

Prospective Data
Insulated Gate Bi-Polar Transistor
Type T2250AB25E

Absolute Maximum Ratings

| | VOLTAGE RATINGS | MAXIMUM LIMITS | UNITS |
|----------------|--|----------------|-------|
| V_{CES} | Collector – emitter voltage | 2500 | V |
| $V_{DC\ link}$ | Permanent DC voltage for 100 FIT failure rate. | 1250 | V |
| V_{GES} | Peak gate – emitter voltage | ± 20 | V |

| | RATINGS | MAXIMUM LIMITS | UNITS |
|-------------|--|----------------|-------|
| $I_{C(DC)}$ | DC collector current, IGBT | 2250 | A |
| I_{CRM} | Repetitive peak collector current, $t_p=1ms$, IGBT | 4500 | A |
| I_{ECO} | Maximum reverse emitter current, $t_p=100\mu s$, (note 2 & 3) | 2250 | A |
| P_{MAX} | Maximum power dissipation, IGBT (Note 2) | 11.8 | KW |
| T_{jop} | Operating temperature range. | -40 to +125 | °C |
| T_{stg} | Storage temperature range. | -40 to +125 | °C |

Notes: -

- 1) Unless otherwise indicated $T_j = 125^\circ C$.
- 2) $T_{sink} = 25^\circ C$, double side cooled.
- 3) The use of an anti-parallel diode is recommended.

Characteristics

IGBT Characteristics

| | PARAMETER | MIN | TYP | MAX | TEST CONDITIONS | UNITS |
|----------------------|--|-----|------|------|---|-------|
| V _{CE(sat)} | Collector – emitter saturation voltage | - | 2.05 | 2.35 | I _C = 2250A, V _{GE} = 15V, T _J = 25°C | V |
| | | - | 2.90 | 3.20 | I _C = 2250A, V _{GE} = 15V | V |
| V _{T0} | Threshold voltage | - | - | 1.29 | Current range: 750 – 2250A | V |
| r _T | Slope resistance | - | - | 0.85 | | mΩ |
| V _{GE(TH)} | Gate threshold voltage | - | 5.8 | 6.3 | V _{CE} = V _{GE} , I _C = 200mA | V |
| I _{CES} | Collector – emitter cut-off current | - | 20 | 60 | V _{CE} = V _{CES} , V _{GE} = 0V | mA |
| I _{GES} | Gate leakage current | - | 10 | ±30 | V _{GE} = ±20V | μA |
| C _{ies} | Input capacitance | - | 300 | - | V _{CE} = 25V, V _{GE} = 0V, f = 1MHz | nF |
| t _{d(on)} | Turn-on delay time | - | 1.2 | - | I _C = 2250A, V _{CE} = 1250V, di/dt = 4000A/μs | μs |
| t _{r(V)} | Rise time | - | 2.7 | - | | μs |
| Q _{g(on)} | Turn-on gate charge | - | 17 | - | V _{GE} = ±15V, L _s = 200nH | μC |
| E _{on} | Turn-on energy | - | 5.3 | - | R _{g(ON)} = 1.2Ω, R _{g(OFF)} = 3.3Ω, C _{GE} = 100nF | J |
| t _{d(off)} | Turn-off delay time | - | 1.8 | - | Freewheel diode type E2250VF25C (Note 3) | μs |
| t _{f(I)} | Fall time | - | 8.5 | - | | μs |
| Q _{g(off)} | Turn-off gate charge | - | 16 | - | | μC |
| E _{off} | Turn-off energy | - | 3.7 | - | | J |
| I _{SC} | Short circuit current | - | 6300 | - | V _{GE} = +15V, V _{CC} = 1250V, V _{CEmax} ≤ V _{CES} , t _p ≤ 10μs | A |

