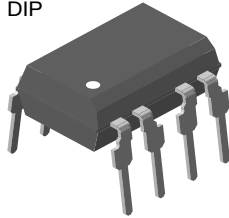
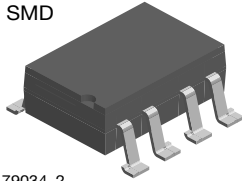


## Dual Photovoltaic MOSFET Driver Solid-State Relay

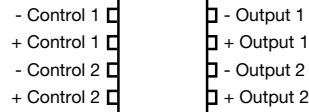
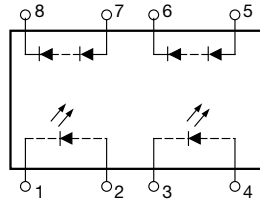
DIP



SMD



i179034\_2



### FEATURES

- High open circuit voltage, up to 15.4 V typical
- High short circuit current, up to 50  $\mu$ A typical
- Isolation test voltage 5300 V<sub>RMS</sub>
- Logic compatible input
- High reliability
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

- High side driver
- Solid-state relays
- Floating power supply
- Power control
- Data acquisition
- ATE
- Isolated switching

### AGENCY APPROVALS

- [UL](#)
- [cUL](#)
- [DIN EN 60747-5 \(VDE 0884-5\)](#)
- [BSI](#)
- [CQC](#)
- [FIMKO](#)

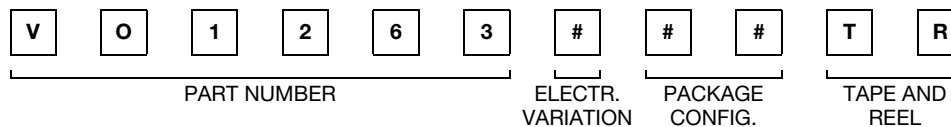
### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

The VO1263AB and VO1263AAC photovoltaic MOSFET driver consists of two LEDs optically coupled to two photodiode arrays. The photodiode array provides a floating source with adequate voltage and current to drive high power MOSFET transistors. Optical coupling provides a high I/O isolation voltage. In order to turn the MOSFET off, an external resistance (gate-to-source) is required for gate discharge.

### ORDERING INFORMATION



| PACKAGE              | UL, cUL, VDE, BSI, CQC, FIMKO |
|----------------------|-------------------------------|
| SMD-8                | VO1263AAC                     |
| SMD-8, tape and reel | VO1263AACTR                   |
| DIP-8                | VO1263AB                      |

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                                    | TEST CONDITION               | SYMBOL            | VALUE       | UNIT |
|----------------------------------------------|------------------------------|-------------------|-------------|------|
| <b>SSR</b>                                   |                              |                   |             |      |
| LED input ratings continuous forward current |                              | I <sub>F</sub>    | 50          | mA   |
| LED input ratings reverse voltage            | I <sub>R</sub> ≤ 10 $\mu$ A  | V <sub>R</sub>    | 5.0         | V    |
| Photodiode array reverse voltage             | I <sub>R</sub> ≤ 2.0 $\mu$ A | V <sub>R</sub>    | 100         | V    |
| Ambient operating temperature range          |                              | T <sub>amb</sub>  | -40 to +100 | °C   |
| Storage temperature range                    |                              | T <sub>stg</sub>  | -40 to +150 | °C   |
| Pin soldering temperature                    | t = 7.0 s max.               | T <sub>slid</sub> | 270         | °C   |

