

# IGBTs

## Selection guide



October 2007

## Low drop, standard speed IGBTs

| Part number    | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 * I <sub>C (nom)</sub> [V] | Package            |
|----------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|--------------------|
|                |                                |                       | [A]                            | [V]                           |   |                    |
|                |                                |                       | max                            | typ                           |   |                    |
| STGB3NB60SDT4  | 1                              | 600                   | 3                              | 1.15                          | 1.90  | D <sup>2</sup> PAK |
| STGD3NB60SDT4  | 1                              | 600                   | 3                              | 1.15                          | 1.90  | DPAK               |
| STGD3NB60SD-1  | 1                              | 600                   | 3                              | 1.15                          | 1.90  | IPAK               |
| STGF7NB60SL    | 1                              | 600                   | 7                              | 1.10                          | -   | TO-220FP           |
| STGD7NB60SL    | 1                              | 600                   | 10                             | 1.10                          | -   | DPAK               |
| STGP10NB60SFP  | 1                              | 600                   | 7                              | 1.15                          | -   | TO-220FP           |
| STGF10NB60SD   | 1                              | 600                   | 7                              | 1.15                          | 1.90  | TO-220FP           |
| STGD7NB60ST4   | 1                              | 600                   | 10                             | 1.10                          | -   | DPAK               |
| STGB10NB60ST4  | 1                              | 600                   | 10                             | 1.25                          | -   | D <sup>2</sup> PAK |
| STGP10NB60S    | 1                              | 600                   | 10                             | 1.25                          | -   | TO-220             |
| STGP10NB60SD   | 1                              | 600                   | 10                             | 1.25                          | 1.90  | TO-220             |
| STGF20NB60S    | 1                              | 600                   | 13                             | 0.95                          | -   | TO-220FP           |
| STGW35NB60SD   | 1                              | 600                   | 35                             | 0.95                          | 2.00  | TO-247             |
| STGE200NB60S   | 1                              | 600                   | 150                            | 1.20                          | -   | ISOTOP             |
| STGD5NB120SZT4 | 1                              | 1200                  | 5                              | 1.25                          | -   | DPAK               |
| STGD5NB120SZ-1 | 1                              | 1200                  | 5                              | 1.25                          | -   | IPAK               |

## Fast switching IGBTs

| Part number   | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 * I <sub>C (nom)</sub> [V] | Package |
|---------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|---------|
|               |                                |                       | [A]                            | [V]                           |   |         |
|               |                                |                       | max                            | typ                           |   |         |
| STGD10NC60SD* | 10                             | 600                   | 10                             | 1.30                          | 2.00  | DPAK    |
| STGP19NC60S*  | 10                             | 600                   | 20                             | 1.30                          | -   | TO-220  |
| STGP19NC60SD* | 10                             | 600                   | 20                             | 1.30                          | 2.00  | TO-220  |
| STGP30NC60S*  | 10                             | 600                   | 30                             | 1.30                          | -   | TO-220  |

