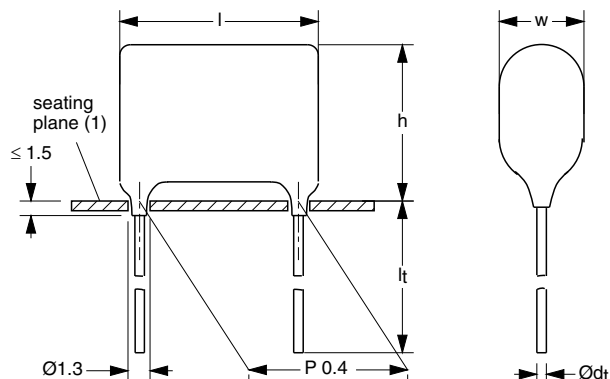


# Metallized Polyester Film Capacitors MKT Radial Potted Type



Dimensions in mm

(1) Hole  $\varnothing 1.0$  for  $d_t = 0.6$  mm

## FEATURES

Available taped on reel and loose in box

- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## CAPACITANCE TOLERANCE

$\pm 10\%$ ;  $\pm 5\%$

## RATED (DC) VOLTAGE

63 V; 100 V; 250 V; 400 V; 630 V

## RATED (AC) VOLTAGE

40 V; 63 V; 160 V; 220 V; 250 V

## CLIMATIC CATEGORY

55/105/56

## RATED TEMPERATURE

85 °C

## MAXIMUM APPLICATION TEMPERATURE

105 °C

## REFERENCE SPECIFICATIONS

IEC 60384-2

## PERFORMANCE GRADE

Grade 1 (long life)

## DETAIL SPECIFICATION

For more detailed data and test requirements see "Type detail specification HQN-384-02/101"

## APPLICATIONS

Blocking and coupling. Bypass and energy reservoir

## MARKING

C-value; tolerance; rated voltage

## DIELECTRIC

Polyester film

## ELECTRODES

Vacuum deposited aluminium

## COATING

Flame retardant epoxy material (UL-class 94 V-0)

