IXYS UK WESTCODE

Date:- 18 March, 2015

Data Sheet Issue:- P1

Prospective data

Insulated Gate Bi-Polar Transistor

Type T1890BF65E

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 collector current, IGBT	1890	A
I_{CRM}	Repetitive peak collector current, t_p=1ms, IGBT	3780	A
I_{CEO}	Maximum reverse emitter current, t_p=100µs, (note 2 & 3)	1890	A
P_{MAX}	Maximum power dissipation, IGBT (Note 2)	22.4	KW
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 140nH.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
$V_{CE(sat)}$	Collector – emitter saturation voltage	-	3.6	-	I_C = 1890A, V_{GE} = 15V, T_j = 25°C	V
		4.4	4.8	5.2	I_C = 1890A, V_{GE} = 15V	V
V_{T0}	Threshold voltage	-	-	2.49	Current range: 630A – 1890A	V
r_T	Slope resistance	-	-	1.44		mΩ
$V_{GE(TH)}$	Gate threshold voltage	-	5.2	-	V_{CE} = V_{GE}, I_C = 1890A	V
I_{CES}	Collector – emitter cut-off current	-	20	60	V_{CE} = V_{CES}, V_{GE} = 0V	mA
I_{GES}	Gate leakage current	-	-	50	V_{GE} = ±20V	µA
C_{ies}	Input capacitance	-	350	-	V_{CE} = 10V, V_{GE} = 0V, f = 100kHz, T_j=25°C	nF
$t_{d(on)}$	Turn-on delay time	-	1.7	-	I_C =1890A, V_{CE} =3600V, di/dt=4500A/µs	µs
t_r(V)	Rise time	-	2.6	-		µs
$Q_{g(on)}$	Turn-on gate charge	-	11	-	V_{GE} = ±15V, L_s=140nH	µC
E_{on}	Turn-on energy	-	13.2	-	$R_{g(ON)}$= 1.8Ω, $R_{g(OFF)}$=5.1Ω, C_{GE}=168nF	J
$t_{d(off)}$	Turn-off delay time	-	4.1	-	Freewheeling diode E2060FF65F at T_j=125°C	µs
t_f(I)	Fall time	-	2.1	-	(Note 3, 4 & 5)	µs
$Q_{g(off)}$	Turn-off gate charge	-	18	-		µC
E_{off}	Turn-off energy	-	10.6	-		J
I_{SC}	Short circuit current	-	10.2	-	V_{GE}=+15V, V_{CC}=3600V, V_{CEmax}≤V_{CES}, t_p≤10µs	kA

Thermal Characteristics

R_{thJK}	Thermal resistance junction to sink	-	-	4.47	Double side cooled	K/kW
		-	-	6.79	Collector side cooled	K/kW
		-	-	13.1	Emitter side cooled	K/kW
F	Mounting force	55	-	75	Note 2	kN
W_t	Weight	-	3.2	-		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) E_{on} integration time 15µs from 10% rising I_G.
5) E_{off} integration time 15µs from 90% falling V_{GE}.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

