

# Automotive IGBT modules : J1 series reliability test results

Table 1. Reliability test results

J1 series type name : CT600CJ1A060-A/CT700CJ1A060-A

The results of CT700CJ1A060-A are described 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 t=30 minutes at each temp. 1,000 cycles	5	0
Vibration 振動	10Hz - 500Hz / 15 minutes 100m/s <sup>2</sup> =10G X, Y, Z: 2 hours in each direction.	5	0
Terminal strength (pull) 端子強度(引張)	Weight 9.8N 10 seconds	5	0
Tightening torque 締付トルク強度	Main terminals (M5): 6.0N · m Module mounting (M5): 6.0N · m 10 seconds	5	0
High temperature storage 高温保存	T <sub>a</sub> =150 °C t=1,000 hours	5	0
Low temperature storage 低温保存	T <sub>a</sub> =-40 °C t=1,000 hours	5	0
High-temperature high-humidity storage 耐湿性	T <sub>a</sub> =85 °C, 85 %RH t=1,000 hours	5	0
High temperature reverse bias 高温逆バイアス	T <sub>a</sub> =150 °C, V <sub>CE</sub> =638V, V <sub>GE</sub> =short t=1,000 hours	5	0
High temperature gate bias 高温ゲートバイアス	T <sub>a</sub> =150 °C, V <sub>GE</sub> =+20V, V <sub>CE</sub> =short t=1,000 hours	5	0
High temperature high-humidity bias 高温高湿逆バイアス	T <sub>a</sub> =85 °C, 85 %RH, V <sub>CE</sub> =638V, V <sub>GE</sub> =short t=1,000 hours	5	0
Power cycling パワーサイクル	ΔT <sub>J</sub> =100°C 30,000 cycles	5	0
Electrostatic discharge (HBM/ESD) 静電耐量	C= 100pF, R= 1,500Ω Applied voltage: ±2,000V	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		Remarks 備考
		Lower Limit 下限	Upper Limit 上限	
I <sub>CES</sub>	V <sub>CE</sub> =V <sub>CES</sub> (rating)V, G-E short-circuited	—	U.S.L.×2.0	
I <sub>GES</sub>	V <sub>GE</sub> =V <sub>GES</sub> (rating)V, C-E short-circuited	—	U.S.L.×2.0	
V <sub>GE(th)</sub>	I <sub>C</sub> = I <sub>C</sub> (rating)/10,000 A, V <sub>CE</sub> = 10V	L.S.L.×0.8	U.S.L.×1.2	
V <sub>CEsat</sub>	I <sub>C</sub> = I <sub>C</sub> (rating)A, V <sub>GE</sub> = 15V	—	U.S.L.×1.2	
V <sub>EC</sub>	I <sub>E</sub> = I <sub>E</sub> (rating)A, V <sub>GE</sub> = 0V	—	U.S.L.×1.2	
V <sub>isol</sub>	V <sub>isol</sub> = 2,500Vrms; 60Hz, 1 minute between all terminals (short) and the baseplate	Break down		

Additional notes

- \*1) The measurements are performed under the temperature and humidity environment we have determined.
- \*2) The abbreviations in this Table are as follows:  
 U.S.L: Upper Specification Limit  
 L.S.L: Lower Specification Limit
- \*3) The U.S.Ls and L.S.Ls are determined based on the specification.
- \*4) The measured items (i.e., parameters) of each test are selected according to our standards.

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