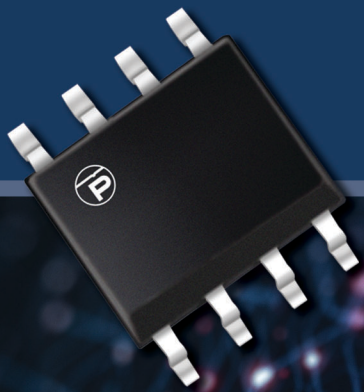


# Screening Test Plans

*By ProTek Devices*



**MIL PROCESSING TEST PLAN FOR DLZ SERIES – H1 VERSIONS  
(Unidirectional)**

TEST	CONDITION	MIL-STD-750 TEST METHOD
<b>Internal Visual</b>		2072
<b>Storage</b>	T <sub>A</sub> = +150°C for 24 hours	1032
<b>Temp Cycle</b>	10 cycles, 15 minutes each extreme @ min/max rated temps	1051
<b>Acceleration</b>	20KG, Y1 axis, no hold time	2006
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub>	4016 4022
<b>Pulse</b>	20 pulses @ I <sub>pp</sub> = 10A, t <sub>p</sub> = 8 x 20μs	
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub>	4016
<b>Burn-in(HTRB)</b>	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 160 hours	1038
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Group A limit, whichever is greater Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub> , D-V <sub>(BR)</sub> ±2% from initial reading	4016 4022
<b>Fine Leak</b>	1 x 10 <sup>-8</sup> atmcc/sec	1071G/H
<b>Gross Leak</b>	T <sub>A</sub> = +125°C, no bubbles	1071C/D
<b>Marking</b>		
<b>Group A</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub> Clamping Voltage (V <sub>C</sub> ) @ I <sub>pp</sub> , t <sub>p</sub> = 8 x 20μs Capacitance @ 0V	4016 4022 4001

## MIL PROCESSING GROUP B TEST PLAN FOR DLZ SERIES – H2 VERSIONS (Unidirectional)

TEST	CONDITION	MIL-STD-750 TEST METHOD	SAMPLE PLAN (Units)	SMALL LOT (Units)
<b><u>SUBGROUP 1</u></b>			15 c=0	4 c=0
Solderability		2026		
Resistance to Solvents		1022		
<b><u>SUBGROUP 2</u></b>			22 c=0	6 c=0
Temp Cycle	10 cycles, 15 minutes @ min/max rated temperatures	1051		
Fine Leak	$1 \times 10^{-8}$ atmcc/sec	1071G/H		
Gross Leak	T <sub>A</sub> = +125°C, no bubbles	1071D		
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>	4016 4022		
<b><u>SUBGROUP 3</u></b>			45 c=0	12 c=0
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>	4016 4022		
Pulse	20 pulses @ I <sub>PP</sub> = 10A, t <sub>p</sub> = 8 x 20µs			
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub>	4016		
Steady State Op-Life (HRTB)	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 340 hours	1027		
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub> , D-V <sub>BR</sub> = ±5% from initial reading	4016 4022		
<b><u>SUBGROUP 4</u></b>				
Decap, Internal Visual	Design Verification, 1 device c=0	2075		
Bond Strength	11 wires c=0	2037		
<b><u>SUBGROUP 5</u></b>	Not Applicable			
<b><u>SUBGROUP 6</u></b>			32 c=0	12 c=0
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>	4016 4022		
High Temperature Life (no-op)	Tstg = +150°C for 340 hours	1032		
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub> , D-V <sub>BR</sub> = ±5% from initial reading	4016 4022		

## MIL PROCESSING TEST PLAN FOR DLZ SERIES – H1 VERSIONS (Bidirectional)

TEST	CONDITION	MIL-STD-750 TEST METHOD
<b>Internal Visual</b>		2072
<b>Storage</b>	T <sub>A</sub> = +150°C for 24 hours	1032
<b>Temp Cycle</b>	10 cycles, 15 minutes each extreme @ min/max rated temps	1051
<b>Acceleration</b>	20KG, Y1 axis, no hold time	2006
<b>Electrical (Polarities A &amp; B)</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub>	4016 4022
<b>Pulse</b>	10 pulses each polarity @ rated I <sub>pp</sub> = 10A, t <sub>p</sub> = 8 x 20μs	
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> (Polarities A & B)	4016
<b>Burn-In(HTRB)</b>	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 80 hours (Polarity A)	1038
<b>Electrical (Polarity A)</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Group A limit, whichever is greater	4016
<b>Burn-In(HTRB)</b>	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 80 hours (Polarity B)	1038
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Group A limit, whichever is greater (Polarity B)	4016
	Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub> , D-V <sub>(BR)</sub> ±2% from initial reading (Polarities A & B)	4022
	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> (Polarity A)	4016
<b>Fine Leak</b>	1 x 10 <sup>-8</sup> atmcc/sec	1071G/H
<b>Gross Leak</b>	T <sub>A</sub> = +125°C, no bubbles	1071C/D
<b>Marking</b>		
<b>Group A</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub>	4016
	Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub>	4022
	Clamping Voltage (V <sub>C</sub> ) @ I <sub>pp</sub> , t <sub>p</sub> = 8 x 20μs	
	Capacitance @ 0V	4001

