WESTCODE
An IXYS Company

Date:- 27 Aug, 2002

Data Sheet Issue:- 2

Provisional data

Insulated Gate Bi-Polar Transistor

Type T1200TA25A

(Development Type Number: TX033TA25A)

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{CES}	Collector – emitter voltage	2500	V
$V_{DC\ link}$	Permanent DC voltage for FIT 100 failure rate.	1250	V
V_{GES}	Peak gate – emitter voltage	±20	V

	RATINGS	MAXIMUM LIMITS	UNITS
$I_{C(DC)}$	Continuous DC collector current, IGBT (Note 2).	1141	A
I_{CRM}	Repetitive peak collector current, t_p=1ms, IGBT.	2400	A
$I_{F(DC)}$	Continuous DC forward current, Diode (note 2).	909	A
I_{FRM}	Repetitive peak forward current, t_p=1ms, Diode.	2400	A
P_{MAX}	Maximum power dissipation, IGBT (note 3).	5.9	kW
$(di/dt)_{cr}$	Critical diode di/dt (note 4)	1600	A/µs
T_j	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) T_{sink} = 25°C, double side cooled.
4) Maximum commutation loop inductance 1µH.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
$V_{CE(sat)}$	Collector – emitter saturation voltage	-	2.7	3.0	I_C = 1200A, V_{GE} = 15V, T_j = 25°C	V
		-	3.2	3.75	I_C = 1200A, V_{GE} = 15V	V
V_{To}	Threshold voltage	-	-	1.25	Current range: 500A – 1600A	V
r_T	Slope resistance	-	-	2.08		mΩ
$V_{GE(TH)}$	Gate threshold voltage	6	6.4	9	V_{CE} = V_{GE}, I_C = 200mA	V
I_{CES}	Collector – emitter cut-off current		8	35	V_{CE} = V_{CES}, V_{GE} = 0V	mA
I_{GES}	Gate leakage current	-	-	±8	V_{GE} = ±20V	µA
C_{ies}	Input capacitance	-	167	-	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	nF
$t_{d(on)}$	Turn-on delay time	-	3.0	-	I_C =1200A, V_{CE} = 0.5V_{CES}, V_{GE} = ±20V, $R_{g(ON)}$= 12Ω, $R_{g(OFF)}$=8.5Ω, Snubber : 10Ω and 0.5µF in series	µs
t_r(I)	Rise time	-	3.0	-		µs
$Q_{g(on)}$	Turn-on gate charge	-	-	28		µC
E_{on}	Turn-on energy	-	2.5	-		J
$t_{d(off)}$	Turn-off delay time	-	2.3	-		µs
t_f	Fall time	-	2.4	-		µs
$Q_{g(off)}$	Turn-off gate charge	-	-	49		µC
E_{off}	Turn-off energy	-	1.4	-		J

Diode Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
V_F	Forward voltage	-	2.32	-	I_F = 1200A, T_j =25°C	V
		-	2.45	3	I_F = 1200A	V
V_{To}	Threshold voltage	-	-	1.5	Current range 500-1600A	V
r_T	Slope resistance	-	-	1.25		mΩ
I_{rm}	Peak reverse recovery current	-	670	-	I_F = 1200A, V_{GE} = ±20V, di/dt=1500A/µs Snubber : 10Ω and 0.5µF in series	A
Q_{rr}	Recovered charge, 50% chord	-	830	-		µC
t_{rr}	Reverse recovery time, 50% chord	-	1.5	-		µs
E_r	Reverse recovery energy	-	0.3	-		J

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R_{thJK}	Thermal resistance junction to sink, IGBT	-	-	16.9	Double side cooled	K/kW
		-	-	26.5	Collector side cooled	K/kW
		-	-	49	Emitter side cooled	K/kW
R_{thJK}	Thermal resistance junction to sink, Diode	-	-	29.2	Double side cooled	K/kW
		-	-	45.2	Cathode side cooled	K/kW
		-	-	84	Anode side cooled	K/kW
F	Mounting force	20	-	30		kN
W_t	Weight	-	1.2	-		kg

Notes:-

1) Unless otherwise indicated T_j=125°C.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

