



TPP25011

Application Specific Discretes
A.S.D.™

OVERVOLTAGE and OVERCURRENT
PROTECTION for TELECOM LINE

FEATURES

- UNIDIRECTIONAL FUNCTION
- PROGRAMMABLE BREAKDOWN VOLTAGE UP TO 250 V
- PROGRAMMABLE CURRENT LIMITATION FROM 40 mA TO 500 mA
- SURGE CURRENT CAPABILITY
 $I_{PP} = 30A \quad 10/1000 \mu s$

DESCRIPTION

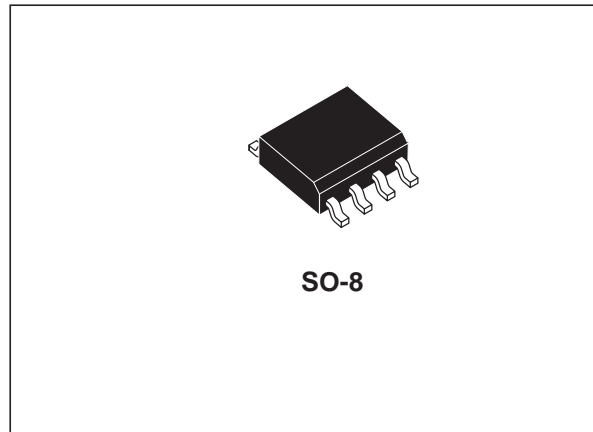
Dedicated to sensitive telecom equipment protection, this device can provide both voltage and current triggered protection with a very tight tolerance. The breakdown voltage can be easily programmed by using an external zener diode.

A multiple protection mode can be also performed when using several zener diodes, providing to each line interface an optimized protection level. The current limiting function is achieved with the use of a resistor between the gate and the cathode. The value of the resistor will determine the level of the desired current.

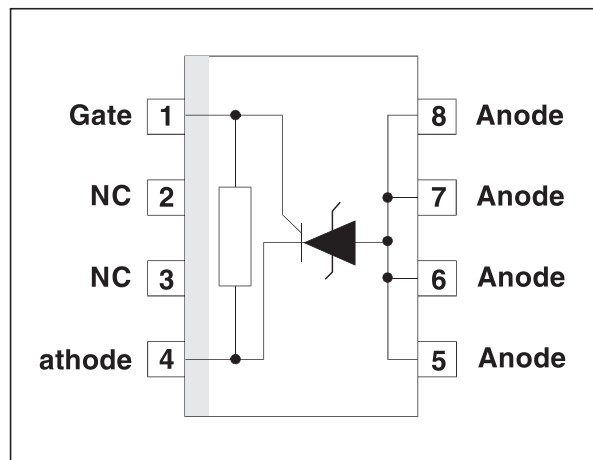
COMPLIES WITH THE FOLLOWING STANDARDS :

| | | | |
|-------------------------------------|---------|---------|----------|
| CCITT K17 : | 10/700 | μs | 1.5 kV |
| | 5/310 | μs | 38 A |
| VDE 0433 : | 10/700 | μs | 2k V |
| | 5/310 | μs | 40 A (*) |
| CNET : | 0.5/700 | μs | 1.5 kV |
| | 0.2/310 | μs | 38 A |
| FCC part 68 : | 2/10 | μs | 2.5 kV |
| | 2/10 | μs | 75 A (*) |
| BELLCORE TR-NWT-000974 : | 10/1000 | μs | 1 kV |
| | 10/1000 | μs | 30 A (*) |

(*) with series resistors or PTC.



SCHEMATIC DIAGRAM



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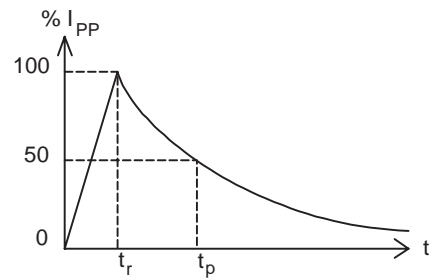
TPP25011

