

Advance Data

Insulated Gate Bi-Polar Transistor

Type T1000TC33E

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
$I_{C(DC)}$	DC collector current, IGBT	1000	A
I_{CRM}	Repetitive peak collector current, $t_p=1ms$, IGBT	2000	A
I_{ECO}	Maximum reverse emitter current, $t_p=100\mu s$, (note 2 & 3)	1000	A
P_{MAX}	Maximum power dissipation, IGBT (Note 2)	6.4	kW
T_j	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) Maximum commutation loop inductance 200nH.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS	
V _{CE(sat)}	Collector – emitter saturation voltage	-	2.57	2.97	I _C = 1000A, V _{GE} = 15V, T _j = 25°C	V	
		-	3.40	3.80	I _C = 1000A, V _{GE} = 15V	V	
V _{T0}	Threshold voltage	-	-	1.835	Current range: 333A – 1000A	V	
r _T	Slope resistance	-	-	1.969		mΩ	
V _{GE(TH)}	Gate threshold voltage	-	5.3	-	V _{CE} = V _{GE} , I _C = 85mA	V	
I _{CES}	Collector – emitter cut-off current	-	5	25	V _{CE} = V _{CES} , V _{GE} = 0V	mA	
I _{GES}	Gate leakage current	-	-	±10	V _{GE} = ±20V	µA	
C _{ies}	Input capacitance	-	135	-	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz, T _j =25°C	nF	
t _{d(on)}	Turn-on delay time	-	1.7	-	I _C =1000A, V _{CE} =1800V, di/dt=2000A/µs V _{GE} = ±15V, L _S =200nH R _{g(ON)} = 2.2Ω, R _{g(OFF)} = 15Ω, C _{GE} =430nF Freewheel diode type EX574MC33E at T _j =125°C	µs	
t _{r(V)}	Rise time	-	1.8	-		µs	
Q _{g(on)}	Turn-on gate charge	-	21	-		µC	
E _{on}	Turn-on energy	-	2.6	-		J	
t _{d(off)}	Turn-off delay time	-	5.3	-		µs	
t _{f(I)}	Fall time	-	1.5	-		µs	
Q _{g(off)}	Turn-off gate charge	-	13	-		µC	
E _{off}	Turn-off energy	-	2.7	-		J	
I _{SC}	Short circuit current	-	3000	-		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	-	-	15.6	Double side cooled	K/kW
		-	-	25.6	Collector side cooled	K/kW
		-	-	40.6	Emitter side cooled	K/kW
F	Mounting force	15	-	25	Note 2	kN
W _t	Weight	-	1.2	-		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