## Very fast switching IGBTs

| Part number   | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 * I <sub>C (nom)</sub> [V] | Package            |
|---------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|--------------------|
|               |                                |                       | [A]                            | [V]                           |   |                    |
|               |                                |                       | max                            | typ                           |   |                    |
| STGF6NC60HD   | 50                             | 600                   | 3                              | 1.75                          | 2.00  | TO-220FP           |
| STGD6NC60HT4  | 50                             | 600                   | 7                              | 1.75                          | -   | DPAK               |
| STGD6NC60HDT4 | 50                             | 600                   | 7                              | 1.75                          | 2.00  | DPAK               |
| STGB6NC60HT4  | 50                             | 600                   | 7                              | 1.75                          | -   | D <sup>2</sup> PAK |
| STGB6NC60HDT4 | 50                             | 600                   | 7                              | 1.75                          | 2.00  | D <sup>2</sup> PAK |
| STGB6NC60HD-1 | 50                             | 600                   | 7                              | 1.75                          | 2.00  | I <sup>2</sup> PAK |
| STGP6NC60H    | 50                             | 600                   | 7                              | 1.75                          | -   | TO-220             |
| STGP6NC60HD   | 50                             | 600                   | 7                              | 1.75                          | 2.00  | TO-220             |
| STGF10NC60HD  | 50                             | 600                   | 6                              | 1.75                          | 2.00  | TO-220FP           |
| STGD10NC60H   | 50                             | 600                   | 10                             | 1.75                          | -   | DPAK               |
| STGD10NC60HD  | 50                             | 600                   | 10                             | 1.75                          | 2.00  | DPAK               |
| STGB10NC60HD  | 50                             | 600                   | 10                             | 1.75                          | 2.00  | D <sup>2</sup> PAK |
| STGP10NC60HD  | 50                             | 600                   | 10                             | 1.75                          | 2.00  | TO-220             |
| STGP10NC60H   | 50                             | 600                   | 10                             | 1.75                          | -   | TO-220             |
| STGF7NC60HD   | 50                             | 600                   | 7                              | 1.75                          | 1.90  | TO-220FP           |
| STGD7NC60HT4  | 50                             | 600                   | 14                             | 1.75                          | -   | DPAK               |
| STGB7NC60HDT4 | 50                             | 600                   | 14                             | 1.75                          | 1.90  | D <sup>2</sup> PAK |
| STGP7NC60H    | 50                             | 600                   | 14                             | 1.75                          | -   | TO-220             |
| STGP7NC60HD   | 50                             | 600                   | 14                             | 1.75                          | 1.90  | TO-220             |
| STGF19NC60HD  | 50                             | 600                   | 9                              | 1.75                          | 1.90  | TO-220FP           |
| STGB19NC60HD  | 50                             | 600                   | 19                             | 1.75                          | 1.90  | D <sup>2</sup> PAK |
| STGP19NC60H   | 50                             | 600                   | 19                             | 1.75                          | -   | TO-220             |
| STGP19NC60HD  | 50                             | 600                   | 19                             | 1.75                          | 1.90  | TO-220             |
| STGW19NC60HD  | 50                             | 600                   | 19                             | 1.75                          | 1.90  | TO-247             |
| STGB20NC60V   | 50                             | 600                   | 30                             | 1.65                          | -   | D <sup>2</sup> PAK |

\* Device under development

## Very fast switching IGBTs cont'd.

| Part number   | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 * I <sub>C (nom)</sub> [V] | Package           |
|---------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|-------------------|
|               |                                |                       | [A]                            | [V]                           |   |                   |
|               |                                |                       | max                            | typ                           |   |                   |
| STGP20NC60V   | 50                             | 600                   | 30                             | 1.65                          | -   | TO-220            |
| STGW20NC60V   | 50                             | 600                   | 30                             | 1.65                          | -   | TO-247            |
| STGW20NC60VD  | 50                             | 600                   | 30                             | 1.65                          | 2.00  | TO-247            |
| STGW30NC60VD  | 50                             | 600                   | 30                             | 1.65                          | 2.00  | TO-247 long leads |
| STGW39NC60VD  | 50                             | 600                   | 40                             | 1.70                          | 2.00  | TO-247            |
| STGW40NC60V   | 50                             | 600                   | 50                             | 1.75                          | -   | TO-247            |
| STGY40NC60VD  | 50                             | 600                   | 50                             | 1.75                          | 2.20  | Max247            |
| STGE50NC60VD  | 50                             | 600                   | 50                             | 1.75                          | 2.20  | ISOTOP            |
| STGJ50NC60VD* | 50                             | 600                   | 50                             | 1.75                          | 2.20  | TO-264            |
| STGF3NC120HD  | 50                             | 1200                  | 3                              | 2.30                          | 2.00  | TO-220FP          |
| STGW30NC120HD | 50                             | 1200                  | 30                             | 2.10                          | 1.90  | TO-247            |
| STGW35NC120HD | 50                             | 1200                  | 30                             | 2.10                          | 1.90  | TO-247 long leads |
| STGW33IH120D  | 50                             | 1200                  | 30                             | 2.10                          | 1.90  | TO-247            |

