2010 Catalog

High-Rel Discrete Semiconductors
Assembly Products

Semtech Space Level Flow
HR500S Axial and Surface Mount Packages

SEMTECH

Semtech Space Level Flow
HR500S Axial and Surface Mount Packages
Table of Contents

The platform device for this flow would be of JANTXV quality level

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1	**Fab Traceability**		**Lot form prior to assembly from a single wafer fabrication lot**
2	**Internal Visual**	**750/2074**	
3	**Visual & Mechanical**	**750/2071**	**The devices shall be examined for: Workmanship Materials, Design and Construction**
4	**Electrical Sort**		**Electrical sort to Semtech internal specifications**
5	**Scope Display**	**750/4023**	**BV ≥ xxx, trace to be as specified**

100% SCREENING

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1	High Temperature Storage	750/1031	TA = 175 ºC, Time = 24 Hours
2	Thermal Cycling	750/1051	Condition C, Temp. extremes : T_A(low) = -55ºC T_A (high) = 175ºC Time: Extreme = 15min Number of cycles = 20
3	Thermal Impedance	750/3101	$Z_{\theta JX}$ = As determined by Group E analysis
4	Thermal Normalization		Thermal distribution determined and "flyers" removed
5	Electrical GNG	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
6	Ir Normalization		Ir distribution determined and "flyers" removed
7	Serialize		Maintain Individual Identity through HTRB and Burn-in. Maintaining serialization through packaging is an available option
8	Pre HTRB Elect	750/4016 750/4011 750/4021	IR < Statistical limit VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = yy Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
9	High Temperature Reverse Bias	750/1038	Condition A, Operated for 48 Hours min. TA = 150ºC, VR = 80% of rated VR

100% SCREENING, continued

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA=+ 25C Unless Otherwise Specified)
10	Post HTRB Elect	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
11	Post HTRB Elect deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre HTRB reading, whichever is greater. Delta VF± xxx Vdc of pre HTRB reading
12	PDA		The total number of devices failing ≤ 5%
13	Power Burn-In	750/1038	Condition B, Operated for 240 hours min. Ta = 55C max, Vr = RATED Vdc, Io = RATED
14	Post Burn-in Elect	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
15	Post Burn-in Elect deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre Burn-In reading, whichever is greater. Delta VF± xxx Vdc of pre Burn-In reading
16	PDA		The total number of devices failing ≤ 5%
17	Combined PDA		≤ 10%

100% SCREENING, continued

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
18	**Scope Display**	**750/4023**	**BV ≥ xxx V, trace to be as specified**
19	**Hot Solder Dip**		**Serialization not maintained**
20	**Hermetic Seal**	**750/2068** **750/1071**	**Use 2068 for opaque glass body** **Use 2071 for clear glass body**
21	**Body coat/band/label**		
22	**Visual & Mechanical**	**750/2071**	**The devices shall be examined for; Workmanship Materials, Design and Construction.**
23	**Electricals**	**750/4016** **750/4011** **750/4021**	**IR <xμA dc, VR = xxx Vdc** **VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified)** **VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified)** **V_{BR} ≥xxx V dc, I_{bv}=yyy μA**
18	**Scope Display**	**750/4023**	**BV ≥ xxx V, trace to be as specified**
24	**Pack**		
	Optional X-Ray	**750/2076**	**2 Views, Maintain Identity**
	Optional IR Hot	**750/4016**	
	Optional TRR	**750/4031**	
	Optional CAP	**750/4001**	

GROUP "A" same as Mil-PRF-19500

Sub Group	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1 (15/0)	Visual & Mechanical	750/2071	The devices shall be examined for: Workmanship, Materials Design, and Construction
2 (116/0)	Electrical (Static) R&R	750/4016 750/4011 750/4021 750/3101	IR VF V_{BR} $Z_{\theta JX}$
3 (116/0)	Electrical (Static) R&R	 750/4016 750/4011 750/4021 750/3101	TA= +/- zzzC IR VF V_{BR} $Z_{\theta JX}$
4 (116/0)	Electrical (Dynamic) R&R Scope T_{rr} Capacitance Forward Recovery Voltage Forward Recovery Time	 750/4023 750/4031 750/4001 750/4026 750/4026	 BV T_{rr} Capacitance Vfr tfr
5	N/A		
6 (22/0)	Surge Current	750/4066	