Thermal Characteristics

| | PARAMETER | MIN | TYP | MAX | TEST CONDITIONS | UNITS |
|-------------------|---|-----|-----|------|-----------------------|-------|
| R _{thJK} | Thermal resistance junction to sink, IGBT | - | - | 8.45 | Double side cooled | K/kW |
| | | - | - | 13.3 | Collector side cooled | K/kW |
| | | - | - | 24.5 | Emitter side cooled | K/kW |
| F | Mounting force | 25 | - | 35 | Note 2 | kN |
| W _t | Weight | - | 1.5 | - | | kg |

Notes:-

- 1) Unless otherwise indicated T_J = 125°C.
- 2) Consult application note 2008AN01 for detailed mounting requirements
- 3) C_{GE} is additional gate – emitter capacitance added to output of gate drive

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

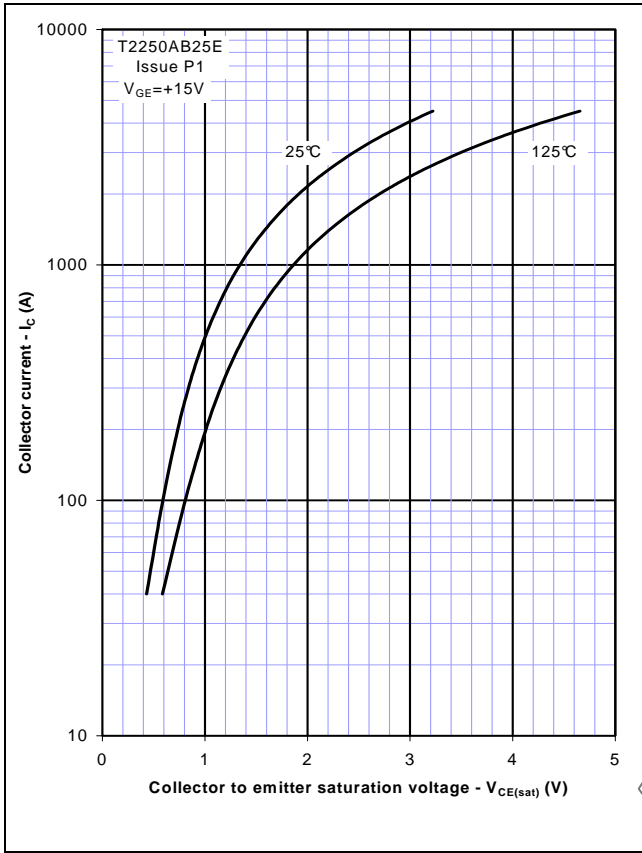


Figure 2 – Typical output characteristic

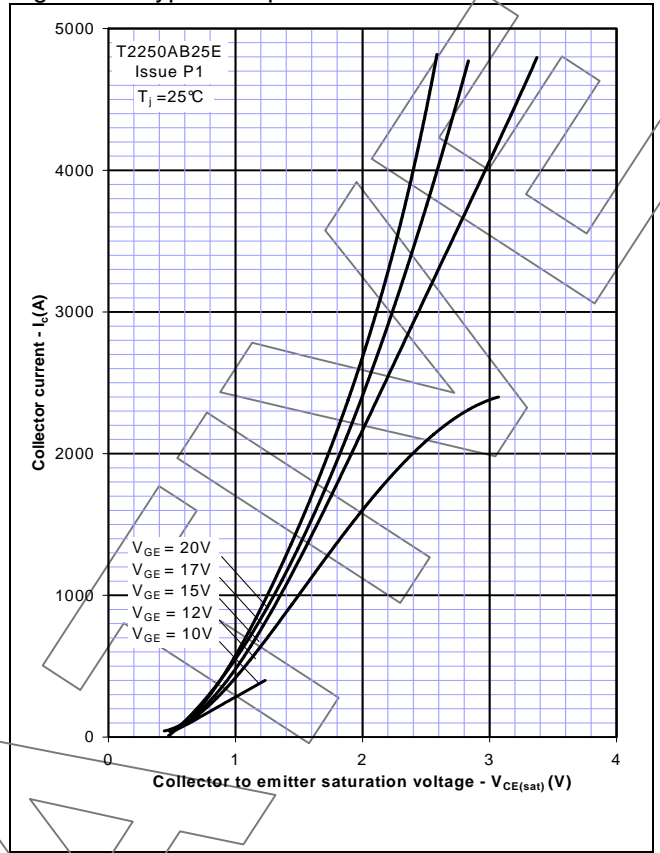


Figure 3 – Typical output characteristic

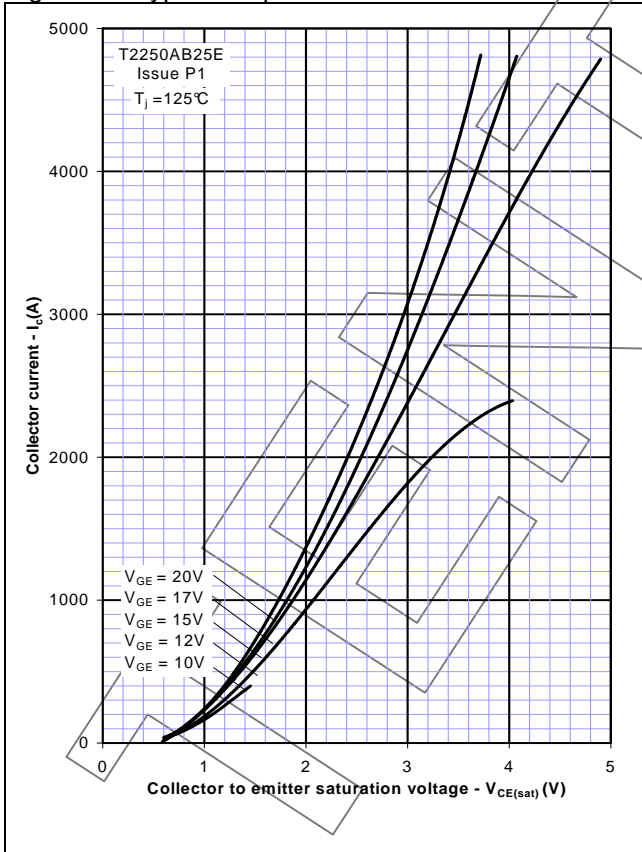