## CONSTRUCTION

Wound mono construction

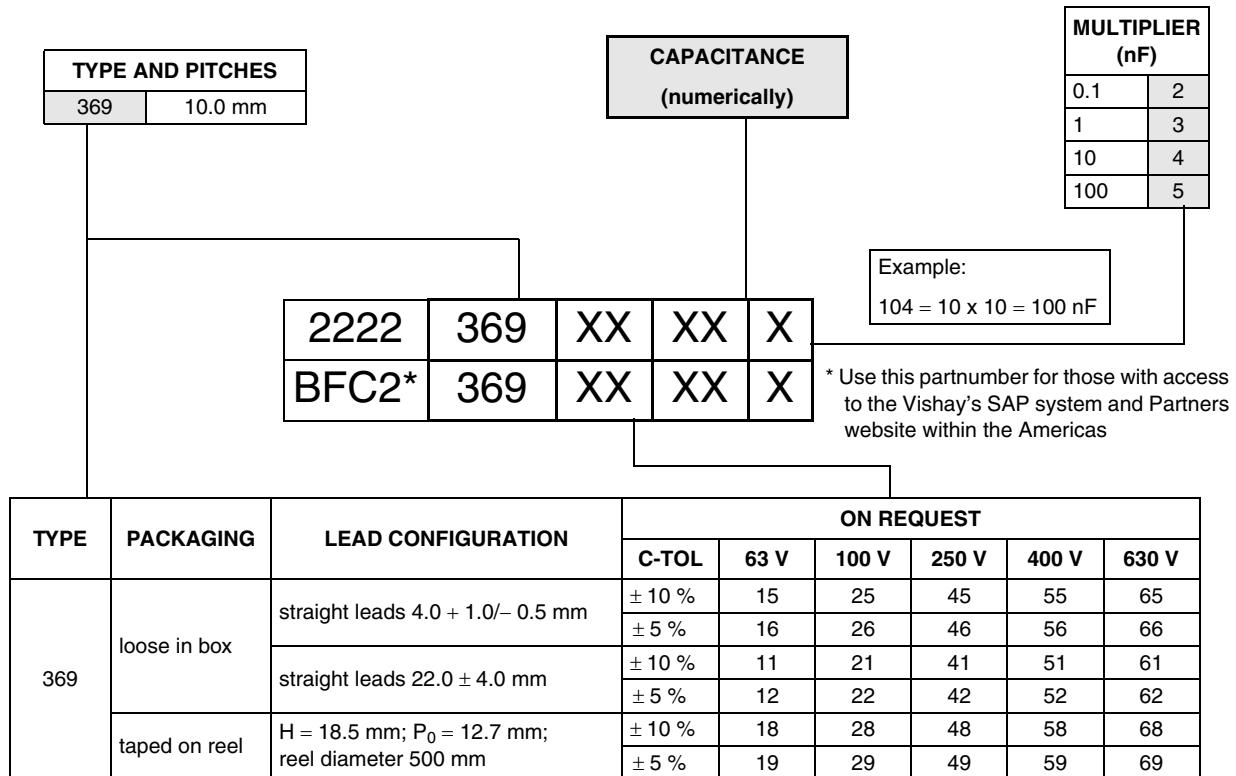
## LEADS

Tinned wire

## CAPACITANCE RANGE (E12 SERIES)

0.001 to 1.0  $\mu$ F

## COMPOSITION OF CATALOG NUMBER



## SPECIFIC REFERENCE DATA

| DESCRIPTION                                                                                                  | VALUE                   |                 |                          |                 |                          |
|--------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|--------------------------|-----------------|--------------------------|
| Tangent of loss angle:<br>C ≤ 0.47 μF<br>0.47 μF < C ≤ 1.0 μF<br>C ≥ 0.1 μF                                  | at 1 kHz                |                 | at 10 kHz                |                 | at 100 kHz               |
|                                                                                                              | ≤ 75 × 10 <sup>-4</sup> |                 | ≤ 130 × 10 <sup>-4</sup> |                 | ≤ 300 × 10 <sup>-4</sup> |
|                                                                                                              | ≤ 75 × 10 <sup>-4</sup> |                 | ≤ 130 × 10 <sup>-4</sup> |                 | ≤ 225 × 10 <sup>-4</sup> |
|                                                                                                              | ≤ 75 × 10 <sup>-4</sup> |                 | ≤ 130 × 10 <sup>-4</sup> |                 | ≤ 300 × 10 <sup>-4</sup> |
| Rated voltage pulse slope (dU/dt) <sub>R</sub>                                                               | at 63 V (DC)            | at 100 V (DC)   | at 250 V (DC)            | at 400 V (DC)   | at 630 V (DC)            |
|                                                                                                              | 30 V/μs                 | 28 V/μs         | 70 V/μs                  | 110 V/μs        | 70 V/μs                  |
| R between leads, for C ≤ 0.33 μF:<br>at 10 V; 1 minute<br>at 100 V; 1 minute<br>at 500 V; 1 minute           | > 15000 MΩ              | > 15000 MΩ      | > 30000 MΩ               | > 30000 MΩ      | > 30000 MΩ               |
| RC between leads, for C > 0.33 μF:<br>at 10 V; 1 minute<br>at 500 V; 1 minute                                | > 5000 s                |                 |                          |                 | > 10000 s                |
| R between interconnecting leads and casing;<br>at 10 V; 1 minute<br>at 100 V; 1 minute<br>at 500 V; 1 minute | > 30000 MΩ              | > 30000 MΩ      | > 30000 MΩ               | > 30000 MΩ      | > 30000 MΩ               |
| Withstanding (DC) voltage (cut off current 10 mA);<br>rise time 100 V/s                                      | 100 V; 1 minute         | 160 V; 1 minute | 400 V; 1 minute          | 640 V; 1 minute | 1008 V; 1 minute         |
| Withstanding (DC) voltage between leads and case                                                             | 200 V; 1 minute         | 200 V; 1 minute | 500 V; 1 minute          | 800 V; 1 minute | 1260 V; 1 minute         |