## Short circuit rugged IGBTs

| Part number    | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 * I <sub>C (nom)</sub> [V] | Package            |
|----------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|--------------------|
|                |                                |                       | [A]                            | [V]                           |   |                    |
|                |                                |                       | max                            | typ                           |   |                    |
| STGF8NC60KD    | 50                             | 600                   | 4                              | 1.90                          | 2.00  | TO220-FP           |
| STGD8NC60KT4   | 50                             | 600                   | 8                              | 1.90                          | -   | DPAK               |
| STGD8NC60KDT4  | 50                             | 600                   | 8                              | 1.90                          | 2.00  | DPAK               |
| STGB8NC60KT4   | 50                             | 600                   | 8                              | 1.90                          | -   | D <sup>2</sup> PAK |
| STGB8NC60KDT4  | 50                             | 600                   | 8                              | 1.90                          | 2.00  | D <sup>2</sup> PAK |
| STGP8NC60K     | 50                             | 600                   | 8                              | 1.90                          | -   | TO-220             |
| STGP8NC60KD    | 50                             | 600                   | 8                              | 1.90                          | 2.00  | TO-220             |
| STGF10NC60KD   | 50                             | 600                   | 6                              | 2.00                          | 2.00  | TO-220FP           |
| STGD10NC60KT4  | 50                             | 600                   | 10                             | 2.00                          | -   | DPAK               |
| STGD10NC60KDT4 | 50                             | 600                   | 10                             | 2.00                          | 2.00  | DPAK               |
| STGB10NC60KT4  | 50                             | 600                   | 10                             | 2.00                          | -   | D <sup>2</sup> PAK |
| STGB10NC60KDT4 | 50                             | 600                   | 10                             | 2.00                          | 2.00  | D <sup>2</sup> PAK |
| STGP10NC60K    | 50                             | 600                   | 10                             | 2.00                          | -   | TO-220             |
| STGP10NC60KD   | 50                             | 600                   | 10                             | 2.00                          | 2.00  | TO-220             |
| STGF14NC60KD   | 50                             | 600                   | 7                              | 1.85                          | 1.90  | TO-220FP           |
| STGD14NC60KT4  | 50                             | 600                   | 14                             | 1.85                          | -   | DPAK               |
| STGB14NC60KT4  | 50                             | 600                   | 14                             | 1.85                          | -   | D <sup>2</sup> PAK |
| STGB14NC60KDT4 | 50                             | 600                   | 14                             | 1.85                          | 1.90  | D <sup>2</sup> PAK |
| STGP14NC60KD   | 50                             | 600                   | 14                             | 1.85                          | 1.90  | TO-220             |
| STGF19NC60KD*  | 50                             | 600                   | 9                              | 1.85                          | 1.90  | TO-220FP           |
| STGB19NC60KD*  | 50                             | 600                   | 19                             | 1.85                          | 1.90  | D <sup>2</sup> PAK |
| STGP19NC60K*   | 50                             | 600                   | 19                             | 1.85                          | -   | TO-220             |
| STGP19NC60KD*  | 50                             | 600                   | 19                             | 1.85                          | 1.90  | TO-220             |
| STGB30NC60K*   | 50                             | 600                   | 30                             | 1.85                          | -   | D <sup>2</sup> PAK |
| STGP30NC60K*   | 50                             | 600                   | 30                             | 1.85                          | -   | TO-220             |
| STGW30NC60KD*  | 50                             | 600                   | 30                             | 1.85                          | 2.00  | TO-247             |
| STGW40NC60KD*  | 50                             | 600                   | 40                             | 1.85                          | 2.00  | TO-247             |
| STGW30NC120KD* | 50                             | 1200                  | 30                             | 2.10                          | 2.00  | TO-247             |

## Ultra fast and hyper fast switching IGBTs

| Part number | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 * I <sub>C (nom)</sub> [V] | Package  |
|-------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|----------|
|             |                                |                       | [A]                            | [V]                           |   |          |
|             |                                |                       | max                            | typ                           |   |          |
| STGFL6NC60D | 100                            | 600                   | 3                              | 2.10                          | 2.10  | TO-220FP |
| STGDL6NC60D | 100                            | 600                   | 6                              | 2.10                          | 2.10  | DPAK     |

