

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC4213

For Muting and Switching Applications

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

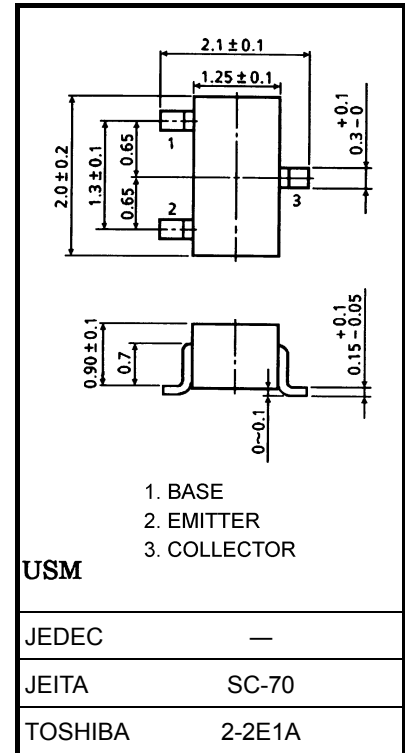
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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	$P_C$	100	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 125	$^\circ\text{C}$

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.

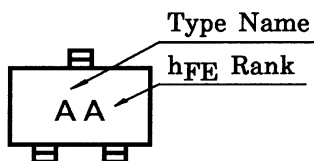
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm



Weight: 0.006 g (typ.)

### Marking

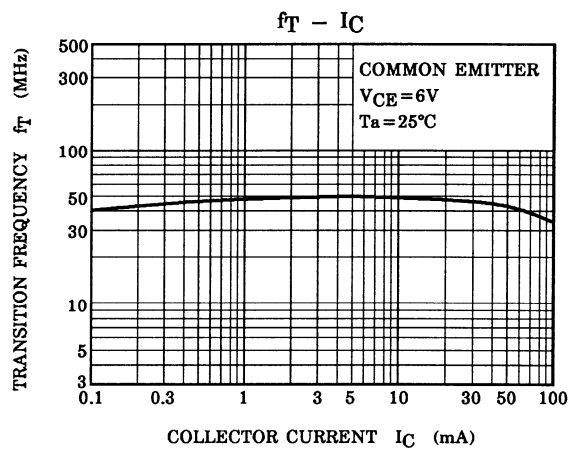
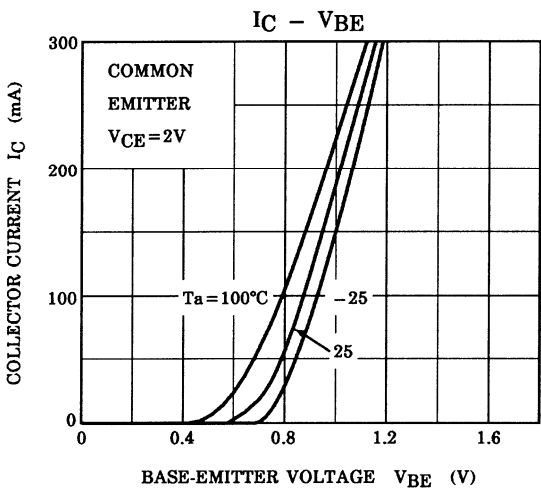
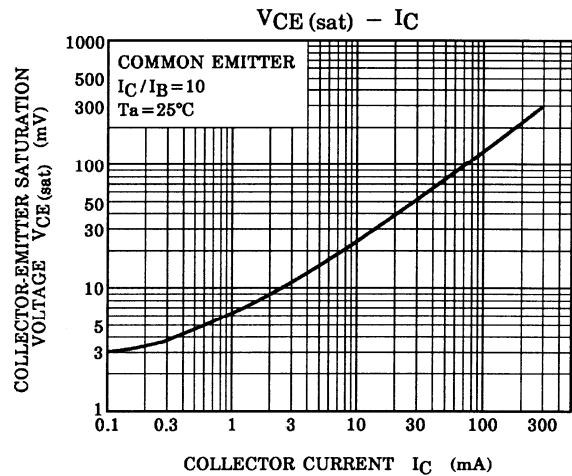
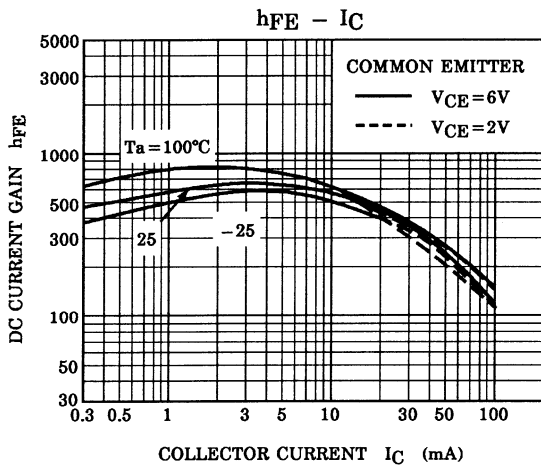
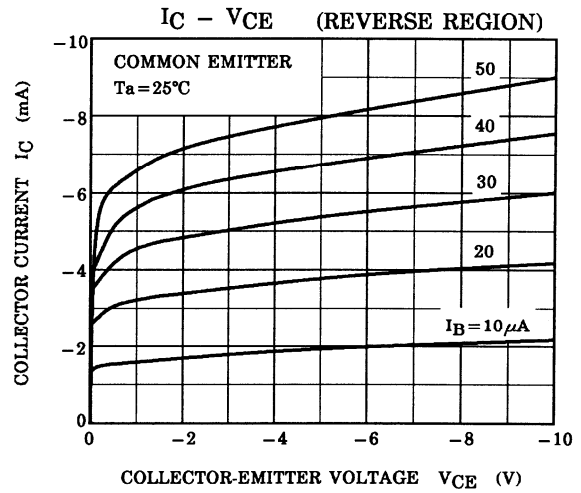
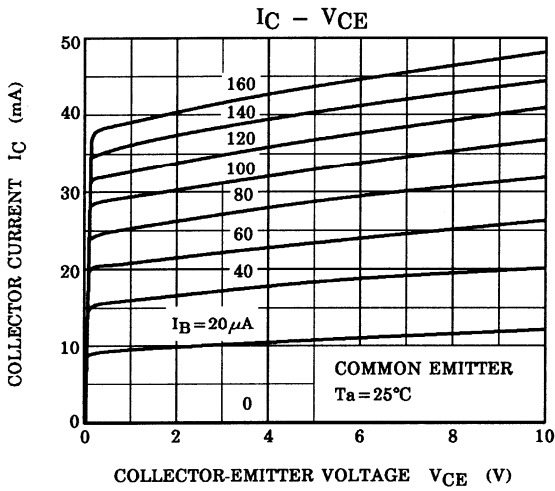


