SHINDENGEN

Switching Power Transistor

HFX Series

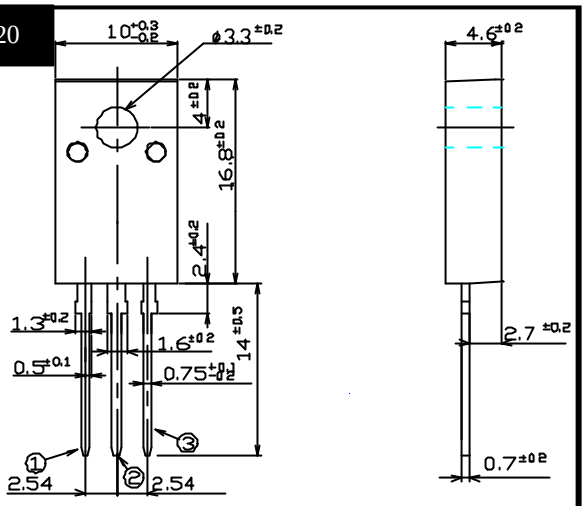
2SC4231
(TP2V80HFX)

2A NPN

OUTLINE DIMENSIONS

Case : ITO-220

Unit : mm



① :B
② :C
③ :E

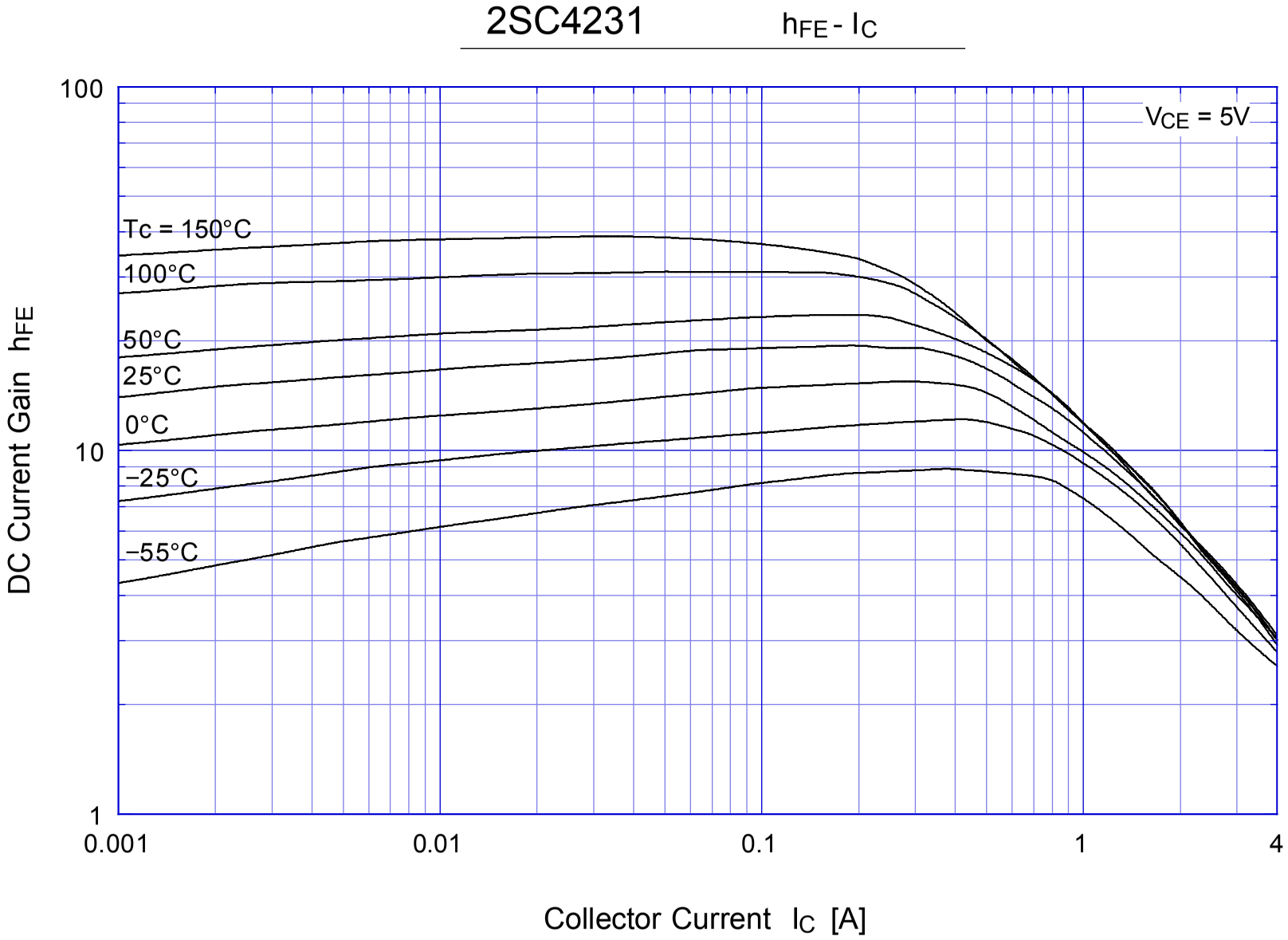
RATINGS

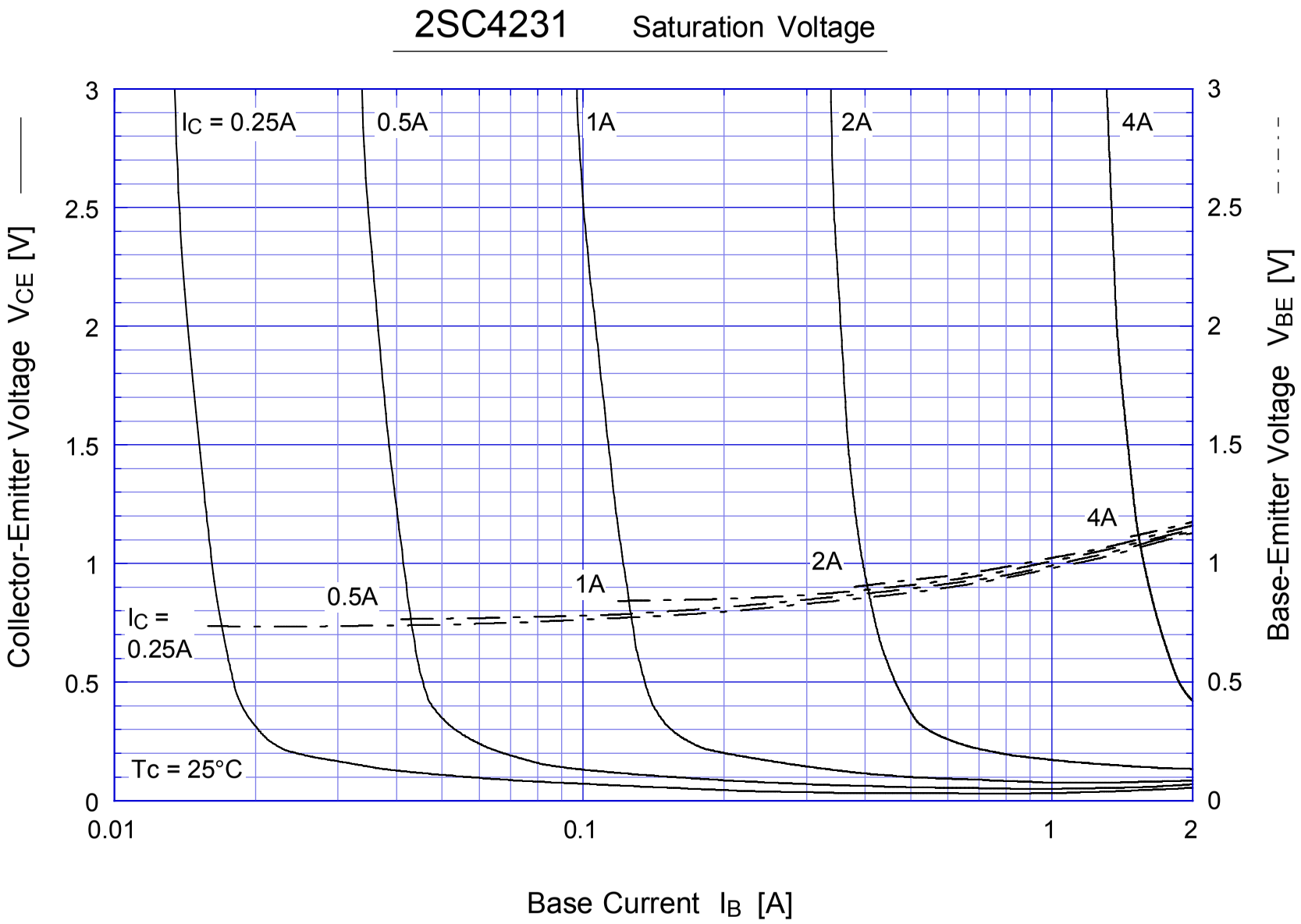
●Absolute Maximum Ratings

Item	Symbol	Conditions	Ratings	Unit
Storage Temperature	Tstg		-55～150	°C
Junction Temperature	Tj		150	°C
Collector to Base Voltage	V_{CBO}		1200	V
Collector to Emitter Voltage	V_{CEO}		800	V
Emitter to Base Voltage	V_{EBO}		7	V
Collector Current DC	I_C		2	A
Collector Current Peak	I_{CP}		4	
Base Current DC	I_B		1	A
Base Current Peak	I_{BP}		2	
Total Transistor Dissipation	P_T	Tc = 25°C	30	W
Dielectric Strength	Vdis	Terminals to case, AC 1 minute	2	kV
Mounting Torque	TOR	(Recommended torque : 0.3N·m)	0.5	N·m