GROUP "B" same as Mil-PRF-19500

Sub Group	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1 (22/0)	Physical DIM	750/2066	Per Device Outline
2 (15/0)	Solderability	750/2026	Steam Aging Required, Solder Temp = +245+ 5 C Flux = Type "R", Dwell = 5 Seconds + ½ second. Visual Magnification = 10X ≥ 95% Coverage
	Resistance to Solvents	750/1022	All areas of the diode body where marking has applied shall be brushed. Mark to remained legible at ≤ 3X magnification
3 (22/0)	Thermal Shock	750/1056	Test condition A, 25 cycles, dwell ≥ 2 minutes 0 C, +2 C, -10 C / 100 C + 10 C, -2 C Alcohol + DI Water / Boiling D.I. Water Transfer time 10≤ seconds
	Temp Cycling	750/1051	Condition C, Temp. extremes : T_A(low) = -55ºC+0, -10ºC T_A (high) = 175ºC Time: Extreme = 15 minutes (min) Number of cycles = 100
	Surge Current	750/4066	
	Hermetic Seal (gross leak)	750/2068	Use 2068 for opaque glass body
	Electrical	750/4016 750/4011 750/4021	IR VF V_{BR}
	DE-CAP Internal Visual (6 Devices)	750/2075	Design Verification

GROUP "B", continued

Sub Group	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
4 (22/0)	Pre Electrical	750/4016 750/4011	IR VF
	Intermittent Op Life	750/1037	2000 cycles condition D
	Electrical	750/4016 750/4011 750/4021	IR VF V_{BR}
	Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre Burn-In reading, whichever is greater. Delta VF± xxx Vdc of pre Burn-In reading
5 (22/0)	Pre Electrical	750/4016 750/4011	IR VF
	Operation Life	750/1027	Bias as specified. T_j = 175ºC T=1000hrs min. Post test per A2
	Electrical	750/4016 750/4011 750/4021 750/3101	IR VF V_{BR} $Z_{\theta JX}$
	Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre Burn-In reading, whichever is greater. Delta VF± xxx Vdc of pre Burn-In reading

GROUP "B", continued

6 (22/0)	Thermal Resistance	750/4081	$R_{\theta JL}$
7 (32/0)	Pre Electrical	750/4016 750/4011	IR VF
	High-temperature Life	750/1032	340 hours minimum $T_A = T_{STG(max)}$
	Electrical	750/4016 750/4011 750/4021	IR VF V_{BR}
	Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre Burn-In reading, whichever is greater. Delta VF± xxx Vdc of pre Burn-In reading
8 (10/0)	PRP	750/4065	P_{rsm}
	Electrical	750/4016 750/4011 750/4021	IR VF V_{BR}

The platform device for this flow would be of JANTXV quality level

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1	Fab Traceability		Lot form prior to assembly from a single wafer fabrication lot
2	Internal Visual	750/2074	
3	Visual & Mechanical	750/2071	The devices shall be examined for: Workmanship Materials, Design and Construction
4	Electrical Sort		Electrical sort to Semtech internal specifications
5	Cathode Band		
6	Lead Cut Off		
7	End Tab Assembly and Reflow		
8	Visual & Mechanical	750/2071	The devices shall be examined for: Workmanship Materials, Design and Construction
9	Electrical GNG	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
10	Scope Display	750/4023	BV ≥ xxxV, trace to be as specified

100% SCREENING

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1	High Temperature Storage	750/1031	TA = xxx ºC, Time = 24 Hours
2	Thermal Cycling	750/1051	Condition C, Temp. extremes : T_A(low) = -55ºC T_A (high) = 175ºC Time: Extreme = 15min Number of cycles = 20
3	Thermal Impedance	750/3101	$Z_{\theta JX}$ = As determined by Group E analysis
4	Thermal Normalization		Thermal distribution determined and "flyers" removed
5	Hermetic Seal	750/2068 750/1071	Use 2068 for opaque glass body Use 1071 for clear glass body
6	Electrical GNG	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
7	Ir Normalization		Ir distribution determined and "flyers" removed
8	Serialize		Maintain Individual Identity through HTRB and Burn-in. Maintaining serialization through packaging is an available option

100% SCREENING, continued

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
9	Pre HTRB Elect	750/4016 750/4011 750/4021	IR < Statistical limit VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = yy Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
10	High Temperature Reverse Bias	750/1038	Condition A, Operated for 48 Hours min. TA = 150ºC, VR = 80% of rated VR
11	Post HTRB Elect	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
12	Post HTRB Elect Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre HTRB reading, whichever is greater. Delta VF± xxx Vdc of pre HTRB reading
13	PDA		The total number of devices failing ≤ 5%

100% SCREENING, continued

Test	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
14	Power Burn-in	750/1038	Condition B, Operated for 240 hours min. Ta = 55C max, Vr = RATED Vdc, Io = RATED
15	Post Burn-in Elect	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
16	Post Burn-in Elect deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre HTRB reading, whichever is greater. Delta VF± xxx Vdc of pre HTRB reading
17	PDA		The total number of devices failing ≤ 5%
18	Combined PDA		≤ 10%
20	Scope Display	750/4023	BV ≥ xxx V, trace to be as specified
21	Pack		Maintain part identity from Burn-in (Optional)
22	Optional X-Ray	750/2076	2 Views, Maintain Identity
23	Optional IR Hot	750/4016	IR≤ yyyµA dc, Vr = xxx Vdc, TA = +zzz C
24	Optional TRR	750/4031	T_{rr} ≤ xxns, If = yA, Ir = yyA, Irec =yyyA
25	Optional CAP	750/4001	C≤ xxpf, Vr = yyV, f=1Mhz

