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SHINDENGEN

Power Switching Regulators

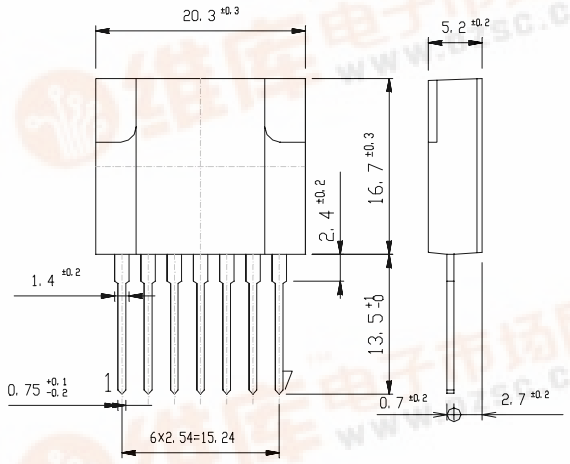
MA1000 Series

MA1020

OUTLINE DIMENSIONS

Case : MA7

Unit : mm



RATINGS

●Absolute Maximum Ratings

Item	Symbol	Conditions	Ratings P Class	Ratings N Class	Unit
Storage Temperature	Tstg		−30～125	−30～125	℃
Operating Temperature	Top	Case Temperature	−20～125	−20～125	℃
Junction Temperature	Tj		150	150	℃
Peak Input Voltage	Vin	②+,④−,Fig.1 is Measurement Circuit of Peak Input Voltage Vin and Collector Cutoff Current I_{CEX}.	500	500	V
Input Current	Iin	Pulse Pulse Width 150 μ s MAX, Duty1/2, Sawtooth Wave, Peak Value, ②+,④−	6	6	A
Maximum Operating Frequency	f(max)		200	200	kHz
Maximum Power Dissipation	P_D	Ta=25℃	3	3	W
	P_D	Heatsink Tc=100℃	12	12	W
Dielectric Strength	Vdis	Terminals To Case AC 1 min	2	2	kV
Insulation Resistance		Terminals To Case 500VDC	100	100	MΩ
Fold Back Control Voltage	V_{CONT}(max)	Fold Control Resistance=0Ω Duty 1/2, ④,⑦	±8	±8	V
Fold Back Control Current	I_{CONT}(max)	④−,⑥+	100	100	mA

●Electrical Characteristics（Tc=25℃）

Item		Symbol	Conditions	Ratings P Class	Ratings N Class	Unit
Q1	Collector Cutoff Current	I_{CEX}	V_{CE}=500V,Fig.1 is Measurement Circuit of Peak Input Voltage Vin and Collector Cutoff Current I_{CEX}. ,②+,④−	MAX 0.1	MAX 0.1	mA
	DC Current Gain	h_{FE}	V_{CE} = 5V, I_C = 1.5A, ②+,④−,⑤I_B	15～30	10～20	
	Collector to Emitter Saturation Voltage	V_{CE}(sat)	I_C=1.5A, I_B=0.3A, ②+,④−,⑤I_B	MAX 1.0	MAX 1.0	V
	Thermal Resistance	θ jc	Junction to Case	MAX 4.17	MAX 4.17	℃/W
D1	Reverse Current	I_R	V_R=450V,①+,②−	MAX 10	MAX 10	μ A
	Forward Voltage	V_F	I_F=0.6A,①−,②+	MAX 1.7	MAX 1.7	V
Driving Saturation Voltage		V_D(sat)	I_C=1.5A, I_B=0.3A, ⑤+,④−	MIN 1.7 MAX 2.3	MIN 1.7 MAX 2.3	V

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●Standard Operating Condition・Design Standard For Application Circuit

Item	Conditions	Ratings		Unit
		P Class	N Class	
Input Rated Voltage		AC90～132	AC90～132	V
Output Nominal Wattage		24	24	W
Output Nominal Voltage		12	12	V
Output Nominal Current		2	2	A

