



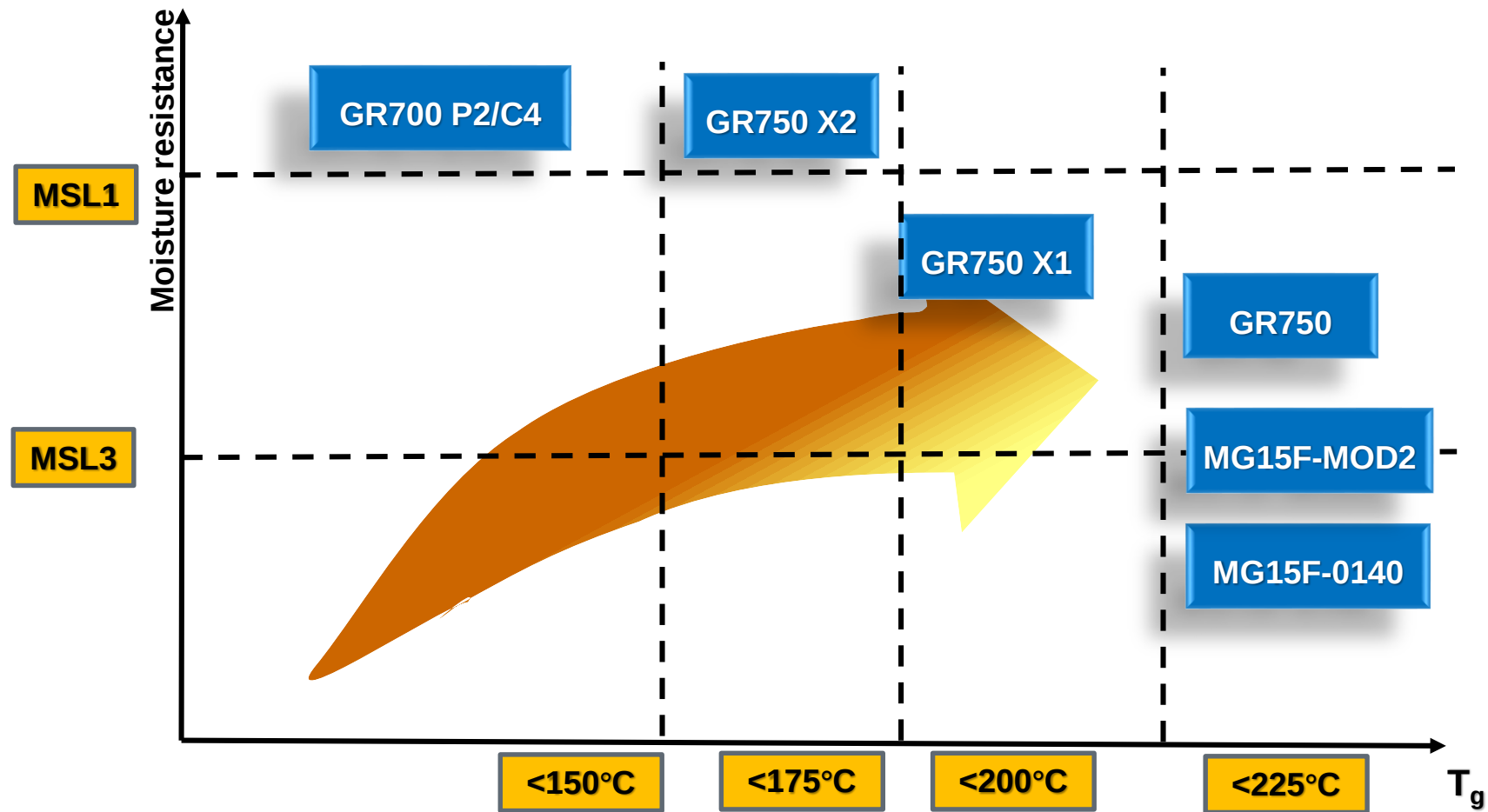
Hysol EMC for High Power Application

Hysol Huawei Electronics Co., LTD

Nov 2020

EMC for High Power Application

Key Products



EMC for High Power Application

High Tg Tech



Product Name			MG15F-MOD2	MG15F-0140	GR750 (Std)	GR750 X1 (Std)	GR750X1 (low CTE)	GR720X2 (Std)	GR750 X2FF fine filler	GR720X2 (high CTE)
Epoxy type	-		OCN/BisA/DCPD	OCN/BisA	MFN	MFN/L.W.A.	MFN/L.W.A.	MFN/L.W.A.	MAR	MAR/L.Vis.
Hardener type	-		Anhydride	Anhydride	New	New	New	New	New	New
Filler cut size	μm		106	150	75	75	75	75	45	75
Flammability	UL-94		V-0 at ¼"	V-0 at 1/8"	V-0 at 1/8"	V-0 at 1/8"	V-0 at 1/8"	V-0 at 1/8"	V-0 at 1/8"	V-0 at 1/8"
Spiral Flow	inches		36	20	42	36	26	45	40	41
Gel Time	sec		32	17	26	24	29	30	30	35
Viscosity @ 175°C	PaS		20	28	10	13	43	25	20	15
T _g by TMA	°C		242	195	225	202	197	170	182	170
CTE 1	ppm/°C		16	21	10	8	6	9	9	14
CTE 2	ppm/°C		49	70	40	42	31	35	32	40
DMA Storage Modulus at RT	MPa		18246	14078	20560	23155	29241	21631	23391	20971
DMA Storage Modulus at 260C	MPa		6491	1883	1658	1713	1711	907	1007	961
T _g by DMA Tanδ Peak	°C		270	217	235	207	200	177	182	177
Flexural modulus	Mpa		16312	12449	16880	18042	21469	17470	17549	16900
Flexural strength	Mpa		120	126	138	136	134	152	169	150
Moisture absorption PCT24h	%		0.55	0.65	0.35	0.3	0.2	0.2	0.2	0.2
Cl/ Na ⁺	ppm		<10	<10	<15	<15	<15	<15	<15	<15
PH			4~6	4~6	5~7	5~7	5~7	5~7	5~7	5~7
Volume resistivity @21C & 500V	Ω.cm		2.4E+16	6.3E+16	3.3E+16	1.7E+16	1.0E+16	1.6E+16	1.8E+16	1.0E+16
Dielectric constant, 21 C & 1MHz			3.6	3.7	3.7	3.7	3.7	3.8	3.8	3.9
Adhesion (tabpull) after MSL3	on Cu	N	344	136	365	406	307	360	407	331
	on Ag	N	235	NA	345	363	269	234	348	415
	on Ni	N	84	111	170	194	130	104	102	110
Comparative Tracking Index	V		600	400	600	600	600	600	600	600
Recommended Molding condition			190°C110s	180°C100s	180°C 90s	180°C 90s	180°C 90s	180°C 90s	180°C 90s	180°C 90s
Recommended PMC condition			190°C 3~6hrs	190°C 3~6hrs	190°C10hrs	190°C10hrs	190°C10hrs	190°C10hrs	190°C10hrs	190°C10hrs

