

MOC211-M

MOC212-M

MOC213-M

DESCRIPTION

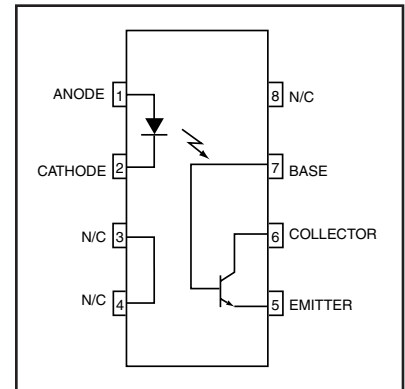
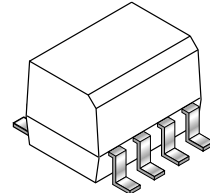
These devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector, in a surface mountable, small outline, plastic package. They are ideally suited for high density applications, and eliminate the need for through - the - board mounting.

FEATURES

- UL Recognized (File #E90700, volume 2)
- VDE Recognized (File #136616) (add option 'V' for VDE approval, e.g., MOC211V-M)
- Convenient Plastic SOIC-8 Surface Mountable Package Style
- Standard SOIC-8 Footprint, with 0.050" Lead Spacing
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- High Input-Output Isolation of 2500 V_{AC(rms)} Guaranteed
- Minimum BV_{CEO} of 30V guaranteed

APPLICATIONS

- General Purpose Switching Circuits
- Interfacing and coupling systems of different potentials and impedances
- Regulation Feedback Circuits
- Monitor and Detection Circuits



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| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) | | | |
|--|---------------|--------------|----------------------------|
| Rating | Symbol | Value | Unit |
| EMITTER | | | |
| Forward Current - Continuous | I_F | 60 | mA |
| Forward Current - Peak (PW = 100 μs , 120 pps) | I_F (pk) | 1.0 | A |
| Reverse Voltage | V_R | 6.0 | V |
| LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 90 0.8 | mW mW/ $^\circ\text{C}$ |
| DETECTOR | | | |
| Collector-Emitter Voltage | V_{CEO} | 30 | V |
| Emitter-Collector Voltage | V_{ECO} | 7.0 | V |
| Collector-Base Voltage | V_{CBO} | 70 | V |
| Collector Current-Continuous | I_C | 150 | mA |
| Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 150 1.76 | mW mW/ $^\circ\text{C}$ |
| TOTAL DEVICE | | | |
| Input-Output Isolation Voltage (1,2,3) (f = 60 Hz, t = 1 min.) | V_{ISO} | 2500 | Vac(rms) |
| Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 250 2.94 | mW mW/ $^\circ\text{C}$ |
| Ambient Operating Temperature Range | T_A | -40 to +100 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -40 to +150 | $^\circ\text{C}$ |
| Lead Soldering Temperature (1/16" from case, 10 sec. duration) | T_L | 260 | $^\circ\text{C}$ |

