IXYS UK WESTCODE

Date:- 30 Nov, 2016

Data Sheet Issue:- P1

Tentative data

Insulated Gate Bi-Polar Transistor

Type T0960VC17G

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{CES}	Collector – emitter voltage	1700	V
$V_{DC\ link}$	Permanent DC voltage for 100 FIT failure rate.	900	V
V_{GES}	Peak gate – emitter voltage	±20	V

	RATINGS	MAXIMUM LIMITS	UNITS
I_C	DC collector current, IGBT	960	A
I_{CRM}	Repetitive peak collector current, t_p=1ms, IGBT	1920	A
$I_{F(DC)}$	Continuous DC forward current, Diode	960	A
I_{FRM}	Repetitive peak forward current, t_p=1ms, Diode	1920	A
I_{FSM}	Peak non-repetitive surge t_p=10ms, V_{RM}=60%V_{RRM}, Diode (Note 4)	5635	A
I_{FSM2}	Peak non-repetitive surge t_p=10ms, V_{RM}≤10V, Diode (Note 4)	6200	A
P_{MAX}	Maximum power dissipation, IGBT (Note 2)	2.96	kW
$(di/dt)_{cr}$	Critical diode di/dt (note 3)	6000	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} = 25°C, double side cooled.
3) Maximum commutation loop inductance 150nH.
4) Half-sinewave, 125°C T_j initial.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
$V_{CE(sat)}$	Collector – emitter saturation voltage	-	2.36	2.65	I_C = 960A, V_{GE} = 15V, T_j = 25°C	V
		-	3.0	3.3	I_C = 960A, V_{GE} = 15V	V
V_{T0}	Threshold voltage	-	-	1.22	Current range: 320A – 960A	V
r_T	Slope resistance	-	-	2.17		mΩ
$V_{GE(TH)}$	Gate threshold voltage	-	5	-	V_{CE} = V_{GE}, I_C = 32mA	V
I_{CES}	Collector – emitter cut-off current		5.5	15	V_{CE} = V_{CES}, V_{GE} = 0V	mA
I_{GES}	Gate leakage current	-	-	±15	V_{GE} = ±20V	µA
C_{ies}	Input capacitance	-	75	-	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	nF
$t_{d(on)}$	Turn-on delay time	-	0.32	-		µs
$t_r(V)$	Rise time	-	0.84	-	I_C =960A, V_{CE} =900V, di/dt=5000A/µs	µs
$Q_{g(on)}$	Turn-on gate charge	-	4.2	-	V_{GE} = ±15V, L_s=120nH	µC
E_{on}	Turn-on energy	-	0.47	-	$R_{g(ON)}$= 2Ω, $R_{g(OFF)}$=15Ω, C_{GE}=120nF	J
$t_{d(off)}$	Turn-off delay time	-	2.1	-	Integral diode used as freewheel diode	µs
$t_f(I)$	Fall time	-	0.55	-	(Note 3 & 4)	µs
$Q_{g(off)}$	Turn-off gate charge	-	2.4	-		µC
E_{off}	Turn-off energy	-	0.8	-		J
I_{SC}	Short circuit current	-	2400	-	V_{GE}=+15V, V_{CC}=900V, V_{CEmax}≤V_{CES}, t_p≤10µs	A

Diode Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
V_F	Forward voltage	-	1.95	2.25	I_F = 960A, T_j =25°C	V
		-	2.05	2.35	I_F = 960A	V
V_{To}	Threshold voltage	-	-	1.37	Current range 320A - 960A	V
r_T	Slope resistance	-	-	1.02		mΩ
I_{rm}	Peak reverse recovery current	-	540	-		A
Q_{rr}	Recovered charge	-	310	-	I_F = 960A, V_r = 900V, V_{GE} = -15V,	µC
t_{rr}	Reverse recovery time, 50% chord	-	0.6	-	di/dt=5000A/µs	µs
E_r	Reverse recovery energy	-	0.18	-		J

