

Provisional Data

Insulated Gate Bi-Polar Transistor Type T1200EA45E

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{CES}	Collector – emitter voltage	4500	V
$V_{DC\ link}$	Permanent DC voltage for 100 FIT failure rate	2800	V
V_{GES}	Peak gate – emitter voltage	± 20	V

	RATINGS	MAXIMUM LIMITS	UNITS
$I_{C(DC)}$	Continuous DC collector current, IGBT (Note 4)	2132	A
I_{CRM}	Repetitive peak collector current, $t_p=500\mu s$, IGBT	2.1	kA
I_{ECO}	Maximum reverse emitter current, $t_p=1ms$, (note 2 & 3)	1193	A
P_{MAX}	Maximum power dissipation, IGBT (note 4)	11.1	kW
$T_{j\ op}$	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) $T_{sink} = 55^{\circ}C$, double side cooled
- 3) The Use of an anti-parallel diode is recommended
- 4) $T_{sink} = 25^{\circ}C$, double side cooled

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
V _{CE(sat)}	Collector – emitter saturation voltage	-	3.5	3.8	I _C = 1200A, V _{GE} = 15V, T _J = 25°C	V
		-	4.7	5.0	I _C = 1200A, V _{GE} = 15V	V
V _{T0}	Threshold voltage	-	-	1.8	Current range: 400 – 1200A	V
r _T	Slope resistance	-	-	1.6		mΩ
V _{GE(TH)}	Gate threshold voltage	4.7	5.5	6.4	V _{CE} = V _{GE} , I _C = 200mA	V
I _{CES}	Collector – emitter cut-off current	-	14	25	V _{CE} = V _{CES} , V _{GE} = 0V	mA
I _{GES}	Gate leakage current	-	-	±200	V _{GE} = ±20V	μA
C _{ies}	Input capacitance	-	200	-	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz	nF
t _{d(on)}	Turn-on delay time	-	1.7	-	I _C = 1200A, V _{CE} = 0.5V _{CES} , V _{GE} = ±20V,	μs
t _{r(l)}	Rise time	-	2.8	-		μs
Q _{g(on)}	Turn-on gate charge	-	-	120	R _{g(ON)} = 3.3Ω, R _{g(OFF)} = 2Ω,	μC
E _{on}	Turn-on energy	-	3.2	-		J
t _{d(off)}	Turn-off delay time	-	1.4	-	R _{g(ON)} = 3.3Ω, R _{g(OFF)} = 2Ω,	μs
t _f	Fall time	-	1.7	-		μs
Q _{g(off)}	Turn-off gate charge	-	-	140		μC
E _{off}	Turn-off energy	-	3.8	-		J

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R _{thJK}	Thermal resistance junction to sink, IGBT	-	-	9	Double side cooled	K/kW
		-	-	14	Collector side cooled	K/kW
		-	-	25	Emitter side cooled	K/kW
F	Mounting force	25	30	35	Note 2	kN
W _t	Weight	-	1.2	-		kg

Notes:-

- 1) Unless otherwise indicated T_J = 125°C
- 2) For other clamp forces, please consult factory

