

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	-	$I_C = 385A, V_{GE} = 15V, T_j = 25^\circ C$	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		m Ω	
$V_{GE(TH)}$	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	$V_{GE} = \pm 20V$	μA	
C_{ies}	Input capacitance	-	70	-	$V_{CE} = 10V, V_{GE} = 0V, f = 100kHz, T_j = 25^\circ C$	nF	
$t_{d(on)}$	Turn-on delay time	-	1.6	-	$I_C = 385A, V_{CE} = 3600V, di/dt = 1000A/\mu s$ $V_{GE} = \pm 15V, L_s = 650nH$ $R_{g(ON)} = 8.2\Omega, R_{g(OFF)} = 24\Omega, C_{GE} = 33nF$ Freewheeling diode E0330MF65F at $T_j = 125^\circ C$ (Note 3, 4 & 5)	μs	
$t_r(V)$	Rise time	-	3.3	-		μs	
$Q_{g(on)}$	Turn-on gate charge	-	2.3	-		μC	
E_{on}	Turn-on energy	-	2.7	-		J	
$t_{d(off)}$	Turn-off delay time	-	4.7	-		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	-		$V_{GE} = +15V, V_{CC} = 3600V, V_{CEmax} \leq V_{CES}, t_p \leq 10\mu s$	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 $T_j = 125^\circ C$.
- 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 $15\mu s$ from 10% rising I_C .
- 5) E_{off} integration time $15\mu s$ from 90% falling V_{GE} .

