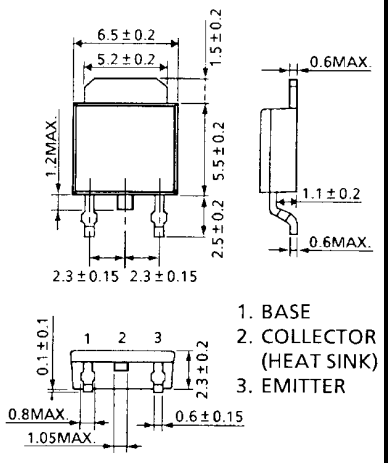
TOSHIBA Transistor Silicon PNP Epitaxial Type

2SA2097

High-Speed Swtching Applications
DC-DC Converter Applications

Unit: mm



JEDEC	—
JEITA	SC-64
TOSHIBA	2-7J1A

Weight: 0.36 g (typ.)

- High DC current gain: h_{FE} = 200 to 500 (I_C = −0.5 A)
- Low collector-emitter saturation: $V_{CE\ (sat)}$ = −0.27 V (max)
- High-speed switching: t_f = 55 ns (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
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

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −50 V, I_E = 0	—	—	−100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = −7 V, I_C = 0	—	—	−100	nA
Collector-emitter brakedown 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	200	—	500	
		h_{FE} (2)	V_{CE} = −2 V, I_C = −1.6 A	100	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = −1.6 A, I_B = −53 mA	—	—	−0.27	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = −1.6 A, I_B = −53 mA	—	—	−1.10	V
Switching time	Rise time	t_r	See Figure 1 circuit diagram V_{CC} ≈ −24 V, R_L = 15 Ω I_{B1} = −I_{B2} = −53 mA	—	63	—	ns
	Storage time	t_{stg}		—	280	—	
	Fall time	t_f		—	55	—	

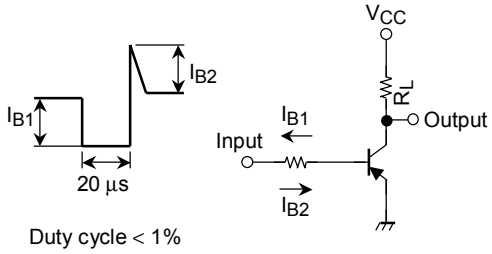
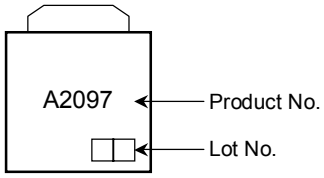
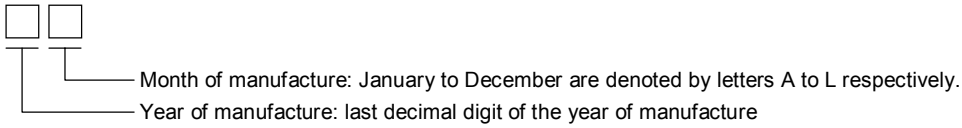


