# 1350V 20A RC Insulated Gate Bipolar Transistor

## Electrical Features:

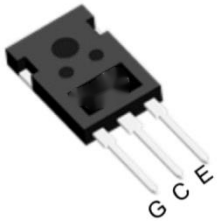
- Low Saturation Voltage $V_{CEsat}$
- Low Switching Losses
- Maximum junction temperature $T_{VJMAX}$=175℃
- RoHS compliant
- Halogen-free

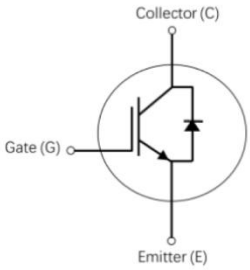
## Applications:

- Inductive Cooking
- Inverterized Microwave Ovens
- Resonant Converters
- Soft Switching Applications

## Key Performance Parameters:

| Parameter | Value | Unit |
|---|---|---|
| $V_{CE}$ | 1350 | V |
| $V_{CEsat, T_{vj}}$ = 25 °C | 1.66 | V |
| $I_C$ | 20 | A |




## Ordering Information:

| Ordering Code | Package Type | Marking Code | Form | Packing |
|---|---|---|---|---|
| SYD3N020WRH | TO-247-3L | SYD3N020WRH | Tube | See the detail package information |

## Maximum Rated values

| Parameter | Symbol | Note or test condition | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| Junction temperature | $T_{vj}$ | | -55 | | +175 | °C |
| Storage temperature | $T_{stg}$ | | -55 | | +175 | °C |
| Temperature under switching conditions | $T_{vj\ OP}$ | | -40 | | +150 | °C |
| IGBT Thermal resistance, junction - case | $R_{th(j-c)}$ | | | 0.52 | | °C/W |
| Thermal resistance, junction-ambient | $R_{th(j-a)}$ | | | 40 | | K/W |

## RC IGBT

## Maximum Rated values

| Parameter | Symbol | Note or test condition | Value | Unit |
|---|---|---|---|---|
| Collector-emitter voltage | $V_{CE}$ | $T_{vj}$ ≥ 25 °C | 1350 | V |
| DC collector current | $I_C$ | Tc = 25 °C | 40 | A |
| | | Tc = 100 °C | 20 | A |
| Pulsed collector current | $I_{Cplus}$ | | 60 | A |
| Maximum Diode forward current | $I_F$ | Tc = 25 °C | 40 | A |
| | | Tc = 100 °C | 20 | A |
| Diode pulsed current | $I_{Fplus}$ | | 60 | A |
| Gate-emitter voltage | $V_{GE}$ | $T_{vj}$ = 25 °C | ±20 | V |

## Characteristic values

| Parameter | Symbol | Note or test condition | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| Collector emitter voltage | $V_{(BR)CES}$ | $I_C$ = 0.5 mA, $V_{GE}$ = 0 V, $T_{vj}$ = 25 °C | 1350 | | | V |
| Collector-emitter saturation voltage | $V_{CEsat}$ | $I_C$= 20 A, $V_{GE}$ = 15 V, $T_{vj}$ = 25 °C | | 1.66 | | V |
| | | $I_C$= 20 A, $V_{GE}$ = 15 V, $T_{vj}$ = 175 °C | | 2.14 | | V |
| Diode forward voltage | $V_F$ | $I_C$ = 20 A, $V_{GE}$ = 0 V, $T_{vj}$ = 25 °C | | 1.86 | | V |
| | | $I_C$ = 20 A, $V_{GE}$ = 0 V, $T_{vj}$ = 175 °C | | 2.11 | | V |
| Gate-emitter threshold voltage | $V_{GEth}$ | $I_C$= 0.5 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25 °C | | 6.1 | | V |
| Zero gate voltage collector current | $I_{CES}$ | $V_{CE}$ = 1350 V, $V_{GE}$ = 0 V, $T_{vj}$ = 25 °C | | | 100 | uA |
| Gate-emitter leakage current | $I_{GES}$ | $V_{CE}$ = 0 V, $V_{GE}$ = +20 V | | | 200 | nA |
| | | $V_{CE}$ = 0 V, $V_{GE}$ = -20 V | -200 | | | nA |
| Input capacitance | $C_{ies}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1MHz | | 2024 | | pF |
| Output capacitance | $C_{oes}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1MHz | | 29 | | pF |
| Reverse transfer capacitance | $C_{res}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1MHz | | 9 | | pF |
| Gate charge | $Q_G$ | $I_C$ = 20 A, $V_{GE}$ = 15 V, $V_{CE}$ = 1080 V | | 71 | | nC |
| Turn-off delay time | $t_{doff}$ | $V_{CE}$ = 600 V, $V_{GE}$ = 15 V, $R_{Gon}$ = 10 Ω, $R_{Goff}$ = 10 Ω, $T_{vj}$ = 25 °C, $I_C$ = 20 A | | 75 | | ns |
| Fall time | $t_f$ | | | 152 | | ns |
| Turn-off energy | $E_{off}$ | | | 0.71 | | mJ |
| Turn-off delay time | $t_{doff}$ | $V_{CE}$ = 600 V, $V_{GE}$ = 15 V, $R_{Gon}$ = 10 Ω, $R_{Goff}$ = 10 Ω, $T_{vj}$ = 175 °C, $I_C$ = 20 A | | 90 | | ns |
| Fall time | $t_f$ | | | 168 | | ns |
| Turn-off energy | $E_{off}$ | | | 0.96 | | mJ |