

Provisional Data

Insulated Gate Bi-Polar Transistor Type T1200EB45E

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	1200	A
I_{CRM}	Repetitive peak collector current, $t_p=1ms$, IGBT	2400	A
I_{ECO}	Maximum reverse emitter current, $t_p=100\mu s$, (note 2 & 3)	1200	A
P_{MAX}	Maximum power dissipation, IGBT (note 2)	12.5	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) $T_{sink} = 25^{\circ}C$, double side cooled
- 3) The use of an anti-parallel diode is recommended

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS	
$V_{CE(sat)}$	Collector – emitter saturation voltage	-	2.8	3.2	$I_C = 1200A, V_{GE} = 15V, T_j = 25^\circ C$	V	
		-	3.6	4.1	$I_C = 1200A, V_{GE} = 15V$	V	
V_{T0}	Threshold voltage	-	-	1.69	Current range: 500 – 1500A	V	
r_T	Slope resistance	-	-	1.97		m Ω	
$V_{GE(TH)}$	Gate threshold voltage	-	5.3	-	$V_{CE} = V_{GE}, I_C = 125mA$	V	
I_{CES}	Collector – emitter cut-off current	-	20	50	$V_{CE} = V_{CES}, V_{GE} = 0V$	mA	
I_{GES}	Gate leakage current	-	-	± 15	$V_{GE} = \pm 20V$	μA	
C_{ies}	Input capacitance	-	200	-	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	nF	
$t_{d(on)}$	Turn-on delay time	-	1.8	-	$I_C = 1200A, V_{CE} = 2800V$ $V_{GE} = \pm 15V, L_S = 250nH$ $R_{g(ON)} = 3.3\Omega, R_{g(OFF)} = 3.3\Omega, C_{GE} = 133nF$. Freewheel diode type E1500VF450. (Note 3)	μs	
$t_r(V)$	Rise time	-	3.0	-		μs	
$Q_{g(on)}$	Turn-on gate charge	-	12	-		μC	
E_{on}	Turn-on energy	-	5.7	-		J	
$t_{d(off)}$	Turn-off delay time	-	1.6	-		μs	
t_f	Fall time	-	2.2	-		μs	
$Q_{g(off)}$	Turn-off gate charge	-	10	-		μC	
E_{off}	Turn-off energy	-	5.1	-		J	
I_{SC}	Short circuit current	-	4750	-		$V_{GE} = +15V, V_{CC} = 2800V, V_{CEmax} \leq V_{CES}, t_p \leq 10\mu s$	A

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R_{thJK}	Thermal resistance junction to sink, IGBT	-	-	8.0	Double side cooled	K/kW
		-	-	12.5	Collector side cooled	K/kW
		-	-	23.3	Emitter side cooled	K/kW
F	Mounting force	25	-	35	Note 2	kN
W_t	Weight	-	1.2	-		kg

Notes:-

- 1) Unless otherwise indicated $T_j = 125^\circ C$.
- 2) Consult application note 2008AN01 for detailed mounting requirements.
- 3) C_{GE} is additional gate - emitter capacitance added to output of gate drive circuit.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