### Note

- 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



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                |              |      |      |      |               |
|----------------------------------------------------------------------------------------------------------|--------------------------------|--------------|------|------|------|---------------|
| PARAMETER                                                                                                | TEST CONDITION                 | SYMBOL       | MIN. | TYP. | MAX. | UNIT          |
| LED forward voltage                                                                                      | $I_F = 10\text{ mA}$           | $V_F$        | 1.2  | 1.4  | 1.7  | V             |
| Detector reverse voltage                                                                                 | $I_R = 2.0\text{ }\mu\text{A}$ | $V_{R(PDA)}$ | -    | 350  | -    | V             |
| Open circuit voltage (pins 5, 6 or 7, 8)                                                                 | $I_F = 5.0\text{ mA}$          | $V_{OC}$     | -    | 14.2 | -    | V             |
|                                                                                                          | $I_F = 10\text{ mA}$           | $V_{OC}$     | 10.3 | 14.7 | 16.5 | V             |
|                                                                                                          | $I_F = 15\text{ mA}$           | $V_{OC}$     | -    | 15   | -    | V             |
|                                                                                                          | $I_F = 20\text{ mA}$           | $V_{OC}$     | -    | 15.2 | -    | V             |
|                                                                                                          | $I_F = 30\text{ mA}$           | $V_{OC}$     | -    | 15.4 | -    | V             |
| Short circuit current (pins 5, 6 or 7, 8)                                                                | $I_F = 5.0\text{ mA}$          | $I_{SC}$     | 2.7  | 7    | -    | $\mu\text{A}$ |
|                                                                                                          | $I_F = 10\text{ mA}$           | $I_{SC}$     | 7    | 15   | -    | $\mu\text{A}$ |
|                                                                                                          | $I_F = 15\text{ mA}$           | $I_{SC}$     | 11   | 24   | -    | $\mu\text{A}$ |
|                                                                                                          | $I_F = 20\text{ mA}$           | $I_{SC}$     | 15   | 33   | -    | $\mu\text{A}$ |
|                                                                                                          | $I_F = 30\text{ mA}$           | $I_{SC}$     | 21   | 50   | -    | $\mu\text{A}$ |

**Note**

- Minimum and maximum values are testing 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>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                     |           |      |      |      |               |
|---------------------------------------------------------------------------------------------------------|-------------------------------------|-----------|------|------|------|---------------|
| PARAMETER                                                                                               | TEST CONDITION                      | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| Turn-on time                                                                                            | $I_F = 20\text{ mA}$ <sup>(1)</sup> | $t_{on}$  | -    | 35   | -    | $\mu\text{s}$ |
| Turn-off time                                                                                           | $I_F = 20\text{ mA}$ <sup>(1)</sup> | $t_{off}$ | -    | 150  | -    | $\mu\text{s}$ |

**Note**

- <sup>(1)</sup>  $f = 100\text{ Hz}$ , pulse width = 2 ms, load ( $R_L$ ) = 1.0 M $\Omega$ ,  $C_L = 15\text{ pF}$ ; measured at 90 % rated voltage ( $t_{on}$ ), 10 % rated voltage ( $t_{off}$ ). Actuation speed depends upon the external  $t_{on}$  and  $t_{off}$  circuitry and the capacitance of the MOSFET

| <b>SAFETY AND INSULATION RATINGS</b>         |                                         |            |               |                    |
|----------------------------------------------|-----------------------------------------|------------|---------------|--------------------|
| PARAMETER                                    | TEST CONDITION                          | SYMBOL     | VALUE         | UNIT               |
| Climatic classification                      | According to IEC 68 part 1              |            | 40 / 100 / 21 |                    |
| Pollution degree                             | According to DIN VDE 0109               |            | 2             |                    |
| Comparative tracking index                   | Insulation group IIIa                   | CTI        | 175           |                    |
| Maximum rated withstanding isolation voltage | According to UL1577, $t = 1\text{ min}$ | $V_{ISO}$  | 5300          | $V_{RMS}$          |
| Maximum transient isolation voltage          | According to DIN EN 60747-5-5           | $V_{IOTM}$ | 8000          | $V_{peak}$         |
| Maximum repetitive peak isolation voltage    | According to DIN EN 60747-5-5           | $V_{IORM}$ | 890           | $V_{peak}$         |
| Output safety power                          |                                         | $P_{SO}$   | 700           | mW                 |
| Input safety current                         |                                         | $I_{SI}$   | 300           | mA                 |
| Input safety temperature                     |                                         | $T_S$      | 175           | $^{\circ}\text{C}$ |
| Creepage distance                            | DIP-8, SMD-8                            |            | $\geq 7$      | mm                 |
| Clearance distance                           |                                         |            | $\geq 7$      | mm                 |

**Note**

- This optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits



FUNCTIONAL DESCRIPTION

Fig. 1 outlines the IV characteristics of the illuminated photodiode array (PDA). For operation at voltages below V<sub>OC</sub>, the PDA acts as a nearly constant current source. The actual region of operation depends upon the load.