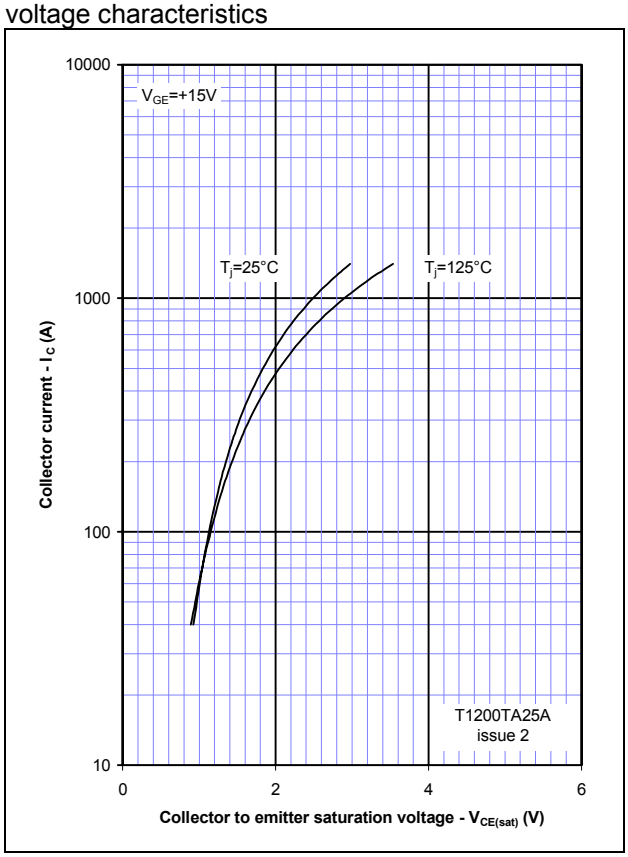


Figure 2 – Typical output characteristic at 25°C

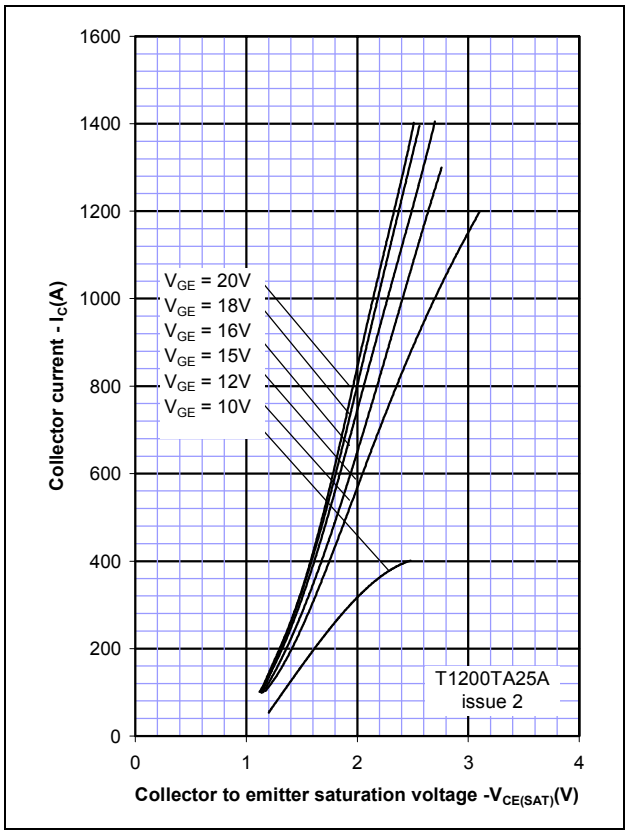


Figure 3 – Typical output characteristic at 125°C

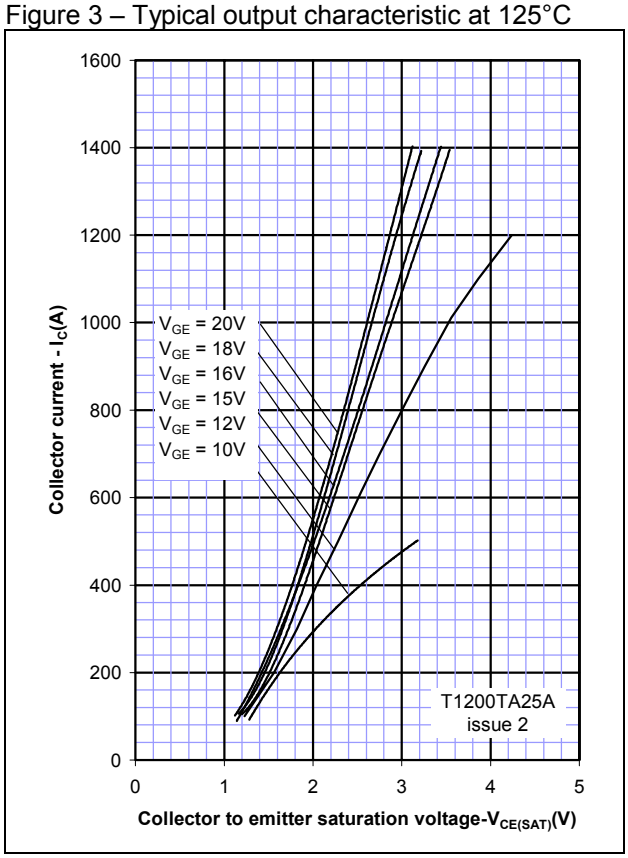


Figure 4 – Typical turn-on gate charge