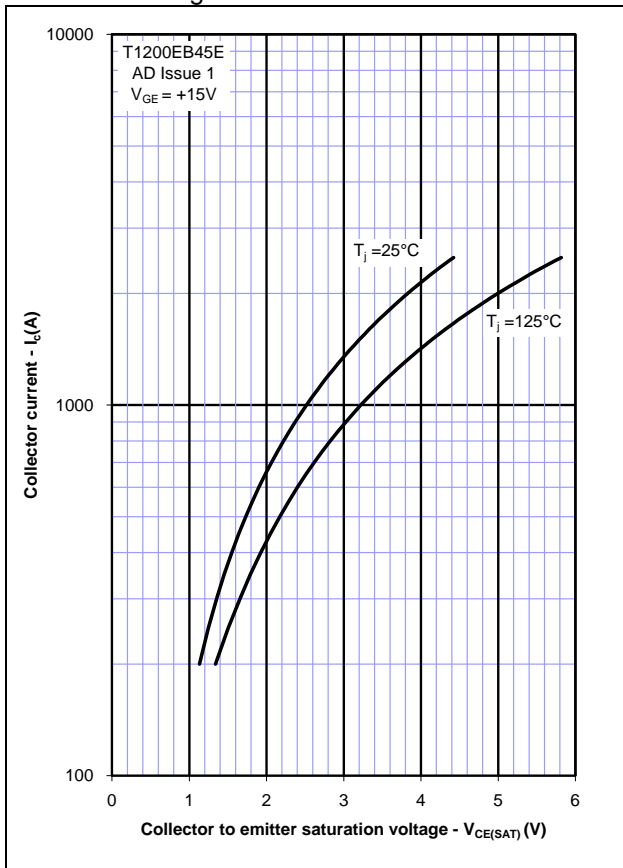


Figure 2 – Typical output characteristic

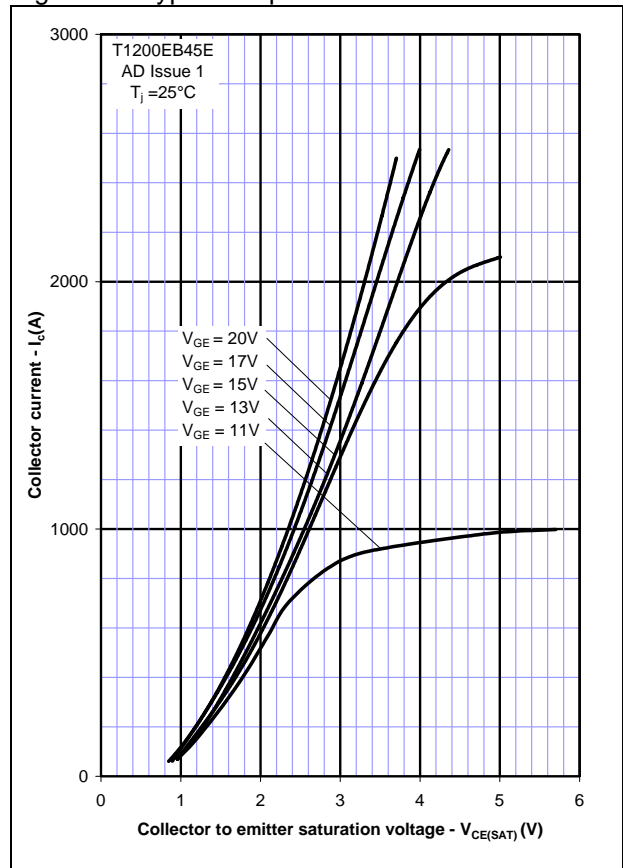


Figure 3 – Typical output characteristic

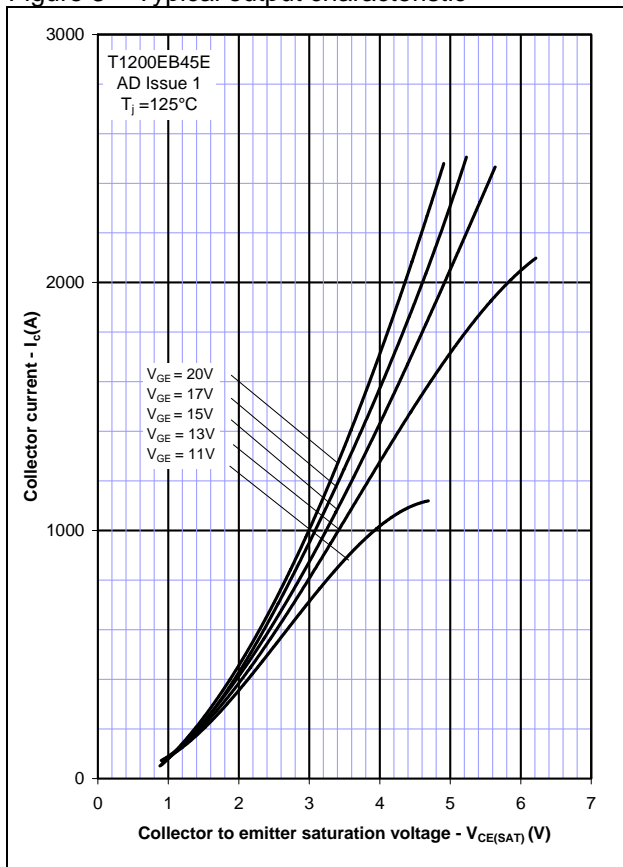


