

# Gas Discharge Tube Three Electrode Q Series

Overvoltage Protection Device

Raychem Circuit Protection Products

**Specification Status: Released**

## GENERAL DESCRIPTION

### BENEFITS

- Helps provide overvoltage fault protection against high energy surges
- Suitable for sensitive equipment due to excellent impulse sparkover response
- Suitable for high-frequency applications
- Highly reliable performance

### FEATURES

- Crowbar device with low arc-voltage
- Low capacitance and insertion loss
- High accuracy spark-over voltages for high precision designs
- Tested per ITU K.12 recommendations
- Optional Fail-Short mechanism
- Non-radioactive materials

## APPLICATIONS

- Telecommunications:
  - MDF modules, xDSL equipment, RF system protection
- Industrial Electronics and Commercial Electronics, such as
  - Power Supplies, Surge Protectors, Alarm systems

## MATERIALS INFORMATION

**ROHS Compliant**  
Devices without Fail-Short

Directive 2002/95/EC  
Compliant

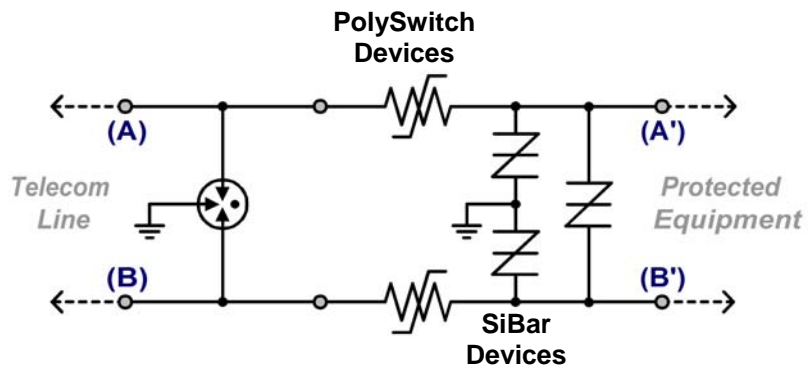
**ELV Compliant**  
Devices with Fail-Short "-FS"

Directive 2000/53/EC  
Compliant

## SYMBOL



## TYPICAL APPLICATION SCHEMATIC



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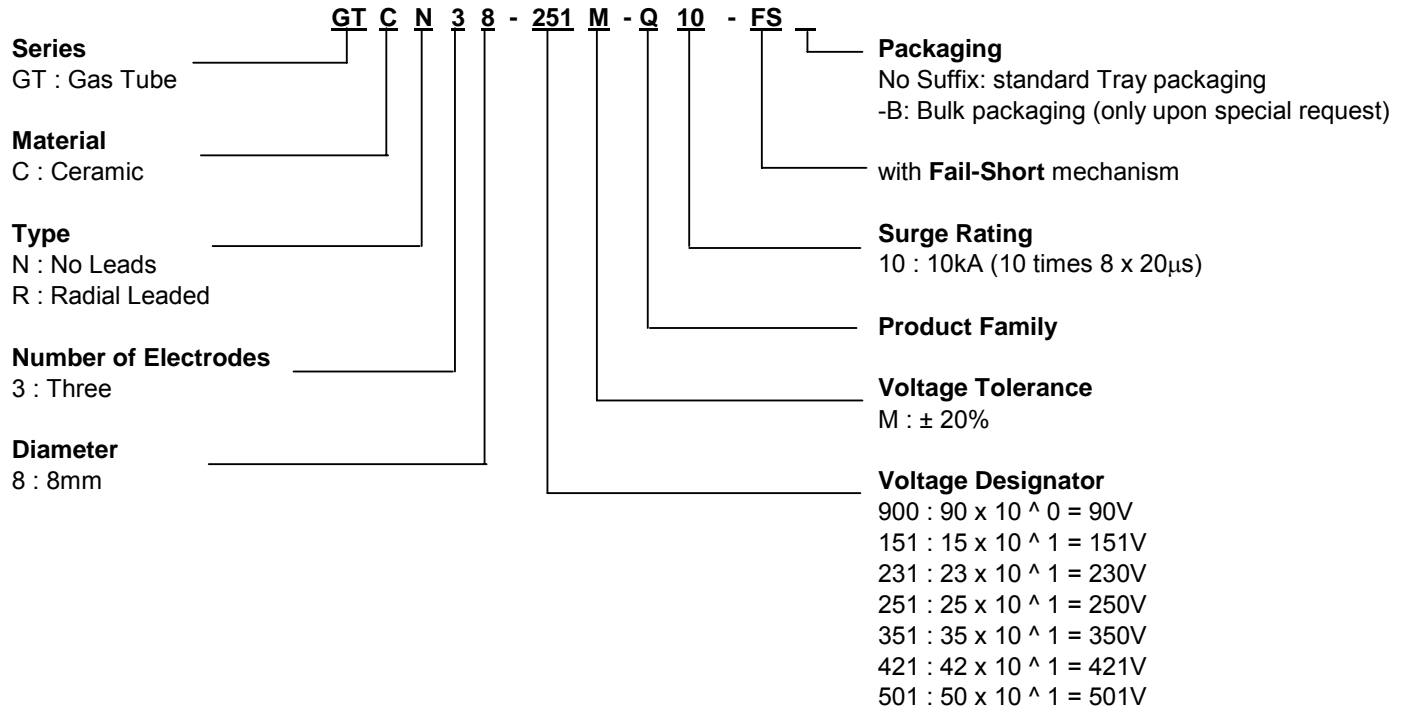
Raychem Circuit Protection Products

