



IXYS
A Littelfuse Technology

Date:- 5 Sep, 2019

Data Sheet Issue:- P1

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	$I_C = 285A, V_{GE} = 15V, T_j = 25^\circ C$	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		m Ω
$V_{GE(TH)}$	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	$V_{GE} = \pm 20V$	μA
C_{ies}	Input capacitance	-	40	-	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	nF
$t_{d(on)}$	Turn-on delay time	-	1.5	-	$I_C = 285A, V_{CE} = 1800V, di/dt = 600A/\mu s$	μs
$t_r(V)$	Rise time	-	1.9	-		μs
$Q_{g(on)}$	Turn-on gate charge	-	5.5	-	$V_{GE} = \pm 15V, L_s = 1.5\mu H$	μC
E_{on}	Turn-on energy	-	0.73	-	$R_{G(ON)} = 7.5\Omega, R_{G(OFF)} = 51\Omega, C_{GE} = 120nF$	J
$t_{d(off)}$	Turn-off delay time	-	4.6	-	Freewheel diode type TBC at $T_j = 125^\circ C$ (Notes 3, 4 & 5)	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	-	$V_{GE} = +15V, V_{CC} = 1800V, V_{CEmax} \leq V_{CES}, t_p \leq 10\mu s$	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 $T_j = 125^\circ C$.
- 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 15 μs from 10% rising I_G .
- 5) E_{off} integration time 15 μs from 90% falling V_{GE} .

