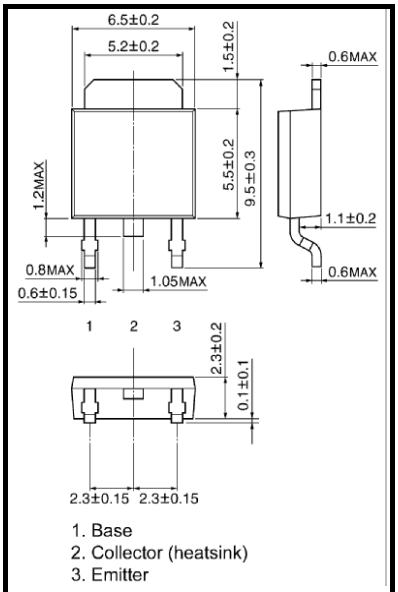
TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC5886

High-Speed Swtching Applications
DC-DC Converter Applications

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-7J1A

Weight: 0.36 g (typ.)

- High DC current gain: h_{FE} = 400 to 1000 (I_C = 0.5 A)
- Low collector-emitter saturation: $V_{CE\ (sat)}$ = 0.22 V (max)
- High-speed switching: t_f = 55 ns (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	100	V
Collector-emitter voltage		V_{CEX}	80	V
		V_{CEO}	50	
Emitter-base voltage		V_{EBO}	7	V
Collector current	DC	I_C	5	A
	Pulse	I_{CP}	10	
Base current		I_B	0.5	A
Collector power dissipation	Ta = 25°C	P_C	1	W
	Tc = 25°C		20	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 100 V, I_E = 0	—	—	100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = 7 V, I_C = 0	—	—	100	nA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	I_C = 10 mA, I_B = 0	50	—	—	V
DC current gain		h_{FE} (1)	V_{CE} = 2 V, I_C = 0.5 A	400	—	1000	
		h_{FE} (2)	V_{CE} = 2 V, I_C = 1.6 A	200	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	I_C = 1.6 A, I_B = 32 mA	—	—	0.22	V
Base-emitter saturation voltage		$V_{BE(sat)}$	I_C = 1.6 A, I_B = 32 mA	—	—	1.10	V
Switching time	Rise time	t_r	See Figure 1. $V_{CC} \simeq$ 24 V, R_L = 15 Ω I_{B1} = 32 mA, I_{B2} = −53 mA	—	63	—	ns
	Storage time	t_{stg}		—	560	—	
	Fall time	t_f		—	55	—	

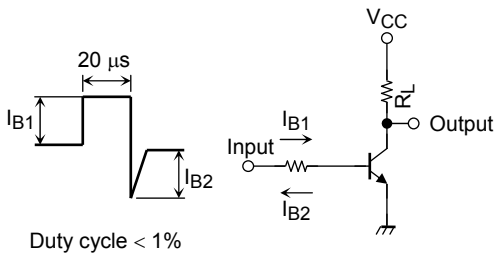
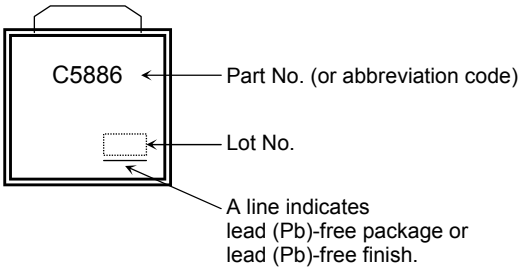
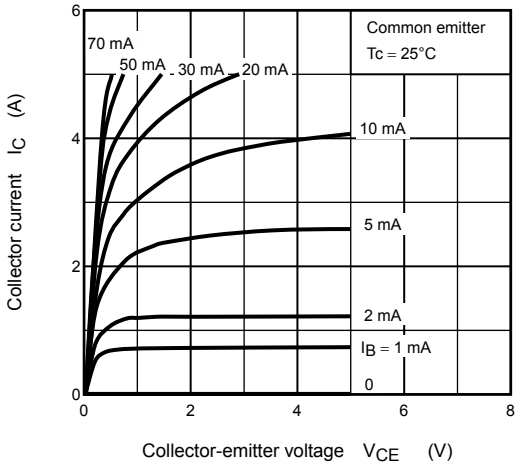


