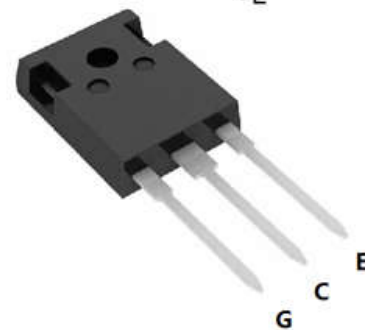
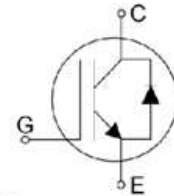


FEATURES

- High breakdown voltage to 1200V for improved reliability
- Trench-Stop Technology offering :
 - High speed switching
 - High ruggedness, temperature stable
 - Short circuit withstand time – 8 μ s
 - Low V_{CEsat}
 - Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Enhanced avalanche capability

| | | |
|-----------------------|------|---|
| V_{CE} | 1200 | V |
| I_C | 50 | A |
| $V_{CE(SAT)} I_C=50A$ | 1.65 | V |



APPLICATION

- Uninterruptible Power Supplies
- Solar inverter
- Welding
- PFC applications

| | | |
|-------------|---------|-----------|
| Product | Package | Packaging |
| YGW50N120FP | TO247 | Tube |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|-------------|------------|------------|
| Collector-Emitter Breakdown Voltage | V_{CE} | 1200 | V |
| DC collector current, limited by T_{jmax} $T_C = 25^\circ C$ $T_C = 100^\circ C$ | I_C | 100 50 | A |
| Diode Forward current, limited by T_{jmax} $T_C = 25^\circ C$ $T_C = 100^\circ C$ | I_F | 100 50 | A |
| Continuous Gate-emitter voltage | V_{GE} | ± 20 | V |
| Transient Gate-emitter voltage | V_{GE} | ± 30 | V |
| Turn off safe operating area $V_{CE} = 1200V$, $T_j = 150^\circ C$ | - | 150 | A |
| Pulsed Collector Current, $V_{GE} = 15V$, t_p limited by T_{jmax} | I_{CM} | 150 | A |
| Diode Pulsed Current, t_p limited by T_{jmax} | I_{Fpuls} | 150 | A |
| Short Circuit Withstand Time, $V_{GE} = 15V$, $V_{CE} = 600V$ | T_{sc} | 8 | μs |
| Power dissipation, $T_j = 25^\circ C$ | P_{tot} | 350 | W |
| Operating junction temperature | T_j | -40...+150 | $^\circ C$ |
| Storage temperature | T_s | -55...+150 | $^\circ C$ |
| Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s | - | 260 | $^\circ C$ |

Thermal Resistance

| Parameter | Symbol | Max. Value | Unit |
|--|----------|------------|------|
| IGBT thermal resistance, junction - case | $R(j-c)$ | 0.36 | K/W |
| Diode thermal resistance, junction - case | $R(j-c)$ | 0.7 | K/W |
| Thermal resistance, junction - ambient | $R(j-a)$ | 40 | K/W |

Electrical Characteristics of the IGBT $T_j = 25$ unless otherwise specified

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|--|--------|--------------|-------------|---------|
| Static | | | | | | |
| Collector-Emitter breakdown voltage | BV_{CES} | $V_{GE}=0V, I_C=250\mu A$ | 1200 | - | - | V |
| Gate threshold voltage | $V_{GE(th)}$ | $V_{GE}=V_{CE}, I_C=250\mu A$ | 4.8 | 5.5 | 6.2 | V |
| Collector-Emitter Saturation voltage | $V_{CE(sat)}$ | $V_{GE}=15V, I_C=50A$ $T_j = 25^\circ C$ $T_j = 150^\circ C$ | - - | 1.65 2.00 | 2.05 - | V |
| Zero gate voltage collector current | I_{CES} | $V_{CE} = 1200V, V_{GE} = 0V$ $T_j = 25^\circ C$ $T_j = 150^\circ C$ | - - | - - | 250 2500 | μA |
| Gate-emitter leakage current | I_{GES} | $V_{CE} = 0V, V_{GE} = \pm 20V$ | - | - | 200 | nA |
| Transconductance | g_{fs} | $V_{CE}=20V, I_C=50A$ | - | 40 | - | S |

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---------------------------------|-------------|--|------|------|------|------|
| Dynamic | | | | | | |
| Input capacitance | C_{ies} | $V_{CE} = 25V, V_{GE} = 0V,$ $f = 1MHz$ | - | 4600 | - | pF |
| Output capacitance | C_{oes} | | - | 210 | - | |
| Reverse transfer capacitance | C_{res} | | - | 25 | - | |
| Gate charge | Q_G | $V_{CC} = 960V, I_C = 50A,$ $V_{GE} = 15V$ | - | 125 | - | nC |
| Short circuit collector current | $I_{C\ SC}$ | $V_{GE}=15V, t_{SC} = 8\mu s$ $V_{CC}=600V,$ $T_{j\ start}=25^\circ C$ | - | 490 | - | A |

