WESTCODE
An IXYS Company

Date:- 21 Nov, 2005

Data Sheet Issue:- 3

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=500µs, 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	°C
T_{stg}	Storage temperature range	-40 to +125	°C

Notes: -
1) Unless otherwise indicated T_j = 125ºC
2) T_{sink} = 55°C, double side cooled
3) The Use of an anti-parallel diode is recommended
4) T_{sink} = 25°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	-		µs
t_r(I)	Rise time	-	2.8	-		µs
$Q_{g(on)}$	Turn-on gate charge	-	-	120	I_C =1200A, V_{CE} = 0.5V_{CES},	µC
E_{on}	Turn-on energy	-	3.2	-	V_{GE} = ±20V,	J
$t_{d(off)}$	Turn-off delay time	-	1.4	-	$R_{g(ON)}$= 3.3Ω,	µs
t_f	Fall time	-	1.7	-	$R_{g(OFF)}$=2Ω,	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

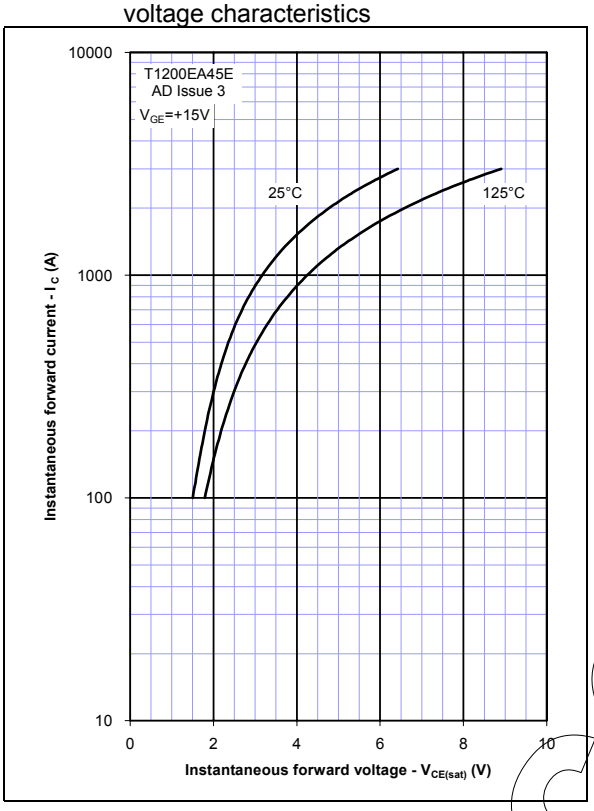


Figure 2 – Typical output characteristic

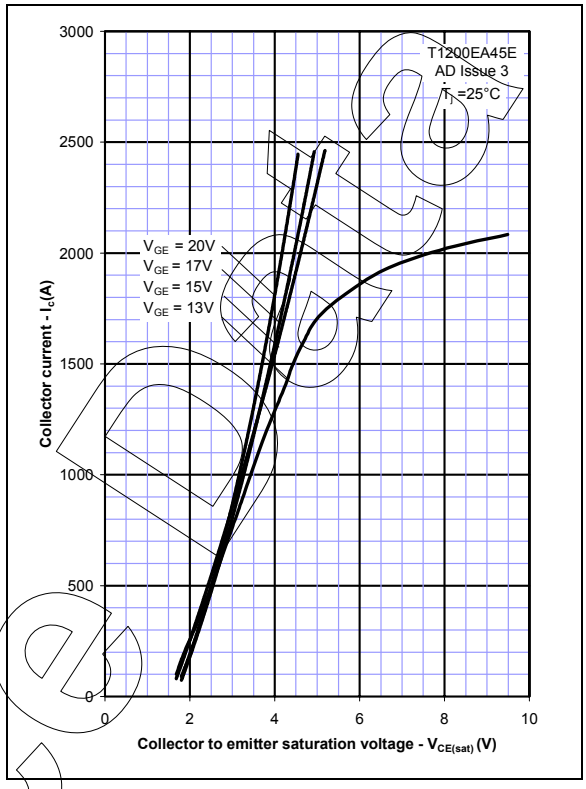


Figure 3 – Typical output characteristic

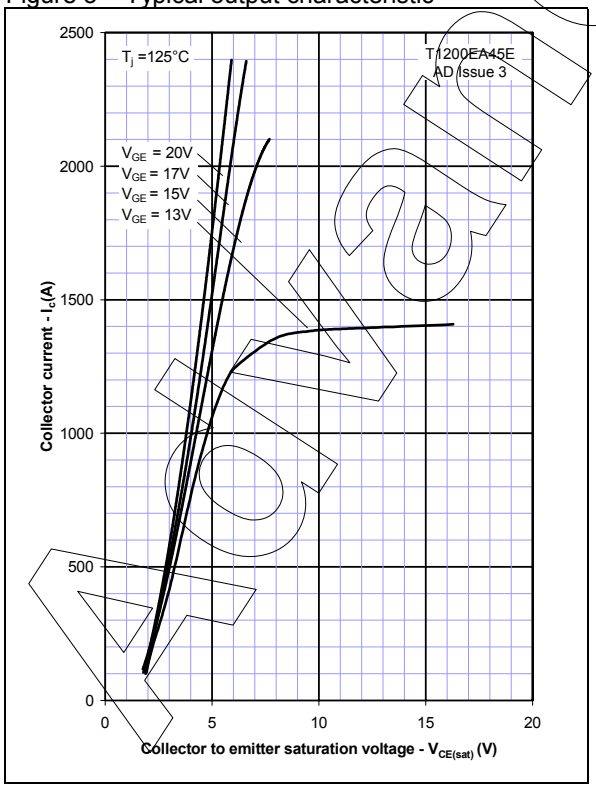


Figure 4 – Typical turn-on gate charge

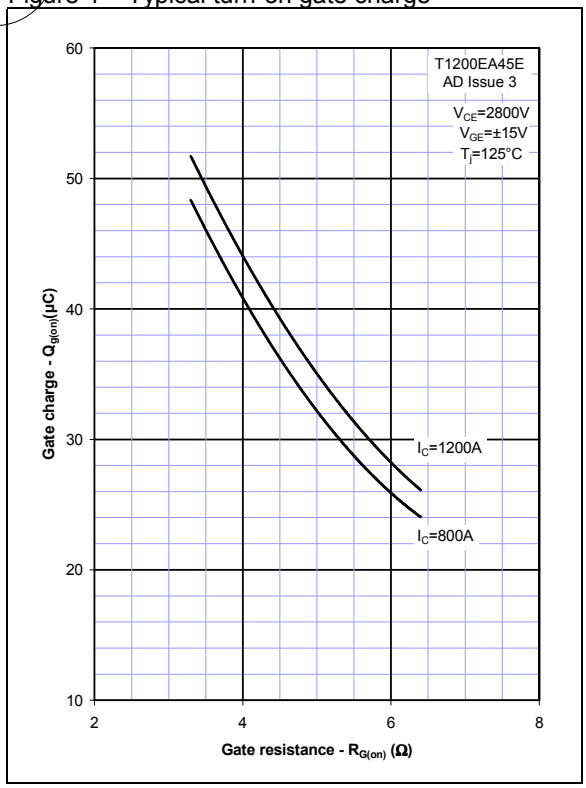


