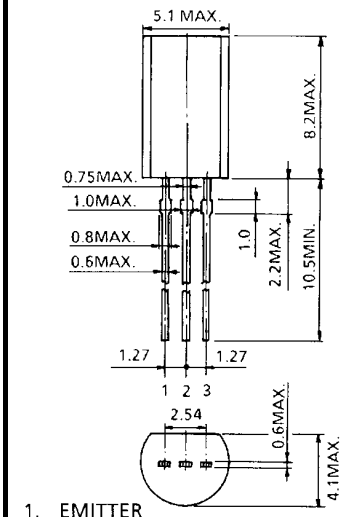
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

2SA1680

Power Amplifier Applications
Power Switching Applications

- Low collector-emitter saturation voltage: $V_{CE\ (sat)}$ = −0.5 V (max) (I_C = −1 A)
- High collector power dissipation: P_C = 900 mW (Ta = 25 °C)
- High-speed switching: t_{stg} = 300 ns (typ.)
- Complementary to 2SC4408.

Unit: mm



JEDEC	TO-92MOD
JEITA	—
TOSHIBA	2-5J1A

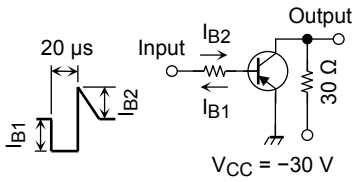
Weight: 0.36 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

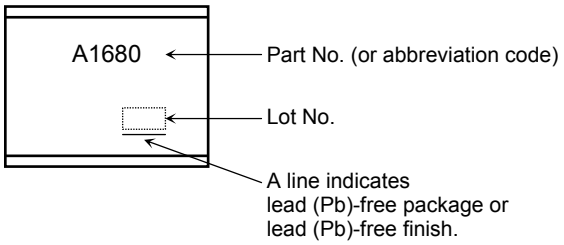
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	−60	V
Collector-emitter voltage	V_{CEO}	−50	V
Emitter-base voltage	V_{EBO}	−6	V
Collector current	I_C	−2	A
Base current	I_B	−0.2	A
Collector power dissipation	P_C	900	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−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).

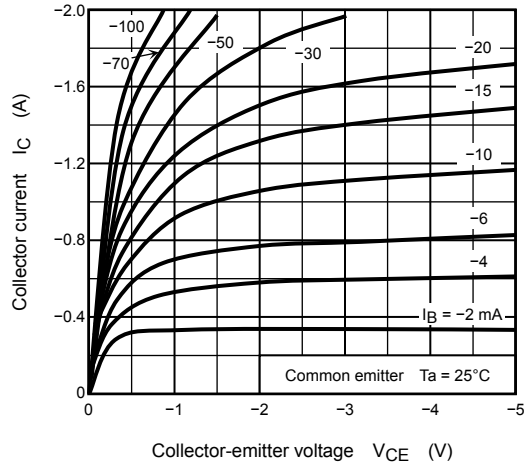
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −60 V, I_E = 0	—	—	−1.0	μA
Emitter cut-off current		I_{EBO}	V_{EB} = −6 V, I_C = 0	—	—	−1.0	μA
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 = −100 mA	120	—	400	
		$h_{FE\ (2)}$	V_{CE} = −2 V, I_C = −1.5 A	40	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = −1 A, I_B = −0.05 A	—	—	−0.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = −1 A, I_B = −0.05 A	—	—	−1.2	V
Transition frequency		f_T	V_{CE} = −2 V, I_C = −100 mA	—	100	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	23	—	pF
Switching time	Turn-on time	t_{on}		—	0.1	—	μs
	Storage time	t_{stg}		—	0.3	—	
	Fall time	t_f		—	0.1	—	
			$-I_{B1} = I_{B2}$ = 0.05 A, duty cycle ≤ 1%				

