

IGBT modules: T series LV100 type 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), 10 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 | |
| Tightening strength 締付トルク強度 | Main terminals: 14.0N·m(M8) Auxiliary terminals: 0.6N·m(M3) Mounting to heat sink: 4.5N·m(M6) | 5 | 0 | |
| High temperature Storage 高温保存 | Ta=125 °C t=1000 hours | 5 | 0 | |
| Low temperature Storage 低温保存 | Ta=-40 °C t=1000 hours | 5 | 0 | |
| Moisture resistance 耐湿性 | Ta=60 °C, 90 %RH t=1000 hours | 5 | 0 | |
| High temperature reverse bias 高温逆バイアス | Tvj=150 °C, VCE(DC)=VCES(rating) × 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 | Tc=50~100 °C, 5,000 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 | L.S.L.×0.8 | 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:

- The measurements are performed under our determined temperature and humidity environment.
- The symbols in the table are as follows.
U.S.L : Upper Specification Limit
L.S.L : Lower Specification Limit
- The U.S.Ls and L.S.Ls are determined on the basis of Specification, which is designated as our standard module specification. In regards to those not defined in Specification, our own internal specifications are applied in lieu thereof.
- The measurement items of each test are selected according to our standards

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