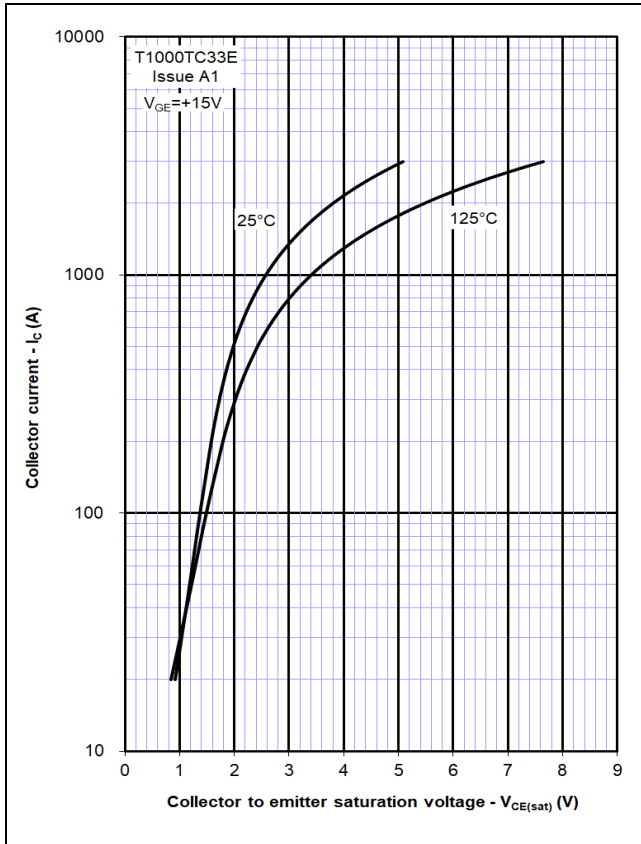


Figure 2 – Typical output characteristic

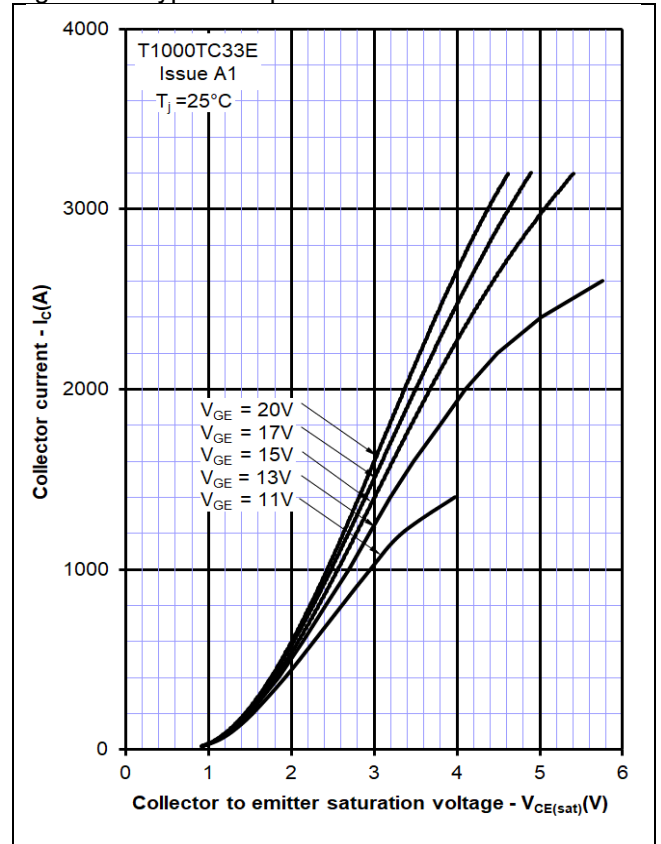


Figure 3 – Typical output characteristic

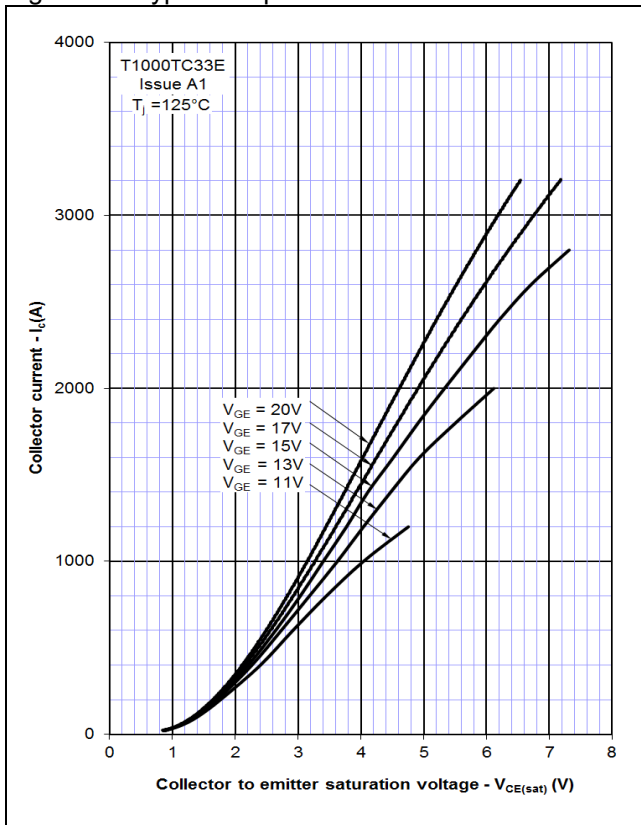


