



Tentative Data

Insulated Gate Bi-Polar Transistor

Type T0285NC33E

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V _{CES}	Collector – emitter voltage	3300	V
V _{DC link}	Permanent DC voltage for 100 FIT failure rate.	1800	V
V _{GES}	Peak gate – emitter voltage	±20	V

	RATINGS	MAXIMUM LIMITS	UNITS
I _C	Continuous DC collector current, IGBT	285	A
I _{CRM}	Repetitive peak collector current, t _p =1ms, IGBT	570	A
I _{ECO}	Maximum reverse emitter current, t _p =100µs, (note 2 & 3)	285	A
P _{MAX}	Maximum power dissipation, IGBT (note 2)	1.85	kW
T _{j op}	Operating temperature range	-40 to +125	°C
T _{stg}	Storage temperature range	-40 to +125	°C

Notes: -

- 1) Unless otherwise indicated T_j = 125°C.
- 2) T_{sink} = 25°C, double side cooled.
- 3) Maximum commutation loop inductance 1.5µH.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS	
V _{CE(sat)}	Collector – emitter saturation voltage	-	2.57	2.97	I _C = 285A, V _{GE} = 15V, T _j = 25°C	V	
		-	3.40	3.80	I _C = 285A, V _{GE} = 15V	V	
V _{T0}	Threshold voltage	-	-	1.77	Current range: 95A – 285A	V	
r _T	Slope resistance	-	-	7.11		mΩ	
V _{GE(TH)}	Gate threshold voltage	-	5.3	-	V _{CE} = V _{GE} , I _C = 25mA	V	
I _{CES}	Collector – emitter cut-off current	-	2.5	8	V _{CE} = V _{CES} , V _{GE} = 0V	mA	
I _{GES}	Gate leakage current	-	-	±7	V _{GE} = ±20V	μA	
C _{ies}	Input capacitance	-	40	-	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz	nF	
t _{d(on)}	Turn-on delay time	-	1.5	-	I _C = 285A, V _{CE} = 1800V, di/dt = 600A/μs V _{GE} = ±15V, L _S = 1.5μH R _{G(ON)} = 7.5Ω, R _{G(OFF)} = 51Ω, C _{GE} = 120nF Freewheel diode type TBC at T _j = 125°C (Notes 3, 4 & 5)	μs	
t _{r(V)}	Rise time	-	1.9	-		μs	
Q _{g(on)}	Turn-on gate charge	-	5.5	-		μC	
E _{on}	Turn-on energy	-	0.73	-		J	
t _{d(off)}	Turn-off delay time	-	4.6	-		μs	
t _{f(I)}	Fall time	-	1.1	-		μs	
Q _{g(off)}	Turn-off gate charge	-	4	-		μC	
E _{off}	Turn-off energy	-	0.75	-		J	
I _{sc}	Short circuit current	-	1100	-		V _{GE} = +15V, V _{CC} = 1800V, 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	-	-	54.6	Double side cooled	K/kW
		-	-	89	Collector side cooled	K/kW
		-	-	140	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 circuit.
- 4) E_{on} integration time 15μs from 10% rising I_G.
- 5) E_{off} integration time 15μs from 90% falling V_{GE}.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

