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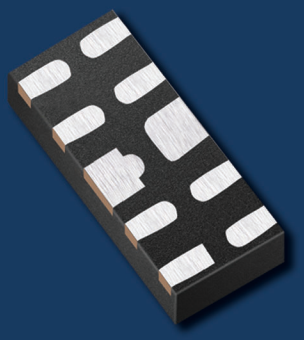
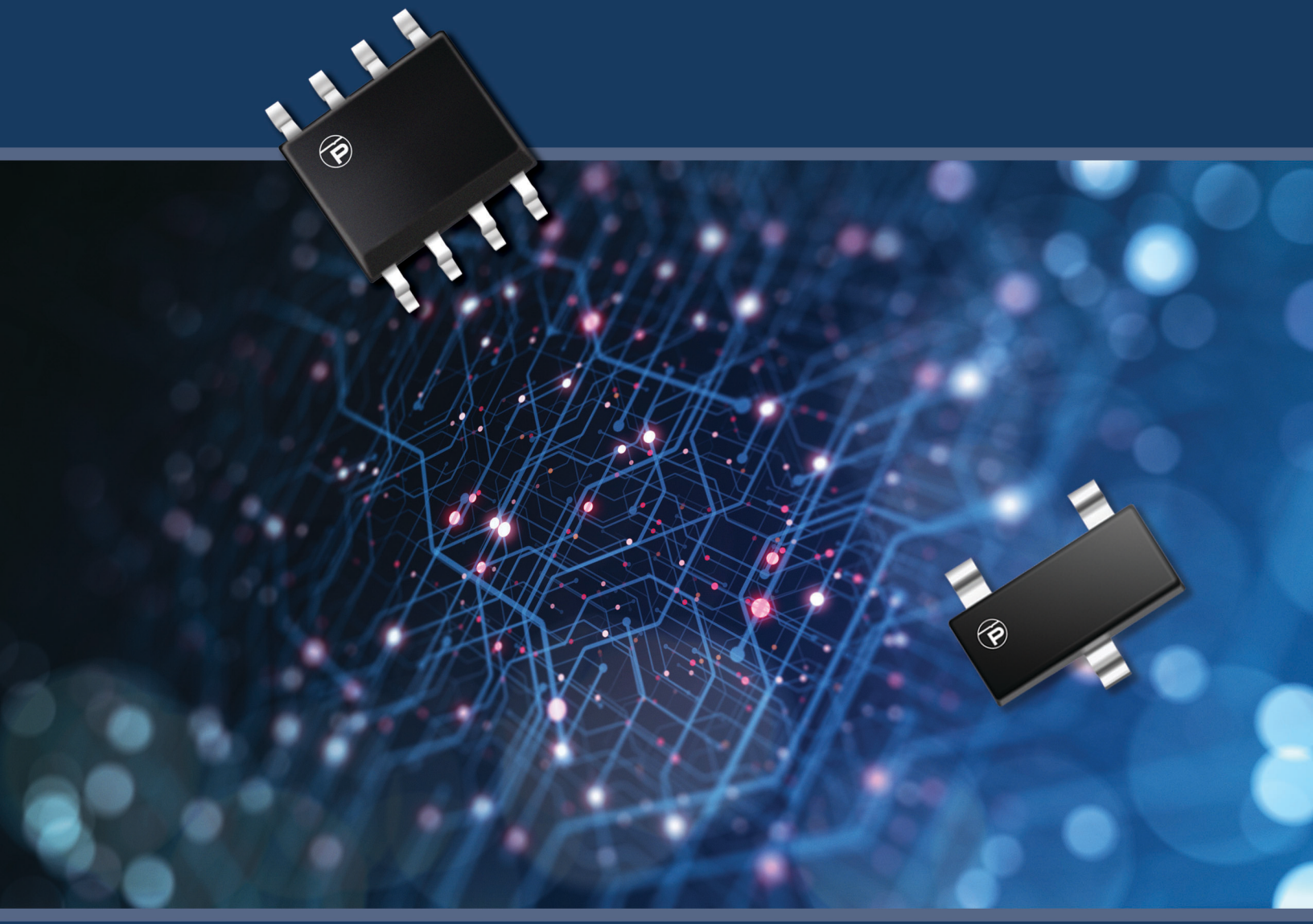


Screening Test Plans

By ProTek Devices



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

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

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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)
SUBGROUP1			15 c=0	4 c=0
Solderability		2026		
Resistance to Solvents		1022		
SUBGROUP 2			22 c=0	6 c=0
Temp Cycle	10 cylces, 15 minutes @ min/max rated temperatures	1051		
Fine Leak	1 x 10^{-8} atmcc/sec	1071G/H		
Gross Leak	T_A = +125°C, no bubbles	1071D		
Electrical	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022		
SUBGROUP 3			45 c=0	12 c=0
Electrical	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022		
Pulse	20 pulses @ I_{PP} = 10A, t_p = 8 x 20µs			
Electrical	Reverse Current (I_R) @ rated V_{WM}	4016		
Steady State Op-Life (HRTB)	T_A = +125°C @ rated V_{WM} for 340 hours	1027		
Electrical	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ = ±5% from initial reading	4016 4022		
SUBGROUP 4				
Decap, Internal Visual	Design Verification, 1 device c=0	2075		
Bond Strength	11 wires c=0	2037		
SUBGROUP 5	Not Applicable			
SUBGROUP 6			32 c=0	12 c=0
Electrical	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022		
High Temperature Life (no-op)	Tstg = +150°C for 340 hours	1032		
Electrical	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ = ±5% from initial reading	4016 4022		