EMC for High Power Application

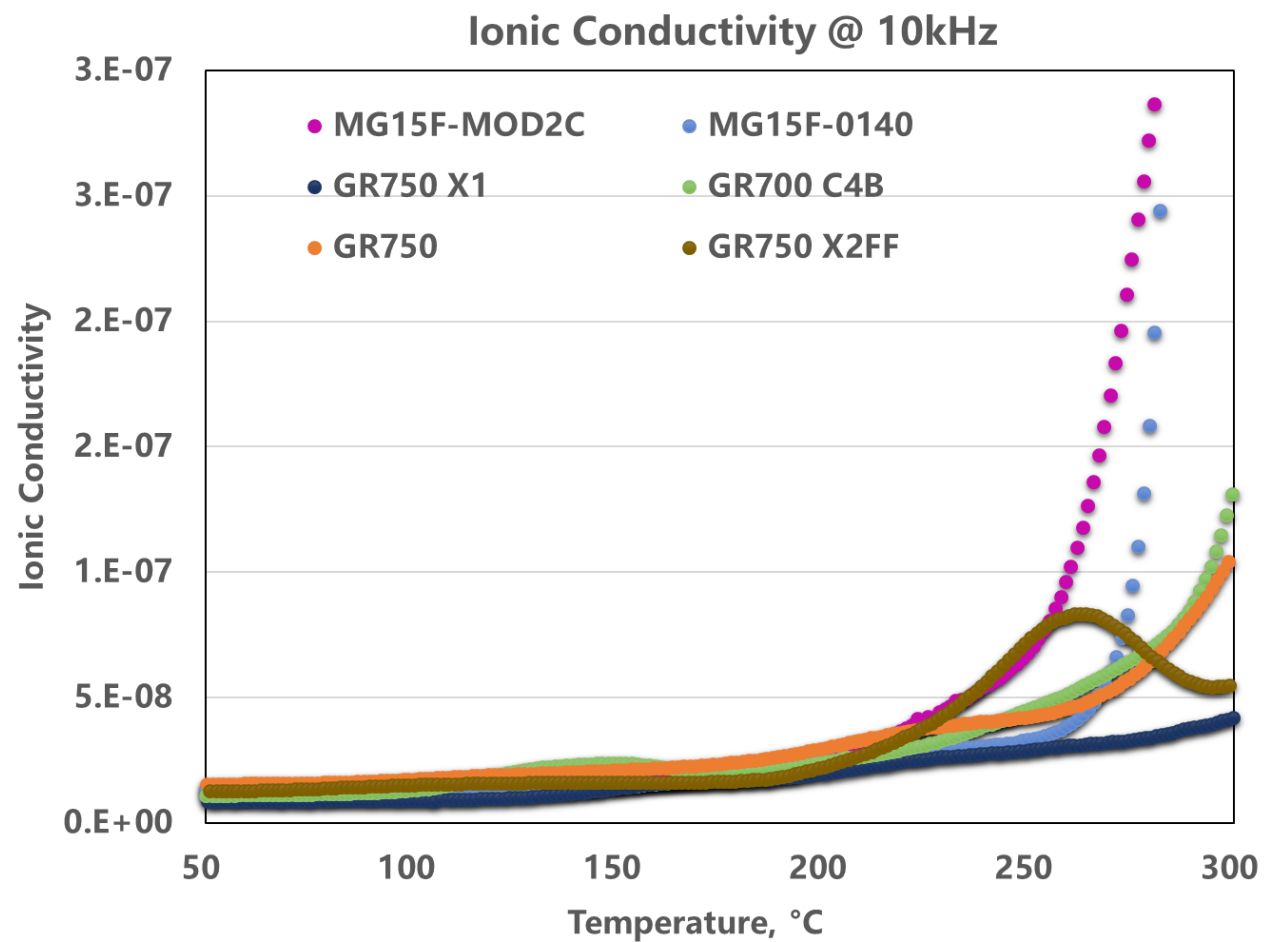
Low Tg Tech



Product Name			GR700 P2	GR700 C4A (Fine filler)	GR700 C4B
Epoxy type	-		MAR	MAR	MAR
Hardener type	-		MAR	MAR	MAR
Filler cut size	μm		75	45	75
Flammability	UL-94		V-0 @ 1/8"	V-0 @ 1/8"	V-0 @ 1/8"
Spiral Flow	inches		35	39	37
Gel Time	sec		24	32	27
Viscosity @ 175°C	PaS		23	26	20
T _g by TMA	°C		115	116	121
CTE 1	ppm/C		7	7	6
CTE 2	ppm/C		29	33	35
DMA Storage Modulus at RT	MPa		29745	25861	26662
DMA Storage Modulus at 260C	MPa		731	503	604
T _g by DMA Tanδ Peak	°C		127	127	136
Flexural modulus	Mpa		22183	19759	20573
Flexural strength	Mpa		166	143	140
Moisture absorption PCT24h	%		0.15	0.22	0.2
Cl ⁻ / Na ⁺	ppm		<15	<15	<15
PH			6.0	6.2	6.2
Volume resistivity @21C & 500V	Ω.cm		5.3E+16	4.6E+16	7.7E+16
Dielectric constant, 21 C & 1MHz			3.9	3.8	3.8
Adhesion (tabpull) after MSL3	on Cu	N	211	367	421
	on Ag	N	317	232	413
	on Ni	N	182	NA	NA
Comparative Tracking Index	V		600	600	600
Recommended Molding condition			175°C 90s	175°C 90s	175°C 90s
Recommended PMC condition			175°C 6hrs	175°C 6hrs	175°C 6hrs