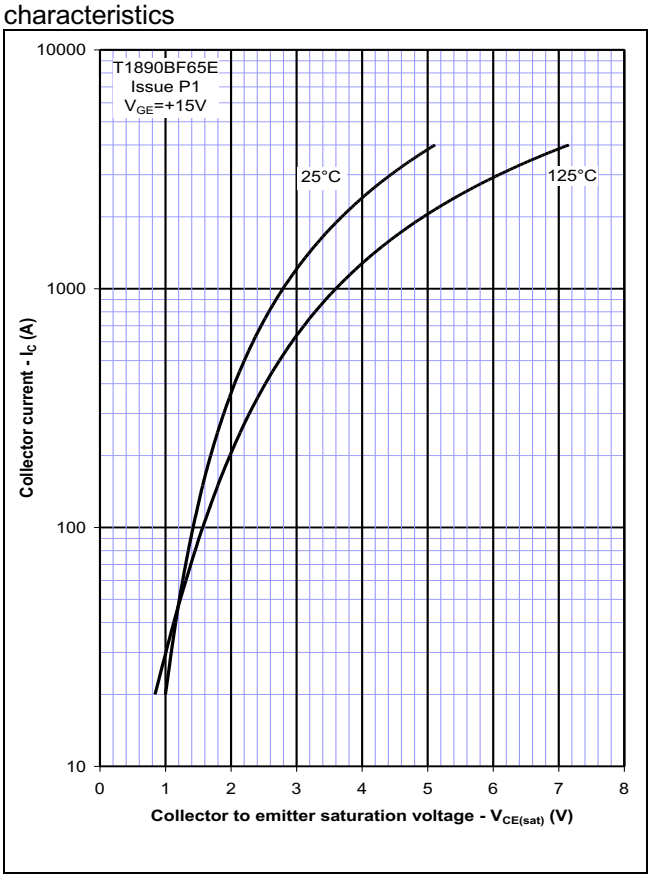


Figure 2 – Typical output characteristic

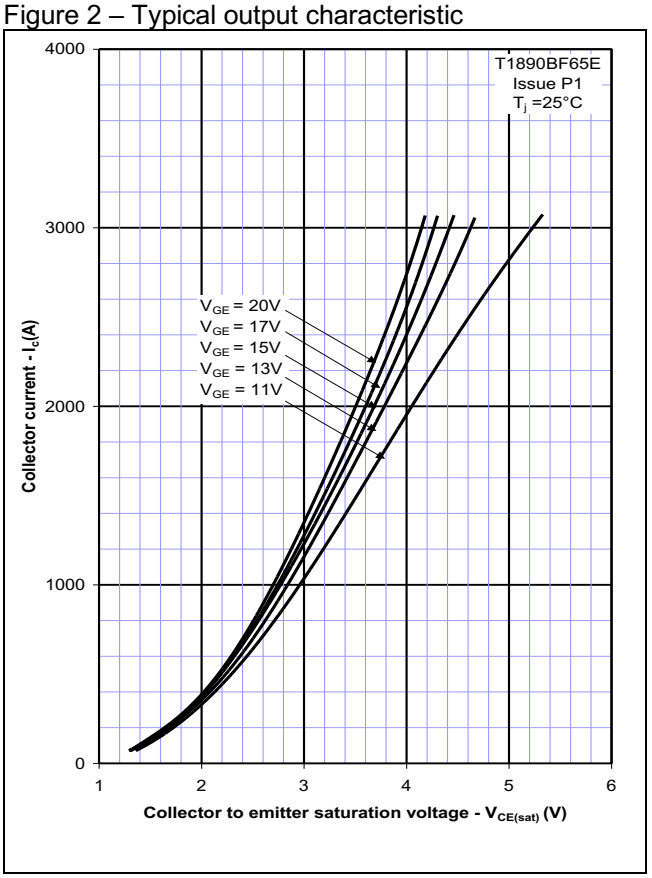


Figure 3 – Typical output characteristic

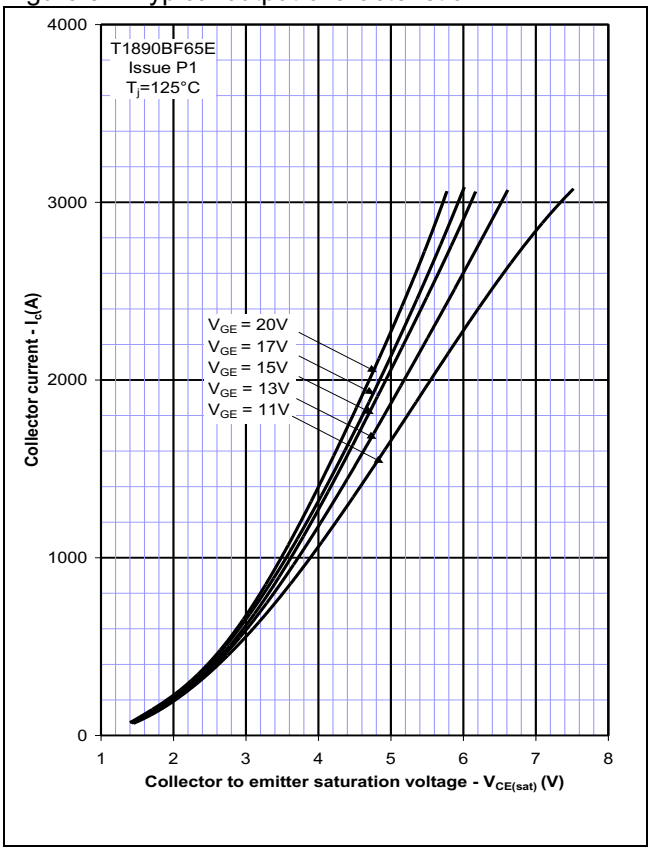


