

Prospective data

Insulated Gate Bi-Polar Transistor

Type T0385HF65E

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	385	A
I_{CRM}	Repetitive peak collector current, $t_p=1ms$, IGBT	770	A
I_{CEO}	Maximum reverse emitter current, $t_p=100\mu s$, (note 2 & 3)	385	A
P_{MAX}	Maximum power dissipation, IGBT (Note 2)	4.6	KW
T_j	Operating temperature range.	-40 to +125	°C
T_{stg}	Storage temperature range.	-40 to +125	°C

Notes: -

- 1) Unless otherwise indicated $T_j = 125^\circ C$.
- 2) $T_{sink} = 25^\circ C$, double side cooled.
- 3) Maximum commutation loop inductance 650nH.

Characteristics

IGBT Characteristics

	PARAMETER	MIN	TYP	MAX	TEST CONDITIONS	UNITS
V _{CE(sat)}	Collector – emitter saturation voltage	-	3.6	-	I _C = 385A, V _{GE} = 15V, T _j = 25°C	V
		4.4	4.8	5.2	I _C = 385A, V _{GE} = 15V	V
V _{T0}	Threshold voltage	-		2.49	Current range: 128A – 385A	V
r _T	Slope resistance	-		7.05		mΩ
V _{GE(TH)}	Gate threshold voltage	-	5.2	-	V _{CE} = V _{GE} , I _C = 385mA	V
I _{CES}	Collector – emitter cut-off current	-	5	15	V _{CE} = V _{CES} , V _{GE} = 0V	mA
I _{GES}	Gate leakage current	-	-	20	V _{GE} = ±20V	μA
C _{ies}	Input capacitance	-	70	-	V _{CE} = 10V, V _{GE} = 0V, f = 100kHz, T _j =25°C	nF
t _{d(on)}	Turn-on delay time	-	1.6	-	I _C = 385A, V _{CE} = 3600V, di/dt = 1000A/μs V _{GE} = ±15V, L _S = 650nH	μs
t _{r(V)}	Rise time	-	3.3	-		μs
Q _{g(on)}	Turn-on gate charge	-	2.3	-	R _{g(ON)} = 8.2Ω, R _{g(OFF)} = 24Ω, C _{GE} = 33nF Freewheeling diode E0330MF65F at T _j = 125°C	μC
E _{on}	Turn-on energy	-	2.7	-		J
t _{d(off)}	Turn-off delay time	-	4.7	-	(Note 3, 4 & 5)	μs
t _{f(l)}	Fall time	-	2.1	-		μs
Q _{g(off)}	Turn-off gate charge	-	3.8	-		μC
E _{off}	Turn-off energy	-	2.2	-		J
I _{SC}	Short circuit current	-	2100	-	V _{GE} = +15V, V _{CC} = 3600V, V _{CEmax} ≤ V _{CES} , t _p ≤ 10μs	A

Thermal Characteristics

R _{thJK}	Thermal resistance junction to sink	-	-	21.9	Double side cooled	K/kW
		-	-	32.9	Collector side cooled	K/kW
		-	-	65.3	Emitter side cooled	K/kW
F	Mounting force	12	-	16	Note 2	kN
W _t	Weight	-	825	-		g

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_C.
- 5) E_{off} integration time 15μs from 90% falling V_{GE}.

