

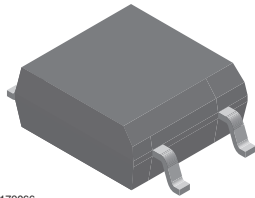


**THE DATASHEET OF  
VOM3053-X001T**

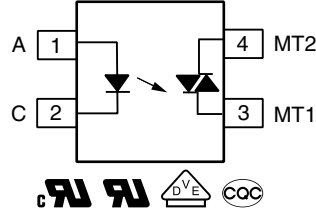




## Optocoupler, Phototriac Output, Non-Zero Crossing, 1.5 kV/μs dV/dt, 600 V



1179066



### FEATURES

- High static dV/dt > 1.5 kV/μs
- Input sensitivity I<sub>FT</sub> = 5 mA and 10 mA
- On-state RMS current I<sub>T(RMS)</sub> = 70 mA
- 600 V peak off-state blocking voltage
- Isolation test voltage 3750 V<sub>RMS</sub>
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### LINKS TO ADDITIONAL RESOURCES



### APPLICATIONS

- Consumer appliances
- Triac drives
- Solid-state relays
- Industrial controls
- Office equipment
- Lighting controls

### DESCRIPTION

The VOM3052 and VOM3053 phototriac consist a GaAs IRLED optically coupled to a photosensitive non-zero crossing TRIAC packaged in a SOP-4 package. It has a LED trigger current of 5 mA for VOM3053 and 10 mA for VOM3052.

The VOM3052 and VOM3053 phototriac isolate low-voltage logic from 120 V<sub>AC</sub>, 240 V<sub>AC</sub>, and 380 V<sub>AC</sub> lines to control resistive, inductive, or capacitive loads including motors, solenoids, high current thyristors or TRIAC and relays.

### AGENCY APPROVALS

- [UL](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE 0884-5\)](#), available with option 1
- [CQC GB4943.1](#)

| ORDERING INFORMATION   |                                 |               |
|--|---------------------------------|---------------|
| <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">V</div> <div style="border: 1px solid black; padding: 2px 5px;">O</div> <div style="border: 1px solid black; padding: 2px 5px;">M</div> <div style="border: 1px solid black; padding: 2px 5px;">3</div> <div style="border: 1px solid black; padding: 2px 5px;">0</div> <div style="border: 1px solid black; padding: 2px 5px;">5</div> <div style="border: 1px solid black; padding: 2px 5px;">X</div> <div style="border: 1px solid black; padding: 2px 5px;">T</div> </div> <p style="text-align: center;">PART NUMBER</p> |                                 |               |
| AGENCY CERTIFIED / PACKAGE   | TRIGGER CURRENT I <sub>FT</sub> |               |
| UL, cUL, CQC   | 5 mA                            | 10 mA         |
| SOP-4  | VOM3053T                        | VOM3052T      |
| SOP-4 180° orientation   | VOM3053T3                       | -             |
| VDE, UL, cUL, CQC  | 5 mA                            | 10 mA         |
| SOP-4  | VOM3053-X001T                   | VOM3052-X001T |

### Notes

- For additional information on the available options refer to option information
- The product is available only on tape and reel



| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                             |      |              |             |                    |
|--|-----------------------------|------|--------------|-------------|--------------------|
| PARAMETER  | TEST CONDITION              | PART | SYMBOL       | VALUE       | UNIT               |
| <b>INPUT</b>   |                             |      |              |             |                    |
| Reverse voltage  |                             |      | $V_R$        | 6           | V                  |
| Forward current  |                             |      | $I_F$        | 60          | mA                 |
| Peak surge current   | 100 $\mu\text{s}$ , 200 pps |      | $I_{FSM}$    | 0.5         | A                  |
| Power dissipation  |                             |      | $P_{diss}$   | 100         | mW                 |
| <b>OUTPUT</b>  |                             |      |              |             |                    |
| Peak off-state voltage   |                             |      | $V_{DRM}$    | 600         | V                  |
| RMS on-state current   |                             |      | $I_{T(RMS)}$ | 70          | mA                 |
| Peak non-repetitive surge current  | PW = 100 ms, 120 pps        |      | $I_{TSM}$    | 1           | A                  |
| Power dissipation  |                             |      | $P_{diss}$   | 200         | mW                 |
| <b>COUPLER</b>   |                             |      |              |             |                    |
| Isolation test voltage   | t = 1 min                   |      | $V_{ISO}$    | 3750        | $V_{RMS}$          |
| Power dissipation  |                             |      | $P_{tot}$    | 300         | mW                 |
| Storage temperature range  |                             |      | $T_{stg}$    | -55 to +150 | $^{\circ}\text{C}$ |
| Ambient temperature range  |                             |      | $T_{amb}$    | -40 to +100 | $^{\circ}\text{C}$ |
| Soldering temperature  |                             |      | $T_{sld}$    | 260         | $^{\circ}\text{C}$ |