Curves

Figure 1 – Typical collector-emitter saturation voltage characteristics

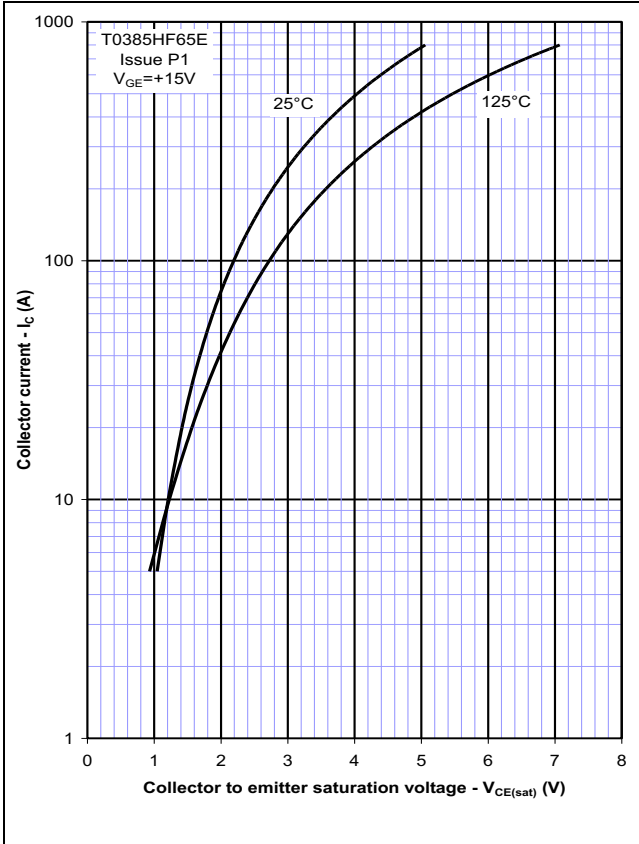


Figure 2 – Typical output characteristic

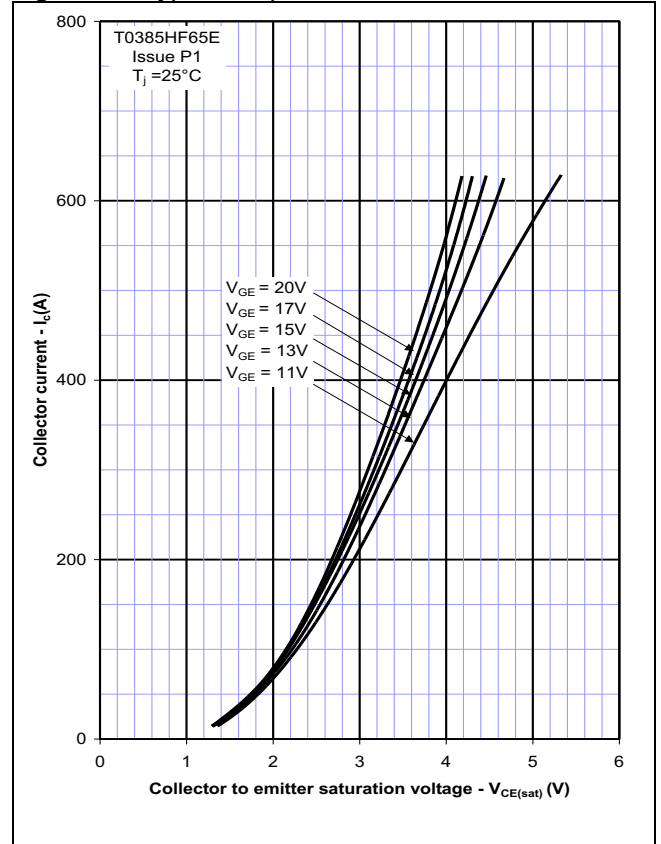