Figure 5 – Typical turn-off gate charge

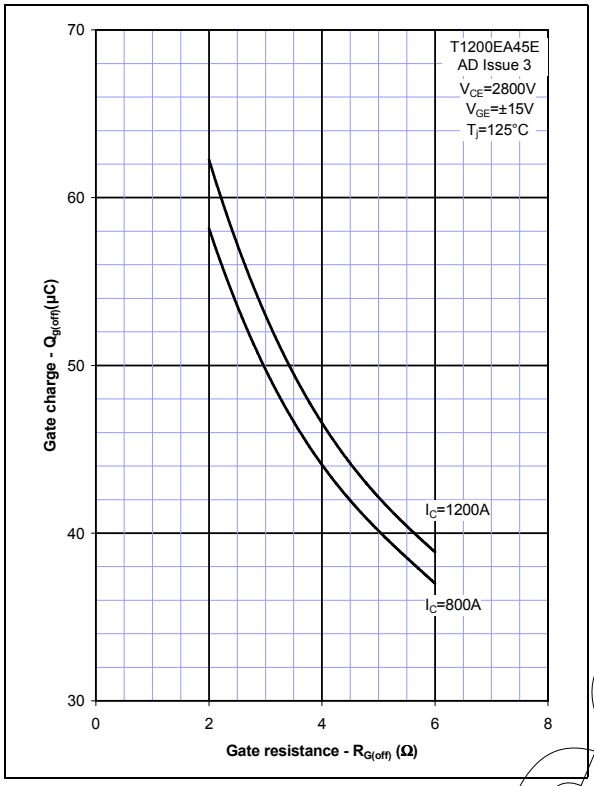


Figure 6 – Typical turn-on delay time vs gate resistance

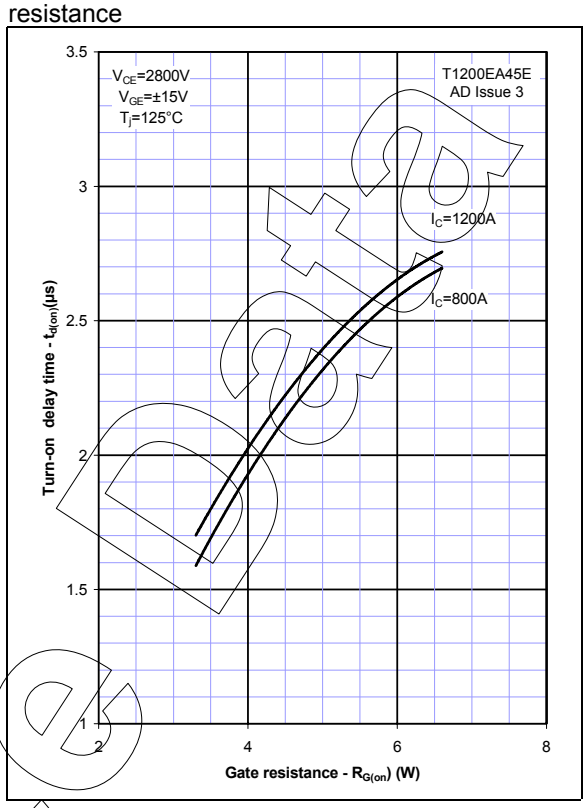


Figure 7 – Typical turn-off delay time vs. gate resistance

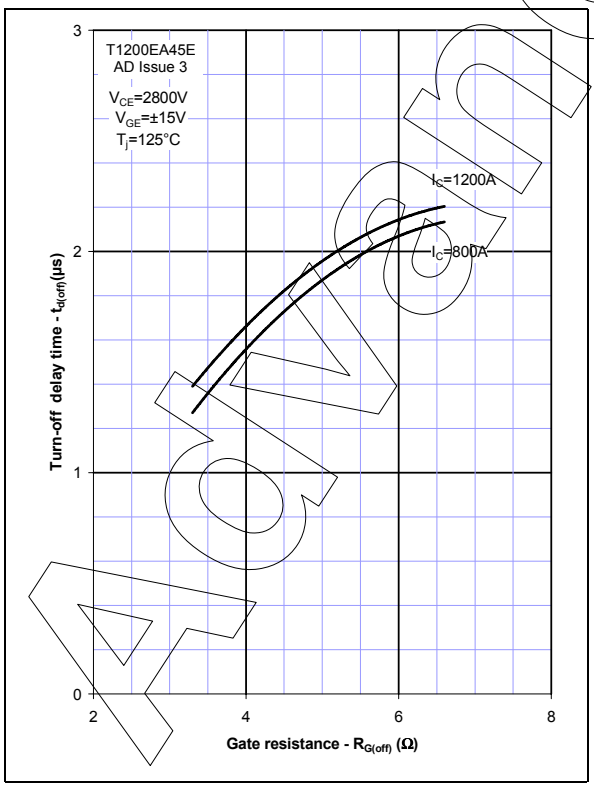


Figure 8 – Typical turn-on energy vs. collector current