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| ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) | | | | | | |
|--|--|---------------|-----------------|-------------|-------------|---------------|
| Parameter | Test Conditions | Symbol | Min | Typ** | Max | Unit |
| EMITTER | | | | | | |
| Input Forward Voltage | ($I_F = 10\text{ mA}$) | V_F | — | 1.15 | 1.5 | V |
| Reverse Leakage Current | ($V_R = 6.0\text{ V}$) | I_R | — | 0.001 | 100 | μA |
| Input Capacitance | | C_{IN} | — | 18 | — | pF |
| DETECTOR | | | | | | |
| Collector-Emitter Dark Current | ($V_{CE} = 10\text{ V}, T_A = 25^\circ\text{C}$) | I_{CEO1} | — | 1.0 | 50 | nA |
| | ($V_{CE} = 10\text{ V}, T_A = 100^\circ\text{C}$) | I_{CEO2} | — | 1.0 | — | μA |
| Collector-Emitter Breakdown Voltage | ($I_C = 100\text{ }\mu\text{A}$) | BV_{CEO} | 30 | 100 | — | V |
| Emitter-Collector Breakdown Voltage | ($I_E = 100\text{ }\mu\text{A}$) | BV_{ECO} | 7.0 | 10 | — | V |
| Collector-Emitter Capacitance | ($f = 1.0\text{ MHz}, V_{CE} = 0$) | C_{CE} | — | 7.0 | — | pF |
| COUPLED | | | | | | |
| Collector-Output Current ⁽⁴⁾ | MOC211-M MOC212-M MOC213-M ($I_F = 10\text{ mA}, V_{CE} = 10\text{ V}$) | CTR | 20 50 100 | — — — | — — — | % |
| Isolation Surge Voltage ^(1,2,3) | $f = (60\text{ Hz AC Peak}, t = 1\text{ min.})$ | V_{ISO} | 2500 | — | — | Vac(rms) |
| Isolation Resistance ⁽²⁾ | ($V = 500\text{ V}$) | R_{ISO} | 10^{11} | — | — | Ω |
| Collector-Emitter Saturation Voltage | ($I_C = 2.0\text{ mA}, I_F = 10\text{ mA}$) | $V_{CE(sat)}$ | — | — | 0.4 | V |
| Isolation Capacitance ⁽²⁾ | ($V = 0\text{ V}, f = 1\text{ MHz}$) | C_{ISO} | — | 0.2 | — | pF |
| Turn-On Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\text{ }\Omega$) (Fig. 6) | t_{on} | — | 7.5 | — | μs |
| Turn-Off Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\text{ }\Omega$) (Fig. 6) | t_{off} | — | 5.7 | — | μs |
| Rise Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\text{ }\Omega$) (Fig. 6) | t_r | — | 3.2 | — | μs |
| Fall Time | ($I_C = 2.0\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\text{ }\Omega$) (Fig. 6) | t_f | — | 4.7 | — | μs |

** Typical values at $T_A = 25^\circ\text{C}$

1. Isolation Surge Voltage, V_{ISO} , is an internal device dielectric breakdown rating.
2. For this test, Pins 1 and 2 are common and Pins 5, 6 and 7 are common.
3. V_{ISO} rating of 2500 $V_{AC(rms)}$ for $t = 1\text{ min.}$ is equivalent to a rating of 3,000 $V_{AC(rms)}$ for $t = 1\text{ sec.}$
4. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.

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Fig. 1 LED Forward Voltage vs. Forward Current