Figure 3 – Typical output characteristic

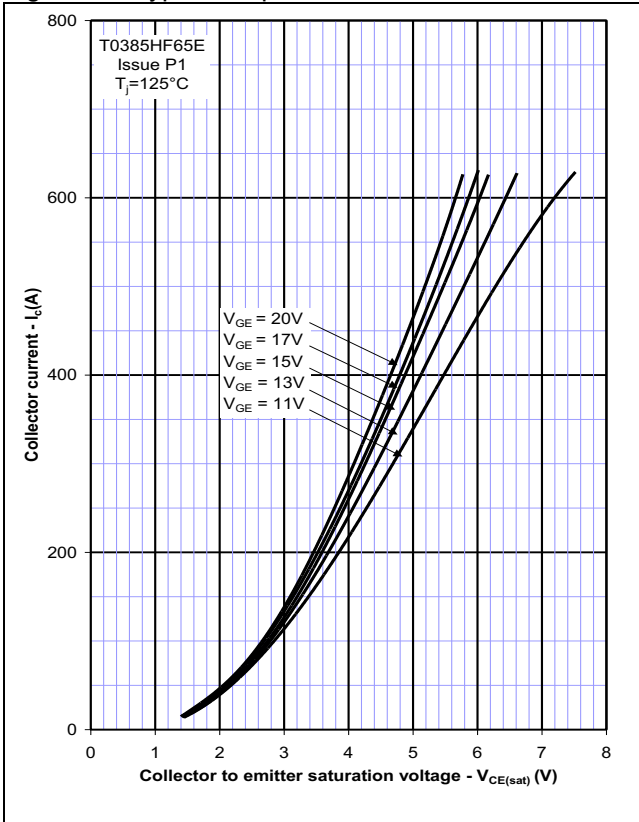


Figure 4 – Typical turn-on delay time vs gate resistance

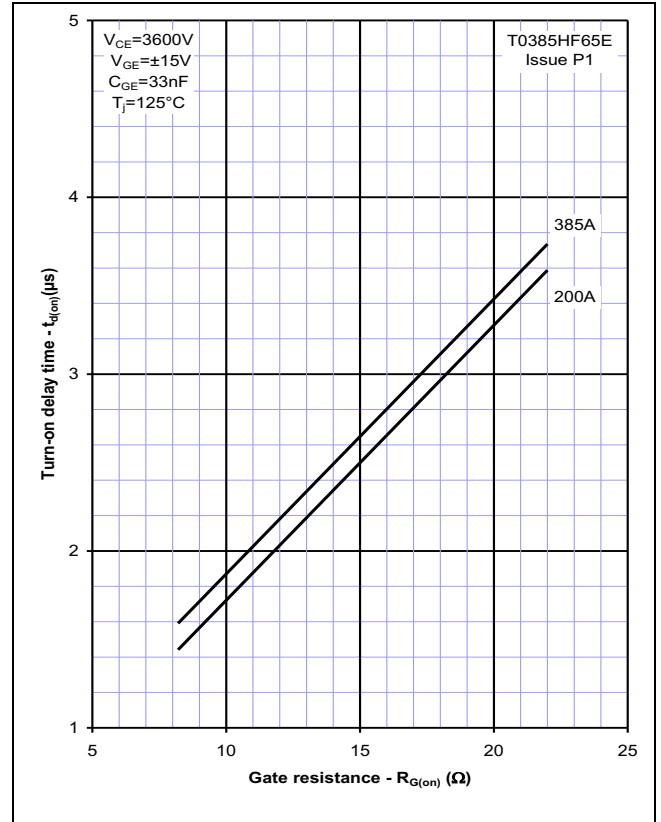