Figure 4 – Typical turn-on delay time vs gate resistance

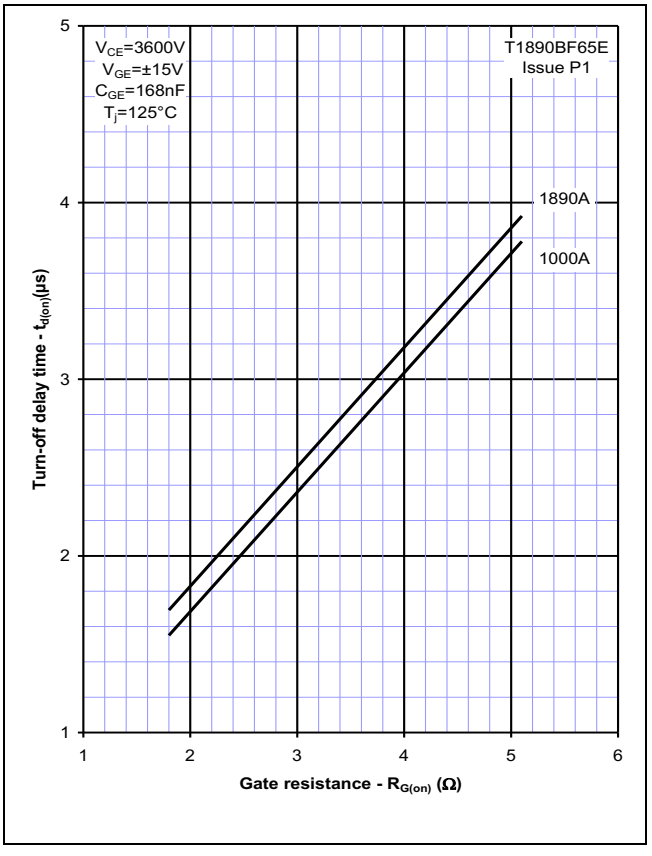


Figure 5 – Typical turn-off delay time vs. gate resistance

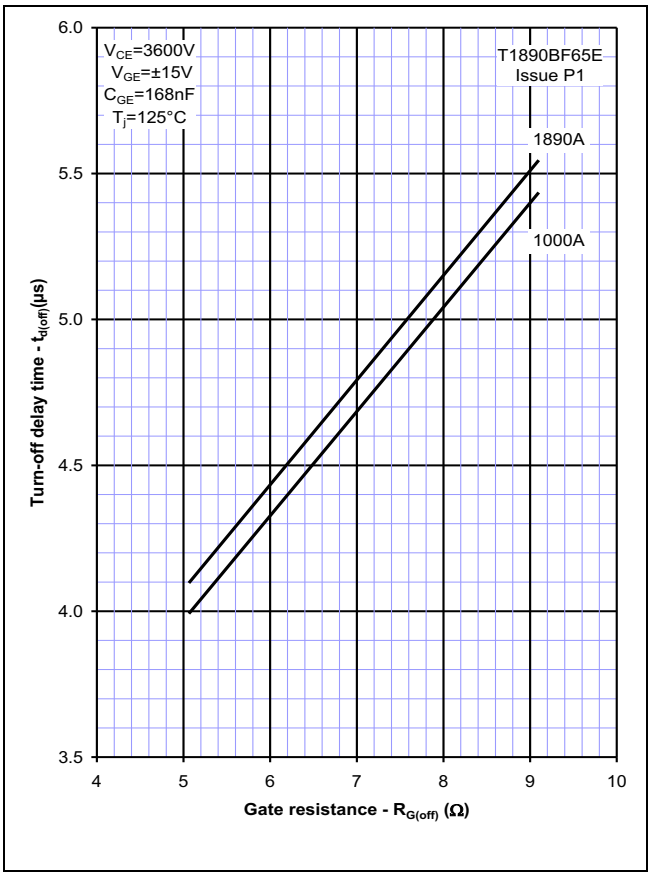