Metallized Polyester Film Capacitors  
MKT Radial Potted Type

Vishay BCcomponents

 $U_{Rdc} = 63 \text{ V}$ ;  $U_{Rac} = 40 \text{ V}$ 

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 369 ..... AND PACKAGING |      |                                |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|------|--------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |      |                                | REEL |
|                                                        |                                                                              |             | l <sub>t</sub> = 4.0 + 1.0/- 0.5 mm         |      | l <sub>t</sub> = 22.0 ± 4.0 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ  | SPQ                            |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |      |                                |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |      |                                |      |
| 0.22                                                   | 4.2 × 9.3 × 12.5                                                             | 0.4         | 15224                                       | 2000 | 1000                           | 1300 |
| 0.27                                                   | 3.8 × 9.0 × 12.5                                                             | 0.4         | 15274                                       | 2000 | 1000                           | 1300 |
| 0.33                                                   | 4.1 × 9.3 × 12.5                                                             | 0.4         | 15334                                       | 2000 | 1000                           | 1300 |
| 0.39                                                   | 4.0 × 9.2 × 12.5                                                             | 0.4         | 15394                                       | 2000 | 1000                           | 1300 |
| 0.47                                                   | 4.3 × 9.5 × 12.5                                                             | 0.5         | 15474                                       | 2000 | 1000                           | 1200 |
| 0.56                                                   | 4.7 × 9.8 × 12.5                                                             | 0.5         | 15564                                       | 2000 | 1000                           | 1200 |
| 0.68                                                   | 5.1 × 10.2 × 12.5                                                            | 0.5         | 15684                                       | 2000 | 1000                           | 1100 |
| 0.82                                                   | 5.5 × 10.7 × 12.5                                                            | 0.6         | 15824                                       | 2000 | 1000                           | 1000 |
| 1                                                      | 6.0 × 11.1 × 12.5                                                            | 0.7         | 15105                                       | 2000 | 1000                           | 900  |

 $U_{Rdc} = 100 \text{ V}$ ;  $U_{Rac} = 63 \text{ V}$ 

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 369 ..... AND PACKAGING |      |                                |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|------|--------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |      |                                | REEL |
|                                                        |                                                                              |             | l <sub>t</sub> = 4.0 + 1.0/- 0.5 mm         |      | l <sub>t</sub> = 22.0 ± 4.0 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ  | SPQ                            |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |      |                                |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |      |                                |      |
| 0.056<br>0.068                                         | 4.0 × 9.1 × 12.5                                                             | 0.4         | 25563<br>25683                              | 2000 | 1000                           | 1500 |
| 0.082                                                  | 3.7 × 8.8 × 12.5                                                             | 0.4         | 25823                                       | 2000 | 1000                           | 1500 |
| 0.1                                                    | 4.0 × 9.0 × 12.5                                                             | 0.4         | 25104                                       | 2000 | 1000                           | 1500 |
| 0.12                                                   | 4.3 × 9.3 × 12.5                                                             | 0.4         | 25124                                       | 2000 | 1000                           | 1500 |
| 0.15                                                   | 3.9 × 8.9 × 12.5                                                             | 0.4         | 25154                                       | 2000 | 1000                           | 1500 |
| 0.18                                                   | 4.2 × 9.2 × 12.5                                                             | 0.5         | 25184                                       | 2000 | 1000                           | 1300 |
| 0.22                                                   | 4.5 × 9.4 × 12.5                                                             | 0.5         | 25224                                       | 2000 | 1000                           | 1200 |

 $U_{Rdc} = 250 \text{ V}$ ;  $U_{Rac} = 160 \text{ V}$ 

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 369 ..... AND PACKAGING |      |                                |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|------|--------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |      |                                | REEL |
|                                                        |                                                                              |             | l <sub>t</sub> = 4.0 + 1.0/- 0.5 mm         |      | l <sub>t</sub> = 22.0 ± 4.0 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ  | SPQ                            |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |      |                                |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |      |                                |      |
| 0.027                                                  | 4.2 × 8.7 × 12.5                                                             | 0.4         | 45273                                       | 2000 | 1000                           | 1500 |
| 0.033                                                  | 4.6 × 8.8 × 12.5                                                             | 0.5         | 45333                                       | 2000 | 1000                           | 1300 |
| 0.039                                                  | 4.0 × 8.8 × 12.5                                                             | 0.4         | 45393                                       | 2000 | 1000                           | 1500 |
| 0.047                                                  | 4.5 × 9.0 × 12.5                                                             | 0.5         | 45473                                       | 2000 | 1000                           | 1500 |
| 0.056                                                  | 4.6 × 8.8 × 12.5                                                             | 0.5         | 45563                                       | 2000 | 1000                           | 1300 |
| 0.068                                                  | 4.6 × 9.2 × 12.5                                                             | 0.5         | 45683                                       | 2000 | 1000                           | 1300 |
| 0.082                                                  | 4.4 × 9.4 × 12.5                                                             | 0.5         | 45823                                       | 2000 | 1000                           | 1200 |
| 0.1                                                    | 4.7 × 9.7 × 12.5                                                             | 0.5         | 45104                                       | 2000 | 1000                           | 1200 |