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

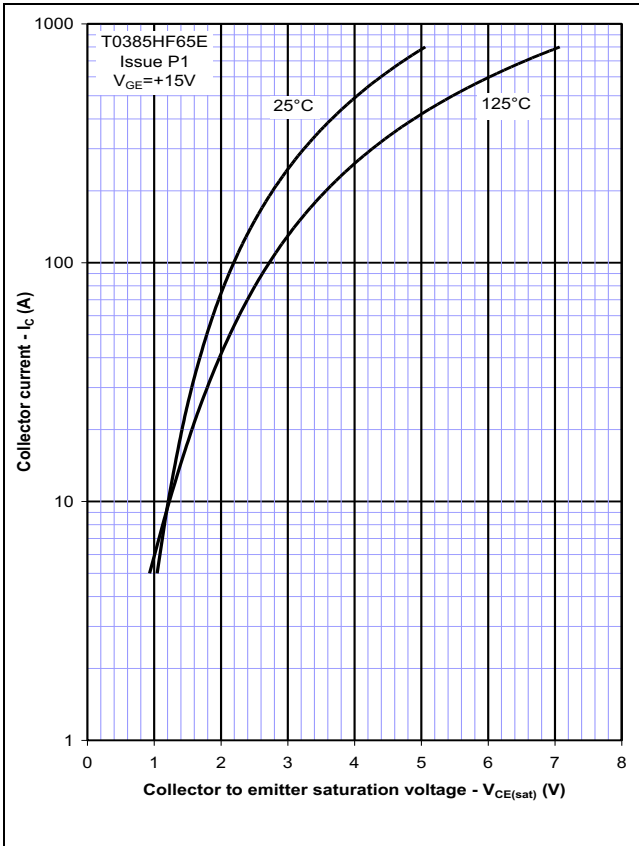


Figure 2 – Typical output characteristic

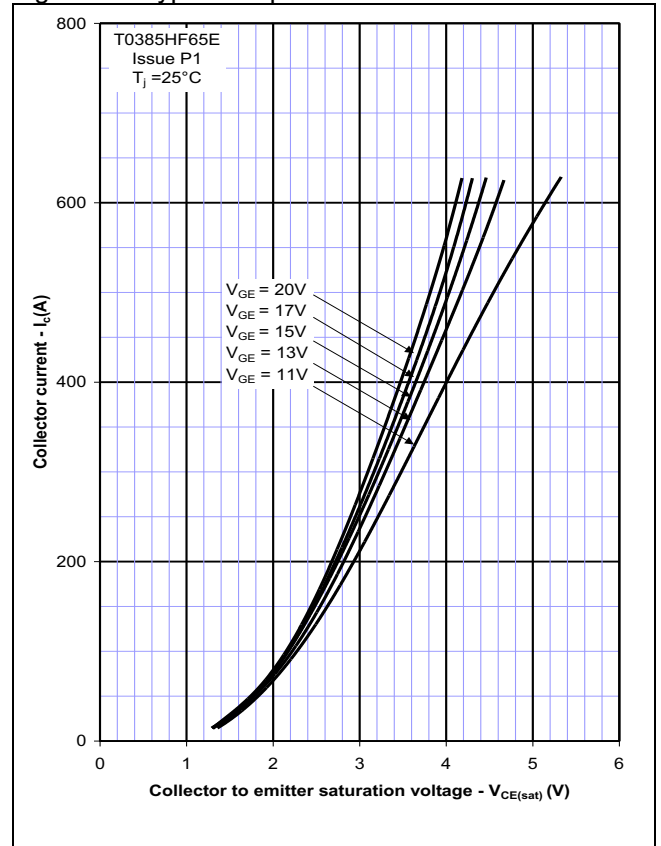


Figure 3 – Typical output characteristic

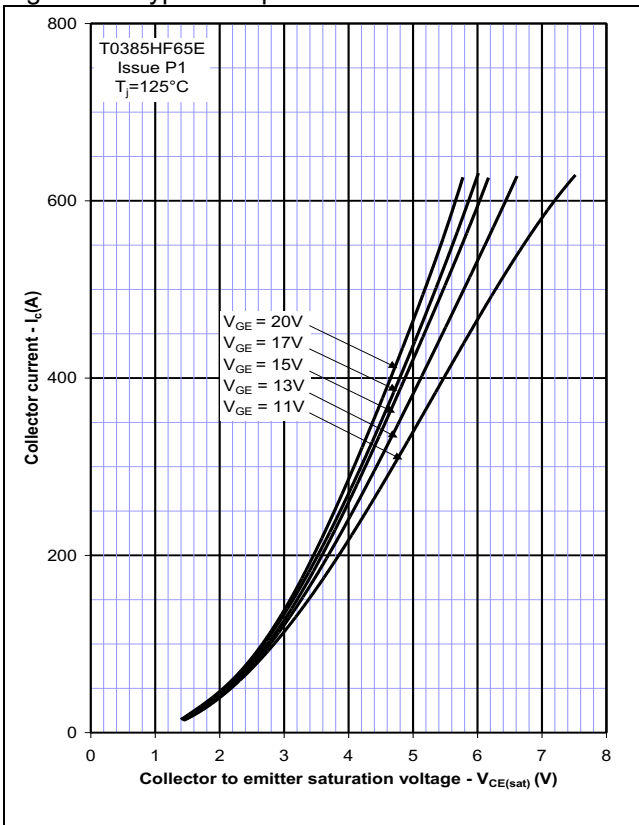