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

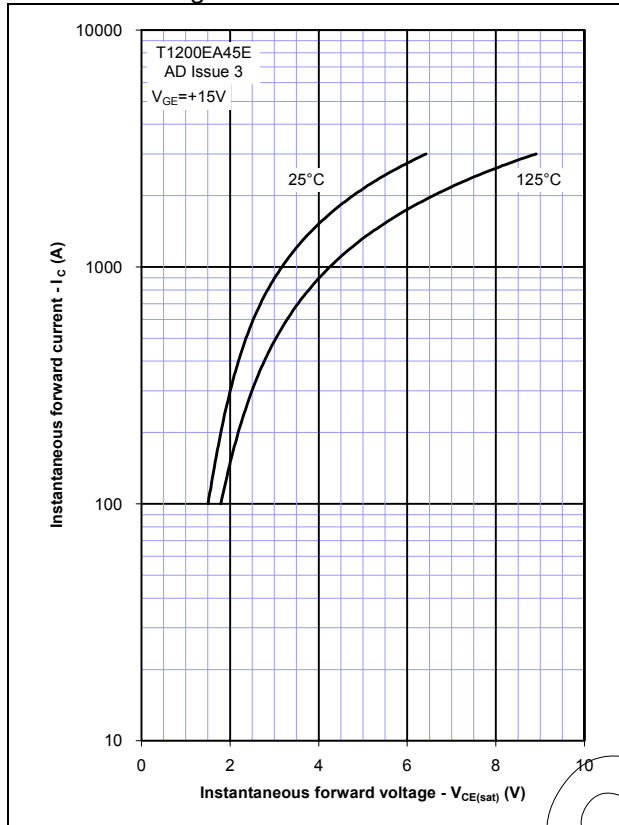


Figure 2 – Typical output characteristic

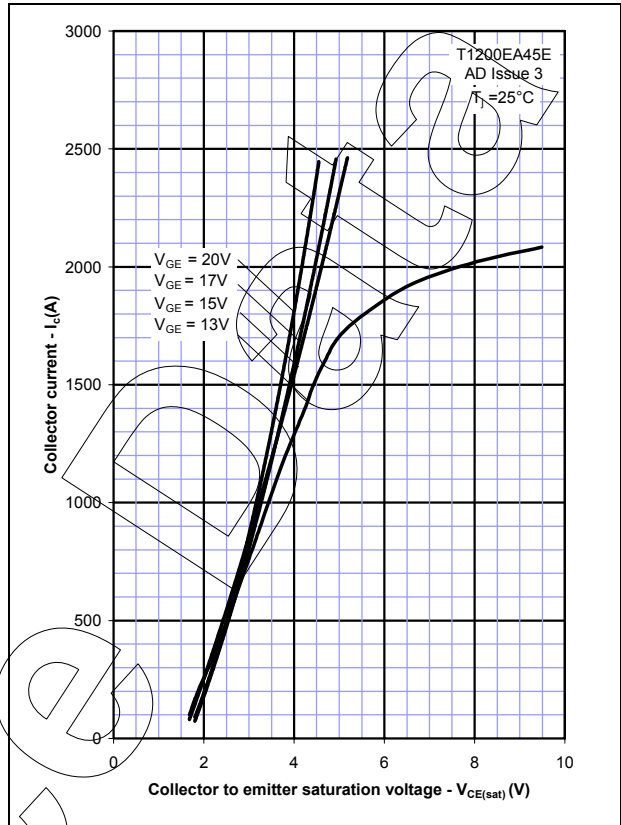


Figure 3 – Typical output characteristic