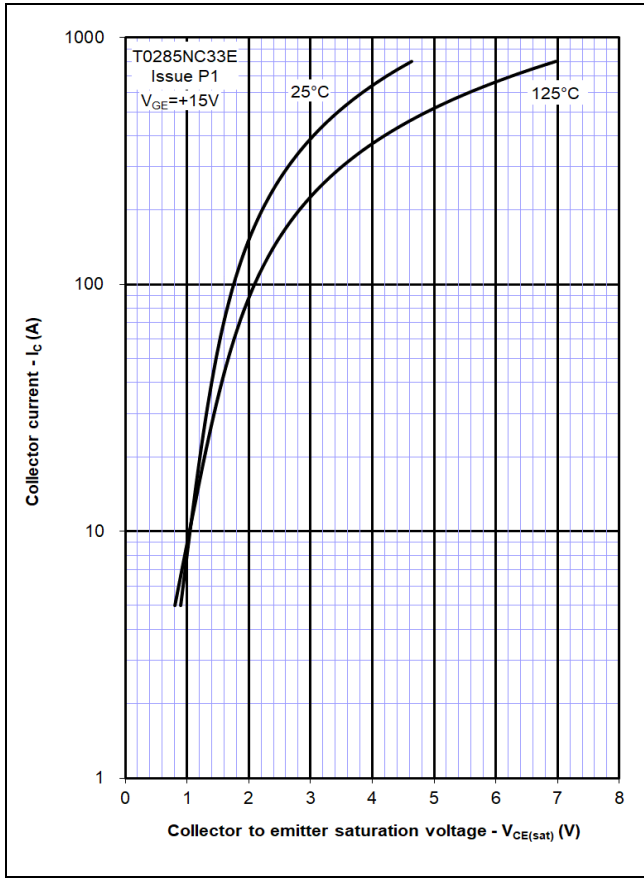


Figure 2 – Typical output characteristic

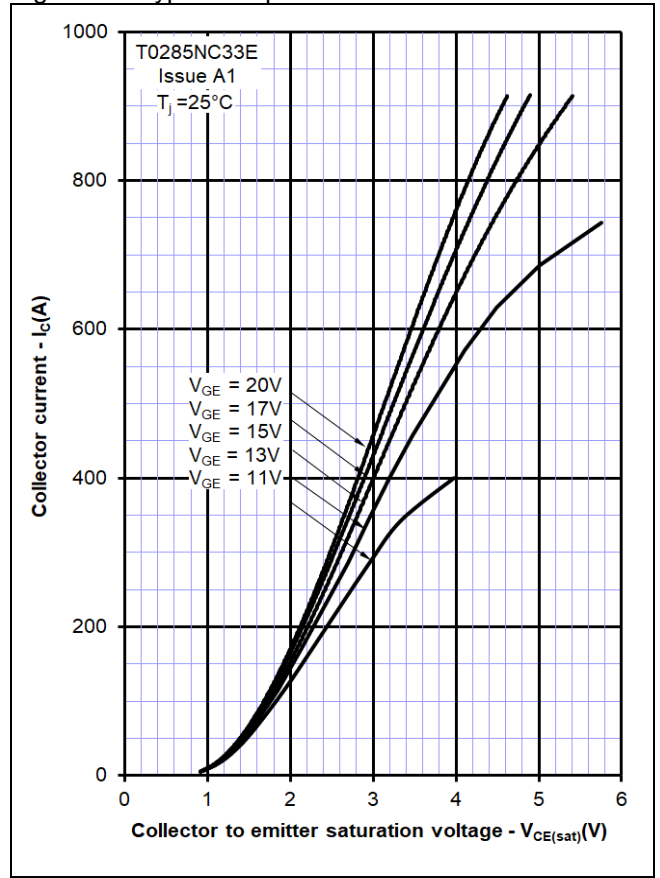


Figure 3 – Typical output characteristic

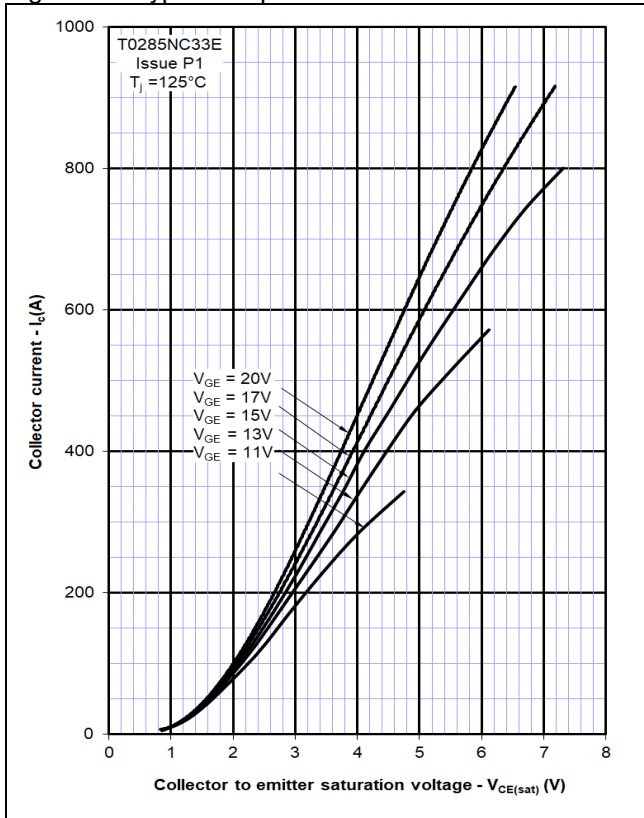