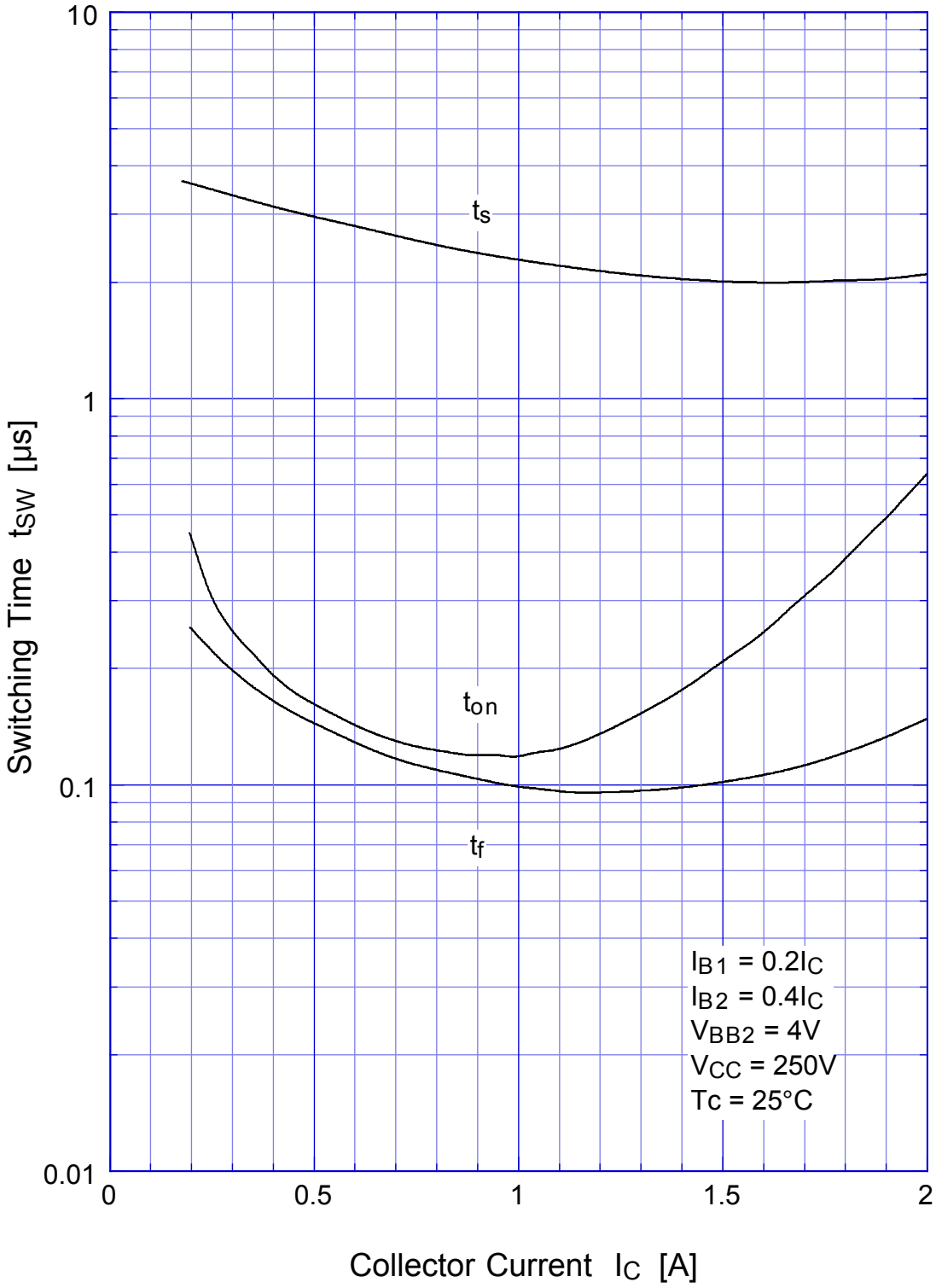
●Electrical Characteristics (Tc=25°C)

