

Application Note AN-114

Failure Mode and Effect Analysis

BridgeSwitch-2 Family

Device Information

Please refer to the BridgeSwitch-2 datasheet for the pin assignments.
Refer to Figure 1 for the package information

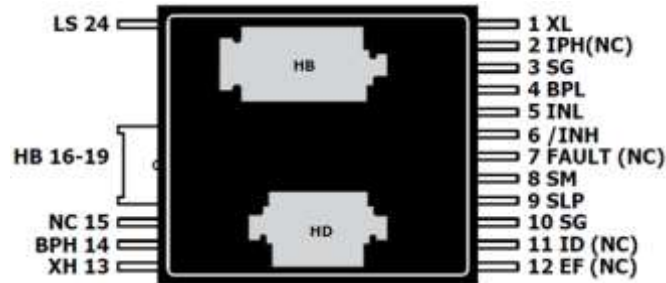


Figure 1. Part Under Test.

Test Results Summary

Adjacent Pin Short Test

Fault Mode	Operation Condition		Operation Behavior Notes	
	Start-up	During Operation	Start-up	During Operation
XL to IPH short	No failure	No failure	Device switching disabled	Normal operation
IPH to SG short	No failure	No failure	Normal operation with no IPH signal	Normal operation with no IPH signal
BPL to SG short	No failure	No failure	Device non-operational and case temperature rises	Device non-operational and case temperature rises
BPL to INL short	No failure	Safe failure	Device non-operational	Device is damaged safely
INL to /INH short	No failure	No failure	Normal operation	Normal operation
/INH to FAULT short	No failure	No failure	Normal operation with no FAULT function	Normal operation with no FAULT function
FAULT to SM short (OVP Mode)	No failure	No failure	Device switching disabled due to OVP condition	Device switching disabled due to OVP condition
FAULT to SM short (NTC Mode, SM Open, SM shorted to ground)	No failure	No failure	Normal operation	Normal operation
SM to SLP short	No failure	No failure	Normal operation	Normal operation
SLP to SG short	No failure	No failure	Normal operation with no sleep function	Normal operation with no sleep function
SG to ID short	No failure	No failure	Normal operation	Normal operation
ID to EF short	No failure	No failure	Normal operation	Normal operation
XH to BPH short	Safe failure	Safe failure	Device is damaged safely	Device is damaged safely

Pin Open Test

Fault Mode	Operation Condition		Operation Behavior Notes	
	Start-up	During Operation	Start-up	During Operation
XL open	No failure	No failure	Normal operation at the minimum LS current limit	Normal operation
IPH open	No failure	No failure	Normal operation with no IPH signal	Normal operation with no IPH signal
SG open (one at a time)	No failure	No failure	Normal operation	Normal operation
BPL open	No failure	No failure	Device non-operational	Device non-operational
INL open	No failure	No failure	LS FREDFET switching disabled	LS FREDFET switching disabled
/INH open	No failure	No failure	HS FREDFET switching disabled	HS FREDFET switching disabled
FAULT open	No failure	No failure	Normal operation with no FAULT function	Normal operation with no FAULT function
SM open	No failure	No failure	Normal operation with no SM-pin function	Normal operation with no SM-pin function
SLP open	No failure	No failure	Normal operation	Normal operation
ID open	No failure	No failure	Normal operation	Normal operation
EF open	No failure	No failure	Normal operation	Normal operation
XH open	No failure	No failure	Normal operation at the minimum HS current limit	Normal operation
BPH open	No failure	No failure	HS FREDFET switching disabled	HS FREDFET switching disabled
LS open	Safe failure	Safe failure	Device is damaged safely	Device is damaged safely
HB open	No failure	Safe failure	Abnormal HS FREDFET switching	Device is damaged safely

Logic Pin to Signal Ground Pin (SG) Short Test

Fault Mode	Operation Condition		Operation Behavior Notes	
	Start-up	During Operation	Start-up	During Operation
XL to SG short	No failure	No failure	LS FREDFET switching disabled	Normal operation
IPH to SG short	No failure	No failure	Normal operation with no IPH signal	Normal operation with no IPH signal
BPL to SG short	No failure	No failure	Device non-operational and case temperature rises	Device non-operational and case temperature rises
INL to SG short	No failure	No failure	LS FREDFET switching disabled	LS FREDFET switching disabled
/INH to SG short	No failure	No failure	HS FREDFET switched on	HS FREDFET switched on
FAULT to SG short	No failure	No failure	Normal operation with no FAULT function	Normal operation with no FAULT function
SM to SG short	No failure	No failure	Normal operation with no SM-pin function	Normal operation with no SM-pin function
SLP to SG short	No failure	No failure	Normal operation with no sleep function	Normal operation with no sleep function
EF to SG short	No failure	No failure	Device switching disabled	Device switching disabled

High-Side Driver Pin to Half-Bridge Connection (HB) Short Test

Fault Mode	Operation Condition		Operation Behavior Notes	
	Start-up	During Operation	Start-up	During Operation
XH to HB short	No failure	No failure	HS FREDFET switching disabled	Normal operation
BPH to HB short	No failure	No failure	HS FREDFET switching disabled	HS FREDFET switching disabled

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