Figure 4 – Typical turn-on delay time vs gate resistance

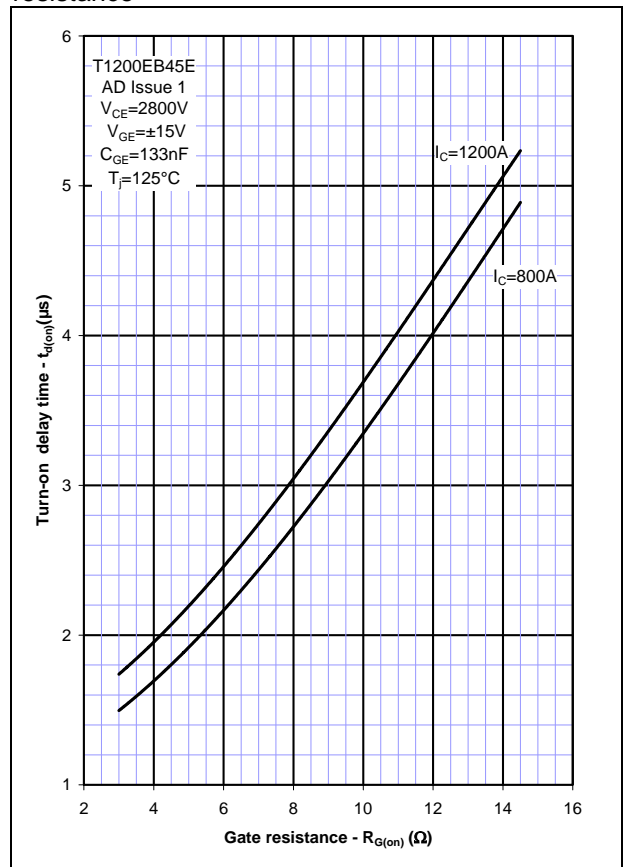


Figure 5 – Typical turn-off delay time vs. gate resistance

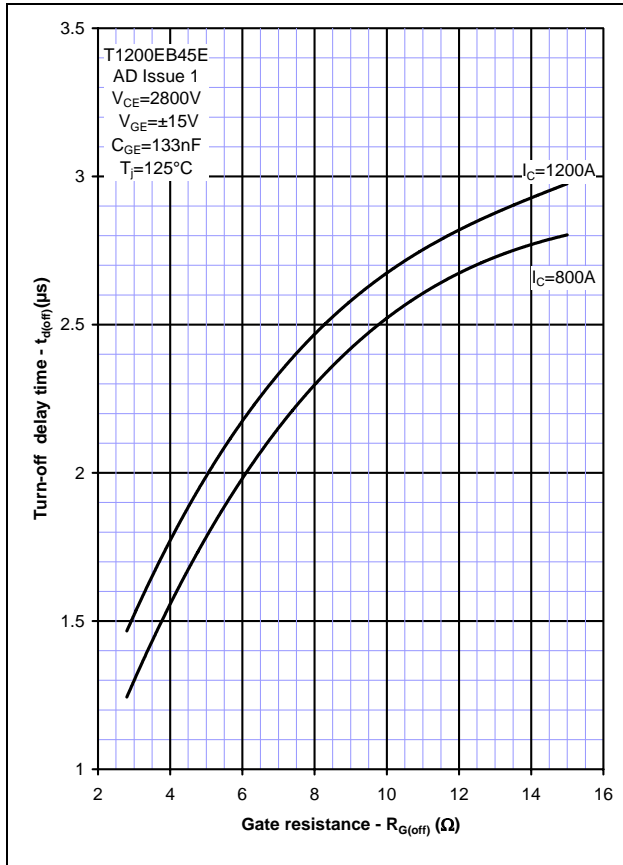