Figure 5 – Typical turn-off delay time vs. gate resistance

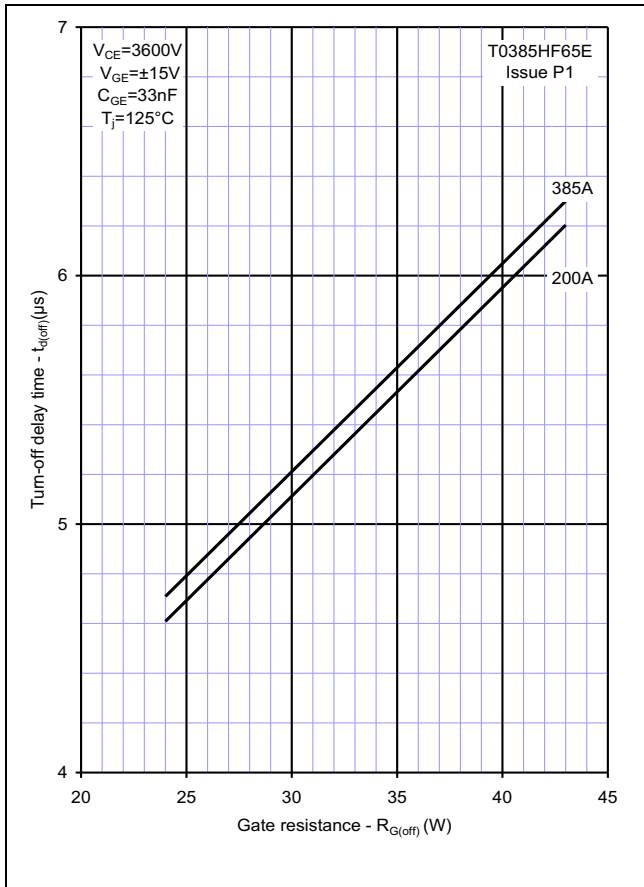


Figure 6 – Typical turn-on energy vs. collector current

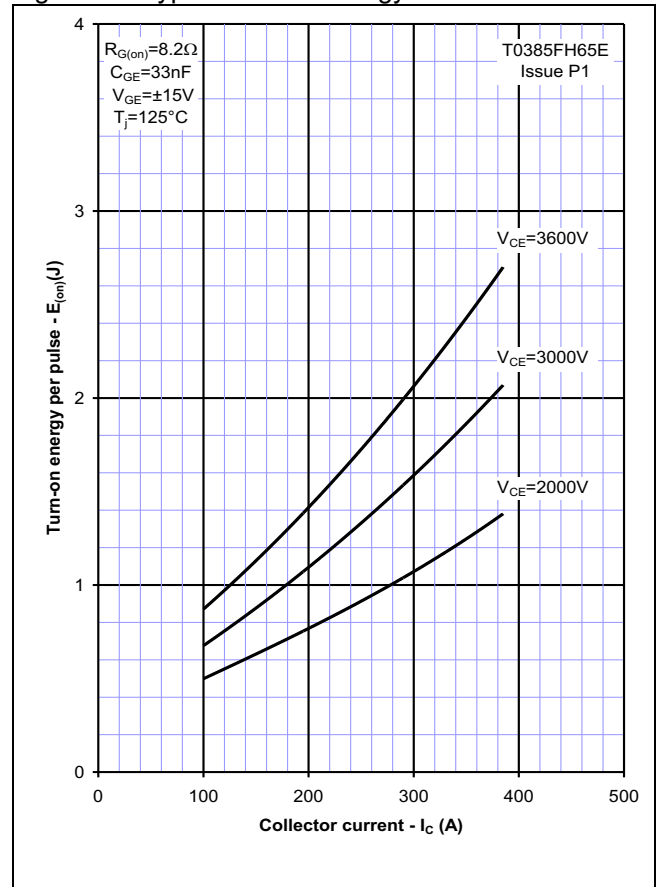


Figure 7 – Typical turn-on energy vs. di/dt