Figure 4 – Typical turn-on delay time vs gate resistance

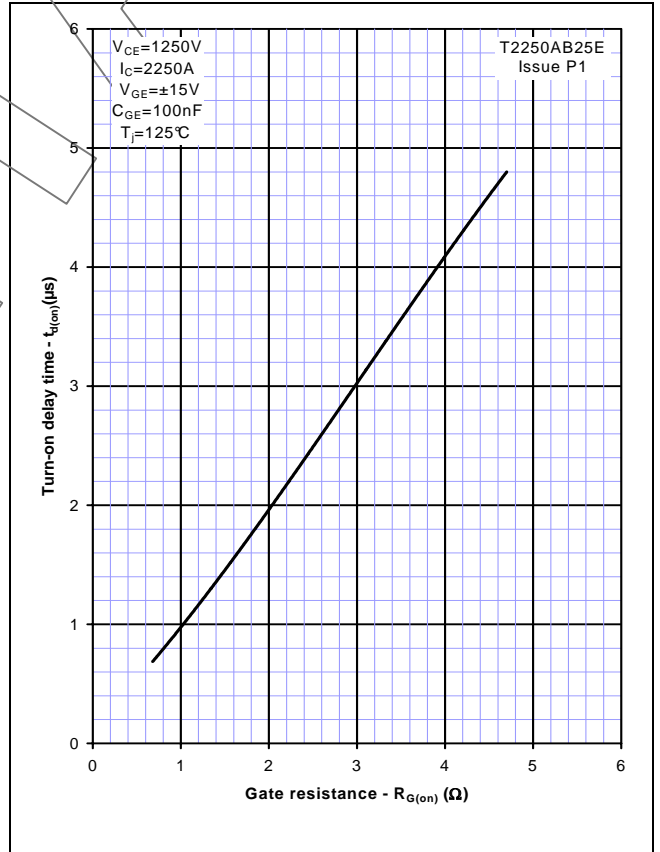


Figure 5 – Typical turn-off delay time vs. gate resistance

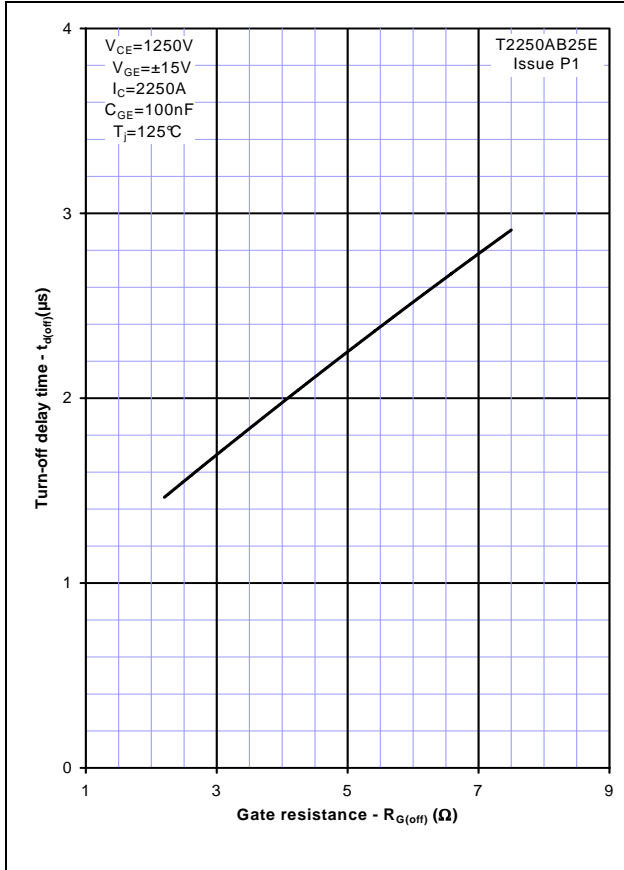


Figure 6 – Typical turn-on energy vs. collector current

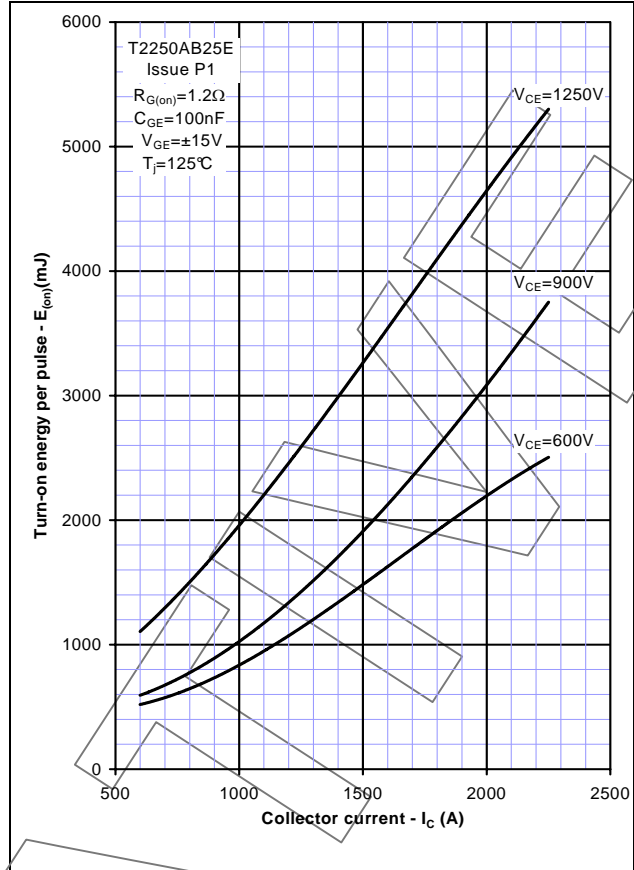