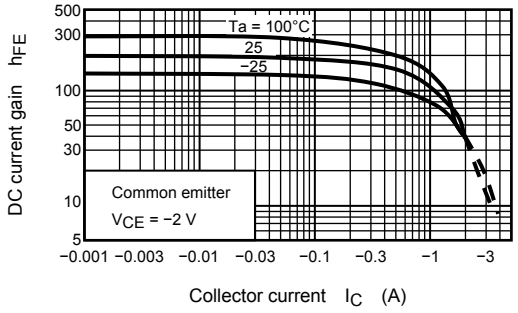
Marking



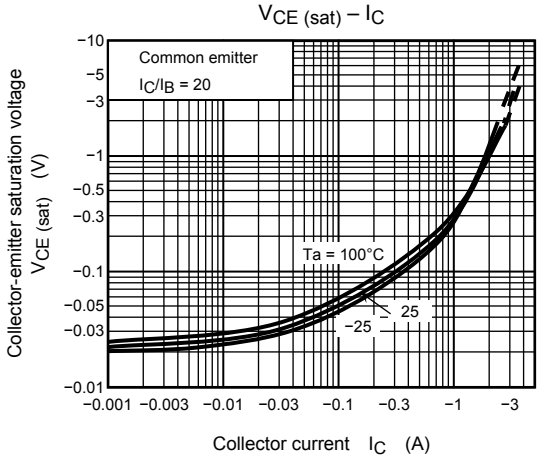
$I_C - V_{CE}$



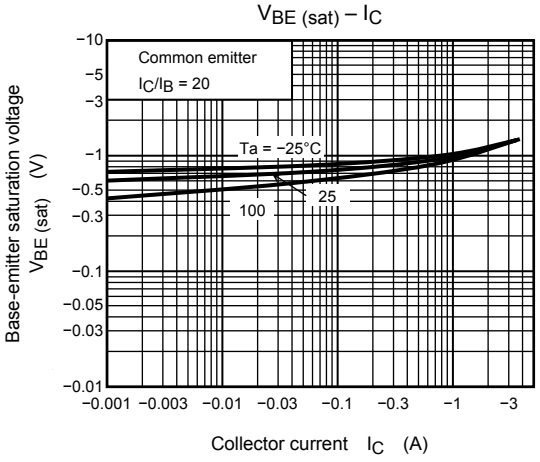
$h_{FE} - I_C$



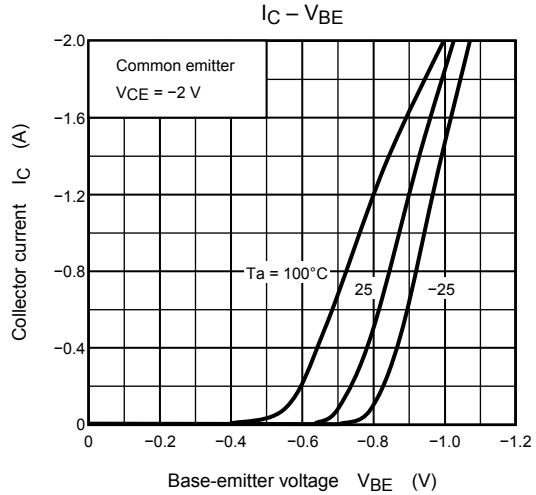
$V_{CE\ (sat)} - I_C$



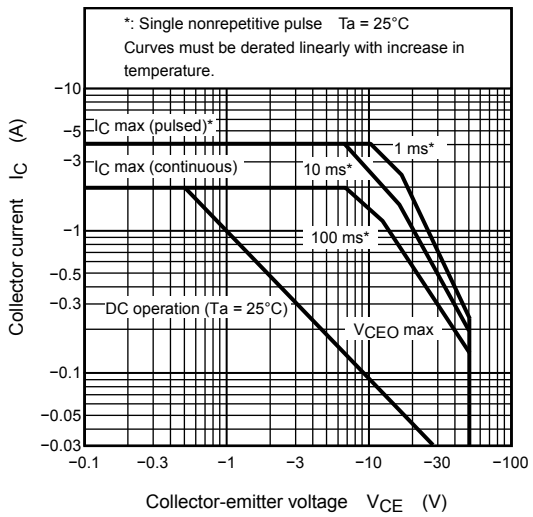
$V_{BE\ (sat)} - I_C$



$I_C - V_{BE}$



Safe Operating Area



RESTRICTIONS ON PRODUCT USE

20070701-EN

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