

Prospective Data
Insulated Gate Bi-Polar Transistor
Type T0500NB25E

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	500	A
I_{CRM}	Repetitive peak collector current, $t_p=1ms$, IGBT	1000	A
I_{ECO}	Maximum reverse emitter current, $t_p=100\mu s$, (note 2 & 3)	500	A
P_{MAX}	Maximum power dissipation, IGBT (Note 2)	2.6	KW
T_{jop}	Operating temperature range.	-40 to +125	$^{\circ}C$
T_{stg}	Storage temperature range.	-40 to +125	$^{\circ}C$

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 = 500A, V _{GE} = 15V, T _j = 25°C	V
		-	2.90	3.20	I _C = 500A, V _{GE} = 15V	V
V _{T0}	Threshold voltage	-	-	1.28	Current range: 167 – 500A	V
r _T	Slope resistance	-	-	3.84		mΩ
V _{GE(TH)}	Gate threshold voltage	-	5.8	6.3	V _{CE} = V _{GE} , I _C = 50mA	V
I _{CES}	Collector – emitter cut-off current	-	7	15	V _{CE} = V _{CES} , V _{GE} = 0V	MA
I _{GES}	Gate leakage current	-	±3	±8	V _{GE} = ±20V	μA
C _{ies}	Input capacitance	-	75	-	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz	NF
t _{d(on)}	Turn-on delay time	-	1.0	-	I _C = 500A, V _{CE} = 1250V, di/dt = 1000A/μs V _{GE} = ±15V, L _s = 200nH R _{g(ON)} = 5.1Ω, R _{g(OFF)} = 12Ω, C _{GE} = 22nF Freewheel diode type E0400YH25C (Note 3)	μs
t _{r(V)}	Rise time	-	2.2	-		μs
Q _{g(on)}	Turn-on gate charge	-	4.5	-		μC
E _{on}	Turn-on energy	-	1.2	-		J
t _{d(off)}	Turn-off delay time	-	1.2	-		μs
t _{f(I)}	Fall time	-	7.8	-		μs
Q _{g(off)}	Turn-off gate charge	-	3.5	-		μC
E _{off}	Turn-off energy	-	0.84	-		J
I _{SC}	Short circuit current	-	1350	-		V _{GE} = +15V, V _{CC} = 1250V, V _{CEmax} ≤ V _{CES} , t _p ≤ 10μs

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R _{thJK}	Thermal resistance junction to sink, IGBT	-	-	38.6	Double side cooled	K/kW
		-	-	60	Collector side cooled	K/kW
		-	-	108	Emitter side cooled	K/kW
F	Mounting force	8	-	12	Note 2	kN
W _t	Weight	-	0.5	-		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