The amount of current applied to the LED (pins 1 and 2 or 3 and 4) determines the amount of light produced for the PDA. For high temperature operation, more LED current may be required.

TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

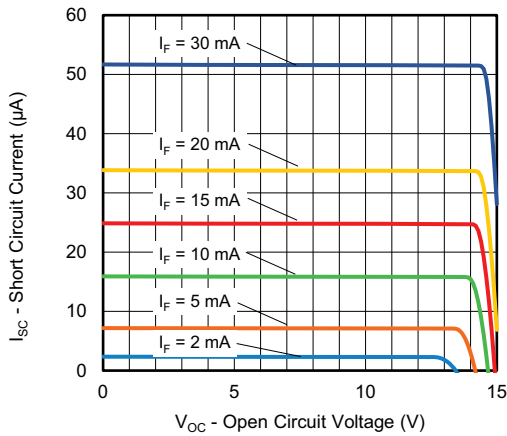


Fig. 1 - Short Circuit Current vs. Open Circuit Voltage

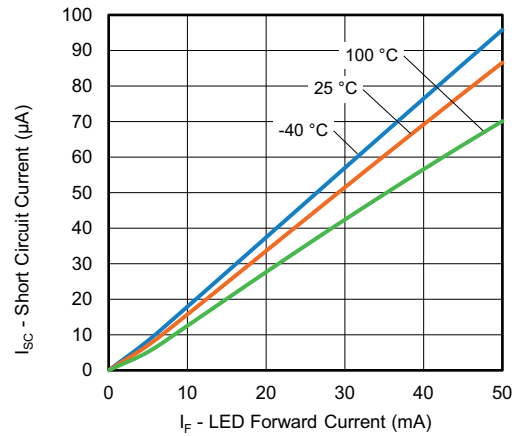


Fig. 3 - Short Circuit Current vs. LED Forward Current

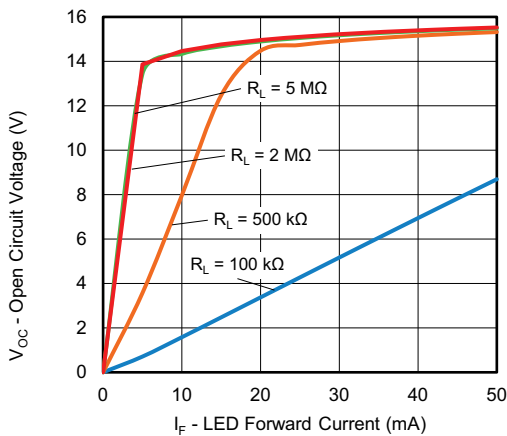


Fig. 2 - Output Voltage vs. LED Current

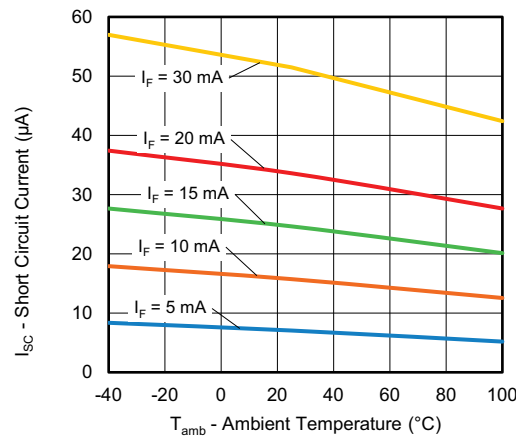