Figure 6 – Typical turn-on energy vs. collector current

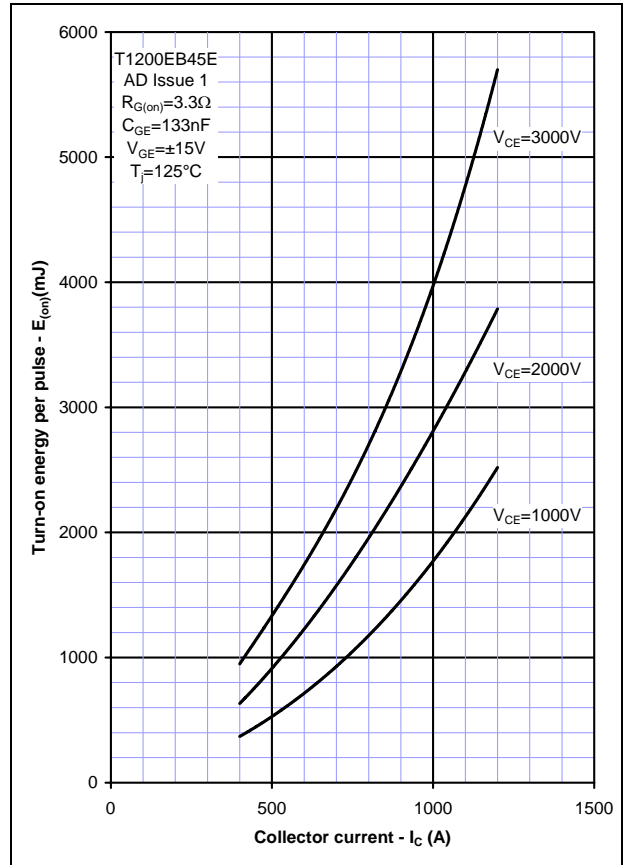


Figure 7 – Typical turn-on energy vs. di/dt

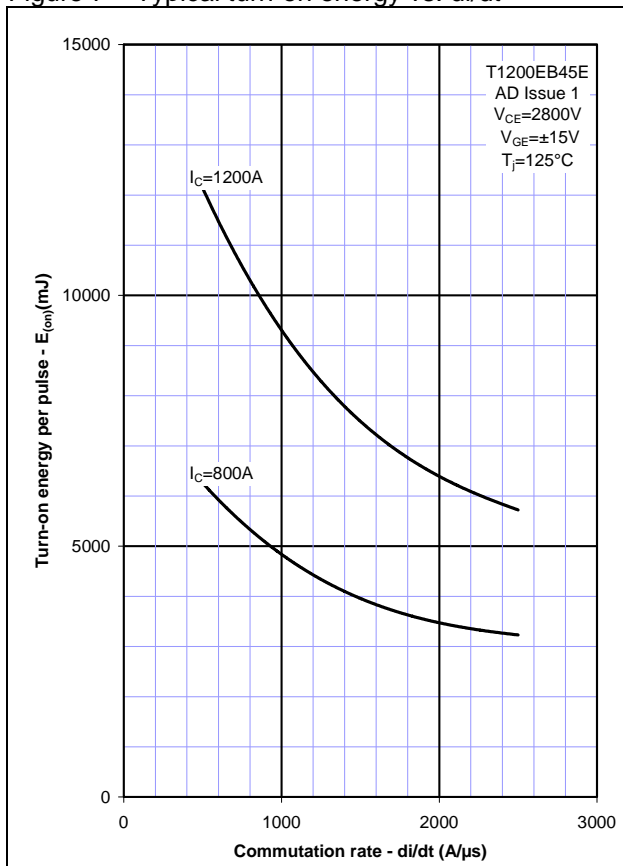