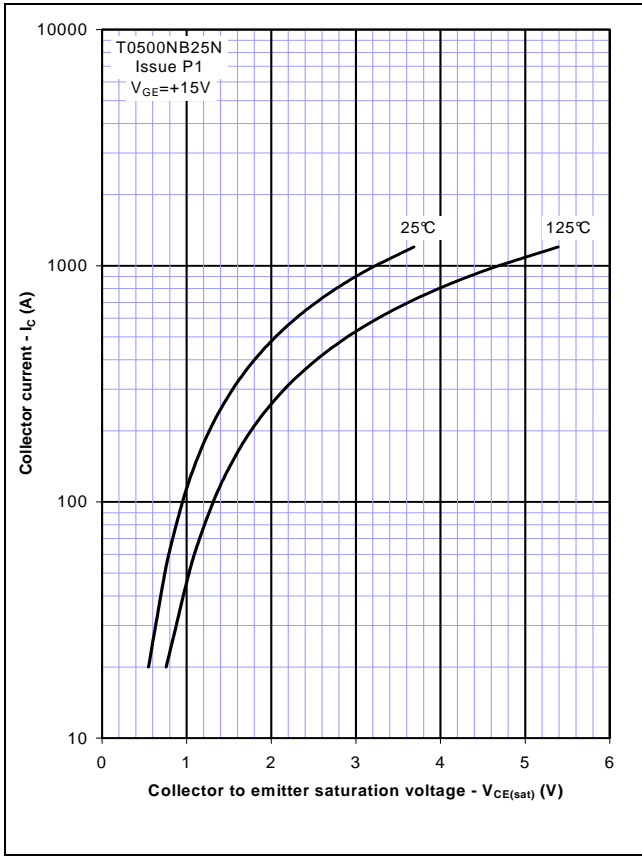


Figure 2 – Typical output characteristic

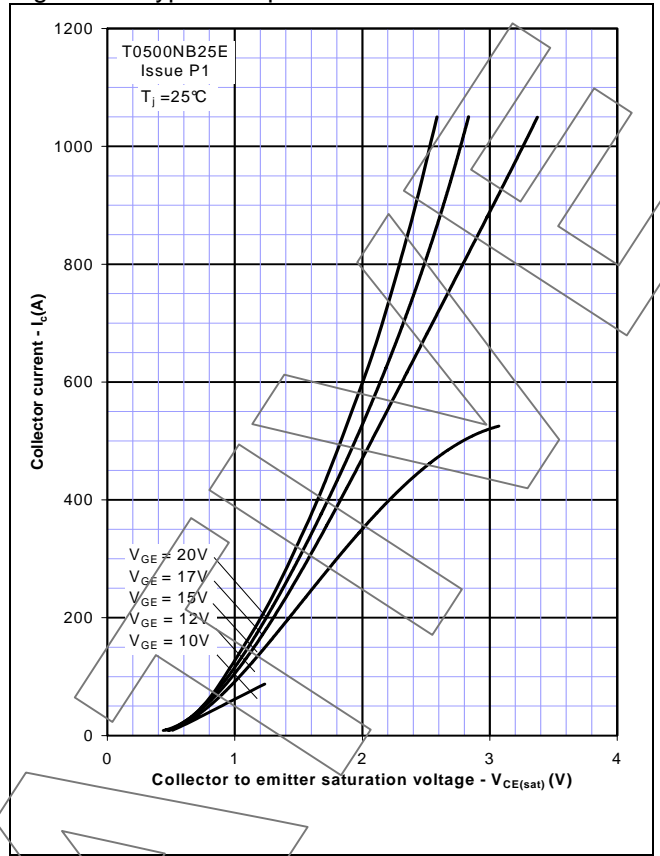


Figure 3 – Typical output characteristic

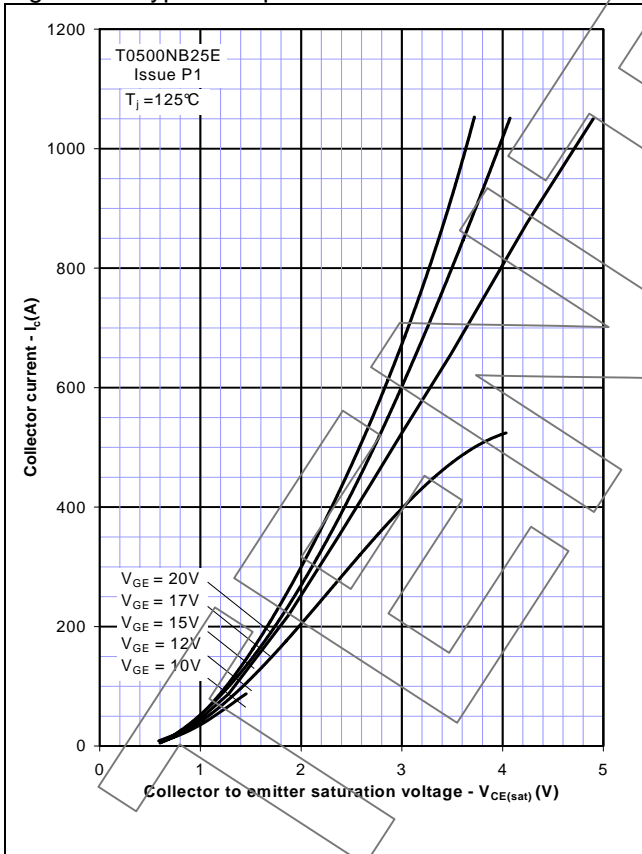