Excellent Electrical Performances

DETA data



CSAM after MSL1

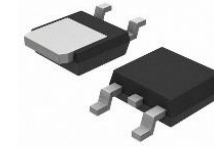


DPAK MSL1 internal test

Bare Cu LF, molded in HHE

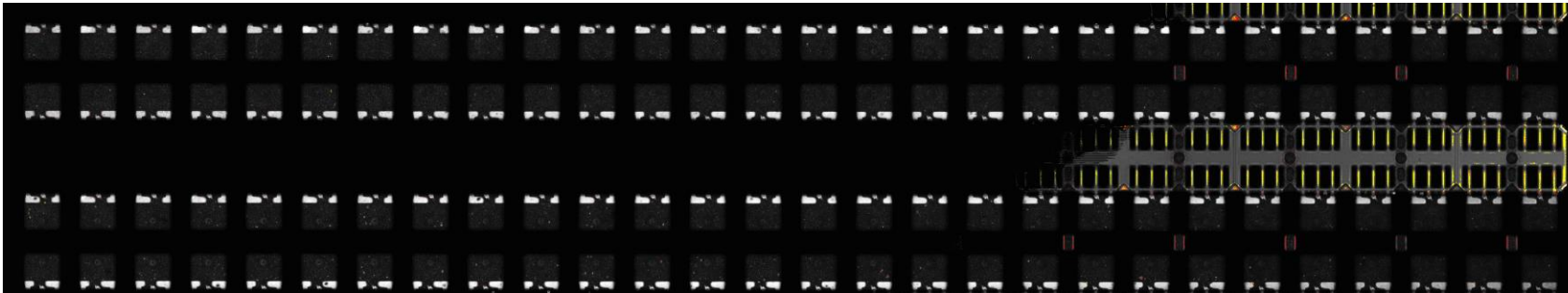
3 times reflow after 85°C/85%RH/ 168h soaking.

Delamination check marked in red by CSAM.