Figure 4 – Typical turn-on delay time vs gate resistance

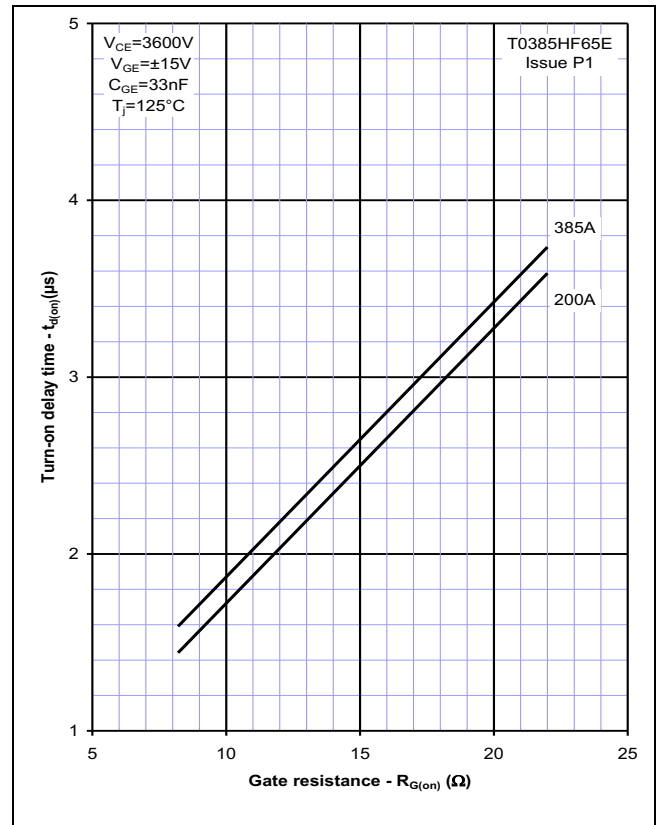


Figure 5 – Typical turn-off delay time vs. gate resistance

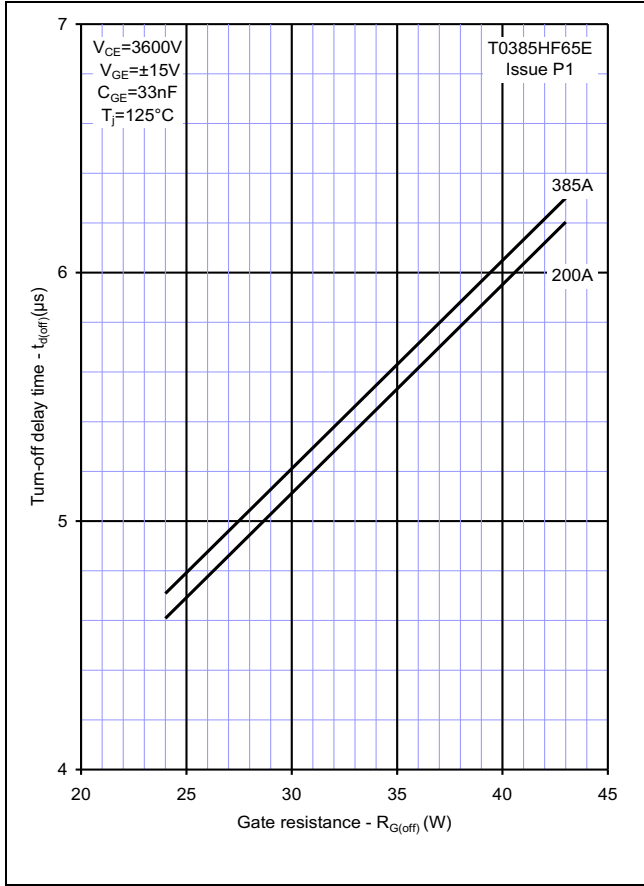


Figure 6 – Typical turn-on energy vs. collector current

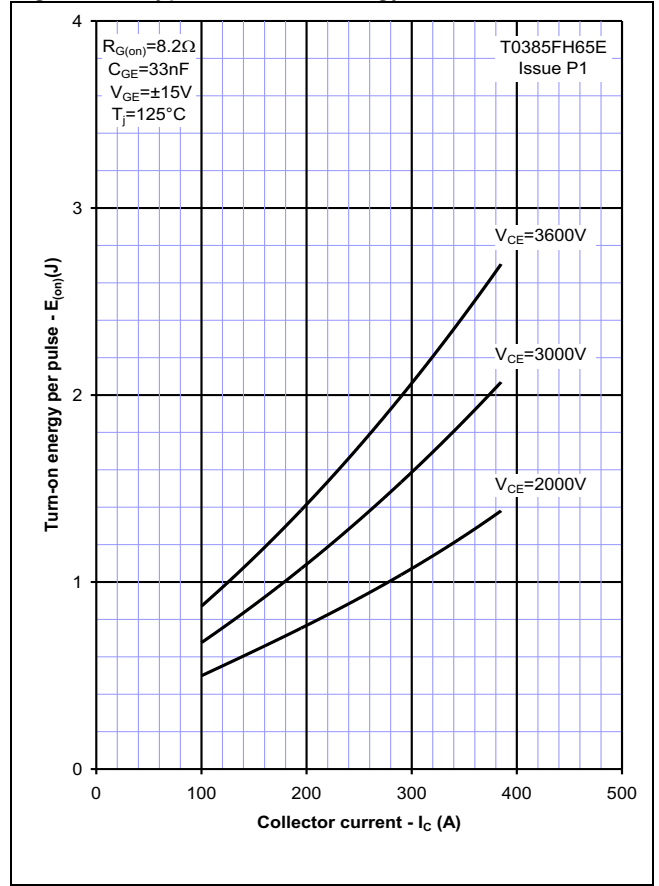


