



Advance Data

Insulated Gate Bi-Polar Transistor

Type T1375DF65E

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V _{CES}	Collector – emitter voltage	6500	V
V _{DC link}	Permanent DC voltage for 100 FIT failure rate.	3600	V
V _{GES}	Peak gate – emitter voltage	±20	V

	RATINGS	MAXIMUM LIMITS	UNITS
I _C	Continuous DC collector current, IGBT	1375	A
I _{CRM}	Repetitive peak collector current, t _p =1ms, IGBT	2750	A
I _{ECO}	Maximum reverse emitter current, t _p =100µs, (note 2 & 3)	1375	A
P _{MAX}	Maximum power dissipation, IGBT (note 2)	16.1	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 200nH.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
V _{CE(sat)}	Collector – emitter saturation voltage	-	3.75	4.05	I _C = 1375A, V _{GE} = 15V, T _j = 25°C	V
		-	5.10	5.40	I _C = 1375A, V _{GE} = 15V	V
V _{T0}	Threshold voltage	-	-	2.403	Current range: 458A – 1375A	V
r _T	Slope resistance	-	-	2.18		mΩ
V _{GE(TH)}	Gate threshold voltage	-	5.4	-	V _{CE} = V _{GE} , I _C = 1375mA	V
I _{CES}	Collector – emitter cut-off current	-	9	30	V _{CE} = V _{CES} , V _{GE} = 0V	mA
I _{GES}	Gate leakage current	-	-	±60	V _{GE} = ±20V	μA
C _{ies}	Input capacitance	-	245	-	V _{CE} = 25V, V _{GE} = 0V, f = 100kHz	nF
t _{d(on)}	Turn-on delay time	-	1.3	-	I _C = 1375A, V _{CE} = 3600V, di/dt = 3500A/μs V _{GE} = ±15V, L _s = 200nH	μs
t _{r(V)}	Rise time	-	3.2	-		μs
Q _{g(on)}	Turn-on gate charge	-	16	-	R _{G(ON)} = 2Ω, R _{G(OFF)} = 7.3Ω, C _{GE} = 100nF Freewheel diode type E1780TG65E at T _j = 125°C	μC
E _{on}	Turn-on energy	-	11.6	-		J
t _{d(off)}	Turn-off delay time	-	4.3	-	(Notes 3, 4 & 5)	μs
t _{f(l)}	Fall time	-	2.1	-		μs
Q _{g(off)}	Turn-off gate charge	-	15.5	-		μC
E _{off}	Turn-off energy	-	8.1	-		J
I _{sc}	Short circuit current	-	6200	-	V _{GE} = +15V, V _{CC} = 3600V, V _{CEmax} ≤ V _{CES} , t _p ≤ 10μs, L _s ≤ 200nH	A

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R _{thJK}	Thermal resistance junction to sink, IGBT	-	-	6.21	Double side cooled	K/kW
		-	-	9.68	Collector side cooled	K/kW
		-	-	18	Emitter side cooled	K/kW
F	Mounting force	45	-	55	Note 2	kN
W _t	Weight	-	2.2	-		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 circuit.
- 4) E_{on} integration time 15μs from 10% rising I_C.
- 5) E_{off} integration time 15μs from 90% falling V_{GE}.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