**Notes**

- Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to Absolute Maximum Ratings for extended periods of the time can adversely affect reliability.

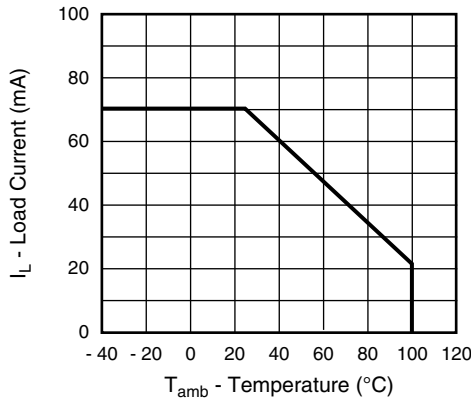


Fig. 1 - Recommended Operating Condition



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |         |               |      |      |      |                  |
|--|---|---------|---------------|------|------|------|------------------|
| PARAMETER  | TEST CONDITION  | PART    | SYMBOL        | MIN. | TYP. | MAX. | UNIT             |
| <b>INPUT</b>   |   |         |               |      |      |      |                  |
| Forward voltage  | $I_F = 10\text{ mA}$                                      |         | $V_F$         | -    | 1.2  | 1.5  | V                |
| Reverse current  | $V_R = 6\text{ V}$  |         | $I_R$         | -    | -    | 10   | $\mu\text{A}$    |
| Input capacitance  | $V_F = 0\text{ V}$ , $f = 1\text{ MHz}$                   |         | $C_I$         | -    | 25   | -    | pF               |
| <b>OUTPUT</b>  |   |         |               |      |      |      |                  |
| Off-state current  | $V_D = V_{DRM}$   |         | $I_{DRM}$     | -    | -    | 100  | nA               |
| On-state voltage   | $I_T = 100\text{ mA}$                                     |         | $V_{TM}$      | -    | -    | 3    | V                |
| Critical rate of rise off-state voltage  | $V_D = 0.67 V_{DRM}$ , $T_J = 25\text{ }^{\circ}\text{C}$ |         | $dV/dt_{cr}$  | 1500 | -    | -    | V/ $\mu\text{s}$ |
| Critical rate of rise of voltage at current commutation  |   |         | $dV/dt_{crq}$ | -    | 0.13 | -    | V/ $\mu\text{s}$ |
| <b>COUPLER</b>   |   |         |               |      |      |      |                  |
| LED trigger current, current required to latch output  | $V_D = 3\text{ V}$  | VOM3053 | $I_{FT}$      | -    | -    | 5    | mA               |
|  |   | VOM3052 | $I_{FT}$      | -    | -    | 10   | mA               |
| Capacitance (input - output)   | $f = 1\text{ MHz}$ , $V_{IO} = 0\text{ V}$                |         | $C_{IO}$      | -    | 0.8  | -    | pF               |
| Peak off-state voltage   | $I_C = 100\text{ }\mu\text{A}$                            |         | $V_{DRM}$     | 600  | -    | -    | V                |
| Holding current  |   |         | $I_{hold}$    | -    | 0.3  | -    | mA               |