●Standard Operating Condition・Standard Operating Characteristics （Ta=25℃）

Item		Conditions	Ratings		Unit	
			P Class	N Class		
Minimum Input Full Load Output Voltage		Vin=90V, I_O=2A	12.0±0.6	12.0±0.6	V	Fig 2, ① Refer
Maximum Input Light Load Output Voltage		Vin=132V, I_O=0.2A	12.0±0.6	12.0±0.6	V	Fig 2, ② Refer
AC Input Voltage		I_O=2A	MAX 85	MAX 85	V	
Over Current Protection	Foldback Current	Vin=132V, V_O=10V	MAX 3.5	MAX 3.5	A	Fig 2, ③ Refer
	Short Circuit	Vin=132V, R_O=0.5Ω	Nodamage To Any Device, Automatic Recovery.		–	Fig 2, ④ Refer
Output Ripple Noise		Vin=90～132V, I_O=0.2～2A	MAX 150	MAX 150	mV P-P	

Figure in ○=Terminal Sign

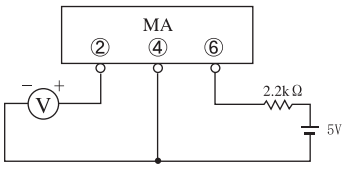

Fig1. Measurement Circuit

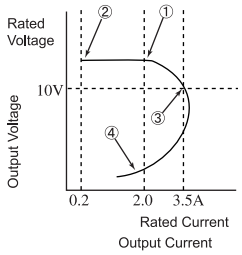

Fig2. Output Voltage/Current

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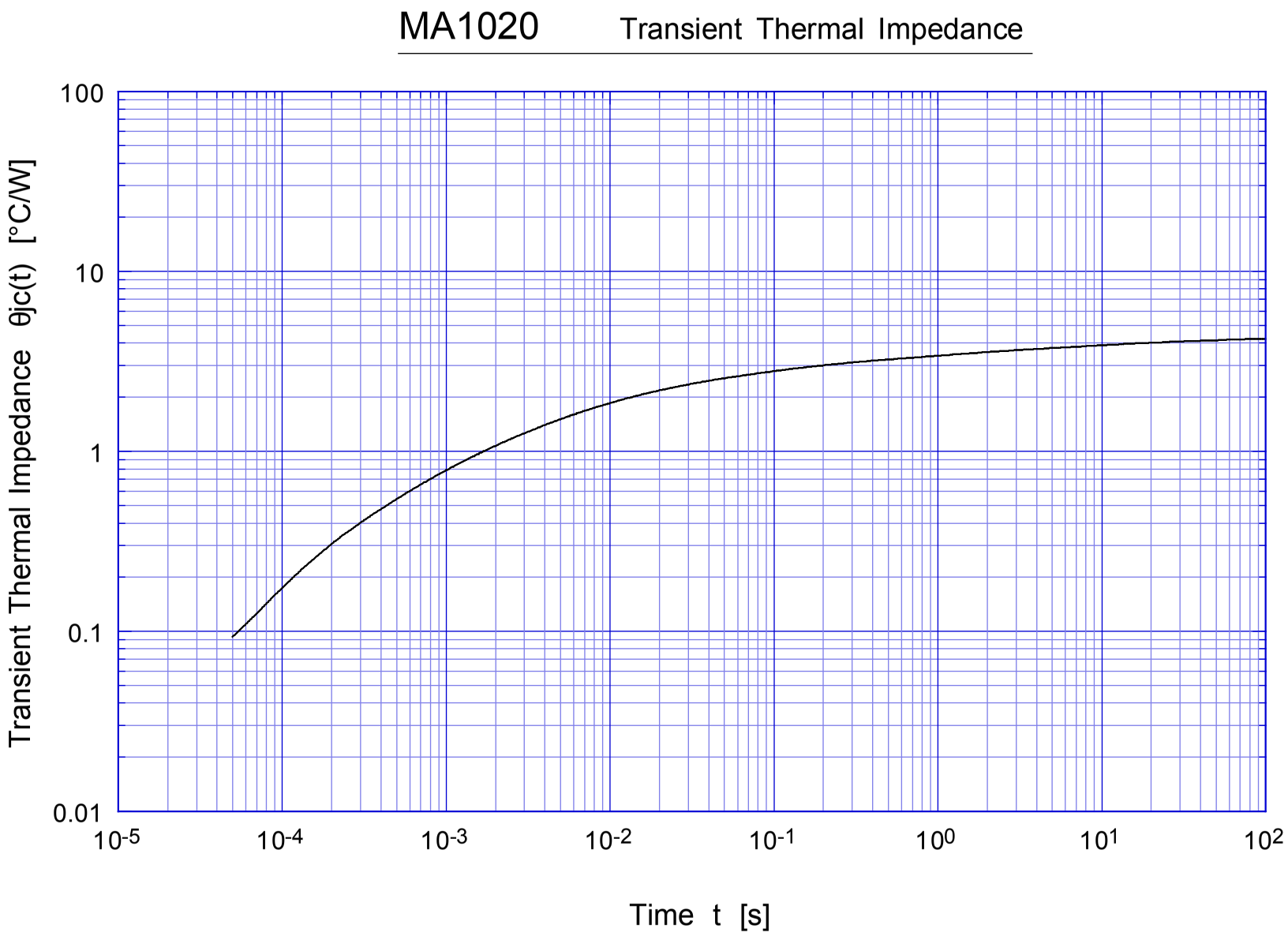
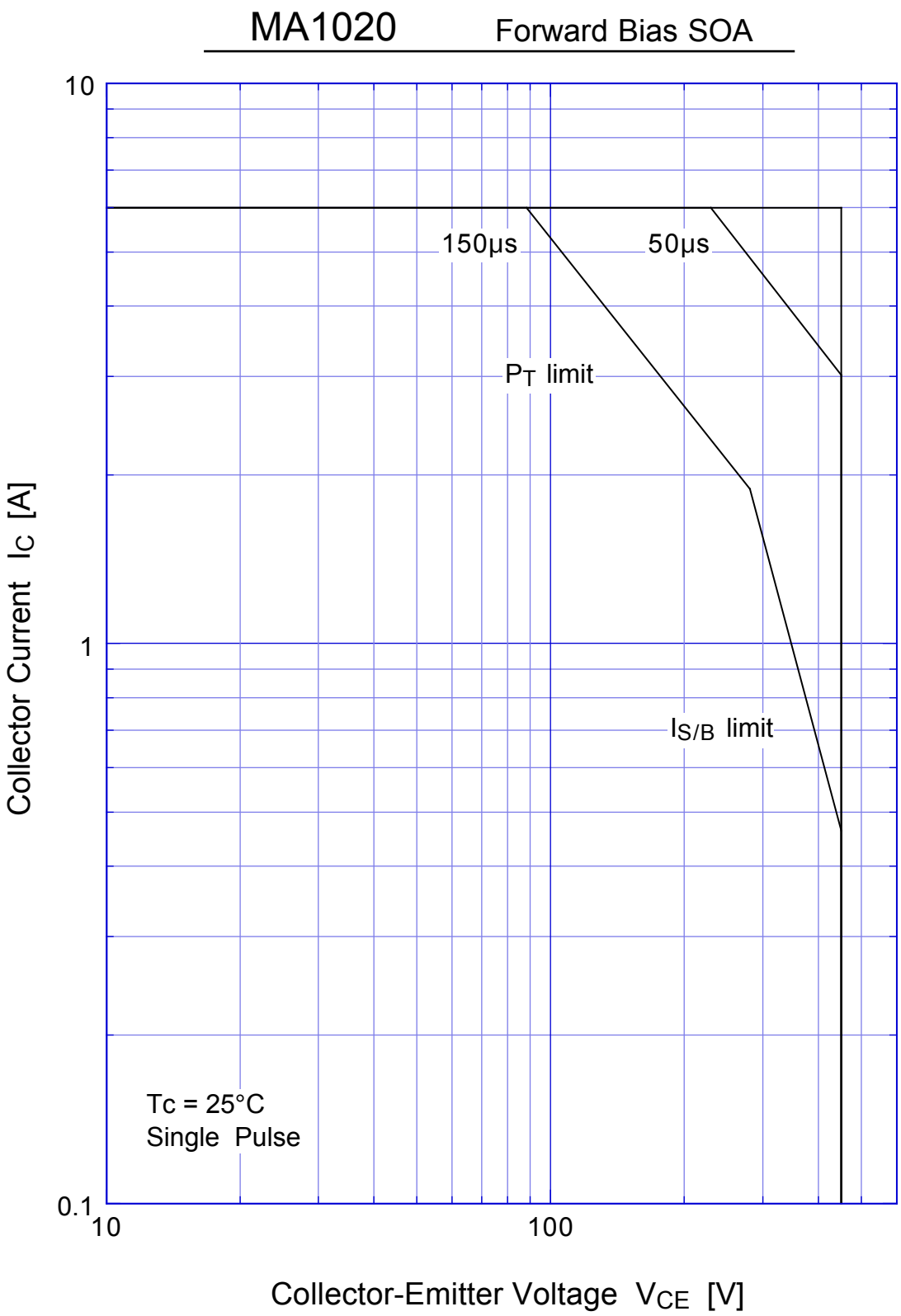
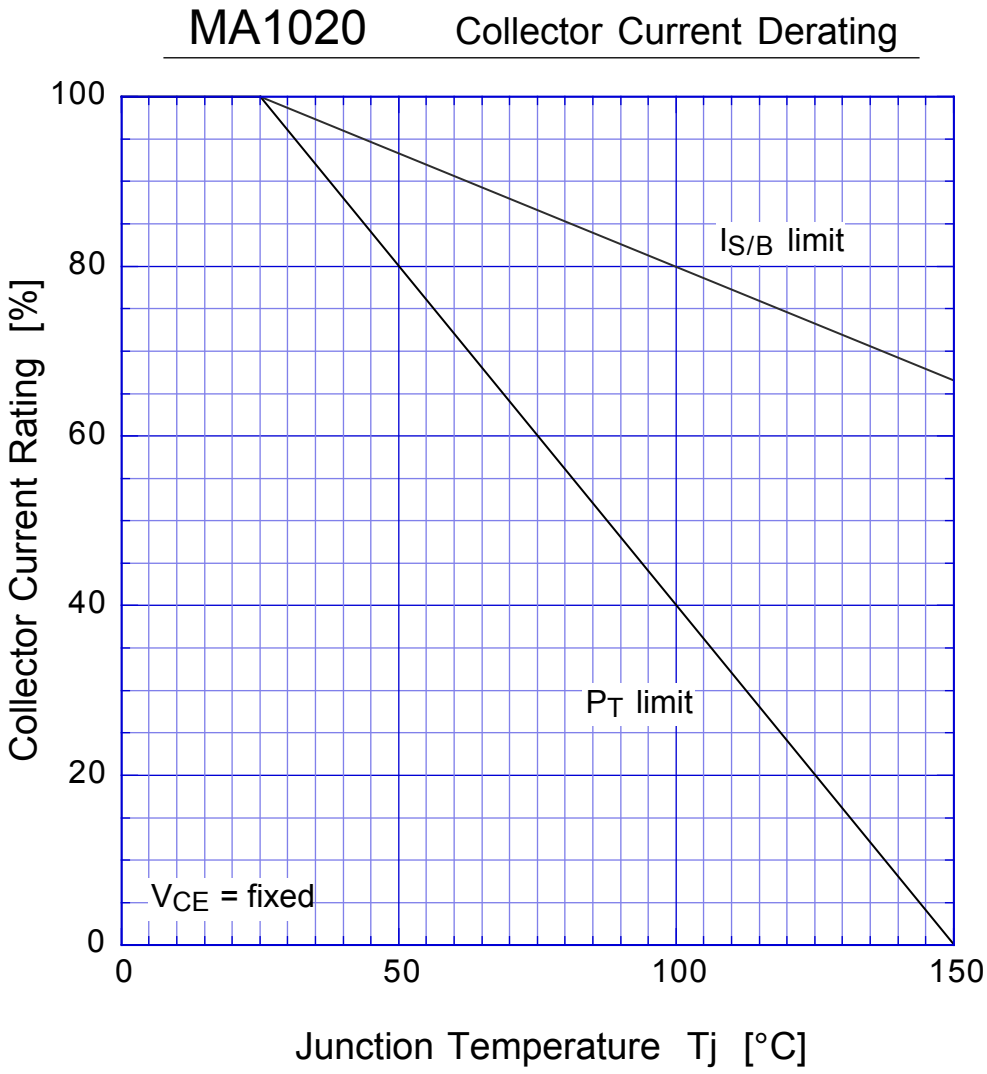
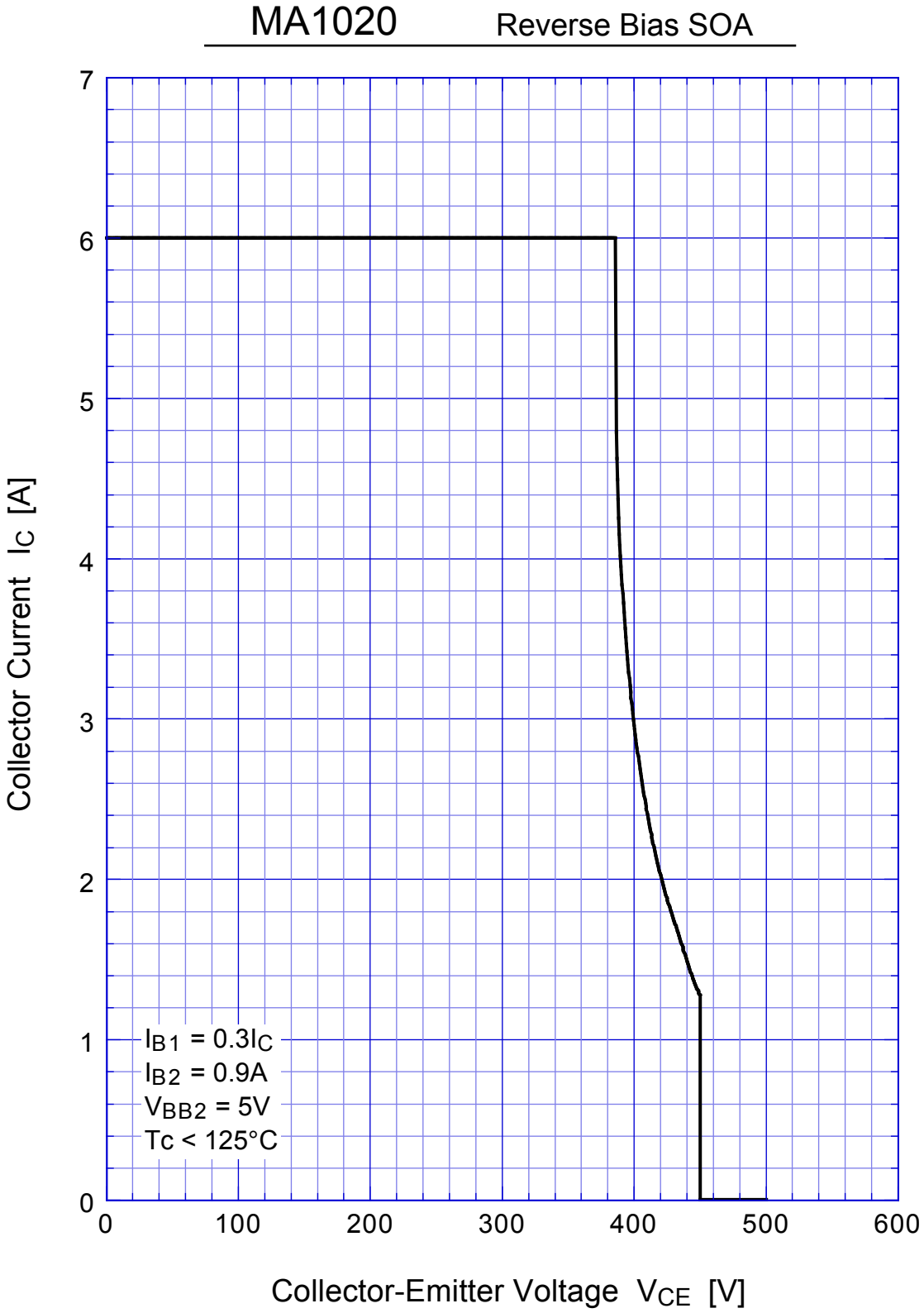
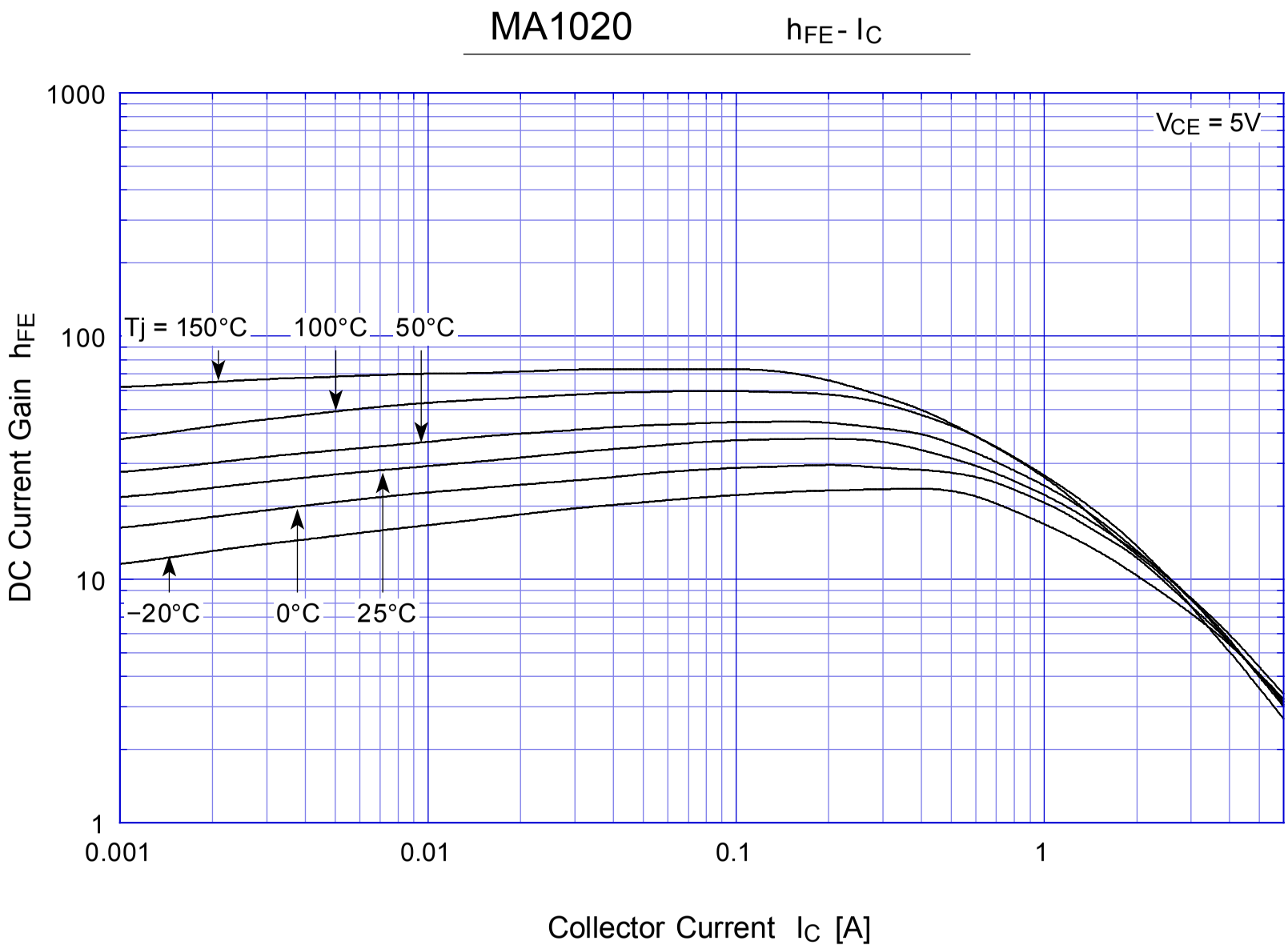

MA1020 Transient Thermal Impedance
Transient Thermal Impedance θjc(t) [°C/W]
100
10
1
0.1
0.01
10-5
10-4
10-3
10-2
10-1
100
101
102
Time t [s]


MA1020
Forward Bias SOA
10
1
0.1
10
100
150μs
50μs
PT limit
IS/B limit
Tc = 25°C
Single Pulse
Collector Current IC [A]
Collector-Emitter Voltage VCE [V]


MA1020
Collector Current Derating
100
80
60
40
20
0
0
50
100
150
Collector Current Rating [%]
Junction Temperature Tj [°C]
IS/B limit
PT limit
VCE = fixed


MA1020
Reverse Bias SOA
Collector Current I_C [A]
Collector-Emitter Voltage V_{CE} [V]
0
1
2
3
4
5
6
7
0
100
200
300
400
500
600
I_{B1} = 0.3I_C
I_{B2} = 0.9A
V_{BB2} = 5V
Tc < 125°C


MA1020
hFE - IC
VCE = 5V
Tj = 150°C
100°C
50°C
−20°C
0°C
25°C
1000
100
10
1
0.001
0.01
0.1
1
DC Current Gain hFE
Collector Current IC [A]