Figure 7 – Typical turn-on energy vs. di/dt

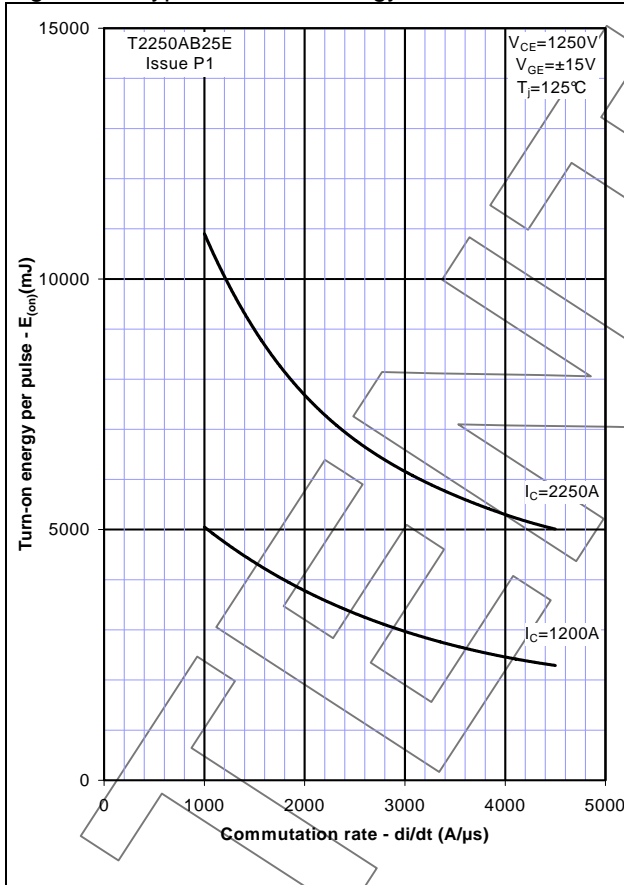


Figure 8 – Typical turn-off energy vs. collector current

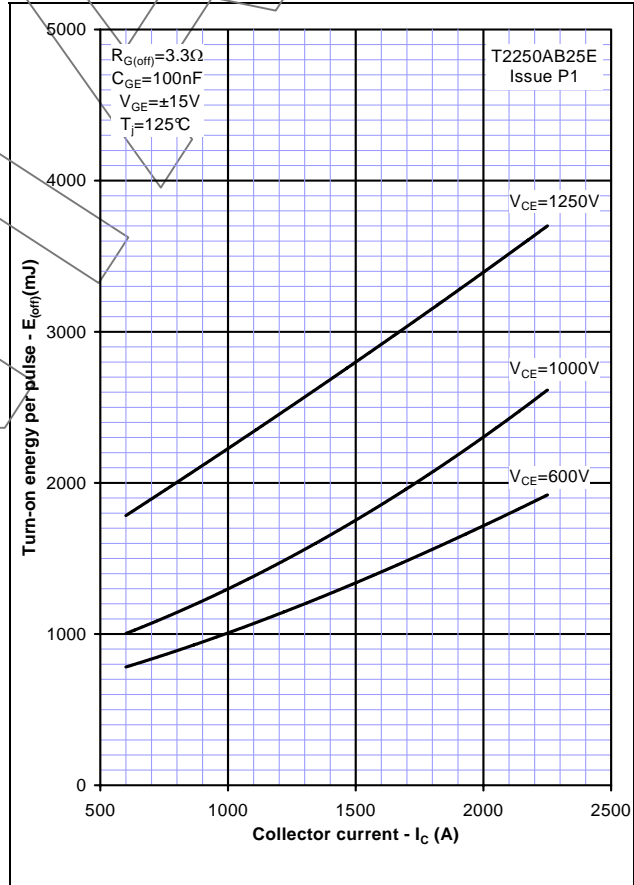


Figure 9 – Turn-off energy vs voltage

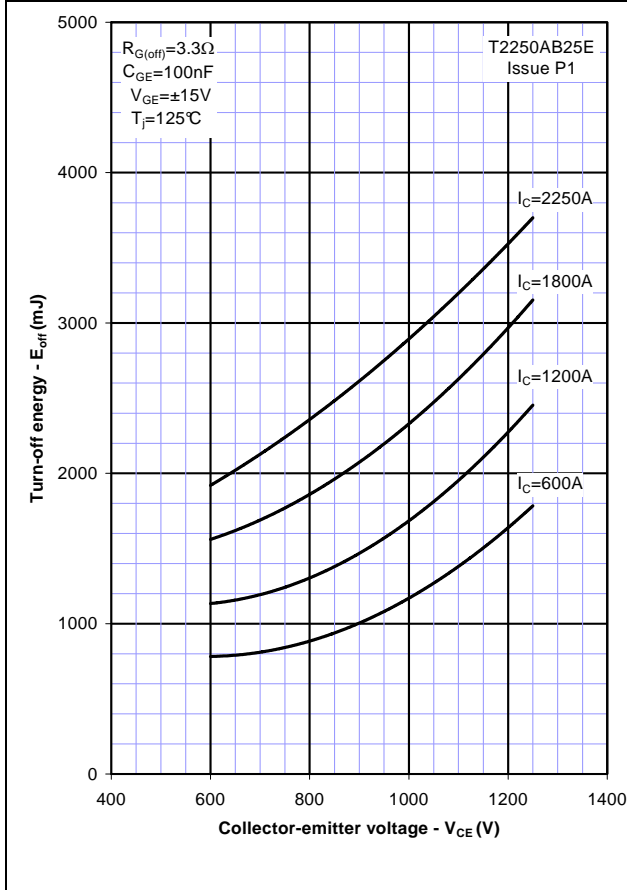


Figure 10 – Safe operating area