\* Device under development

## Ultra fast and hyper fast switching IGBTs cont'd.

| Part number  | Max. switching frequency [kHz] | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 100° C | V <sub>CE(sat)</sub> @ 100° C | V <sub>F</sub> max @ 0.5 × I <sub>C (nom)</sub> [V] | Package            |
|--------------|--------------------------------|-----------------------|--------------------------------|-------------------------------|---|--------------------|
|              |                                |                       | [A]                            | [V]                           |   |                    |
|              |                                |                       | max                            | typ                           |   |                    |
| STGBL6NC60D  | 100                            | 600                   | 6                              | 2.10                          | 2.10  | D <sup>2</sup> PAK |
| STGPL6NC60D  | 100                            | 600                   | 6                              | 2.10                          | 2.10  | TO-220             |
| STGF19NC60WD | 100                            | 600                   | 9                              | 2.00                          | 1.90  | TO-220FP           |
| STGP19NC60W  | 100                            | 600                   | 19                             | 2.00                          | -   | TO-220             |
| STGP19NC60WD | 100                            | 600                   | 19                             | 2.00                          | 1.90  | TO-220             |
| STGW19NC60W  | 100                            | 600                   | 19                             | 2.00                          | -   | TO-247             |
| STGW19NC60WD | 100                            | 600                   | 19                             | 2.00                          | 1.90  | TO-247             |
| STGPP30NC60W | 100                            | 600                   | 30                             | 1.90                          | -   | TO-220             |
| STGW30NC60W  | 100                            | 600                   | 30                             | 1.90                          | -   | TO-247             |
| STGW30NC60WD | 100                            | 600                   | 30                             | 1.90                          | 1.50  | TO-247             |
| STGW40NC60W  | 100                            | 600                   | 40                             | 1.90                          | -   | TO-247             |
| STGW40NC60WD | 100                            | 600                   | 40                             | 1.90                          | 1.50  | TO-247             |
| STGW50NC60W  | 100                            | 600                   | 55                             | 1.90                          | -   | TO-247             |
| STGY50NC60WD | 100                            | 600                   | 55                             | 1.90                          | NA  | Max247             |
| STGE50NC60W  | 100                            | 600                   | 55                             | 1.90                          | NA  | ISOTOP             |
| STGJ50NC60W* | 100                            | 600                   | 55                             | 1.90                          | NA  | TO-264             |

## Logic level, fully clamped IGBTs (frequency up to 1 kHz) for electronic ignition

| Part number    | BV <sub>CES</sub> [V] |     |     | I <sub>C (cont)</sub> @ 100°C [A] | V <sub>CE(sat)</sub> @ I <sub>C (nom)</sub> [V] |      | V <sub>GE (TH)</sub> [V] | Package             | E <sub>AS</sub> max [mJ] |
|----------------|-----------------------|-----|-----|-----------------------------------|---|------|--------------------------|---------------------|--------------------------|
|                | min                   | typ | max |                                   | typ   | max  |                          |                     |                          |
| STGD18N40LZT4* | 370                   | 400 | 430 | 10                                | 1.30  | 1.70 | 1.20                     | DPAK                | 300                      |
| STGD18N40LZ-1* | 370                   | 400 | 430 | 10                                | 1.30  | 1.70 | 1.20                     | DPAK                | 300                      |
| STGB18N40LZT4* | 370                   | 400 | 430 | 10                                | 1.30  | 1.70 | 1.20                     | D <sup>2</sup> PAK  | 300                      |
| STGB18N40LZ-1* | 370                   | 400 | 430 | 10                                | 1.30  | 1.70 | 1.20                     | D <sup>2</sup> PAK  | 300                      |
| STGB10NB40LZT4 | 380                   | 410 | 440 | 10                                | 1.20  | 1.80 | 1.00                     | D <sup>2</sup> PAK  | 300                      |
| STGB7NB40LZT4  | 370                   | 400 | 430 | 14                                | 1.30  | 1.50 | 1.20                     | D <sup>2</sup> PAK  | 200                      |
| STGB10NB37LZ   | 375                   | 400 | 425 | 20                                | 1.20  | 1.80 | 1.00                     | D <sup>2</sup> PAK  | 300                      |
| STGB10NB37LZT4 | 375                   | 400 | 425 | 20                                | 1.20  | 1.80 | 1.00                     | D <sup>2</sup> PAK  | 300                      |
| STGP10NB37LZ   | 375                   | 400 | 425 | 20                                | 1.20  | 1.80 | 1.00                     | TO-220              | 300                      |
| STGB20NB37LZT4 | 375                   | 400 | 425 | 20                                | 1.35  | 2.00 | 1.00                     | D <sup>2</sup> PAK  | 700                      |
| STGB20NB41LZT4 | 382                   | 412 | 442 | 20                                | 1.30  | 2.00 | 1.00                     | D <sup>2</sup> PAK  | 700                      |
| STGB20NB32LZ   | 320                   | 350 | 380 | 30                                | 1.35  | 2.00 | 1.00                     | D <sup>2</sup> PAK  | 700                      |
| STGB20NB32LZT4 | 320                   | 350 | 380 | 30                                | 1.35  | 2.00 | 1.00                     | D <sup>2</sup> PAK  | 700                      |
| STGB20NB32LZ-1 | 320                   | 350 | 380 | 30                                | 1.35  | 2.00 | 1.00                     | I <sup>2</sup> PAK  | 700                      |
| STGB35N35LZT4* | 320                   | 350 | 380 | 30                                | 1.40  | 1.80 | 1.20                     | D <sup>2</sup> PAK  | 700                      |
| STGB35N35LZ-1* | 320                   | 350 | 380 | 30                                | 1.40  | 1.80 | 1.20                     | I <sup>2</sup> PAK  | 700                      |
| STGB35N35LZ-S* | 320                   | 350 | 380 | 30                                | 1.40  | 1.80 | 1.20                     | I <sup>2</sup> SPAK | 700                      |