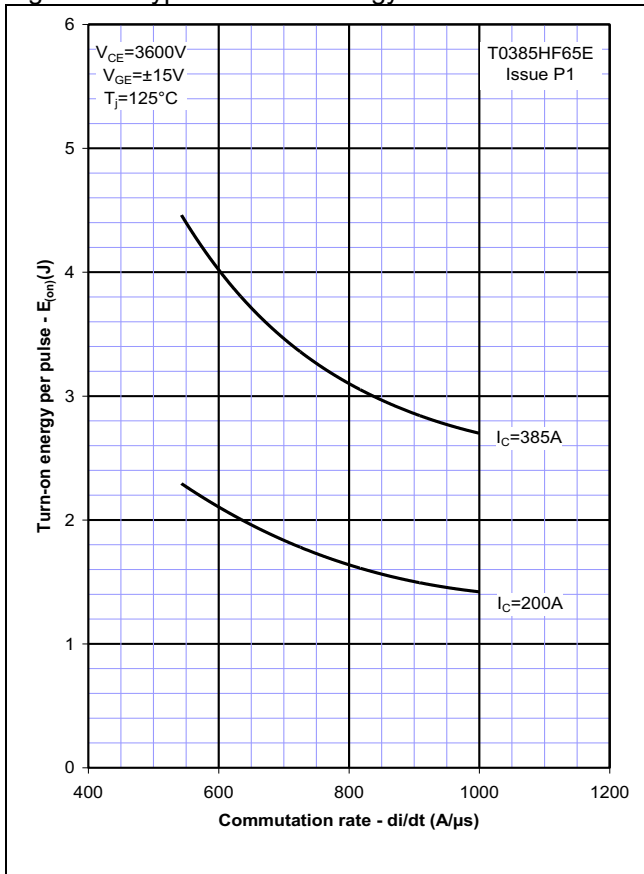


Figure 8 – Typical turn-off energy vs. collector current

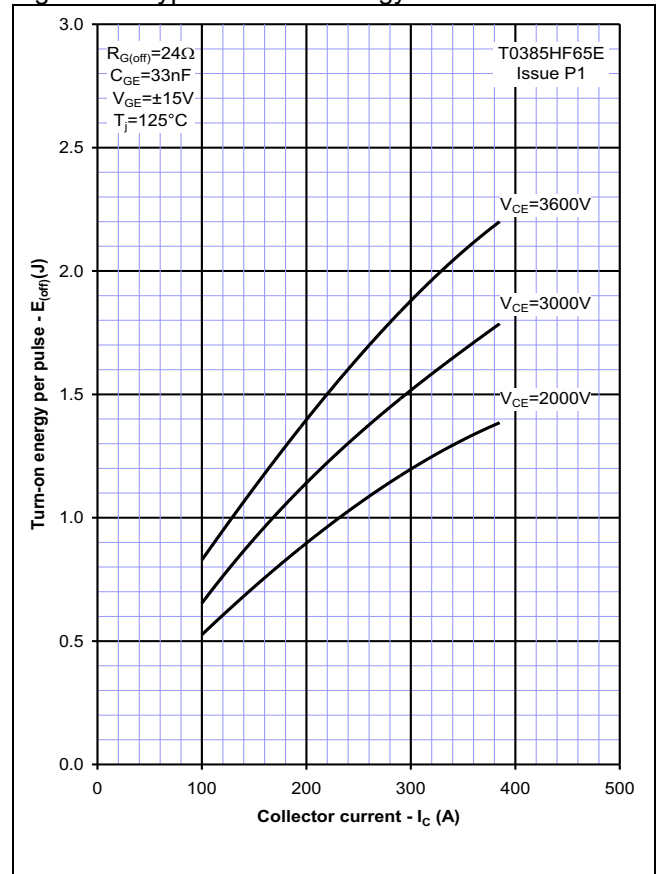


Figure 9 – Turn-off energy vs voltage