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

| Symbol | Parameter | | Value | Unit |
|--------------------|---|--|----------------------|--------------------|
| I_{PP} | Peak pulse current (see note 1) | 10/1000 μs | 30 | A |
| | | 5/310 μs | 40 | |
| | | 2/10 μs | 75 | |
| I_{TSM} | Non repetitive surge peak on-state current ($F = 50\text{Hz}$) | $t_p = 10\text{ms}$ $t = 1\text{s}$ | 5 3.5 | A |
| T_{stg} T_j | Storage temperature range Maximum junction temperature | | - 55 to + 150 150 | $^{\circ}\text{C}$ |

Note 1 : Pulse waveform :

| | | |
|-----------------------|-----------------------|-------------------------|
| 10/1000 μs | $t_r = 10\mu\text{s}$ | $t_p = 1000\mu\text{s}$ |
| 5/310 μs | $t_r = 5\mu\text{s}$ | $t_p = 310\mu\text{s}$ |
| 2/10 μs | $t_r = 2\mu\text{s}$ | $t_p = 10\mu\text{s}$ |

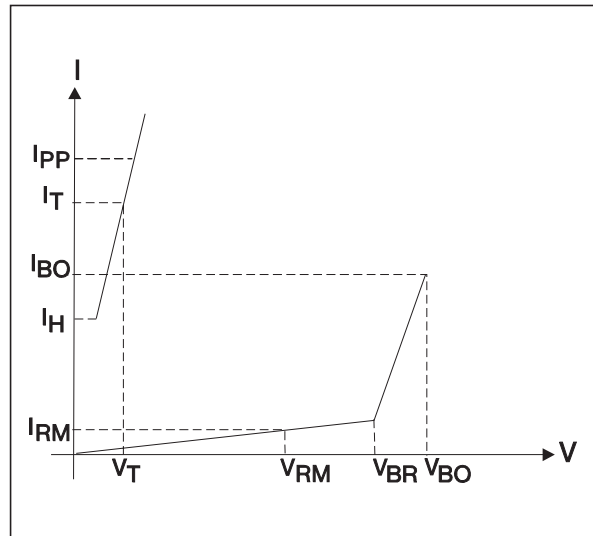


THERMAL RESISTANCES

| Symbol | Parameter | Value | Unit |
|---------------|---------------------|-------|----------------------|
| $R_{th(j-a)}$ | Junction to ambient | 170 | $^{\circ}\text{C/W}$ |

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$)

| Symbol | Parameter |
|----------|--------------------------------------|
| V_{RM} | Stand-off voltage |
| I_{RM} | Leakage current at stand-off voltage |
| V_{BR} | Breakdown voltage |
| V_{BO} | Breakover voltage |
| I_H | Holding current |
| I_{BO} | Breakover current |
| I_{PP} | Peak pulse current |
| V_{GN} | Gate voltage |
| I_G | Gate triggering current |
| C | Capacitance |



1 - OPERATION WITHOUT GATE

| Type | $I_{RM} @ V_{RM}$ max. | | $V_{BR} @ I_R$ min. | | $V_{BO} @ I_{BO}$ max. min. note1 max. | | | I_H min. note 2 | C max. note 3 |
|----------|---------------------------|----|------------------------|----|---|----|-----|----------------------|------------------|
| | μA | V | V | mA | V | mA | mA | mA | pF |
| TPP25011 | 6 | 60 | 250 | 1 | 340 | 15 | 200 | 180 | 100 |