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

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

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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)
SUBGROUP1			15 c=0	4 c=0
Solderability		2026		
Resistance to Solvents		1022		
SUBGROUP 2			22 c=0	6 c=0
Temp Cycle	10 cylces, 15 minutes @ min/max rated temperatures	1051		
Fine Leak	1 x 10^{-8} atmcc/sec	1071G/H		
Gross Leak	T_A = +125°C, no bubbles	1071D		
Electrical (Polarities A & B)	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022		
SUBGROUP 3			45 c=0	12 c=0
Electrical (Polarities A & B)	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022		
Pulse	10 pulses @ I_{PP} = 10A, t_p = 8 x 20µs			
Electrical	Reverse Current (I_R) @ rated V_{WM} (Polarities A & B)	4016		
Steady State Op-Life (HRTB)	T_A = +125°C @ rated V_{WM} for 170 hours (Polarity A)	1027		
Electrical (Polarity A)	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 100% or 20% of Grp A Limit, Whichever is greater	4016		
Steady State Op-Life (HRTB)	T_A = +125°C @ rated V_{WM} for 170 hours (Polarity B)	1027		
Electrical (Polarity B)	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ = ±5% from initial reading (Polarities A & B) Reverse Current (I_R) @ rated V_{WM} (Polarity A)	4016 4022		
SUBGROUP 4				
Decap, Internal Visual	Design Verification, 1 device c=0	2075		
Bond Strength	11 wires c=0	2037		
SUBGROUP 5	Not Applicable			
SUBGROUP 6			32 c=0	12 c=0
Electrical (Polarities A & B)	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022		
High Temperature Life (no-op)	Tstg = +150°C for 340 hours	1032		
Electrical (Polarities A & B)	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 100% or 20% of Grp A Limit, Whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ = ±5% from initial reading	4016 4022		

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SUBMODULE SCREENING TEST PLAN
For Modules H1, H2 and H3

TEST	CONDITION	MIL-STD-750 TEST METHOD
Storage	T_A = +175°C for 24 hours	1032
Temp Cycle	-65°C to +175°C, 20 cycles, 15 minutes each extreme	1051
Acceleration	20KG, Y1 axis, no hold time	2006
Electrical	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022
Pulse	20 pulses @ rated I_{PP}, t_p = 10 x 1000µs	
Electrical	Reverse Current (I_R) @ rated V_{WM}	4016
Burn-In	T_A = +125°C @ rated V_{WM} for 96 hours	1038
Electrical	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 50% or 1µA, whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ ±2% from initial reading	4016 4022
Fine Leak	5 x 10^{-8} atmcc/sec	1071G/H
Gross Leak	T_A = +125°C for 1 minute, no bubbles	1071C/D
Group A	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T Clamping Voltage (V_C) @ I_{PP}, t_p = 10 x 1000µs Forward Voltage (V_F) @ I_F, t_p = 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.

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MODULE SCREENING TEST PLAN
For Module H1

TEST	CONDITION	MIL-STD-750 TEST METHOD
Group A	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

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MODULE SCREENING TEST PLAN
For Module H2

TEST	CONDITION	MIL-STD-750 TEST METHOD
Storage	T_A = +150°C for 24 hours	1032
Temp Cycle	-65°C to +150°C, 10 cycles, 30 minutes each extreme	1051
Electrical	Reverse Current (I_R) @ rated V_{WM} Breakdown Voltage ($V_{(BR)}$) @ I_T	4016 4022
Pulse	20 pulses @ rated I_{PP}, t_p = rated	
Electrical	Reverse Current (I_R) @ rated V_{WM}	4016
Burn-In	T_A = +125°C @ rated V_{WM} for 96 hours	1038
Electrical	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 50% or 1µA, whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ ±2% from initial reading	4016 4022
Group A	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

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

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MODULE GROUP B TESTING
For Module H3

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

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

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MODULE GROUP C TESTING
For Module H3

TEST	CONDITION	MIL-STD-750 TEST METHOD	SAMPLE PLAN (Units)	SMALL LOT (Units)
SUBGROUP 1			15 c=0	6 c=0
Physical Dimensions		2066		
SUBGROUP 2			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		
SUBGROUP 3			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		
SUBGROUP 4			15 c=0	6 c=0
Salt Atmosphere		1041		
SUBGROUP 5			22 c=0	12 c=0
Operating Life	@ rated V_{WM}, T_A = +125°C for 1,000 hours	1026		
Electrical	Reverse Current (I_R) @ rated V_{WM}, D-I_R = 50% or 1µA, whichever is greater Breakdown Voltage ($V_{(BR)}$) @ I_T, D-$V_{(BR)}$ ±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.

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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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