Date:- 10 Oct, 2022

Data Sheet Issue:- A1

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 = 125ºC.
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 $R_{G(ON)}$= 2Ω, $R_{G(OFF)}$=7.3Ω, C_{GE}=100nF Freewheel diode type E1780TG65E at T_j=125°C (Notes 3, 4 & 5)	µs
t_r(V)	Rise time	-	3.2	-		µs
$Q_{g(on)}$	Turn-on gate charge	-	16	-		µC
E_{on}	Turn-on energy	-	11.6	-		J
$t_{d(off)}$	Turn-off delay time	-	4.3	-		µs
t_f(I)	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_G.
5) E_{off} integration time 15µs from 90% falling V_{GE}.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

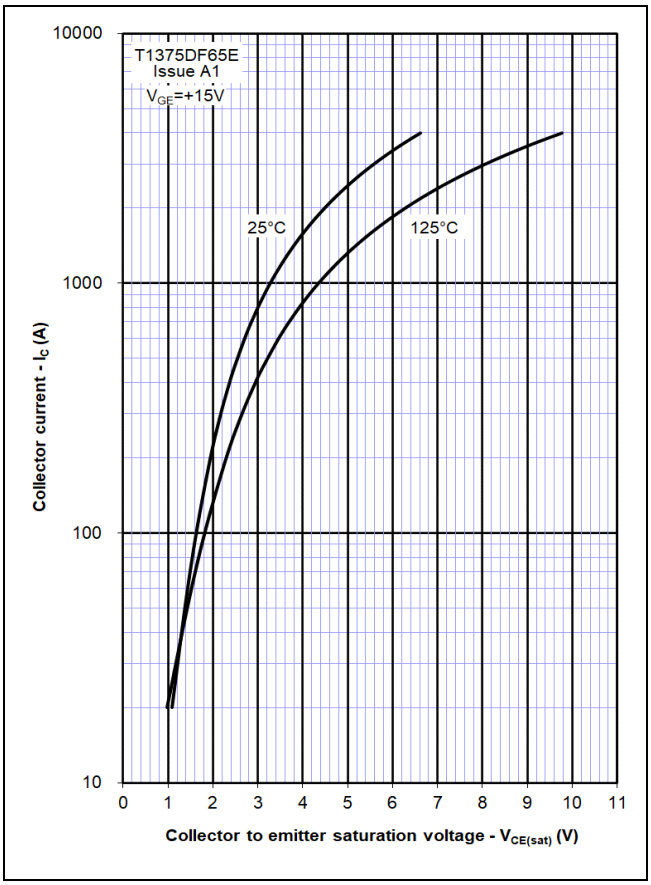


Figure 2 – Typical output characteristic

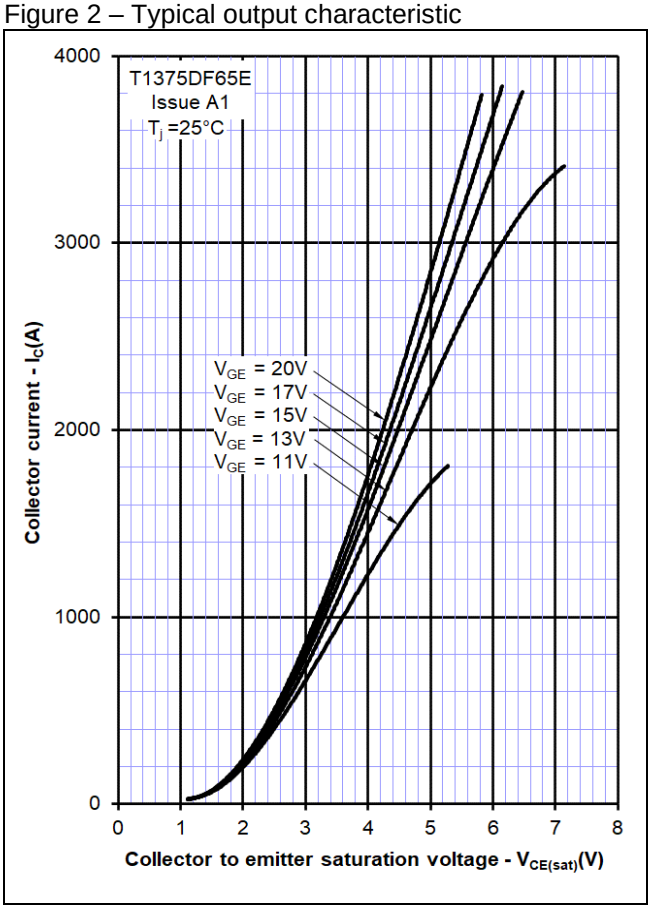


Figure 3 – Typical output characteristic