2 - OPERATION WITH GATE

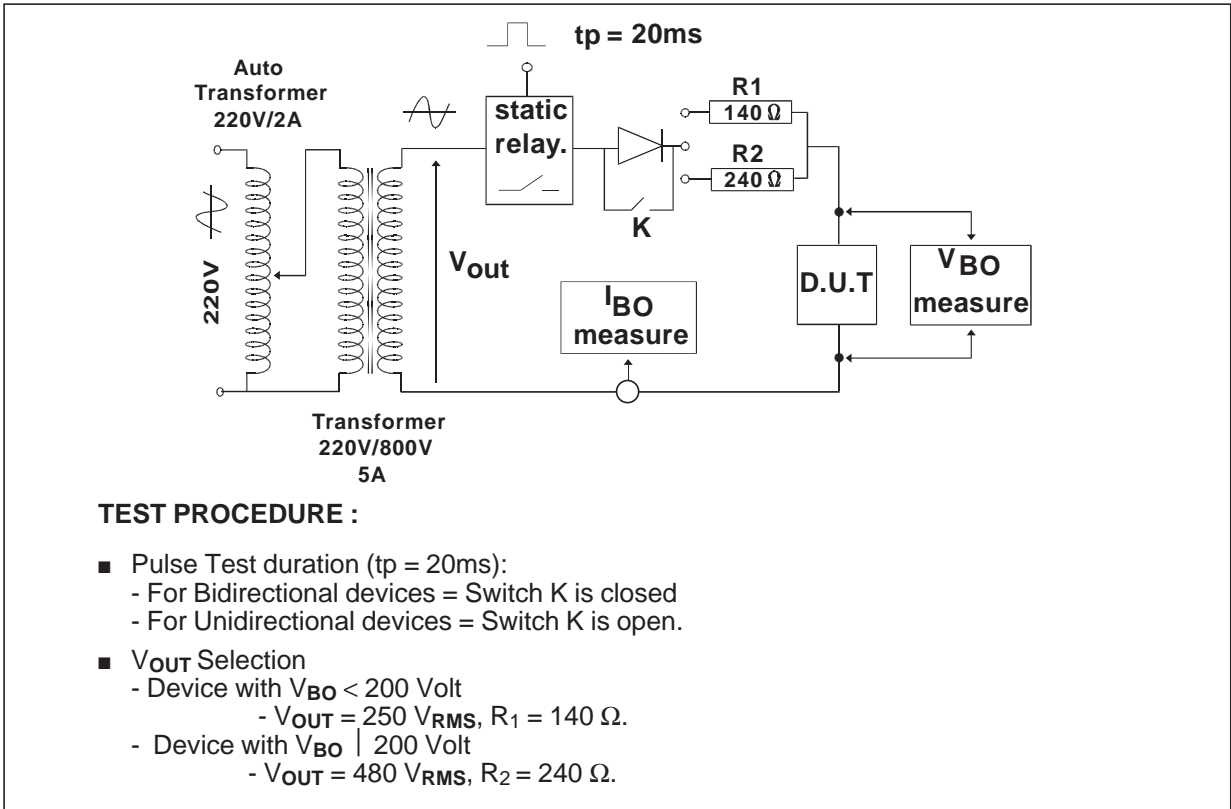
| Type | $V_{GN} @ I_{GN} = 30 \text{ mA}$ min. max. note 4 | | I_G min. max. $V_{A-C} = 100 \text{ V}$ | |
|----------|--|------|---|----|
| | V | V | mA | mA |
| TPP25011 | 1.05 | 1.35 | 5 | 40 |

Note 1: See the reference test circuit 1.

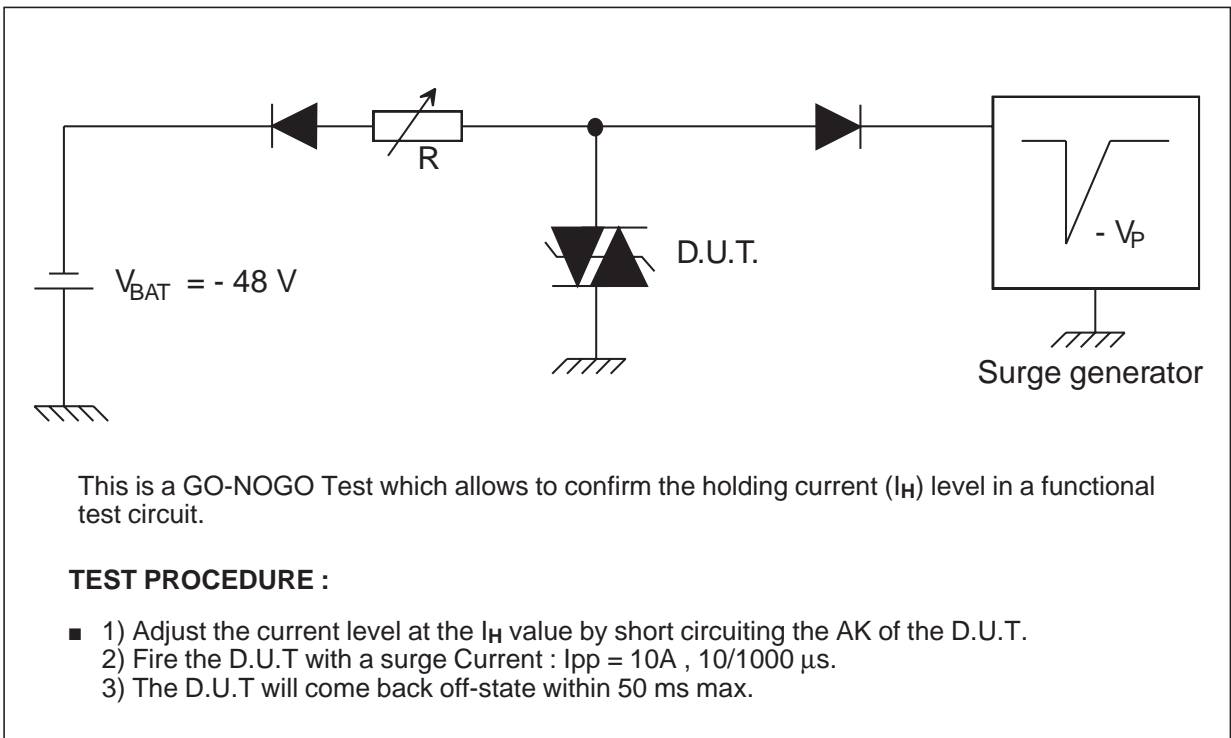
Note 2: See test circuit 2.