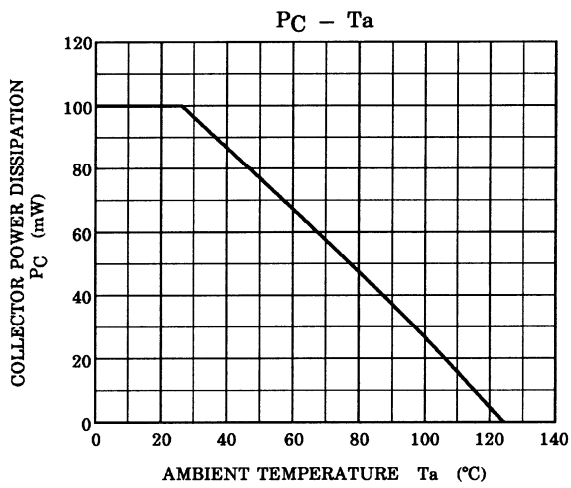
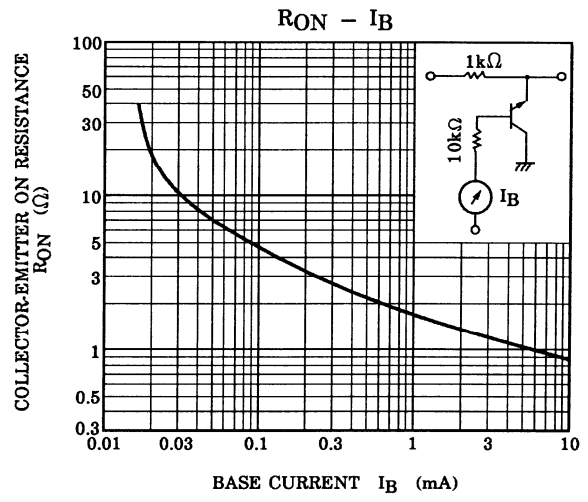
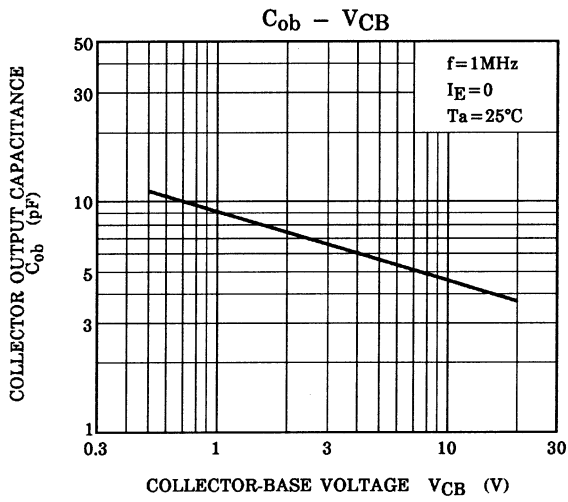
Start of commercial production  
1987-05

## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	0.1	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 25\text{ V}, I_C = 0$	—	—	0.1	$\mu\text{A}$
DC current gain		$h_{FE}$ (Note)	$V_{CE} = 2\text{ V}, I_C = 4\text{ mA}$	200	—	1200	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 30\text{ A}, I_B = 3\text{ mA}$	—	0.042	0.1	V
Base-emitter voltage		$V_{BE}$	$V_{CE} = 2\text{ V}, I_C = 4\text{ mA}$	—	0.61	—	V
Transition frequency		$f_T$	$V_{CE} = 6\text{ V}, I_C = 4\text{ mA}$	—	30	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	4.8	7	pF
Switching time	Turn-on time	$t_{on}$	<p>Duty cycle <math>\leq 2\%</math></p>	—	160	—	ns
	Storage time	$t_{stg}$		—	500	—	
	Fall time	$t_f$		—	130	—	

Note:  $h_{FE}$  classification A: 200 to 700, B: 350 to 1200





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