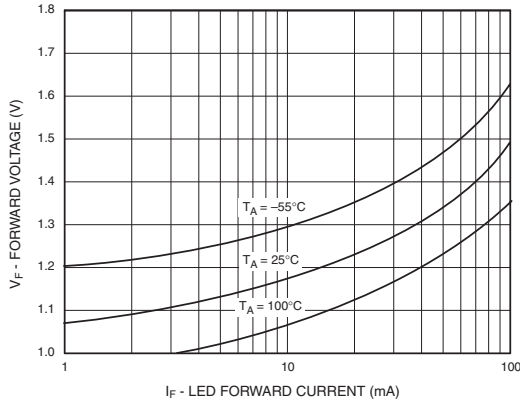


Fig. 2 Output Current vs. Input Current

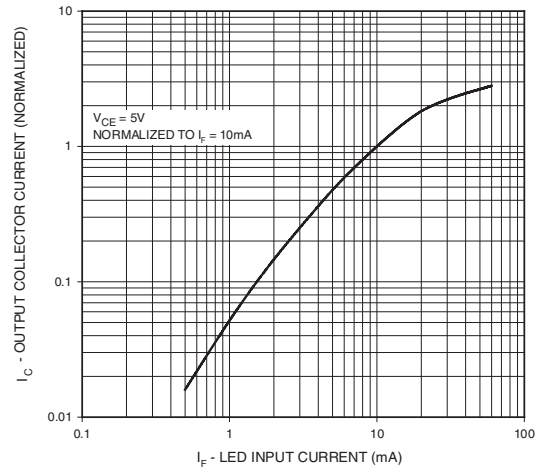


Fig. 3 Output Current vs. Ambient Temperature

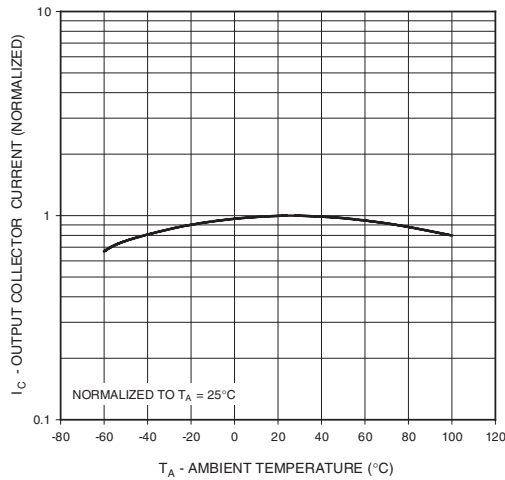


Fig. 4 Output Current vs. Collector - Emitter Voltage

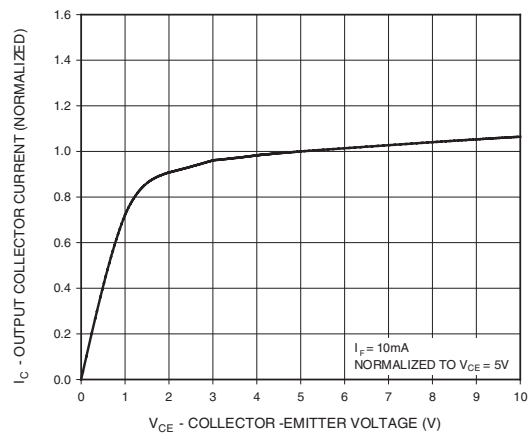


Fig. 5 Dark Current vs. Ambient Temperature

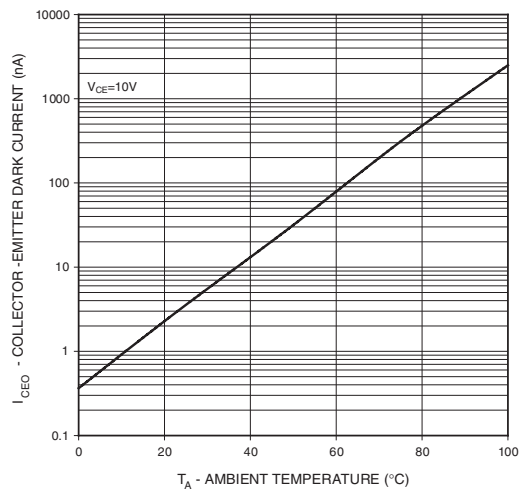
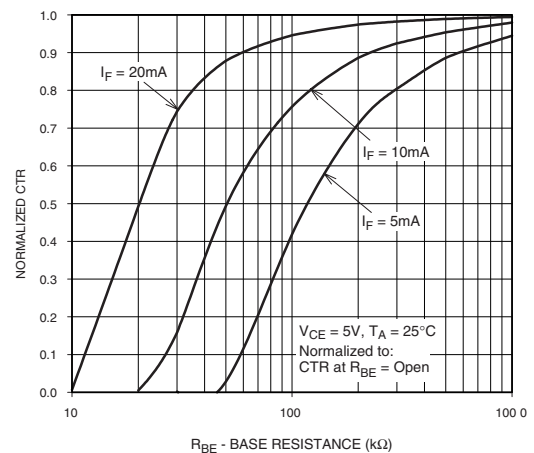


Fig. 6 CTR vs. RBE (Unsaturated)



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Fig. 7 CTR vs. R_{BE} (Saturated)

