



# 深圳市康泰嵩隆电子科技有限公司

|              |     |     |     |         |       |      |     |       |
|--------------|-----|-----|-----|---------|-------|------|-----|-------|
| MVR1812-471G | 300 | 385 | 470 | 423-517 | 500A  | 5-10 | 775 | 2000V |
| MVR1812-511G | 320 | 415 | 510 | 459-561 | 400A  | 5-10 | 845 |       |
| MVR1812-221H | 140 | 180 | 220 | 198-242 | 800A  | 5-10 | 360 |       |
| MVR1812-241H | 150 | 200 | 240 | 216-264 | 1000A | 5-10 | 395 |       |
| MVR1812-271H | 175 | 225 | 270 | 243-297 | 1000A | 5-10 | 455 |       |
| MVR1812-391H | 250 | 320 | 270 | 351-429 | 1000A | 5-10 | 650 |       |
| MVR1812-431H | 275 | 350 | 430 | 387-473 | 1000A | 5-10 | 710 |       |
| MVR1812-471H | 300 | 385 | 470 | 423-517 | 1000A | 5-10 | 775 |       |

## 2220 Size

| Part Number       |                | Working Voltage |                 | Breakdown Voltage |           | Peak Current   | Clamping Voltage |     | Surge Voltage V     |
|-------------------|----------------|-----------------|-----------------|-------------------|-----------|----------------|------------------|-----|---------------------|
|                   |                | AC              | DC              | @ 1mA DC          |           | 8/20uS         | 8/20uS           |     |                     |
|                   |                | V <sub>AC</sub> | V <sub>DC</sub> | VB                |           | I <sub>p</sub> | A                | V   |                     |
| 2220              | MVR2220-240G/H | 14              | 18              | 24                | 21.6-26.4 | 800A/1200A     | 1-10             | 38  | 2000V<br>&<br>2500V |
|                   | MVR2220-270G/H | 17              | 22              | 27                | 24.3-29.7 | 800A/1200A     | 1-10             | 44  |                     |
|                   | MVR2220-300G/H | 18              | 24              | 30                | 27.2-33.0 | 800A/1200A     | 1-10             | 48  |                     |
|                   | MVR2220-330G/H | 20              | 26              | 33                | 29.7-36.3 | 800A/1200A     | 1-10             | 54  |                     |
|                   | MVR2220-360G/H | 22              | 28              | 36                | 32.7-39.6 | 800A/1200A     | 1-10             | 59  |                     |
|                   | MVR2220-390G/H | 25              | 30              | 39                | 35.1-42.9 | 800A/1200A     | 1-10             | 65  |                     |
|                   | MVR2220-420G/H | 26              | 33              | 42                | 38.1-46.2 | 800A/1200A     | 1-10             | 72  |                     |
|                   | MVR2220-470G/H | 30              | 38              | 47                | 42.3-51.7 | 800A/1200A     | 1-10             | 77  |                     |
|                   | MVR2220-560G/H | 35              | 45              | 56                | 50.4-61.6 | 800A/1200A     | 1-10             | 90  |                     |
|                   | MVR2220-680G/H | 40              | 56              | 68                | 61.2-74.8 | 800A/1200A     | 1-10             | 110 |                     |
|                   | MVR2220-760G/H | 45              | 60              | 76                | 69.1-83.6 | 800A/1200A     | 1-10             | 126 |                     |
|                   | MVR2220-820G/H | 50              | 65              | 82                | 73.8-90.2 | 800A/1200A     | 1-10             | 135 |                     |
|                   | MVR2220-101G/H | 60              | 85              | 100               | 90-110    | 800A/1200A     | 1-10             | 165 |                     |
| 2220<br>High<br>V | MVR2220-201G   | 130             | 170             | 200               | 185-225   | 500A           | 5-10             | 340 | 1000V               |
|                   | MVR2220-221G   | 140             | 180             | 220               | 198-242   | 500A           | 5-10             | 360 |                     |
|                   | MVR2220-241G   | 150             | 200             | 240               | 216-264   | 500A           | 5-10             | 395 |                     |
|                   | MVR2220-271G   | 175             | 225             | 270               | 243-297   | 500A           | 5-10             | 455 |                     |
|                   | MVR2220-391G   | 250             | 320             | 270               | 351-429   | 500A           | 5-10             | 650 |                     |
|                   | MVR2220-431G   | 275             | 350             | 430               | 387-473   | 500A           | 5-10             | 710 |                     |
|                   | MVR2220-471G   | 300             | 385             | 470               | 423-517   | 500A           | 5-10             | 775 |                     |
|                   | MVR2220-511G   | 320             | 415             | 510               | 459-561   | 400A           | 5-10             | 845 | 2000V               |
|                   | MVR2220-221H   | 140             | 180             | 220               | 198-242   | 800A           | 5-10             | 360 |                     |
|                   | MVR2220-241H   | 150             | 200             | 240               | 216-264   | 1000A          | 5-10             | 395 |                     |
|                   | MVR2220-271H   | 175             | 225             | 270               | 243-297   | 1000A          | 5-10             | 455 |                     |
|                   | MVR2220-391H   | 250             | 320             | 390               | 351-429   | 1000A          | 5-10             | 650 |                     |
|                   | MVR2220-431H   | 275             | 350             | 430               | 387-473   | 1000A          | 5-10             | 710 |                     |
| MVR2220-471H      | 300            | 385             | 470             | 423-517           | 1000A     | 5-10           | 775              |     |                     |