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

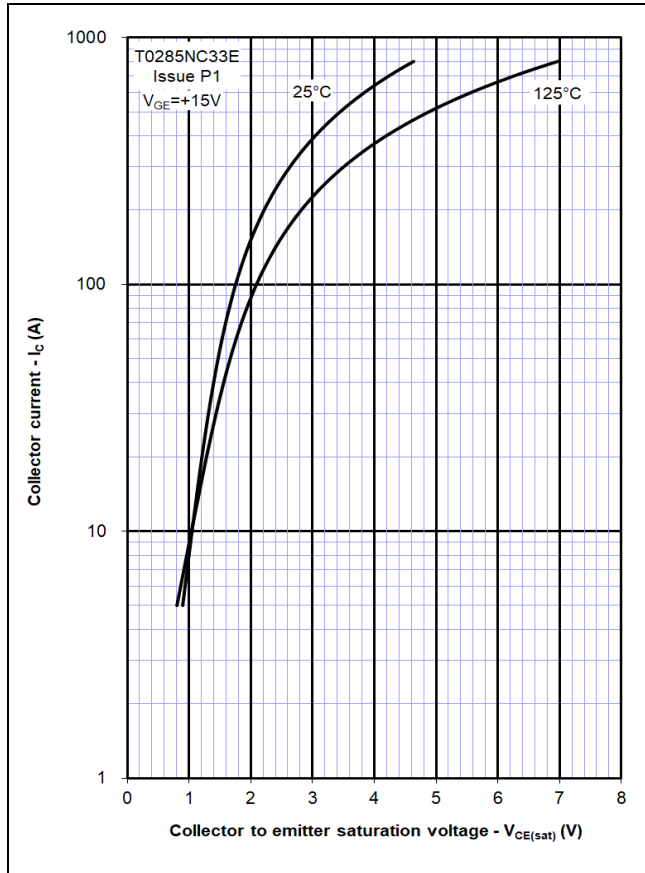


Figure 2 – Typical output characteristic

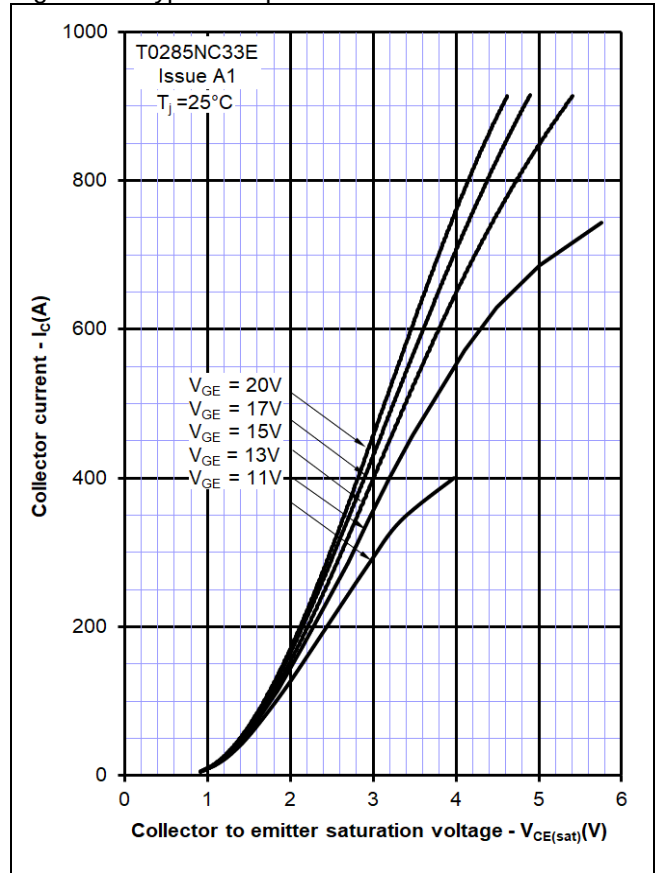