Figure 4 – Typical turn-on delay time vs gate resistance

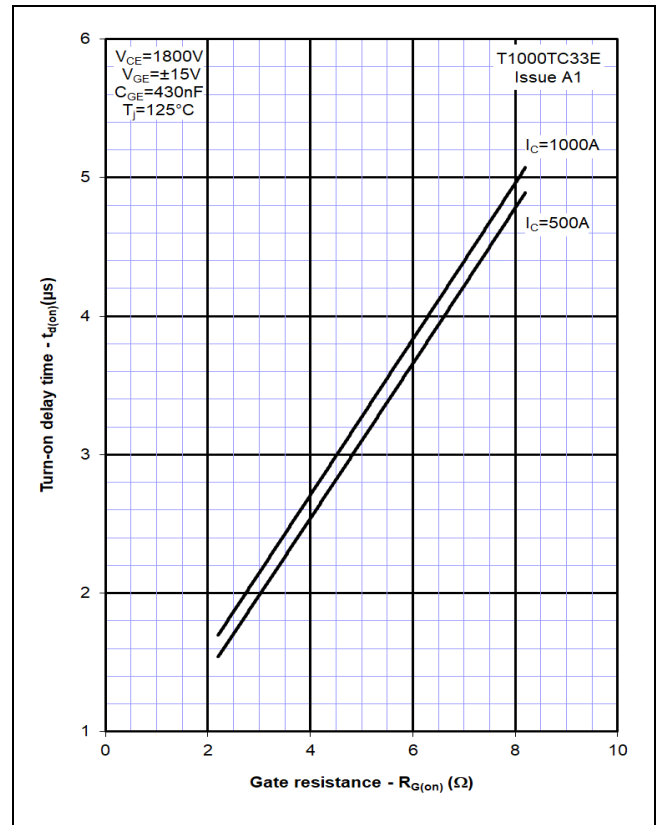


Figure 5 – Typical turn-off delay time vs. gate resistance

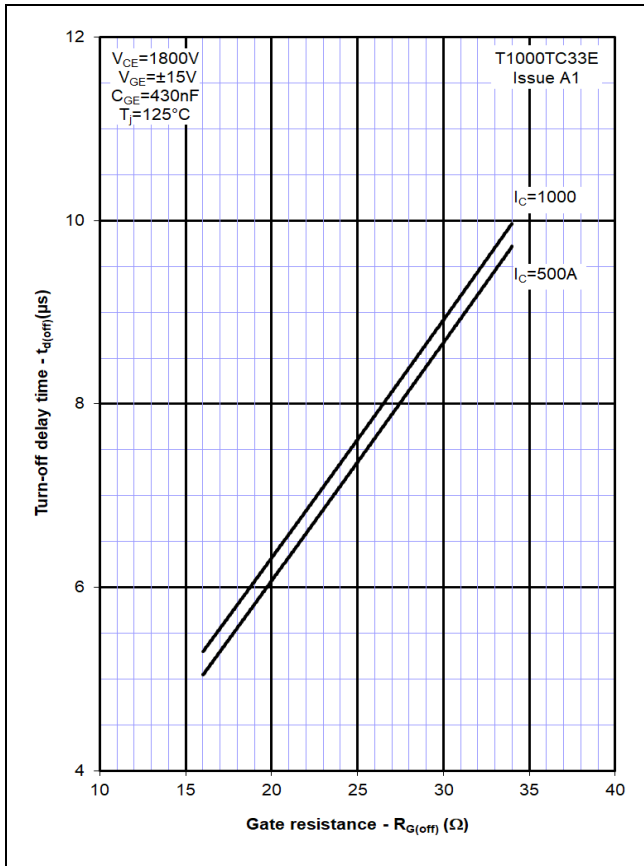