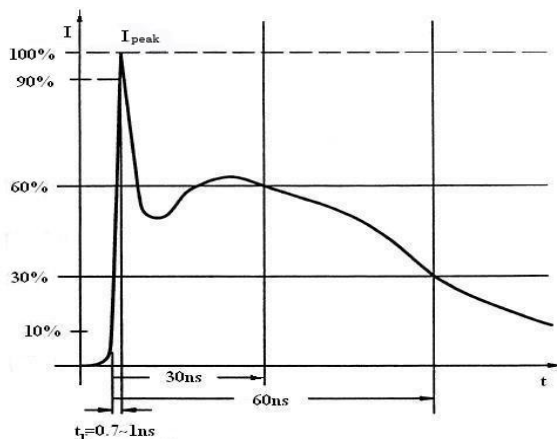
# 深圳市康泰嵩隆电子科技有限公司

|  |                 |     |     |     |         |       |      |     |       |
|--|-----------------|-----|-----|-----|---------|-------|------|-----|-------|
|  | MVR2220-511H    | 320 | 415 | 510 | 459-561 | 1000A | 5-10 | 845 |       |
|  | MVR2220-561H    | 350 | 460 | 620 | 558-682 | 1000A | 5-10 | 920 |       |
|  | MVR2220-391H152 | 250 | 320 | 390 | 351-429 | 1500A | 5-20 | 650 | 3000V |
|  | MVR2220-391H202 | 250 | 320 | 390 | 351-429 | 2000A | 5-20 | 650 | 4000V |
|  | MVR2220-471H152 | 300 | 385 | 470 | 423-517 | 1500A | 5-20 | 710 | 3000V |
|  | MVR2220-471H202 | 300 | 385 | 470 | 423-517 | 2000A | 5-20 | 710 | 4000V |