Figure 3 – Typical output characteristic

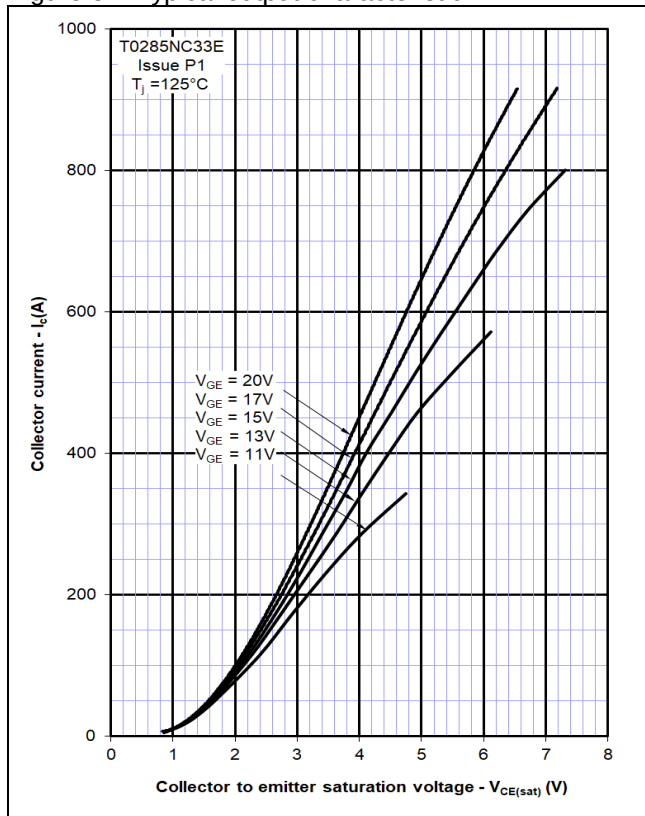


Figure 4 – Typical turn-on delay time vs gate resistance

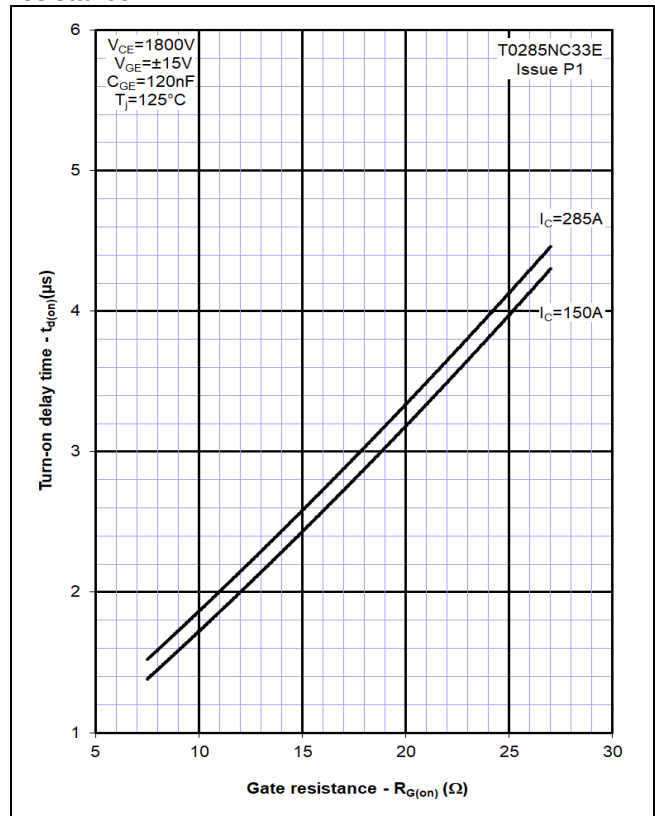