Figure 4 – Typical turn-on delay time vs gate resistance

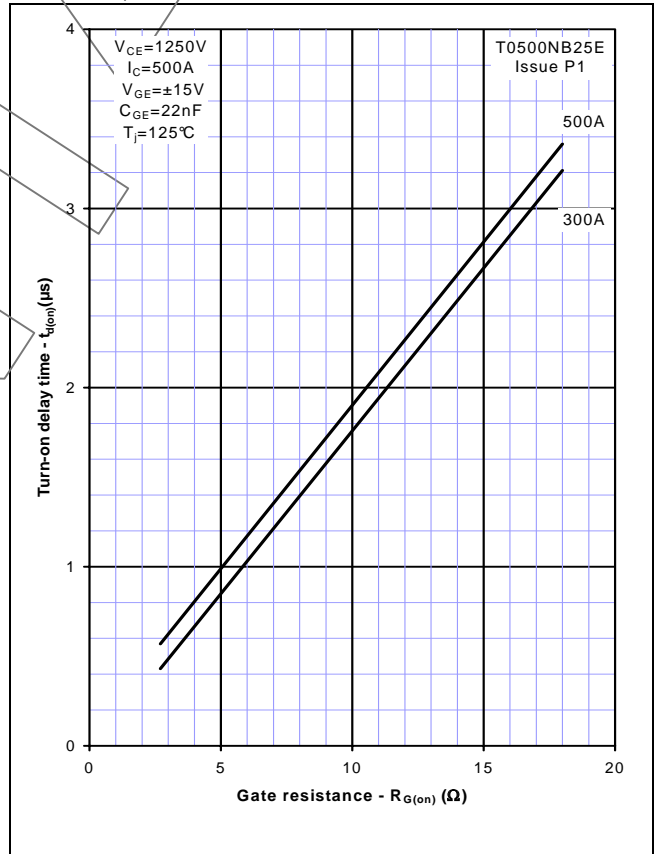


Figure 5 – Typical turn-off delay time vs. gate resistance

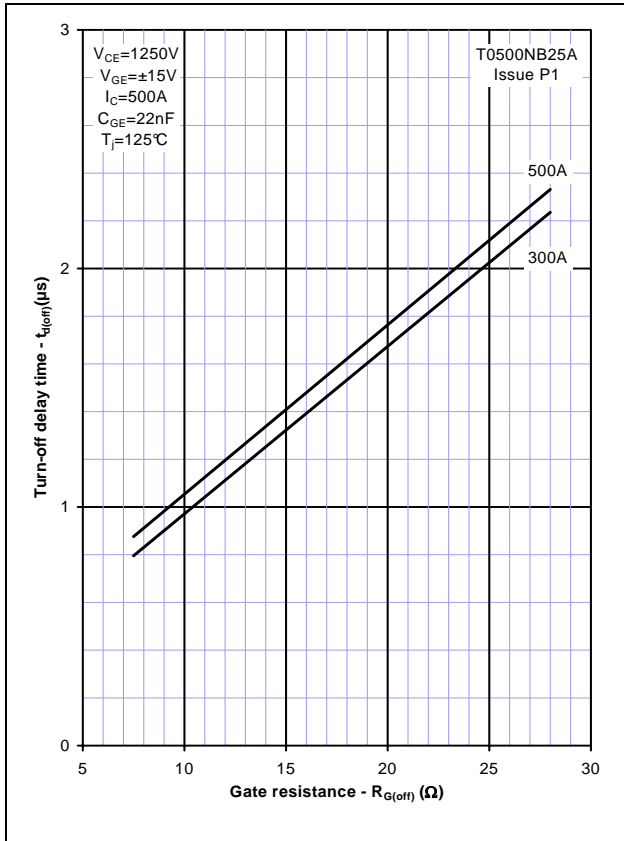