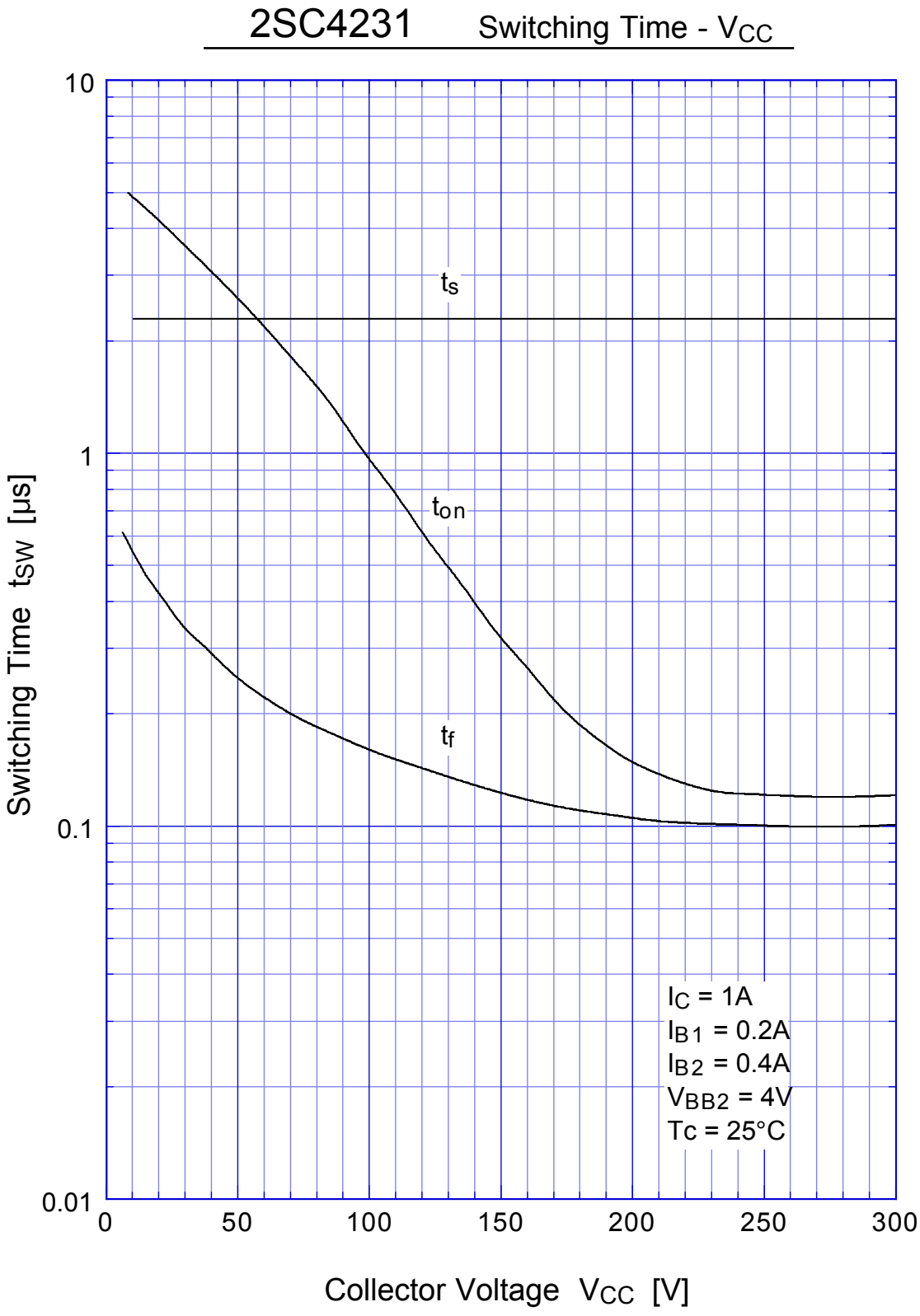
Item	Symbol	Conditions	Ratings	Unit
Collector to Emitter Sustaining Voltage	$V_{CEO}(sus)$	I_C = 0.1A	Min 800	V
Collector Cutoff Current	I_{CBO}	At rated Voltage	Max 0.1	mA
	I_{CEO}		Max 0.1	
Emitter Cutoff Current	I_{EBO}	At rated Voltage	Max 0.1	mA
DC Current Gain	h_{FE}	V_{CE} = 5V, I_C = 1A	Min 8	
	h_{FEL}	V_{CE} = 5V, I_C = 1mA	Min 7	
Collector to Emitter Saturation Voltage	$V_{CE}(sat)$	I_C = 1A	Max 1.0	V
Base to Emitter Saturation Voltage	$V_{BE}(sat)$	I_B = 0.2A	Max 1.5	V
Thermal Resistance	θjc	Junction to case	Max 4.16	°C/W
Transition Frequency	f_T	V_{CE} = 10V, I_C = 0.2A	TYP 8	MHz
Turn on Time	ton	I_C = 1A	Max 0.5	μs
Storage Time	ts	I_{B1} = 0.2A, I_{B2} = 0.4A	Max 3.5	
Fall Time	tf	R_L = 250Ω, V_{BB2} = 4V	Max 0.3	


2SC4231
hFE - IC
VCE = 5V
Tc = 150°C
100°C
50°C
25°C
0°C
−25°C
−55°C
100
10
1
0.001
0.01
0.1
1
4
DC Current Gain hFE
Collector Current IC [A]