Figure 8 – Typical turn-off energy vs. collector current

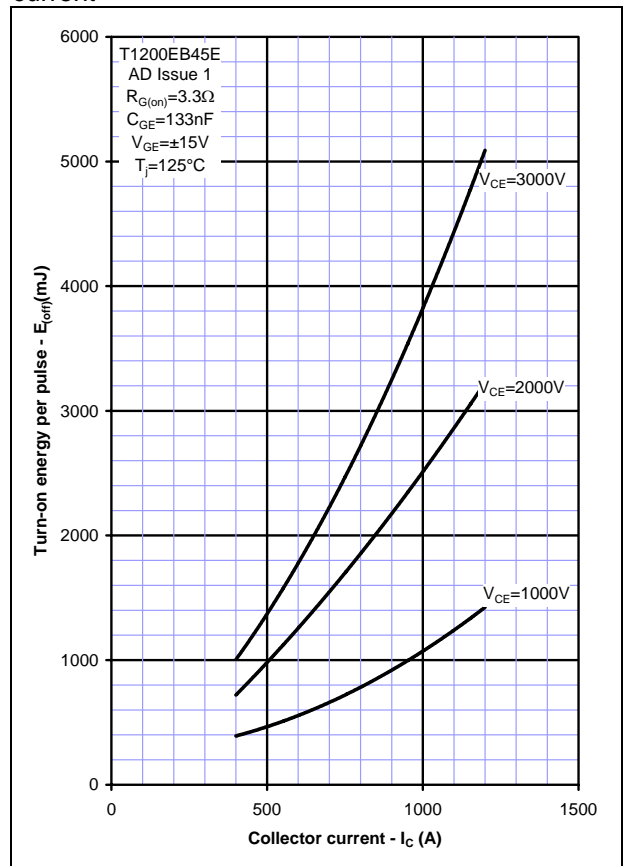


Figure 9 – Turn-off energy vs voltage

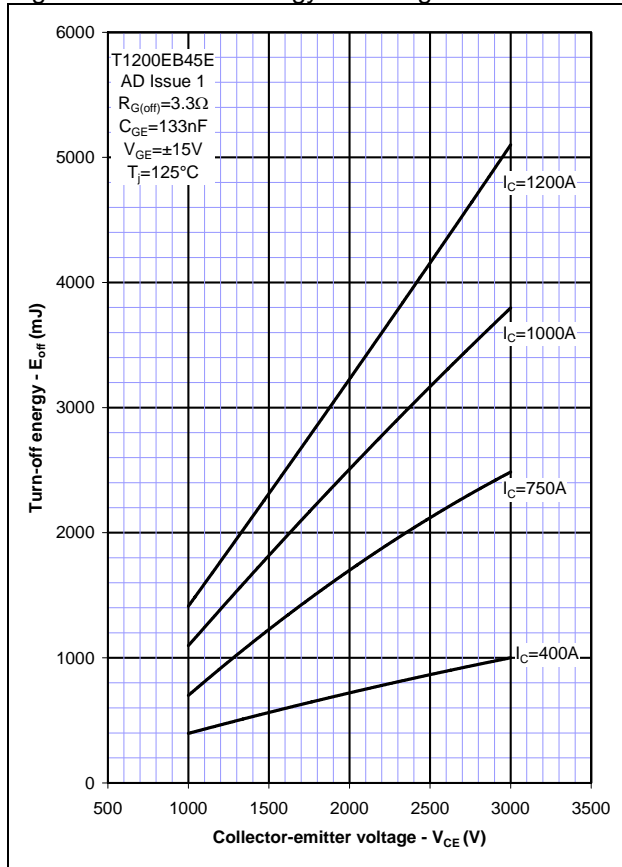


Figure 10 – Safe operating area

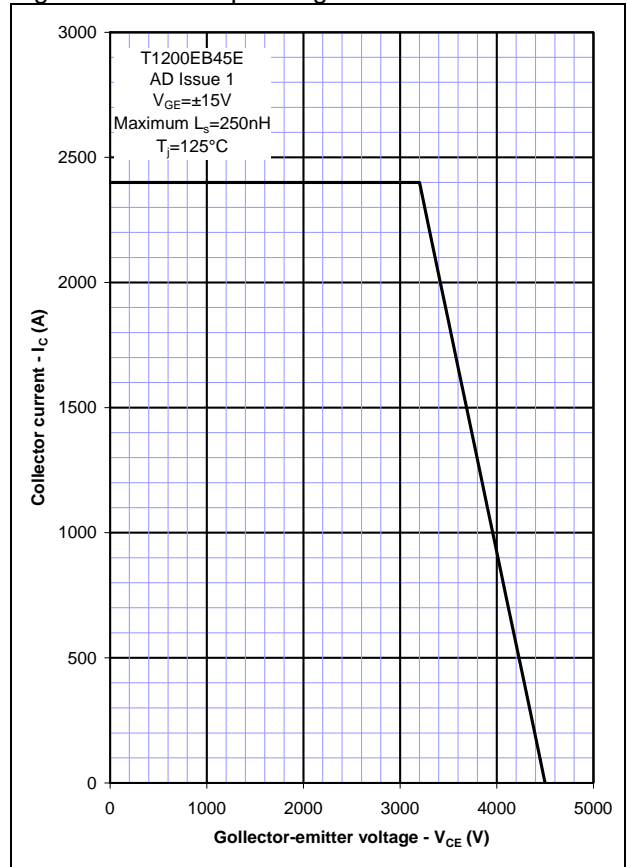