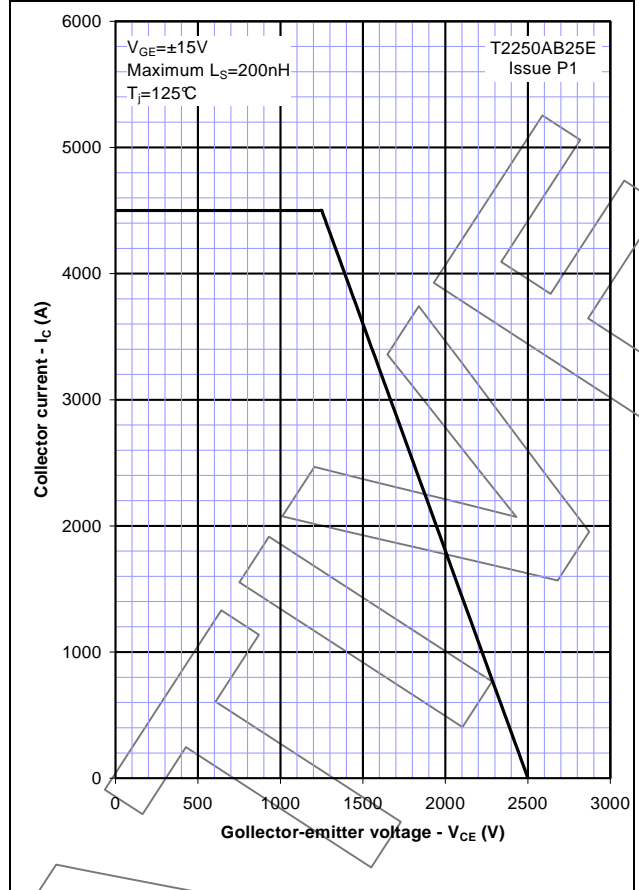
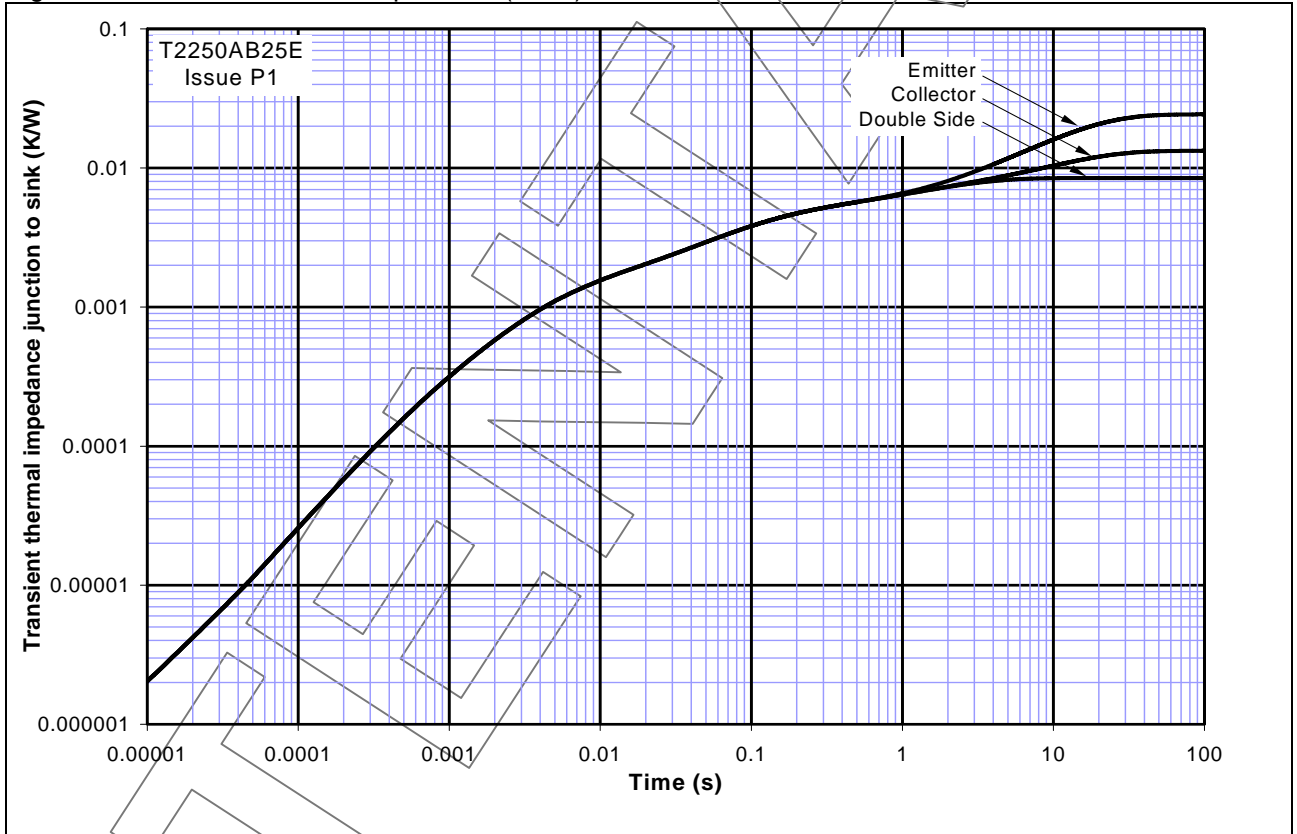
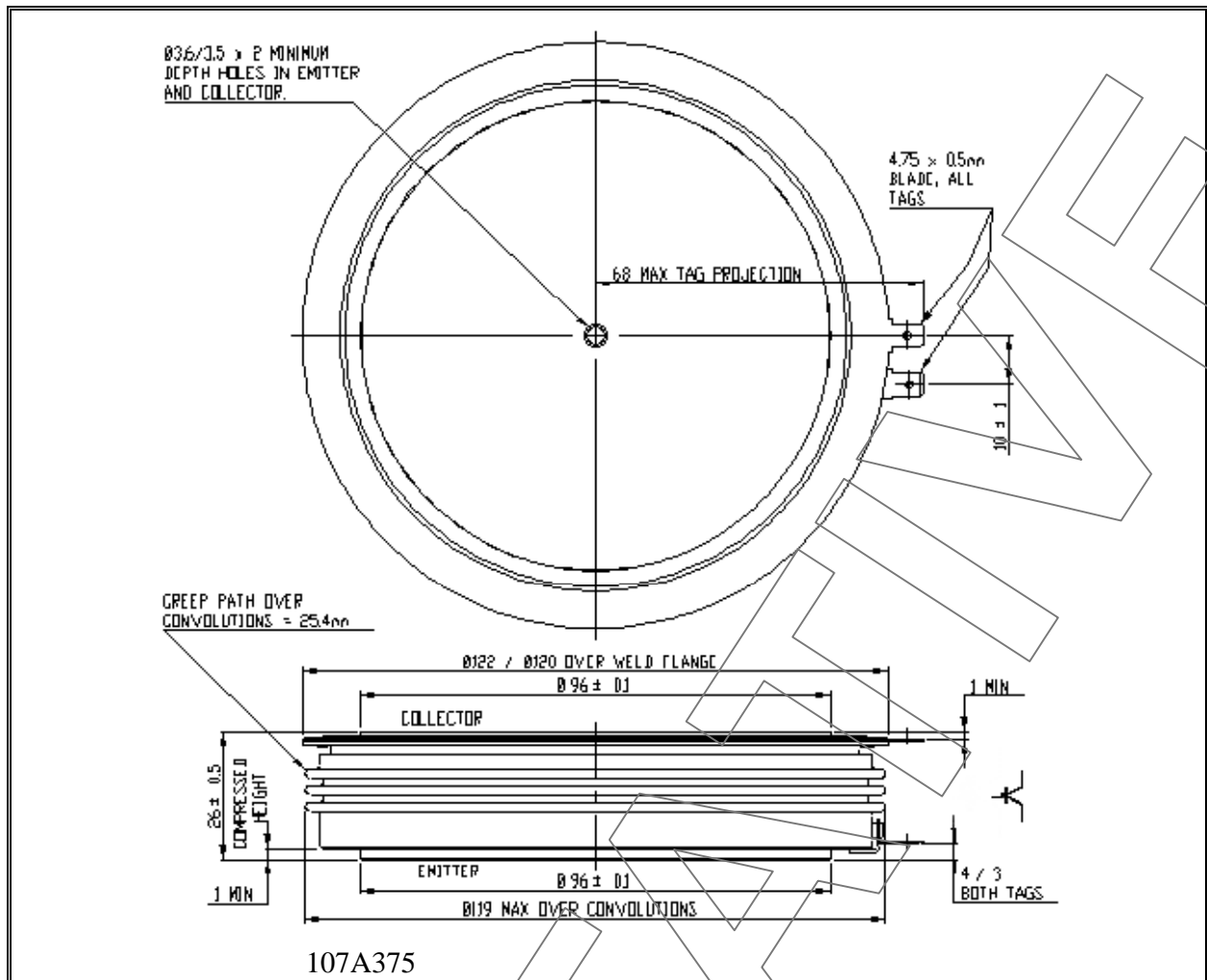


Figure 11 – Transient thermal impedance (IGBT)



Outline Drawing & Ordering Information



| ORDERING INFORMATION | | | |
|---------------------------------------|--------------------|--------------------------------------|-------------------|
| (Please quote 10 digit code as below) | | | |
| T2250 | AB | 25 | E |
| Fixed type Code | Fixed Outline Code | Voltage Grade $V_{CES}/100$ 25 | Fixed format code |

Typical order code: T2250AB25E ($V_{CES} = 2500V$)

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