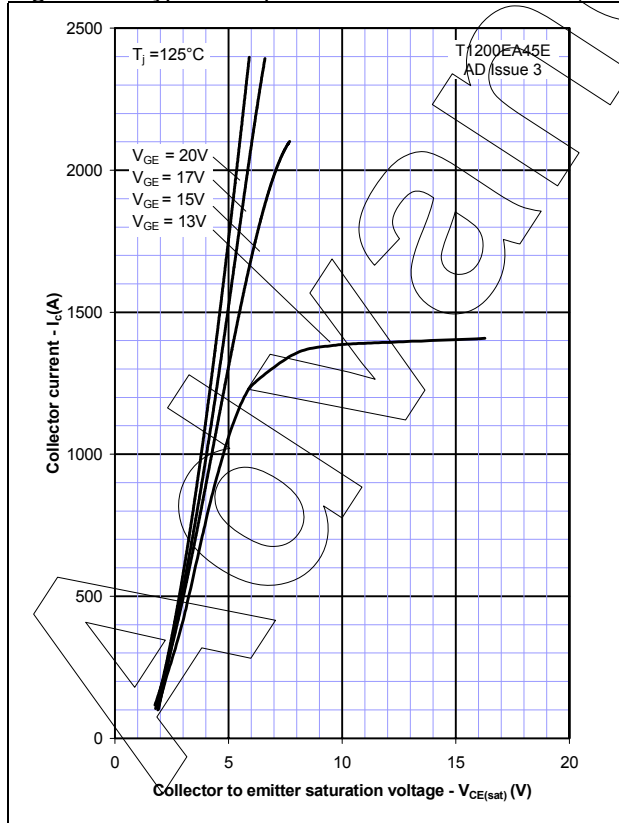


Figure 4 – Typical turn-on gate charge

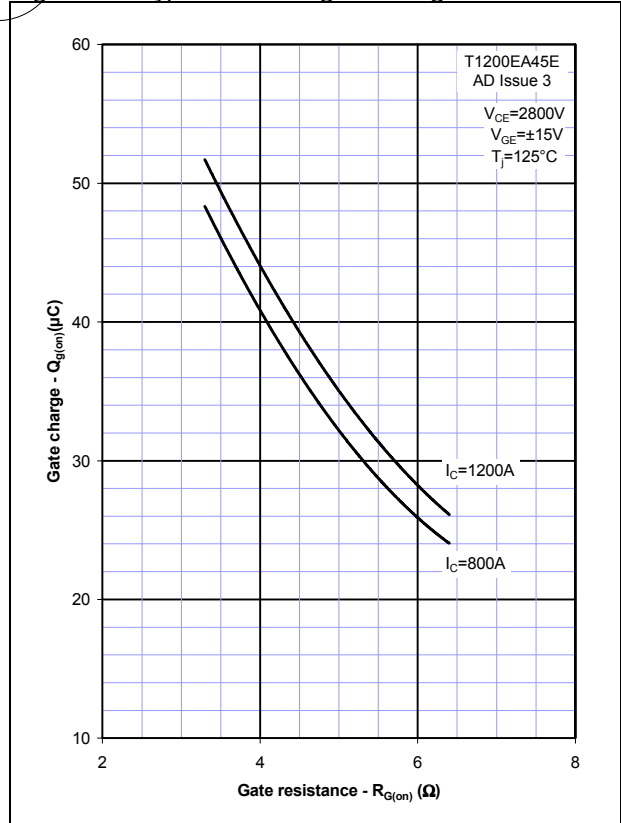


Figure 5 – Typical turn-off gate charge

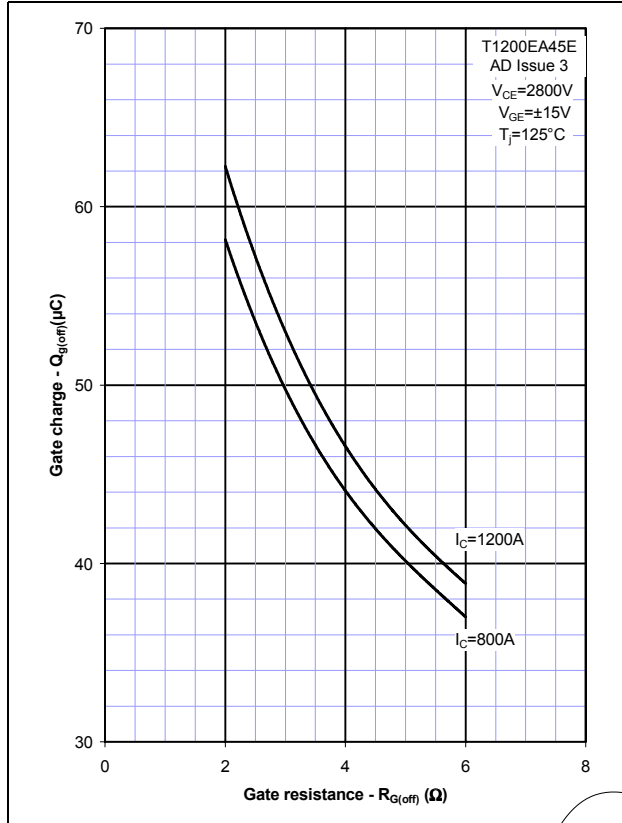