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R_{thJK}	Thermal resistance junction to sink, IGBT	-	-	33.8	Double side cooled	K/kW
		-	-	51.8	Collector side cooled	K/kW
		-	-	96.9	Emitter side cooled	K/kW
R_{thJK}	Thermal resistance junction to sink, Diode	-	-	36.1	Double side cooled	K/kW
		-	-	55.6	Cathode side cooled	K/kW
		-	-	104	Anode side cooled	K/kW
F	Mounting force	11	-	16	Note 2	kN
W_t	Weight	-	0.65	-		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
4) Figures 6 to 9 are obtained using integral diode as freewheeling diode

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

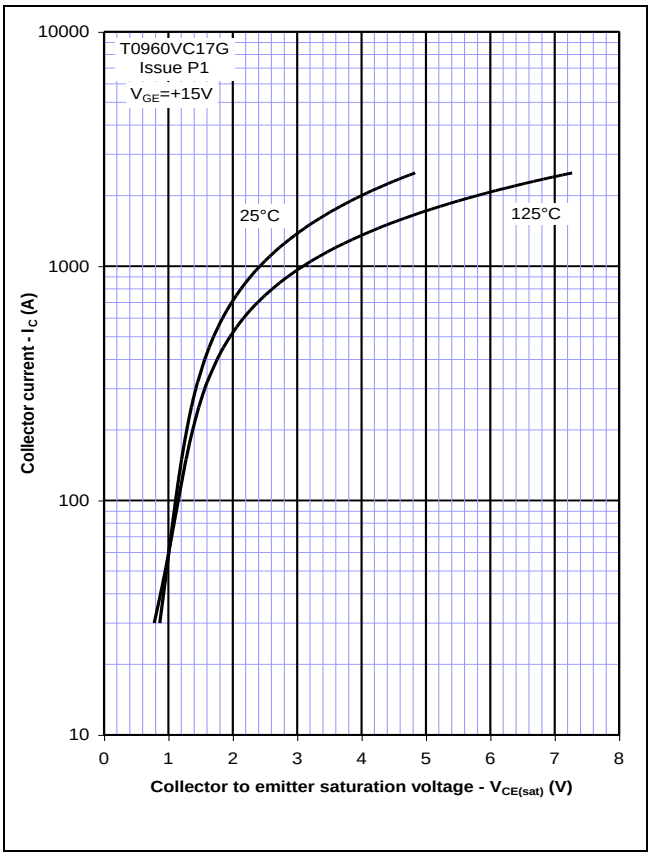


Figure 2 – Typical output characteristic

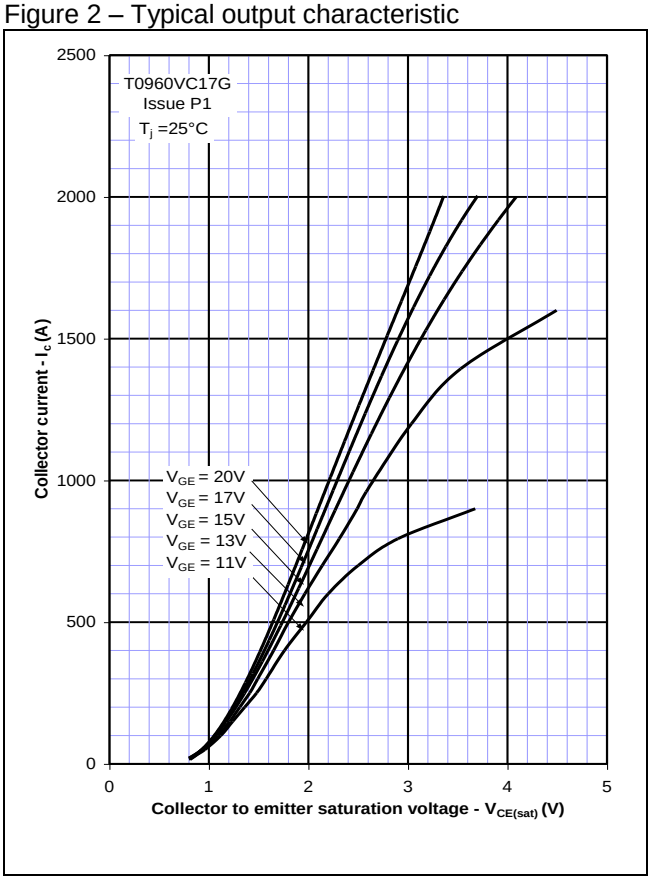


Figure 3 – Typical output characteristic

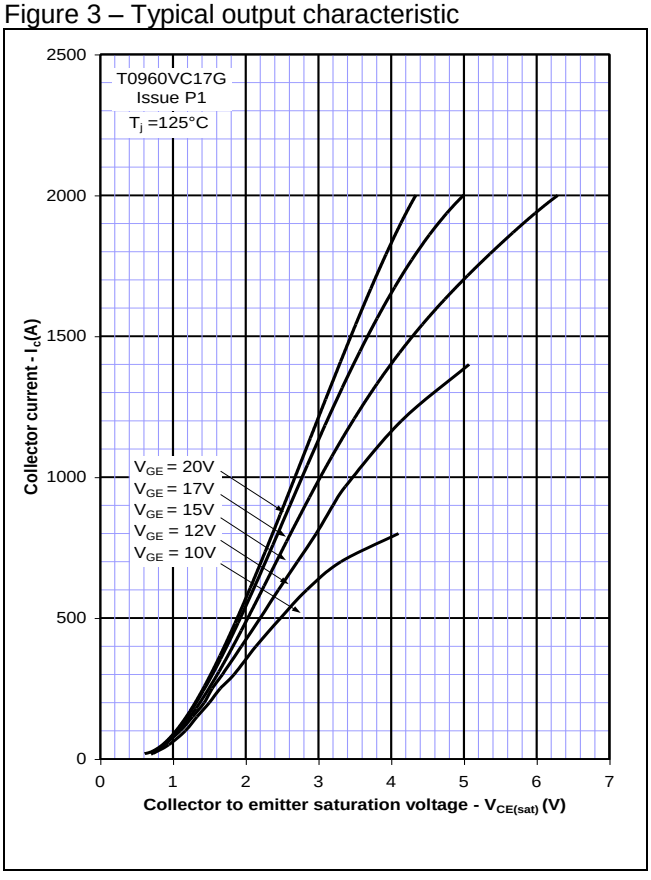


Figure 4 – Safe operating area (IGBT)