Figure 5 – Typical turn-off delay time vs. gate resistance

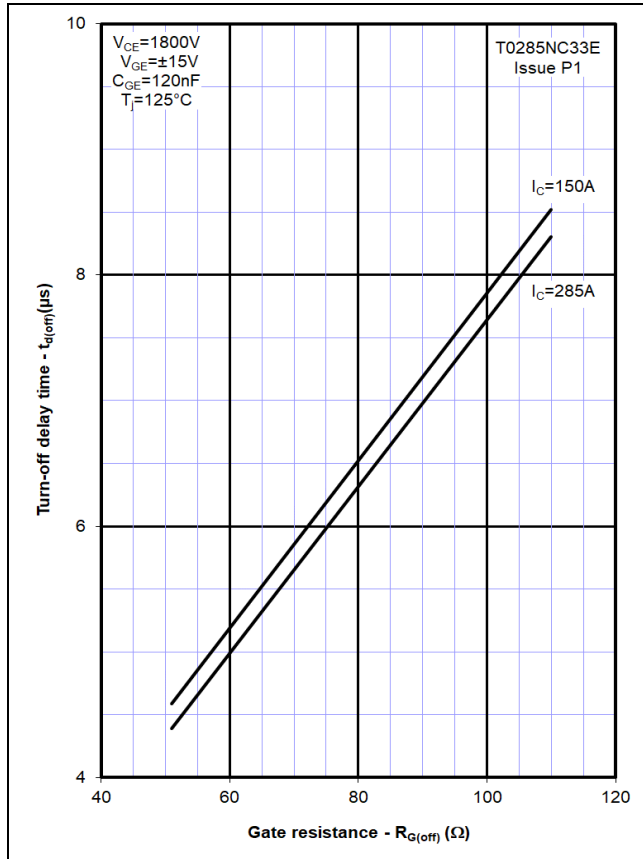


Figure 6 – Typical turn-on energy vs. collector current

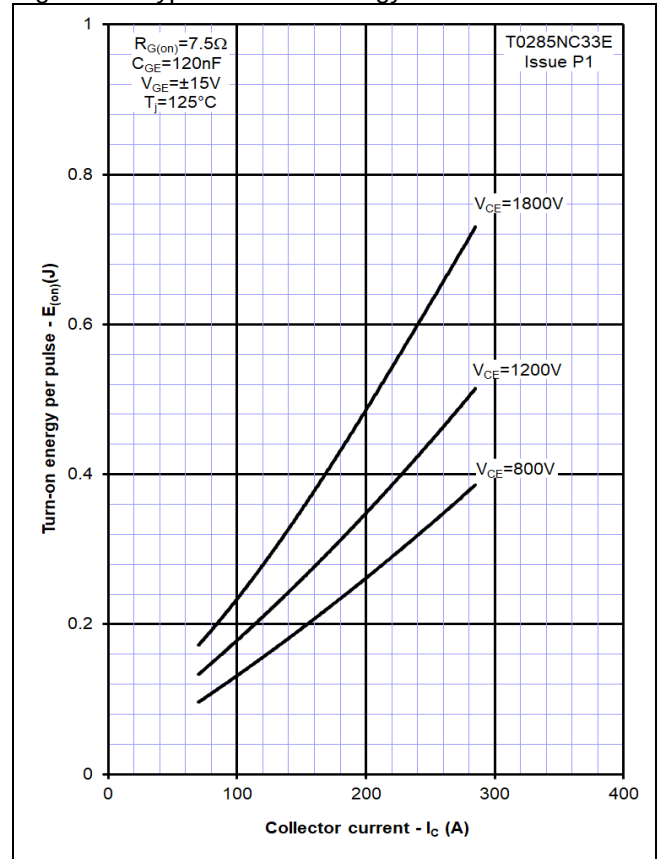