Fig. 4 - Short Circuit Current vs. Ambient Temperature

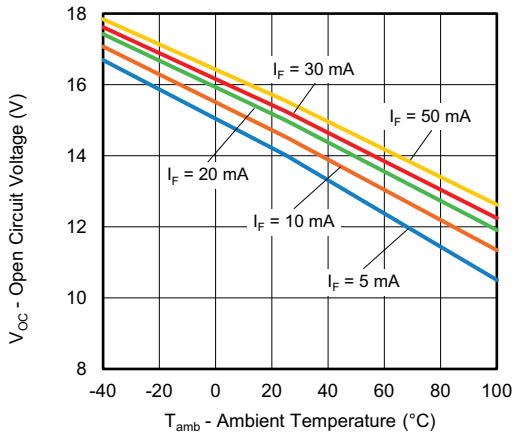


Fig. 5 - Open Circuit Voltage vs. Ambient Temperature

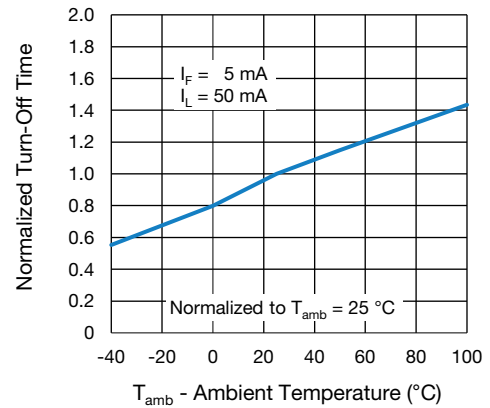


Fig. 8 - Normalized Turn-Off Time vs. Ambient Temperature

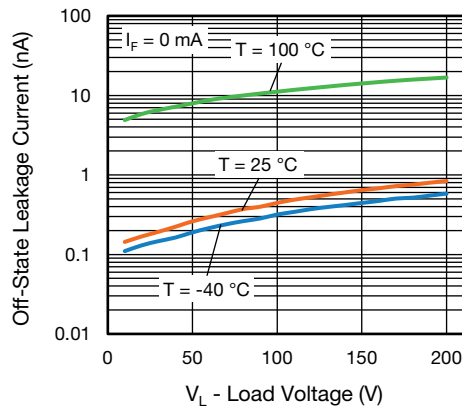


Fig. 6 - Leakage Current vs. Load Voltage

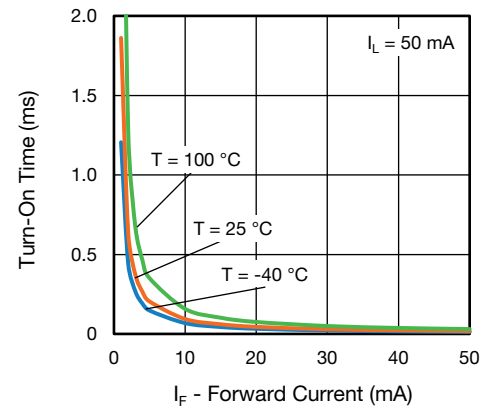


Fig. 9 - Turn-On Time vs. Forward Current

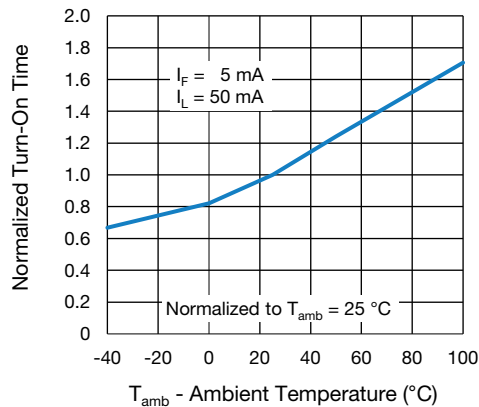


Fig. 7 - Normalized Turn-On Time vs. Ambient Temperature

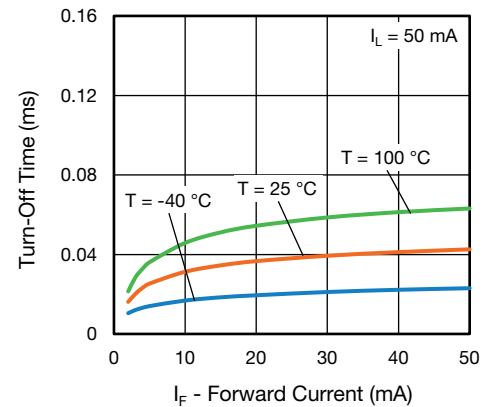
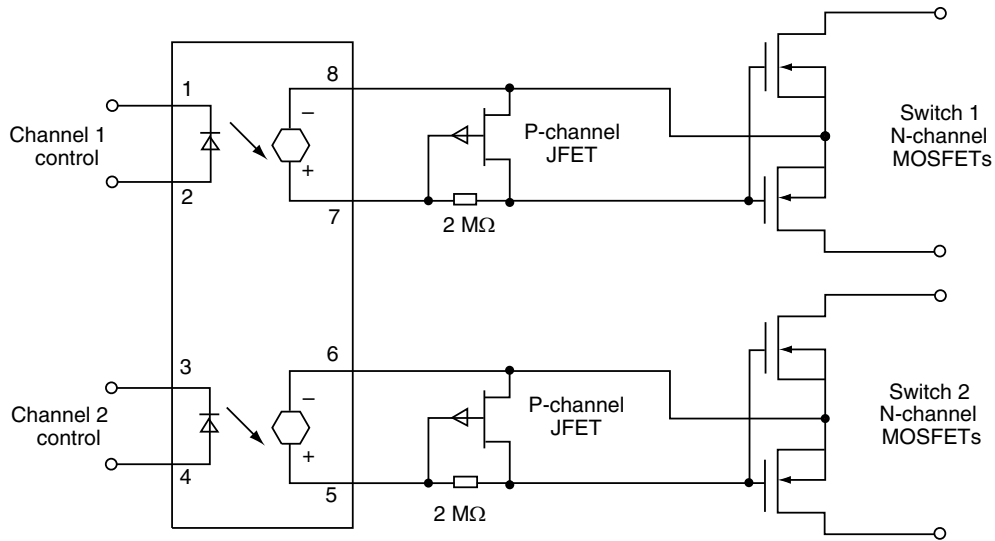