## 3220 Size

| Part Number |                 | Working Voltage |                 | Breakdown Voltage |         | Peak Current   | Clamping Voltage |     | Surge Voltage V |       |
|-------------|-----------------|-----------------|-----------------|-------------------|---------|----------------|------------------|-----|-----------------|-------|
|             |                 | AC              | DC              | @ 1mA DC          |         | 8/20uS         | 8/20uS           |     |                 |       |
|             |                 | V <sub>AC</sub> | V <sub>DC</sub> | VB                |         | I <sub>p</sub> | A                | V   |                 |       |
| 3220 High V | MVR3220-201G    | 130             | 170             | 200               | 185-225 | 500A           | 5-10             | 340 | 1000V           |       |
|             | MVR3220-221G    | 140             | 180             | 220               | 198-242 | 500A           | 5-10             | 360 |                 |       |
|             | MVR3220-241G    | 150             | 200             | 240               | 216-264 | 500A           | 5-10             | 395 |                 |       |
|             | MVR3220-271G    | 175             | 225             | 270               | 243-297 | 500A           | 5-10             | 455 |                 |       |
|             | MVR3220-391G    | 250             | 320             | 270               | 351-429 | 500A           | 5-10             | 650 |                 |       |
|             | MVR3220-431G    | 275             | 350             | 430               | 387-473 | 450A           | 5-10             | 710 |                 |       |
|             | MVR3220-471G    | 300             | 385             | 470               | 423-517 | 450A           | 5-10             | 775 |                 |       |
|             | MVR3220-511G    | 320             | 415             | 510               | 459-561 | 450A           | 5-10             | 845 | 2000V           |       |
|             | MVR3220-221H    | 140             | 180             | 220               | 198-242 | 800A           | 5-10             | 360 |                 |       |
|             | MVR3220-241H    | 150             | 200             | 240               | 216-264 | 1000A          | 5-10             | 395 |                 |       |
|             | MVR3220-271H    | 175             | 225             | 270               | 243-297 | 1000A          | 5-10             | 455 |                 |       |
|             | MVR3220-391H    | 250             | 320             | 270               | 351-429 | 1000A          | 5-10             | 650 |                 |       |
|             | MVR3220-431H    | 275             | 350             | 430               | 387-473 | 1000A          | 5-10             | 710 |                 |       |
|             | MVR3220-471H    | 300             | 385             | 470               | 423-517 | 1000A          | 5-10             | 775 |                 |       |
|             | MVR3220-511H    | 320             | 415             | 510               | 459-561 | 1000A          | 5-10             | 845 |                 |       |
|             | MVR3220-561H    | 350             | 460             | 620               | 558-682 | 1000A          | 5-10             | 920 |                 |       |
|             | MVR3220-471H152 | 300             | 385             | 470               | 423-517 | 1500A          | 5-20             | 710 |                 | 3000V |
|             | MVR3220-471H302 | 300             | 385             | 470               | 423-517 | 3000A          | 5-20             | 710 |                 | 6000V |

## ESD Wave Form

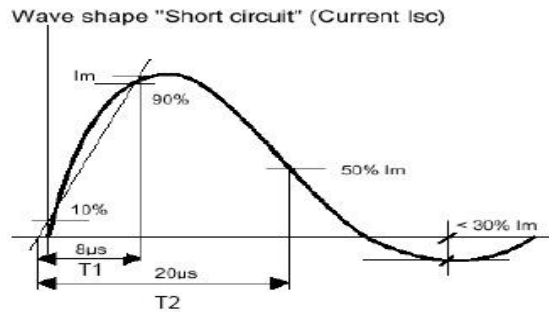


| SEVERITY LEVEL | AIRDIRCHARGE | DIRECT ISCHARGE |
|----------------|--------------|-----------------|
| 1              | 2 kV         | 2 kV            |
| 2              | 4 kV         | 4 kV            |
| 3              | 8 kV         | 6 kV            |
| 4              | 15 kV        | 8 kV            |

IEC61000-4-2 Compliant ESD Current Pulse Waveform

## IEC61000-4-2 Standards

### Surge Wave Form



| SEVERITY LEVEL | T1        | T2         |
|----------------|-----------|------------|
| 1              | 8 $\mu$ S | 20 $\mu$ S |

## IEC61000-4-5 Standards

### Enviromental Reliability Test

| Characteristic                   | Test method and description                                                                                                                                                                                                                         |      |                  |               |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---------------|
| High Temperature Storage         | The specimen shall be subjected to 125°C for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. The change of varistor voltage shall be within 10%.                                  |      |                  |               |
| Temperature Cycle                | The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and humidity for one two hours. The change of varistor voltage shall be within 10% and mechanical damage shall be examined.         | Step | Temperature      | Period        |
|                                  |                                                                                                                                                                                                                                                     | 1    | -40 $\pm$ 3°C    | 30min $\pm$ 3 |
|                                  |                                                                                                                                                                                                                                                     | 2    | Room Temperature | 1~2hours      |
|                                  |                                                                                                                                                                                                                                                     | 3    | 125 $\pm$ 2°C    | 30min $\pm$ 3 |
| High Temperature Load            | After being continuously applied the maximum allowable voltage at 85°C for 1000hours, the specimen shall be stored at room temperature and humidity for one or hours, the change of varistor voltage shall be within 10%.                           |      |                  |               |
| Damp Heat Load/<br>Humidity Load | The specimen should be subjected to 40°C, 90 to 95%RH environment, and the maximum allowable voltage applied for 1000 hours, then stored at room temperature and humidity for one or two hours. The change of varistor voltage shall be within 10%. |      |                  |               |
| Low Temperature Storage          | The specimen should be subjected to -40°C, without load for 1000 hours and then stored at room temperature for one two hours. The change of varistor voltage shall be within 10%.                                                                   |      |                  |               |

## 7.Soldering Recommendation

The principal techniques used for the soldering of components in surface mount technology are infrared reflow and wave soldering.