Figure 7 – Typical turn-on energy vs. di/dt

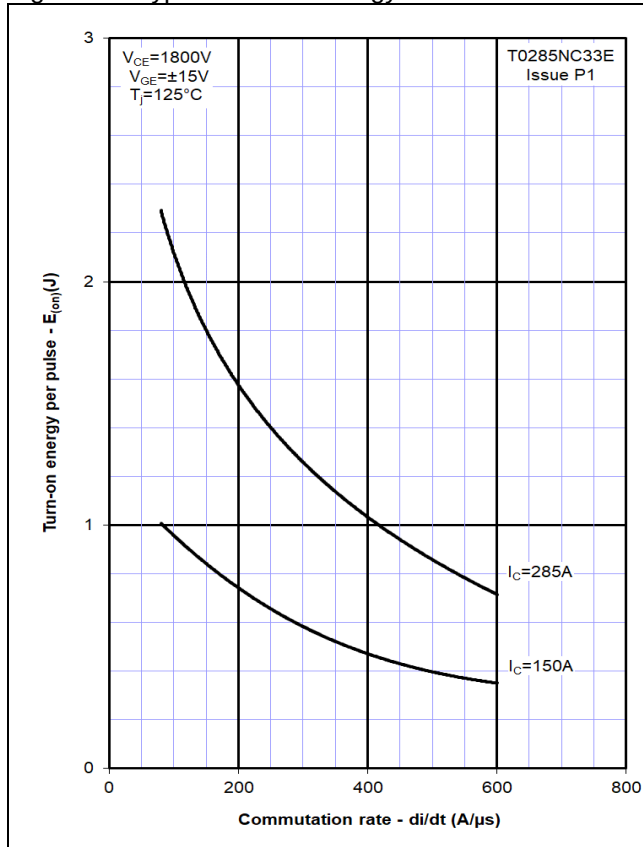


Figure 8 – Typical turn-off energy vs. collector current

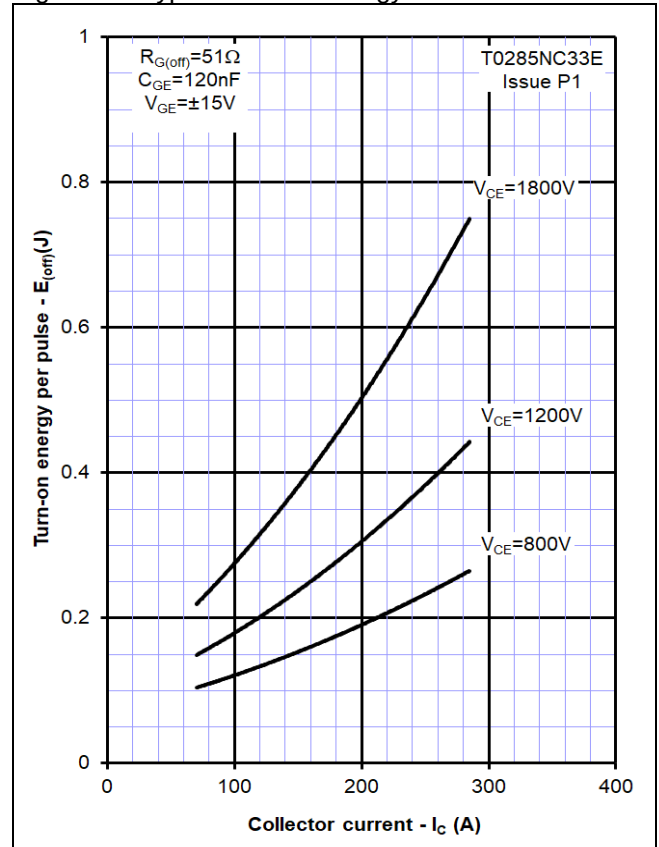