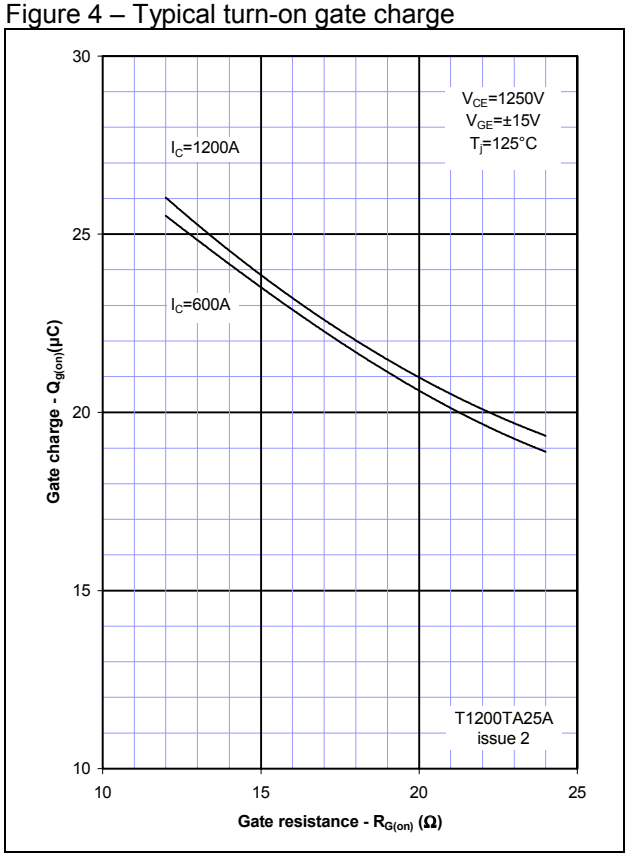


Figure 5 – Typical turn-off gate charge

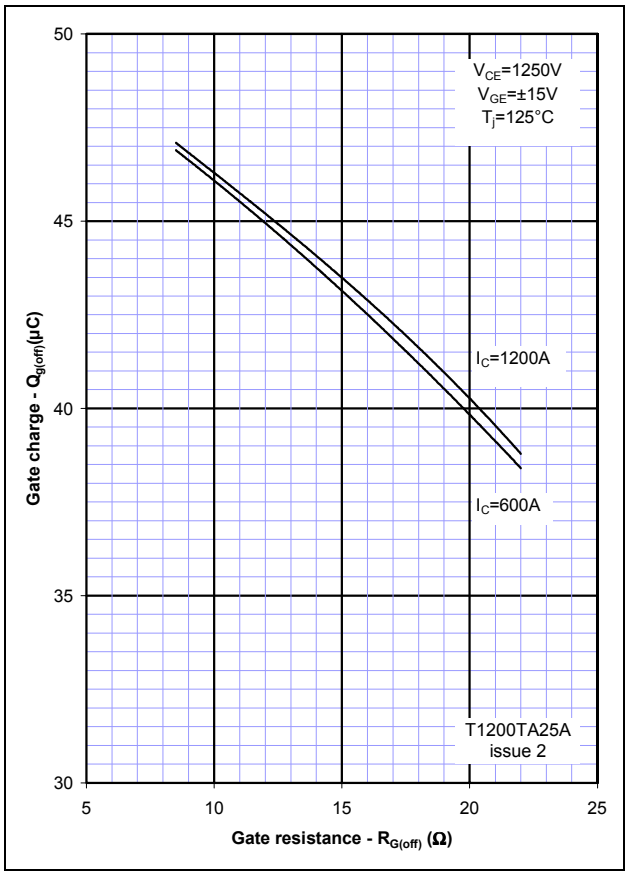


Figure 6 – Typical turn-on delay time vs gate resistance

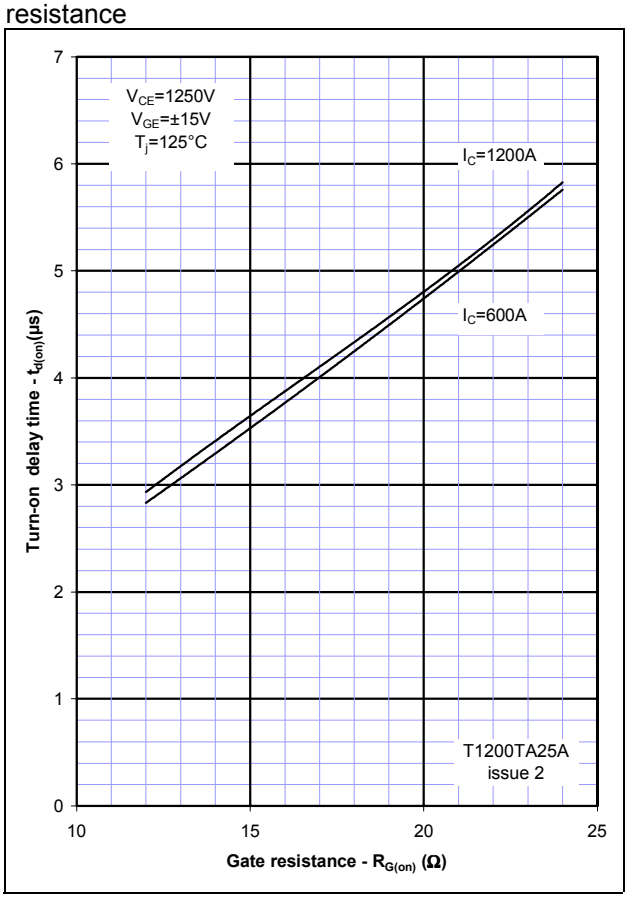


Figure 7 – Typical turn-off delay time vs. gate resistance