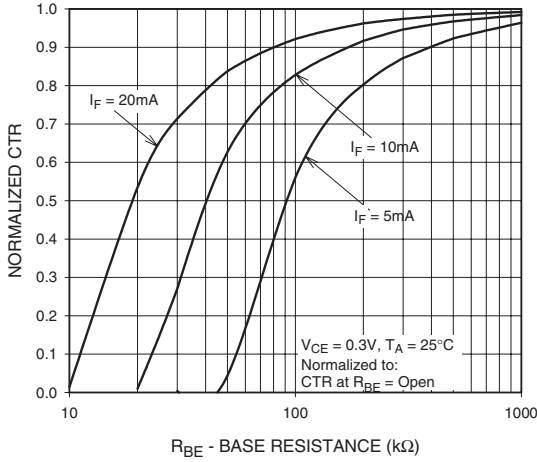


Fig. 8 Normalized t_{on} vs. R_{BE}

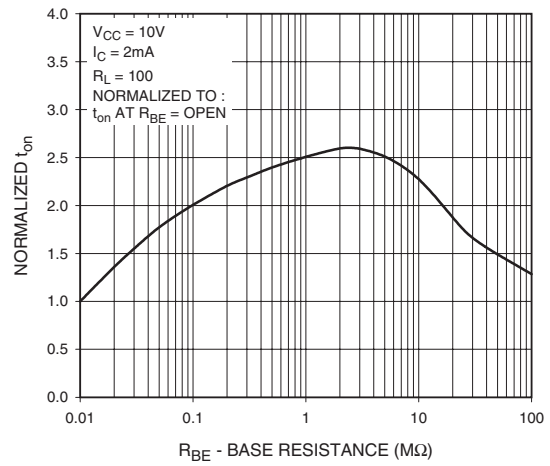
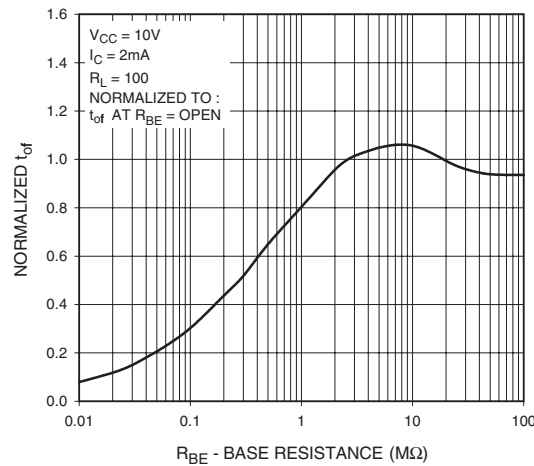


Fig. 9 Normalized t_{of} vs. R_{BE}



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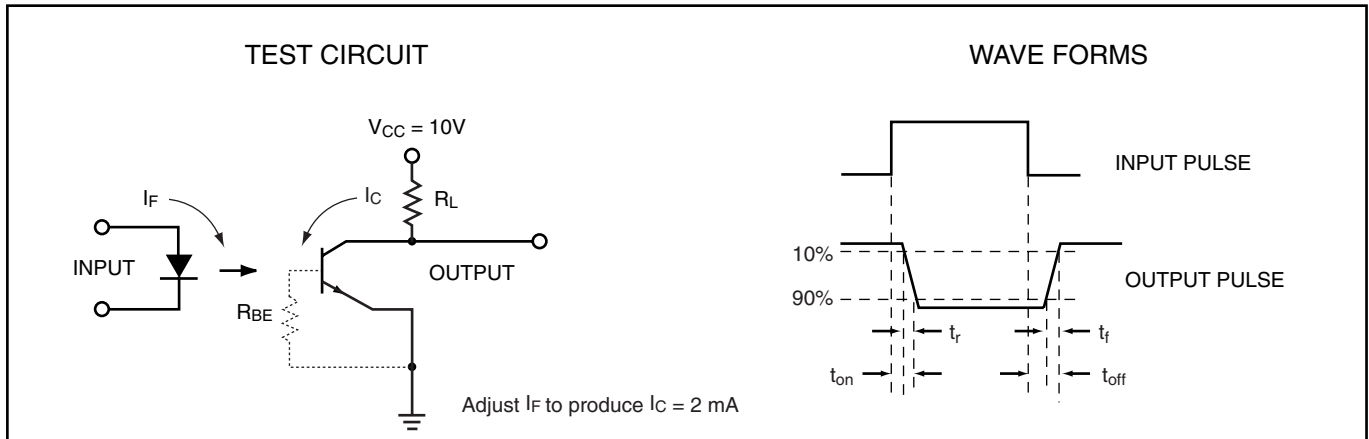