Figure 4 – Typical turn-on delay time vs gate resistance

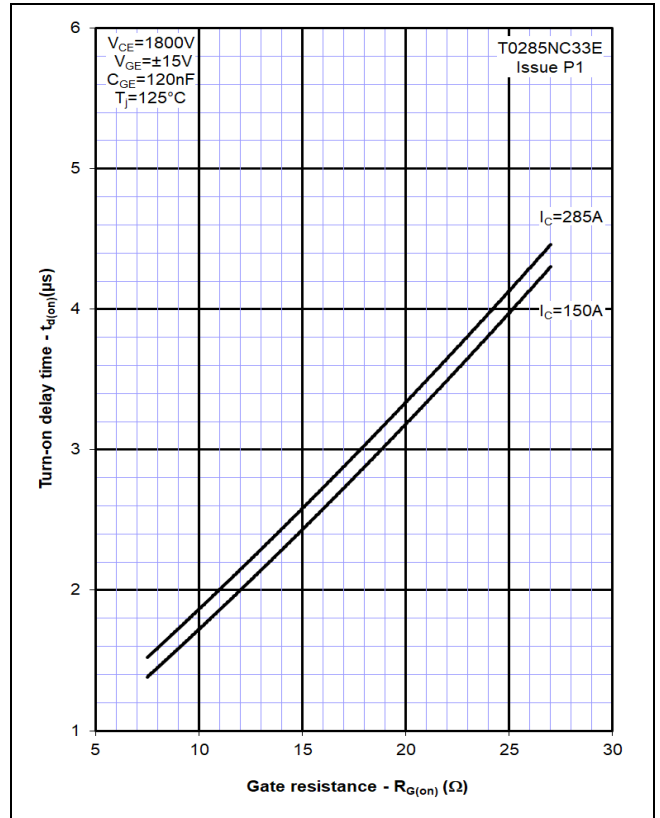


Figure 5 – Typical turn-off delay time vs. gate resistance

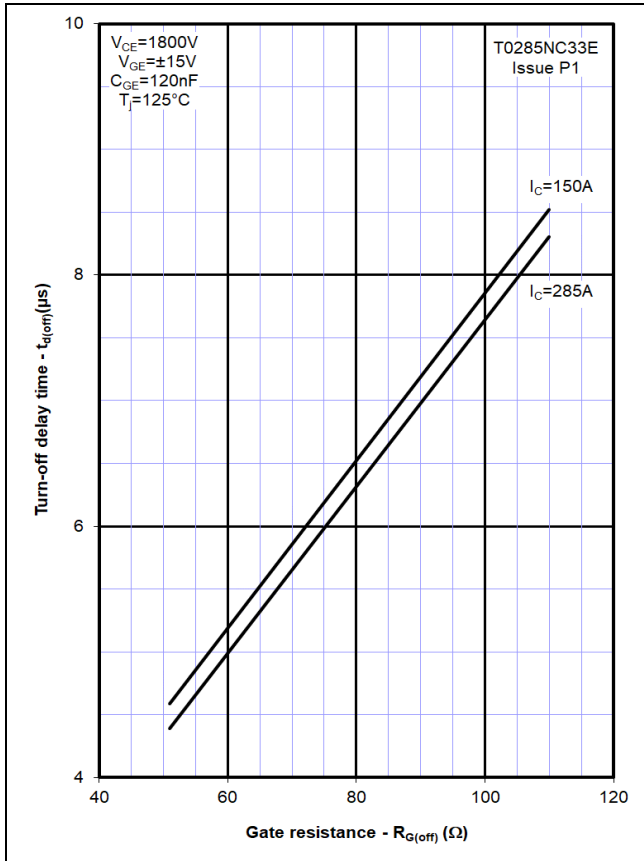