Figure 6 – Typical turn-on energy vs. collector current

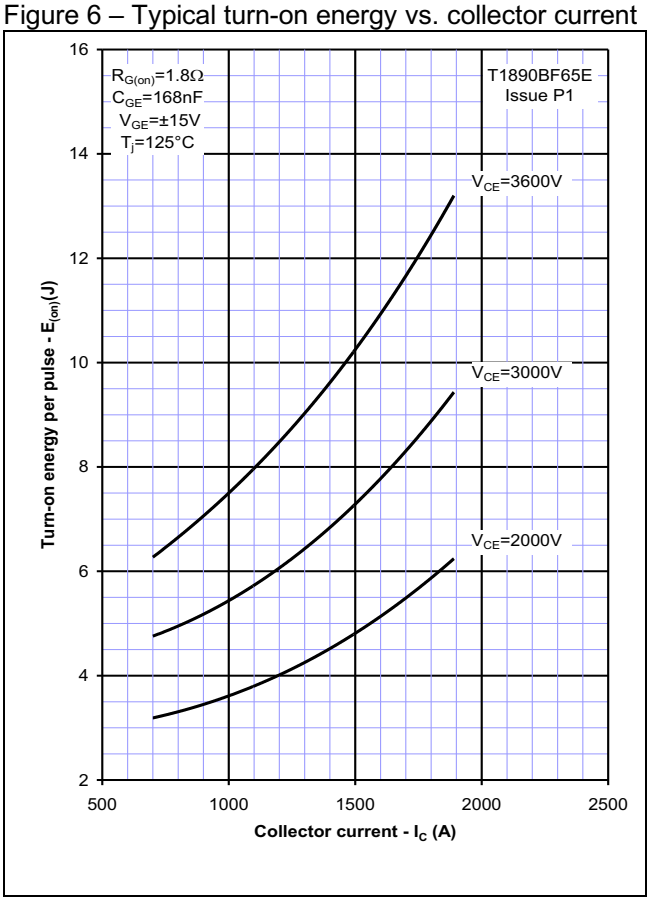


Figure 7 – Typical turn-on energy vs. di/dt

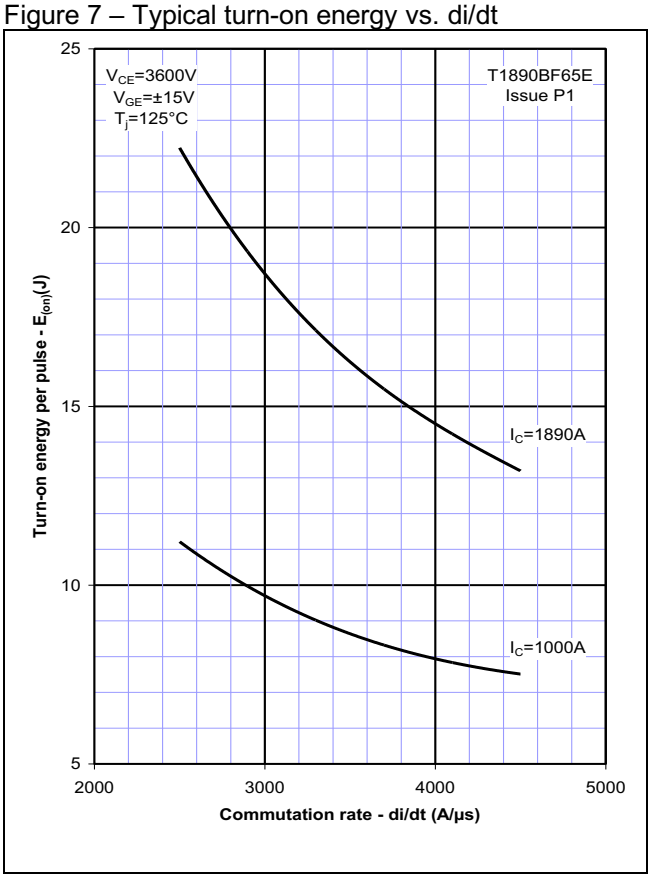


Figure 8 – Typical turn-off energy vs. collector current

