




**BOURNS®**

## Features

- Compliant with AEC-Q200 Rev-C- Stress Test Qualification for Passive Components in Automotive Applications
- Surface Mount Devices
- Fully compatible with current industry standards
- Packaged per EIA 481-2 standard
- RoHS compliant\* and halogen free\*\*
- Agency recognition:   
- Patents pending

## MF-SM Series - PTC Resettable Fuses

### Electrical Characteristics

| Model        | V max. Volts | I max Amps | I <sub>hold</sub> | I <sub>trip</sub> | Resistance    |         | Max. Time To Trip |                  | Tripped Power Dissipation |
|--------------|--------------|------------|-------------------|-------------------|---------------|---------|-------------------|------------------|---------------------------|
|              |              |            | Amperes at 23 °C  |                   | Ohms at 23 °C |         | Amperes at 23 °C  | Seconds at 23 °C | Watts at 23 °C            |
|              |              |            | Hold              | Trip              | R Min.        | R1 Max. | Max.              | Typ.             |                           |
| MF-SM030     | 60           | 40         | 0.30              | 0.60              | 0.90          | 4.80    | 1.5               | 3.0              | 1.7                       |
| MF-SM050     | 60           | 40         | 0.50              | 1.00              | 0.35          | 1.40    | 2.5               | 4.0              | 1.7                       |
| MF-SM075     | 30           | 80         | 0.75              | 1.50              | 0.23          | 1.00    | 8.0               | 0.3              | 1.7                       |
| MF-SM075/60* | 60           | 10         | 0.75              | 1.50              | 0.23          | 1.00    | 8.0               | 0.3              | 1.7                       |
| MF-SM100     | 30           | 80         | 1.10              | 2.20              | 0.12          | 0.48    | 8.0               | 0.5              | 1.7                       |
| MF-SM100/33  | 33           | 40         | 1.10              | 2.20              | 0.12          | 0.41    | 8.0               | 0.5              | 1.7                       |
| MF-SM125     | 15           | 100        | 1.25              | 2.50              | 0.07          | 0.25    | 8.0               | 2.0              | 1.7                       |
| MF-SM150     | 15           | 100        | 1.50              | 3.00              | 0.06          | 0.25    | 8.0               | 5.0              | 1.9                       |
| MF-SM150/33  | 33           | 40         | 1.50              | 3.00              | 0.06          | 0.23    | 8.0               | 5.0              | 1.9                       |
| MF-SM185/33  | 33           | 40         | 1.80              | 3.60              | 0.04          | 0.15    | 8.0               | 5.0              | 1.9                       |
| MF-SM200     | 15           | 100        | 2.00              | 4.00              | 0.045         | 0.125   | 8.0               | 12.0             | 1.9                       |
| MF-SM250     | 15           | 100        | 2.50              | 5.00              | 0.024         | 0.085   | 8.0               | 25.0             | 1.9                       |
| MF-SM260     | 6            | 100        | 2.60              | 5.20              | 0.025         | 0.075   | 8.0               | 20.0             | 1.7                       |
| MF-SM300**   | 6            | 100        | 3.00              | 6.00              | 0.015         | 0.048   | 8.0               | 35.0             | 1.5                       |

\*CSA recognition pending. \*\*UL approved, CSA & TUV approval pending.

### Environmental Characteristics

|   |  |
|---|--|
| Operating Temperature.....                                | -40 °C to +85 °C   |
| Maximum Device Surface Temperature in Tripped State ..... | 125 °C   |
| Passive Aging .....                                       | +85 °C, 1000 hours ..... ±5 % typical resistance change          |
| Humidity Aging .....                                      | +85 °C, 85 % R.H. 7 days ..... ±5 % typical resistance change    |
| Thermal Shock .....                                       | MIL-STD-202F, Method 107G, ..... ±10 % typical resistance change |
|   | +125 °C to -55 °C, 10 cycles                                     |
| Vibration .....   | MIL-STD-883C, Method 2007.1, Condition A ..... No change         |