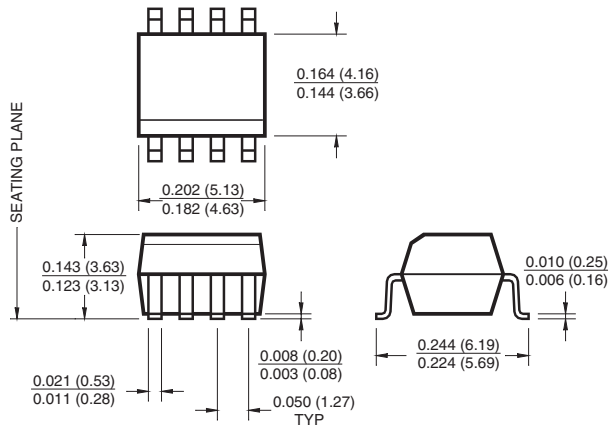
Figure 6. Switching Time Test Circuit and Waveforms

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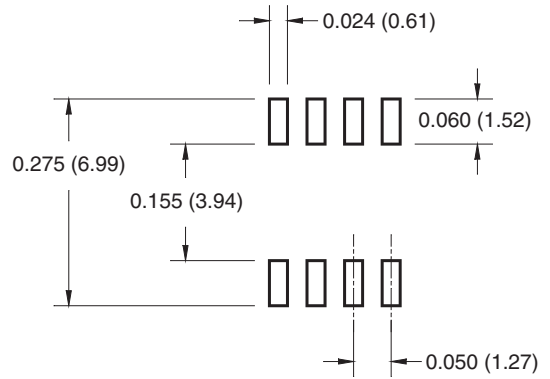
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Package Dimensions (Surface Mount)



8-Pin Small Outline



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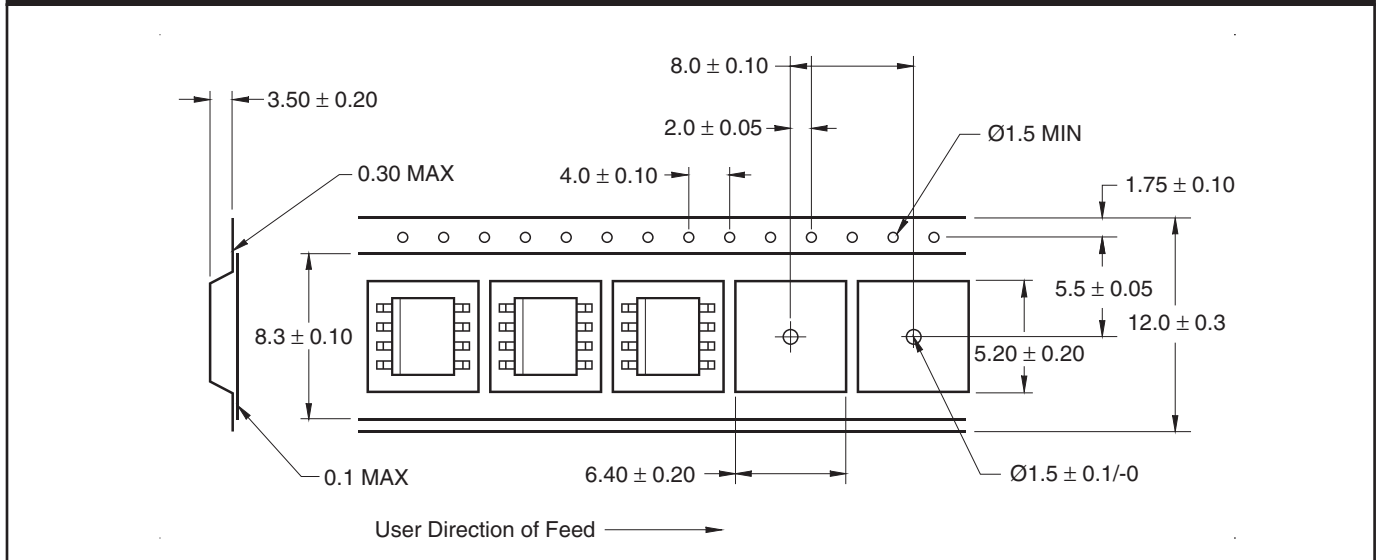
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ORDERING INFORMATION