### 7.1 wave Soldering

When wave soldering. The MLCV is attach to the circuit board by means of an adhesive. The assembly is then place on a conveyor and run though the soldering process to contact the wave. Wave soldering is the most strenuous of the processes. To avoid the possibility of generating stresses due to thermal shock., a preheat stage in the



soldering process is recommended, and the peak temperature of the solder process should be rigidly controlled. The following is the typical profiles.

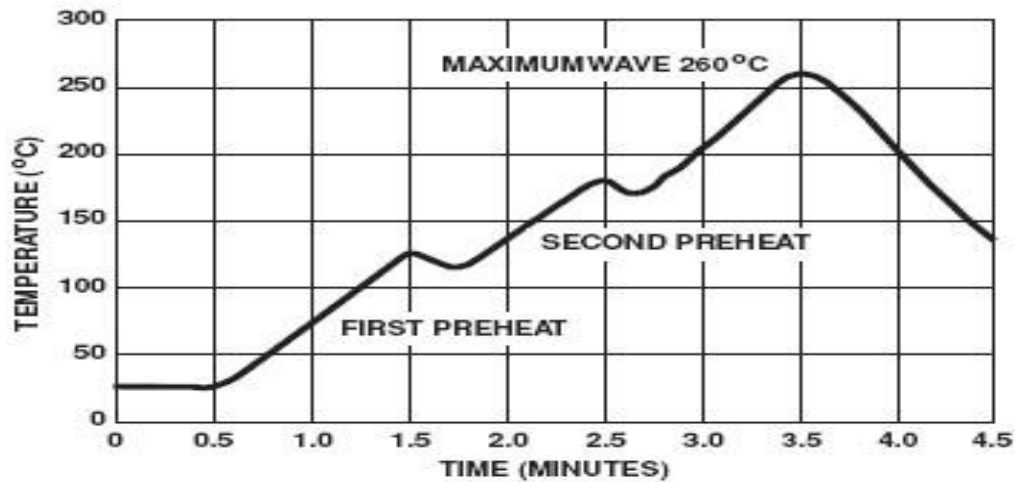


FIGURE 6. WAVE SOLDER PROFILE

## 7.2 Reflow Soldering

When reflow soldering, the device is placed a solder paste on the substrate ,as the solder paste is heated, it re-flows and solders the unite to board. When using a reflow process ,care should be taken to ensure that the MLCV is not subjected to an thermal gradient steeper than 4 degrees per second; the ideal gradient being 2degrees per second. During the soldering process, preheating to within 100 degrees of the soldier's peak temperature is essential to minimize thermal shock. The following is typical profile.