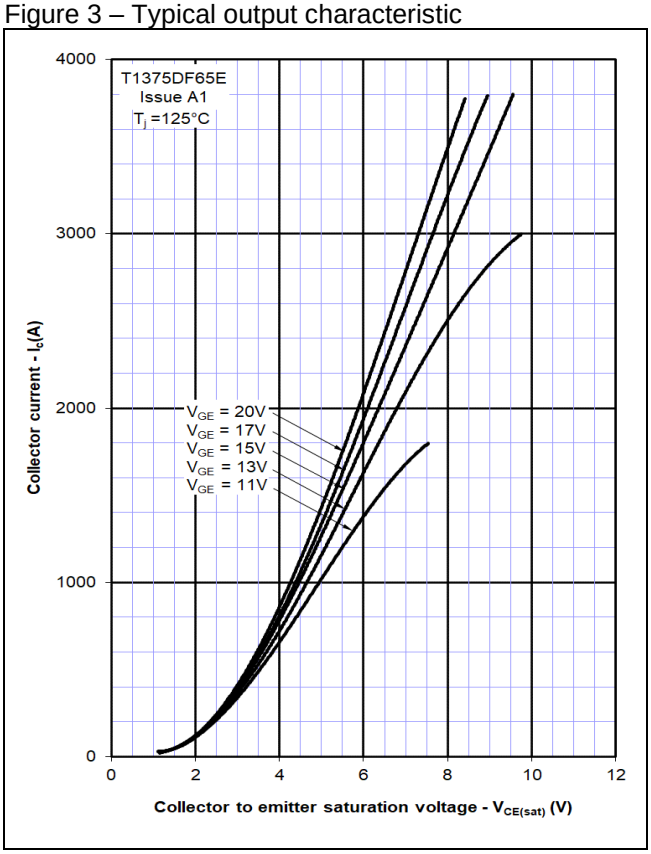


Figure 4 – Typical turn-on delay time vs gate resistance

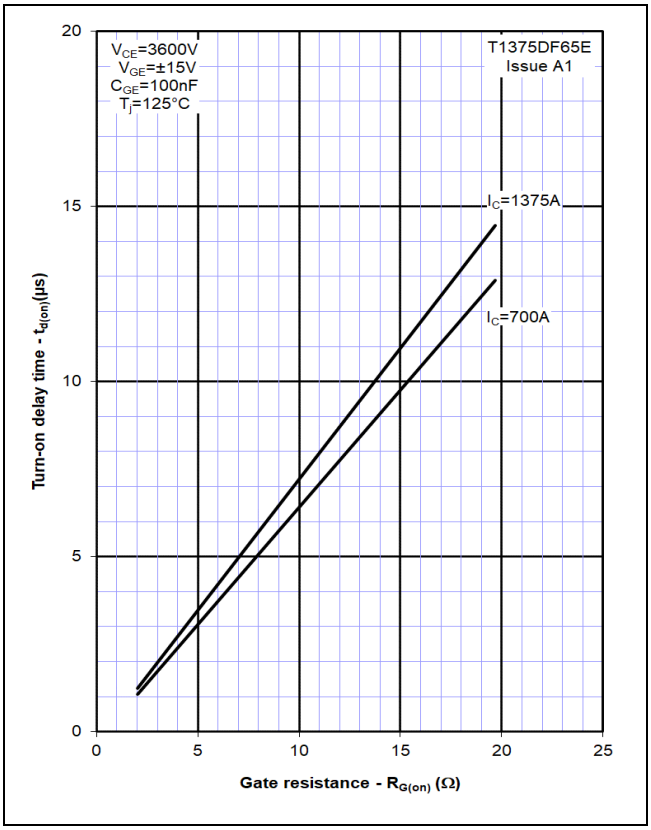


Figure 5 – Typical turn-off delay time vs. gate resistance

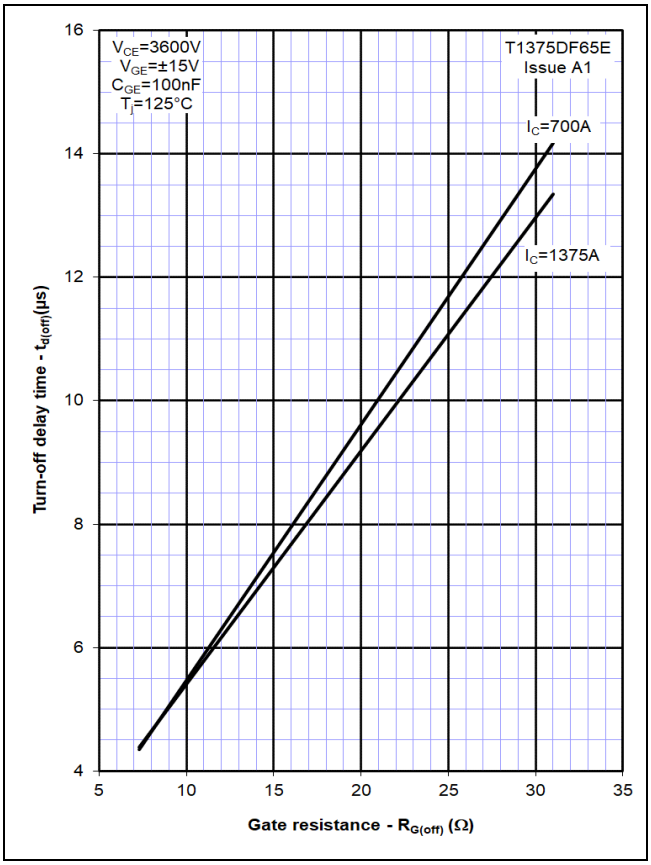