| Option | Order Entry Identifier | Description |
|--------|------------------------|---|
| V | V | VDE 0884 |
| R1 | R1 | Tape and reel (500 units per reel) |
| R1V | R1V | VDE 0884, Tape and reel (500 units per reel) |
| R2 | R2 | Tape and reel (2500 units per reel) |
| R2V | R2V | VDE 0884, Tape and reel (2500 units per reel) |

QT Carrier Tape Specifications

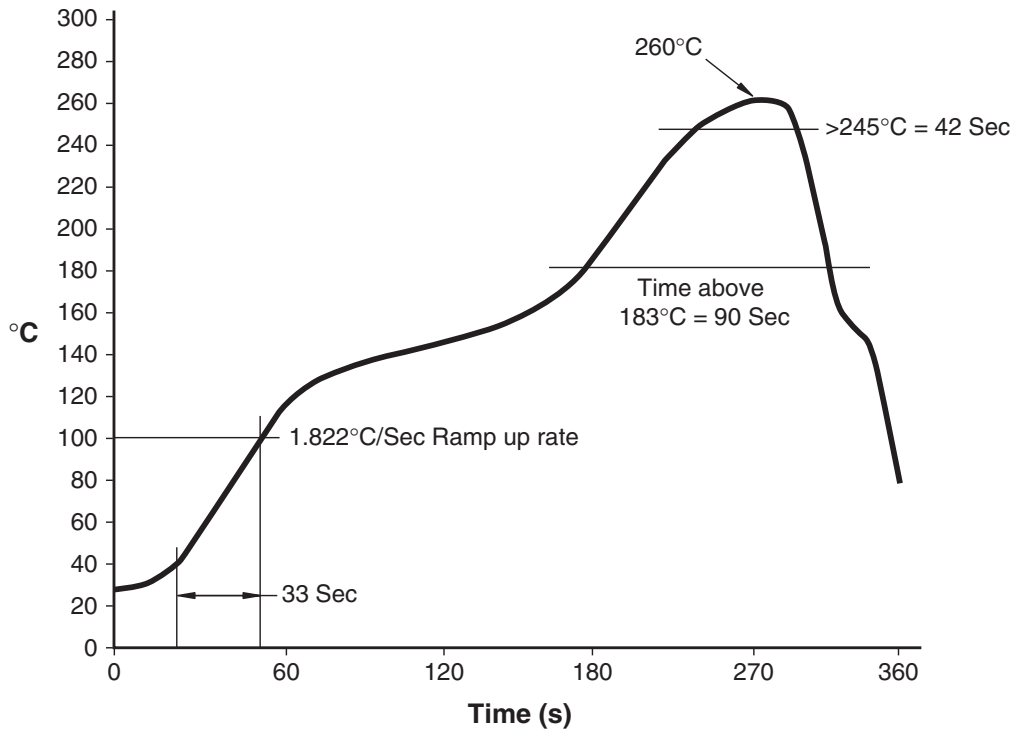


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Reflow Profile



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