Figure 7 – Typical turn-on energy vs. di/dt

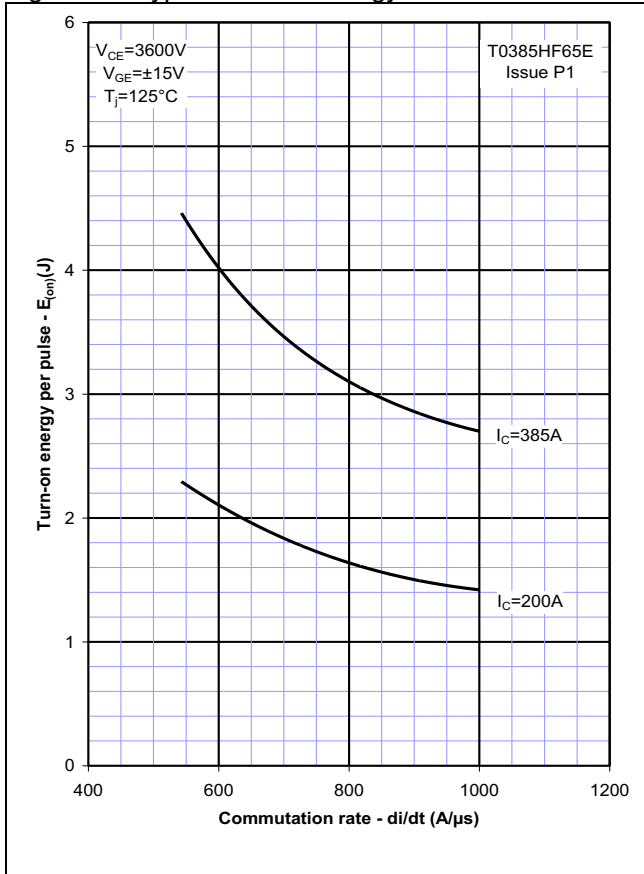


Figure 8 – Typical turn-off energy vs. collector current

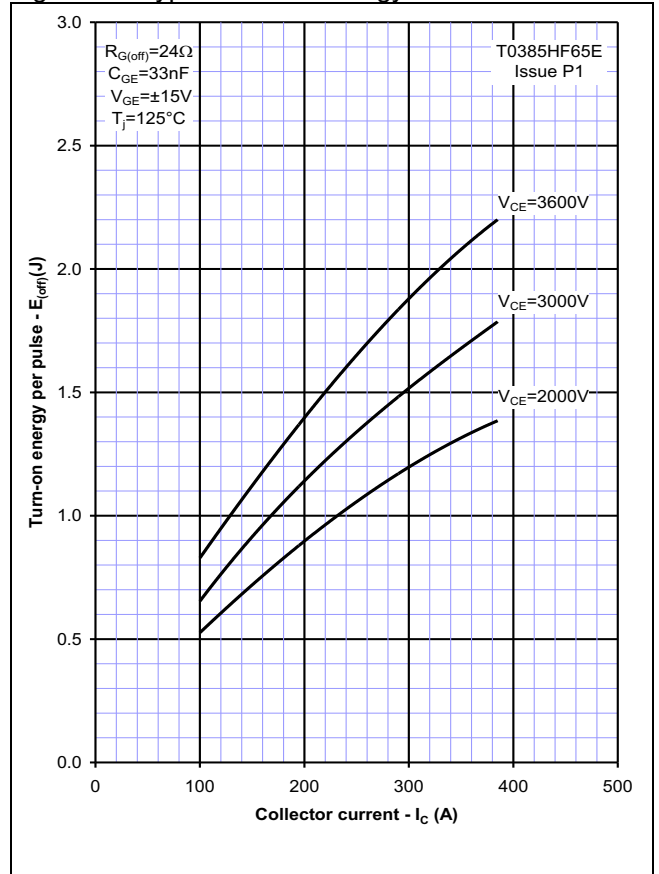


Figure 9 – Turn-off energy vs voltage

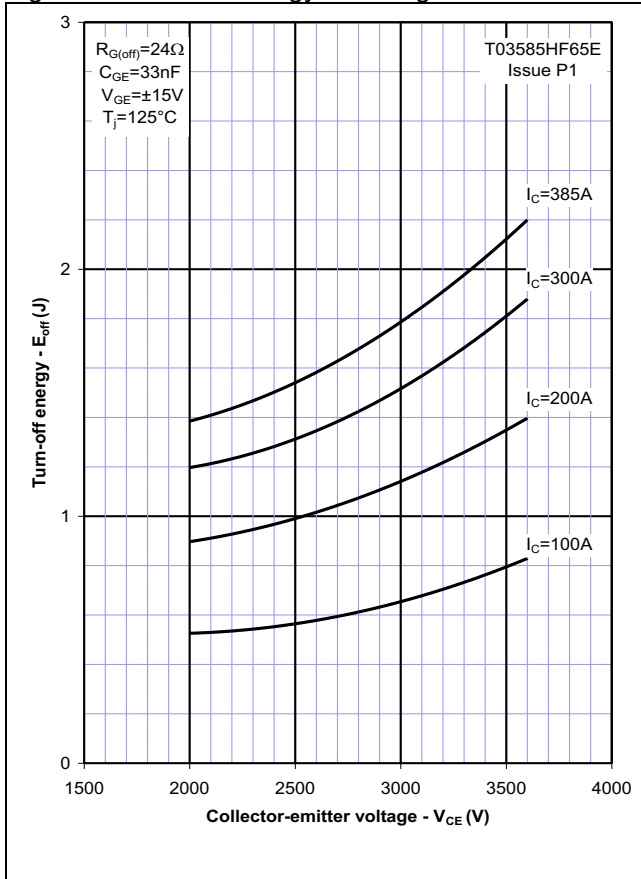