PRODUCT: GTCx38-xxxx-Q10

DOCUMENT: SCD 25913  
REV LETTER: C  
REV DATE: MAY 25, 2007  
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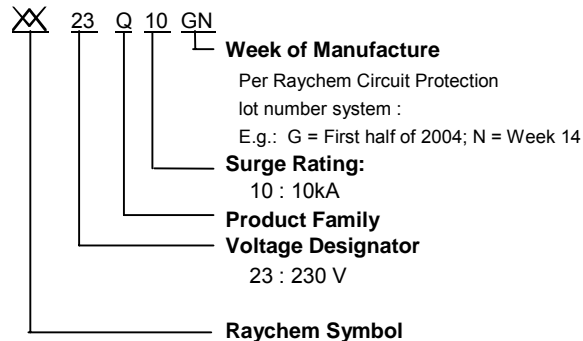
## PART NUMBERING

### EXAMPLE:



## DEVICE MARKING

### EXAMPLE : GTCR38-231M-Q10



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**GENERAL CHARACTERISTICS**

No Radioactive Material

Storage temperature:

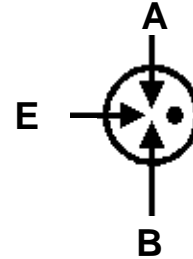
Devices without Fail-Short Mechanism: -40°C ... +90°C  
Devices with Fail-Short Mechanism: -20°C ... +65°C

Operating temperature:

Devices without Fail-Short Mechanism: -40°C ... +90°C  
Devices with Fail-Short Mechanism: -20°C ... +65°C

Body: Nickel Plated

Leads: Tin Plated



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### DEVICE RATINGS AND CHARACTERISTICS