Figure 6 – Typical turn-on delay time vs gate resistance

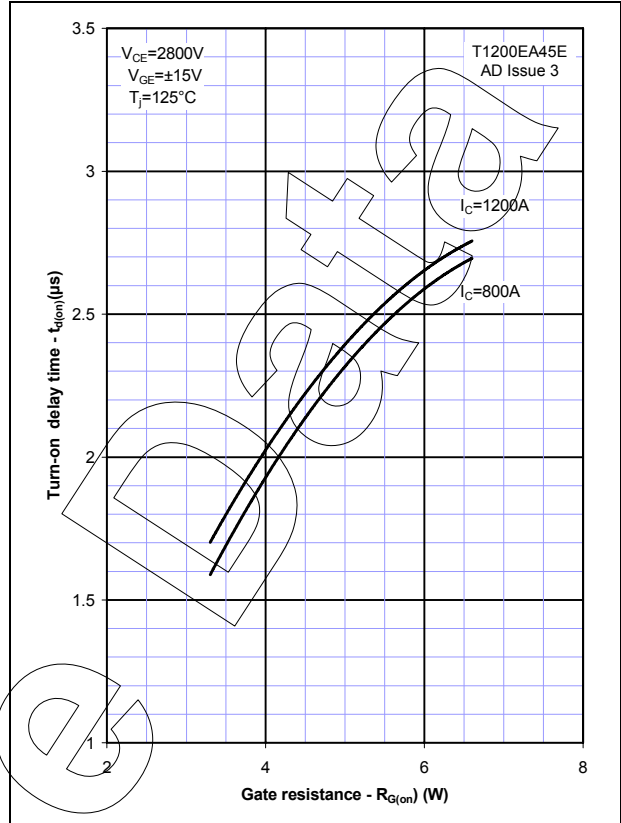


Figure 7 – Typical turn-off delay time vs. gate resistance

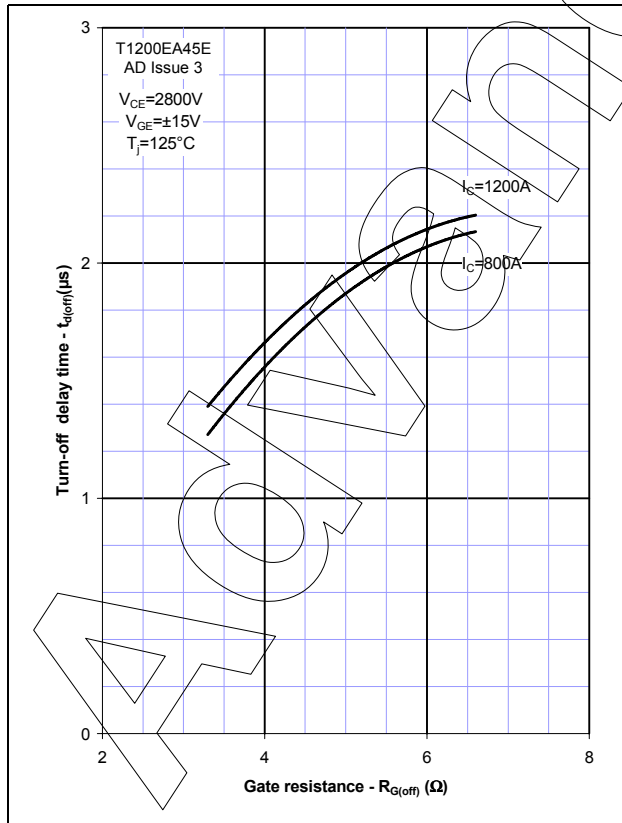