Figure 6 – Typical turn-on energy vs. collector current

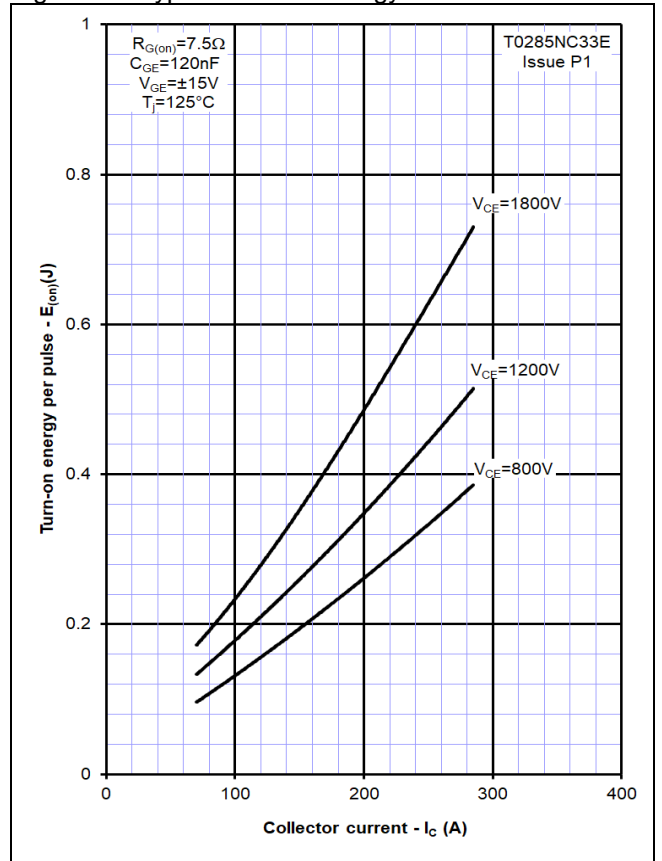


Figure 7 – Typical turn-on energy vs. di/dt

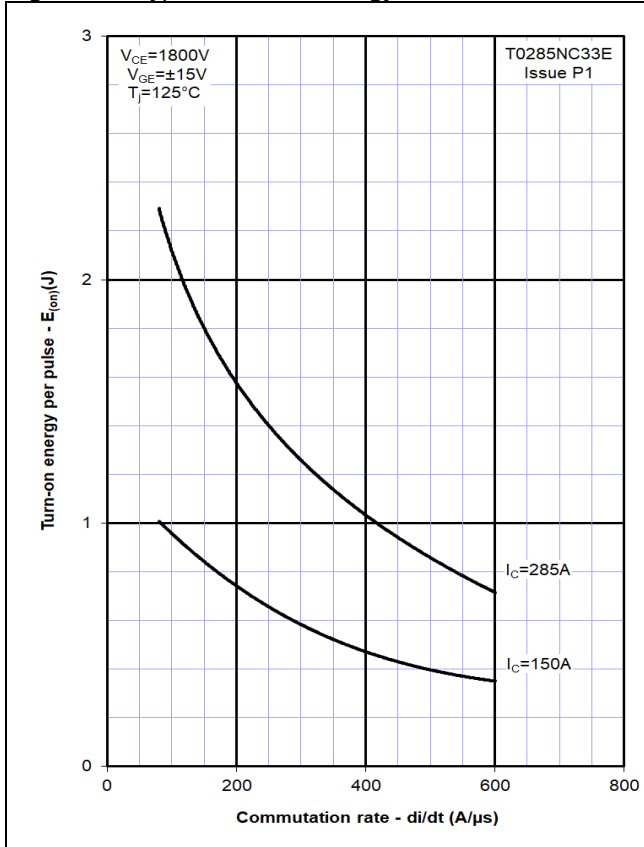