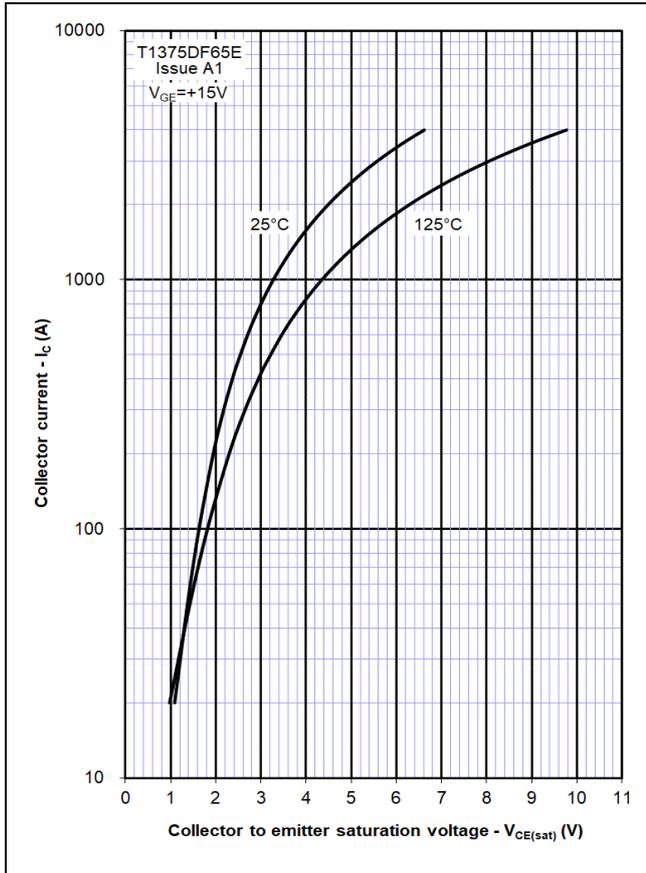


Figure 2 – Typical output characteristic

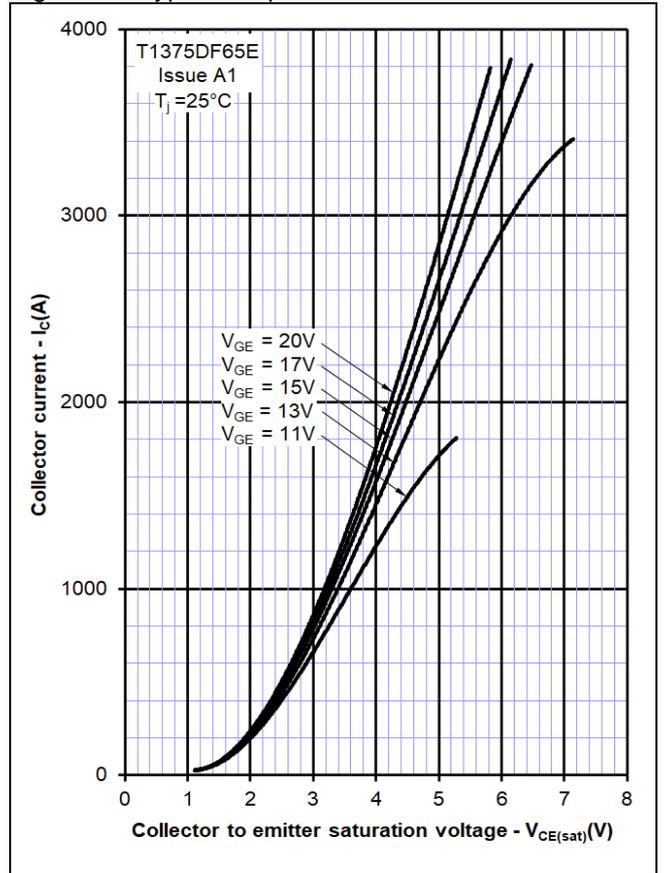


Figure 3 – Typical output characteristic

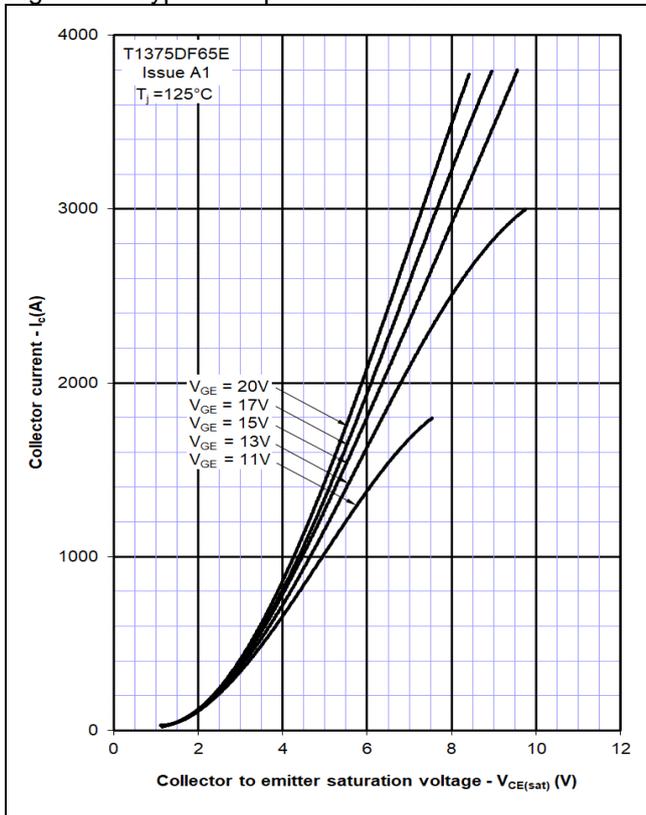


