

Prospective Data
Insulated Gate Bi-Polar Transistor
 Type T0900DF65A

Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{CES}	Collector – emitter voltage	6500	V
V_{CES}	Collector – emitter voltage (T_j 25°C)	6500	V
V_{CES}	Collector – emitter voltage (T_j -40°C)	6000	V
$V_{DC\ link}$	Permanent DC voltage for 100 FIT failure rate	3600	V
V_{GES}	Peak gate – emitter voltage	±20	V

	RATINGS	MAXIMUM LIMITS	UNITS
$I_{C(DC)}$	DC collector current, IGBT	900	A
I_{CRM}	Repetitive peak collector current, $t_p=1ms$, IGBT	1800	A
$I_{F(DC)}$	Continuous DC forward current, Diode	900	A
I_{FRM}	Repetitive peak forward current, $t_p=1ms$, Diode	1800	A
I_{FSM}	Peak non-repetitive surge $t_p=10ms$, $V_{RM}=60\%V_{RRM}$, Diode (Note 4)	9.55	kA
I_{FSM2}	Peak non-repetitive surge $t_p=10ms$, $V_{RM}\leq 10V$, Diode (Note 4)	10.5	kA
P_{MAX}	Maximum power dissipation, IGBT (Note 2)	10.6	kW
$(di/dt)_{cr}$	Critical diode di/dt (note 3)	2500	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 $T_j = 125^\circ C$.
- 2) $T_{sink} = 25^\circ C$, double side cooled.
- 3) Maximum commutation loop inductance 200nH.
- 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	-	3.6	-	I _C = 900A, V _{GE} = 15V, T _J = 25°C	V	
		4.4	4.8	5.2	I _C = 900A, V _{GE} = 15V	V	
V _{T0}	Threshold voltage	-	-	2.49	Current range: 300A – 900A	V	
r _T	Slope resistance	-	-	3.02		mΩ	
V _{GE(TH)}	Gate threshold voltage	-	5.2	-	V _{CE} = V _{GE} , I _C = 900mA	V	
I _{CES}	Collector – emitter cut-off current	-	10	35	V _{CE} = V _{CES} , V _{GE} = 0V	mA	
I _{GES}	Gate leakage current	-50	-	+50	V _{GE} = ±20V	μA	
C _{ies}	Input capacitance	-	160	-	V _{CE} = 10V, V _{GE} = 0V, f = 100kHz, T _J = 25°C	nF	
t _{d(on)}	Turn-on delay time	-	1.6	-	I _C = 900A, V _{CE} = 3600V, di/dt = 2500A/μs V _{GE} = ±15V, L _S = 280nH R _{g(ON)} = 3.9Ω, R _{g(OFF)} = 12Ω, C _{GE} = 68nF Integral diode used as freewheel diode (Note 3 & 4)	μs	
t _{r(V)}	Rise time	-	3.1	-		μs	
Q _{g(on)}	Turn-on gate charge	-	5.8	-		μC	
E _{on}	Turn-on energy	-	6.5	-		J	
t _{d(off)}	Turn-off delay time	-	4.5	-		μs	
t _{f(l)}	Fall time	-	2.3	-		μs	
Q _{g(off)}	Turn-off gate charge	-	5.2	-		μC	
E _{off}	Turn-off energy	-	5.3	-		J	
I _{SC}	Short circuit current	-	4900	-		V _{GE} = +15V, V _{CC} = 3600V, V _{CEmax} ≤ V _{CES} , t _p ≤ 10μs	A

Diode Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
V _F	Forward voltage	-	3.4	-	I _F = 900A, T _J = 25°C	V
		-	3.8	4.2	I _F = 900A	V
V _{T0}	Threshold voltage	-	-	1.98	Current range 300A – 900A	V
r _T	Slope resistance	-	-	2.47		mΩ
I _{rm}	Peak reverse recovery current	-	1100	-	I _F = 900A, V _{GE} = -15V, di/dt = 2500A/μs	A
Q _{rr}	Recovered charge	-	980	-		μC
t _{rr}	Reverse recovery time, 50% chord	-	1.1	-		μs
E _r	Reverse recovery energy	-	2.2	-		J