Figure 6 – Typical turn-on energy vs. collector current

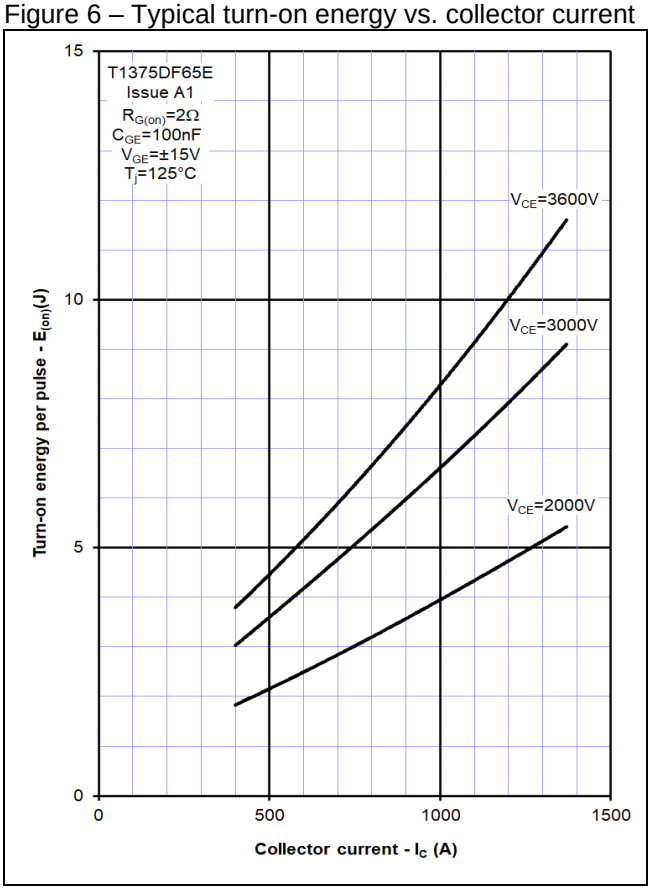


Figure 7 – Typical turn-on energy vs. di/dt

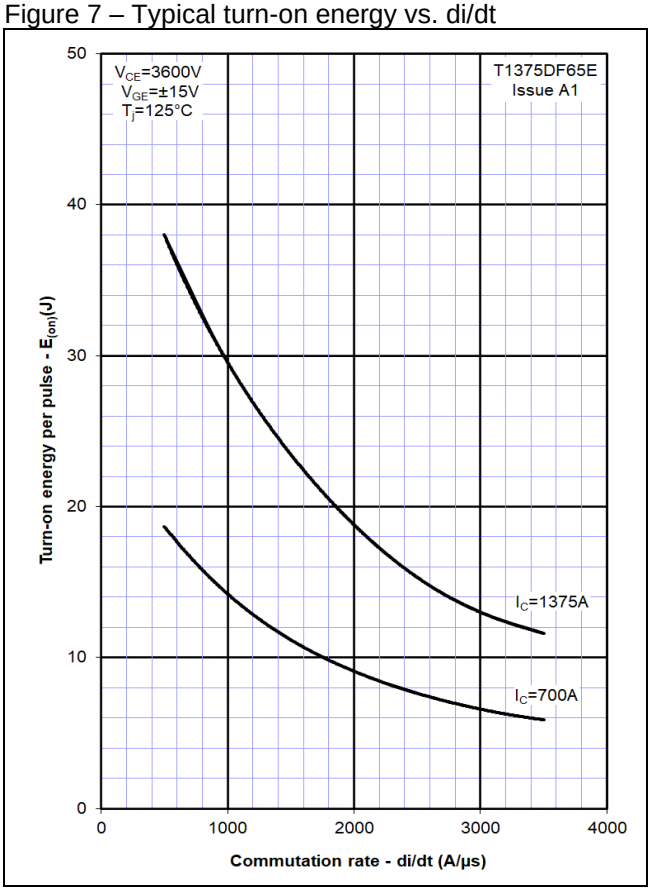


Figure 8 – Typical turn-off energy vs. collector current