Switching Characteristic, Inductive Load

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|--------|------------|------|------|------|------|
| Dynamic , at $T_j = 25^\circ \text{C}$ | | | | | | |

Turn-on delay time

Fig. 1 Output characteristics



Fig. 2 Saturation voltage characteristics

Fig. 3 Switching times vs. gate resistor

Fig. 4 Switching times vs. collector current

Fig. 5 Switching loss vs. gate resistor



Fig. 6 Switching loss vs. collector current

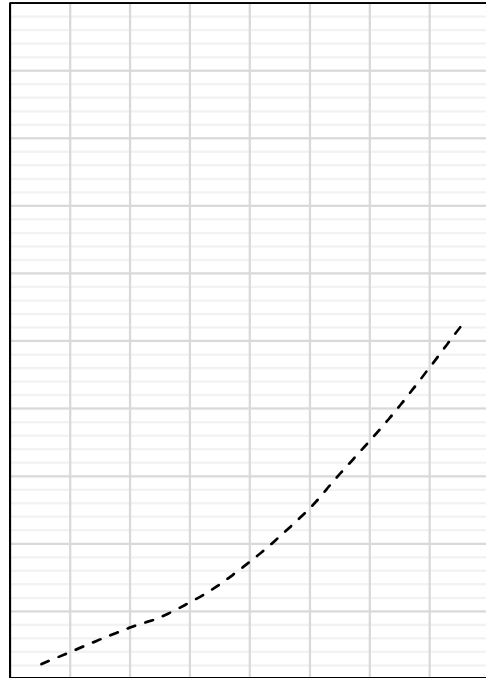


Fig. 7 Gate charge characteristics

Fig. 8 Capacitance characteristics

Fig. 9 IGBT Transient Thermal Impedance

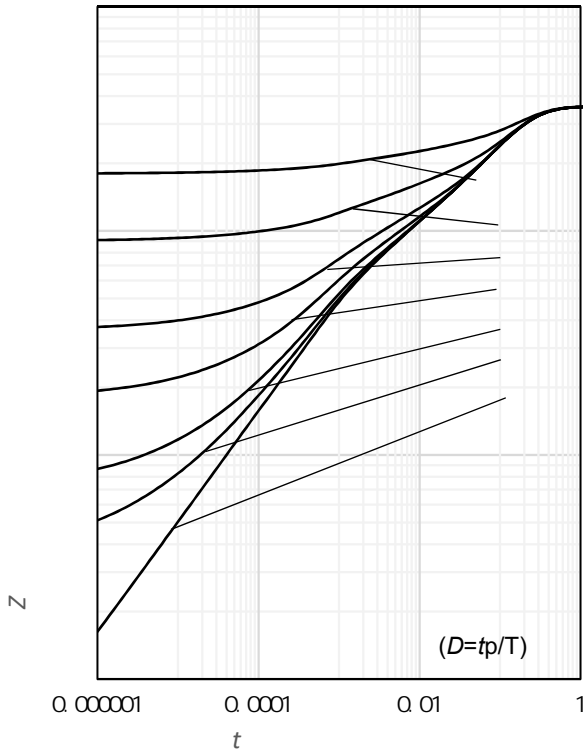


Fig.11 FBSOA characteristics

Fig. 10 FRD Transient Thermal Impedance

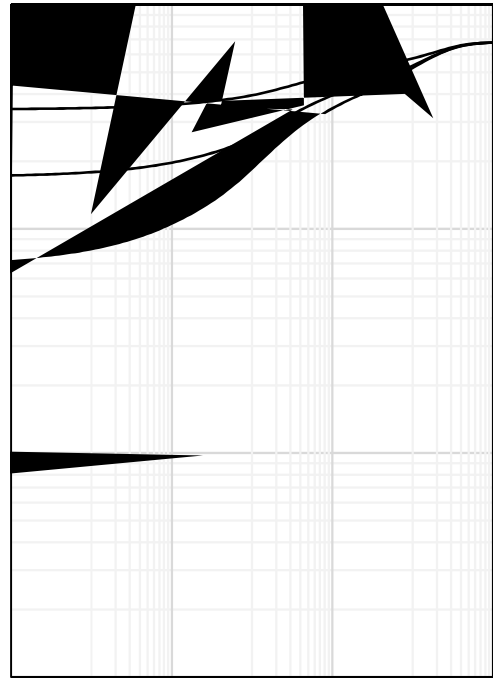
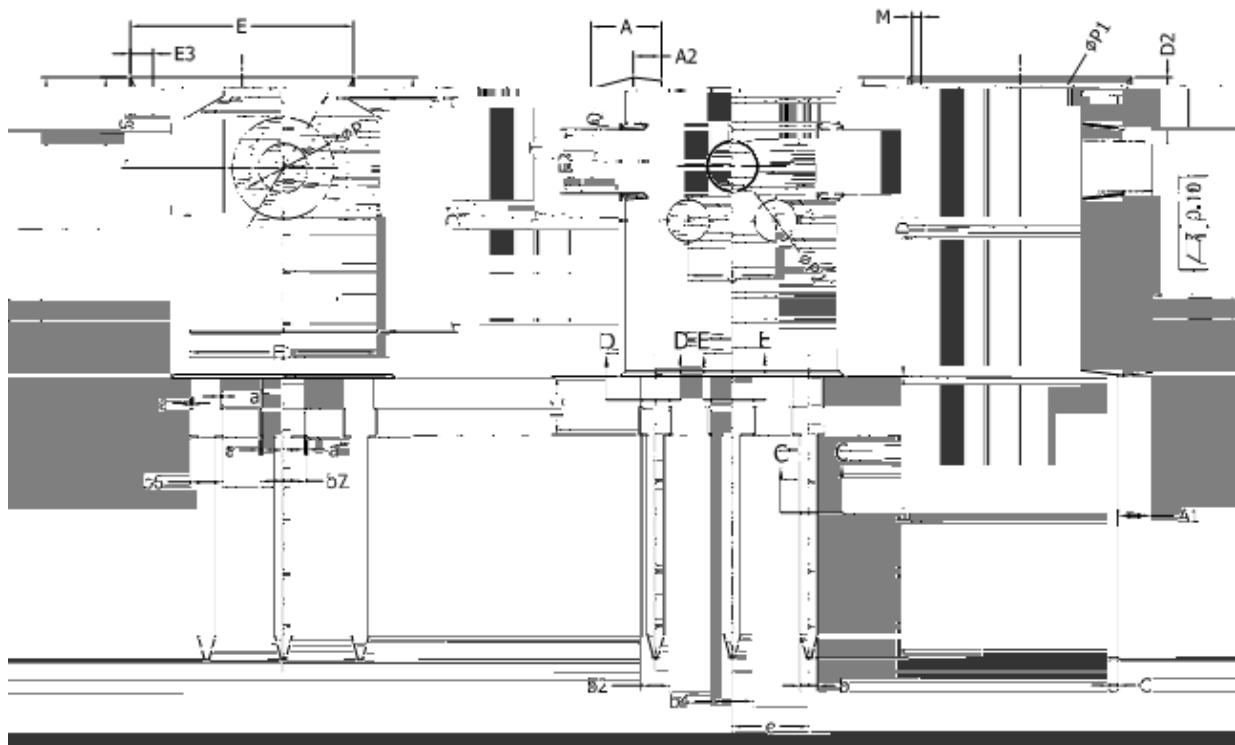


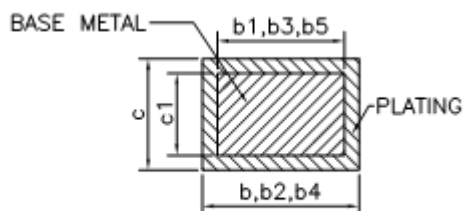
Fig.12 Typical transfer characteristic

TO247 package information