## MIL PROCESSING GROUP B TEST PLAN FOR DLZ SERIES – H2 VERSIONS (Bidirectional)

TEST	CONDITION	MIL-STD-750 TEST METHOD	SAMPLE PLAN (Units)	SMALL LOT (Units)
<b><u>SUBGROUP 1</u></b>			15 c=0	4 c=0
Solderability		2026		
Resistance to Solvents		1022		
<b><u>SUBGROUP 2</u></b>			22 c=0	6 c=0
Temp Cycle	10 cycles, 15 minutes @ min/max rated temperatures	1051		
Fine Leak	$1 \times 10^{-8}$ atmcc/sec	1071G/H		
Gross Leak	T <sub>A</sub> = +125°C, no bubbles	1071D		
Electrical (Polarities A & B)	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>	4016 4022		
<b><u>SUBGROUP 3</u></b>			45 c=0	12 c=0
Electrical (Polarities A & B)	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>	4016 4022		
Pulse	10 pulses @ I <sub>PP</sub> = 10A, t <sub>p</sub> = 8 x 20µs			
Electrical	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> (Polarities A & B)	4016		
Steady State Op-Life (HRTB)	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 170 hours (Polarity A)	1027		
Electrical (Polarity A)	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Grp A Limit, Whichever is greater	4016		
Steady State Op-Life (HRTB)	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 170 hours (Polarity B)	1027		
Electrical (Polarity B)	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub> , D-V <sub>BR</sub> = ±5% from initial reading (Polarities A & B) Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> (Polarity A)	4016 4022		
<b><u>SUBGROUP 4</u></b>				
Decap, Internal Visual	Design Verification, 1 device c=0	2075		
Bond Strength	11 wires c=0	2037		
<b><u>SUBGROUP 5</u></b>	Not Applicable			
<b><u>SUBGROUP 6</u></b>			32 c=0	12 c=0
Electrical (Polarities A & B)	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub>	4016 4022		
High Temperature Life (no-op)	Tstg = +150°C for 340 hours	1032		
Electrical (Polarities A & B)	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage (V <sub>BR</sub> ) @ I <sub>T</sub> , D-V <sub>BR</sub> = ±5% from initial reading	4016 4022		

## SUBMODULE SCREENING TEST PLAN For Modules H1, H2 and H3

TEST	CONDITION	MIL-STD-750 TEST METHOD
<b>Storage</b>	T <sub>A</sub> = +175°C for 24 hours	1032
<b>Temp Cycle</b>	-65°C to +175°C, 20 cycles, 15 minutes each extreme	1051
<b>Acceleration</b>	20KG, Y1 axis, no hold time	2006
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub>	4016 4022
<b>Pulse</b>	20 pulses @ rated I <sub>PP</sub> , t <sub>p</sub> = 10 x 1000μs	
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub>	4016
<b>Burn-In</b>	T <sub>A</sub> = +125°C @ rated V <sub>WM</sub> for 96 hours	1038
<b>Electrical</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> , D-I <sub>R</sub> = 50% or 1μA, whichever is greater Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub> , D-V <sub>(BR)</sub> ±2% from initial reading	4016 4022
<b>Fine Leak</b>	5 x 10 <sup>-8</sup> atmcc/sec	1071G/H
<b>Gross Leak</b>	T <sub>A</sub> = +125°C for 1 minute, no bubbles	1071C/D
<b>Group A</b>	Reverse Current (I <sub>R</sub> ) @ rated V <sub>WM</sub> Breakdown Voltage (V <sub>(BR)</sub> ) @ I <sub>T</sub> Clamping Voltage (V <sub>C</sub> ) @ I <sub>PP</sub> , t <sub>p</sub> = 10 x 1000μs Forward Voltage (V <sub>F</sub> ) @ I <sub>F</sub> , t <sub>p</sub> = 8.3ms	4016 4022 4011

**Note:** For bidirectional devices, test both polarities – split hours on Burn-in test and surge pulse to 50% each polarity.