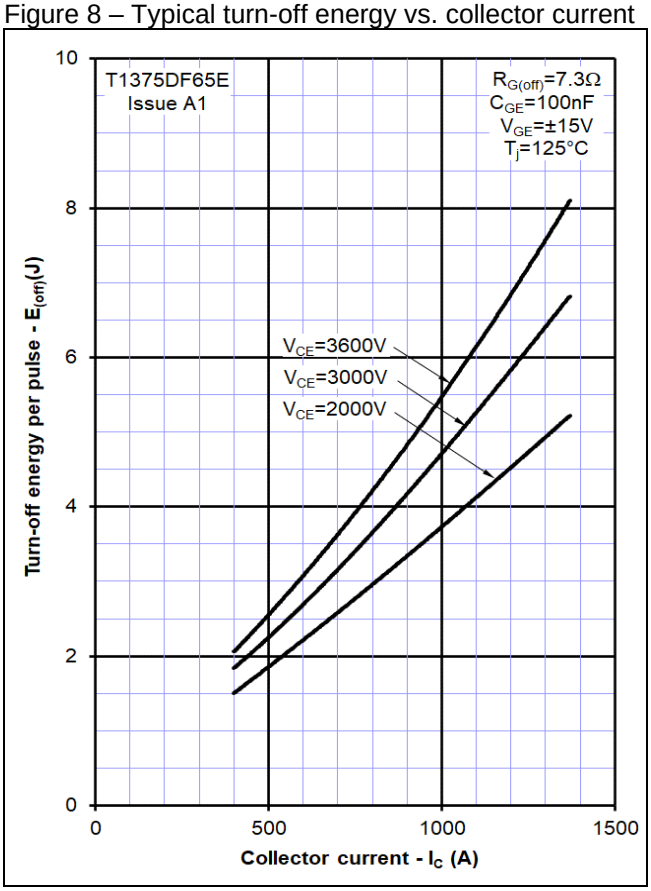


Figure 9 – Turn-off energy vs voltage

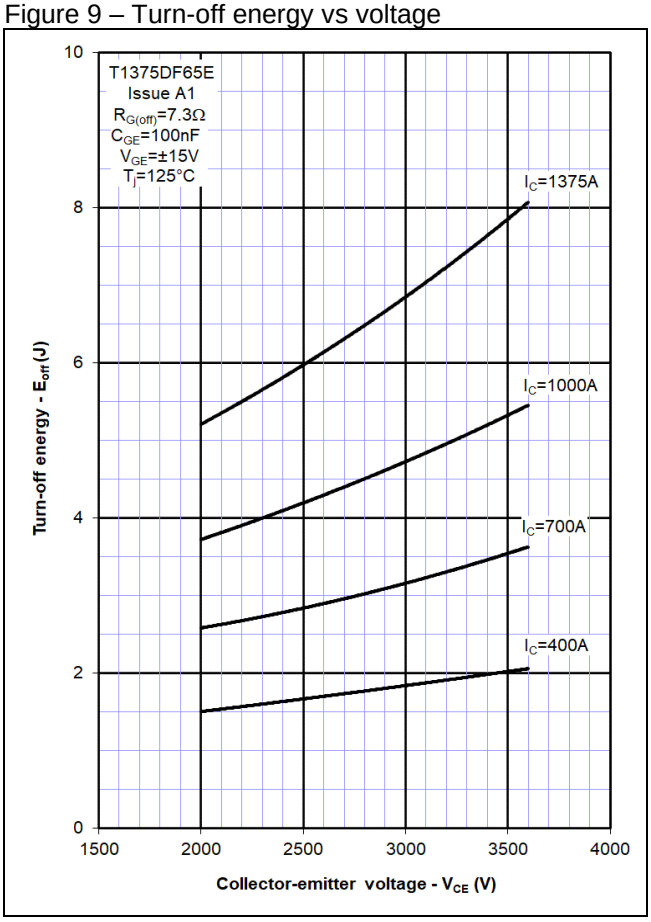


Figure 10 – Safe operating area

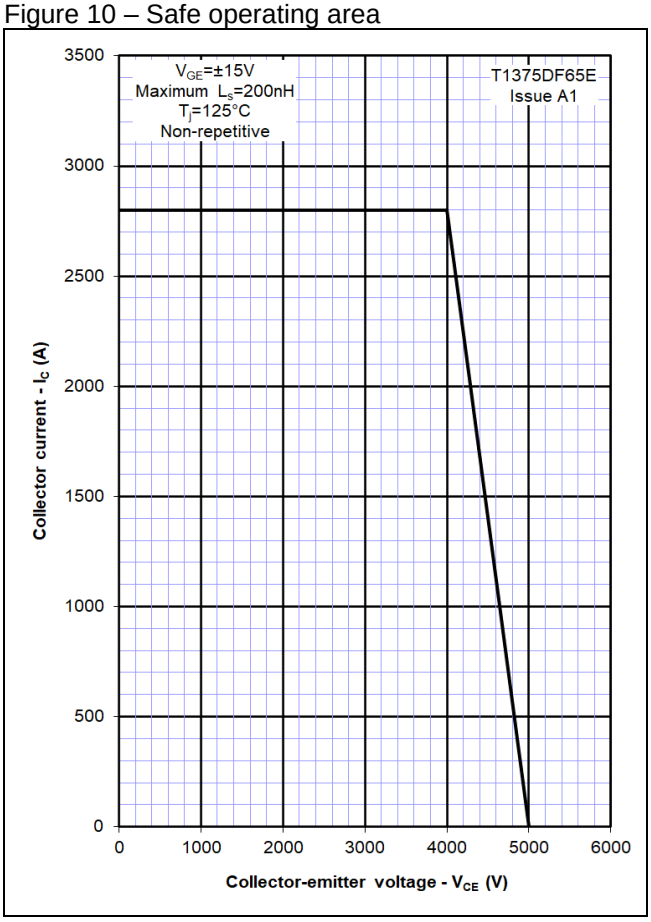
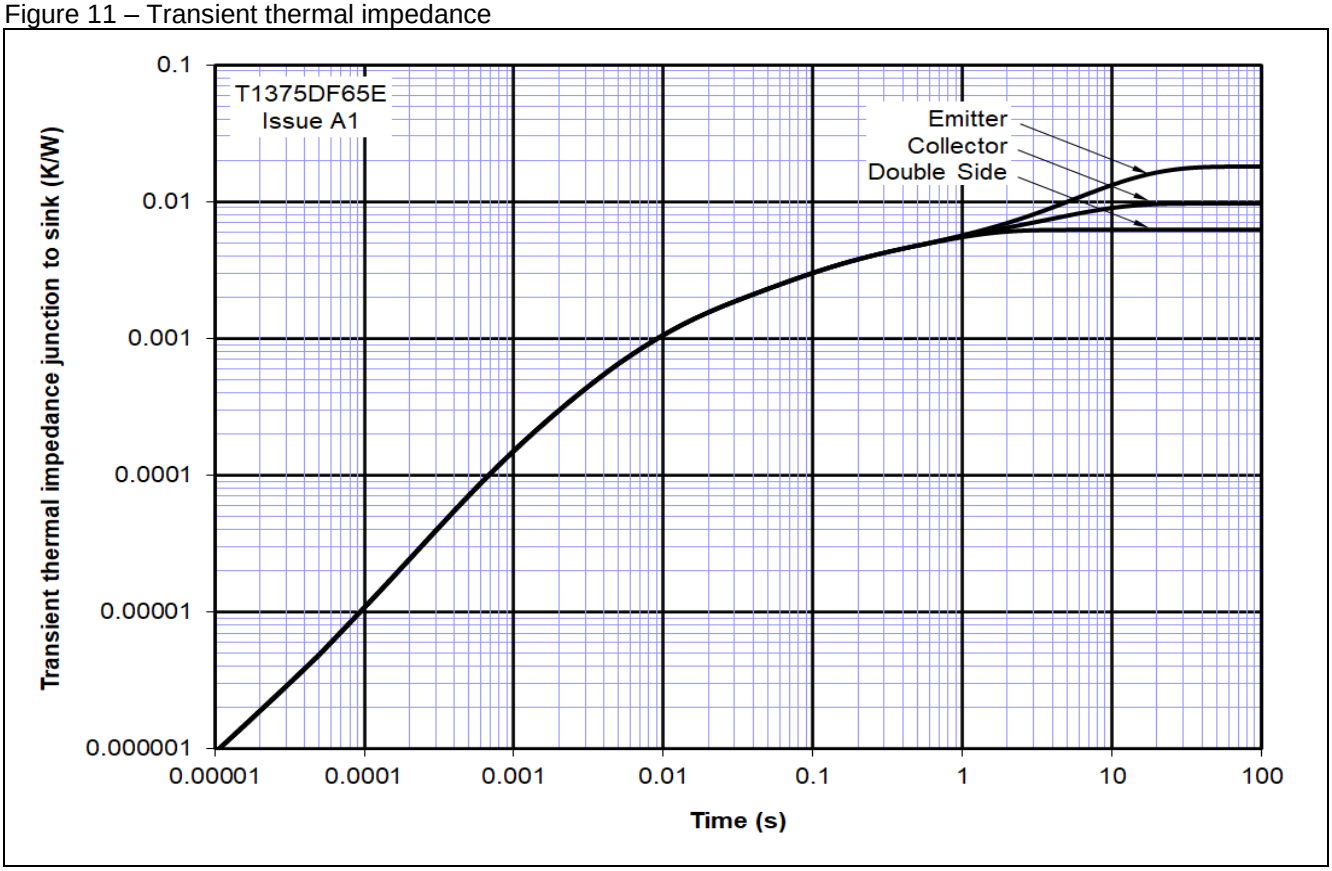