Fig. 10 - Turn-Off Time vs. Forward Current

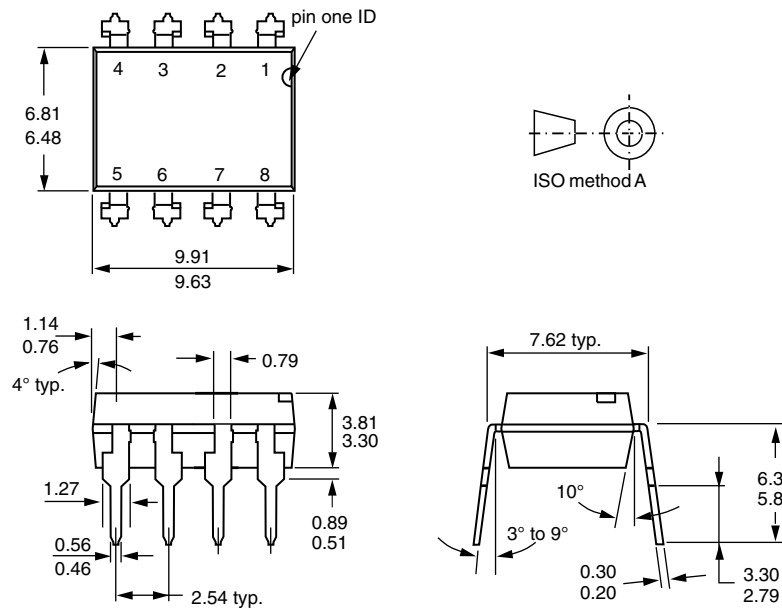


ih1262cb\_09

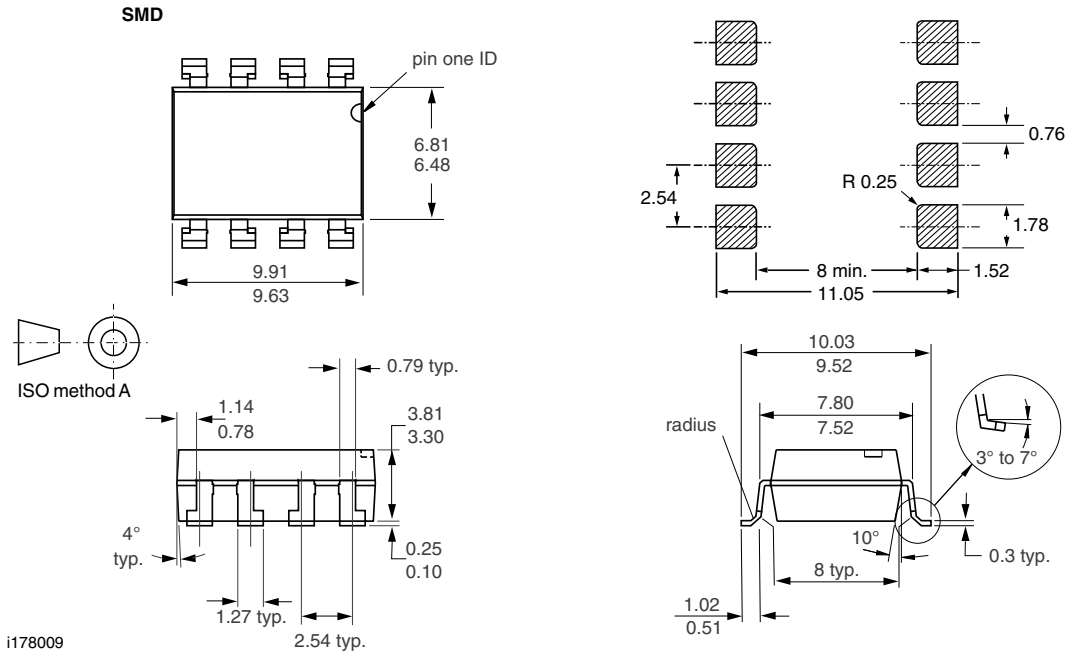
Fig. 11 - Typical Dual Form A Solid-State Relay Application

**PACKAGE DIMENSIONS** in millimeters

DIP



ih178008



**PACKAGE MARKING (example)**

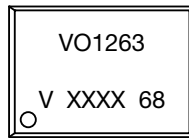


Fig. 12 - Example of VO1263AAC