Figure 9 – Turn-off energy vs voltage

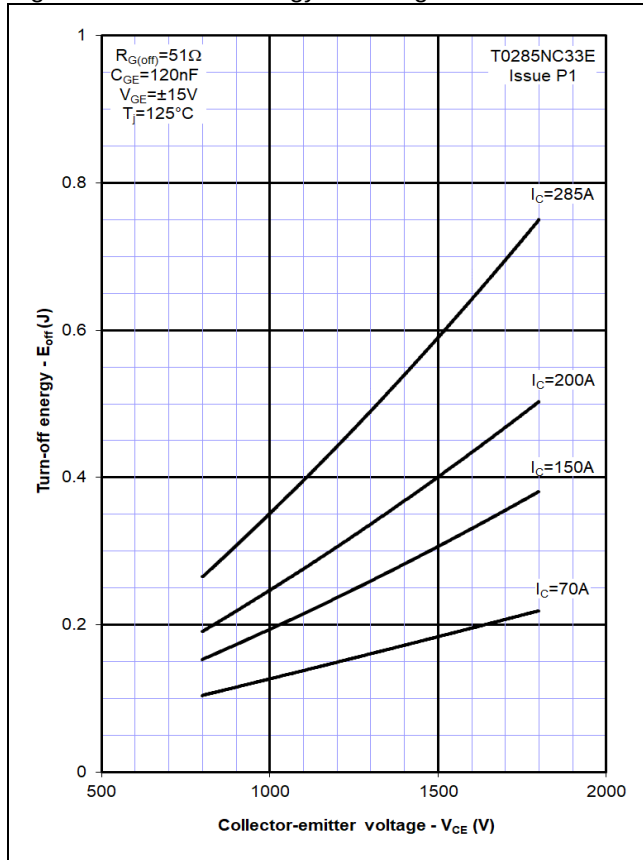


Figure 10 – Safe operating area

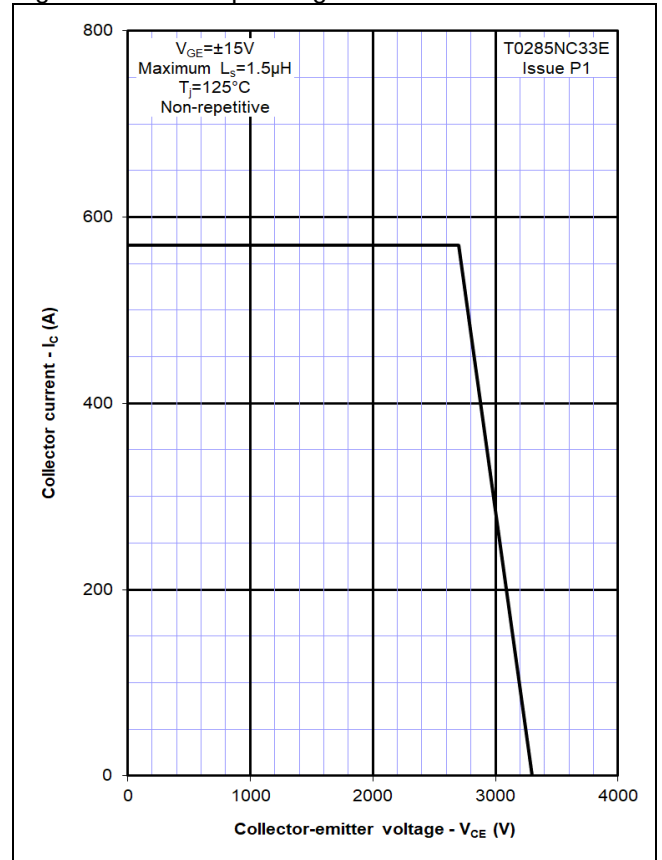
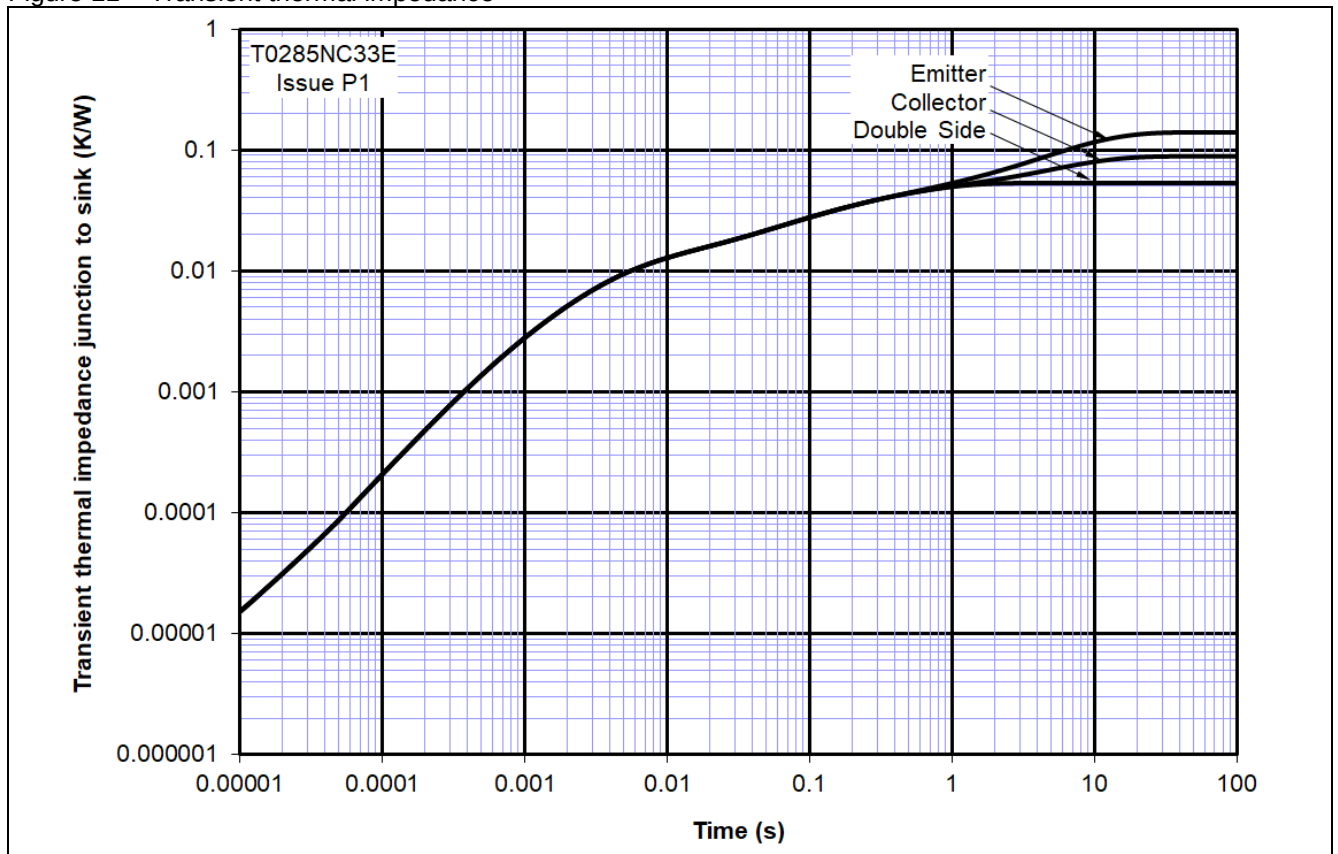