Figure 4 – Typical turn-on delay time vs gate resistance

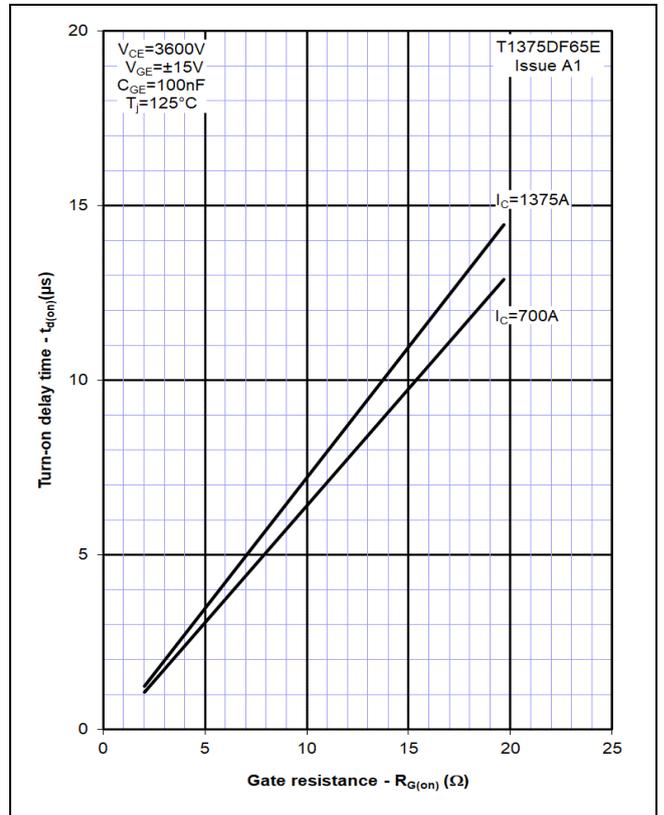


Figure 5 – Typical turn-off delay time vs. gate resistance

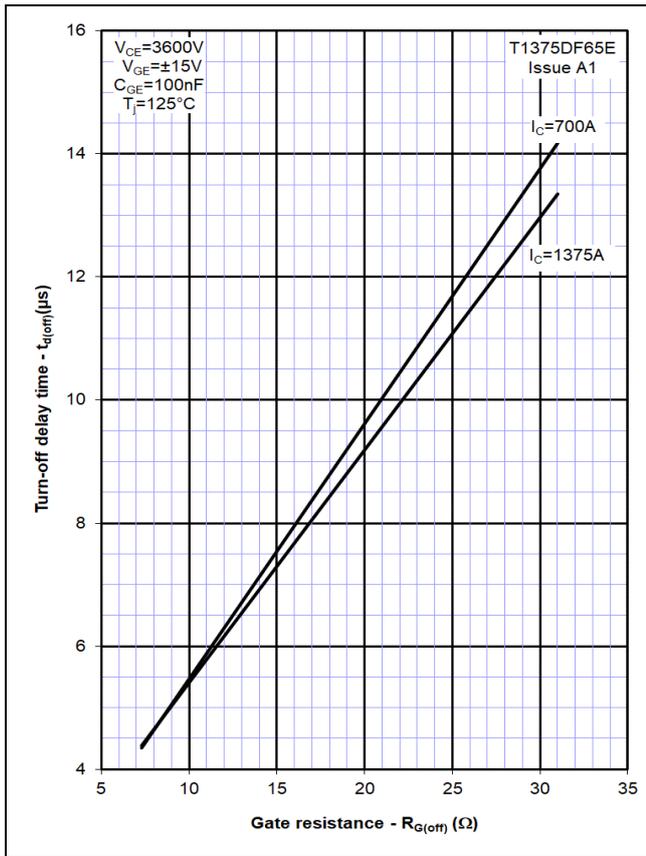