**Note**

- Minimum and maximum values were tested requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

| <b>SAFETY AND INSULATION RATINGS</b>  |            |           |               |      |                    |  |
|---|------------|-----------|---------------|------|--------------------|--|
| PARAMETER   | SYMBOL     | MIN.      | TYP.          | MAX. | UNIT               |  |
| Climatic classification (according to IEC 68 part 1)                                      |            | -         | 40 / 100 / 21 | -    |                    |  |
| Pollution degree (DIN VDE 0109)   |            | -         | 2             | -    |                    |  |
| Comparative tracking index  | CTI        | 175       | -             | 399  |                    |  |
| Peak transient overvoltage  | $V_{IOTM}$ | -         | -             | 6000 | $V_{peak}$         |  |
| Peak insulation voltage   | $V_{IORM}$ | -         | -             | 707  | $V_{peak}$         |  |
| Isolation resistance at $T_{amb} = 100\text{ }^{\circ}\text{C}$ , $V_{DC} = 500\text{ V}$ | $R_{IO}$   | $10^{11}$ | -             | -    | $\Omega$           |  |
| Isolation resistance at $T_{amb} = 25\text{ }^{\circ}\text{C}$ , $V_{DC} = 500\text{ V}$  | $R_{IO}$   | $10^{12}$ | -             | -    | $\Omega$           |  |
| Safety rating - power   | $P_{SO}$   | -         | -             | 400  | mW                 |  |
| Safety rating - input current   | $I_{SI}$   | -         | -             | 150  | mA                 |  |
| Safety rating - temperature   | $T_{SI}$   | -         | -             | 165  | $^{\circ}\text{C}$ |  |
| Creepage distance   |            | 5         | -             | -    | mm                 |  |
| Clearance distance  |            | 5         | -             | -    | mm                 |  |
| Insulation thickness  | DTI        | 0.4       | -             | -    | mm                 |  |

