

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

## 2SC4213

For Muting and Switching Applications

- High emitter-base voltage:  $V_{EBO} = 25\text{ V}$
- High reverse  $h_{FE}$ : Reverse  $h_{FE} = 150$  (typ.) ( $V_{CE} = -2\text{ V}$ ,  $I_C = -4\text{ mA}$ )
- Low on resistance:  $R_{ON} = 1\ \Omega$  (typ.) ( $I_B = 5\text{ mA}$ )
- High DC current gain:  $h_{FE} = 200$  to 1200
- Small package

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	50	V
Collector-emitter voltage	$V_{CEO}$	20	V
Emitter-base voltage	$V_{EBO}$	25	V
Collector current	$I_C$	300	mA
Base current	$I_B$	60	mA
Collector power dissipation	$P_C$ (Note 1, 3)	200	mW
	$P_C$ (Note 2)	100	
Junction temperature	$T_j$ (Note 1)	150	$^\circ\text{C}$
	$T_j$ (Note 2)	125	
Storage temperature range	$T_{stg}$ (Note 1)	-55 to 150	$^\circ\text{C}$
	$T_{stg}$ (Note 2)	-55 to 125	

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.

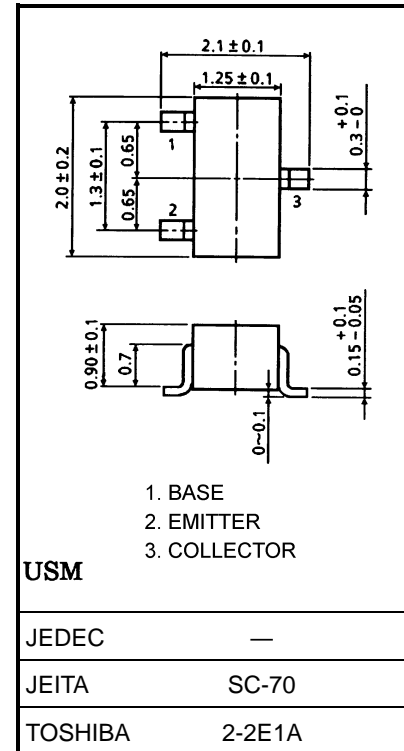
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1 : For devices with the ordering part number ending in LF(T).

Note 2 : For devices with the ordering part number in other than LF(T).

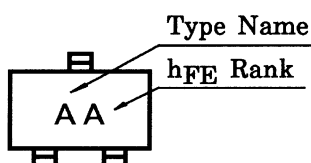
Note 3 : Mounted on a FR4 board. (25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 0.5 mm<sup>2</sup> × 3)

Unit: mm



Weight: 0.006 g (typ.)