Figure 8 – Typical turn-off energy vs. collector current

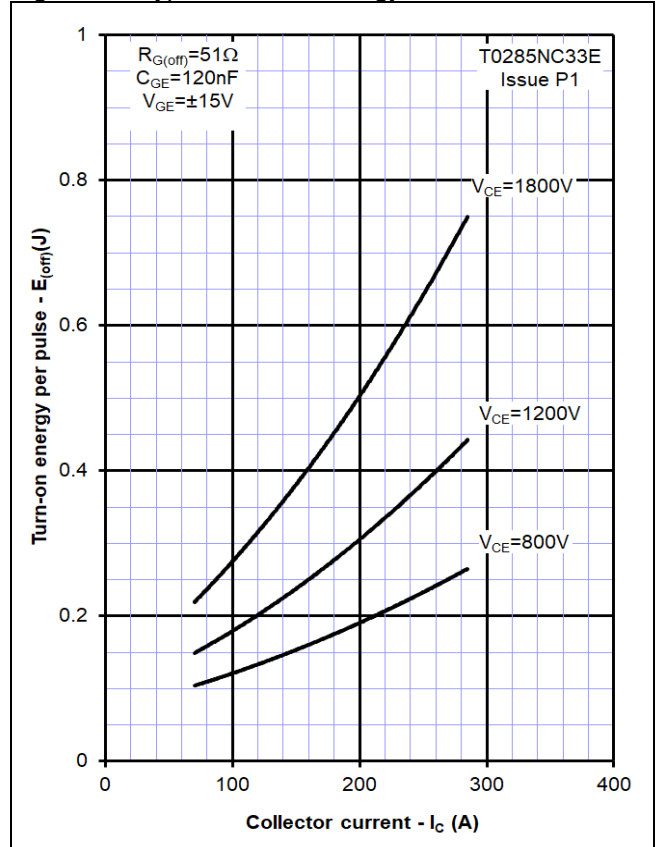


Figure 9 – Turn-off energy vs voltage

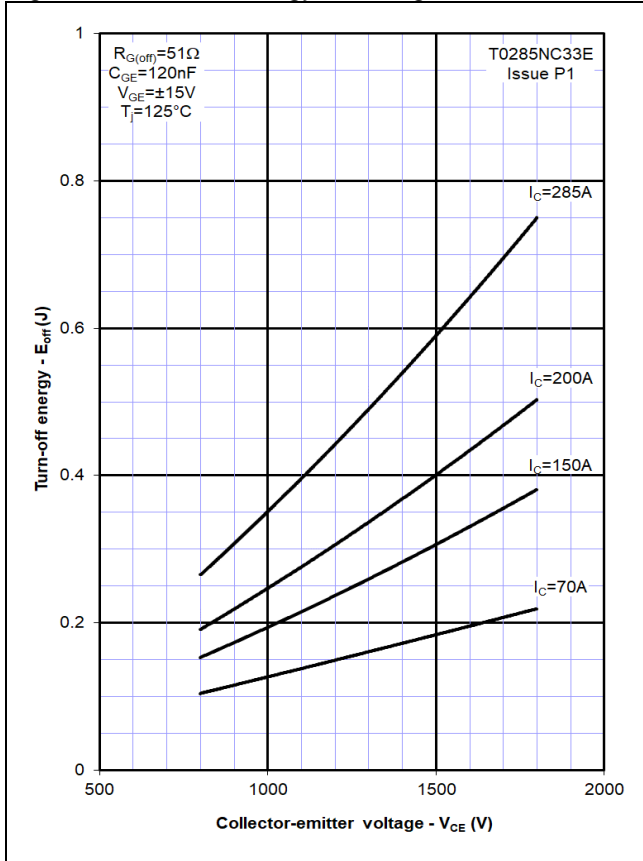


Figure 10 – Safe operating area

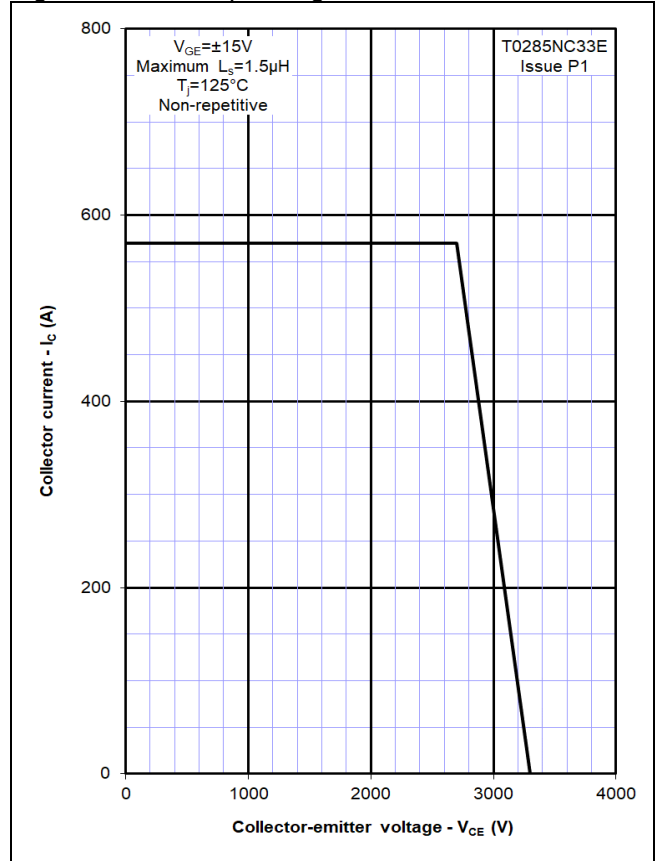