Thermal Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
R _{thJK}	Thermal resistance junction to sink, IGBT	-	-	9.4	Double side cooled	K/kW
		-	-	14.3	Collector side cooled	K/kW
		-	-	27.6	Emitter side cooled	K/kW
R _{thJK}	Thermal resistance junction to sink, Diode	-	-	16	Double side cooled	K/kW
		-	-	23.4	Cathode side cooled	K/kW
		-	-	50.6	Anode side cooled	K/kW
F	Mounting force	45	-	55	Note 2	kN
W _t	Weight	-	1.5	-		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) Data are obtained using integral diode as freewheeling diode

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

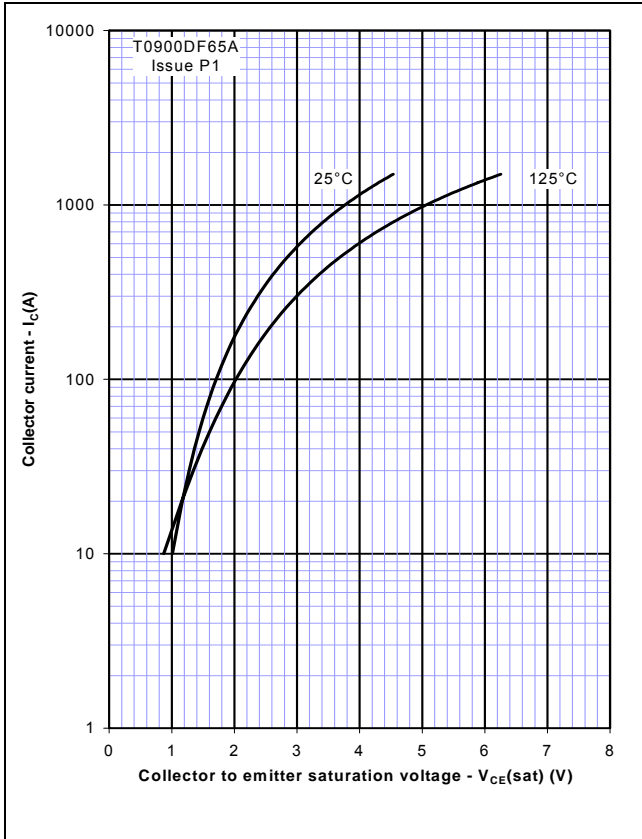


Figure 2 – Typical output characteristics

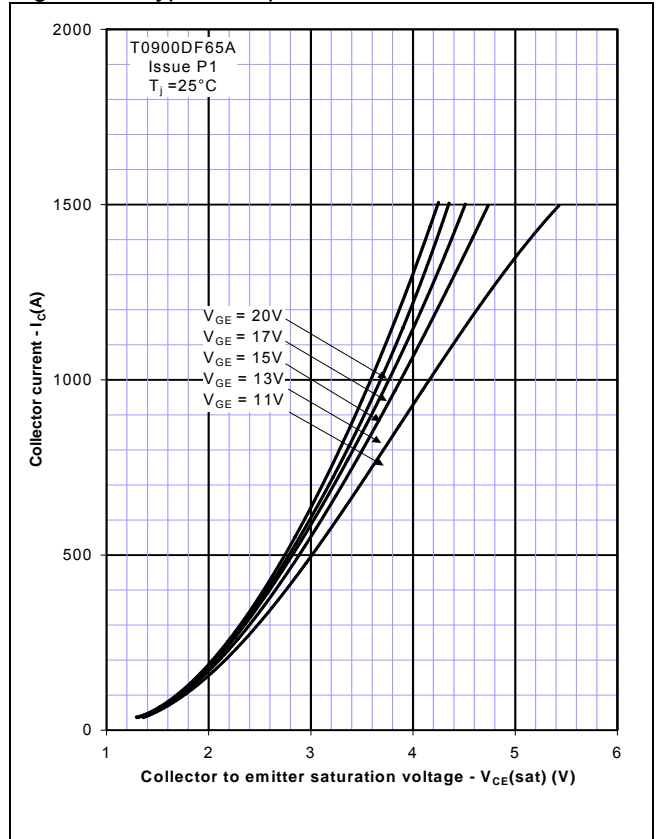


Figure 3 – Typical output characteristics

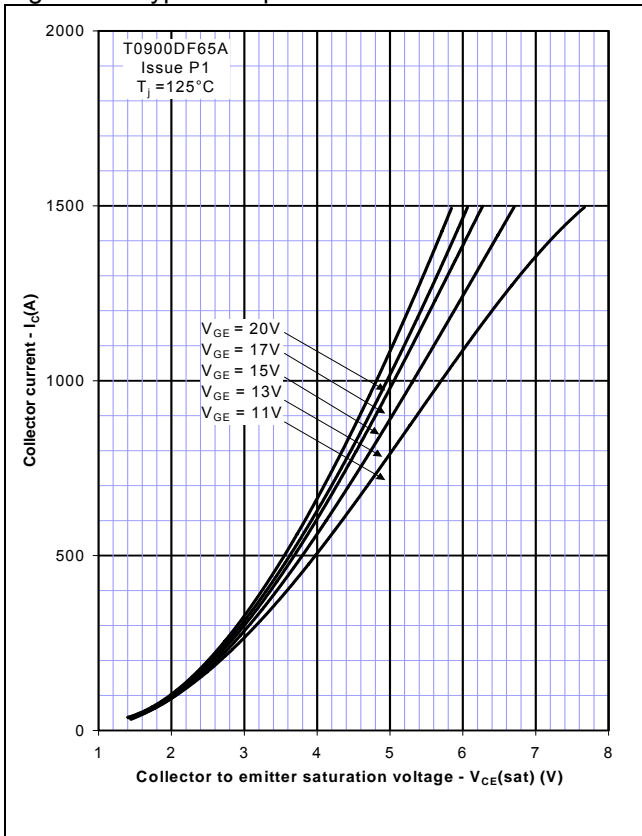


Figure 4 – Typical diode forward characteristics

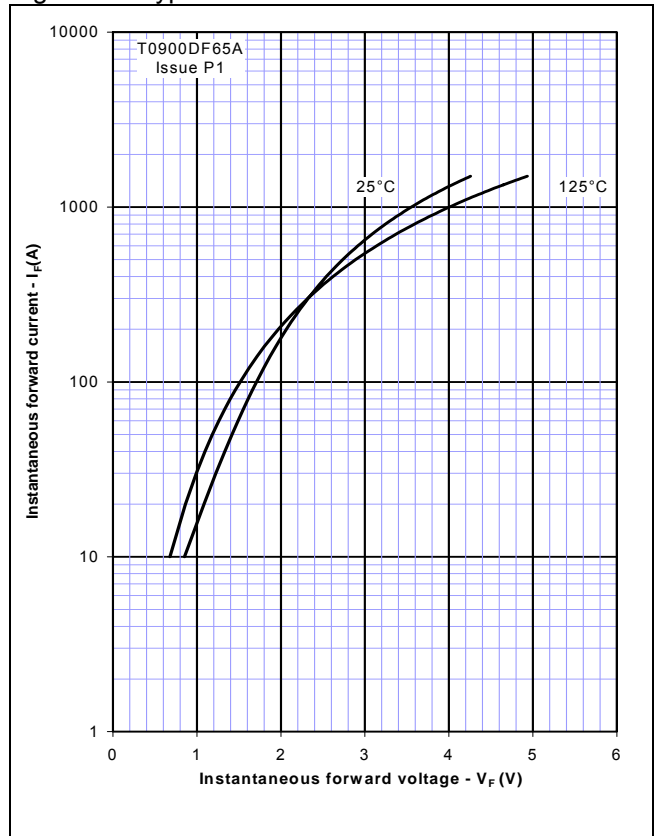


Figure 5 – Transient thermal impedance (IGBT)