Figure 6 – Typical turn-on energy vs. collector current

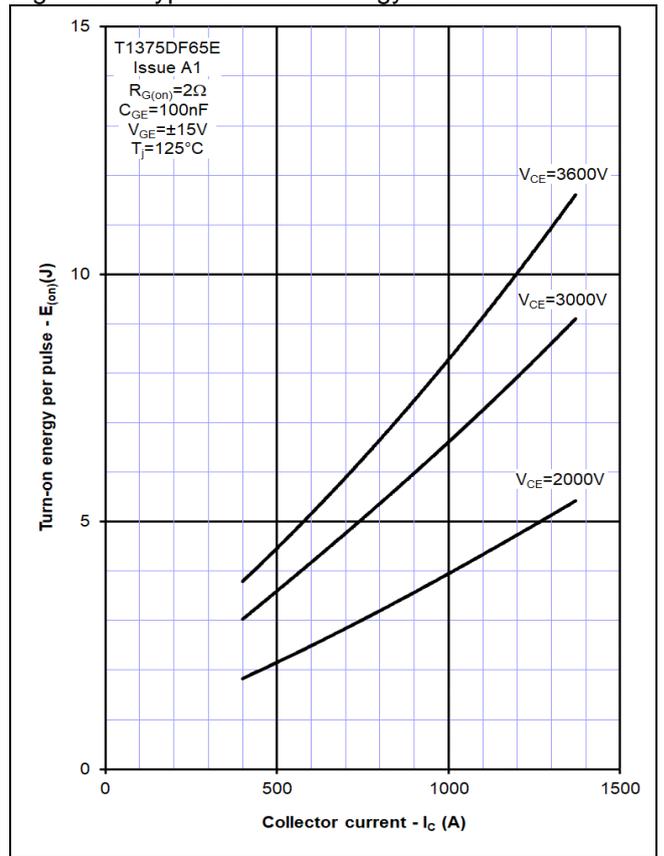


Figure 7 – Typical turn-on energy vs. di/dt

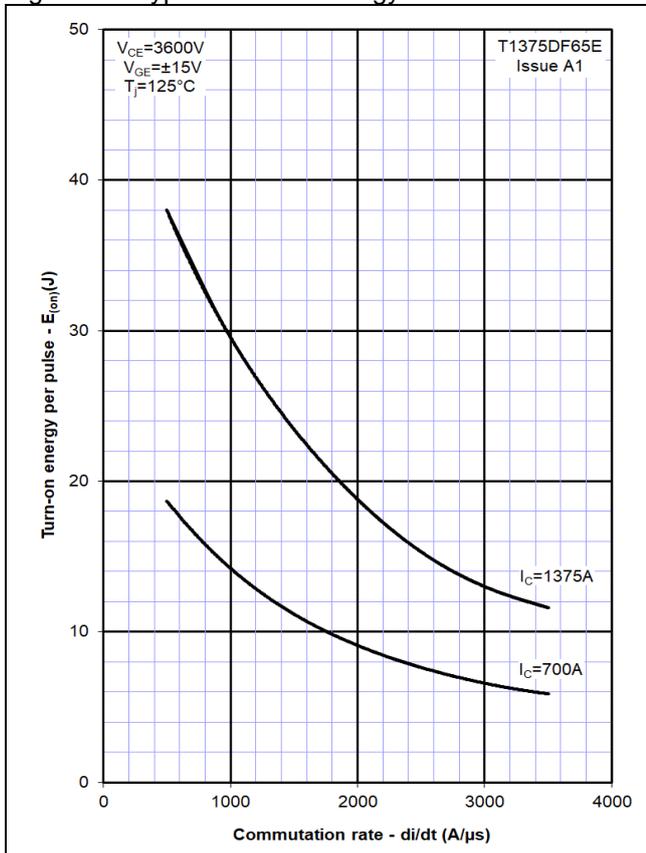