$U_{Rdc} = 400\text{ V}$ ;  $U_{Rac} = 220\text{ V}$ 

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 369 ..... AND PACKAGING |      |                                |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|------|--------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |      |                                | REEL |
|                                                        |                                                                              |             | l <sub>t</sub> = 4.0 + 1.0/- 0.5 mm         |      | l <sub>t</sub> = 22.0 ± 4.0 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ  | SPQ                            |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |      |                                |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |      |                                |      |
| 0.001                                                  | 4.5 × 8.7 × 12.5                                                             | 0.5         | 55102                                       | 2000 | 1000                           | 1500 |
| 0.0012                                                 | 4.5 × 9.0 × 12.5                                                             | 0.5         | 55122                                       | 2000 | 1000                           | 1500 |
| 0.0015                                                 | 4.5 × 8.8 × 12.5                                                             | 0.5         | 55152                                       | 2000 | 1000                           | 1500 |
| 0.0018                                                 | 4.5 × 8.7 × 12.5                                                             | 0.5         | 55182                                       | 2000 | 1000                           | 1500 |
| 0.0022                                                 | 4.0 × 8.6 × 12.5                                                             | 0.5         | 55222                                       | 2000 | 1000                           | 1500 |
| 0.0027                                                 | 4.3 × 8.9 × 12.5                                                             | 0.5         | 55272                                       | 2000 | 1000                           | 1500 |
| 0.0033                                                 | 4.6 × 9.1 × 12.5                                                             | 0.5         | 55332                                       | 2000 | 1000                           | 1500 |
| 0.0039                                                 | 4.0 × 8.7 × 12.5                                                             | 0.5         | 55392                                       | 2000 | 1000                           | 1500 |
| 0.0047                                                 | 4.1 × 8.8 × 12.5                                                             | 0.5         | 55472                                       | 2000 | 1000                           | 1500 |
| 0.0056<br>0.0068<br>0.0082<br>0.01                     | 4.6 × 9.1 × 12.5                                                             | 0.5         | 55562<br>55682<br>55822<br>55103            | 2000 | 1000                           | 1500 |
| 0.012                                                  | 4.0 × 8.7 × 12.5                                                             | 0.5         | 55123                                       | 2000 | 1000                           | 1500 |
| 0.015                                                  | 4.1 × 8.8 × 12.5                                                             | 0.5         | 55153                                       | 2000 | 1000                           | 1500 |
| 0.018                                                  | 4.4 × 8.8 × 12.5                                                             | 0.5         | 55183                                       | 2000 | 1000                           | 1300 |
| 0.022                                                  | 4.2 × 8.8 × 12.5                                                             | 0.5         | 55223                                       | 2000 | 1000                           | 1500 |
| 0.027                                                  | 4.2 × 9.1 × 12.5                                                             | 0.5         | 55273                                       | 2000 | 1000                           | 1300 |
| 0.033                                                  | 4.6 × 9.4 × 12.5                                                             | 0.5         | 55333                                       | 2000 | 1000                           | 1300 |

 $U_{Rdc} = 630\text{ V}$ ;  $U_{Rac} = 250\text{ V}$ 

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 369 ..... AND PACKAGING |      |                                |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|------|--------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |      |                                | REEL |
|                                                        |                                                                              |             | l <sub>t</sub> = 4.0 + 1.0/- 0.5 mm         |      | l <sub>t</sub> = 22.0 ± 4.0 mm |      |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ  | SPQ                            |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |      |                                | SPQ  |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |      |                                |      |
| 0.01                                                   | 4.1 × 8.7 × 12.5                                                             | 0.4         | 65103                                       | 2000 | 1000                           | 1300 |
| 0.012                                                  | 4.4 × 8.9 × 12.5                                                             | 0.5         | 65123                                       | 2000 | 1000                           | 1200 |
| 0.015                                                  | 4.9 × 9.2 × 12.5                                                             | 0.5         | 65153                                       | 2000 | 1000                           | 1100 |
| 0.018                                                  | 5.3 × 9.5 × 12.5                                                             | 0.6         | 65183                                       | 2000 | 1000                           | 1000 |
| 0.022                                                  | 5.9 × 9.9 × 12.5                                                             | 0.7         | 65223                                       | 2000 | 1000                           | 900  |

## APPLICATION NOTE AND LIMITING CONDITIONS

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection, as described hereunder. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

For capacitors connected in parallel, normally the proof voltage and possibly the rated voltage must be reduced. For information depending of the capacitance value and the number of parallel connections contact: [dc-film@vishay.com](mailto:dc-film@vishay.com)

To select the capacitor for a certain application, the following conditions must be checked:

1. The peak voltage ( $U_P$ ) shall not be greater than the rated DC voltage ( $U_{RDC}$ ).
2. The peak-to-peak voltage ( $U_{P-P}$ ) shall not be greater than  $2\sqrt{2} \times U_{RAC}$  to avoid the ionization inception level.
3. The voltage pulse slope ( $dU/dt$ ) shall not exceed the rated voltage pulse slope in an RC-circuit at rated voltage and without ringing. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by  $U_{RDC}$  and divided by the applied voltage.