### Test Procedures And Requirements For Model MF-SM Series

| Test                 | Test Conditions                                       | Accept/Reject Criteria                   |
|----------------------|---|--|
| Visual/Mech.....     | Verify dimensions and materials.....                  | Per MF physical description              |
| Resistance.....      | In still air @ 23 °C.....                             | R <sub>min</sub> ≤ R ≤ R <sub>1max</sub> |
| Time to Trip.....    | At specified current, V <sub>max</sub> , 23 °C .....  | T ≤ max. time to trip (seconds)          |
| Hold Current.....    | 30 min. at I <sub>hold</sub> .....                    | No trip                                  |
| Trip Cycle Life..... | V <sub>max</sub> , I <sub>max</sub> , 100 cycles..... | No arcing or burning                     |
| Trip Endurance ..... | V <sub>max</sub> , 48 hours .....                     | No arcing or burning                     |
| Solderability.....   | MIL-STD-202F, Method 208F.....                        | 95 % min. coverage                       |

UL File Number ..... E174545 <http://www.ul.com/> Follow link to Certifications, then UL File No., enter E174545  
 CSA File Number..... CA110338 <http://directories.csa-international.org/> Under "Certification Record" and "File Number" enter 110338-0-000  
 TÜV Certificate Number .. R 02057213 <http://www.tuvdotcom.com/> Follow link to "other certificates", enter File No. 2057213

### Thermal Derating Chart - I<sub>hold</sub> (Amps)

| Model       | Ambient Operating Temperature |        |      |       |       |       |       |       |       |  |
|-------------|-------------------------------|--------|------|-------|-------|-------|-------|-------|-------|--|
|             | -40 °C                        | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |  |
| MF-SM030    | 0.45                          | 0.40   | 0.35 | 0.30  | 0.25  | 0.23  | 0.20  | 0.17  | 0.14  |  |
| MF-SM050    | 0.76                          | 0.67   | 0.59 | 0.50  | 0.42  | 0.38  | 0.33  | 0.29  | 0.23  |  |
| MF-SM075    | 1.11                          | 0.99   | 0.84 | 0.75  | 0.63  | 0.57  | 0.49  | 0.45  | 0.36  |  |
| MF-SM075/60 | 1.11                          | 0.99   | 0.84 | 0.75  | 0.63  | 0.57  | 0.49  | 0.45  | 0.36  |  |
| MF-SM100    | 1.66                          | 1.47   | 1.29 | 1.10  | 0.91  | 0.83  | 0.73  | 0.64  | 0.50  |  |
| MF-SM100/33 | 1.66                          | 1.47   | 1.29 | 1.10  | 0.91  | 0.83  | 0.73  | 0.64  | 0.50  |  |
| MF-SM125    | 1.89                          | 1.68   | 1.46 | 1.25  | 1.04  | 0.94  | 0.83  | 0.73  | 0.56  |  |
| MF-SM150    | 2.27                          | 2.01   | 1.76 | 1.50  | 1.25  | 1.13  | 0.99  | 0.87  | 0.68  |  |
| MF-SM150/33 | 2.27                          | 2.01   | 1.76 | 1.50  | 1.25  | 1.13  | 0.99  | 0.87  | 0.68  |  |
| MF-SM185/33 | 2.56                          | 2.32   | 2.08 | 1.85  | 1.60  | 1.44  | 1.28  | 1.12  | 0.88  |  |
| MF-SM200    | 3.02                          | 2.68   | 2.34 | 2.00  | 1.66  | 1.50  | 1.32  | 1.16  | 0.90  |  |
| MF-SM250    | 3.78                          | 3.35   | 2.93 | 2.50  | 2.08  | 1.88  | 1.65  | 1.45  | 1.13  |  |
| MF-SM260    | 3.64                          | 3.25   | 2.91 | 2.60  | 2.26  | 2.08  | 1.95  | 1.74  | 1.48  |  |
| MF-SM300    | 4.13                          | 3.75   | 3.30 | 2.87  | 2.62  | 2.43  | 2.25  | 2.00  | 1.78  |  |

I<sub>trip</sub> is approximately two times I<sub>hold</sub>.

\*RoHS Directive 2002/95/EC Jan 27, 2003 including Annex.

\*\*To be considered halogen free, each homogenous material can have a maximum concentration of 900 ppm of either bromine or chlorine.

Specifications are subject to change without notice.

Customers should verify actual device performance in their specific applications.