Figure 6 – Typical turn-on energy vs. collector current

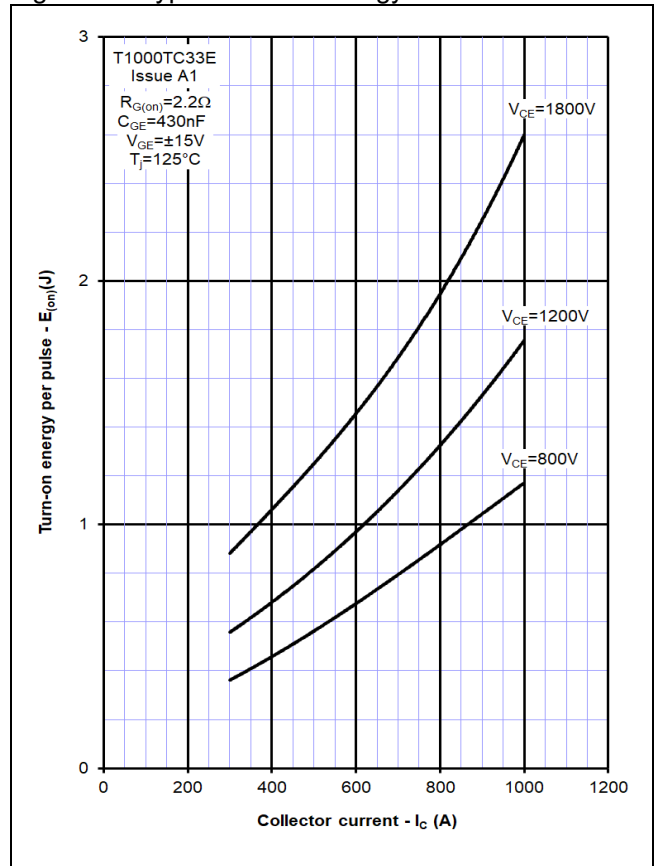


Figure 7 – Typical turn-on energy vs. di/dt

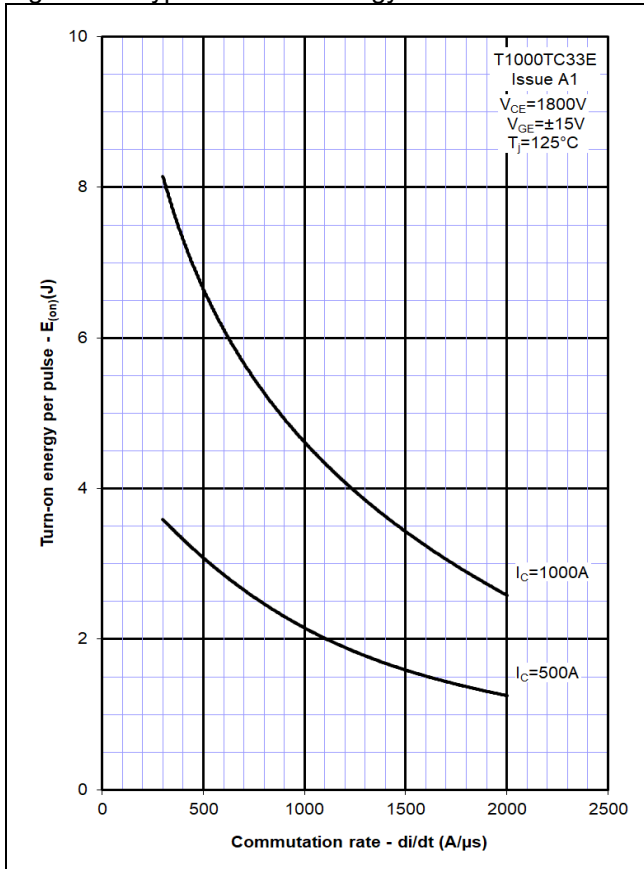


Figure 8 – Typical turn-off energy vs. collector current