For all other pulses following equation must be fulfilled:

$$2 \times \int_0^T \left( \frac{dU}{dt} \right)^2 \times dt < U_{RDC} \times \left( \frac{dU}{dt} \right)_{rated}$$

T is the pulse duration.

The rated voltage pulse slope is valid for ambient temperatures up to 85 °C. For higher temperatures a derating factor of 3 % per K shall be applied.

4. The maximum component surface temperature rise must be lower than the limits (see graph "Max. allowed component temperature rise").
5. Since in circuits used at voltages over 280 V peak-to-peak the risk for an intrinsically active flammability after a capacitor breakdown (short circuit) increases, it is recommended that the power to the component is limited to 100 times the values mentioned in the table: "Heat Conductivity"
6. When using these capacitors as across-the-line capacitor in the input filter for mains applications the applicant must guarantee that the following conditions are fulfilled in any case (spikes and surge voltages from the mains included).
7. For continuous use as series connection with an impedance to the mains, please refer to application note [www.vishay.com/doc?28153](http://www.vishay.com/doc?28153).

### Voltage Conditions for 6 Above

| ALLOWED VOLTAGES                             | $T_{amb} \leq 85\text{ °C}$ | $85\text{ °C} < T_{amb} \leq 105\text{ °C}$ |
|----------------------------------------------|-----------------------------|---------------------------------------------|
| Maximum continuous RMS voltage               | $U_{RAC}$                   | $0.8 \times U_{RAC}$                        |
| Maximum temperature RMS-overvoltage (< 24 h) | $1.25 \times U_{RAC}$       | $U_{RAC}$                                   |
| Maximum peak voltage ( $U_{O-P}$ ) (< 2 s)   | $1.6 \times U_{RDC}$        | $1.3 \times U_{RDC}$                        |

### Example

C = 3300 nF - 100 V used for the voltage signal shown in next figure.

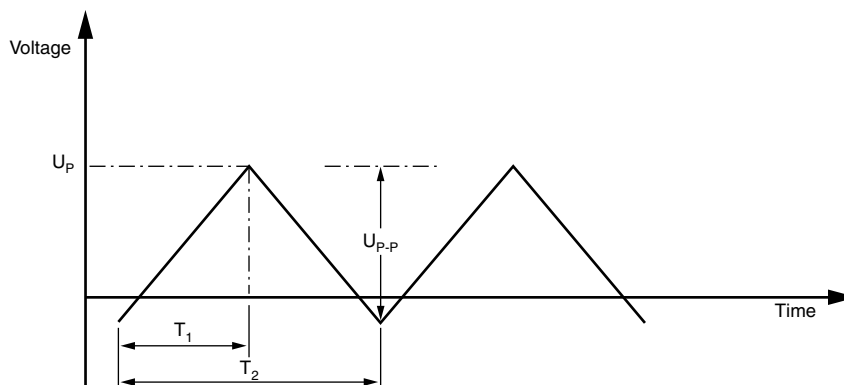
$U_{P-P} = 80\text{ V}$ ;  $U_P = 70\text{ V}$ ;  $T_1 = 0.5\text{ ms}$ ;  $T_2 = 1\text{ ms}$

The ambient temperature is 35 °C.

Checking conditions:

1. The peak voltage  $U_P = 70\text{ V}$  is lower than  $100\text{ V}_{DC}$ .
2. The peak-to-peak voltage 80 V is lower than  $2\sqrt{2} \times 63\text{ V}_{AC} = 178\text{ V}_{P-P}$ .
3. The voltage pulse slope ( $dU/dt$ ) =  $80\text{ V}/500\text{ }\mu\text{s} = 0.16\text{ V}/\mu\text{s}$   
This is lower than  $8\text{ V}/\mu\text{s}$  (see "Specific Reference Data" for each version).
4. The dissipated power is 60 mW as calculated with fourier terms  
The temperature rise for  $w_{max} = 8.5\text{ mm}$  and pitch = 22.5 mm will be  $60\text{ mW}/18\text{ mW/°C} = 3.3\text{ °C}$   
This is lower than 15 °C temperature rise at 35 °C, according figure "Maximum allowed component temperature rise"
5. Not applicable
6. Not applicable
7. Not applicable

## Voltage Signal





## Disclaimer

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