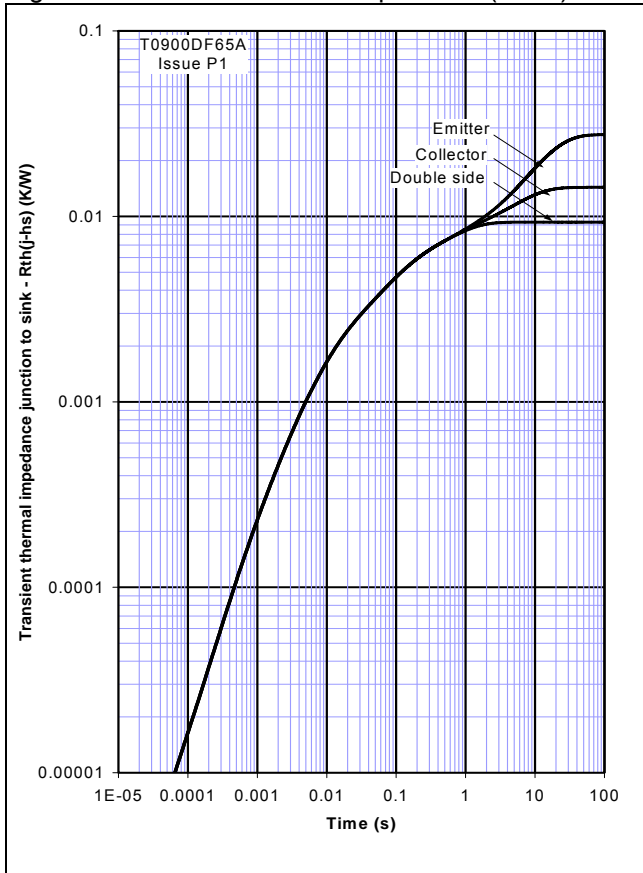
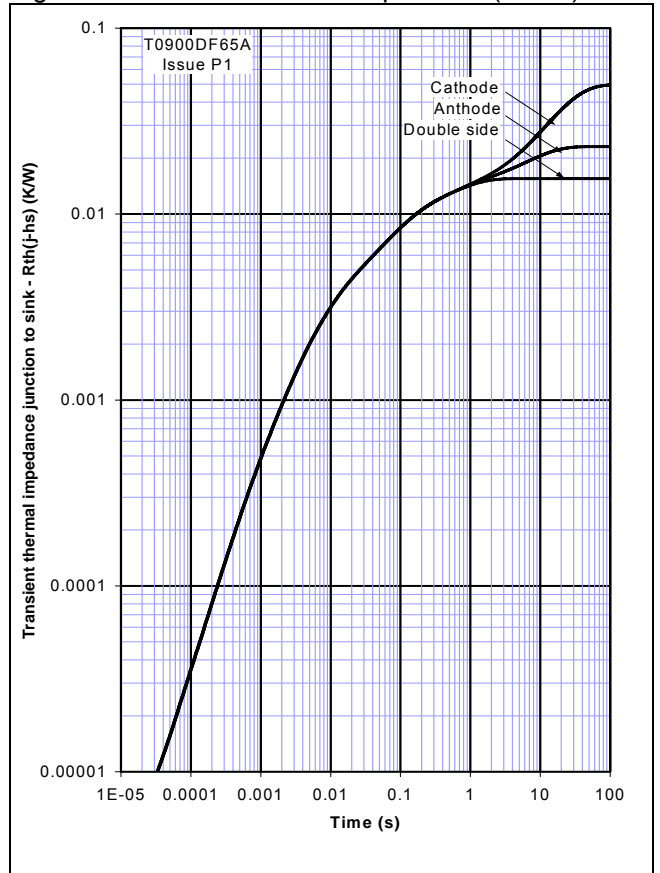
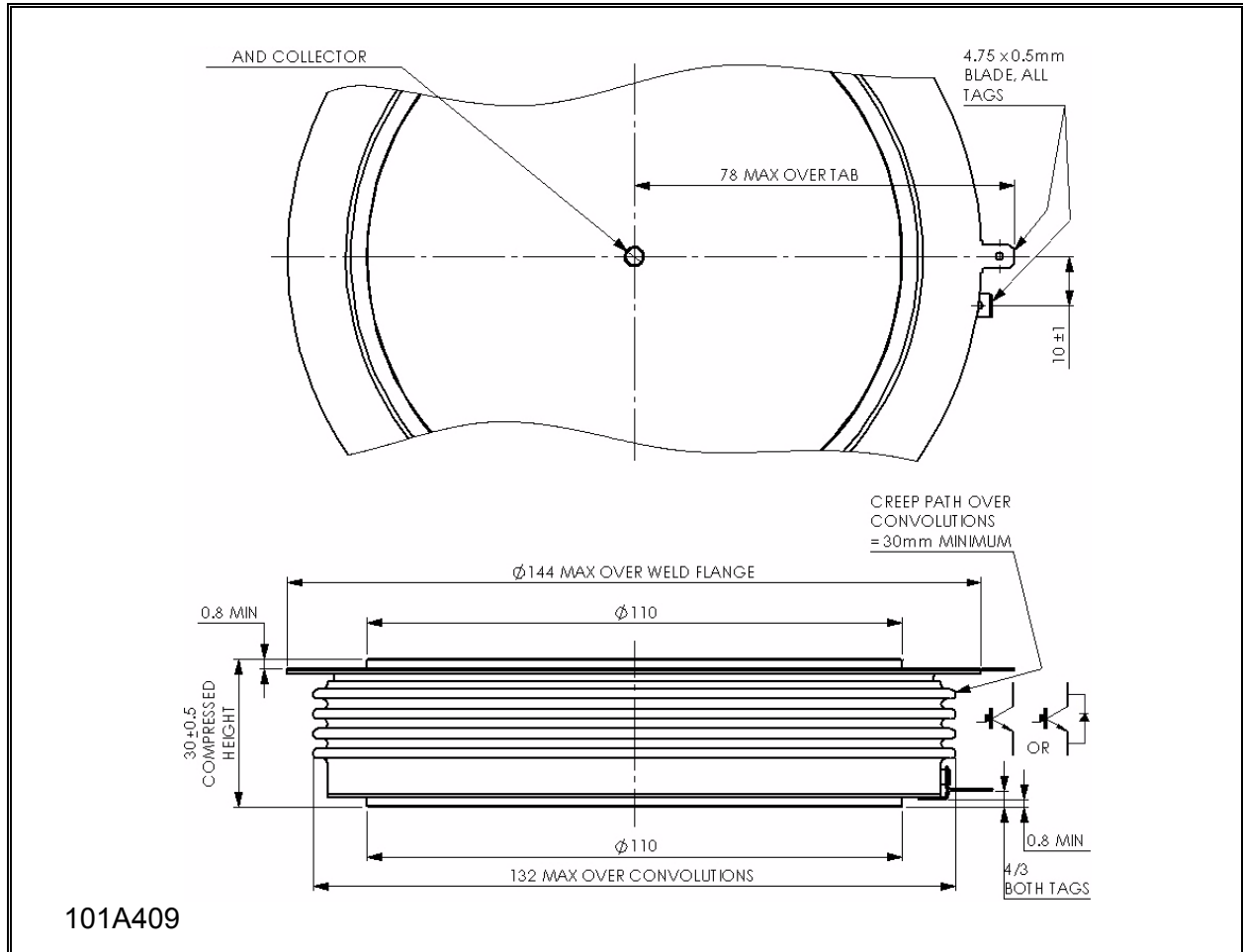


Figure 6 – Transient thermal impedance (Diode)



Outline Drawing & Ordering Information



ORDERING INFORMATION			
(Please quote 10 digit code as below)			
T0900	DF	65	A
Fixed type Code	Fixed Outline Code	Voltage Grade $V_{CES}/100$ 65	Fixed format code
Typical order code: T0900DF65A ($V_{CES} = 6500V$)			

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