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ELL302 - Minor-I

1. The $i-v$ characteristics of an IGBT device (operating at 1 kHz with a duty cycle of 0.5) ON -to- OFF-state transition is shown in Fig.2. Determine (a) the power loss taking place in the device, (b) thermal resistance of the heat sink, . (Assumptions: (i) Negligible IGBT ON-state losses, (ii) OFF -to- ON-state transition losses are equal to ON -to- OFF-state transition losses, (iii) junction -to- case thermal resistance is 0.7 k/W, case -to- sink thermal resistance is 0.1 k/W, (iv) if the IGBT junction temperature is not exceeding 110°C , ambient temperature is 38°C . (15 marks)

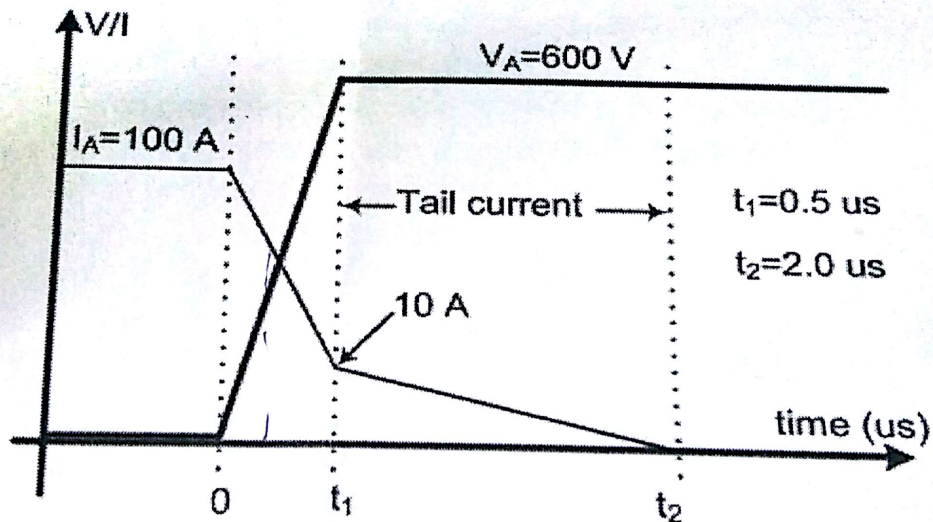


Fig. 2.