Note 3: $V_R = 5\text{V}$, $F = 1\text{MHz}$

REFERENCE TEST CIRCUIT 1 :



FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT 2 = GO - NOGO TEST



APPLICATION CIRCUIT
Overvoltage protection and current limitation

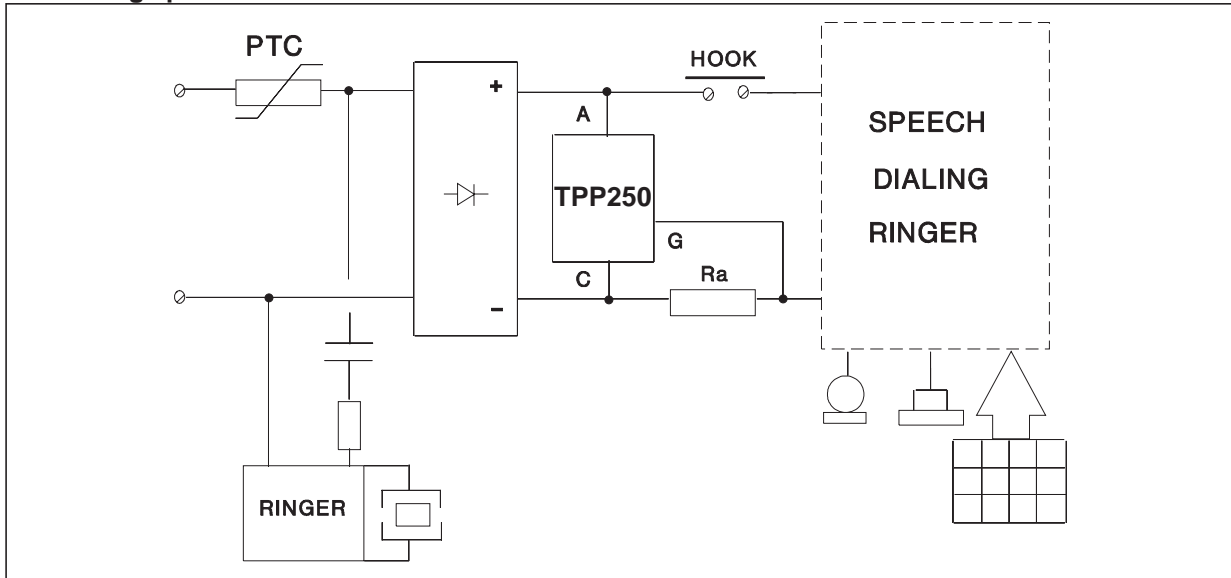
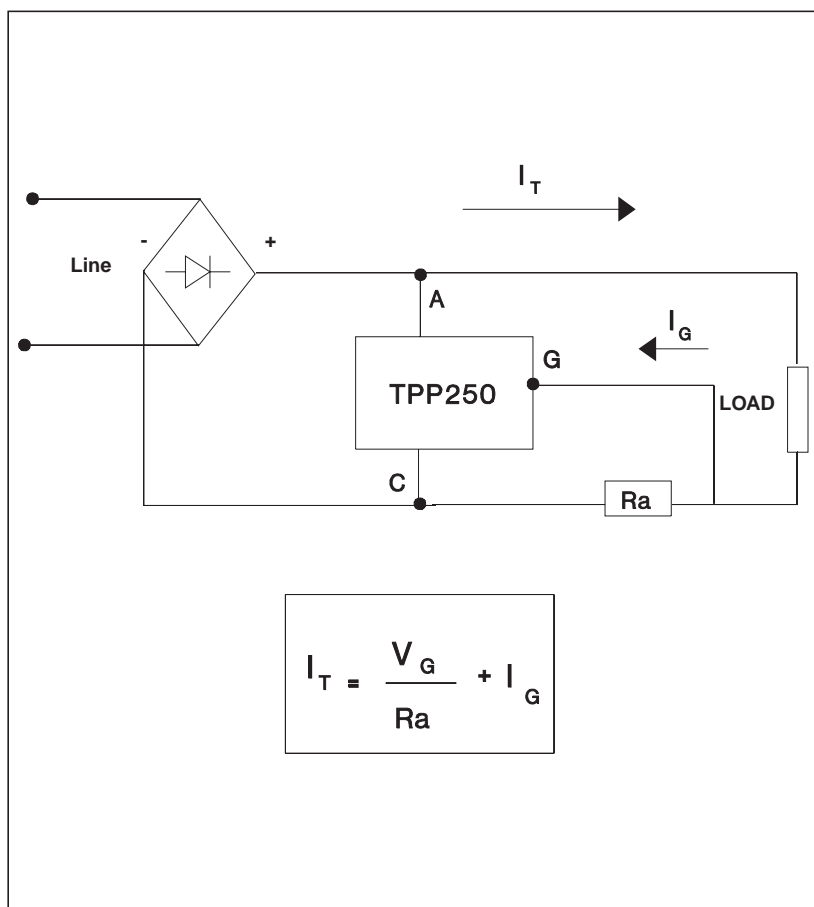