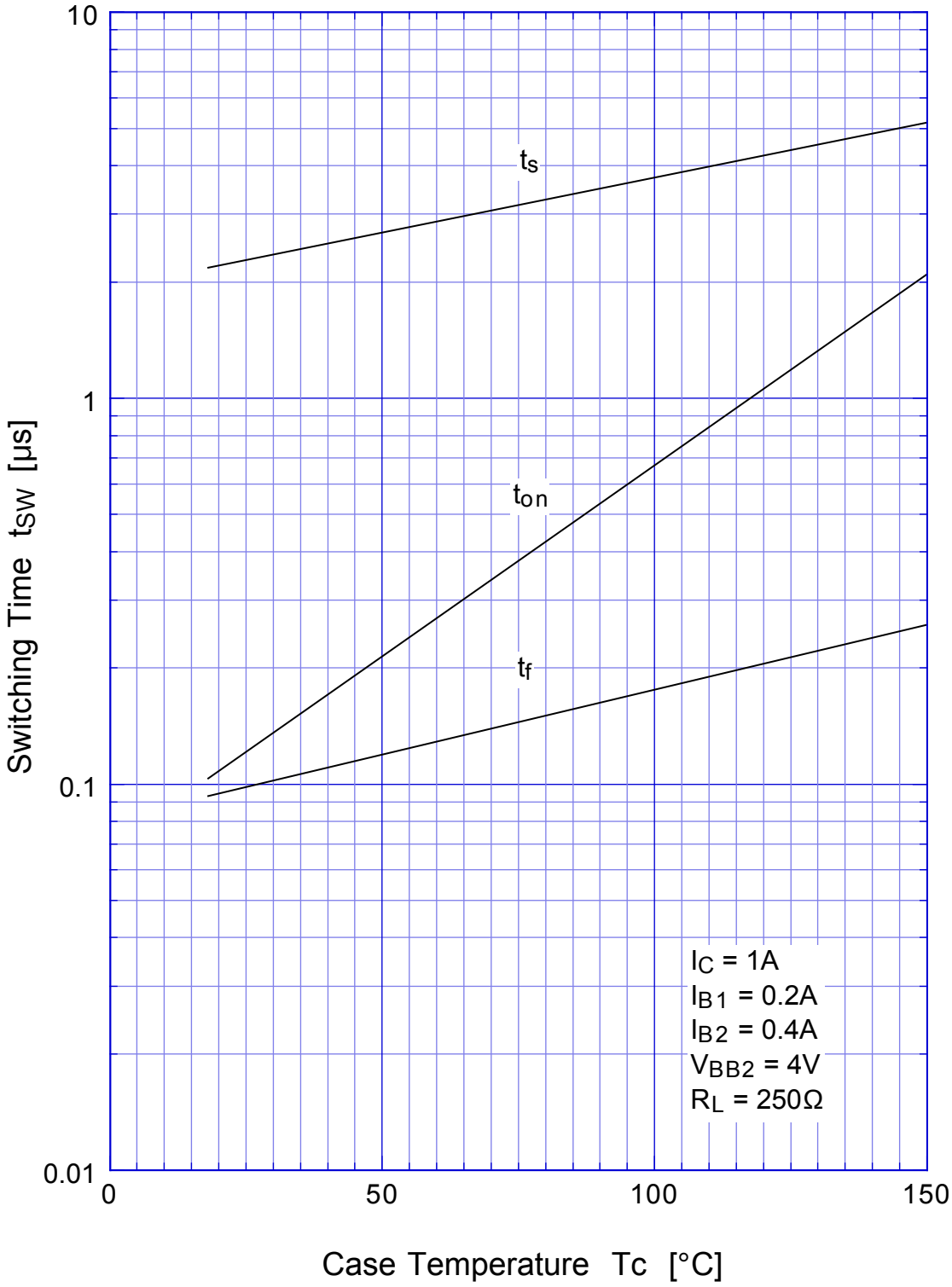

2SC4231 Saturation Voltage
Collector-Emitter Voltage V_{CE} [V]
Base-Emitter Voltage V_{BE} [V]
Base Current I_B [A]
I_C = 0.25A
0.5A
1A
2A
4A
I_C = 0.25A
Tc = 25°C
0
0.5
1
1.5
2
2.5
3
0.01
0.1
1
2

2SC4231 Switching Time - I_C

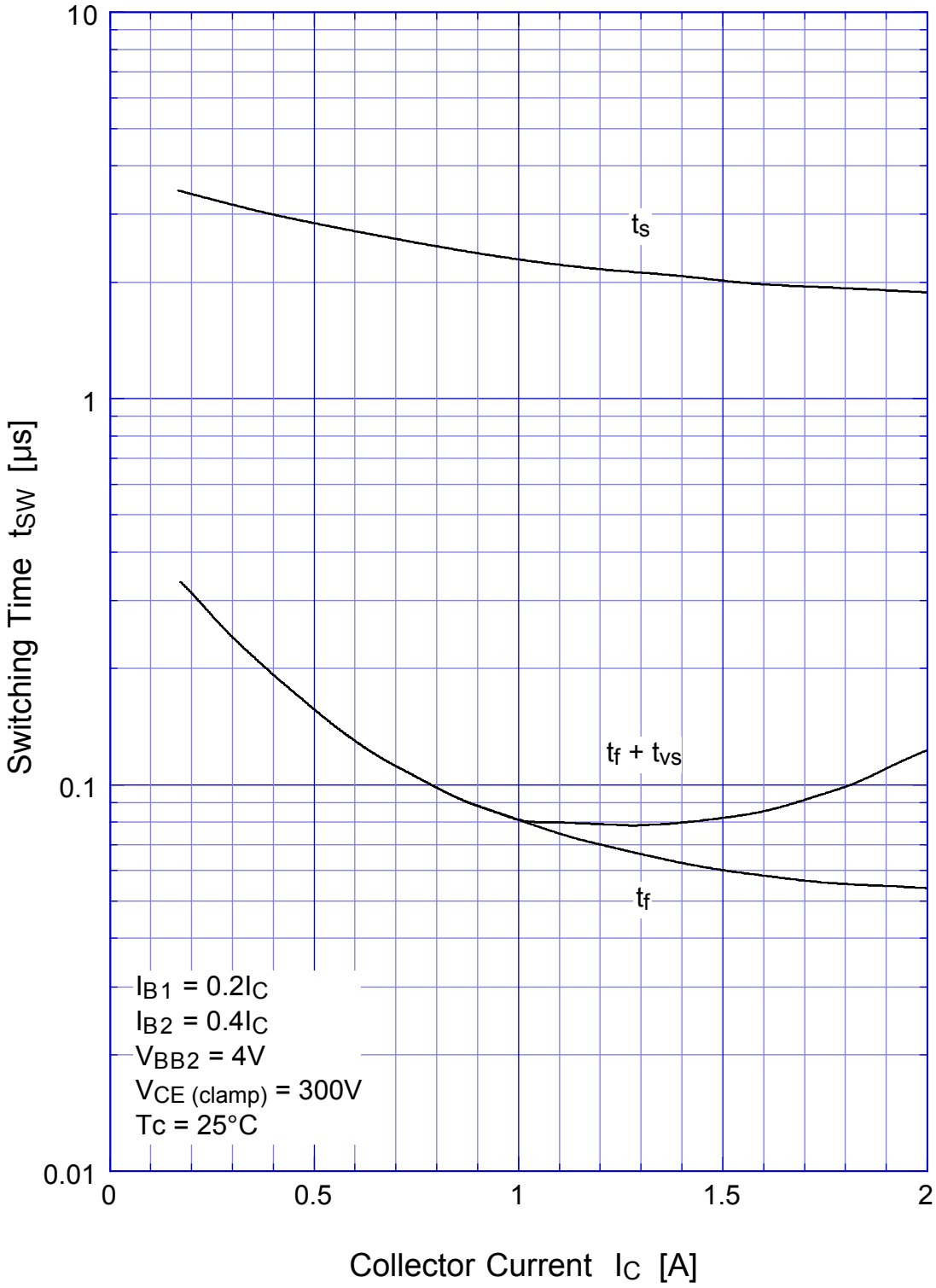



2SC4231
Switching Time - VCC
10
1
0.1
0.01
0
50
100
150
200
250
300
ts
ton
tf
IC = 1A
IB1 = 0.2A
IB2 = 0.4A
VBB2 = 4V
Tc = 25°C
Switching Time tSW [µs]
Collector Voltage VCC [V]