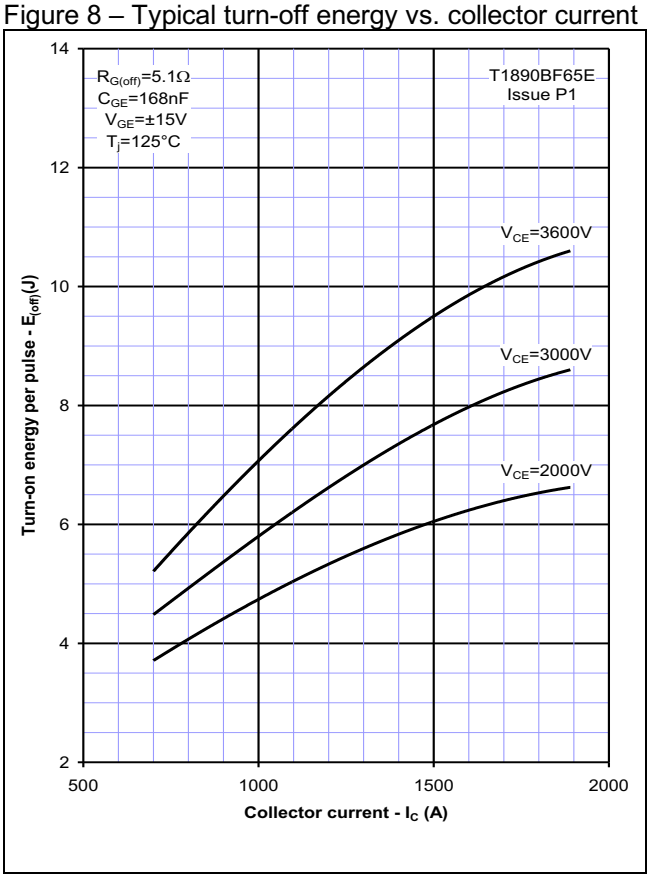


Figure 9 – Turn-off energy vs voltage

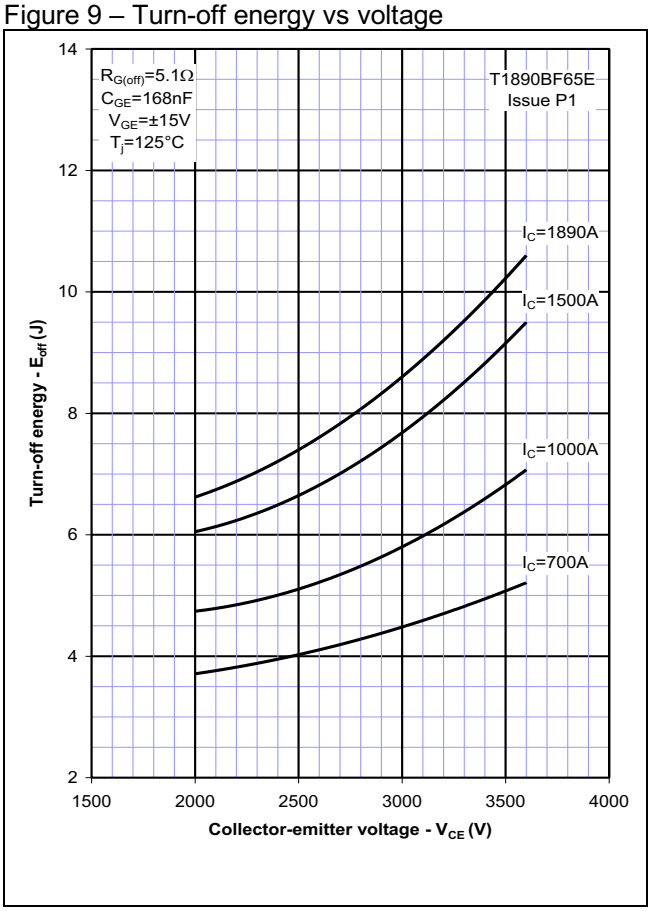


Figure 10 – Safe operating area

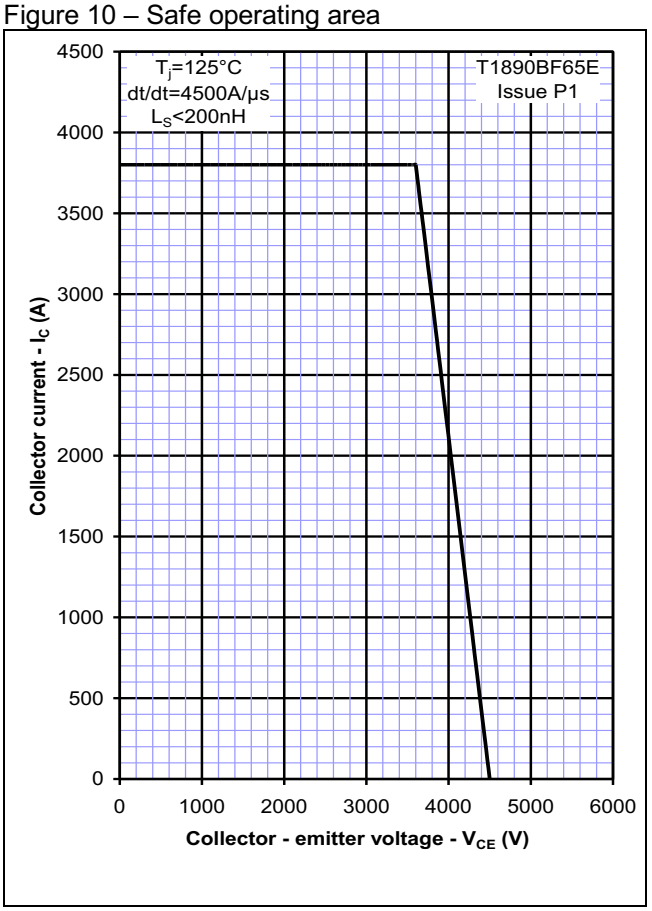
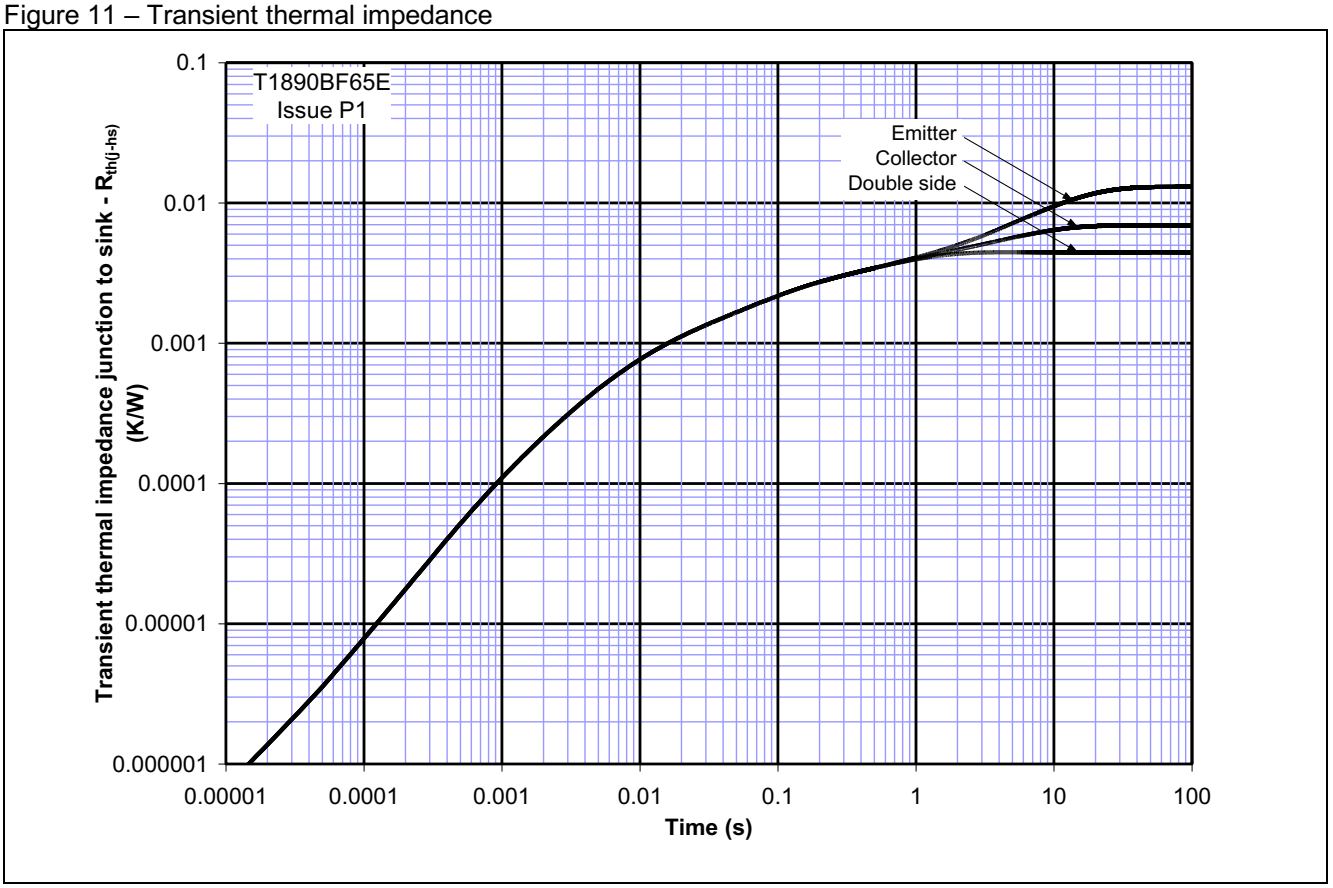