## MODULE SCREENING TEST PLAN For Module H1

TEST	CONDITION	MIL-STD-750 TEST METHOD
<b>Group A</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$ Clamping Voltage ( $V_C$ ) @ $I_{pp}$ , $t_p$ = Rated Forward Voltage ( $V_F$ ) @ $I_F$ , $t_p$ = 8.3ms	4016 4022  4011

## MODULE SCREENING TEST PLAN For Module H2

TEST	CONDITION	MIL-STD-750 TEST METHOD
<b>Storage</b>	$T_A = +150^{\circ}\text{C}$ for 24 hours	1032
<b>Temp Cycle</b>	$-65^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ , 10 cycles, 30 minutes each extreme	1051
<b>Electrical</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$	4016 4022
<b>Pulse</b>	20 pulses @ rated $I_{PP}$ , $t_p = \text{rated}$	
<b>Electrical</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$	4016
<b>Burn-In</b>	$T_A = +125^{\circ}\text{C}$ @ rated $V_{WM}$ for 96 hours	1038
<b>Electrical</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ , $D-I_R = 50\%$ or $1\mu\text{A}$ , whichever is greater Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$ , $D-V_{(BR)} \pm 2\%$ from initial reading	4016 4022
<b>Group A</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$ Clamping Voltage ( $V_C$ ) @ $I_{PP}$ , $t_p = \text{rated}$ Forward Voltage ( $V_F$ ) @ $I_F$ , $t_D = 8.3\text{ms}$	4016 4022 4011

**Note:** For bidirectional devices, test both polarities – split hours on Burn-in test and surge pulse to 50% each polarity.



## MODULE GROUP B TESTING For Module H3

TEST	CONDITION	MIL-STD-750 TEST METHOD	SAMPLE PLAN (Units)	SMALL LOT (Units)
<b><u>SUBGROUP 1</u></b>			15 c=0	4 c=0
<b>Solderability Resistance to Solvents</b>		2026 1022		
<b><u>SUBGROUP 2</u></b>			22 c=0	6 c=0
<b>Temp Cycle</b>	-65°C to +150°C, 10 cycles, 30 minutes each extreme	1051		
<b>Electrical</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$	4016 4022		
<b><u>SUBGROUP 3</u></b>			45 c=0	12 c=0
<b>Electrical</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$	4016 4022		
<b>Operating Life</b>	@ rated $V_{WM}$ , $T_A = +125^\circ\text{C}$ for 340 hours	1026		
<b>Electrical</b>	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ , $D-I_R = 50\%$ or $1\mu\text{A}$ , whichever is greater Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$ , $D-V_{(BR)} \pm 5\%$ from initial reading	4016 4022		

**Note:** For bidirectional devices, test both polarities – split hours on Operating Life to 50% each polarity.

## MODULE GROUP C TESTING For Module H3

TEST	CONDITION	MIL-STD-750 TEST METHOD	SAMPLE PLAN (Units)	SMALL LOT (Units)
<b><u>SUBGROUP 1</u></b>			15 c=0	6 c=0
Physical Dimensions		2066		
<b><u>SUBGROUP 2</u></b>			22 c=0	6 c=0
Terminal Strength (tension)	Test Condition A, W = 10lbs., t = 15 seconds	2036		
Moisture Resistance	Omit initial conditioning	1021		
Electrical	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$	4016 4022		
<b><u>SUBGROUP 3</u></b>			22 c=0	6 c=0
Shock	1500Gs, 0.5ms, 5 blows in each orientation X1, Y1, Z1	2016		
Vibration		2056		
Electrical	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$	4016 4022		
<b><u>SUBGROUP 4</u></b>			15 c=0	6 c=0
Salt Atmosphere		1041		
<b><u>SUBGROUP 5</u></b>			22 c=0	12 c=0
Operating Life	@ rated $V_{WM}$ , $T_A = +125^\circ\text{C}$ for 1,000 hours	1026		
Electrical	Reverse Current ( $I_R$ ) @ rated $V_{WM}$ , $D-I_R = 50\%$ or $1\mu\text{A}$ , whichever is greater Breakdown Voltage ( $V_{(BR)}$ ) @ $I_T$ , $D-V_{(BR)} \pm 5\%$ from initial reading	4016 4022		

Note: For bidirectional devices, test both polarities – split hours on Burn-in test and surge pulse to 50% each polarity.

## COMPANY PROFILE

In business more than 30 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection components. These include Transient Voltage Suppressor arrays (TVS arrays), Steering Diode/Hybrid arrays, Thyristor Surge Suppressors, EMI Filters, High-Powered Components and Modules as well as Chipscale TVS arrays. These devices deliver circuit protection in electronic systems from numerous overvoltage events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices is an ISO 9001 certified company.

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