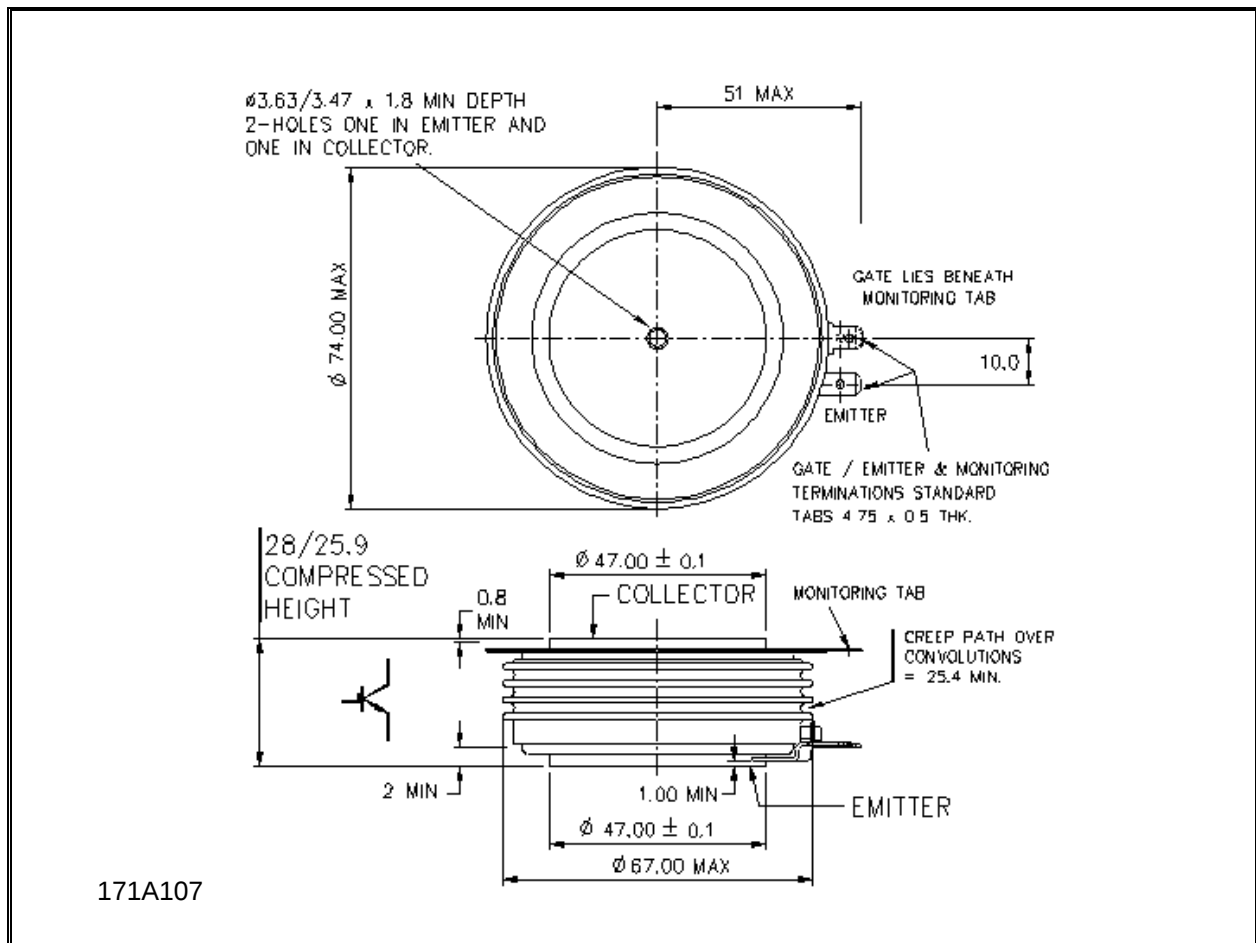


Figure 11 – Transient thermal impedance



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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