**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

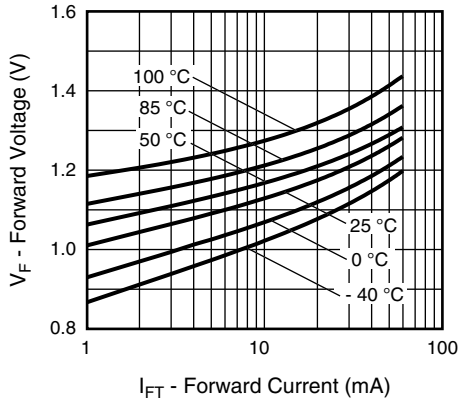


Fig. 2 - Forward Current vs. Forward Voltage

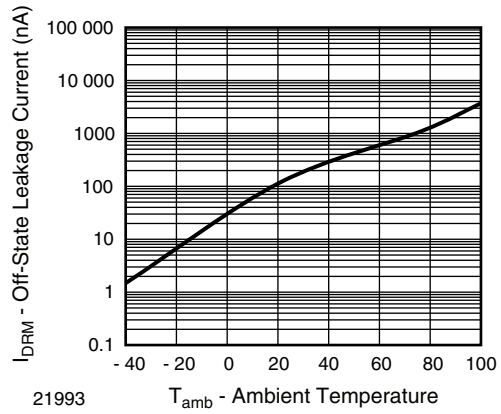


Fig. 5 - Off-State Leakage Current vs. Ambient Temperature

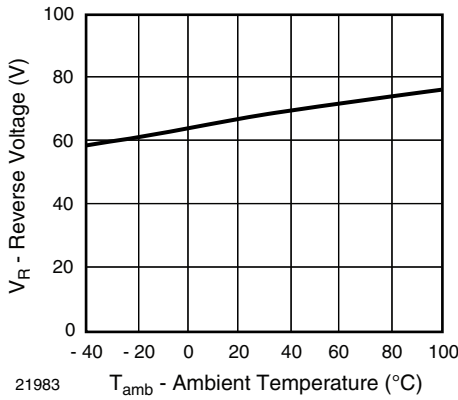


Fig. 3 - Reverse Voltage vs. Ambient Temperature

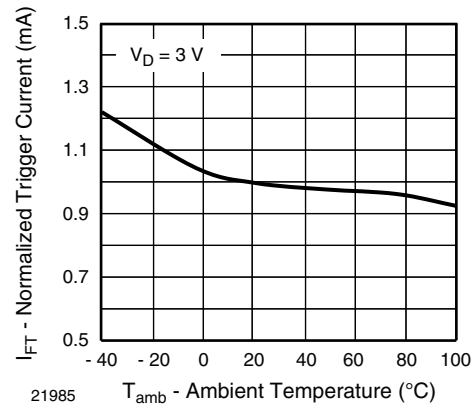


Fig. 6 - Normalized Trigger Current vs. Ambient Temperature

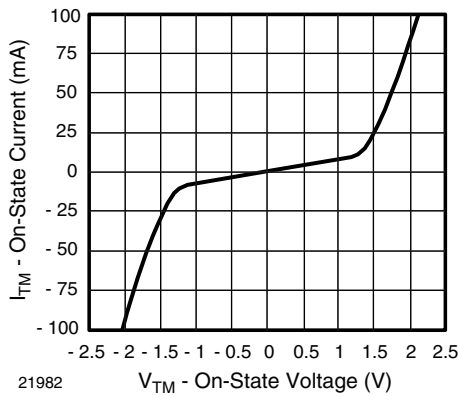


Fig. 4 - On-State Current vs. On-State Voltage

