

<DIPIM>

SLIMDIP Series APPLICATION NOTE

SLIMDIP-S, -M, -L, -W, -X, -Z

Table of contents

CHAPTER 1 INTRODUCTION	2
1.1 Features of SLIMDIP	2
1.2 Functions	3
1.3 Target Applications	4
1.4 Product Line-up	4
1.5 The Differences between previous series and SLIMDIP	4
CHAPTER 2 SPECIFICATIONS AND CHARACTERISTICS.....	6
2.1 SLIMDIP Specifications	6
2.1.1 Maximum Ratings.....	6
2.1.2 Thermal Resistance.....	8
2.1.3 Electric Characteristics and Recommended Conditions	9
2.1.4 Mechanical Characteristics and Ratings.....	11
2.2 Protective Functions and Operating Sequence	12
2.2.1 Short Circuit Protection.....	12
2.2.2 Control Supply UV Protection	14
2.2.3 OT Protection	16
2.2.4 Temperature output function V_{OT}	17
2.3 Package Outlines	20
2.3.1 Package outlines	20
2.3.2 Marking	22
2.3.3 Terminal Description	23
2.4 Mounting Method	25
2.4.1 Electric Spacing.....	25
2.4.2 Mounting Method and Precautions	25
2.4.3 Soldering Conditions	26
CHAPTER 3 SYSTEM APPLICATION GUIDANCE.....	27
3.1 Application Guidance	27
3.1.1 System connection	27
3.1.2 Interface Circuit (Direct Coupling Interface example for using one shunt resistor).....	28
3.1.3 Interface Circuit (Example of Opto-coupler Isolated Interface).....	29
3.1.4 External SC Protection Circuit with Using Three Shunt Resistors.....	30
3.1.5 Circuits of Signal Input Terminals and Fo Terminal	30
3.1.6 Snubber Circuit.....	32
3.1.7 Recommended Wiring Method around Shunt Resistor	32
3.1.8 Precaution for Wiring on PCB.....	34
3.1.9 Parallel operation of DIPIM	35
3.1.10 SOA of SLIMDIP	35
3.1.11 SCSOA.....	36
3.1.12 Power Life Cycles.....	39
3.2 Power Loss and Thermal Dissipation Calculation	40
3.2.1 Power Loss Calculation	40
3.2.2 Temperature Rise Considerations and Calculation Example	42
3.2.3 Installation of thermocouple.....	43
3.3 Noise and ESD Withstand Capability	44
3.3.1 Evaluation Circuit of Noise Withstand Capability	44
3.3.2 Countermeasures and Precautions	44
3.3.3 Static Electricity Withstand Capability	45
CHAPTER 4 Bootstrap Circuit Operation	46
4.1 Bootstrap Circuit Operation	46
4.2 Bootstrap Supply Circuit Current at Switching State	47
4.3 Note for designing the bootstrap circuit	48
4.4 Initial charging in bootstrap circuit	49
CHAPTER 5 PACKAGE HANDLING	50
5.1 Packaging Specification	50
5.2 Handling Precautions	51