### Marking

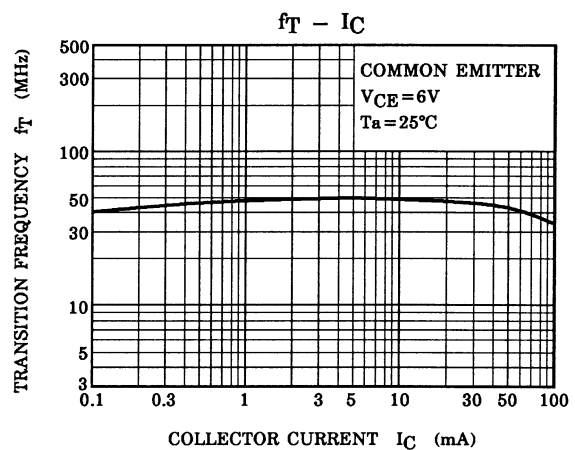
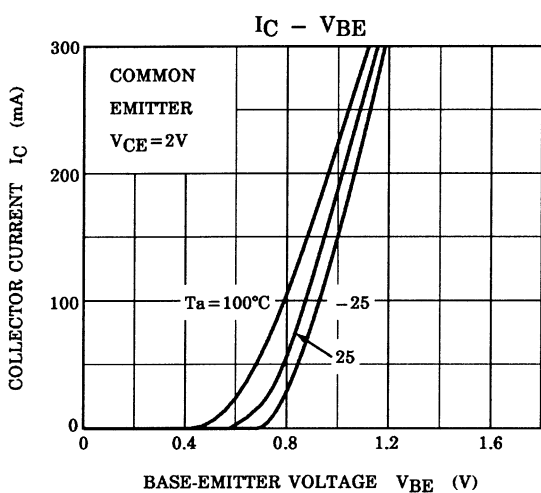
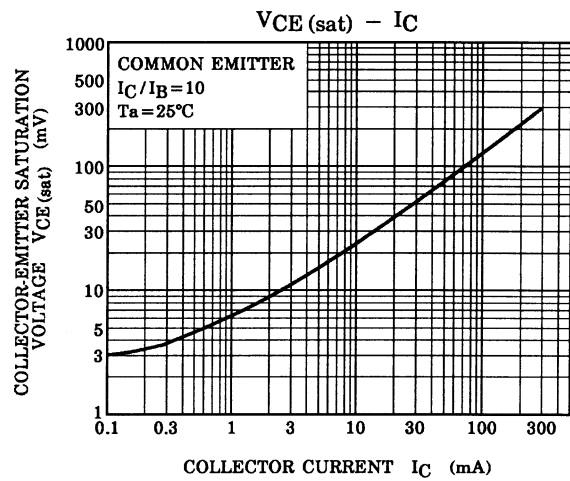
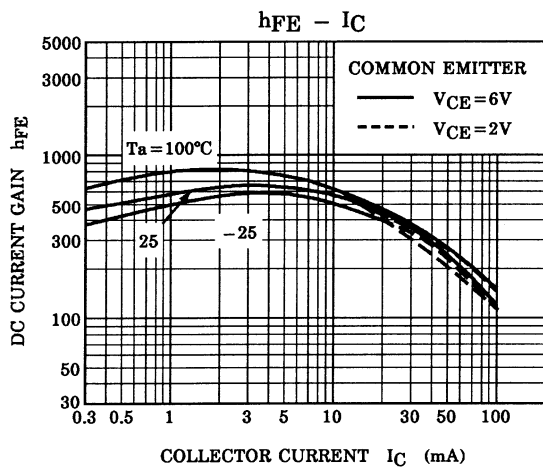
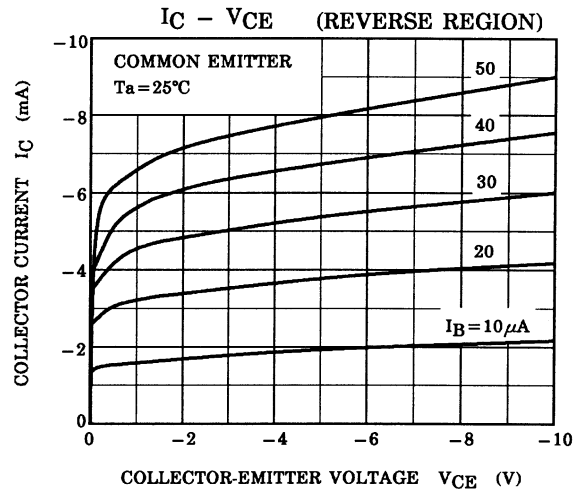
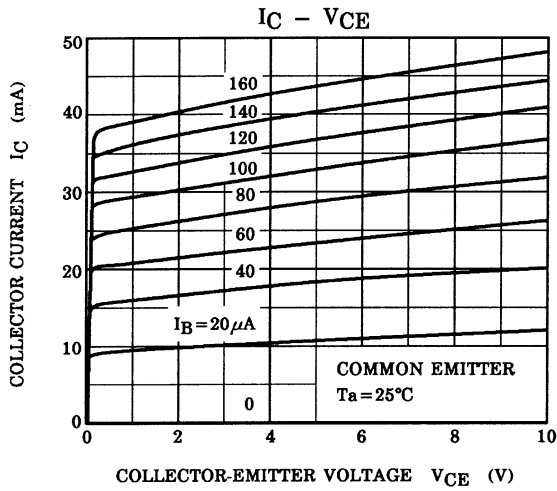