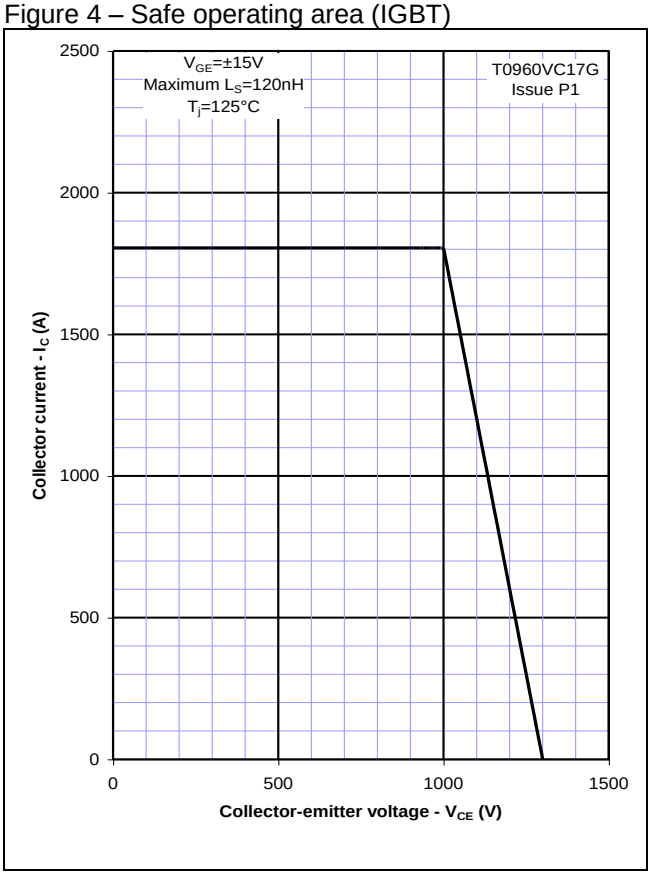


Figure 5 – Typical diode forward characteristics

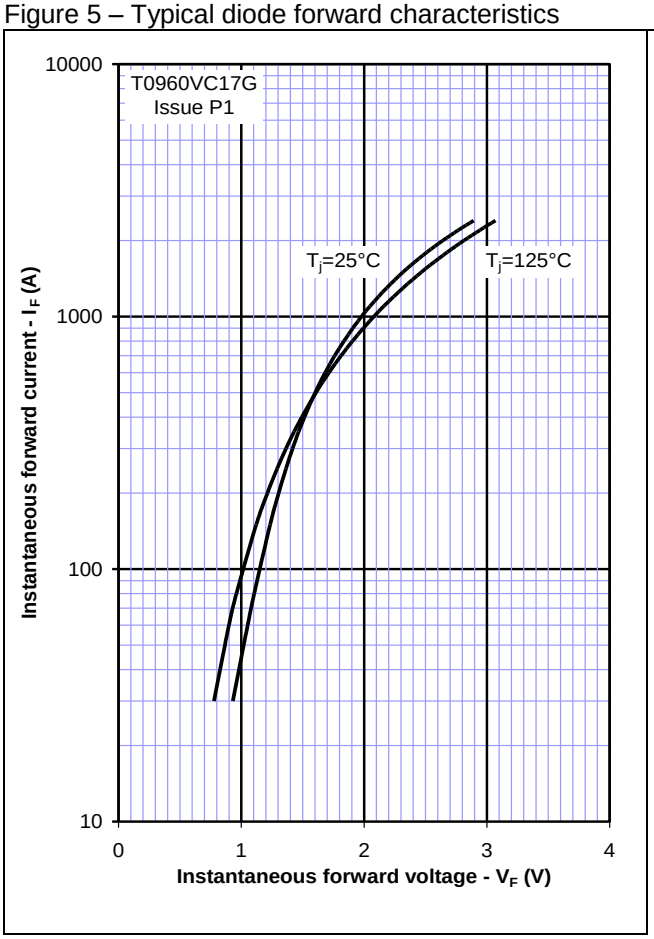


Figure 6 – Safe operating area (Diode)