| Part Number  | DC Sparkover Voltage (A-E) (B-E) | Impulse Sparkover Voltage (A-E) (B-E) |                | Insulation Resistance | Capacitance  | DC Holdover Voltage | Impulse Life (A + B - E) | Impulse Discharge Current 8/20 $\mu$ s (A + B - E) | AC Discharge Current, 50Hz (A + B - E) |
|--|----------------------------------|---------------------------------------|----------------|-----------------------|--------------|---------------------|--------------------------|--|--|
|  | @ 100V/s                         | @ 100V/ $\mu$ s                       | @ 1kV/ $\mu$ s | @ 100V <sub>DC</sub>  | @ 1MHz       | Per ITU K.12        | 10/1000 $\mu$ s, 200A    | Repeat 10 times (5 times each polarity)            | Repeat 5 times (1s interval)           |
| GTCN38-900M-Q10<br>GTCN38-900M-Q10-FS<br>GTCR38-900M-Q10<br>GTCR38-900M-Q10-FS | 72-108                           | $\leq 450$                            | $\leq 500V$    | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 52V$          | 300 times                | 10kA   | 10A                                    |
| GTCN38-151M-Q10<br>GTCN38-151M-Q10-FS<br>GTCR38-151M-Q10<br>GTCR38-151M-Q10-FS | 120 - 180                        | $\leq 500$                            | $\leq 600$     | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 52V$          | 300 times                | 10kA   | 10A                                    |
| GTCN38-231M-Q10<br>GTCN38-231M-Q10-FS<br>GTCR38-231M-Q10<br>GTCR38-231M-Q10-FS | 184 - 280V                       | $\leq 600$                            | $\leq 700V$    | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 135V$         | 300 times                | 10kA   | 10A                                    |
| GTCN38-251M-Q10<br>GTCN38-251M-Q10-FS<br>GTCR38-251M-Q10<br>GTCR38-251M-Q10-FS | 200 - 300V                       | $\leq 600$                            | $\leq 700V$    | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 135V$         | 300 times                | 10kA   | 10A                                    |
| GTCN38-351M-Q10<br>GTCN38-351M-Q10-FS<br>GTCR38-351M-Q10<br>GTCR38-351M-Q10-FS | 280 - 420V                       | $\leq 900$                            | $\leq 900V$    | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 135V$         | 300 times                | 10kA   | 10A                                    |
| GTCN38-421M-Q10<br>GTCN38-421M-Q10-FS<br>GTCR38-421M-Q10<br>GTCR38-421M-Q10-FS | 300 - 500                        | $\leq 900$                            | $\leq 1000$    | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 135V$         | 300 times                | 10kA   | 10A                                    |
| GTCN38-501M-Q10<br>GTCN38-501M-Q10-FS<br>GTCR38-501M-Q10<br>GTCR38-501M-Q10-FS | 400 - 600                        | $\leq 1100$                           | $\leq 1200$    | $\geq 10,000M\Omega$  | $\leq 3.0pF$ | $\leq 135V$         | 300 times                | 10kA   | 10A                                    |

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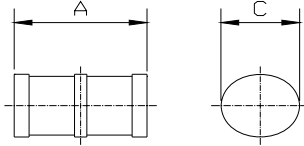
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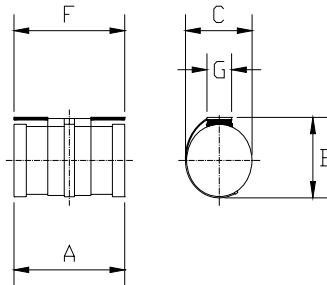
## DIMENSIONS

No Leads, no Fail-Short mechanism  
(GTCN38-xxxx-Q10)



|      |  | A    |      | C    |      |
|------|--|------|------|------|------|
|      |  | MIN  | MAX  | MIN  | MAX  |
| mm:  |  | 9.7  | 10.3 | 7.8  | 8.2  |
| in*: |  | 0.38 | 0.41 | 0.31 | 0.32 |

No Leads, with Fail-Short mechanism  
(GTCN38-xxxx-10-FS)



|      |  | A    |      | B   |      | C   |      | F   |      | G   |      |
|------|--|------|------|-----|------|-----|------|-----|------|-----|------|
|      |  | MIN  | MAX  | MIN | MAX  | MIN | MAX  | MIN | MAX  | MIN | MAX  |
| mm:  |  | 9.7  | 10.3 | --  | 9.5  | --  | 8.2  | --  | 10.5 | --  | 3.0  |
| in*: |  | 0.38 | 0.41 | --  | 0.37 | --  | 0.32 | --  | 0.41 | --  | 0.12 |

- Rounded off approximation

\* R

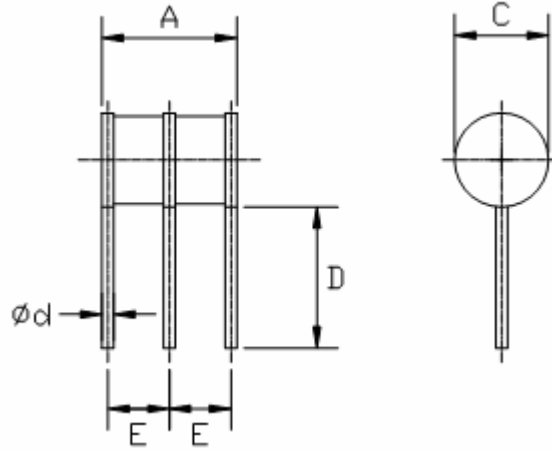
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Radial Leads, no Fail-Short mechanism  
(GTCR38-xxxx-Q10)