Figure 6 – Typical turn-on energy vs. collector current

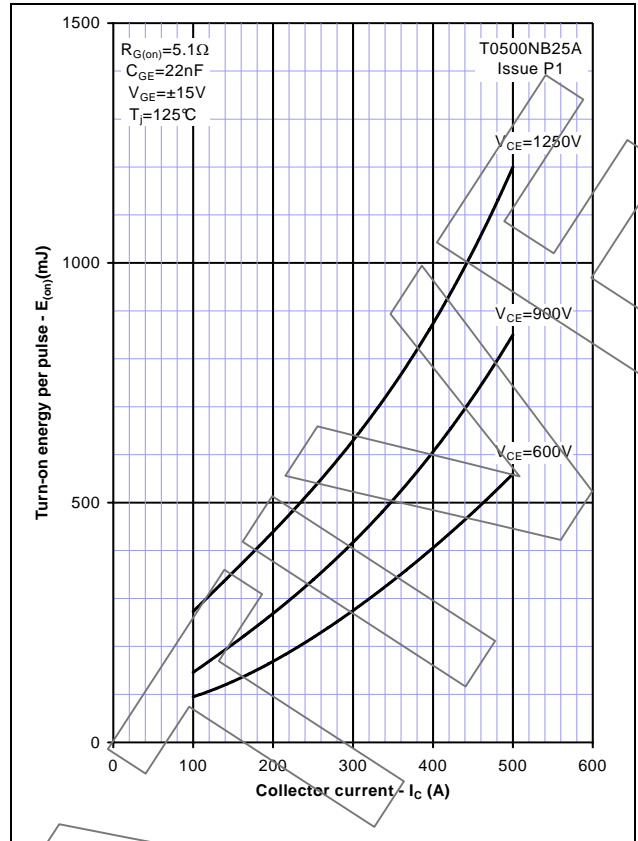


Figure 7 – Typical turn-on energy vs. di/dt

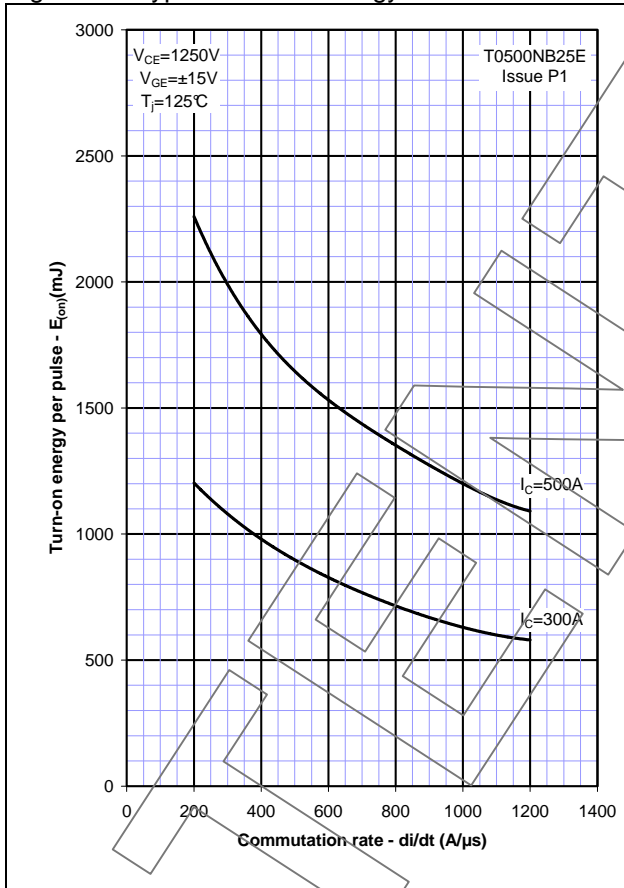


Figure 8 – Typical turn-off energy vs. collector current