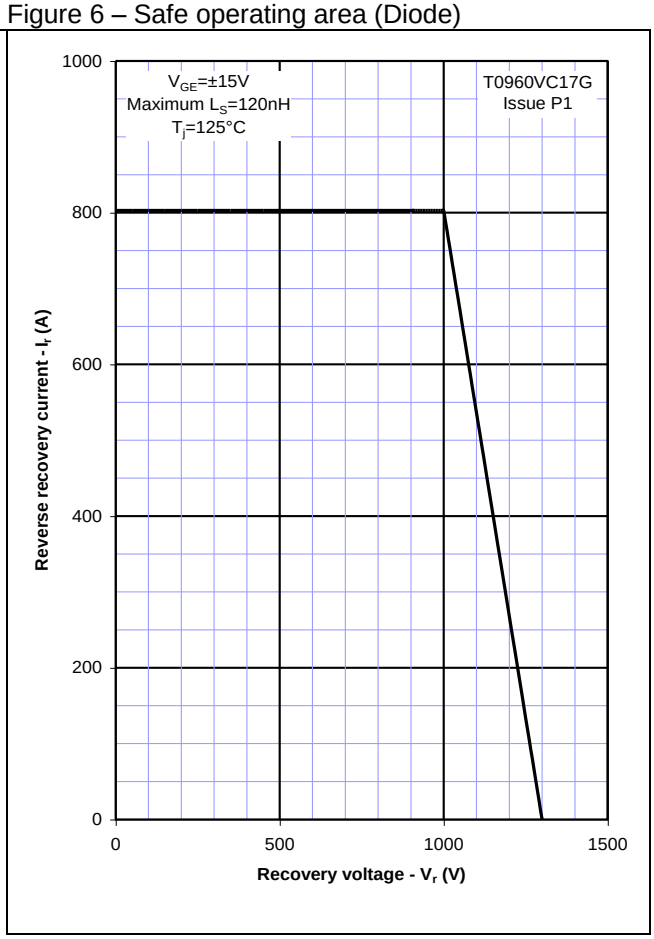


Figure 7 – Transient thermal impedance (IGBT)

