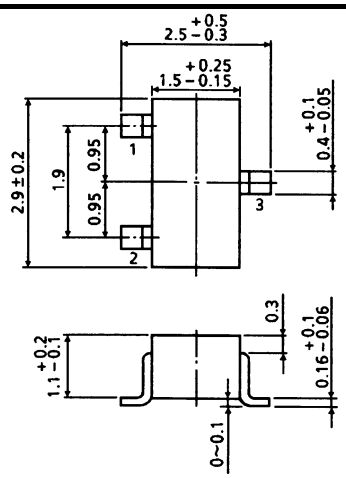
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

2SA1953

General Purpose Amplifier Applications
Switching and Muting Switch Application

- Low saturation voltage: $V_{CE\ (sat)}$ (1) = −15 mV (typ.)
  @I_C = −10 mA/I_B = −0.5 mA
- Large collector current: I_C = −500 mA (max)

Unit: mm



JEDEC	TO-236MOD
JEITA	SC-59
TOSHIBA	2-3F1A

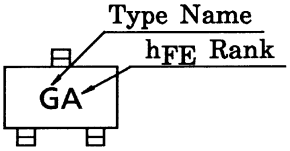
Weight: 0.012 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

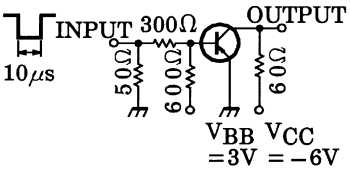
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	−15	V
Collector-emitter voltage	V_{CEO}	−12	V
Emitter-base voltage	V_{EBO}	−5	V
Collector current	I_C	−500	mA
Base current	I_B	−50	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°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).

Marking

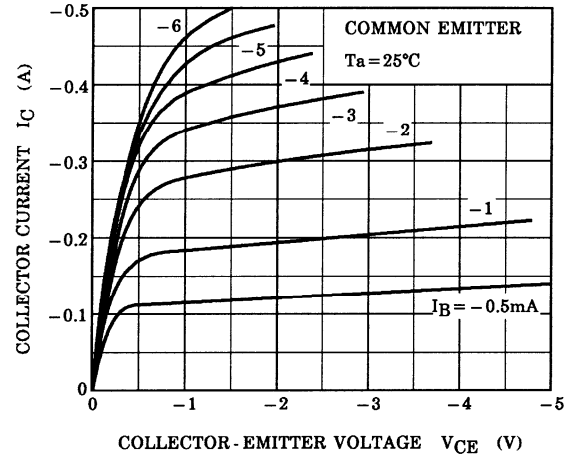


Electrical Characteristics (Ta = 25°C)

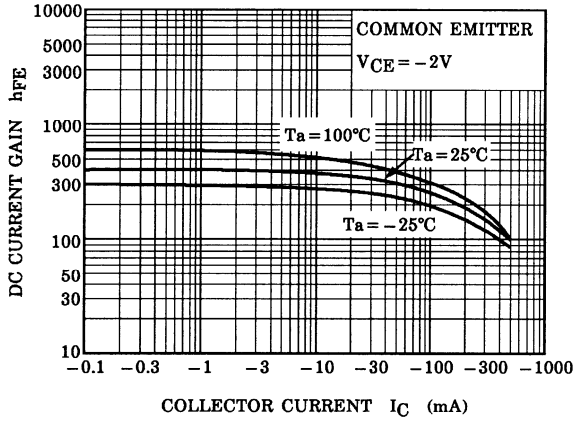
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −15 V, I_E = 0	—	—	−0.1	μA
Emitter cut-off current		I_{EBO}	V_{EB} = −5 V, I_C = 0	—	—	−0.1	μA
DC current gain		h_{FE} (Note)	V_{CE} = −2 V, I_C = −10 mA	300	—	1000	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$ (1)	I_C = −10 mA, I_B = −0.5 mA	—	−15	−30	mV
		$V_{CE\ (sat)}$ (2)	I_C = −200 mA, I_B = −10 mA	—	−110	−250	
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = −200 mA, I_B = −10 mA	—	−0.87	−1.2	V
Transition frequency		f_T	V_{CE} = −2 V, I_C = −10 mA	80	130	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	4.2		pF
Collector-emitter on resistance		R_{on}	I_B = −1 mA, V_{in} = −1 V_{rms}, f = 1 kHz	—	0.9	—	Ω
Switching time	Turn-on time	t_{on}		—	40	—	ns
	Storage time	t_{stg}		—	280	—	
	Fall time	t_f	I_{B1} = −I_{B2} = −5 mA	—	45	—	