Figure 10 – Safe operating area

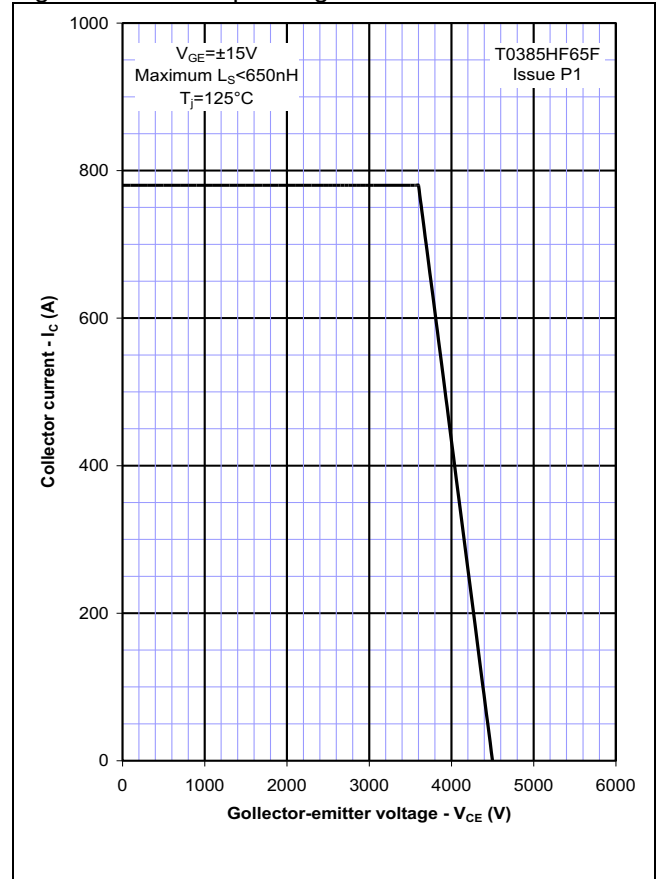
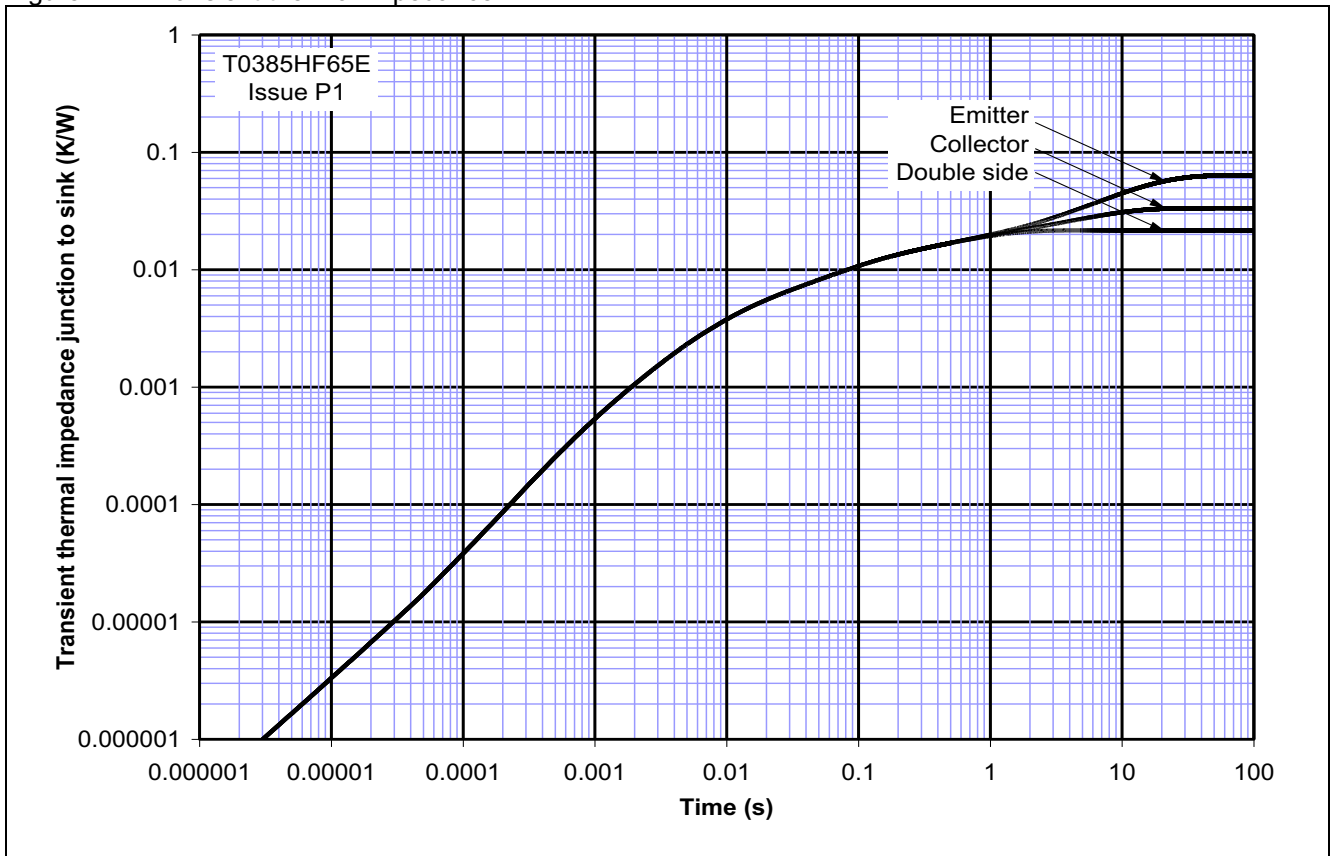
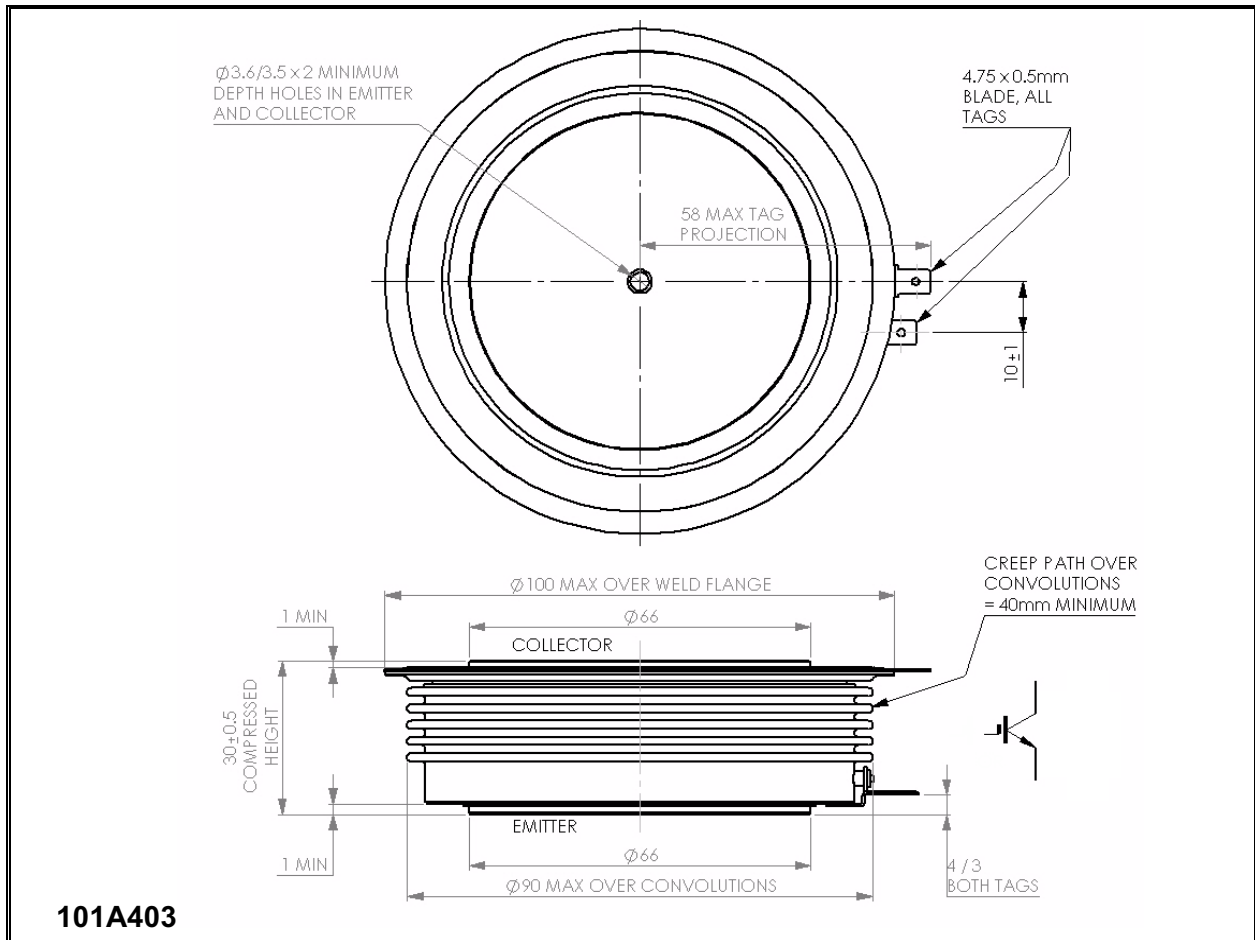


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



ORDERING INFORMATION

(Please quote 10 digit code as below)

T0385	HF	65	E
Fixed type Code	Fixed Outline Code	Voltage Grade $V_{CES}/100$ 65	Fixed format code

Typical order code: T0385HF65E ($V_{CES} = 6500V$)

IXYS Semiconductor GmbH
Edisonstraße 15
D-68623 Lampertheim
Tel: +49 6206 503-0
Fax: +49 6206 503-627
E-mail: marcom@ixys.de



IXYS UK Westcode Ltd
Langley Park Way, Langley Park,
Chippenham, Wiltshire, SN15 1GE.
Tel: +44 (0)1249 444524
Fax: +44 (0)1249 659448
E-mail: sales@ixysuk.com

IXYS Corporation
1590 Buckeye Drive
Milpitas CA 95035-7418
Tel: +1 (408) 457 9000
Fax: +1 (408) 496 0670
E-mail: sales@ixys.net

www.ixysuk.com

www.ixys.net

IXYS Long Beach
IXYS Long Beach, Inc
2500 Mira Mar Ave, Long Beach
CA 90815
Tel: +1 (562) 296 6584
Fax: +1 (562) 296 6585
E-mail: service@ixyslongbeach.com

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