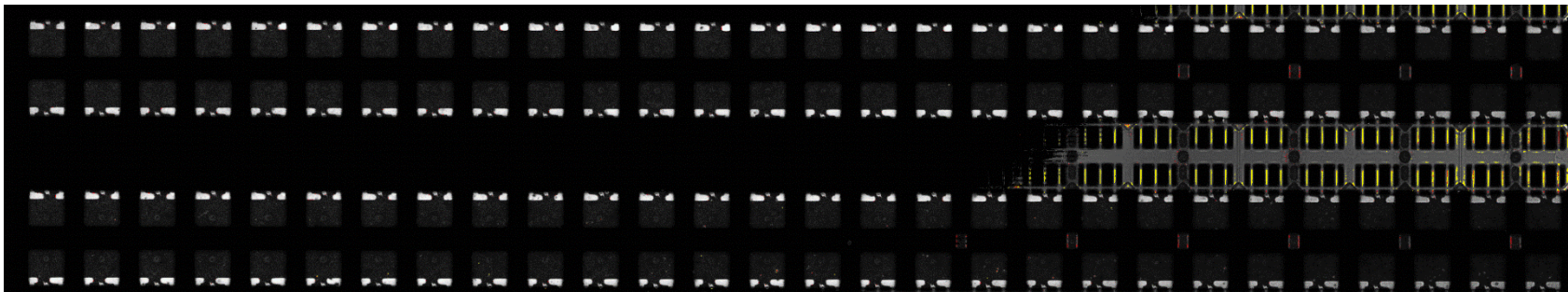
GR700 C4A

Lead 0 Delam



GR750 X2FF

Lead 0 Delam



CSAM after MSL3

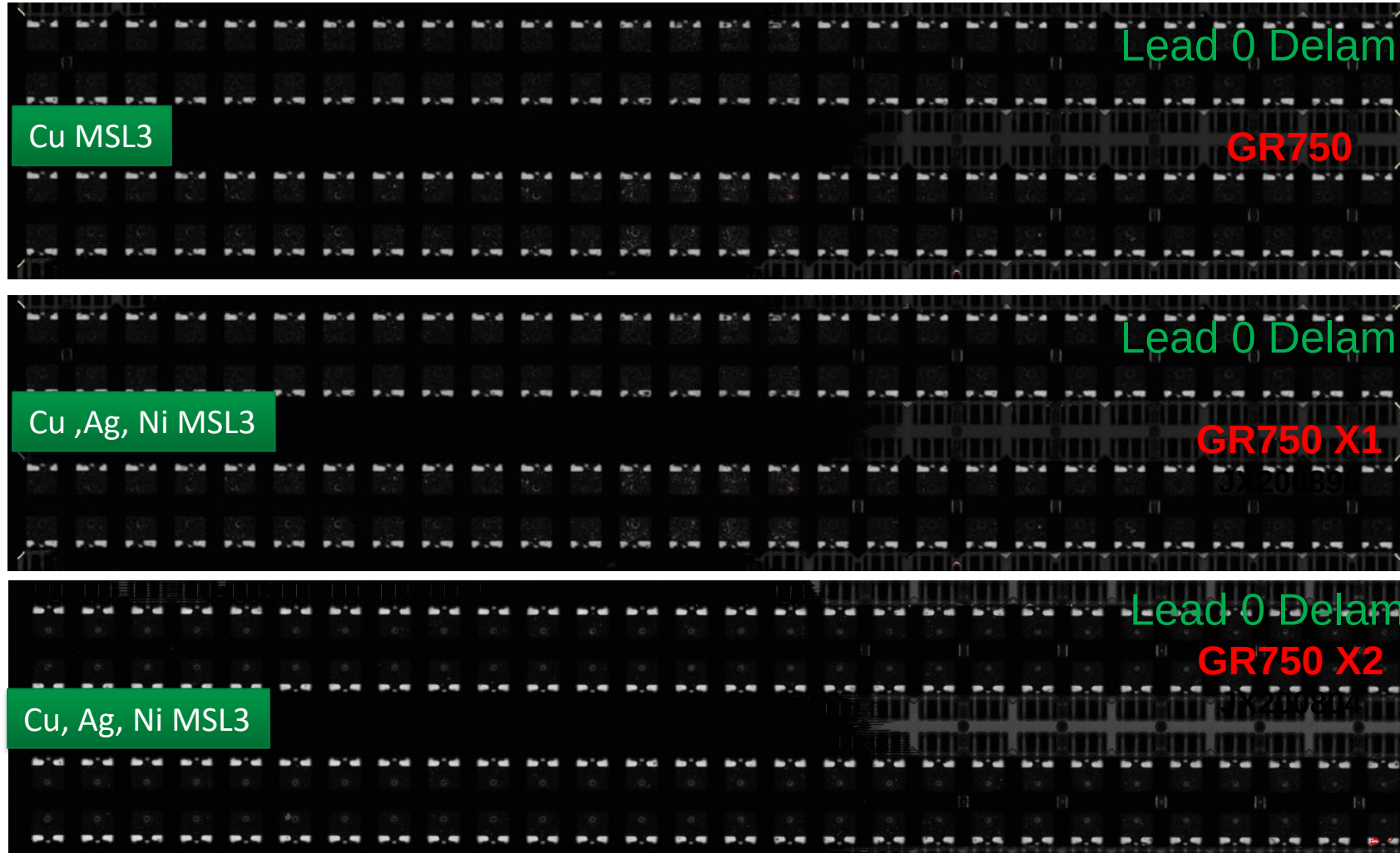
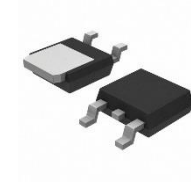


DPAK MSL3 internal test

Cu Pad, Cu, Ag, Ni Lead, molded in HHE

3 times reflow after 60 C/60 %RH/ 40 h soaking.

Delamination check marked in red by CSAM.



■ GR750 X1 1200Voltage SiC TO247 Test

■ PKG TO247

■ LF: Cu/Ni

Test Item	Parameters	Sample quantity	Test period	Criteria	Test Result
HTRB	TA=175°C @ 80% of Max VR	77pcs	168/500/1000 hrs	JESD22-A108D	PASS
TC	-55°C,15 mins; 150°C,15mins.	77pcs	200/500/1000 cycles	JESD22-A104D	PASS
AC	TA=121°C±2°C, RH=100% , P=15PSIG	77pcs	96 hrs	JESD22-A102D	PASS
HAST	130°C, 85%RH @80% of Max VR up to 42V	77pcs	96 hrs	JESD22-A110D	PASS
H3TRB	85°C, 85%RH @80% of Max VR up to 100V	77pcs	1000 hrs	JESD22-A101C	PASS

■ GR700 P2 1700 Voltage SiC TO247 Test

■ PKG TO247

■ LF: Cu/Ni

Test Item	Parameters	Sample quantity	Test period	Criteria	Test Result
HTRB	TA=175°C @ 80% of Max VR	80pcs	168/504/1008 hrs	JESD22-A108D	PASS
TC	-55°C,15 mins; 150°C,15mins.	80pcs	250/500/1000 cycles	JESD22-A104D	PASS
uHAST	130°C, 85%RH	80pcs	96 hrs	JESD22-A110D	PASS
H3TRB	85°C, 85%RH @80% of Max VR up to 100V	80pcs	168/504/1008 hrs	JESD22-A101C	PASS

Thank you !