## Applications

Almost anywhere there is a low voltage power supply and a load to be protected, including:

- Computers & peripherals
- General electronics
- Automotive applications

## MF-SM Series - PTC Resettable Fuses

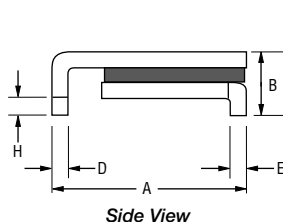
**BOURNS®**

### Product Dimensions

| Model       | A               |                 | B               | C               | D               |                 | E               |                 | F               |                 | G               |                 | H               |
|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|             | Min.            | Max.            | Max.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            | Max.            | Min.            |
| MF-SM030    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.18<br>(0.125) | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM050    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.18<br>(0.125) | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM075    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.18<br>(0.125) | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM075/60 | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.18<br>(0.125) | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM100    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.0<br>(0.118)  | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM100/33 | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.0<br>(0.118)  | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM125    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.0<br>(0.118)  | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM150    | 8.00<br>(0.315) | 9.50<br>(0.374) | 3.0<br>(0.118)  | 6.71<br>(0.264) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 3.68<br>(0.145) | 3.94<br>(0.155) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM150/33 | 8.00<br>(0.315) | 9.50<br>(0.374) | 3.0<br>(0.118)  | 6.71<br>(0.264) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 3.68<br>(0.145) | 3.94<br>(0.155) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM185/33 | 8.00<br>(0.315) | 9.50<br>(0.374) | 3.0<br>(0.118)  | 6.71<br>(0.264) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 3.68<br>(0.145) | 3.94<br>(0.155) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM200    | 8.00<br>(0.315) | 9.50<br>(0.374) | 3.0<br>(0.118)  | 6.71<br>(0.264) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 3.68<br>(0.145) | 3.94<br>(0.155) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM250    | 8.00<br>(0.315) | 9.50<br>(0.374) | 3.0<br>(0.118)  | 6.71<br>(0.264) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 3.68<br>(0.145) | 3.94<br>(0.155) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM260    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.0<br>(0.118)  | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |
| MF-SM300    | 6.73<br>(0.265) | 7.98<br>(0.314) | 3.0<br>(0.118)  | 5.44<br>(0.214) | 0.56<br>(0.022) | 0.71<br>(0.028) | 0.56<br>(0.022) | 0.71<br>(0.028) | 2.16<br>(0.085) | 2.41<br>(0.095) | 0.66<br>(0.026) | 1.37<br>(0.054) | 0.43<br>(0.017) |

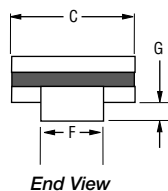
Packaging:

TAPE & REEL: MF-SM030, 050, 075, 075/60, 100, 100/33, 125, 260, 300 = 2000 pcs. per reel;  
MF-SM150, 150/33, 185/33, 200, 250 = 1500 pcs. per reel.

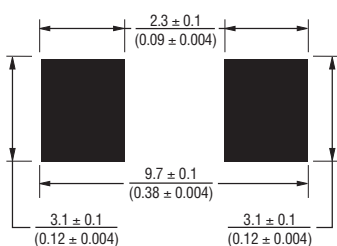


DIMENSIONS: MM  
(INCHES)

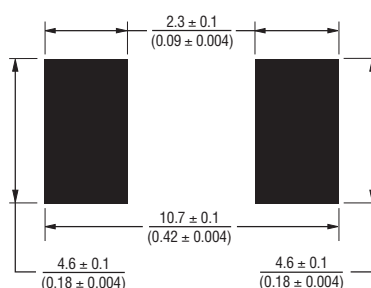
Terminal material:  
Tin-plated brass



Recommended Pad Layout  
MF-SM030, 050, 075, 075/60, 100, 100/33, 125, 260, 300



Recommended Pad Layout  
MF-SM150, 150/33, 185/33, 200, 250



### How to Order

#### MF - SM 100/33 - 2 - 99

Multifuse® Product Designator \_\_\_\_\_  
Series \_\_\_\_\_  
SM = Surface Mount Component  
Hold Current,  $I_{hold}/V_{max}^*$   
030 - 300 (0.3 - 3.0 Amps)  
Packaging Options  
- 2 = Tape and Reel\*\*  
Part Number Suffix Option \_\_\_\_\_

- 99 = As of date code April 1, 2005 all MF-SM models are RoHS compliant. The suffix "-99" can be used if a new part number is required to reference the RoHS compliance.

Examples:  
MF-SM030-2 ..... Tape and reel packaging  
MF-SM030-2-99..... Tape and reel packaging with part number suffix option  
MF-SM150-2 ..... Tape and reel packaging  
MF-SM150/33-2-99 .. Tape and reel packaging with part number suffix option

\*  $V_{max}$  entry applies only to models MF-SM075/60, MF-SM100/33, MF-SM150/33 & MF-SM185/33.