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|-------|-------|-------|
| A | 4.90 | 5.00 | 5.10 |
| A1 | 2.31 | 2.41 | 2.51 |
| A2 | 1.90 | 2.00 | 2.10 |
| a | 0 | -- | 0.15 |
| a' | 0 | -- | 0.15 |
| b | 1.16 | -- | 1.26 |
| b1 | 1.15 | 1.2 | 1.22 |
| b2 | 1.96 | -- | 2.06 |
| b3 | 1.95 | 2.00 | 2.02 |
| b4 | 2.96 | -- | 3.06 |
| b5 | 2.96 | 3.00 | 3.02 |
| b6 | 2.00 | -- | 2.25 |
| b7 | 3.00 | -- | 3.25 |
| c | 0.59 | -- | 0.66 |
| c1 | 0.58 | 0.60 | 0.62 |
| D | 20.90 | 21.00 | 21.10 |
| D1 | 16.25 | 16.55 | 16.85 |
| D2 | 1.05 | 1.17 | 1.35 |
| E | 15.70 | 15.80 | 15.90 |
| E1 | 13.10 | 13.30 | 13.50 |
| E2 | 4.40 | 4.50 | 4.60 |
| E3 | 1.50 | 1.60 | 1.70 |
| e | 5.336 | 5.436 | 5.53 |
| L | 19.80 | 19.92 | 20.10 |
| L1 | 4.10 | -- | 4.30 |
| M | 0.35 | -- | 0.95 |
| P | 3.40 | 3.50 | 3.60 |
| P1 | 7.00 | -- | 7.40 |
| P2 | 2.40 | 2.50 | 2.60 |
| Q | 5.60 | -- | 6.00 |
| S | 6.05 | 6.15 | 6.25 |
| T | 9.80 | -- | 10.20 |
| U | 6.00 | -- | 6.40 |



SECTION C-C,D-D & E-E