Figure 8 – Typical turn-on energy vs. collector current

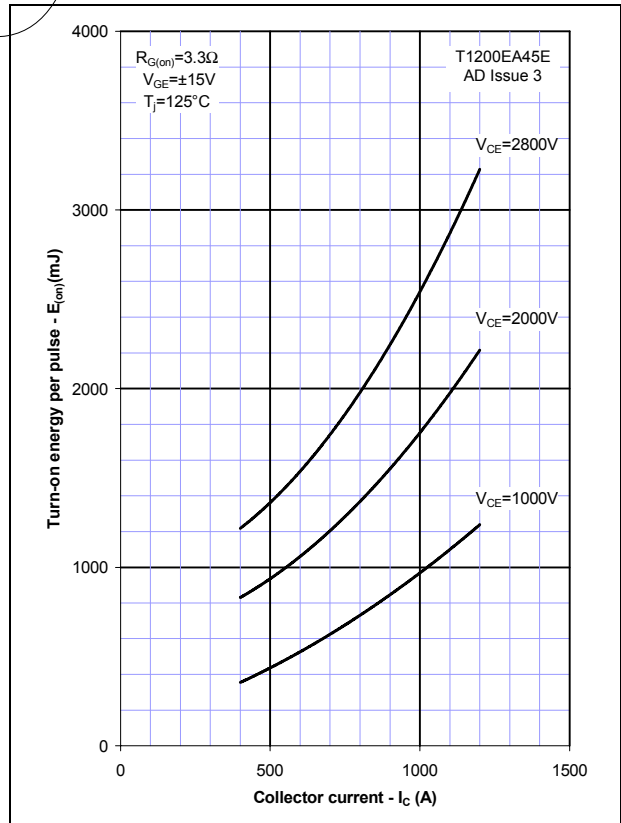


Figure 9 – Typical turn-on energy vs. di/dt

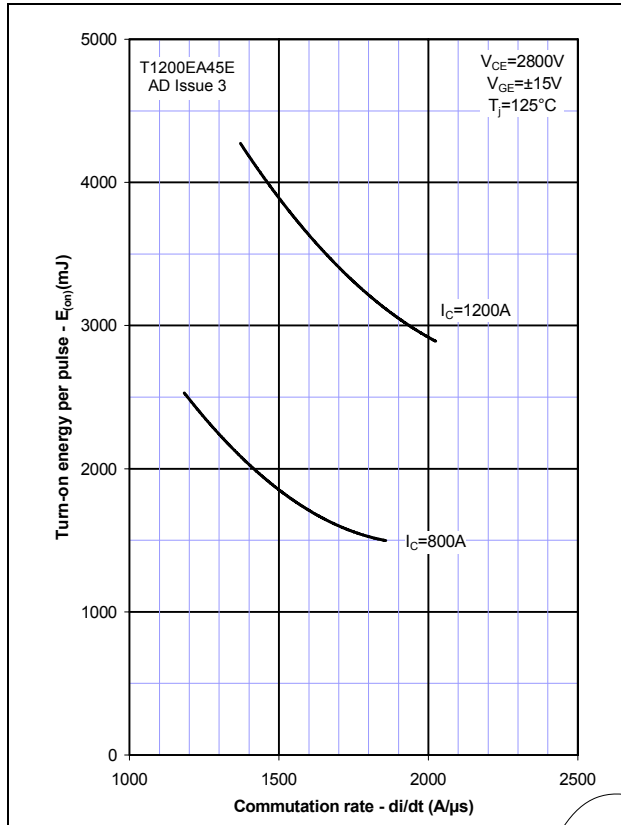


Figure 10 – Typical turn-off energy vs. collector current

