

HVIGBT modules: X series reliability test results

Table 1. Reliability test results

The results for representative module are shown in below table.

Test Category 試験項目	Test condition 試験条件	Number of samples 試料数	Number of failures 故障数	
Temperature cycling 温度サイクル	-40°C ~ 125°C (air), 500 cycles, t=60 minutes at each temp.	5	0	
Variable frequency vibration 振動	10Hz - 500Hz / 15 min., 100m/s ² =10G, X, Y, Z : 2 hours in each direction.	5	0	
High temperature Storage 高温保存	Ta=150 °C, t=1000 hours	5	0	
Low temperature Storage 低温保存	Ta=-55 °C, t=1000 hours	5	0	
Moisture resistance 耐湿性	Ta=85°C, 85%RH, t=1000 hours	5	0	
High temperature reverse bias 高温逆バイアス	Tvj=150°C, VCE(DC)=VCES(rating) x 0.85, VGE=short, t=1000 hours	5	0	
High temperature gate bias 高温ゲートバイアス	Tvj=150 °C, VCE=short, t=1000 hours	VGE(DC)=+20V	5	0
		VGE(DC)=-20V	5	0
Intermittent operation life 断続通電	ΔTc=68°C, 40,000 cycles	5	0	

Table 2. Failure criteria

Parameter 測定項目	Measurement conditions 測定条件	Criteria for failure 故障判定基準	
		Lower/下限	Upper/上限
ICES	VCE=VCES(rating), G-E short-circuited	—	U.S.L.×2.0
IGES	VGE=VGES(rating), C-E short-circuited	—	U.S.L.×2.0
VGE(th)	IC=IC(rating)/10000A, VCE=10V	I.V.D.×0.5 L.S.L.×0.8	I.V.D.×1.5 U.S.L.×1.2
VCEsat	IC=IC(rating)A, VGE=15V	—	U.S.L.×1.2
VEC	IE=IE(rating)A, G-E short-circuited	—	U.S.L.×1.2
Visol	Visol= Visol(rating), AC 1 minute between shorted all terminals and base plate	Break down	

Additional notes:

- (1) The measurements are performed under our determined temperature and humidity environment.
- (2) The symbols in the table are as follows.
U.S.L : Upper Specification Limit
L.S.L : Lower Specification Limit
I.V.D : Initial Value of the individual Device
- (3) The U.S.Ls and L.S.Ls are determined on the basis of Specification #300, which is designated as our standard module specification. In regards to those not defined in Spec. #300, our own internal specifications are applied in lieu thereof.
- (4) The measurement items of each test are selected according to our standards

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