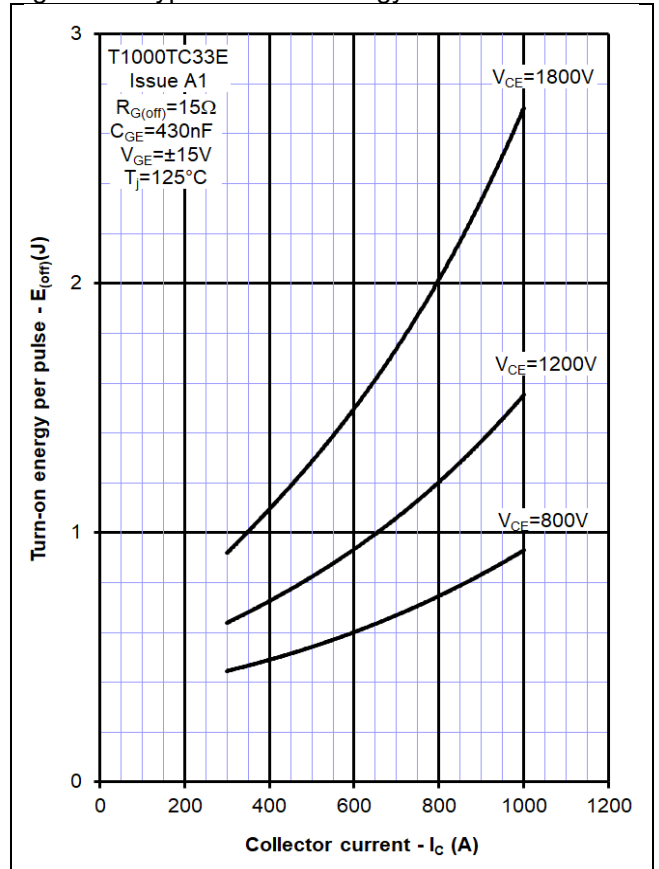


Figure 9 – Turn-off energy vs voltage

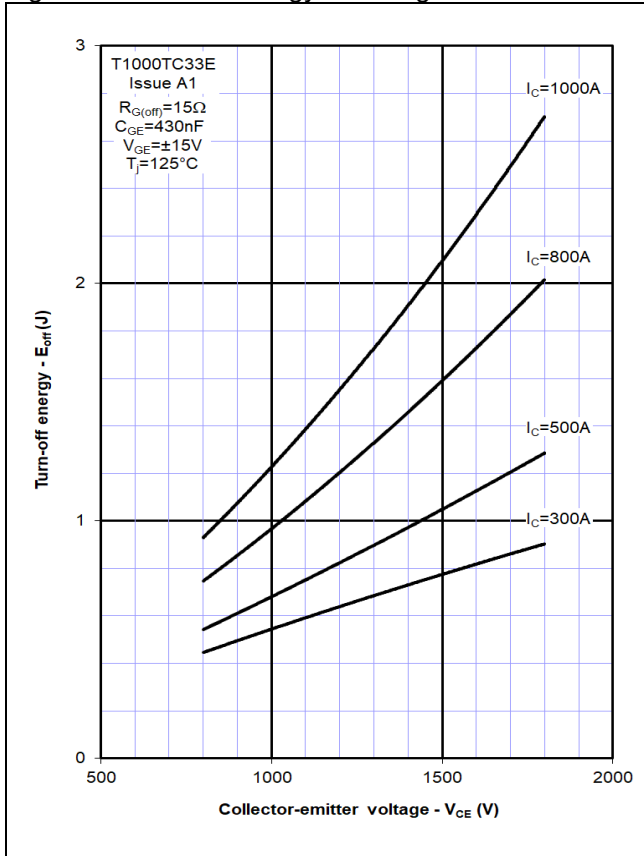


Figure 10 – Safe operating area

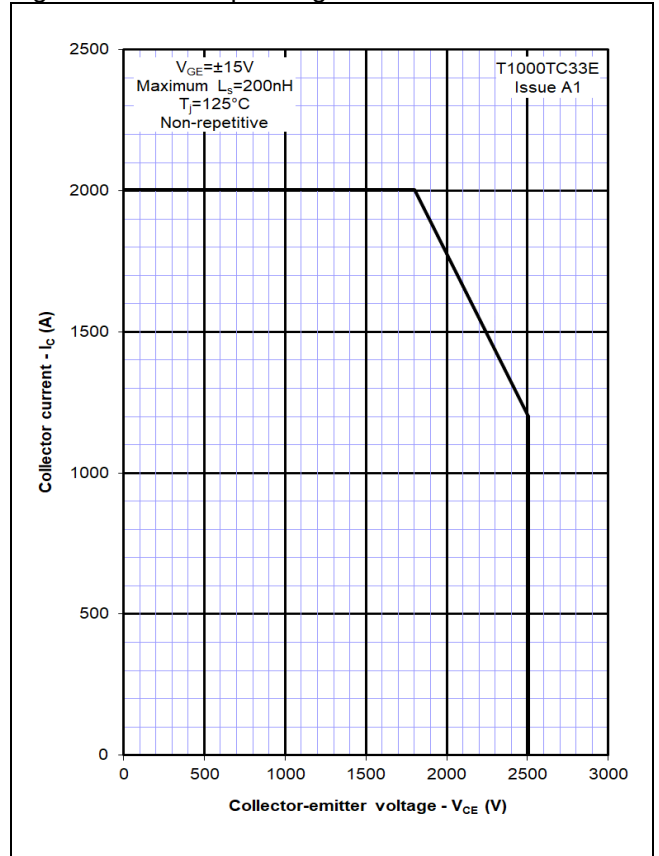