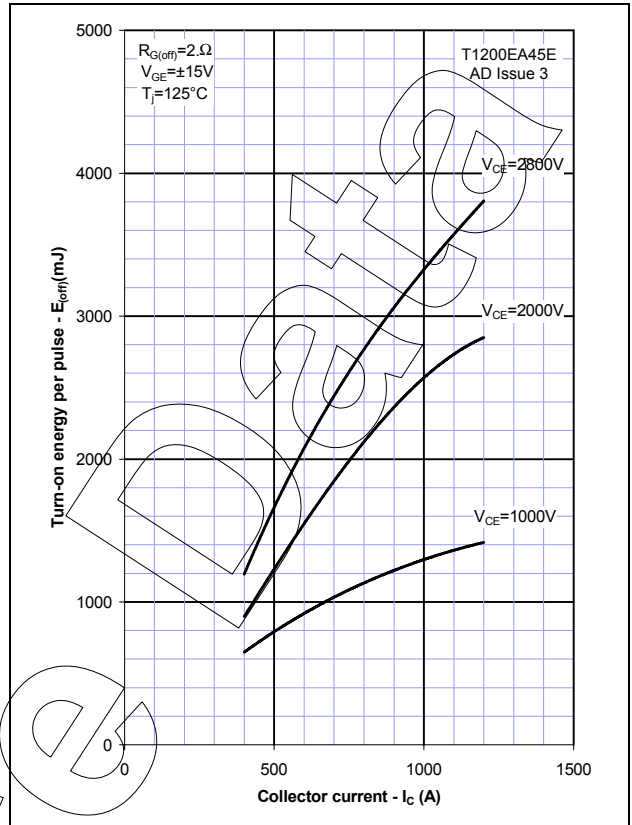


Figure 11 – Turn-off energy vs voltage

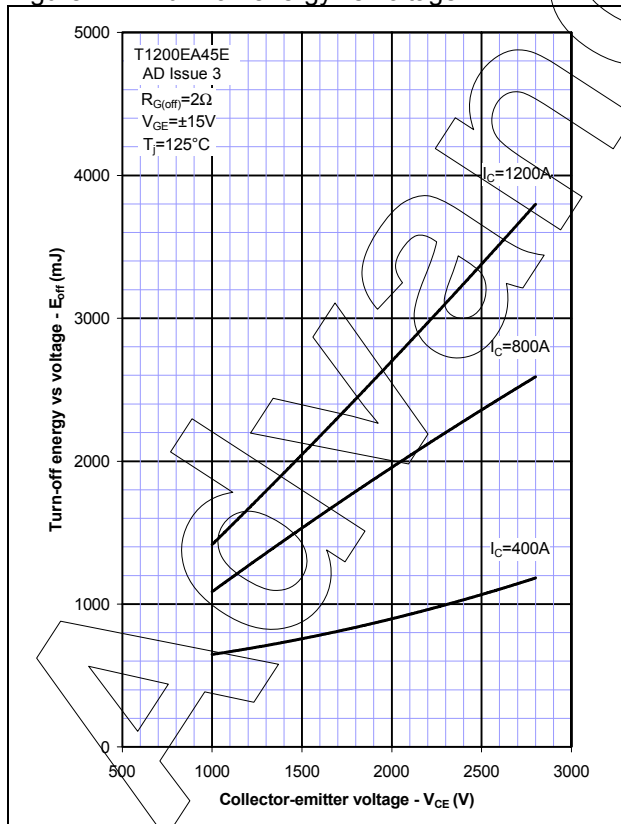


Figure 12 – Safe operating area

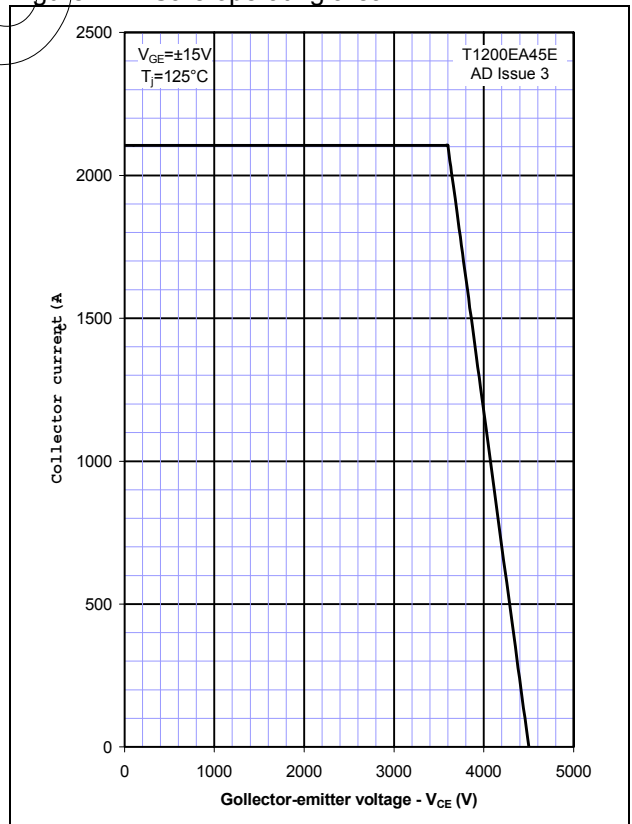