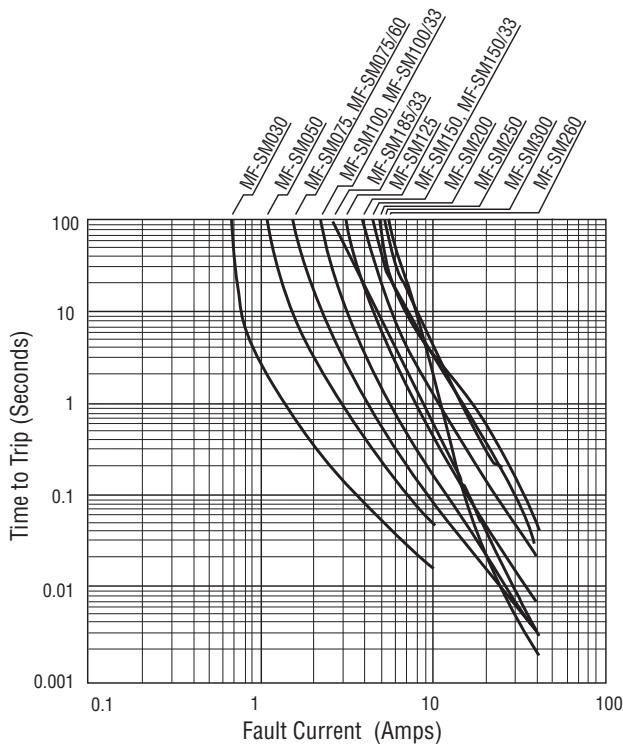
\*\* Packaged per EIA-481-2

Specifications are subject to change without notice.  
Customers should verify actual device performance in their specific applications.

# MF-SM Series - PTC Resettable Fuses

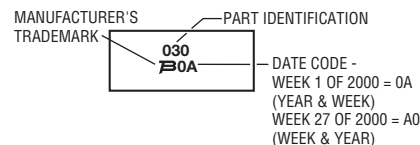


## Typical Time to Trip at 23 °C

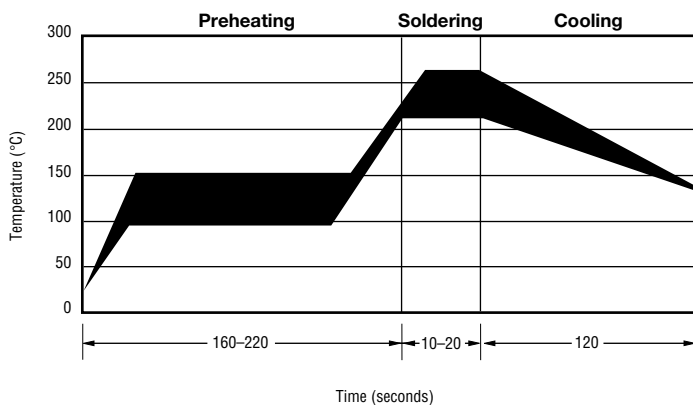


## Typical Part Marking

Represents total content. Layout may vary.



## Solder Reflow Recommendations



### Solder reflow

- Recommended reflow methods: IR, vapor phase oven, hot air oven.
- Devices are not designed to be wave soldered to the bottom side of the board.
- Gluing the devices is not recommended.
- Recommended maximum paste thickness is 0.25 mm (.010 inch).
- Devices can be cleaned using standard industry methods and solvents.

### Note:

- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

### Rework

- A device should not be reworked.

## Storage Recommendations

The recommended long term storage conditions for Multifuse® Polymer PTC devices are 40 °C maximum and 70 % RH maximum. All devices should remain in the original sealed packaging prior to use. Devices may not conform with data sheet specifications if these storage recommendations are exceeded. Devices stored in this manner have an indefinite shelf life.