## PDP application specific

| Part number  | BV <sub>CES</sub> min [V] | I <sub>RP</sub> max [A] | V <sub>CE(sat)</sub> @ 100°C typ [V] | V <sub>F</sub> max [V] | Package  |
|--------------|---------------------------|-------------------------|--------------------------------------|------------------------|----------|
| STGF100N30*  | 300                       | 210                     | 2.50                                 | -                      | TO-220FP |
| STGW100N30*  | 300                       | 210                     | 2.50                                 | -                      | TO-247   |
| STGW100N30D* | 300                       | 210                     | 2.50                                 | 1.25                   | TO-247   |

## Medical application specific

| Part number      | BV <sub>CES</sub> [V] | I <sub>C (cont)</sub> @ 70°C max [A] | V <sub>CE(sat)</sub> @ 70°C typ [V] | I <sub>surge</sub> [A] | Sub. application | Package |
|------------------|-----------------------|--------------------------------------|-------------------------------------|------------------------|------------------|---------|
| STGHi100N160S*   | 1600                  | 50                                   | 1.70                                | 120                    | AED              | HiPAK3  |
| STGW100N160S*    | 1600                  | 50                                   | 1.70                                | 120                    | AED              | TO-247  |
| G7NB120SD1(9120) | 1200                  | 7                                    | 2.30                                | -                      | ICD              | Die     |

\* Device under development

## Power modules (SEMITOP®)

| Part number    | $V_{CES}$ [V] | $I_C$ (cont) max [A] @ 80°C | Topology  | Package  |
|----------------|---------------|-----------------------------|---|----------|
| STG3P2M10N60B  | 600           | 10                          | 1- $\Phi$ rectifier bridge + 3- $\Phi$ inverter | SEMITOP2 |
| STG3P3M10N60D* | 600           | 10                          | 3- $\Phi$ rectifier bridge + 3- $\Phi$ inverter | SEMITOP3 |
| STG3P3M10K60D* | 600           | 10                          | 3- $\Phi$ rectifier bridge + 3- $\Phi$ inverter | SEMITOP3 |
| STG3P3M25N60   | 600           | 25                          | 3- $\Phi$ inverter                              | SEMITOP3 |

## Intelligent power modules

| Part number   | $V_{CES}$ [V] | $I_{Cnom}$ max [A] | Topology                     | Package     |
|---------------|---------------|--------------------|------------------------------|-------------|
| STGIPF10K60*  | 600           | 10                 | 3- $\Phi$ inverter + drivers | Plastic DIP |
| STGIP3M25N60* | 600           | 25                 | 3- $\Phi$ inverter + drivers | SEMITOP3    |