Figure 1 Switching Time Test Circuit & Timing Chart

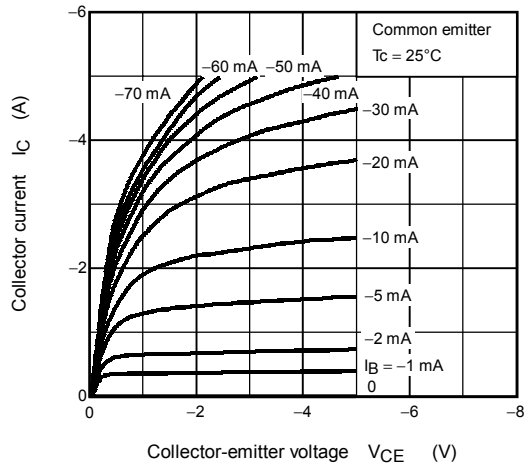
Marking



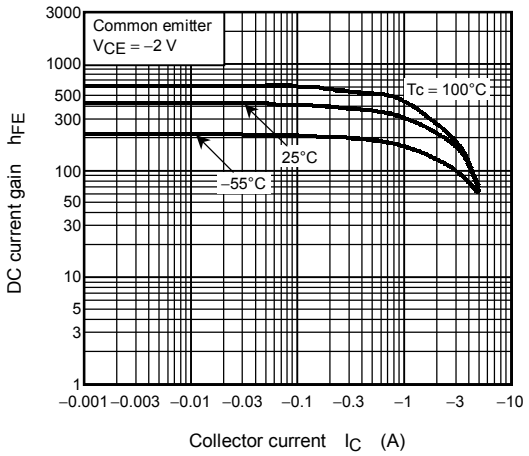
Explanation of Lot No.