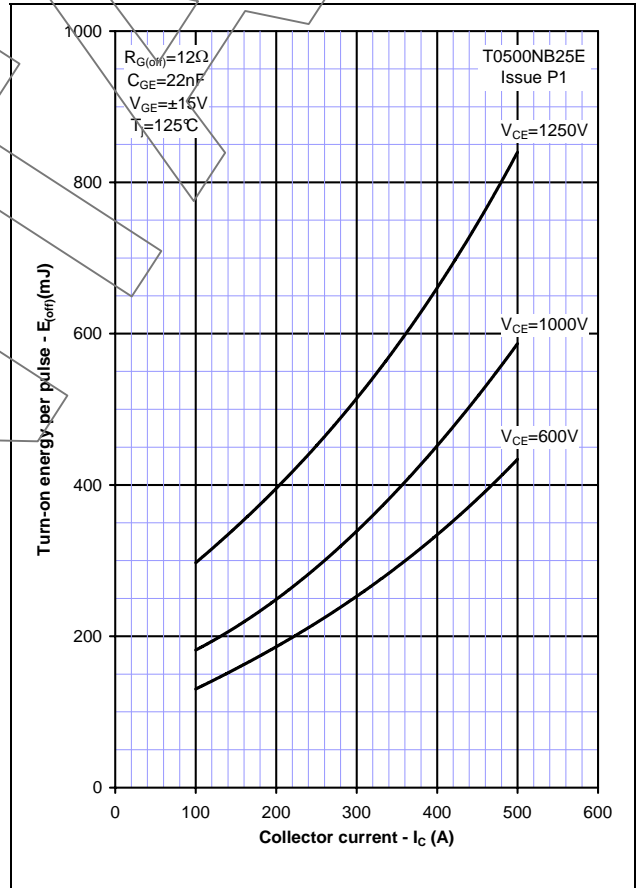


Figure 9 – Turn-off energy vs voltage

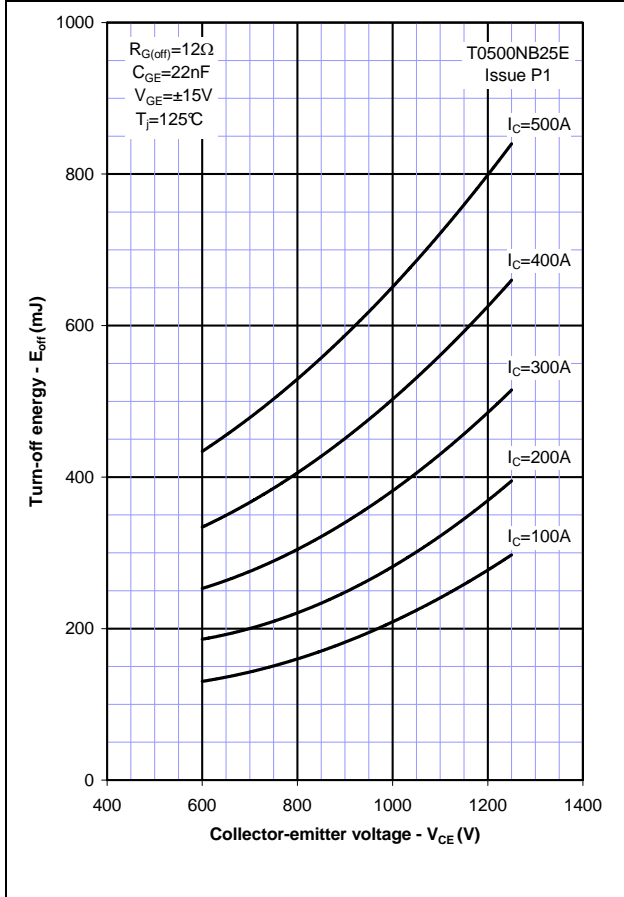


Figure 10 – Safe operating area

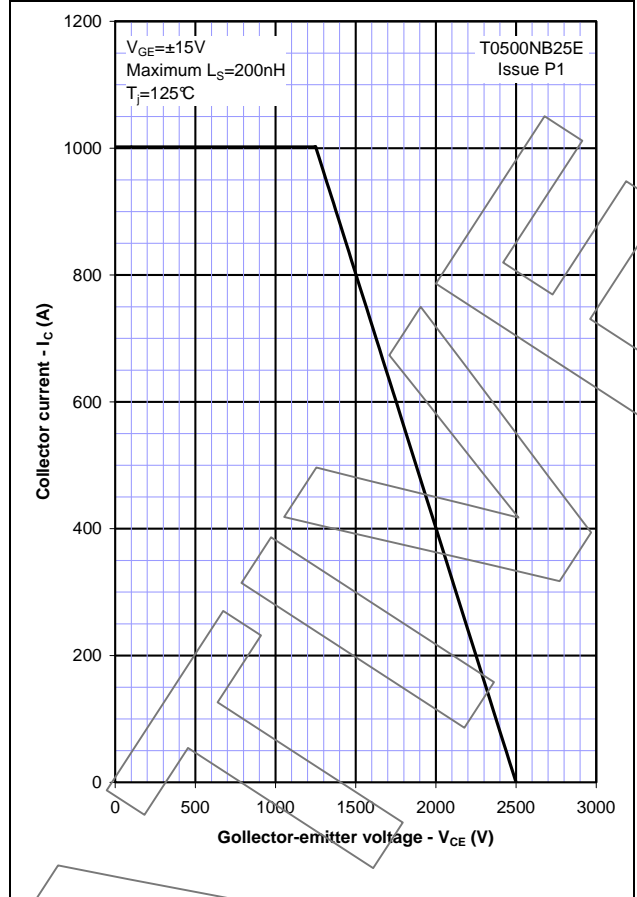