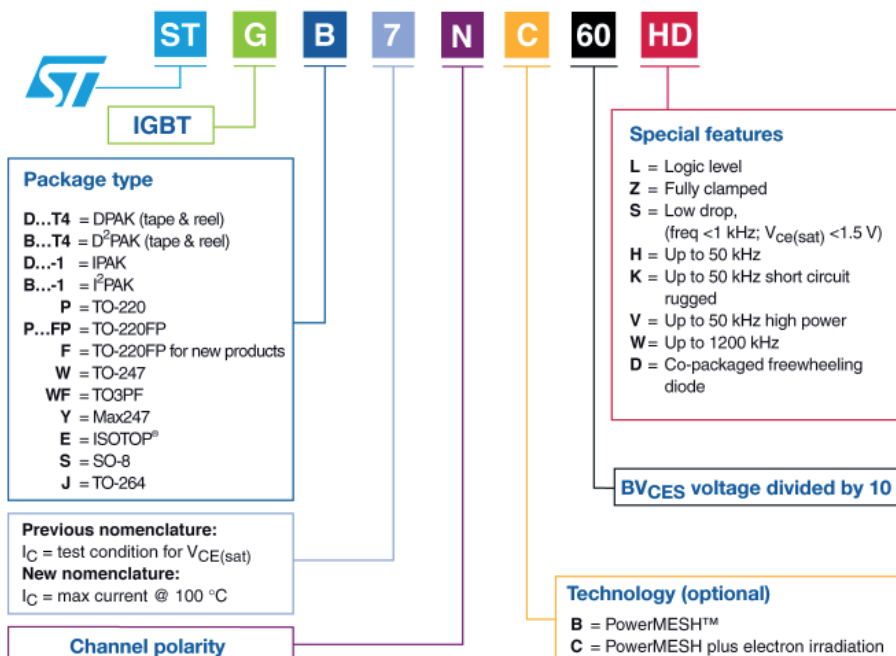
## IGBT series vs. applications

| Sales Type                               | Lifetime control   | Purpose / Application   |
|--|--------------------|---|
| STGxxxNxxLZ                              | No                 | Electronic ignition   |
| STGxxxNBxxS (also with diode D)          | No                 | Dimmer, HID, lighting, UPS  |
| STGxxxNCxxxH / K / S (also with diode D) | Yes (new advanced) | Motor control and/or home appliances, TV deflection, induction heating                    |
| STGxxxNCxxV (also with diode D)          | Yes (new advanced) | Motor control, induction heating  |
| STGxxxNCxxW (also with diode D)          | Yes (new advanced) | HF welding, PFC, UPS, power supplies, lighting, diesel piezo-injection, induction heating |
| STGxLxxNCxxD                             | Yes (new advanced) | PDP   |
| STGx100N30 (also with diode D)           | Yes (new advanced) | Medical   |
| STGx100N160S                             | No                 | Medical   |

Suffix "K" stands for short-circuit rated IGBT

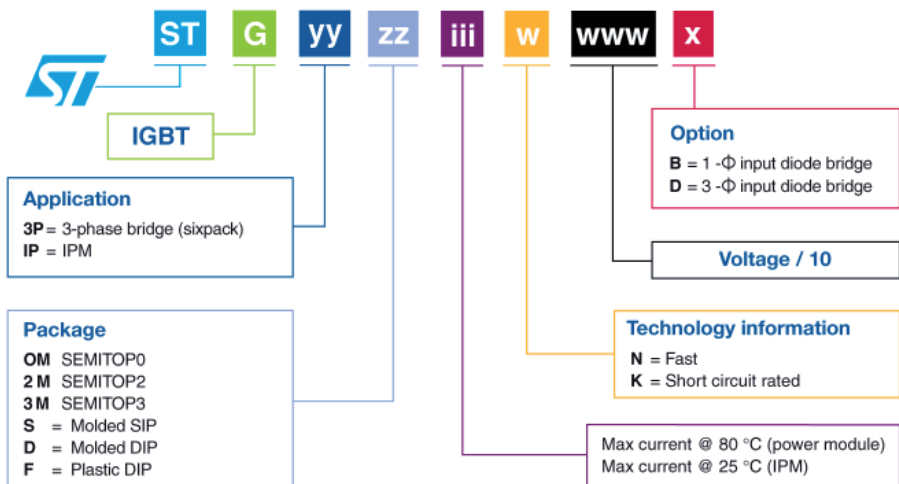
Suffix "D" stands for co-packaged freewheeling diode

## IGBT ordering information



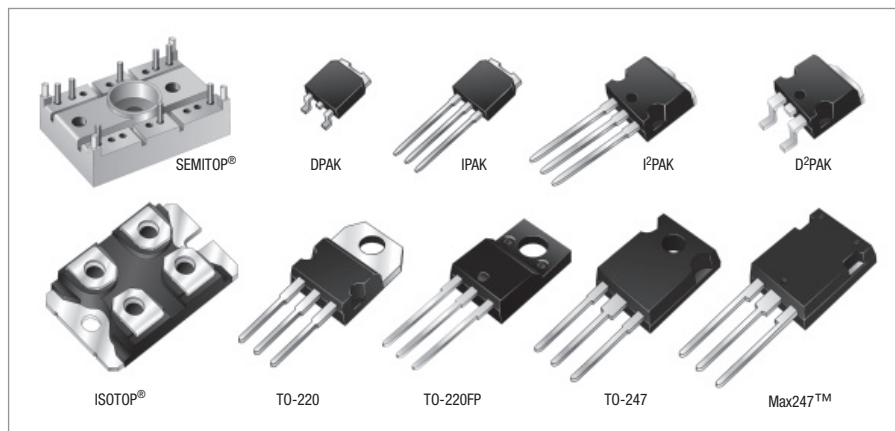
\* Device under development

## IGBT module ordering information



The option digit is present only for IGBT power modules, not IGBT intelligent power modules (IPM)

## Package options



Package images are not to scale



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