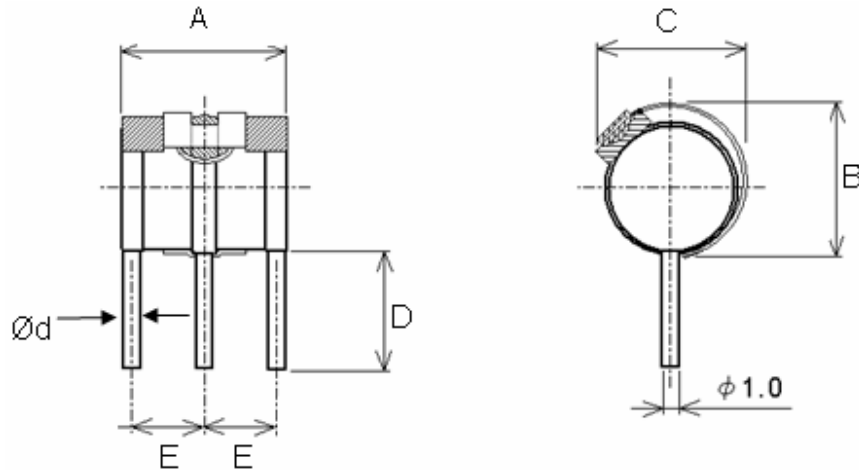


mm:  
in\*:

| A    |      | C    |      | D    |      | E    |      | Ød   |
|------|------|------|------|------|------|------|------|------|
| MIN  | MAX  | MIN  | MAX  | MIN  | MAX  | MIN  | MAX  | NOM  |
| 9.7  | 10.3 | 7.8  | 8.2  | 6.5  | 7.5  | 4.1  | 4.7  | 1.0  |
| 0.38 | 0.41 | 0.31 | 0.32 | 0.26 | 0.30 | 0.16 | 0.19 | 0.04 |

\* Rounded off approximation

Radial Leads, with Fail-Short mechanism  
(GTCR38-xxxxQ10-FS)



mm:  
in\*:

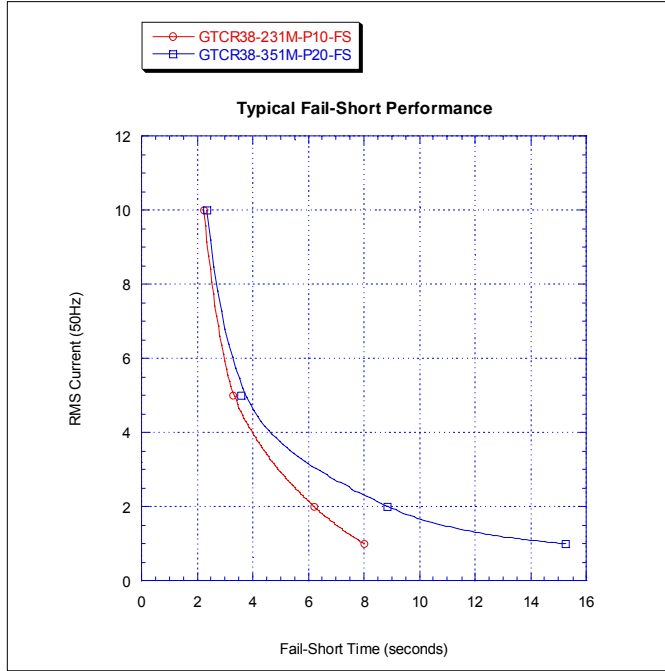
| A    |      | B   |      | C   |      | D    |     | E    |      | Ød   |
|------|------|-----|------|-----|------|------|-----|------|------|------|
| MIN  | MAX  | MIN | MAX  | MIN | MAX  | MIN  | MAX | MIN  | MAX  | NOM  |
| 9.7  | 10.3 | --  | 9.5  | --  | 8.5  | 6.0  | --  | 4.1  | 4.7  | 1.0  |
| 0.38 | 0.41 | --  | 0.37 | --  | 0.34 | 0.24 | --  | 0.16 | 0.19 | 0.04 |

\* Rounded off approximation

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**FAIL-SHORT MECHANISM RESPONSE TIME** (Graph represents typical values)



**Note: Both electrodes simultaneously powered, each with the AC current value in the graph**

**PACKAGING**

| Packaging | Bulk*<br>( vacuum bags) | Tray | Standard Box |
|-----------|-------------------------|------|--------------|
| Quantity  | 200                     | 100  | 1,000**      |

\* Standard packaging is in trays.  
Bulk packaging is only available upon request.

\*\* 5 bags or 10 trays

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