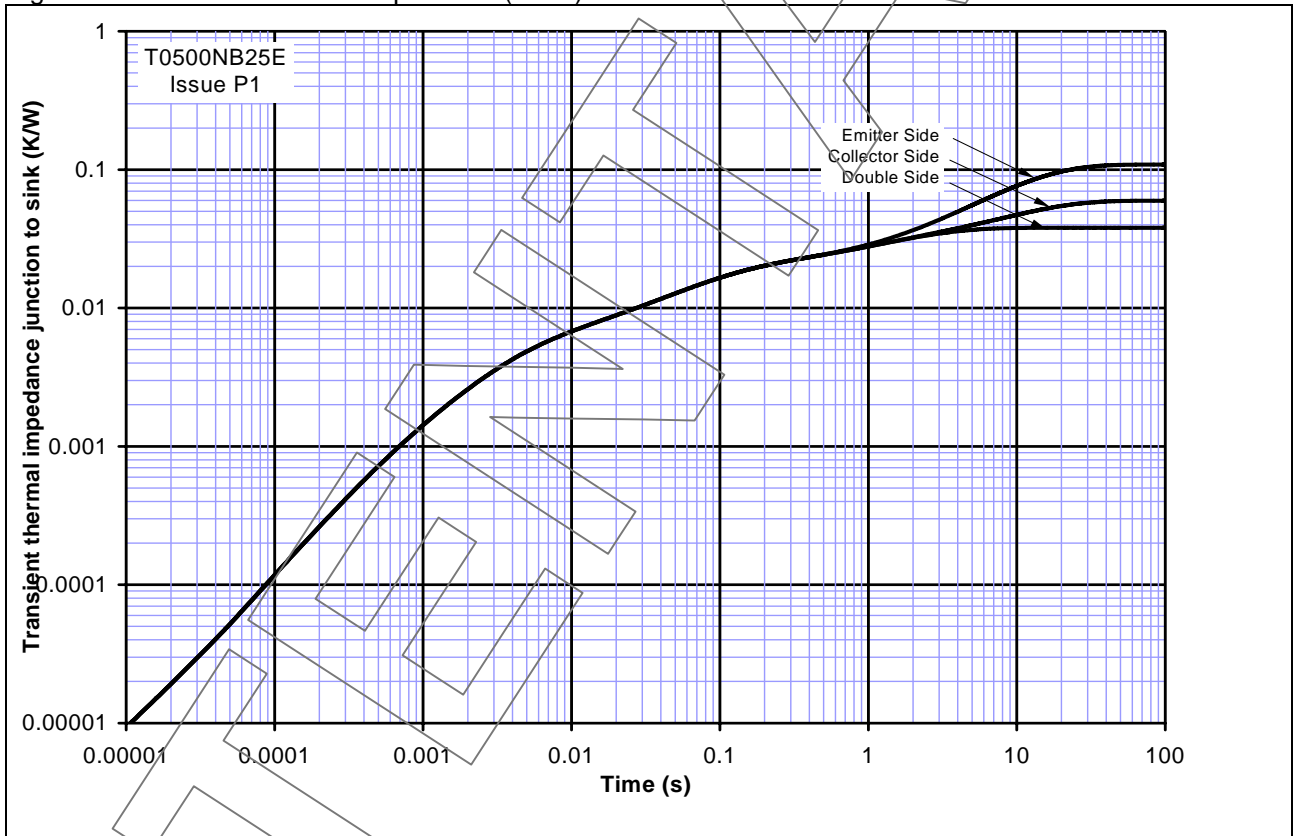
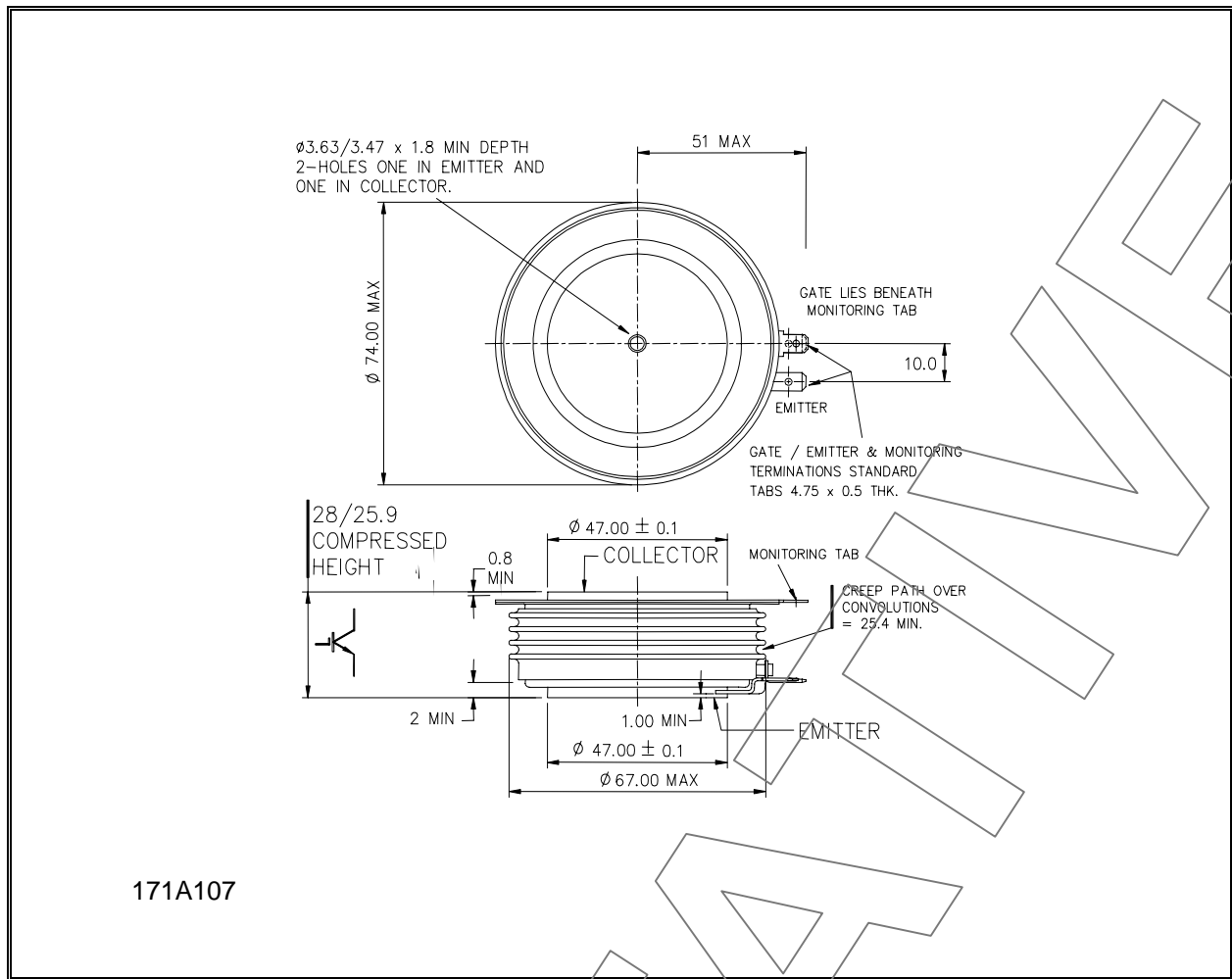


Figure 11 – Transient thermal impedance (IGBT)



Outline Drawing & Ordering Information



ORDERING INFORMATION			
		(Please quote 10 digit code as below)	
T0500	NB	25	E
Fixed type Code	Fixed Outline Code	Voltage Grade $V_{CES}/100$ 25	Fixed format code

Typical order code: T0500NB25E ($V_{CES} = 2500V$)

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