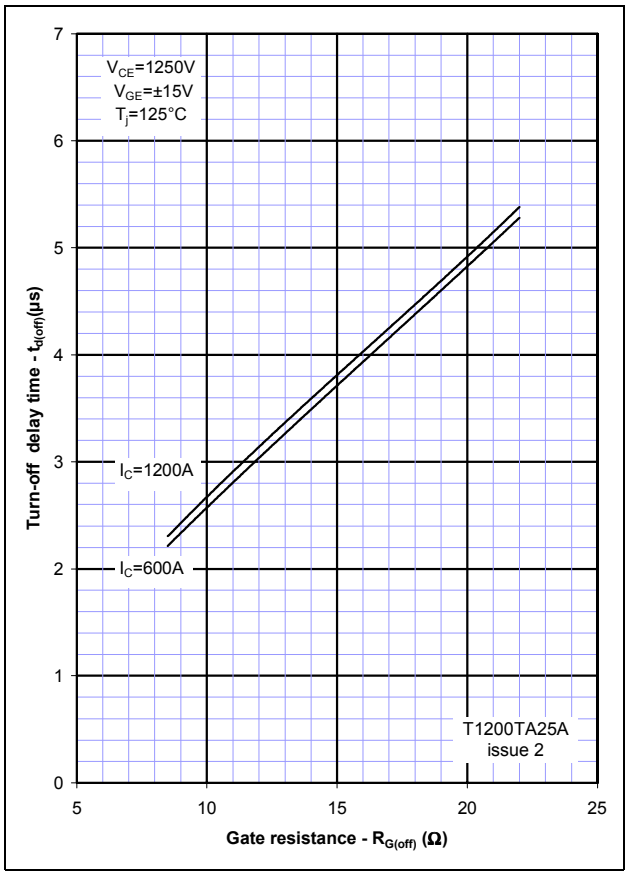


Figure 8 – Typical turn-on energy vs. collector current

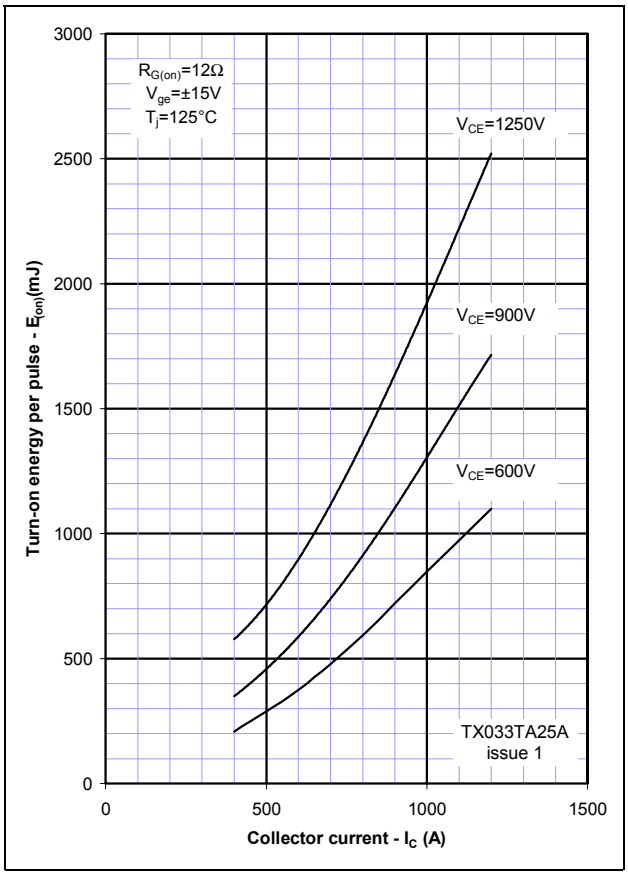


Figure 9 – Typical turn-on energy vs. di/dt

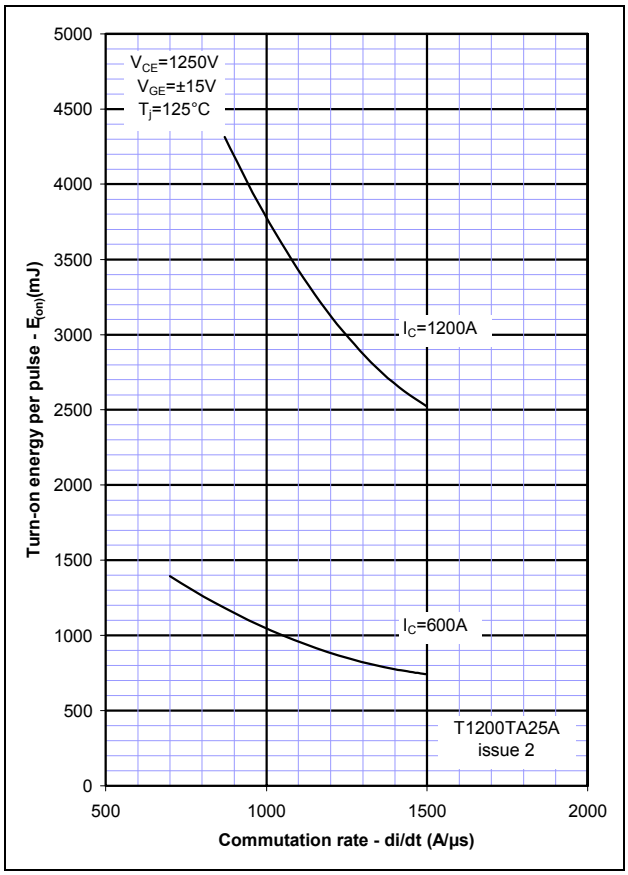


Figure 10 – Typical turn-off energy vs. collector current