**MF-SM, MF-SM/33, MF-SM/60 & MF-SM/250 Series Tape and Reel Specifications**

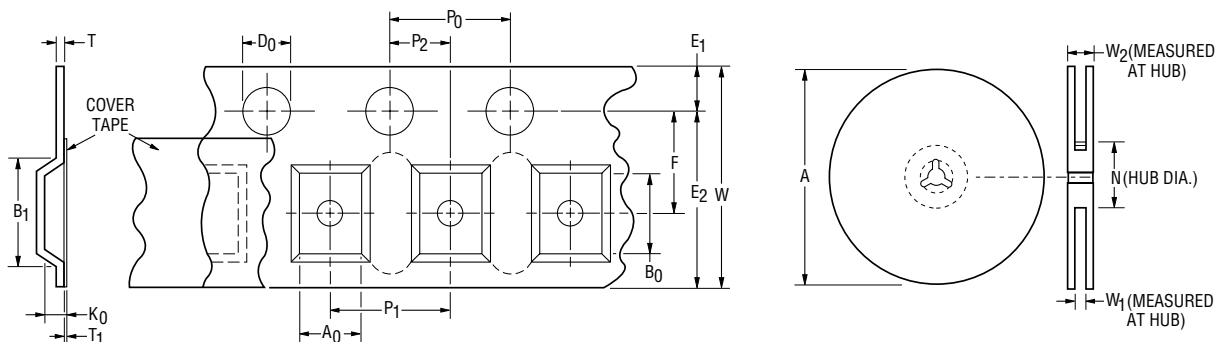


NOTE: Effective December 1, 2010 (product date code V0), the cover tape will be changed to the new 3M™ Universal Cover Tape (UCT).

| Tape Dimensions        | MF-SM030, 050, 075, 100, 125, 260, 300;<br>MF-SM075/60; MF-SM-100/33 | MF-SM150, 200, 250;<br>MF-SM-150/33, MF-SM-185/33;<br>MF-SM013/250 per EIA 481-2 |
|------------------------|--|--|
|                        | per EIA-481-2  | per EIA 481-2  |
| W                      | $\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$                             | $\frac{16.0 \pm 0.3}{(0.630 \pm 0.012)}$   |
| P <sub>0</sub>         | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$                              | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$  |
| P <sub>1</sub>         | $\frac{8.0 \pm 0.1}{(0.315 \pm 0.004)}$                              | $\frac{12.0 \pm 0.1}{(0.472 \pm 0.004)}$   |
| P <sub>2</sub>         | $\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$                              | $\frac{2.0 \pm 0.1}{(0.079 \pm 0.004)}$  |
| A <sub>0</sub>         | $\frac{5.7 \pm 0.1}{(0.224 \pm 0.004)}$                              | $\frac{6.9 \pm 0.1}{(0.272 \pm 0.004)}$  |
| B <sub>0</sub>         | $\frac{8.1 \pm 0.1}{(0.319 \pm 0.004)}$                              | $\frac{9.6 \pm 0.1}{(0.378 \pm 0.004)}$  |
| B <sub>1</sub> max.    | $\frac{12.1}{(0.476)}$   | $\frac{12.1}{(0.476)}$   |
| D <sub>0</sub>         | $\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$                          | $\frac{1.5 + 0.1/-0.0}{(0.059 + 0.004/-0)}$                                      |
| F                      | $\frac{7.5 \pm 0.1}{(0.295 + 0.004)}$                                | $\frac{7.5 \pm 0.1}{(0.295 + 0.004)}$  |
| E <sub>1</sub>         | $\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$                             | $\frac{1.75 \pm 0.1}{(0.069 \pm 0.004)}$   |
| E <sub>2</sub> min.    | $\frac{14.25}{(0.561)}$  | $\frac{14.25}{(0.561)}$  |
| T max.                 | $\frac{0.6}{(0.024)}$  | $\frac{0.6}{(0.024)}$  |
| T <sub>1</sub> max.    | $\frac{0.1}{(0.004)}$  | $\frac{0.1}{(0.004)}$  |
| K <sub>0</sub>         | $\frac{3.4 \pm 0.1}{(0.134 \pm 0.004)}$                              | $\frac{3.4 \pm 0.1^*}{(0.134 \pm 0.004)^*}$                                      |
| Leader min.            | $\frac{390}{(15.35)}$  | $\frac{390}{(15.35)}$  |
| Trailer min.           | $\frac{160}{(6.30)}$   | $\frac{160}{(6.30)}$   |
| <b>Reel Dimensions</b> |  |  |
| A max.                 | $\frac{360}{(14.17)}$  | $\frac{360}{(14.17)}$  |
| N min.                 | $\frac{50}{(1.97)}$  | $\frac{50}{(1.97)}$  |
| W <sub>1</sub>         | $\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$                         | $\frac{16.4 + 2.0/-0.0}{(0.646 + 0.079/-0)}$                                     |
| W <sub>2</sub> max.    | $\frac{22.4}{(0.882)}$   | $\frac{22.4}{(0.882)}$   |

\* Model MF-SM013/250 =  $\frac{3.8 \pm 0.1}{(0.150 \pm 0.004)}$

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



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Customers should verify actual device performance in their specific applications.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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