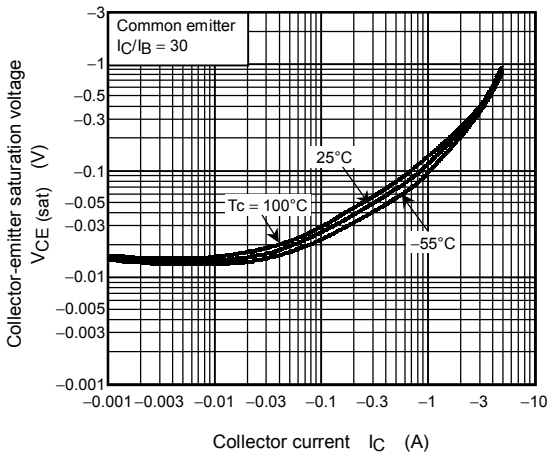
$I_C - V_{CE}$



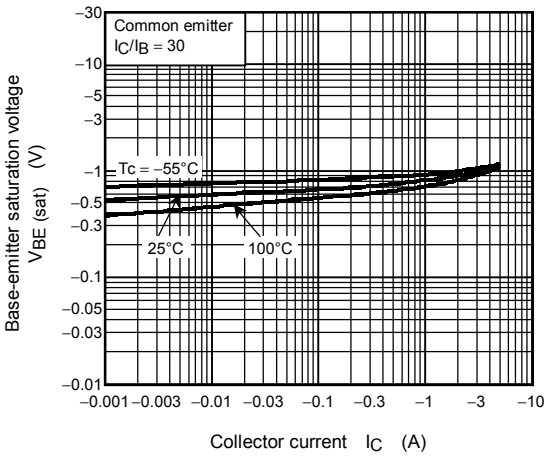
$h_{FE} - I_C$



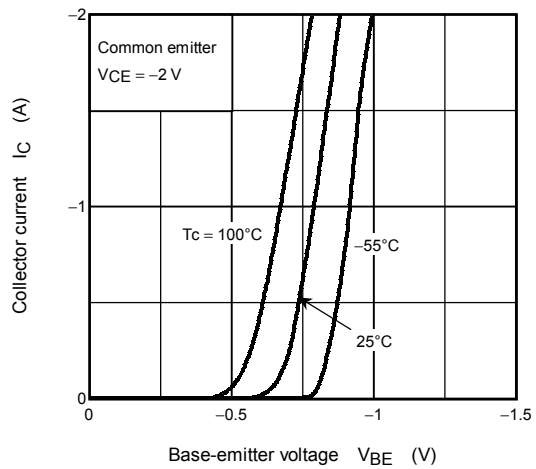
$V_{CE\ (sat)} - I_C$



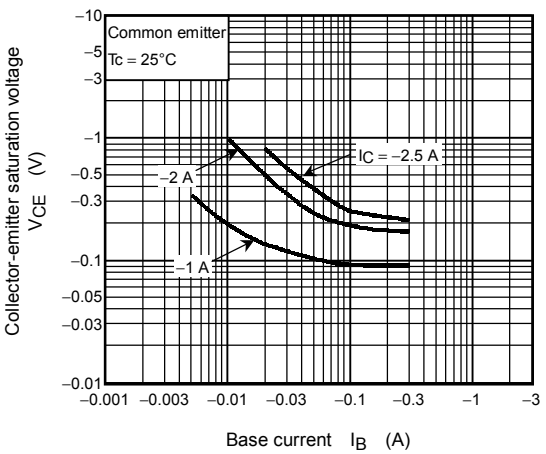
$V_{BE\ (sat)} - I_C$

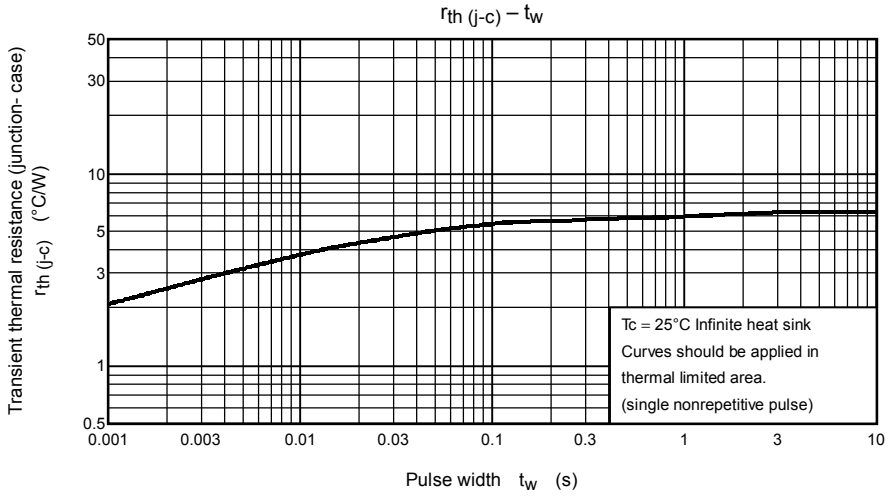


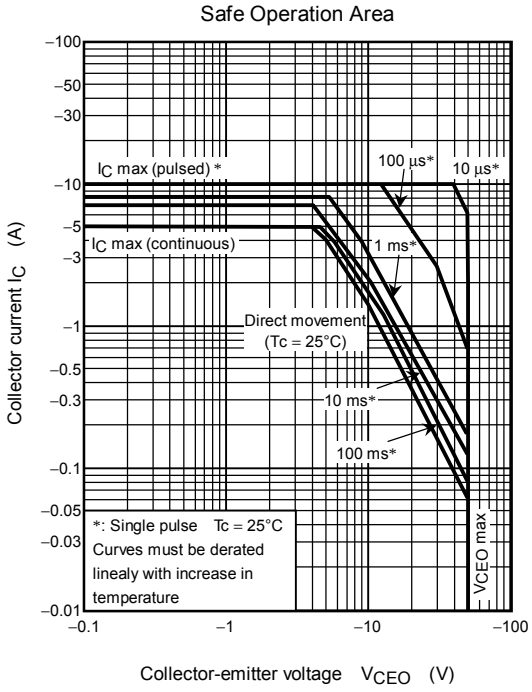
$I_C - V_{BE}$



$V_{CE} - I_B$




$r_{th\ (j\text{-}c)} - t_w$
Transient thermal resistance (junction- case) $r_{th\ (j\text{-}c)}$ (°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 t_W (s)


Safe Operation Area
Collector current I_C (A)
−100
−50
−30
−10
−5
−3
−1
−0.5
−0.3
−0.1
−0.05
−0.03
−0.01
I_C max (pulsed) *
100 μs*
10 μs*
I_C max (continuous)
1 ms*
Direct movement
(Tc = 25°C)
10 ms*
100 ms*
*: Single pulse Tc = 25°C
Curves must be derated
linealy with increase in
temperature
V_{CEO} max
−0.1
−1
−10
−100
Collector-emitter voltage V_{CEO} (V)

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000707EAA

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