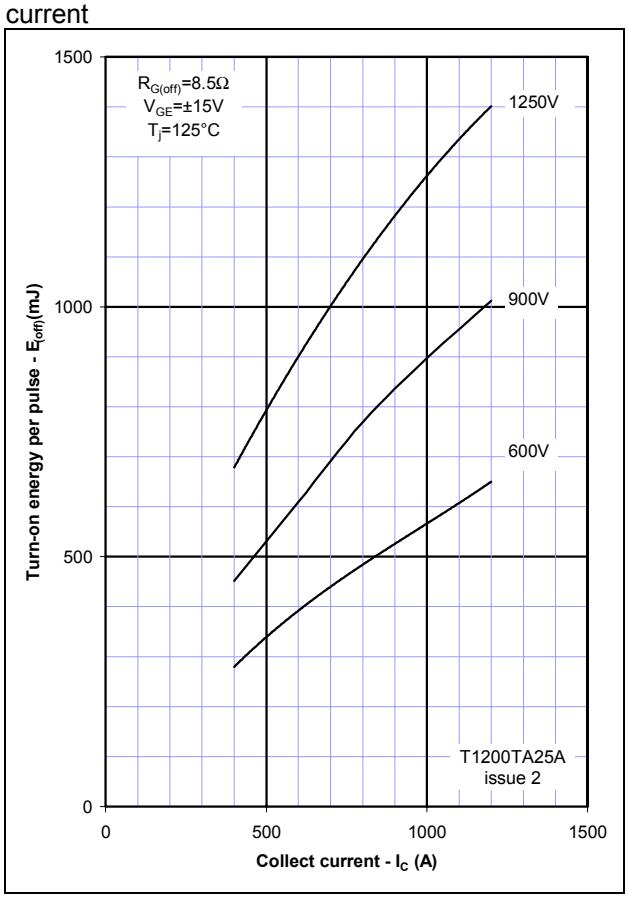


Figure 11 – Turn-off energy vs. voltage

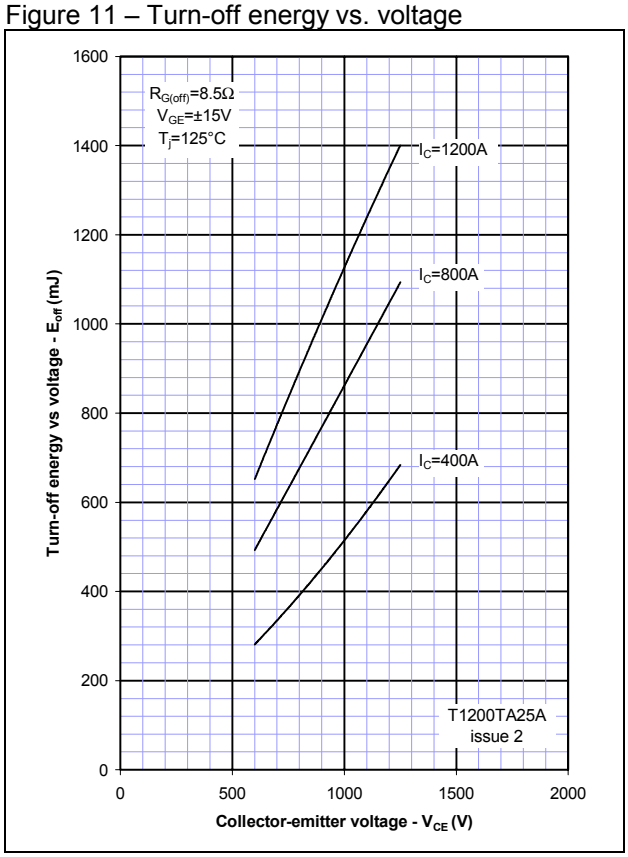


Figure 12 – Safe operating area

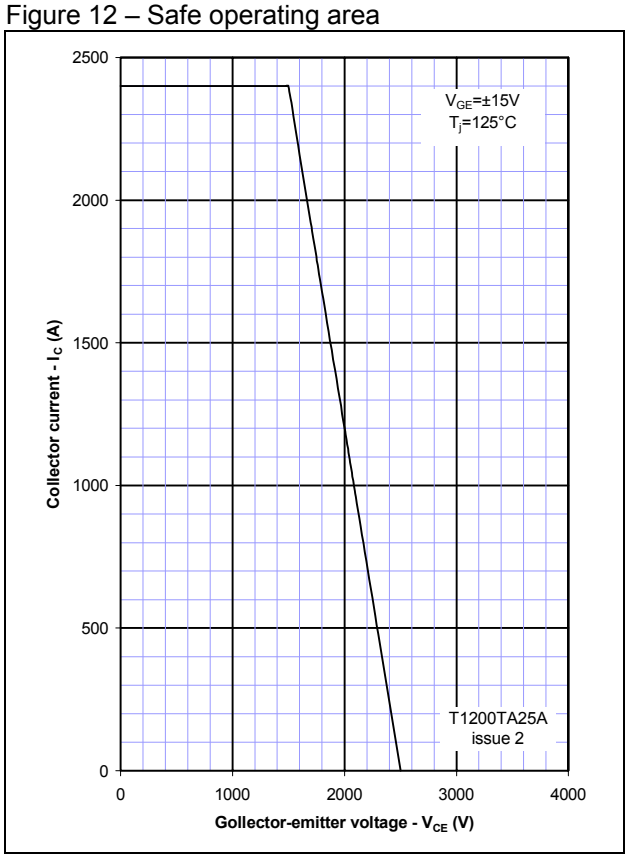


Figure 13 – Typical diode forward characteristic

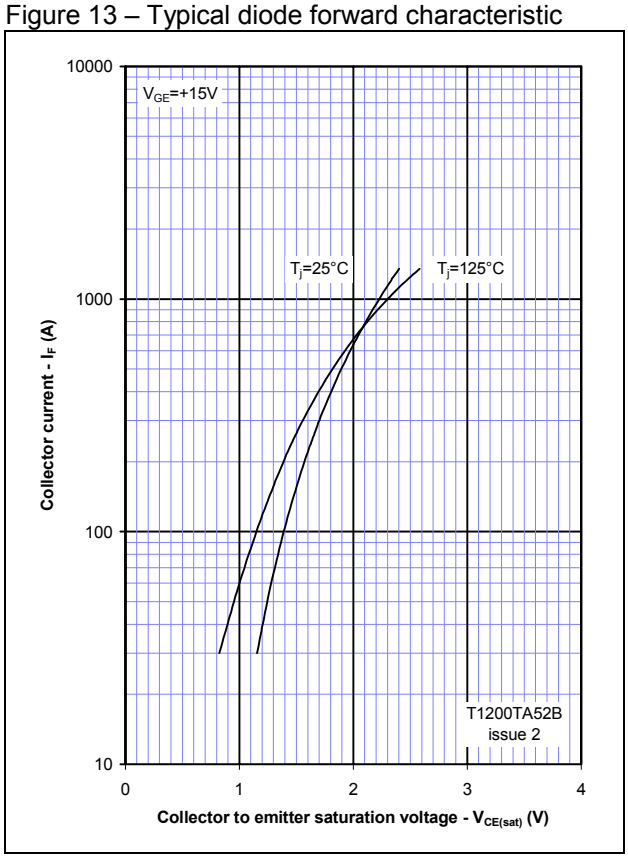