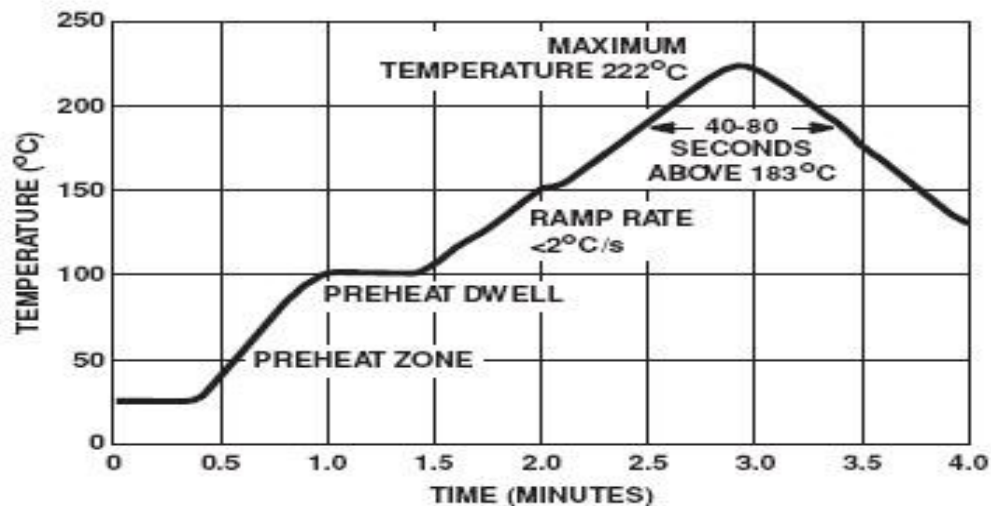


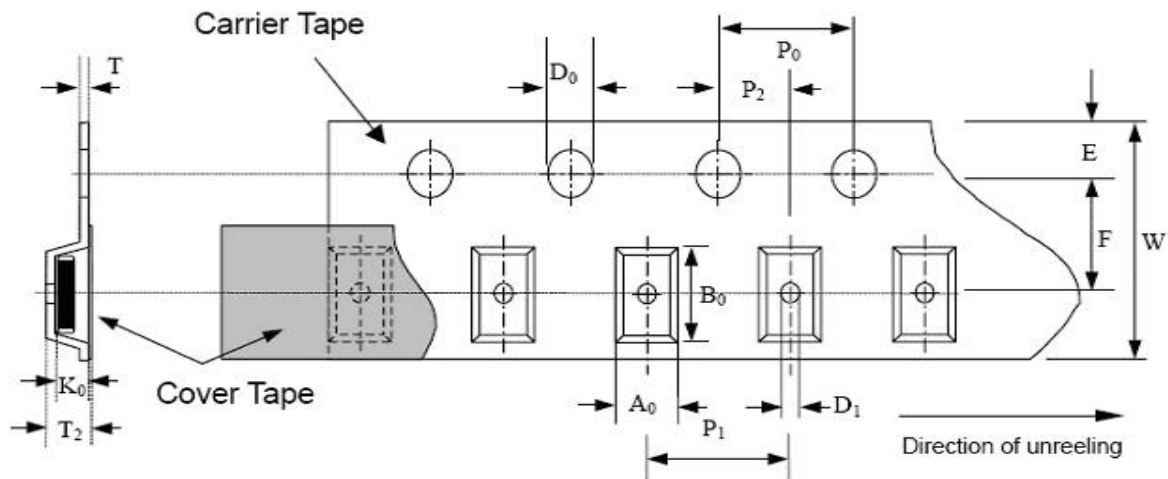
FIGURE 5. REFLOW SOLDER PROFILE

## 8 Packaging Specification

**8.1** Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.

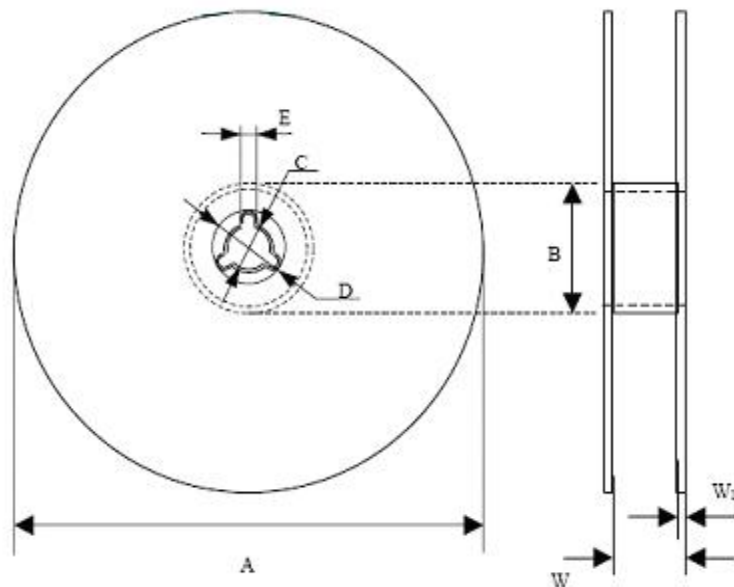
**8.2** The adhesion of the heat-sealed cover tape shall be  $40 \pm 20 / - 15$  grams.