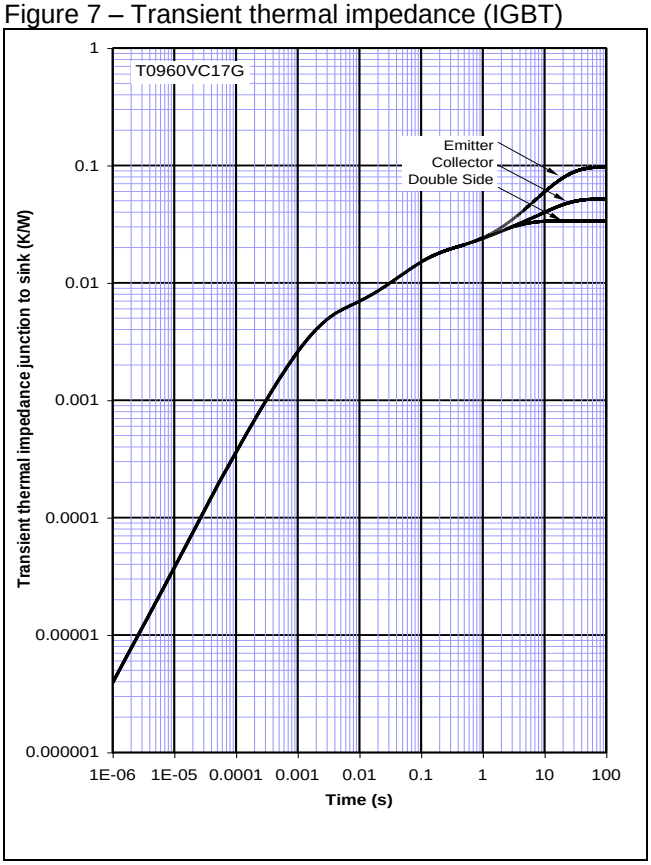
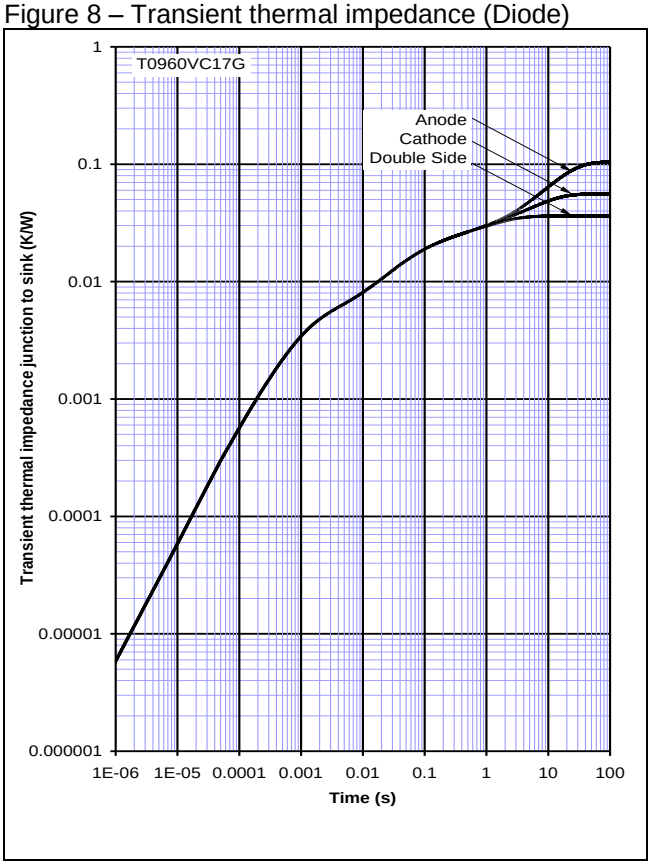
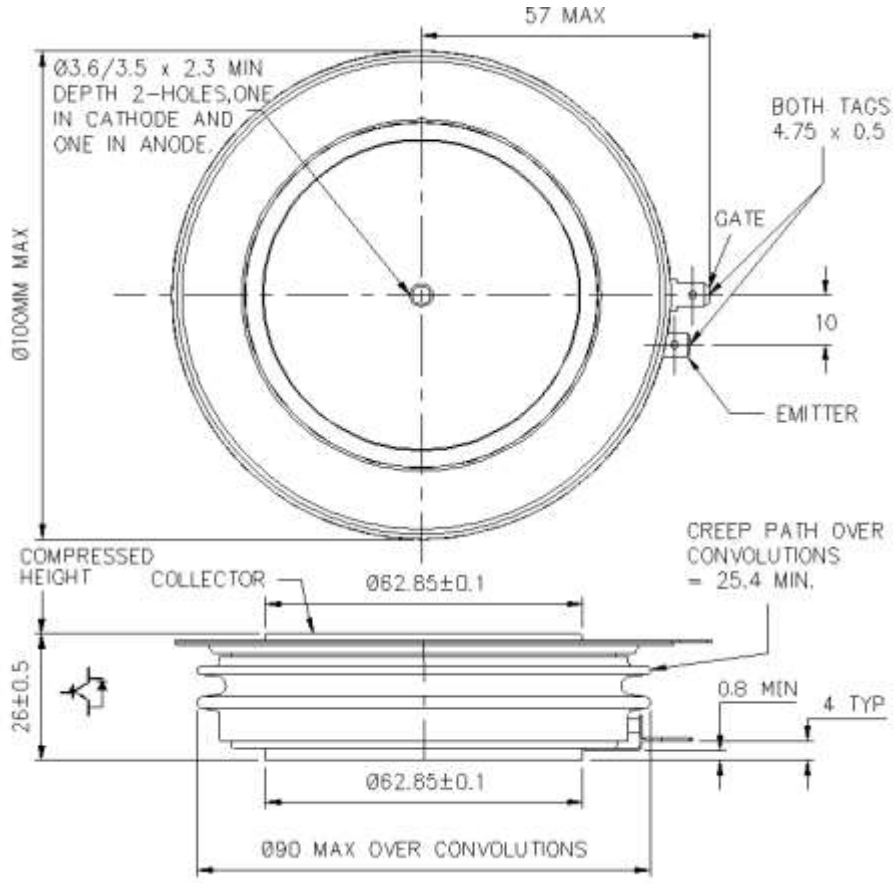


Figure 8 – Transient thermal impedance (Diode)



Outline Drawing & Ordering Information



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ORDERING INFORMATION (Please quote 10 digit code as below)

T0960	VC	17	G
Fixed type Code	Fixed Outline Code	Voltage Grade V_{CES}/100 17	Fixed format code

Typical order code: T0960VC17G (V_{CES} = 1700V)

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