GROUP "A" same as Mil-PRF-19500

Sub Group	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1 (15/0)	Visual & Mechanical	750/2071	The devices shall be examined for; Workmanship, Materials Design, and Construction
2 (116/0)	Electrical (Static) R&R	750/4016 750/4011 750/4021 750/3101	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA $Z_{\theta JX}$ = As determined by Group E analysis
3 (116/0)	Electrical (Static) R&R	750/4016 750/4011 750/4011 750/4021	T_a = +zzz°C IR ≤ yyyµ Adc, VR = xxxVdc VF_6, < xxx Vdc, If = yy Adc (pulse as specified) T_a = -zzz°C VF, < xxx Vdc, If = 1yy Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
4 (116/0)	Electrical (Dynamic) R&R Scope T_{rr} Capacitance Forward Rrecovery Voltage Forward Recovery Time	 750/4023 750/4031 750/4001 750/4026 750/4026	 BV ≥ xxx V, trace to be as specified ≤ xx ns, If = yyA, Ir = yyA, Irec = yyyA dI/Dt=-yyA/µS min CAP ≤ xxpf, Vr = xxV, f=1Mhz V_{fr} < xxV t_r=ynS tfr
5	N/A		
6 (22/0)	Surge Current	750/4066	Surge = yyA, TA = 25°C, VR = xxxVdc, Io = yA, 10 Surges, 1 min between surges A2 electrical other than thermal impedance

GROUP "B" same as Mil-PRF-19500

Sub Group	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
1 (22/0)	Physical DIM	750/2066	Per Device Outline
2 (15/0)	Solderability	750/2026	Steam Aging Required, Solder Temp = +245+ 5 C Flux = Type "R", Dwell = 5 Seconds + ½ second. Visual Magnification = 10X ≥ 95% Coverage
	Resistance to Solvents	750/1022	All areas of the diode body where marking has applied shall be brushed. Mark to remained legible at ≤ 3X magnification
3 (22/0)	Thermal Shock	750/1056	Test condition A, 25 cycles, dwell ≥ 2 minutes 0 C, +2 C, -10 C / 100 C + 10 C, -2 C Alcohol + DI Water / Boiling D.I. Water Transfer time 10≤ seconds
	Temp Cycling	750/1051	Condition C, Temp. extremes : T_A(low) = -55ºC+0, -10ºC T_A (high) = 175ºC Time: Extreme = 15 minutes (min) Number of cycles = 100
	Surge Current	750/4066	I_{Surge} = yyA, TA = 25º C, VR = xxx Vdc Io = RATED, 10 Surges, 1 min between surges
	Hermetic Seal (gross leak)	750/2068 750/1071	Use 2068 for opaque glass body Use 1071 for clear glass body
	Electrical	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
	DE-CAP Internal Visual (6 Devices)	750/2075	Design Verification

GROUP "B", continued

Sub Group	Operation	MIL STD Reference Document	Conditions and/or Description of Operation (TA =+ 25C Unless Otherwise Specified)
4 (22/0)	Pre Electrical	750/4016 750/4011	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified)
	Intermittent Op Life	750/1037	2000 cycles condition D.
	Electrical	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
	Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre HTRB reading, whichever is greater. Delta VF± xxx Vdc of pre HTRB reading
5 (22/0)	Pre Electrical	750/4016 750/4011	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified)
	Operation Life	750/1027	Bias as specified. T_j = 175ºC T=1000hrs min. Post test per A2
	Electrical	750/4016 750/4011 750/4021 750/3101	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA $Z_{\theta JX}$
	Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre HTRB reading, whichever is greater. Delta VF± xxx Vdc of pre HTRB reading

GROUP "B", continued

6 (22/0)	Thermal Resistance	750/4081	$R_{\theta JEC}$ < yy°C/W
7 (32/0)	Pre Electrical	750/4016 750/4011	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified)
	High-temperature Life	750/1032	340 hours minimum $T_A = T_{STG(max)}$
	Electrical	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA
	Deltas	750/4016 750/4011	Delta IR = ± yyy nAdc or 100% of pre HTRB reading, whichever is greater. Delta VF± xxx Vdc of pre HTRB reading
8 (10/0)	PRP	750/4065	P_{rsm}
	Electrical	750/4016 750/4011 750/4021	IR <xµA dc, VR = xxx Vdc VF_1, < xxx Vdc, If_1 = y Adc (pulse as specified) VF_2, < xxx Vdc, If_2 = y Adc (pulse as specified) V_{BR} ≥xxx V dc, I_{bv}=yyy µA

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