

Absolute Maximum Ratings for Soldering

Scope

The specifications contained herein apply only to National Semiconductor products whose datasheets refer to this document and specifically exclude those products that use the package families listed in the tables in this section.

NOT applicable to the following Pb-free package families:

LAMINATE CSP	LCC	LTCC
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NOT applicable to the following SnPb package families:

LLP	PLCC	SSOP
PQFP-208 pins	SOIC WIDE	TEPBGA

All specifications in this document are to be interpreted as Absolute Maximum Ratings. Absolute Maximum Ratings indicate limits beyond which damage to the device may occur, including inoperability and degradation of device reliability and/or performance. Functional operation of the device and/or non-degradation at the Absolute Maximum Ratings or other conditions beyond those indicated in the Operating Ratings or Operating Conditions is not implied. The Operating Ratings or Operating Conditions indicate conditions at which the device is functional and the device should not be operated beyond such conditions.

Infrared and Convection

Pb-FREE SMT PACKAGES

These specifications meet IPC/JEDEC J-STD-020.

TABLE 1. Pb-Free Peak Body Temperatures

Package Thickness	Package Volume < 350 mm ³	Package Volume 350 – 2000 mm ³	Package Volume >2000 mm ³
<1.6 mm	260°C	260°C	260°C
1.6 mm – 2.5 mm	260°C	250°C	245°C
> 2.5 mm	250°C	245°C	245°C
Package volume excludes external terminals (e.g., balls, bumps, lands, leads) and/or nonintegral heat sinks.			
Dwell time max within 5°C of peak temperature: 30 sec			

SnPb SMT PACKAGES

The specifications in [Table 1](#) apply for SnPb package families **not** listed below. [Table 1](#) exceeds J-STD-020 requirements for SnPb packages.

For the families listed below, specifications in [Table 2](#) apply. These specifications meet J-STD-020.

EQUAD	SOIC NARROW	TO-252
FBGA	PBGA	TO-263
FCBGA	TBGA	CERPACK
LBGA	TFBGA	

TABLE 2. SnPb Peak Body Temperatures

Package Thickness	Package Volume <350 mm ³	Package Volume ≥350 mm ³
<2.5 mm	235°C	220°C
≥ 2.5 mm	220°C	220°C
Package volume excludes external terminals (e.g., balls, bumps, lands, leads) and/or nonintegral heat sinks.		
Dwell time max within 5°C of peak temperature: 20 sec		

Notes

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Switching Regulators	www.national.com/switchers	Distributors	www.national.com/contacts
LDOs	www.national.com/ldo	Quality and Reliability	www.national.com/quality
LED Lighting	www.national.com/led	Feedback/Support	www.national.com/feedback
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