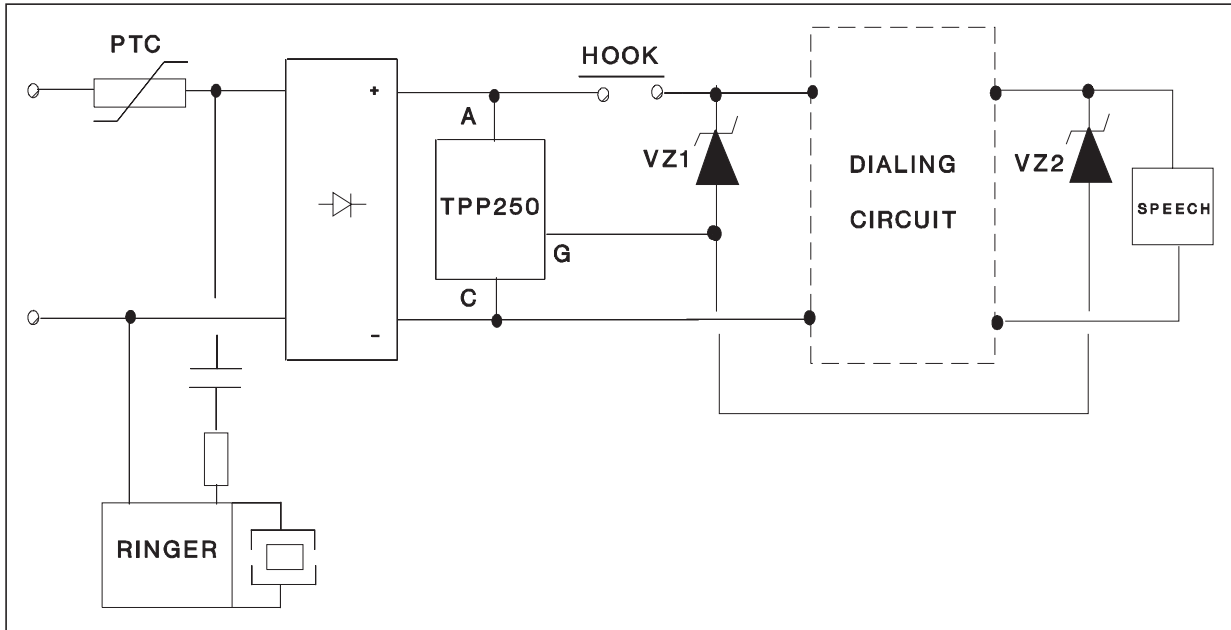
Table below gives the tolerance of the limited current I_T for each standardized resistor value.