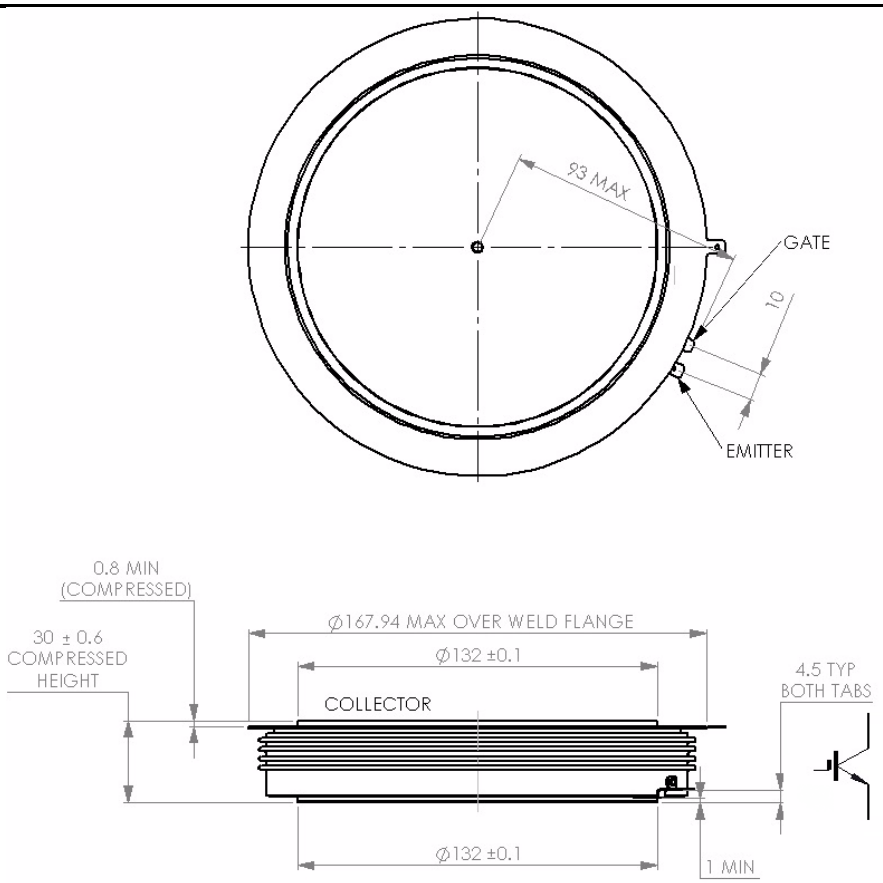


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



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ORDERING INFORMATION (Please quote 10 digit code as below)			
T1890	**BF**	**65**	**E**
Fixed type Code	Fixed Outline Code	Voltage Grade V_{CES}/100 65	Fixed format code
Typical order code: T1890BF65E (V_{CES} = 6500V)			

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