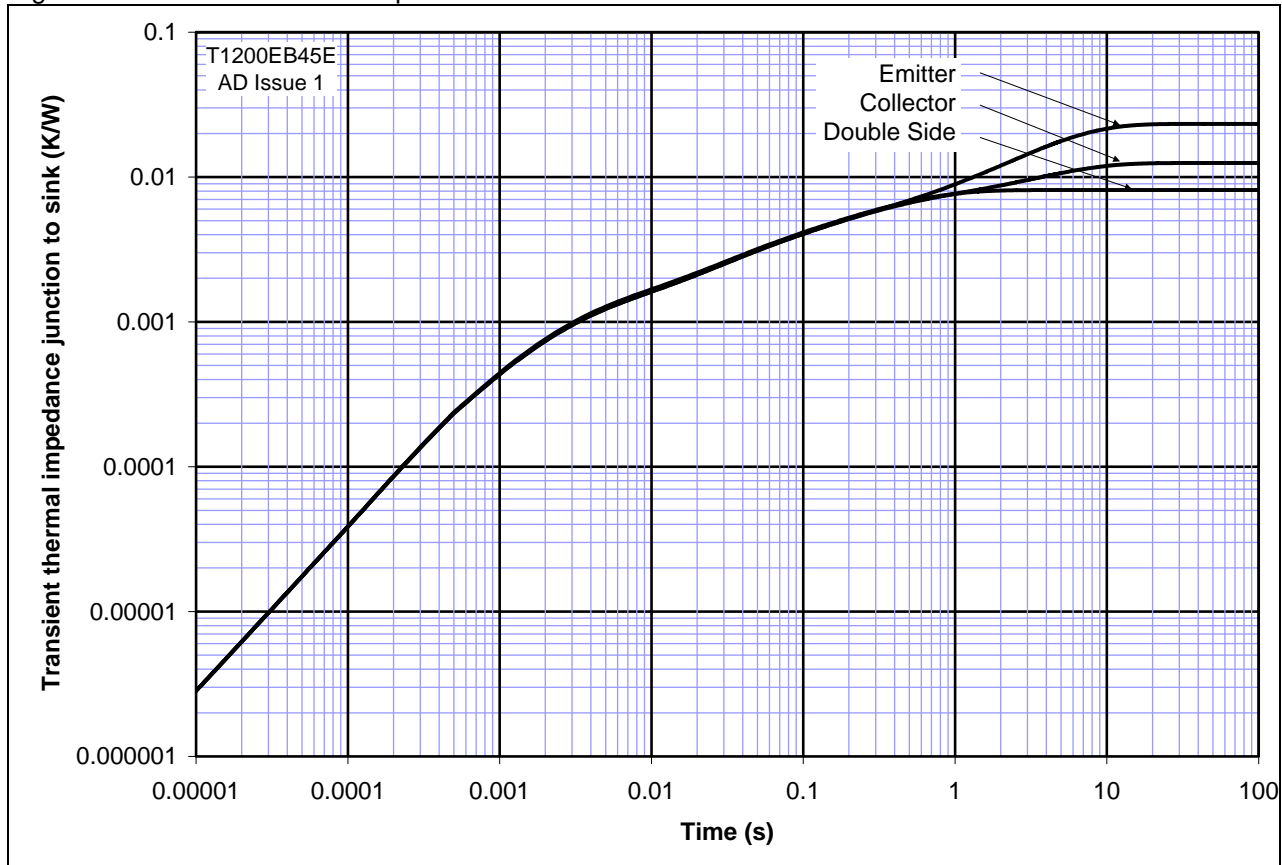
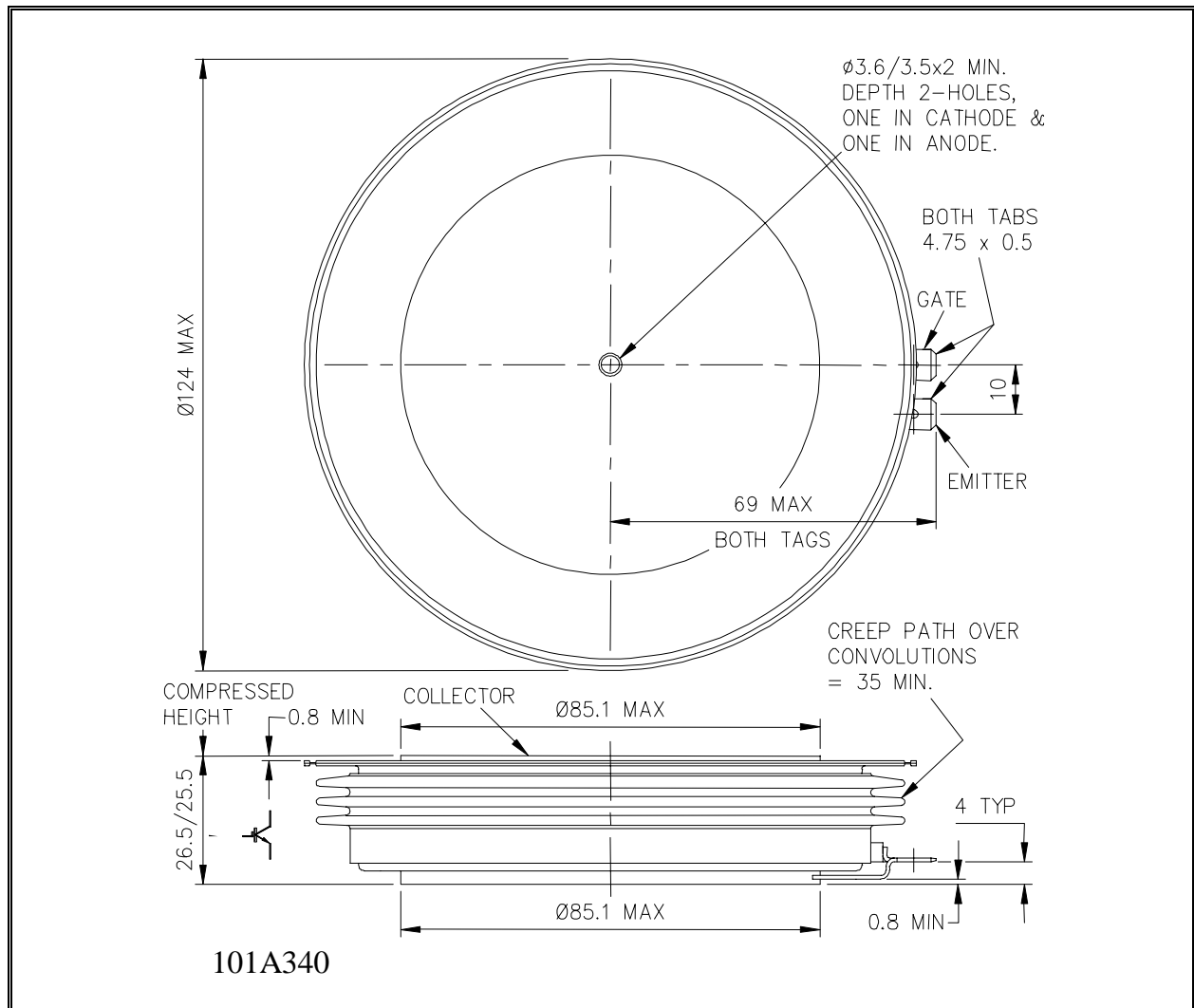


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



ORDERING INFORMATION (Please quote 10 digit code as below)

T1200	EB	45	E
Fixed type Code	Fixed Outline Code	Voltage Grade $V_{CES}/100$ 45	Fixed format code

Typical order code: T1200EB45E ($V_{CES} = 4500V$)

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