| CURRENT TOLERANCE | | |
|-------------------|--------------------|--------------------|
| R Ω (± 5%) | I_T mA min | I_T mA max |
| 3.00 | 338 | 514 |
| 3.30 | 308 | 471 |
| 3.60 | 283 | 435 |
| 3.90 | 261 | 404 |
| 4.30 | 238 | 370 |
| 4.70 | 218 | 342 |
| 5.10 | 201 | 319 |
| 5.60 | 184 | 294 |
| 6.20 | 166 | 269 |
| 6.80 | 152 | 249 |
| 7.50 | 138 | 229 |
| 8.20 | 127 | 213 |
| 9.10 | 115 | 196 |
| 10.10 | 104 | 181 |
| 11.00 | 96 | 169 |
| 12.00 | 88 | 158 |
| 13.00 | 82 | 149 |
| 15.00 | 72 | 135 |
| 16.00 | 68 | 129 |
| 18.00 | 61 | 119 |
| 20.00 | 55 | 111 |
| 22.00 | 50 | 105 |
| 24.00 | 47 | 99 |
| 27.00 | 42 | 93 |
| 30.00 | 38 | 87 |



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Telephone set protection

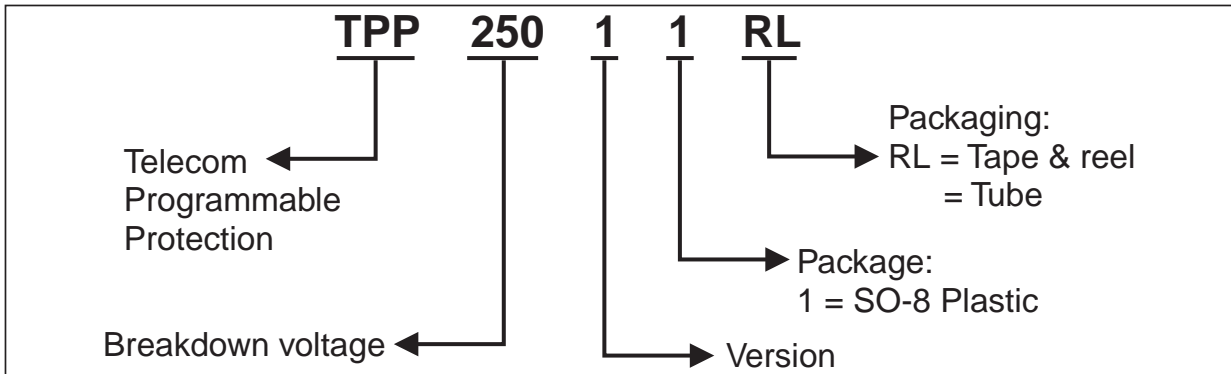


PROTECTION MODES :

OFF HOOK = Ringer circuit protection is insured with intrinsic breakdown voltage at 250 V

ON HOOK = In dialing mode and in conversation mode, the breakdown voltage of TPP250 can be adapted at different levels with zener diodes.

ORDER CODE



MARKING

| Package | Type | Marking |
|---------|----------|---------|
| SO-8 | TPP25011 | TPP250 |

PACKAGE MECHANICAL DATA
SO-8 Plastic

| REF. | DIMENSIONS | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimetres | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.75 | | | 0.069 |
| a1 | 0.1 | | 0.25 | 0.004 | | 0.010 |
| a2 | | | 1.65 | | | 0.065 |
| b | 0.35 | | 0.48 | 0.014 | | 0.019 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.50 | | | 0.020 | |
| c1 | 45° (typ) | | | | | |
| D | 4.8 | | 5.0 | 0.189 | | 0.197 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 3.81 | | | 0.150 | |
| F | 3.8 | | 4.0 | 0.15 | | 0.157 |
| L | 0.4 | | 1.27 | 0.016 | | 0.050 |
| M | | | 0.6 | | | 0.024 |
| S | 8° (max) | | | | | |

Packaging : Products supplied antistatic tubes or tape and reel.

Weight :0.08g

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