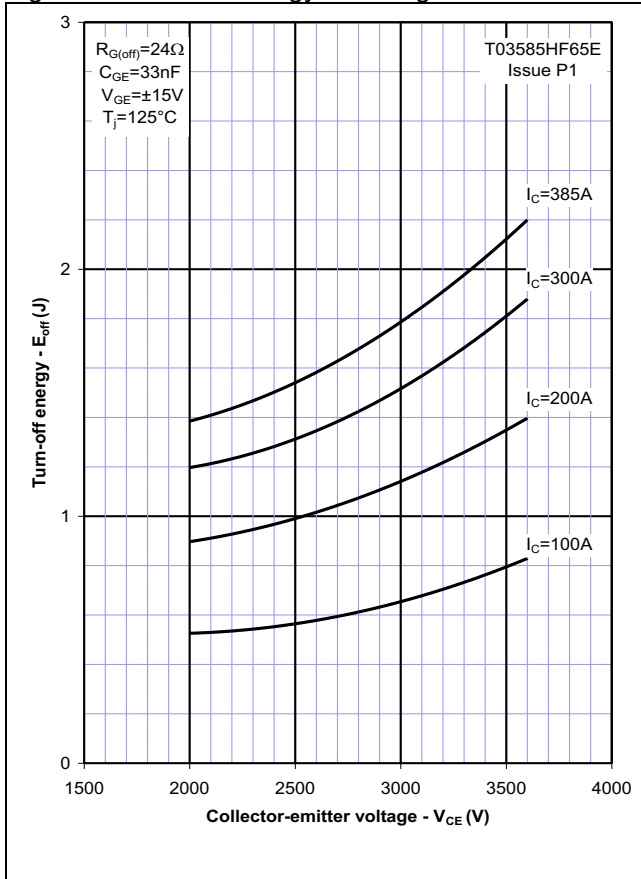


Figure 10 – Safe operating area

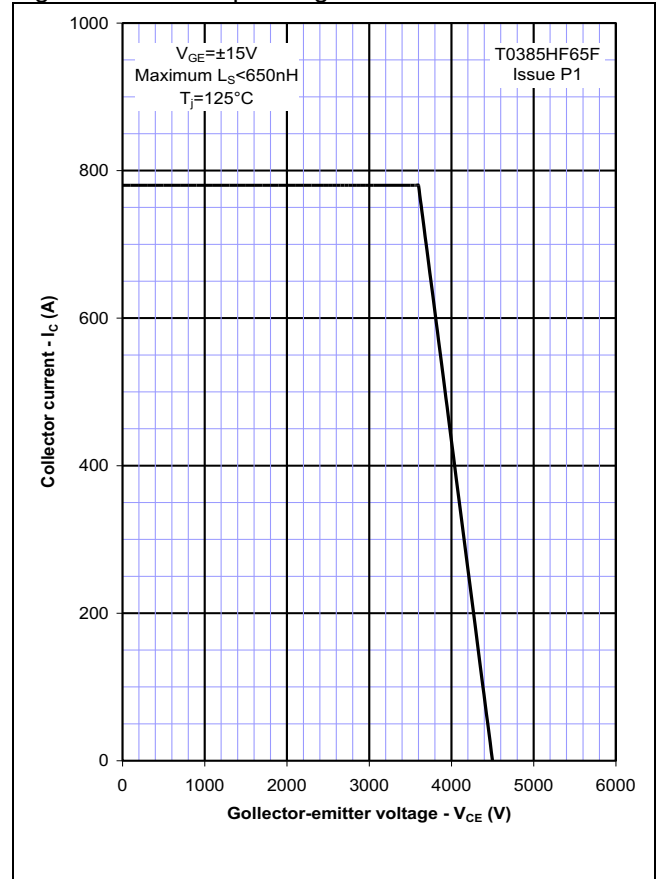
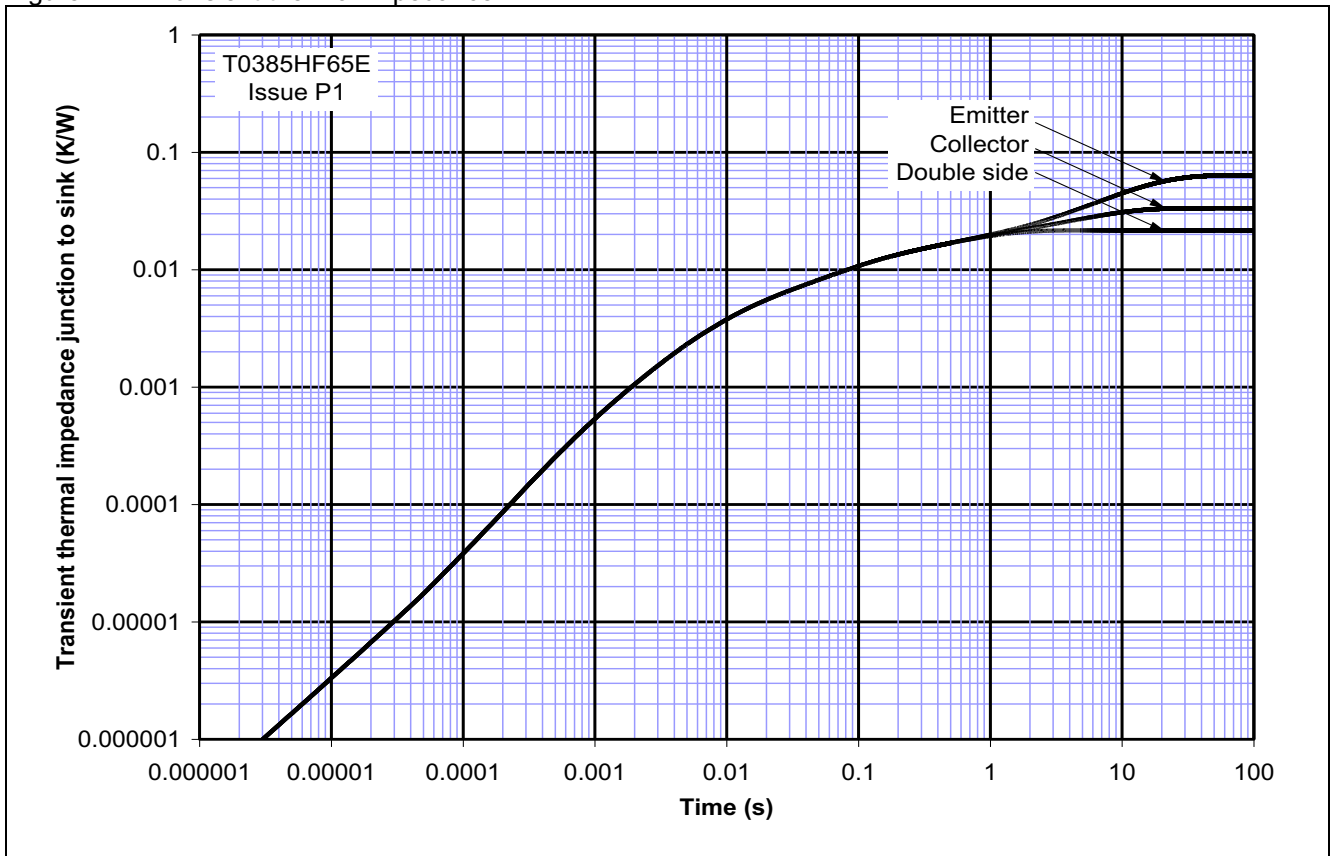
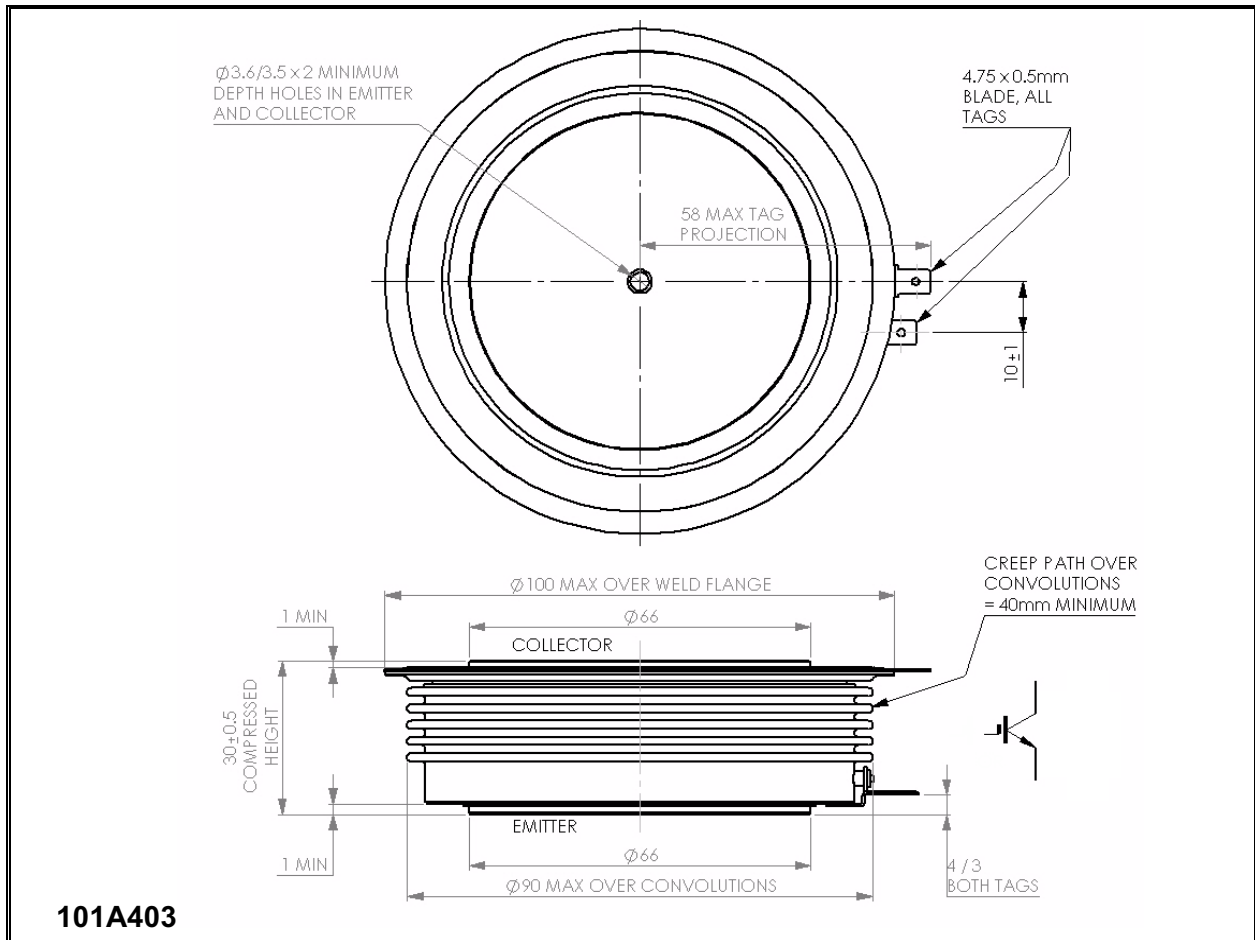


Figure 11 – Transient thermal impedance



Outline Drawing & Ordering Information



101A403

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 ($V_{CES} = 6500V$)

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