Figure 14 – Typical recovered charge

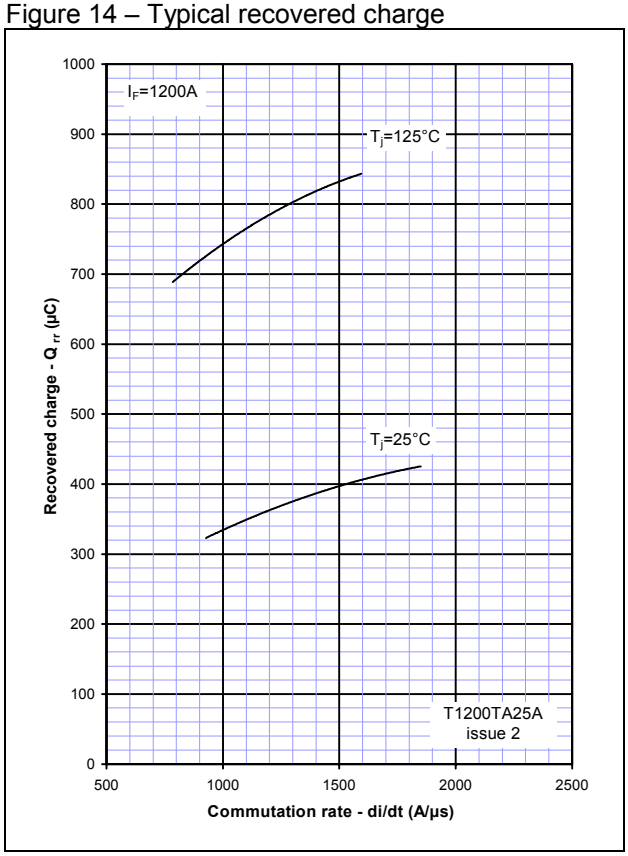


Figure 15 – Typical reverse recovery current

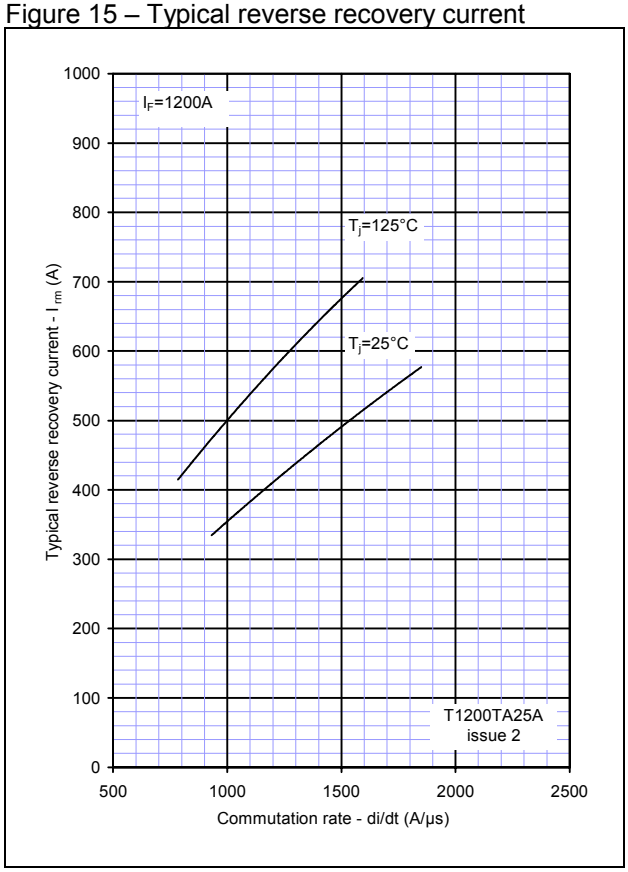


Figure 16 – Typical reverse recovery time

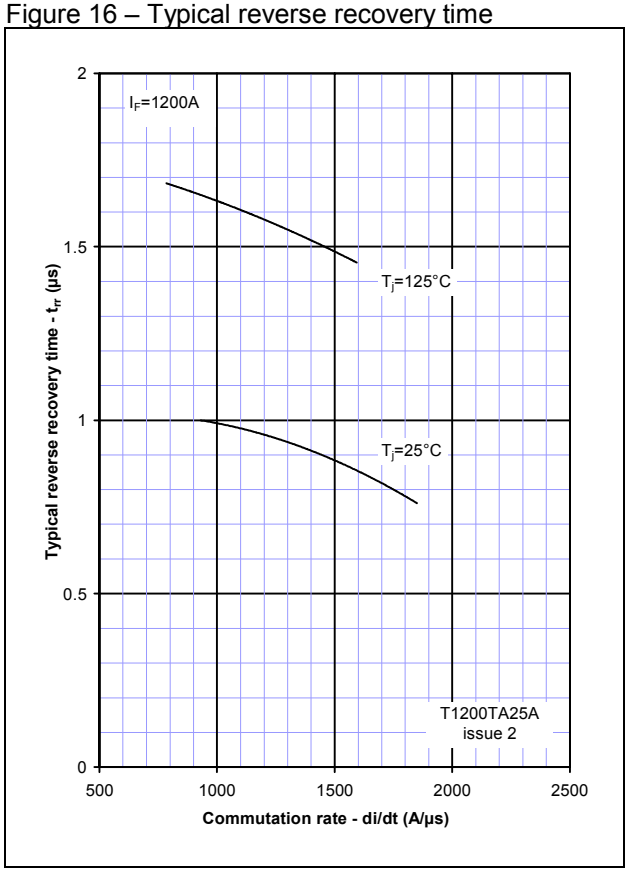


Figure 17– Transient thermal impedance (IGBT)

