

(54) Title of the invention : INSULATED GATE BIPOLAR TRANSISTOR

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(57) Abstract :

An IGBT is provided having layers between an emitter electrode (2) on an emitter side (11) and a collector electrode (25) on a collector side (15) comprising: a drift layer (8) of a first conductivity type a base layer (5) which electrically contacts the emitter electrode (2) and is completely separated from the drift layer (8) a first and second source region (7) which is arranged on the base layer (6) towards the emitter side (11) and electrically contacts the emitter electrode (2) a first trench gate electrode (3) which is arranged lateral to the base layer (5) and which is separated from the base layer (5) the first source region (7) and the drift layer (8) by a first insulating layer (31) wherein a channel is formable between the emitter electrode (2) the first source region (7) the base layer (5) and the drift layer (8) a second insulating layer (32) which is arranged on top of the first trench gate electrode (3) an enhancement layer (6) which separates the base layer (5) from the drift layer (8) at least in a plane parallel to the emitter side (11) a grounded gate electrode (4) comprising a second grounded trench gate electrode (41) and an electrically conducting layer (42) wherein the second trench gate electrode (41) is arranged lateral to the base layer (5) and which second trench gate electrode (41) is separated from the base layer (5) the enhancement layer (6) and the drift layer (8) by a third insulating layer (43) wherein the electrically conductive layer (42) covers and extends outside the second trench gate electrode (41) at least to a region above the base layer (5) wherein the electrically conductive layer (42) is separated from the base layer (5) by a fourth electrically insulating layer (44) and wherein the electrically conductive layer (42) contacts the second trench gate electrode (41) wherein a second channel is formable from the emitter electrode (2) the second source region (75) the base layer (5) and the drift layer (8) between a first trench gate electrode (3) and a second trench gate electrode (4) a fifth insulating layer (45) which is arranged on top of the second trench gate electrode (41) which fifth insulating layer (45) has a recess (47) such that the electrically conducting layer (42) electrically contacts the emitter electrode (2).

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