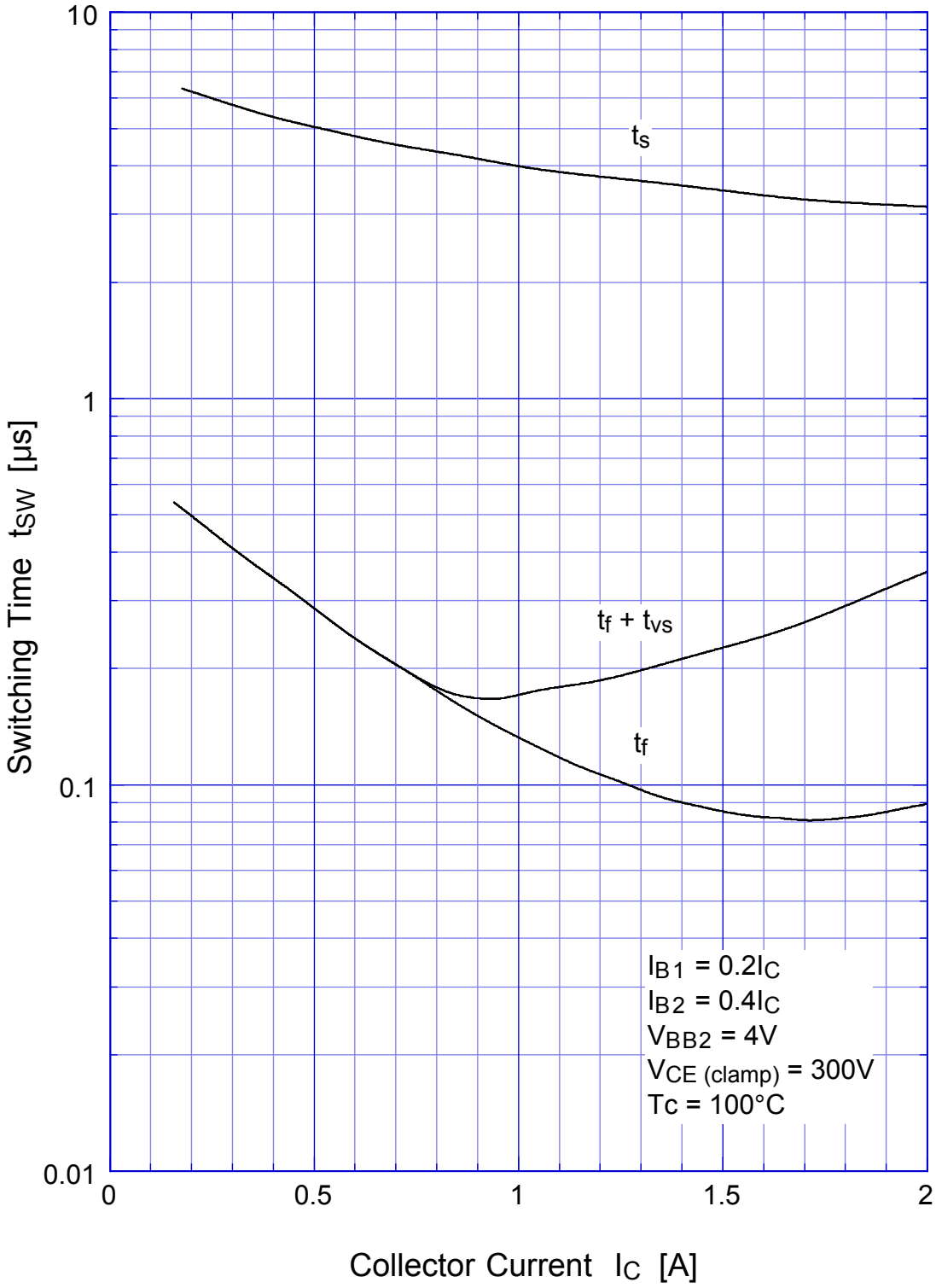
2SC4231 Switching Time - Tc

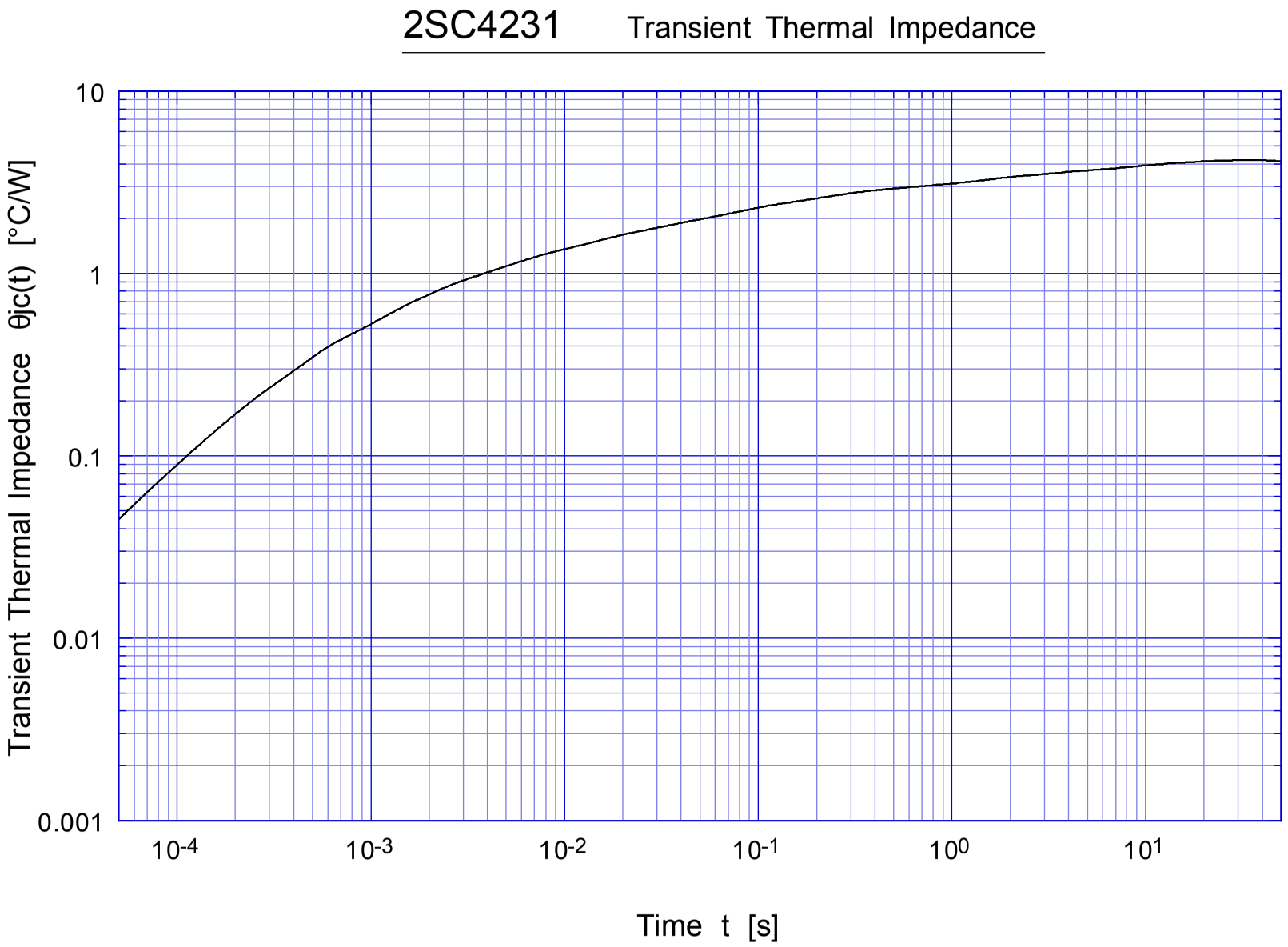


2SC4231 L-Load Switching Time - I_C

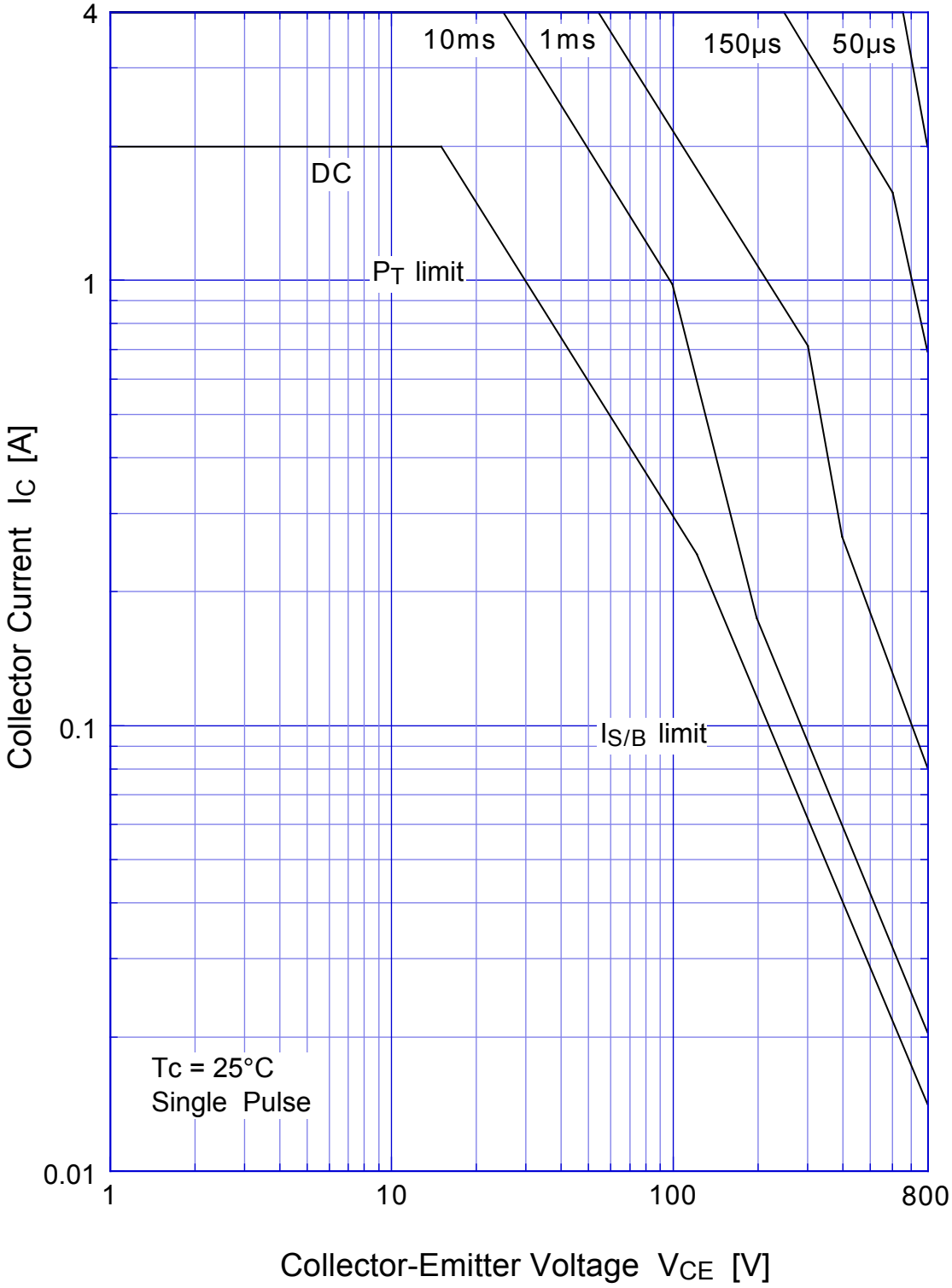


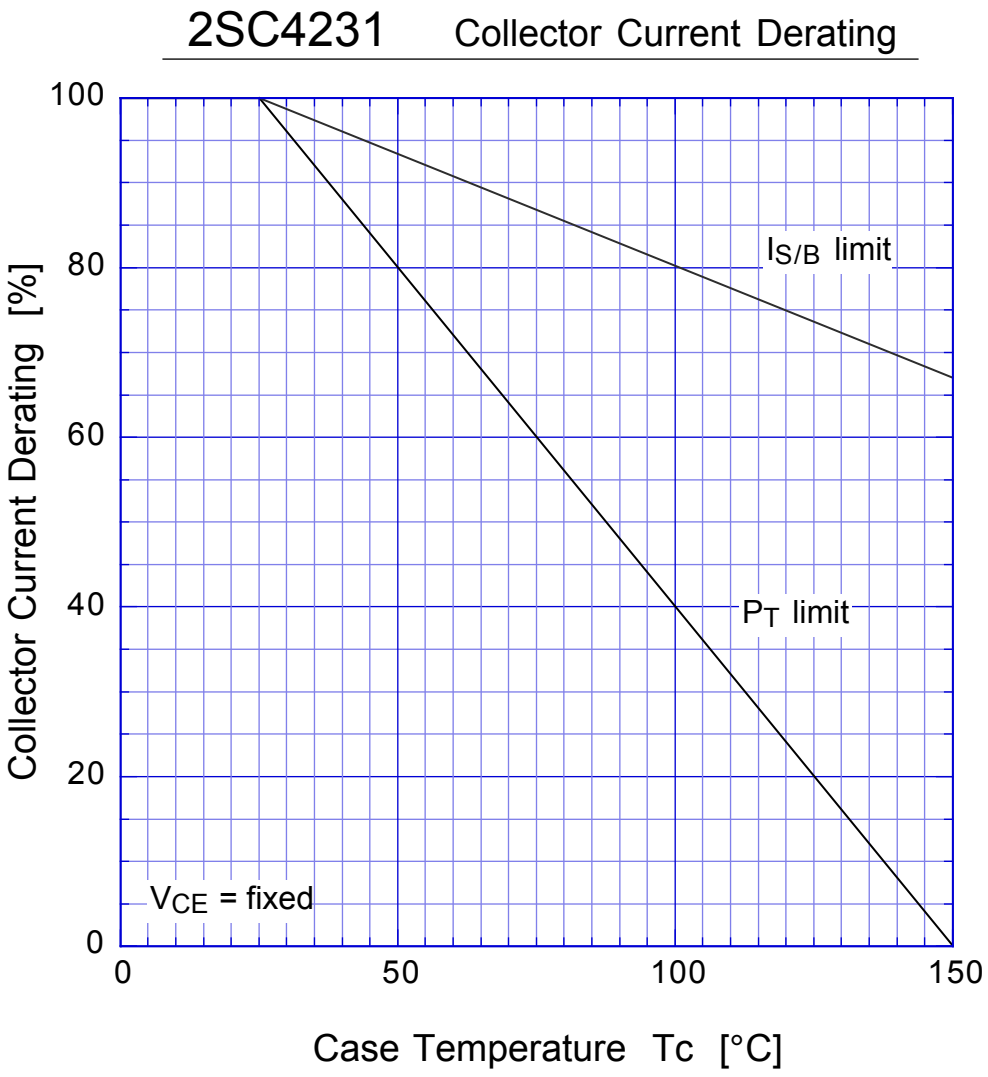
2SC4231 L-Load Switching Time - I_C (At High Temperature)




2SC4231 Transient Thermal Impedance
Transient Thermal Impedance θjc(t) [°C/W]
10
1
0.1
0.01
0.001
10-4
10-3
10-2
10-1
100
101
Time t [s]

2SC4231 Forward Bias SOA




2SC4231 Collector Current Derating
100
80
60
40
20
0
Collector Current Derating [%]
0
50
100
150
Case Temperature Tc [°C]
IS/B limit
PT limit
VCE = fixed

2SC4231 Reverse Bias SOA