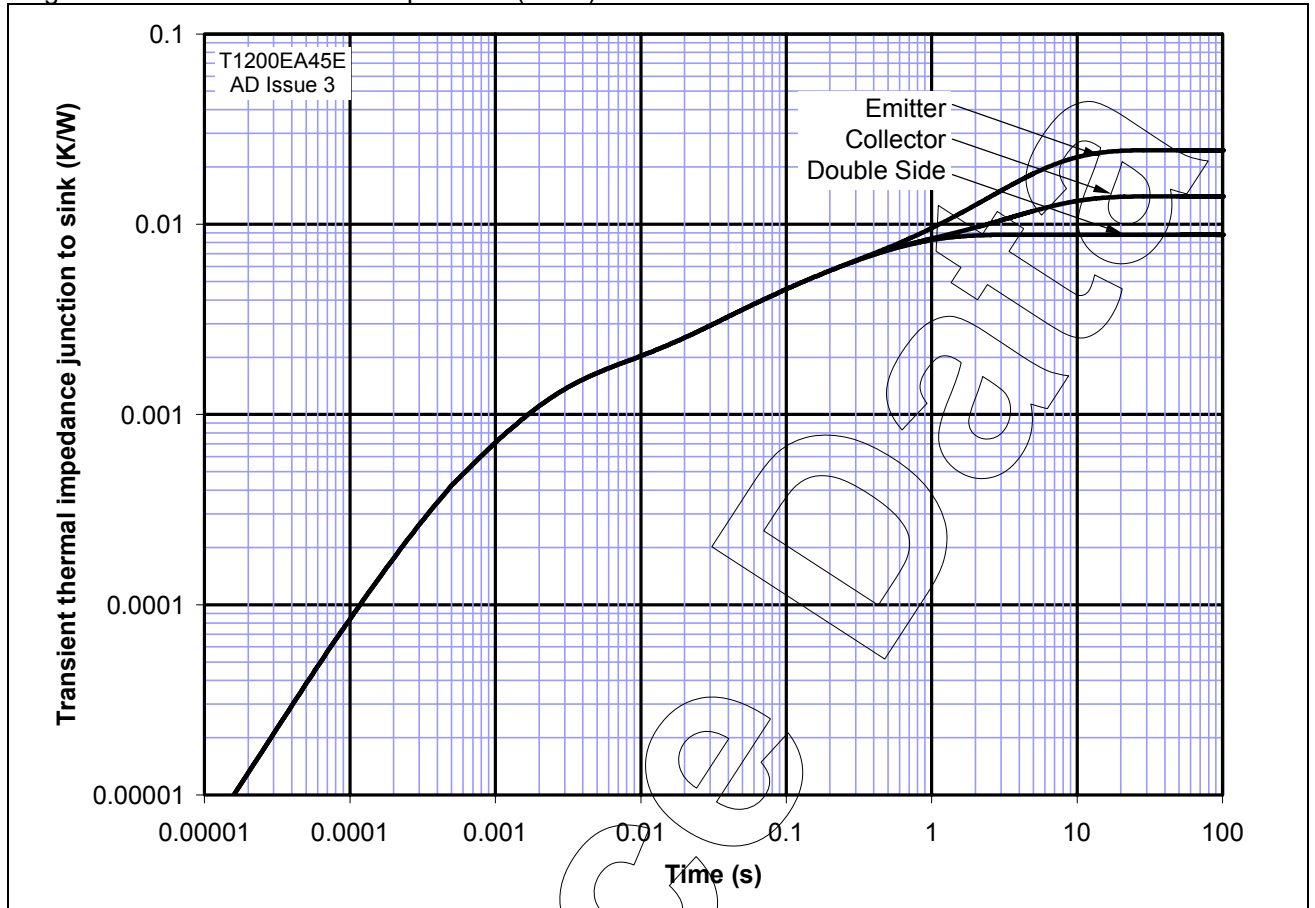
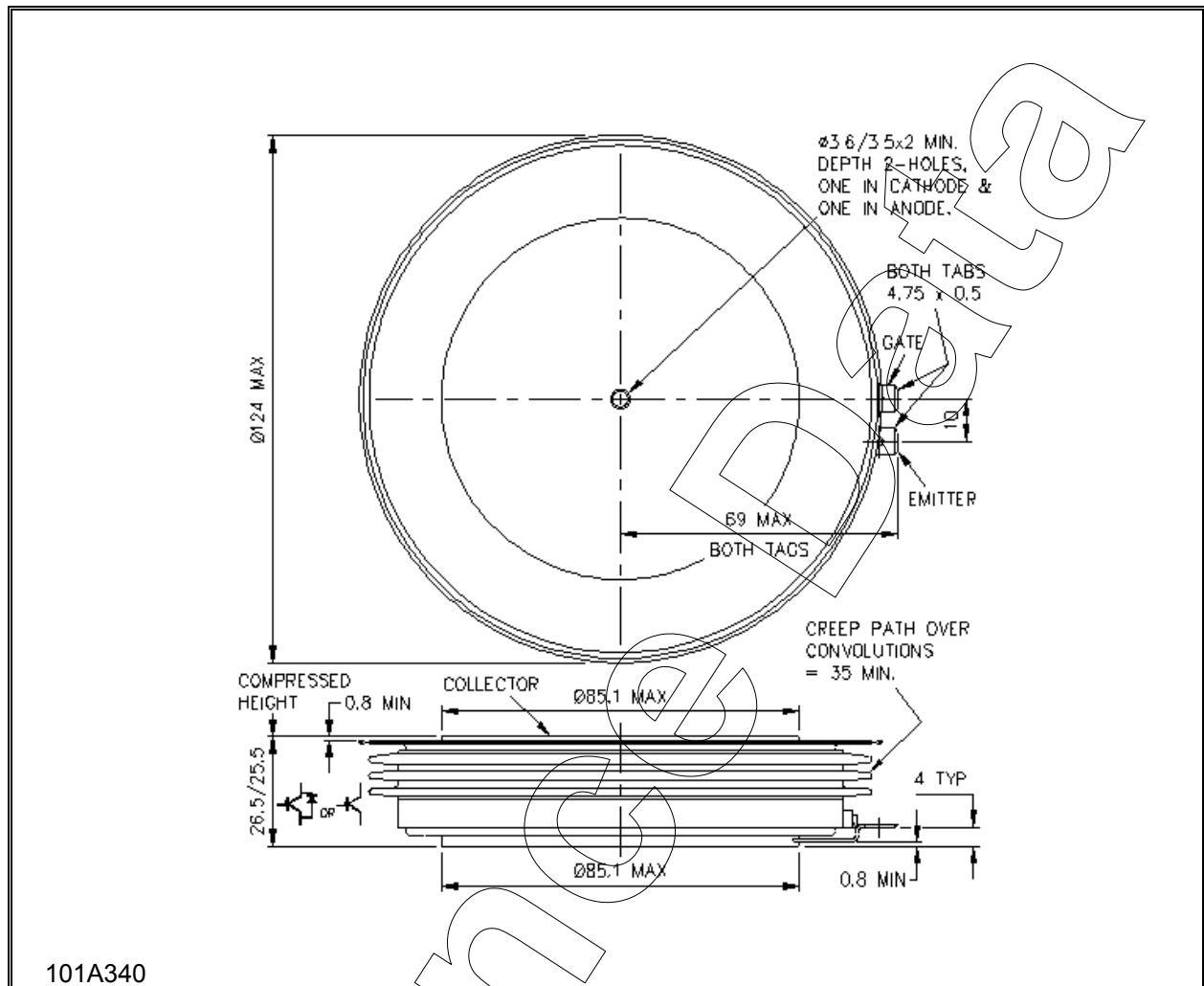


Figure 13 – Transient thermal impedance (IGBT)



Outline Drawing & Ordering Information



ORDERING INFORMATION			
(Please quote 10 digit code as below)			
T1200	EA	45	E
Fixed type Code	Fixed Outline Code	Voltage Grade $V_{CES}/100$ 45	Fixed format code
Typical order code: T1200EA54E ($V_{CES} = 4500V$)			

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