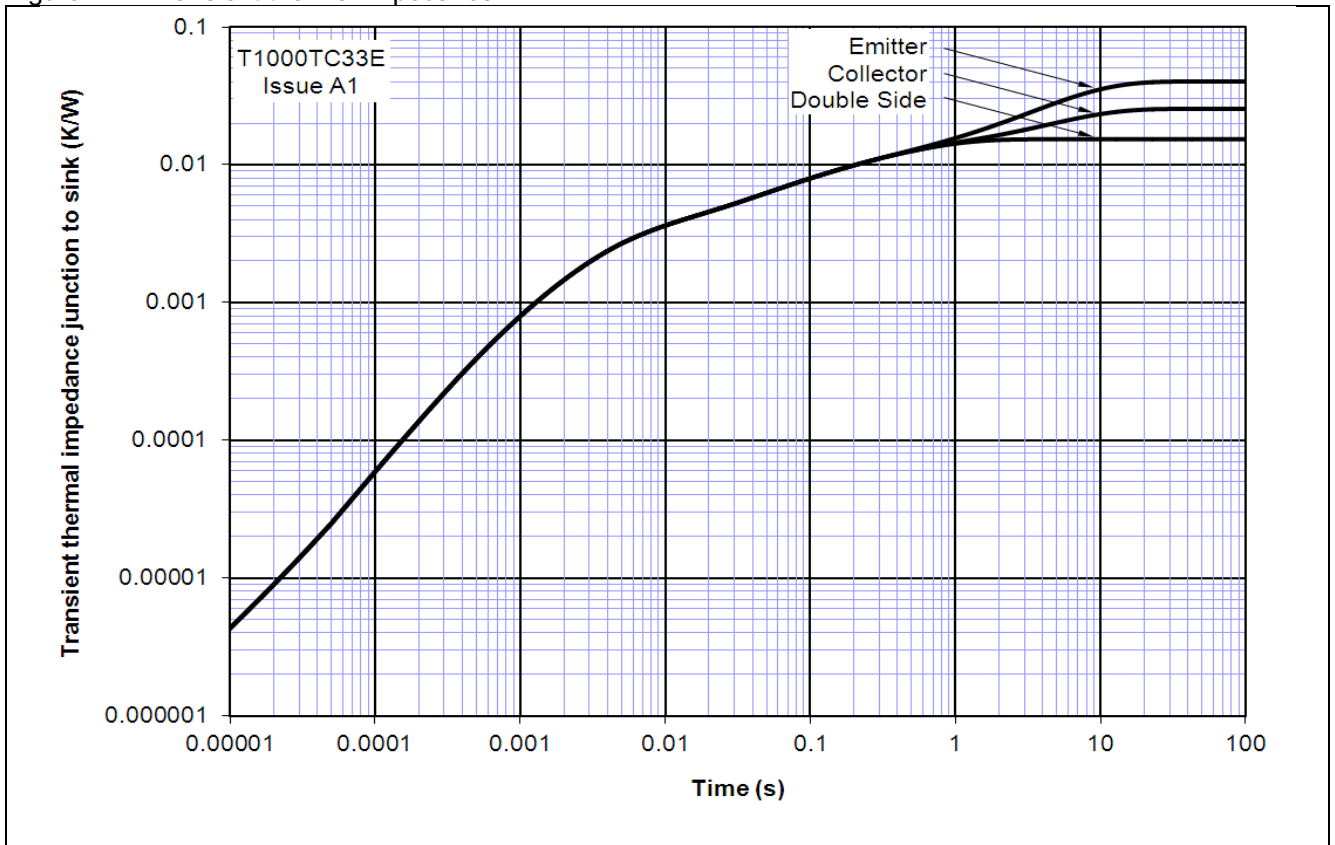
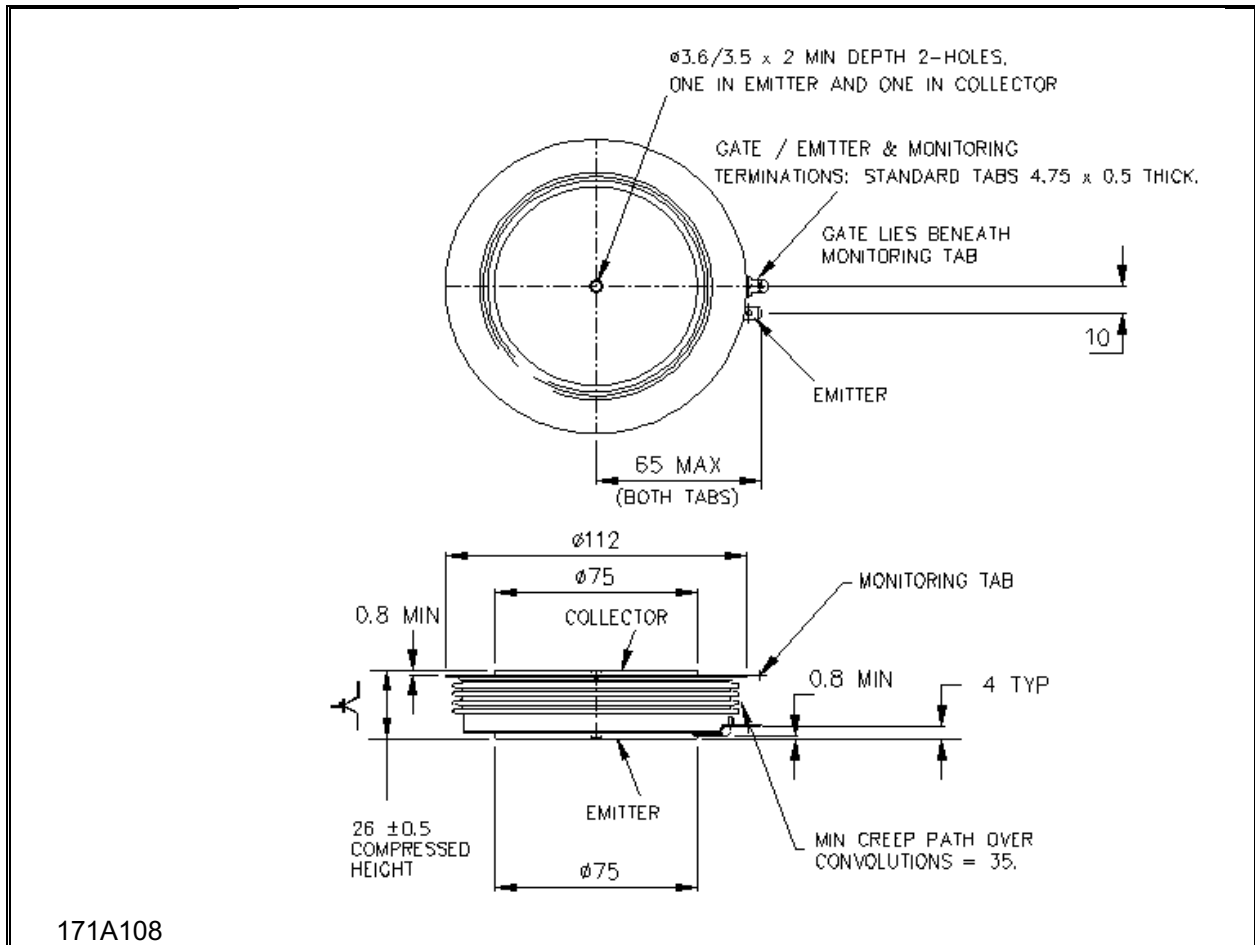


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



ORDERING INFORMATION			
(Please quote 10 digit code as below)			
T1000	TC	33	E
Fixed type Code	Fixed Outline Code	Voltage Grade $V_{CES}/100$ 33	Fixed format code
Typical order code: T1000TC33E ($V_{CES} = 3300V$)			

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