Figure 8 – Typical turn-off energy vs. collector current

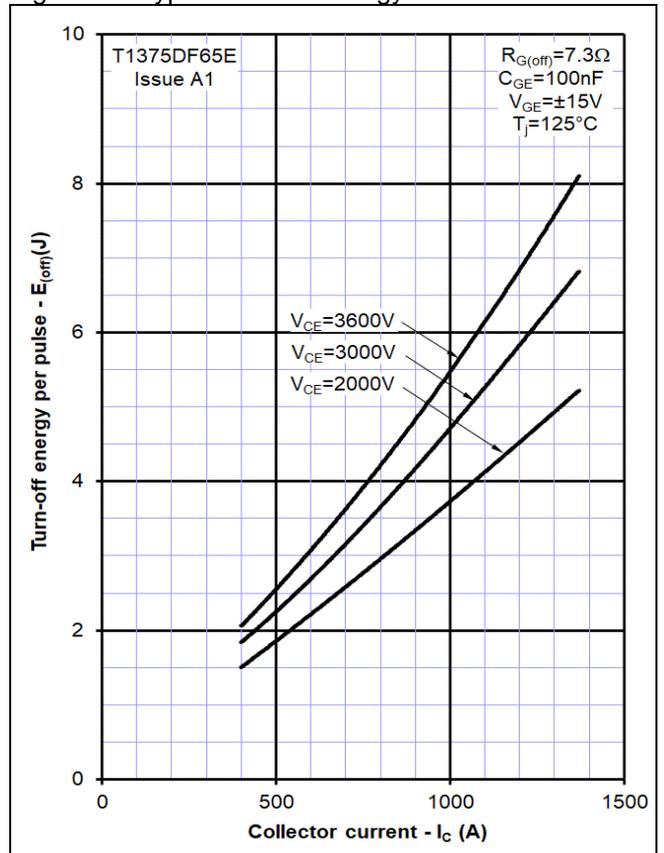


Figure 9 – Turn-off energy vs voltage

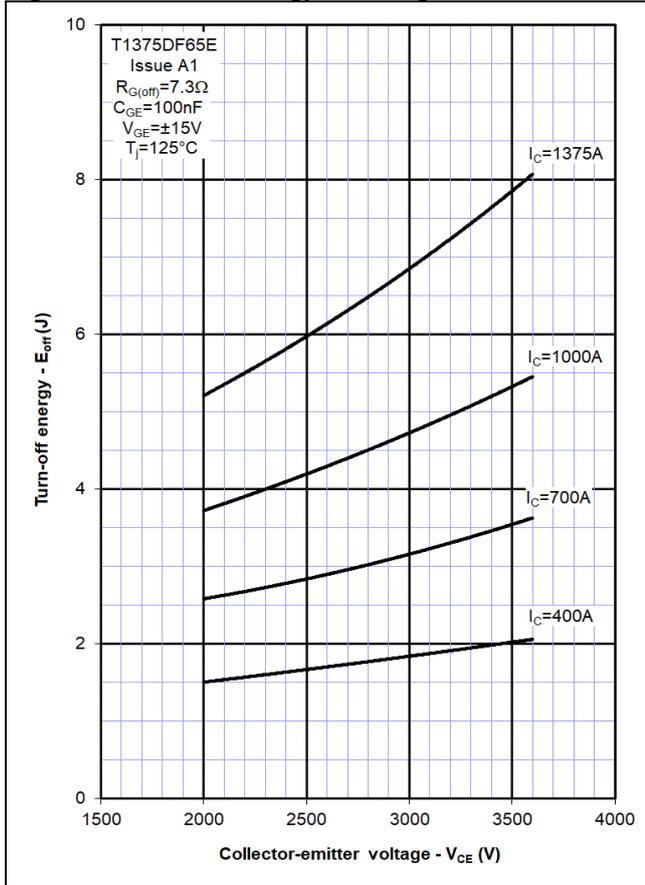


Figure 10 – Safe operating area

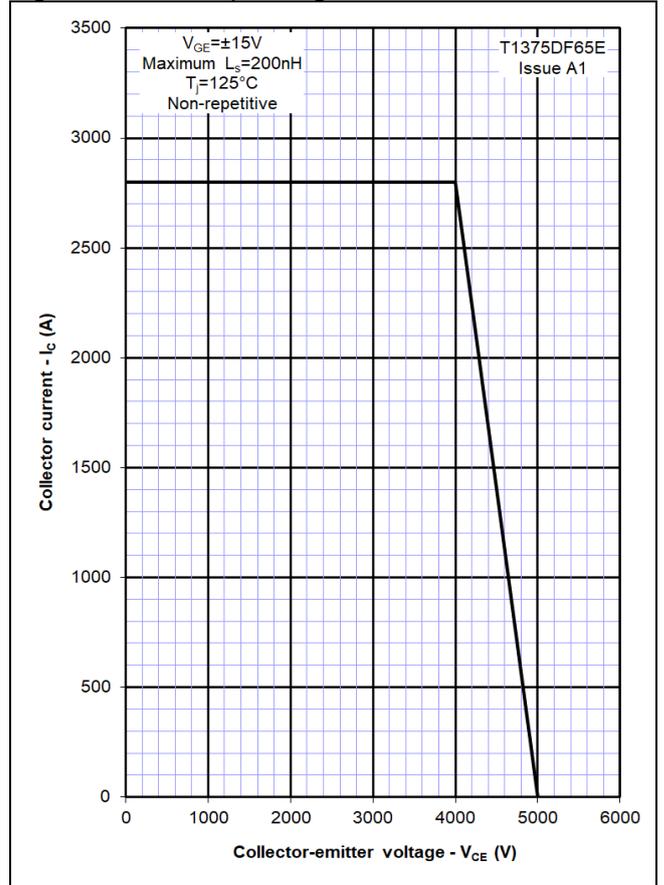