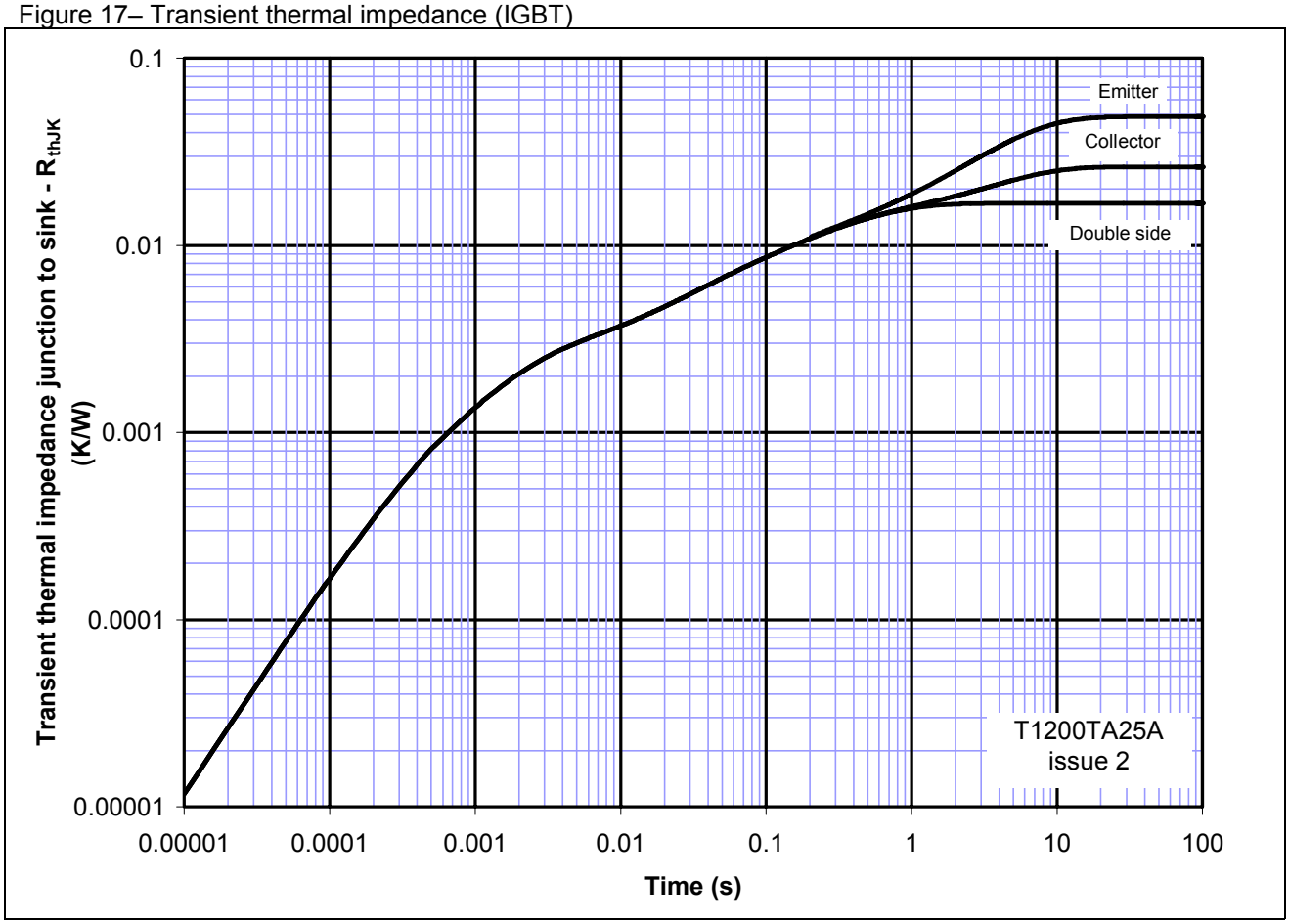
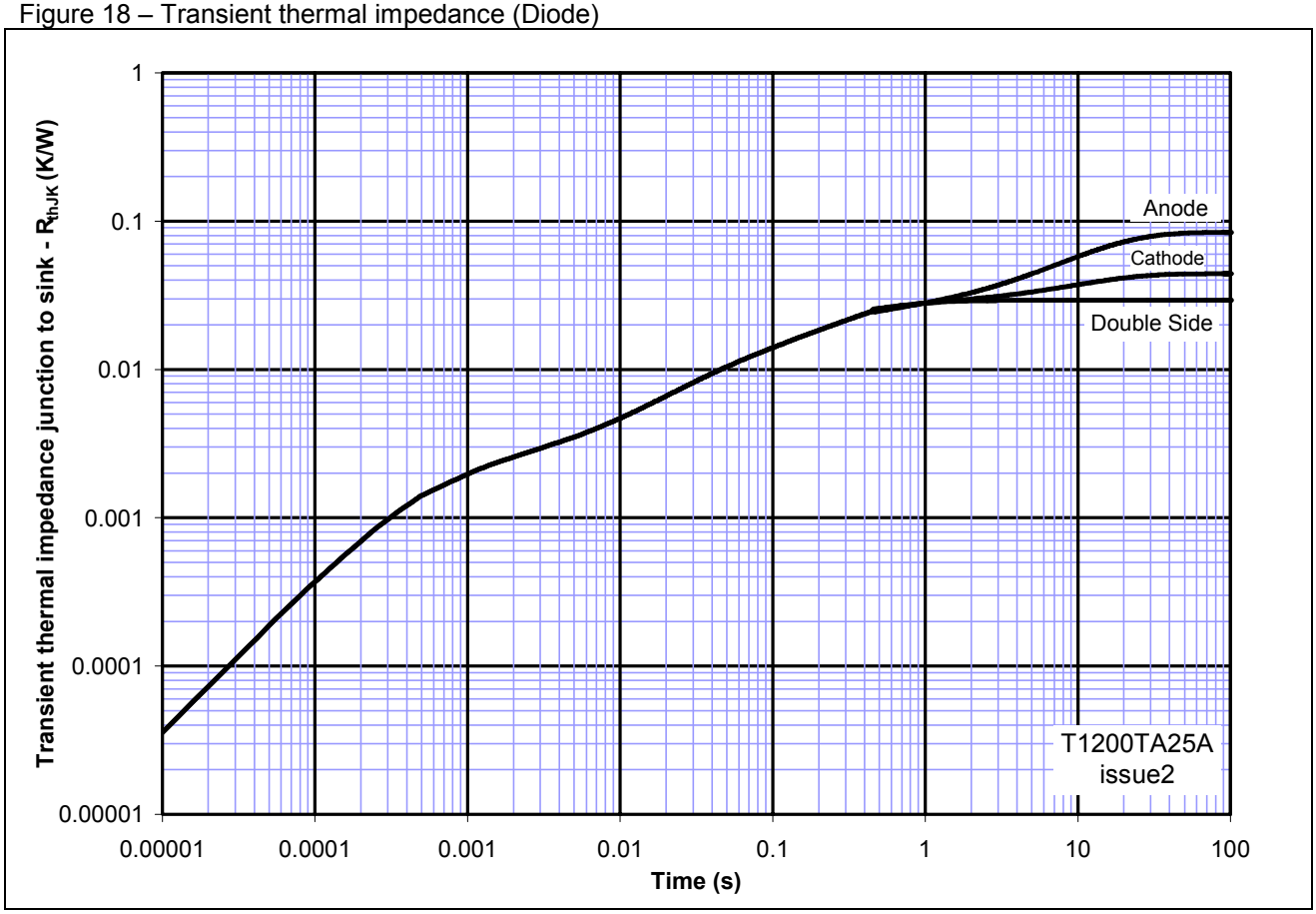
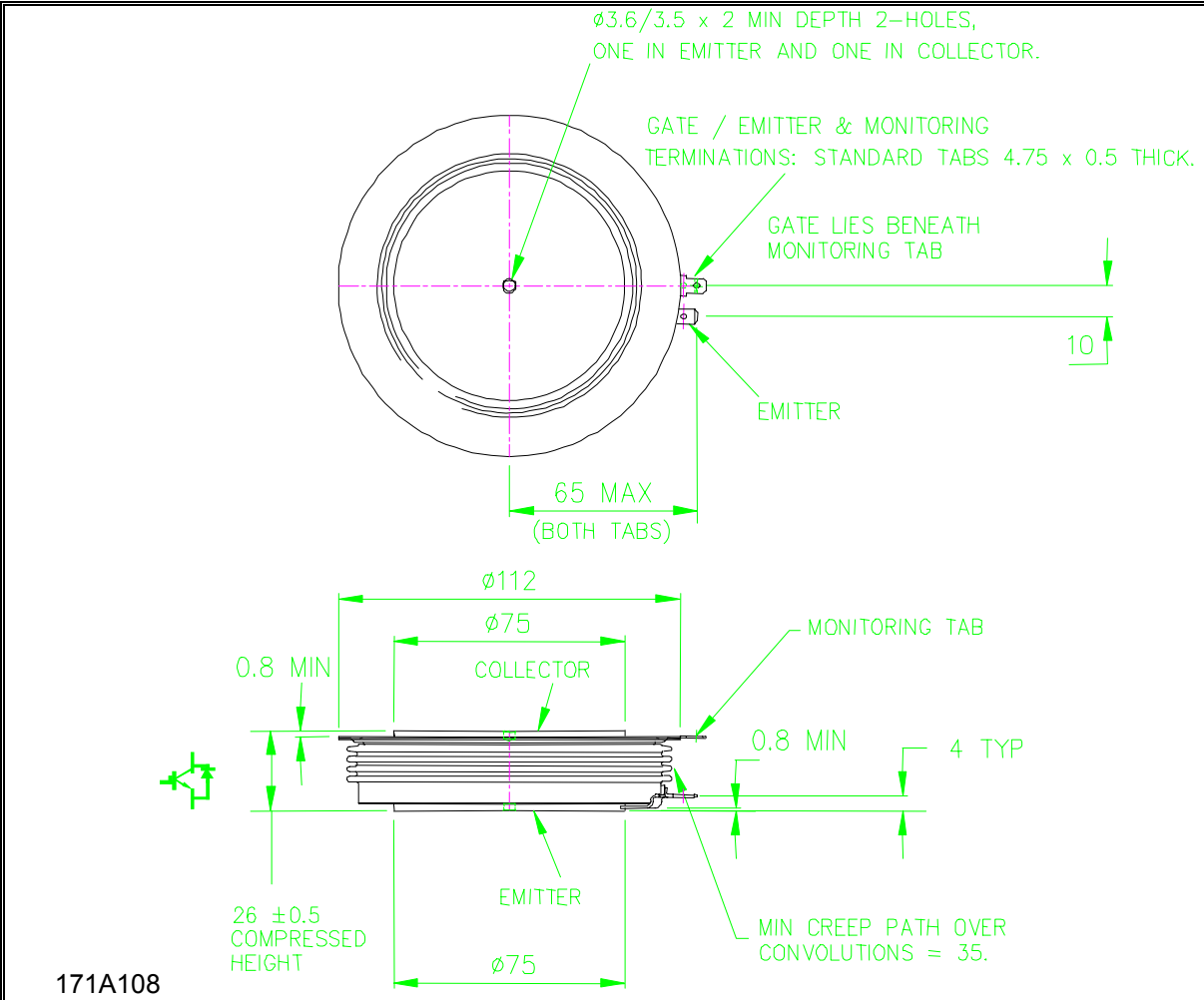


Figure 18 – Transient thermal impedance (Diode)



Outline Drawing & Ordering Information



ORDERING INFORMATION (Please quote 10 digit code as below)

T1200	TA	25	A
Fixed type code	Fixed Outline Code	Voltage Grade 2500V	Fixed format diode

Typical order code: T1200TA25A (V_{CES} = 2500V)

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