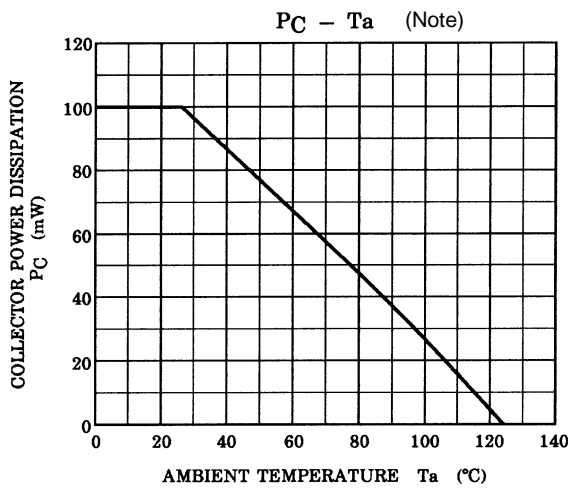
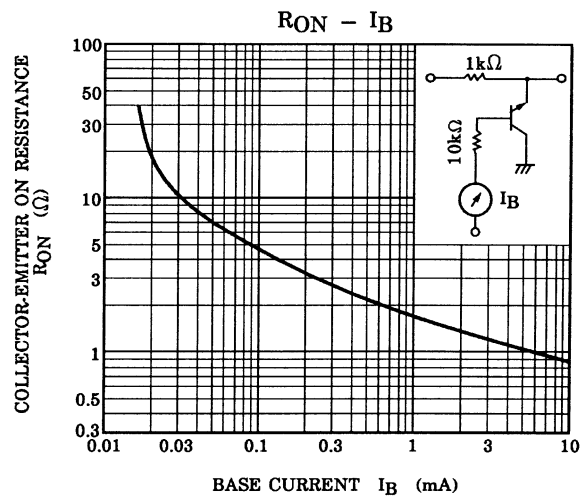
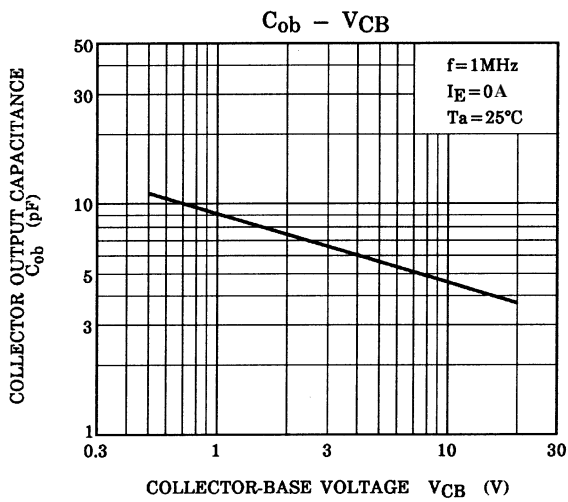
Start of commercial production  
1987-05

## Electrical Characteristics (Ta = 25°C)

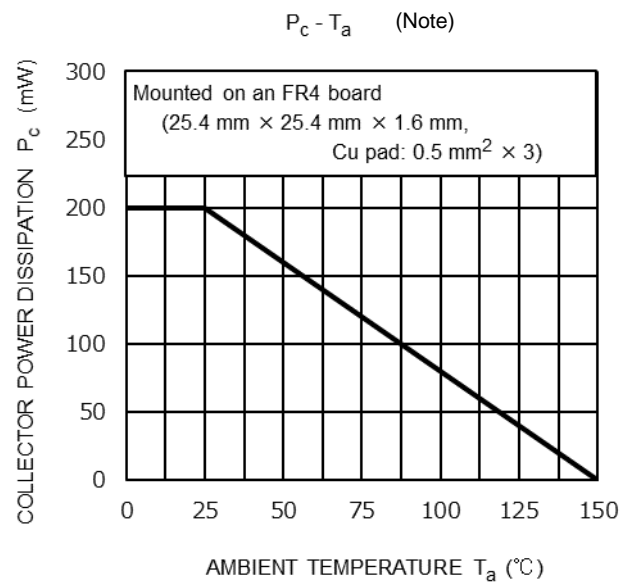
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		ICBO	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0 A	—	—	0.1	μA
Emitter cut-off current		IEBO	V <sub>EB</sub> = 25 V, I <sub>C</sub> = 0 A	—	—	0.1	μA
DC current gain		h <sub>FE</sub> (Note)	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 4 mA	200	—	1200	—
Collector-emitter saturation voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 30 mA, I <sub>B</sub> = 3 mA	—	0.042	0.1	V
Base-emitter voltage		V <sub>BE</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 4 mA	—	0.61	—	V
Transition frequency		f <sub>T</sub>	V <sub>CE</sub> = 6 V, I <sub>C</sub> = 4 mA	—	30	—	MHz
Collector output capacitance		C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 A, f = 1 MHz	—	4.8	7	pF
Switching time	Turn-on time	t <sub>on</sub>	<p>Duty cycle ≤ 2%</p>	—	160	—	ns
	Storage time	t <sub>stg</sub>		—	500	—	
	Fall time	t <sub>f</sub>		—	130	—	

Note: h<sub>FE</sub> classification A: 200 to 700, B: 350 to 1200





Note: Reference only with  $T_j$  of  $125^\circ\text{C}$ .



Note: Reference only with  $T_j$  of  $150^\circ\text{C}$ .

The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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