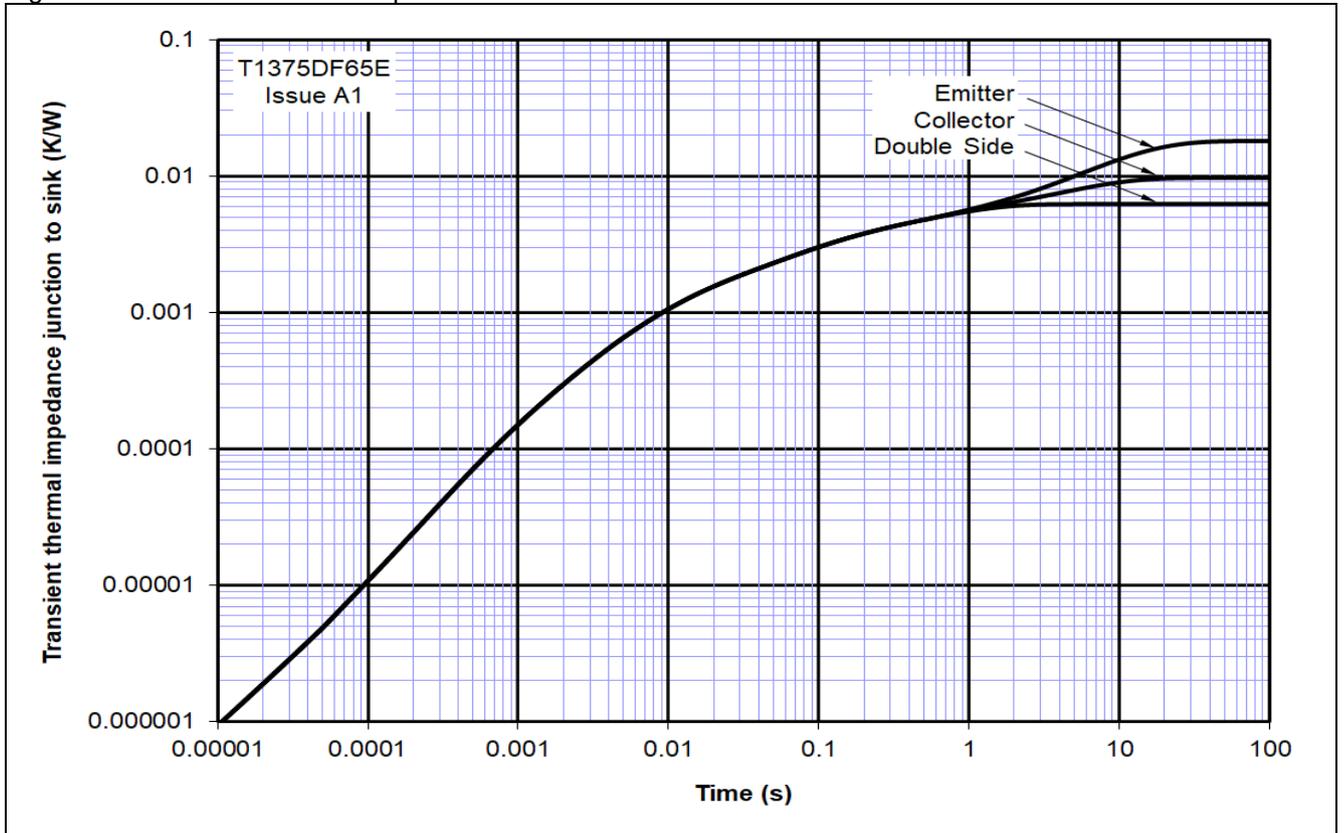
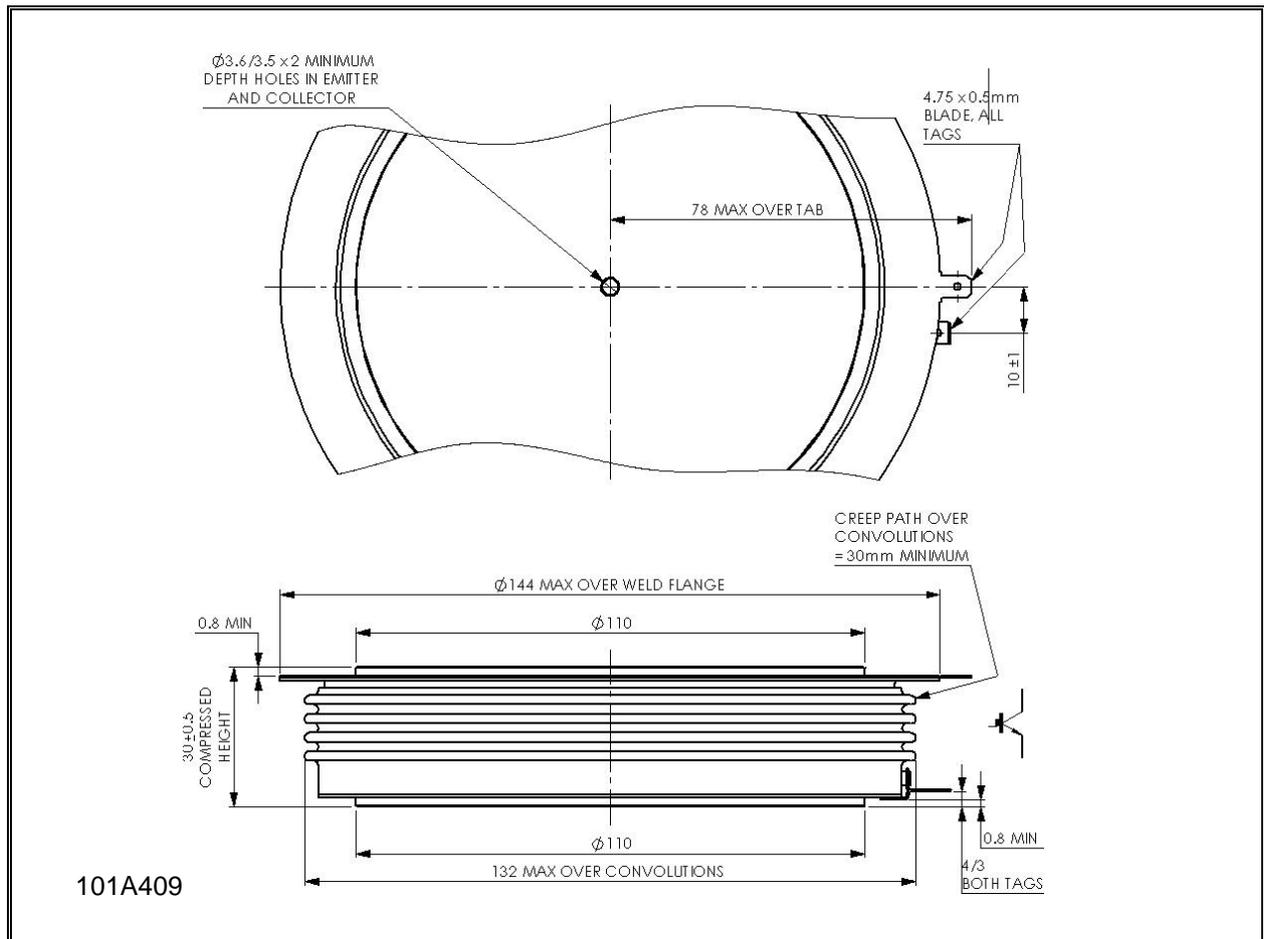


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



ORDERING INFORMATION

(Please quote 10 digit code as below)

T1375	DF	65	E
Fixed type Code	Fixed Outline Code	Voltage Grade V _{CES} /100 65	Fixed format code

Typical order code: T1375DF65E (V_{CES} = 6500V)

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