SLOVENSKI STANDARD
oSIST prEN IEC 63378-6:2025

01-julij-2025

Standardizacija toplotnih lastnosti pri polprevodniških ohišjih - 6. del: Model toplotne upornosti in kapacitivnosti za napoved prehodne temperature na spojih in merilnih točkah

Thermal standardization on semiconductor packages - Part 6: Thermal resistance and capacitance model for transient temperature prediction at junction and measurement points

iTeh Standards
(https://standards.iteh.ai)
Document Preview

Normalisation thermique des boîtiers de semiconducteurs - Partie 6: Modèle de résistance thermique et de capacité pour la prédiction de la température transitoire aux points de jonction et de mesure

oSIST prEN IEC 63378-6:2025

Ta slovenski standard je istoveten z: **prEN IEC 63378-6:2025**

ICS:

31.080.01	Polprevodniški elementi (naprave) na splošno	Semiconductor devices in general

oSIST prEN IEC 63378-6:2025 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

oSIST prEN IEC 63378-6:2025
https://standards.iteh.ai/catalog/standards/sist/95a1b681-c400-4fb5-b85c-757f6d2d0c3f/osist-pren-iec-63378-6-2025

47D/991/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 63378-6 ED1**	
DATE OF CIRCULATION: **2025-05-23**	CLOSING DATE FOR VOTING: **2025-08-15**
SUPERSEDES DOCUMENTS: **47D/969/CD, 47D/990/CC**	

IEC SC 47D : SEMICONDUCTOR DEVICES PACKAGING	
SECRETARIAT: Japan	SECRETARY: Mr Hiroyoshi Yoshida
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 91	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Digital content,Energy Efficiency	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

iTeh Standards
(https://standards.iteh.ai)
Document Preview
oSIST prEN IEC 63378-6:2025
https://standards.iteh.ai/catalog/standards/sist/95a1b681-c400-4fb5-b85c-757f6d2d0c3f/osist-pren-iec-63378-6-2025

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Thermal standardization on semiconductor packages - Part 6: Thermal resistance and capacitance model for transient temperature prediction at junction and measurement points

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

Copyright © 2025 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 7
2 Normative references 7
3 Terms and definitions 7
4 Definition of DXRC 9
  4.1 General 9
  4.2 Thermal Resistance and Capacitance (RC) topology of DXRC 9
    4.2.1 Thermal RC topology of DXRC 9
    4.2.2 Outline of DXRC 9
    4.2.3 RC values on NJA-RC 10
    4.2.4 RC values on MPA-RC 10
Annex A (informative) Accuracy Verification of DXRC model for TO-252 12
  A.1 General 12
  A.2 CFD Model 12
  A.3 Calculation of thermal RC values 14
  A.4 MPA-RC and DXRC model outline 15
  A.5 Optimization of RC values in MPA-RC 15
  A.6 Result 16
Annex B (informative) Accuracy Verification of DXRC model for TO-263 18
  B.1 General 18
  B.2 CFD Model 18
  B.3 Calculation of thermal RC values 20
  B.4 MPA-RC and DXRC model outline 21
  B.5 Optimization of RC values in MPA-RC 21
  B.6 Result 22
Annex C (informative) Accuracy Verification of DXRC model for HSOP 23
  C.1 General 23
  C.2 CFD Model 23
  C.3 Calculation of thermal RC values 25
  C.4 MPA-RC and DXRC model outline 26
  C.5 Optimization of RC values in MPA-RC 26
  C.6 Result 27
Annex D (informative) The effect of PCB layers 28
  D.1 General 28
  D.2 Verification Method 28
  D.3 Result 28
Bibliography 30

Figure 1 – Thermal RC topology of DXRC 9
Figure 2 – Outline of DXRC 10
Figure A.1 – CFD Model for TO-252 12
Figure A.2 – Size of TO-252 package 13

iTeh Standards (https://standards.iteh.ai) Document Preview
oSIST prEN IEC 63378-6:2025
https://standards.iteh.ai/catalog/standards/sist/95a1b681-c400-4fb5-b85c-757f6d2d0c3f/osist-pren-iec-63378-6-2025

oSIST prEN IEC 63378-6:2025

Figure A.3 – Structure Function 14
Figure A.4 – Result of Verification 17
Figure B.1 – CFD Model for TO-263 18
Figure B.2 – Size of TO-263 package 19
Figure B.2 – Structure Function 20
Figure B.3 – Result of Verification 22
Figure C.1 – CFD Model for HSOP 23
Figure C.2 – Size of HSOP package 24
Figure C.3 – Structure Function 25
Figure C.4 – Result of Verification 27
Figure D.1 – Comparisons of temperature rise between the detailed model and the DXRC model 29

Table A.1 – Material Attributes 13
Table A.2 – Thermal Resistances in NJA-RC 14
Table A.3 – Thermal Capacitances in NJA-RC 15
Table A.4 – Input Variables 16
Table A.5 – Optimized RC values 16
Table B.1 – Material Attributes 19
Table B.2 – Thermal Resistances in NJA-RC 20
Table B.3 – Thermal Capacitances in NJA-RC 21
Table B.4 – Optimized RC values 22
Table C.1 – Material Attributes 24
Table C.2 – Thermal Resistances in NJA-RC 25
Table C.3 – Thermal Capacitances in NJA-RC 26
Table C.4 – Optimized RC values 27
Table D.1 – Combination of the coverages of copper layers 28

iTeh Standards
(https://standards.iteh.ai)
Document Preview
oSIST prEN IEC 63378-6:2025
https://standards.iteh.ai/catalog/standards/sist/95a18681-e400-4f05-885e-757f6d2d0e3f/osist-pren-iec-63378-6-2025