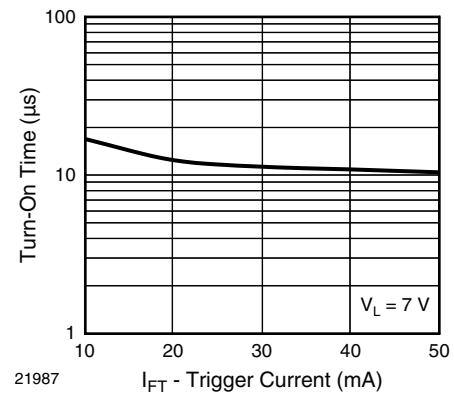


Fig. 7 - Trigger Current vs. Turn-On Time

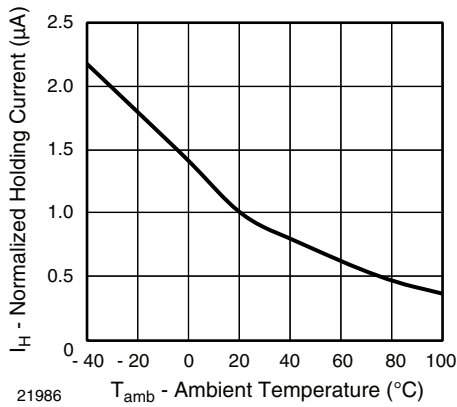


Fig. 8 - Normalized Holding Current vs. Ambient Temperature

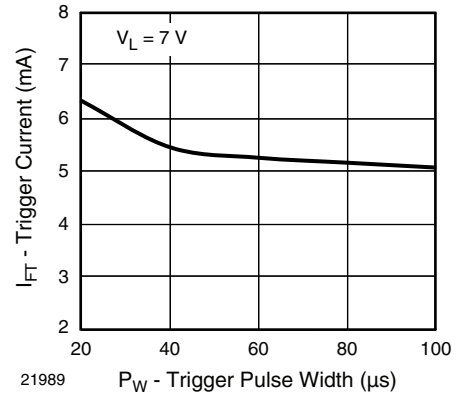


Fig. 10 - Trigger Current vs. Trigger Pulse Width

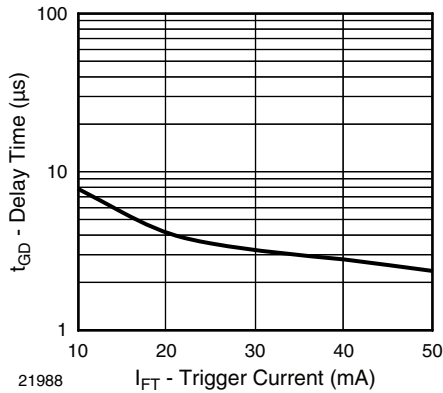


Fig. 9 - Trigger Current vs. Delay Time

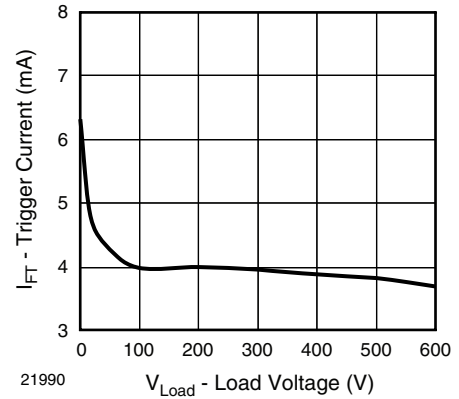
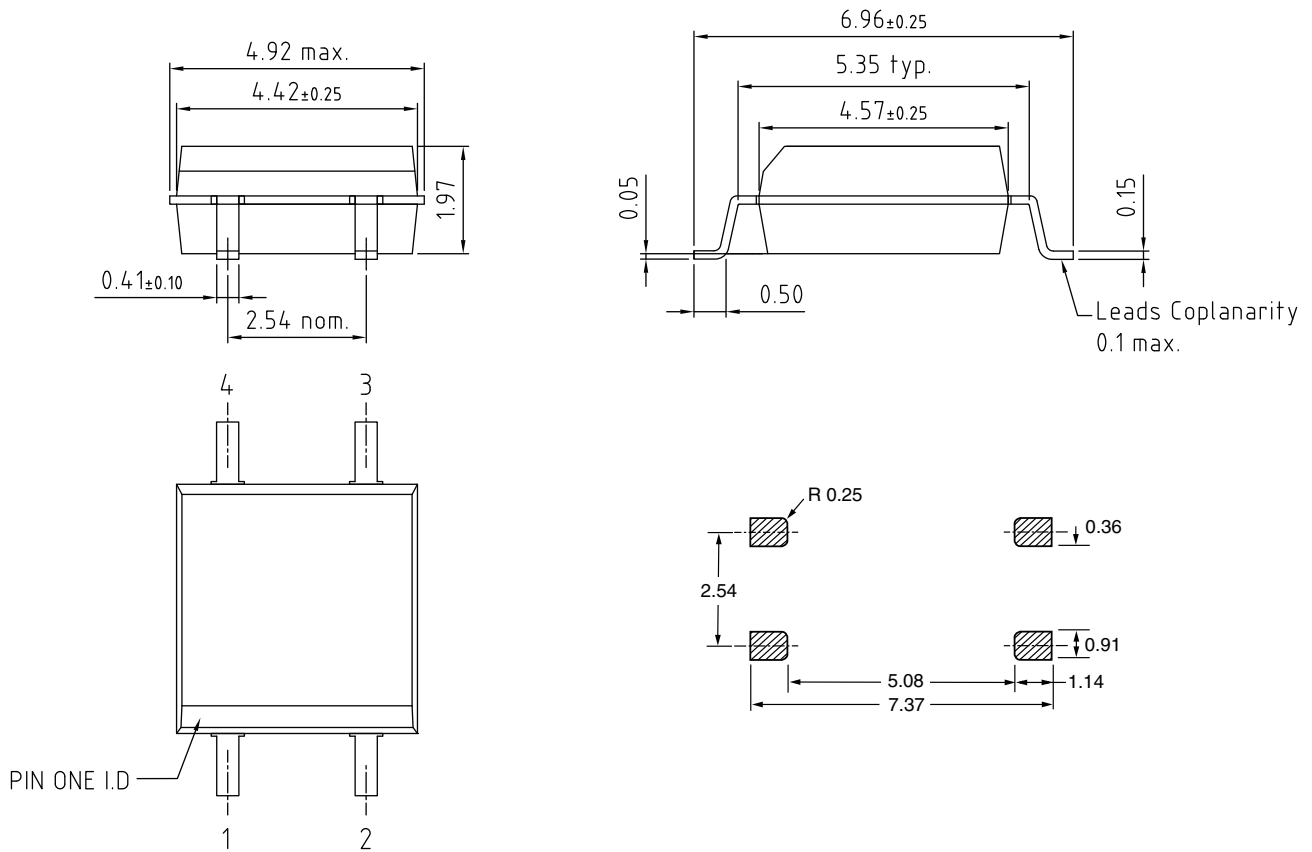


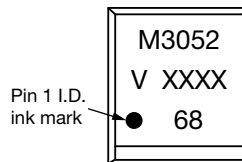
Fig. 11 - Trigger Current vs. Load Voltage



PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



Note

- XXXX = LMC (lot marking code)

TAPE AND REEL PACKAGING

Dimensions in millimeters

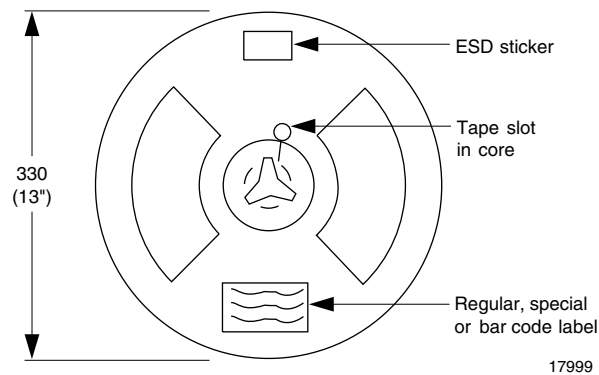


Fig. 12 - Tape and Reel Shipping Medium, 2000 Units per Reel

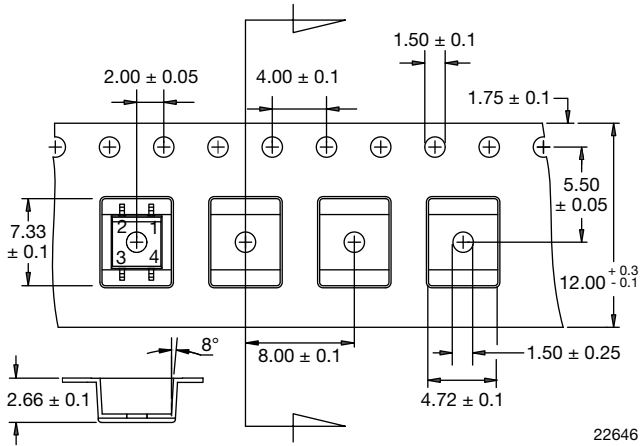


Fig. 13 - Tape Dimensions

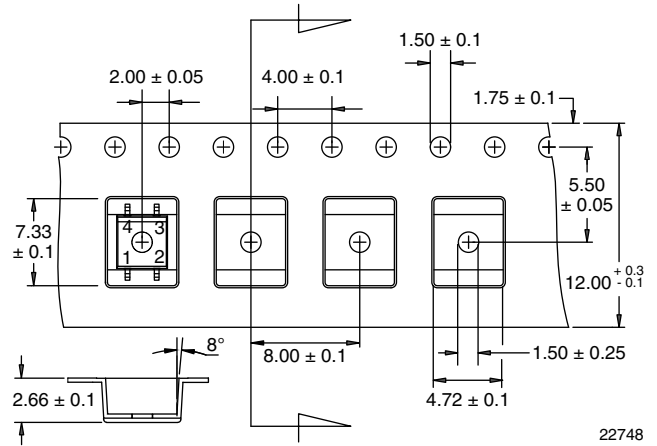


Fig. 14 - Tape Dimensions (order code T3)

**SOLDER PROFILE**

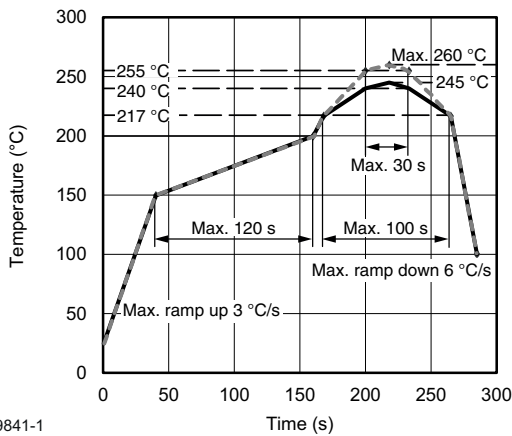


Fig. 15 - Lead (Pb)-Free Reflow Solder Profile According to J-STD-020

**HANDLING AND STORAGE CONDITIONS**

ESD level: HBM class 2

Floor life: unlimited

Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ , RH < 85 %

Moisture sensitivity level 1, according to J-STD-020



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