Figure 1 Switching Time Test Circuit & Timing Chart

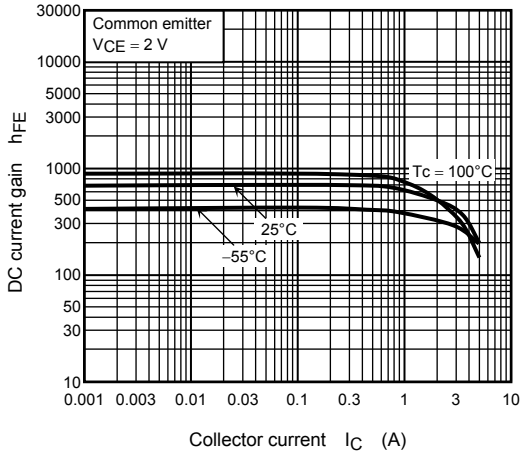
Marking



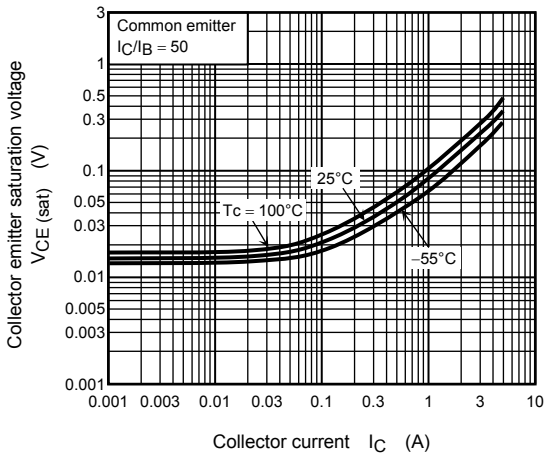
$I_C - V_{CE}$



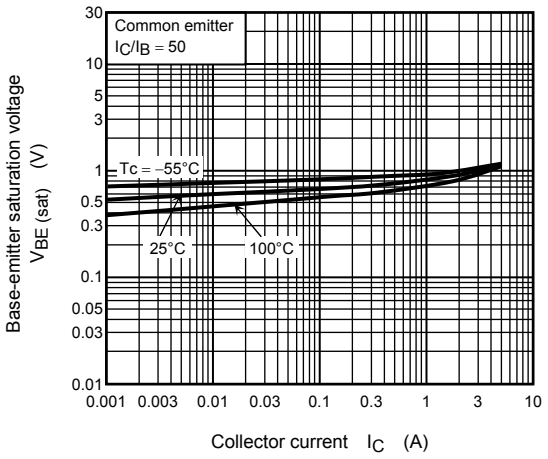
$h_{FE} - I_C$



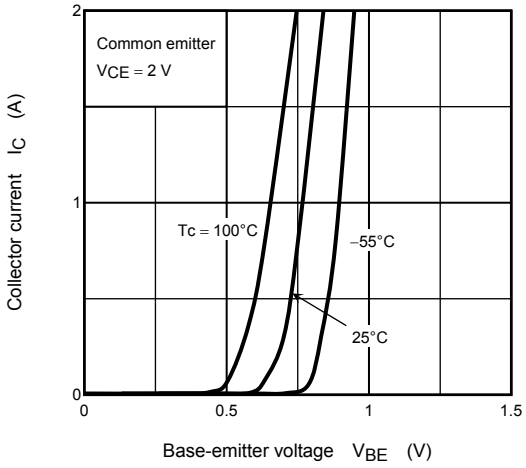
$V_{CE\,(sat)} - I_C$



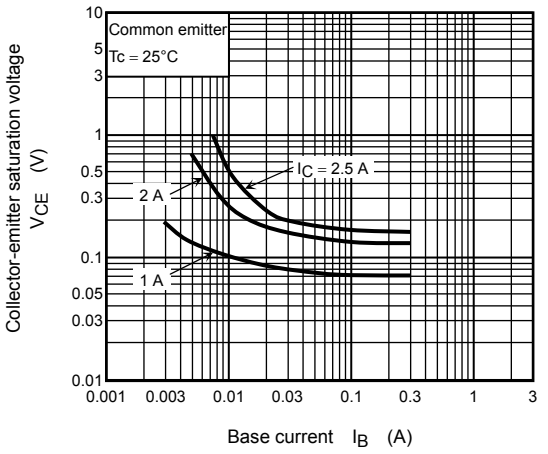
$V_{BE\,(sat)} - I_C$

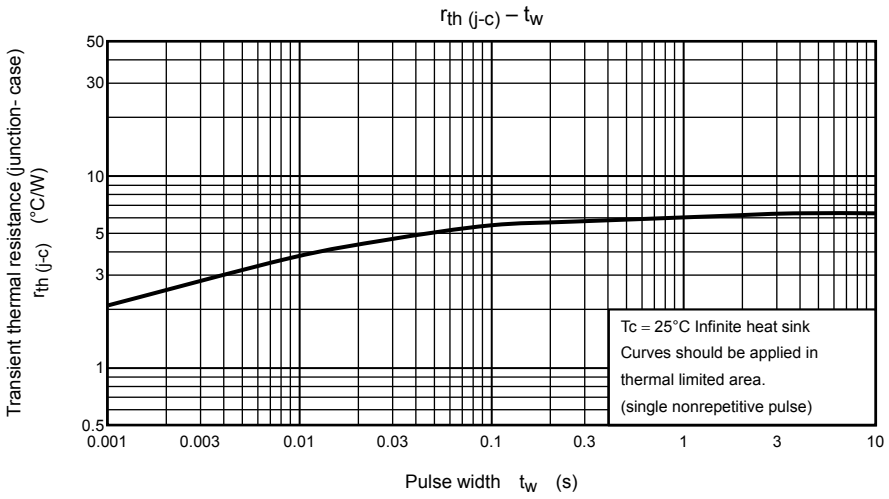


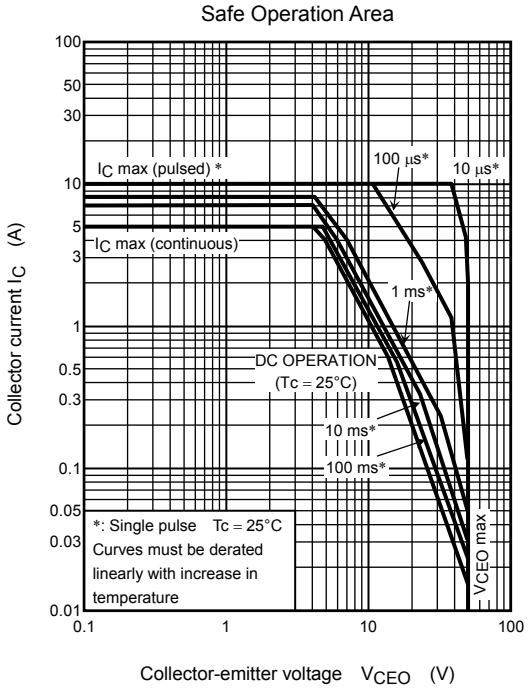
$I_C - V_{BE}$



$V_{CE} - I_B$




rth (j-c) – tw
Transient thermal resistance (junction- case)
rth (j-c) (°C/W)
50
30
10
5
3
1
0.5
0.001
0.003
0.01
0.03
0.1
0.3
1
3
10
Tc = 25°C Infinite heat sink
Curves should be applied in
thermal limited area.
(single nonrepetitive pulse)
Pulse width tw (s)


Safe Operation Area
Collector current IC (A)
100
50
30
10
5
3
1
0.5
0.3
0.1
0.05
0.03
0.01
IC max (pulsed) *
100 μs*
10 μs*
IC max (continuous)
1 ms*
DC OPERATION
(Tc = 25°C)
10 ms*
100 ms*
*: Single pulse Tc = 25°C
Curves must be derated
linearly with increase in
temperature
VCEO max
0.1
1
10
100
Collector-emitter voltage VCEO (V)

RESTRICTIONS ON PRODUCT USE

20070701-EN

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