**8.3** Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator handle.



| type | A <sub>0</sub><br>±0.10 | B <sub>0</sub><br>±0.10 | K <sub>0</sub><br>±0.10 | T<br>±0.05 | T <sub>2</sub><br>±0.05 | D <sub>0</sub><br>+0.10<br>-0.00 | D <sub>1</sub><br>±0.05 | P <sub>1</sub><br>±0.10 | P <sub>2</sub><br>±0.05 | P <sub>0</sub><br>±0.05 | W<br>±0.20 | E<br>±0.10 | F<br>±0.05 |
|------|-------------------------|-------------------------|-------------------------|------------|-------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------|------------|------------|
| 0402 | 0.85                    | 1.25                    | 0.65                    | 0.22       | 0.87                    | 1.50                             | 1.00                    | 3.00                    | 2.00                    | 4.00                    | 8.00       | 1.75       | 3.50       |
| 0603 | 1.08                    | 1.88                    | 0.95                    | 0.22       | 1.17                    | 1.50                             | 1.00                    | 4.00                    | 2.00                    | 4.00                    | 8.00       | 1.75       | 3.50       |
| 0805 | 1.42                    | 2.30                    | 0.95                    | 0.22       | 1.26                    | 1.50                             | 1.00                    | 4.00                    | 2.00                    | 4.00                    | 8.00       | 1.75       | 3.50       |
| 1206 | 1.88                    | 3.50                    | 1.27                    | 0.20       | 1.49                    | 1.50                             | 1.00                    | 4.00                    | 2.00                    | 4.00                    | 8.00       | 1.75       | 3.50       |
| 1210 | 2.18                    | 3.46                    | 1.45                    | 0.22       | 1.77                    | 1.50                             | 1.00                    | 4.00                    | 2.00                    | 4.00                    | 8.00       | 1.75       | 3.50       |
| 1812 | 3.66                    | 4.95                    | 1.74                    | 0.25       | 1.99                    | 1.50                             | 1.50                    | 8.00                    | 2.00                    | 4.00                    | 12.00      | 1.75       | 5.50       |
| 2220 | 5.10                    | 5.97                    | 2.80                    | 0.25       | 3.05                    | 1.50                             | 1.50                    | 8.00                    | 2.00                    | 4.00                    | 12.00      | 1.75       | 5.50       |
| 2225 | 5.10                    | 6.57                    | 2.80                    | 0.25       | 3.05                    | 1.50                             | 1.50                    | 8.00                    | 2.00                    | 4.00                    | 12.00      | 1.75       | 5.50       |
| 3220 | 5.50                    | 8.50                    | 2.80                    | 1.00       | 3.05                    | 1.50                             | 1.50                    | 8.00                    | 2.00                    | 4.00                    | 12.00      | 1.75       | 7.50       |

## 9. reel dimension



| type | A         | B        | C        | D        | E       | W        | W <sub>1</sub> |
|------|-----------|----------|----------|----------|---------|----------|----------------|
| 0402 | 178.0±1.0 | 60.0±0.5 | 13.0±0.2 | 21.0±0.2 | 2.0±0.5 | 9.0±0.50 | 1.5±0.15       |
| 0603 | 178.0±1.0 | 60.0±0.5 | 13.0±0.2 | 21.0±0.2 | 2.0±0.5 | 9.0±0.50 | 1.5±0.15       |
| 0805 | 178.0±1.0 | 60.0±0.5 | 13.0±0.2 | 21.0±0.2 | 2.0±0.5 | 9.0±0.50 | 1.5±0.15       |
| 1206 | 178.0±1.0 | 60.0±0.5 | 13.0±0.2 | 21.0±0.2 | 2.0±0.5 | 9.0±0.50 | 1.5±0.15       |
| 1210 | 178.0±1.0 | 60.0±0.5 | 13.0±0.2 | 21.0±0.2 | 2.0±0.5 | 9.0±0.50 | 1.5±0.15       |
| 1812 | 178.0±1.0 | 60.0±0.5 | 13.5±0.1 | 21.0±0.2 | 2.0±0.5 | 13.6±0.2 | 1.5±0.15       |
| 2220 | 178.0±1.0 | 60.0±0.5 | 13.5±0.1 | 21.0±0.2 | 2.0±0.5 | 13.6±0.2 | 1.5±0.15       |
| 3220 | 178.0±1.0 | 60.0±0.5 | 13.5±0.1 | 21.0±0.2 | 2.0±0.5 | 13.6±0.2 | 1.5±0.15       |

| type             | 0402    | 0603  | 0805 | 1206 | 1210 | 1812 | 2220     | 3220     |
|------------------|---------|-------|------|------|------|------|----------|----------|
| quantity         | paper   | 10000 | 4000 | 4000 | -    | -    | -        | -        |
|                  | plastic | -     | -    | -    | 3000 | 3000 | 3000     | 500/1000 |
| Minimum ordering | -       | 4000  | 4000 | 3000 | 3000 | 3000 | 500/1000 | 500/1000 |