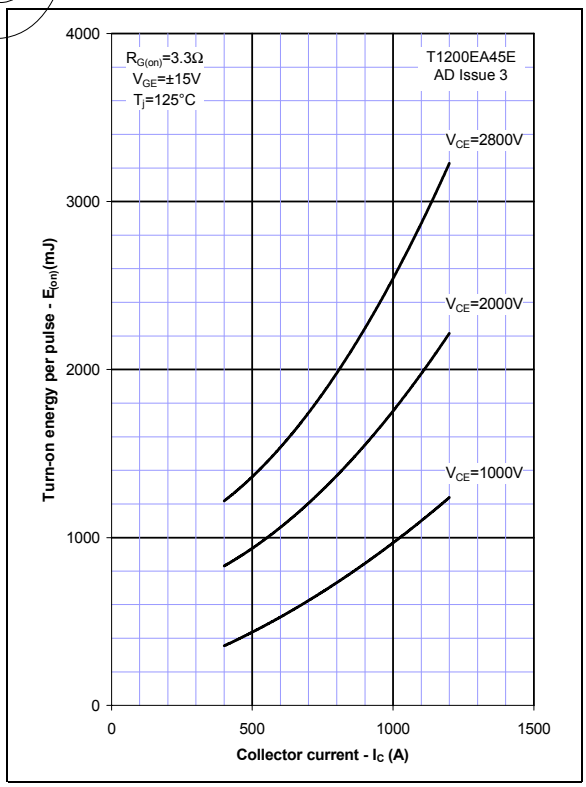


Figure 9 – Typical turn-on energy vs. di/dt

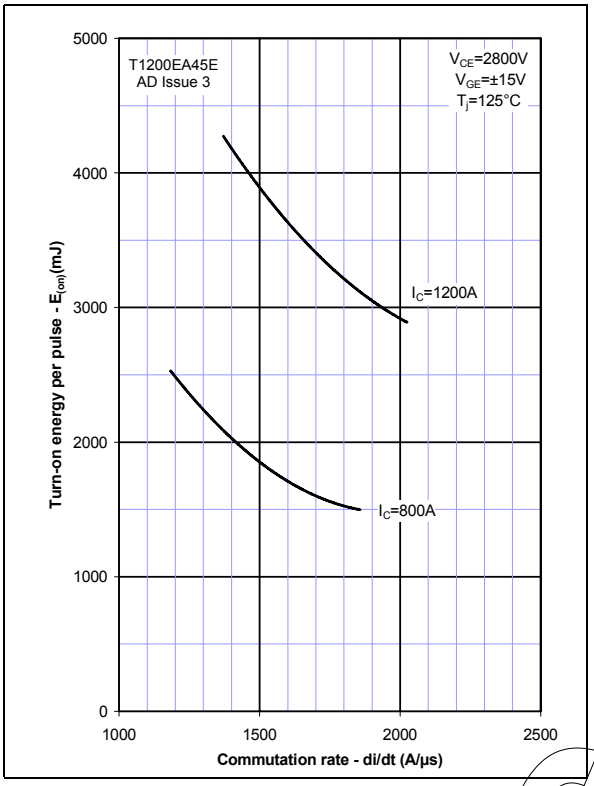


Figure 10 – Typical turn-off energy vs. collector current

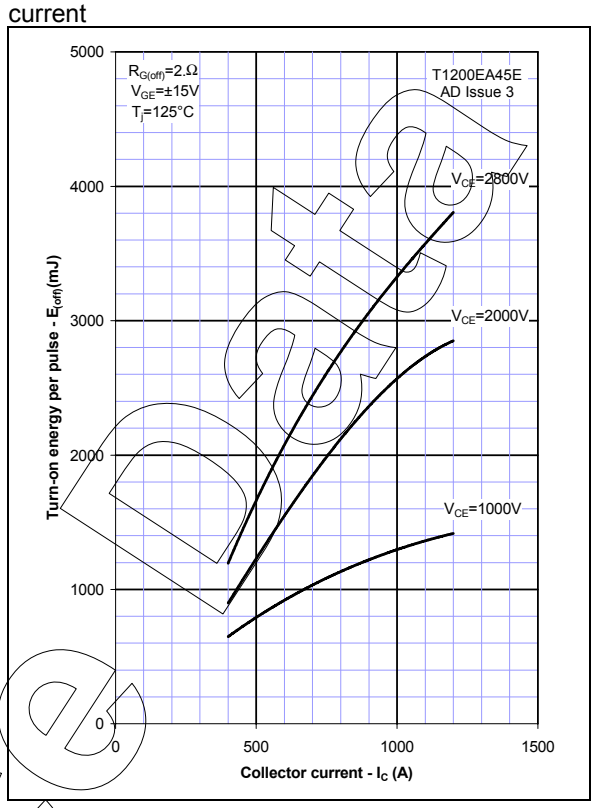


Figure 11 – Turn-off energy vs voltage

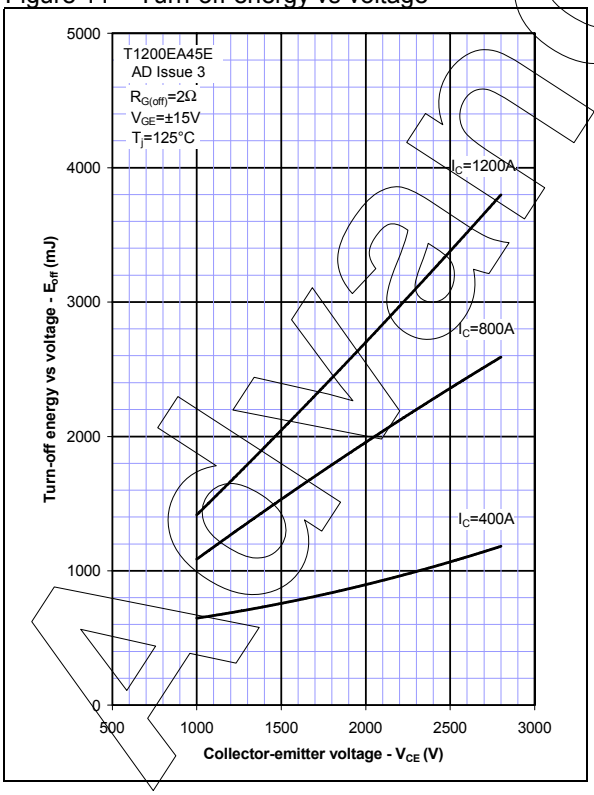


Figure 12 – Safe operating area