Note: h_{FE} classification A: 300~600, B: 500~1000

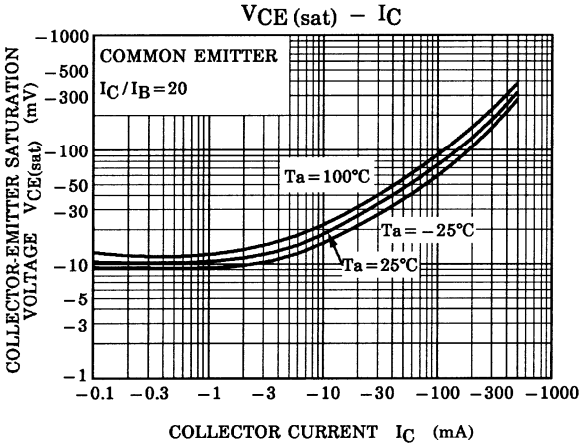
$I_C - V_{CE}$



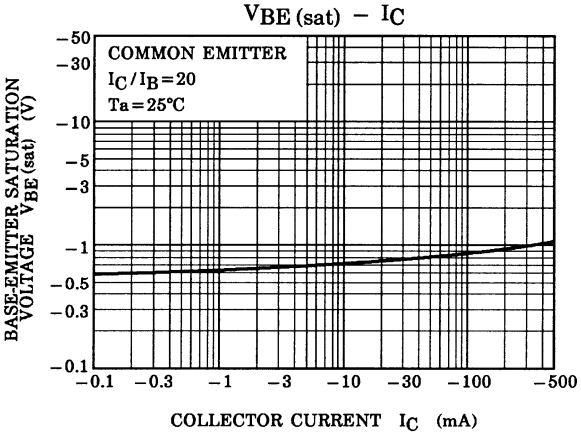
$h_{FE} - I_C$



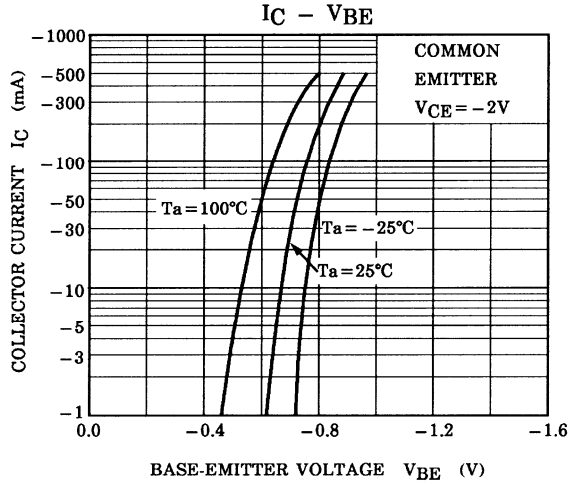
$V_{CE\,(sat)} - I_C$



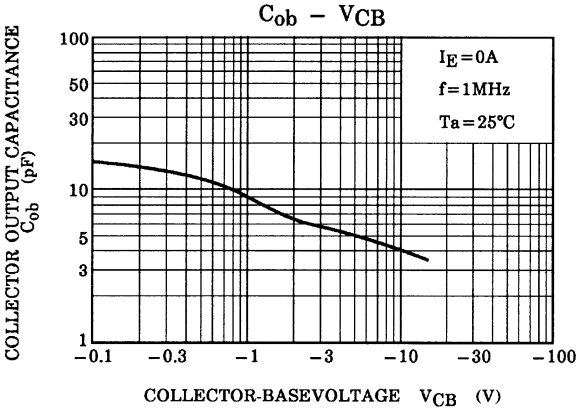
$V_{BE\,(sat)} - I_C$

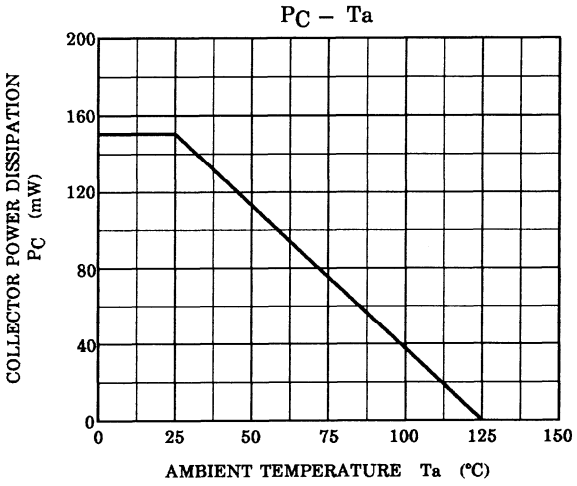


$I_C - V_{BE}$



$C_{ob} - V_{CB}$




P_C – Ta
COLLECTOR POWER DISSIPATION P_C (mW)
200
160
120
80
40
0
0
25
50
75
100
125
150
AMBIENT TEMPERATURE Ta (°C)

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