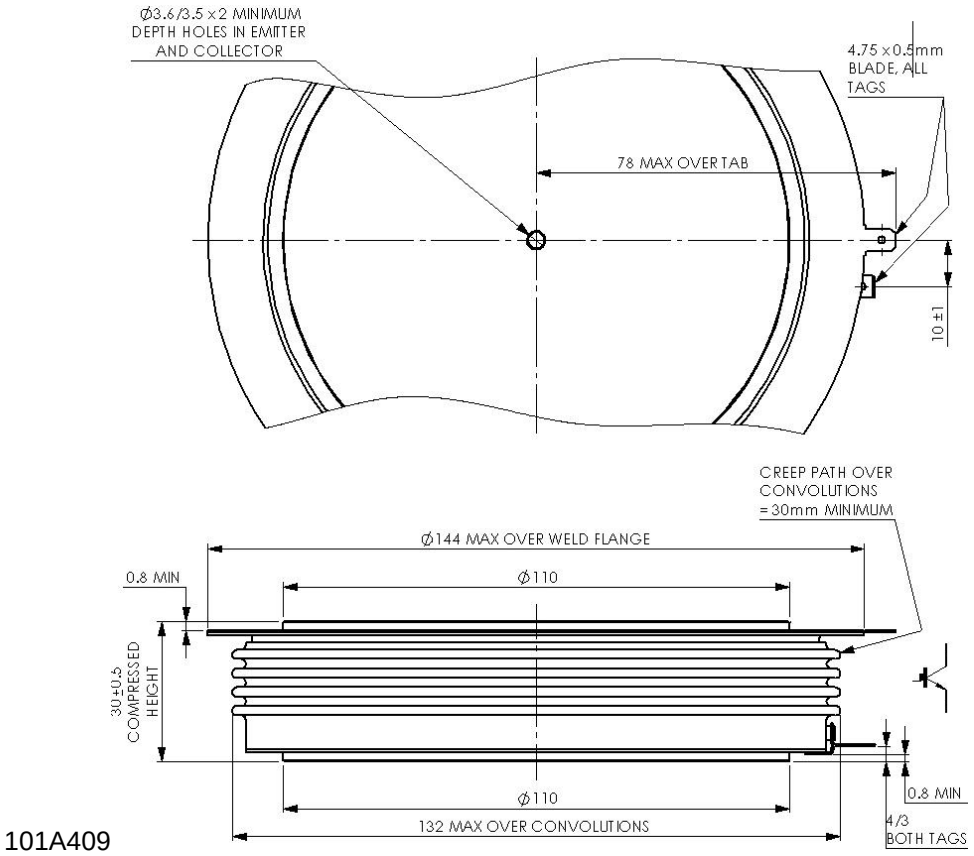


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



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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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