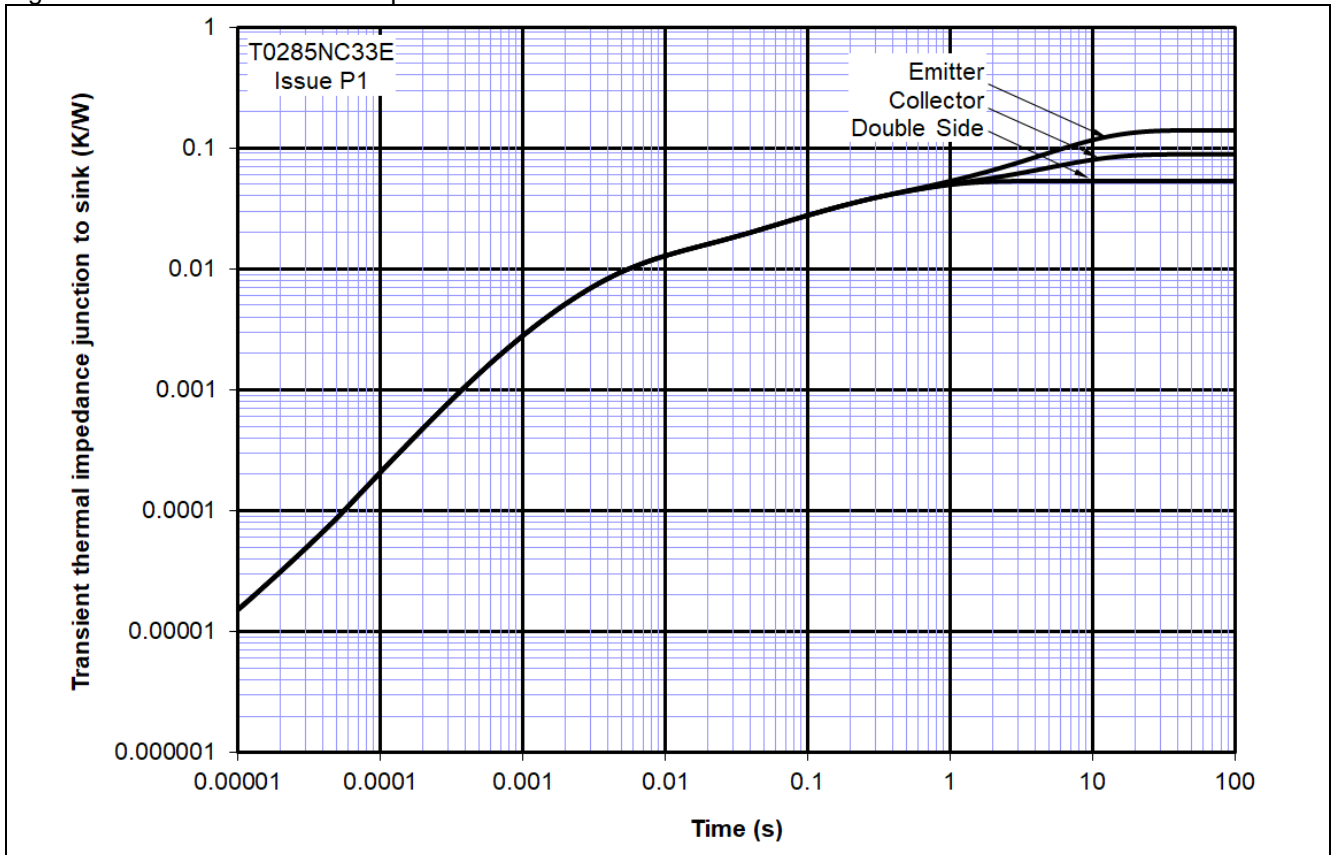
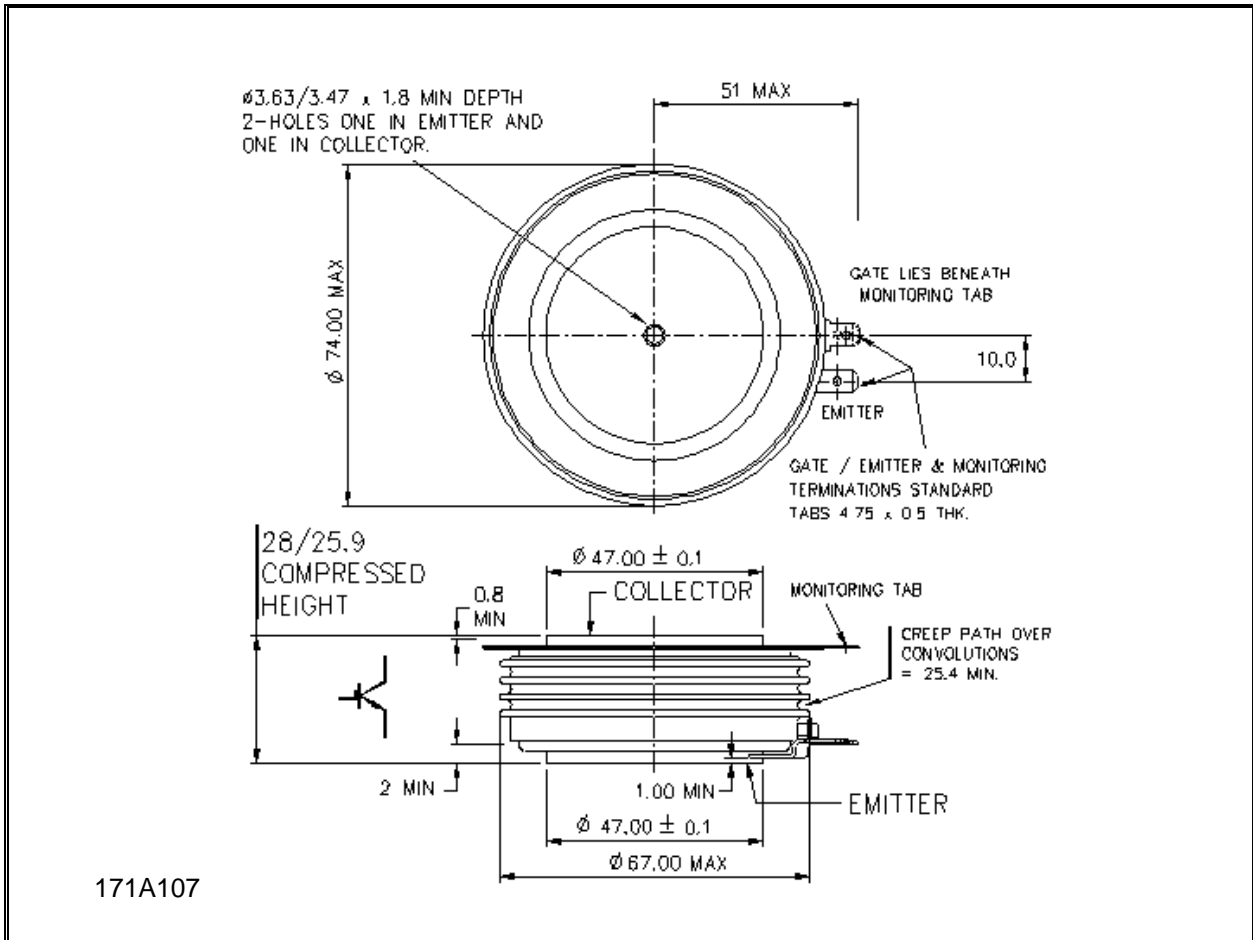


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



ORDERING INFORMATION

(Please quote 10 digit code as below)

T0285	NC	33	E
Fixed type Code	Fixed Outline Code	Voltage Grade V _{CES} /100 33	Fixed format code

 Typical order code: T0285NC33E (V_{CES} = 3300V)

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