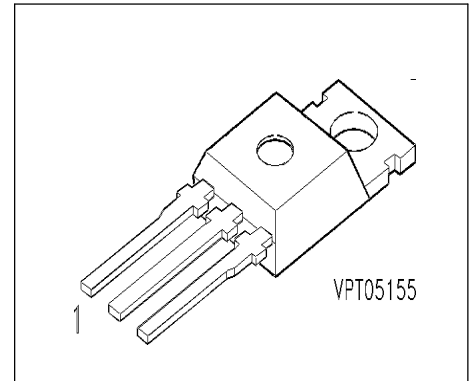


IGBT

- Low forward voltage drop
- High switching speed
- Low tail current
- Latch-up free
- Avalanche rated



| Pin 1 | Pin 2 | Pin 3 |
|-------|-------|-------|
| G | C | E |

| Type | V_{CE} | I_C | Package | Ordering Code |
|----------|----------|-------|-----------|------------------|
| SGP02N60 | 600V | 2A | TO-220 AB | Q67040-A |

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|--|-------------|----------|------|
| Collector-emitter voltage | V_{CE} | 600 | V |
| Collector-gate voltage | V_{CGR} | 600 | |
| $R_{GE} = 20 \text{ k}\Omega$ | | | |
| Gate-emitter voltage | V_{GE} | ± 20 | |
| DC collector current | I_C | | A |
| $T_C = 25 \text{ }^\circ\text{C}$ | | 5.5 | |
| $T_C = 100 \text{ }^\circ\text{C}$ | | 2 | |
| Pulsed collector current, $t_p = 1 \text{ ms}$ | I_{Cpuls} | | |
| $T_C = 25 \text{ }^\circ\text{C}$ | | 11 | |
| $T_C = 100 \text{ }^\circ\text{C}$ | | 4 | |
| Avalanche energy, single pulse | E_{AS} | | mJ |
| $I_C = 2 \text{ A}$, $V_{CC} = 50 \text{ V}$, $R_{GE} = 25 \text{ }\Omega$ | | 3 | |
| $L = 1.5 \text{ mH}$, $T_j = 25 \text{ }^\circ\text{C}$ | | | |
| Power dissipation | P_{tot} | | W |
| $T_C = 25 \text{ }^\circ\text{C}$ | | 30 | |

Preliminary data

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|-------------------------------------|-----------|---------------|------|
| Chip or operating temperature | T_j | -55 ... + 150 | °C |
| Storage temperature | T_{stg} | -55 ... + 150 | |
| IEC climatic category, DIN IEC 68-1 | - | 55 / 150 / 56 | - |

Thermal Resistance

| | | | |
|-------------------------------------|------------|-----|-----|
| Thermal resistance, junction - case | R_{thJC} | 4.2 | K/W |
|-------------------------------------|------------|-----|-----|

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

Static Characteristics

| | | | | | |
|--|---------------|----------|----------|------------|----|
| Collector-emitter breakdown voltage $V_{GE} = 0\text{ V}$, $I_C = 0.5\text{ mA}$, $T_j = -55\text{ °C}$ | $V_{(BR)CES}$ | 600 | - | - | V |
| Gate threshold voltage $V_{GE} = V_{CE}$, $I_C = 0.15\text{ mA}$, $T_j = 25\text{ °C}$ $V_{GE} = V_{CE}$, $I_C = 0.15\text{ mA}$, $T_j = 150\text{ °C}$ | $V_{GE(th)}$ | 3 2 | 4 3 | 5 - | |
| Collector-emitter saturation voltage $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$, $T_j = 25\text{ °C}$ $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$, $T_j = 150\text{ °C}$ | $V_{CE(sat)}$ | 1.6 - | 2 2.3 | 2.5 2.8 | |
| Zero gate voltage collector current $V_{CE} = 600\text{ V}$, $V_{GE} = 0\text{ V}$, $T_j = 25\text{ °C}$ $V_{CE} = 600\text{ V}$, $V_{GE} = 0\text{ V}$, $T_j = 150\text{ °C}$ | I_{CES} | - - | - - | 20 250 | μA |
| Gate-emitter leakage current $V_{GE} = 25\text{ V}$, $V_{CE} = 0\text{ V}$ | I_{GES} | - | - | 100 | nA |

Preliminary data

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

AC Characteristics

| | | | | | |
|---|-----------|------|-----|-----|----|
| Transconductance $V_{CE} = 20\text{ V}, I_C = 2\text{ A}$ | g_{fs} | 0.45 | 1.6 | - | S |
| Input capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$ | C_{iss} | - | 150 | 190 | pF |
| Output capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$ | C_{oss} | - | 20 | 25 | |
| Reverse transfer capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$ | C_{rss} | - | 10 | 13 | |

Preliminary data

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

Switching Characteristics, Inductive Load at $T_j = 150\text{ °C}$

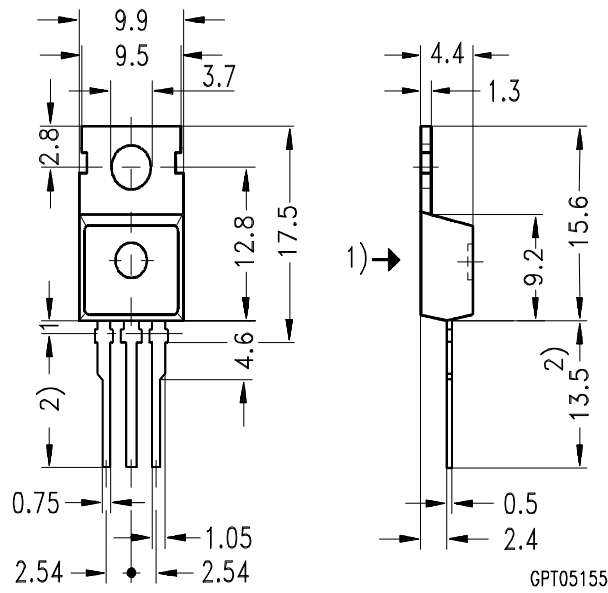
| | | | | | |
|---|--------------|---|------|-------|----|
| Turn-on delay time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ $R_{Gon} = 118\ \Omega$ | $t_{d(on)}$ | - | 20 | 30 | ns |
| Rise time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ $R_{Gon} = 118\ \Omega$ | t_r | - | 15 | 23 | |
| Turn-off delay time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ $R_{Goff} = 118\ \Omega$ | $t_{d(off)}$ | - | 280 | 420 | |
| Fall time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ $R_{Goff} = 118\ \Omega$ | t_f | - | 110 | 165 | |
| Total turn-on loss energy * $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ $R_{Gon} = 118\ \Omega$, $T_j = 150\text{ °C}$ | E_{on} | - | 0.12 | 0.16 | mJ |
| Total turn-off loss energy $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ $R_{Goff} = 118\ \Omega$, $T_j = 150\text{ °C}$ | E_{off} | - | 0.05 | 0.065 | |
| Total Gate Charge $V_{CC} = 480\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 2\text{ A}$ | $Q_{G(on)}$ | - | 14 | 21 | nC |

* includes the reverse recovery losses caused by the FWD of the BUP410D

Package Outlines

Dimensions in mm

Weight:



- 1) punch direction, burr max. 0.04
- 2) dip tinning
- 3) max. 14.5 by dip tinning press burr max. 0.05