**Note**

- XXXX = LMC (lot marking code)

**SOLDER PROFILES**

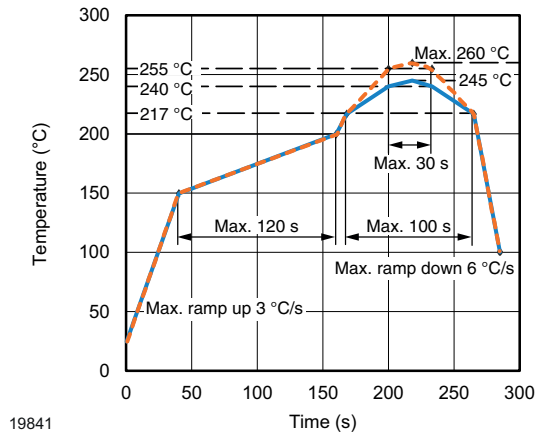


Fig. 13 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020 for SMD Devices

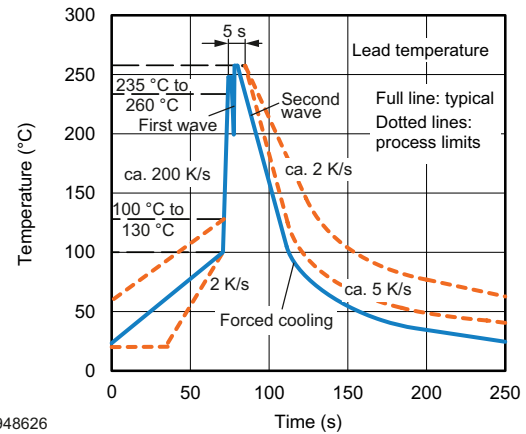


Fig. 14 - Wave Soldering Double Wave Profile According to J-STD-020 for DIP Devices



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