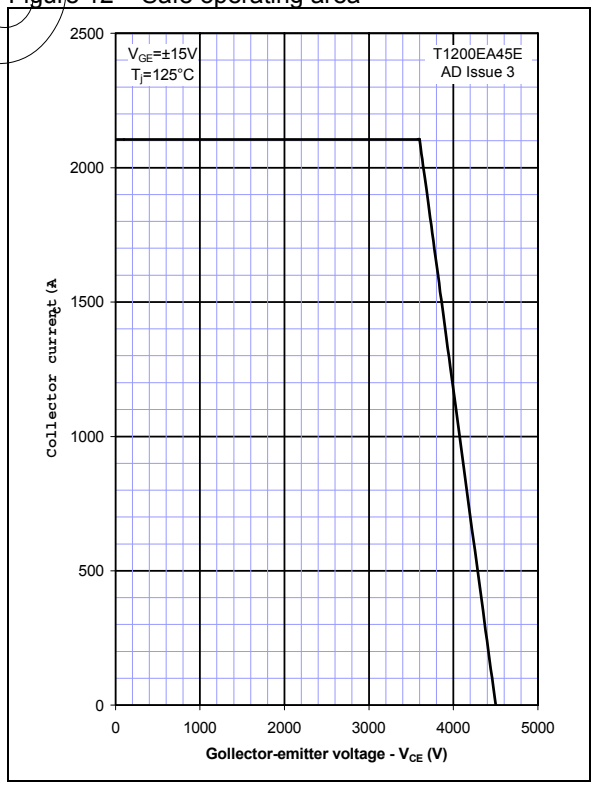
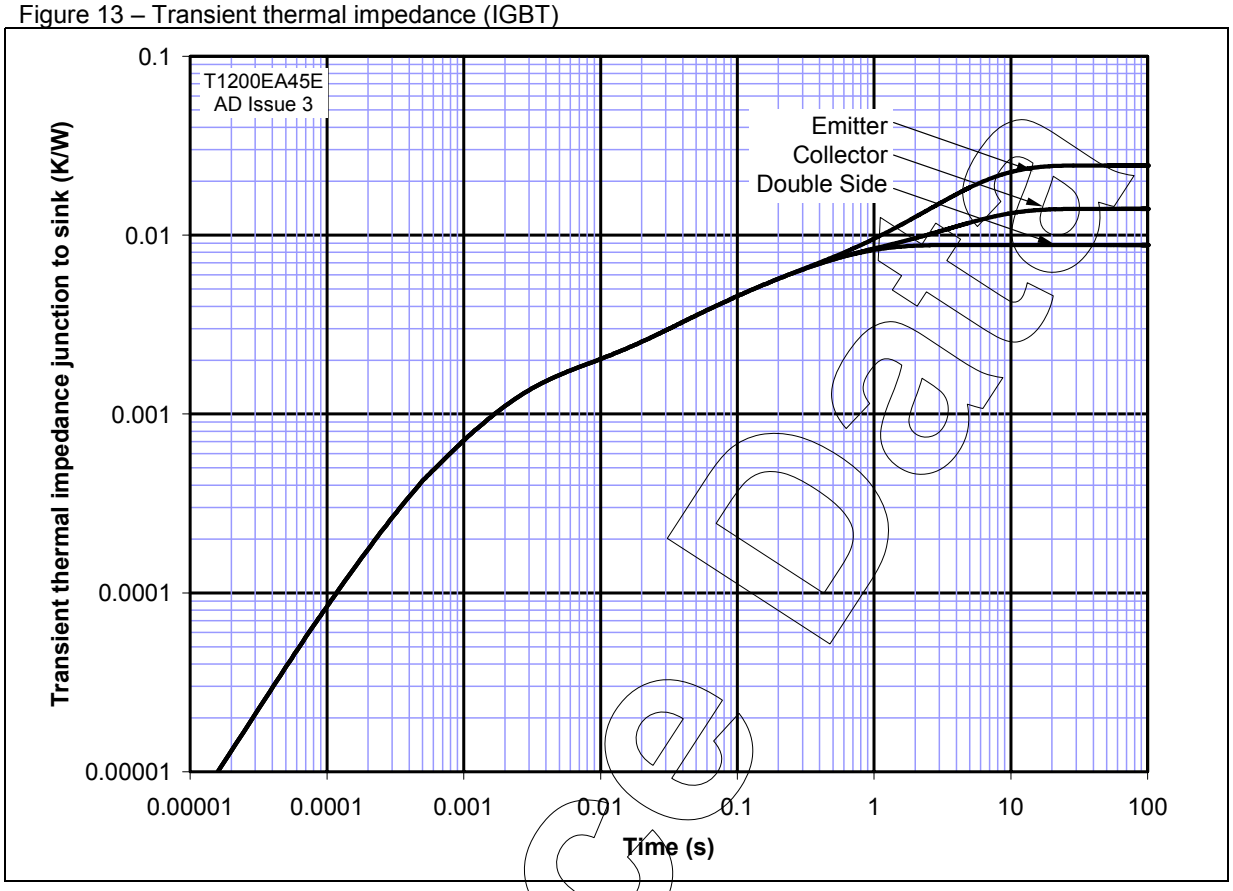
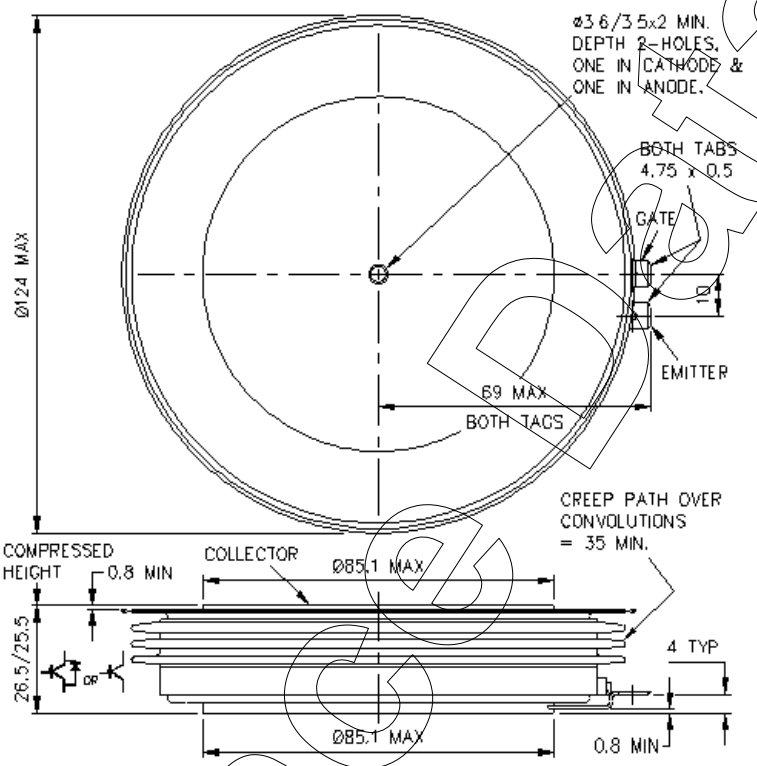


Figure 13 – Transient thermal impedance (IGBT)



Outline Drawing & Ordering Information



101A340

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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