

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC5233

General Purpose Amplifier Applications  
Switching and Muting Switch Application

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

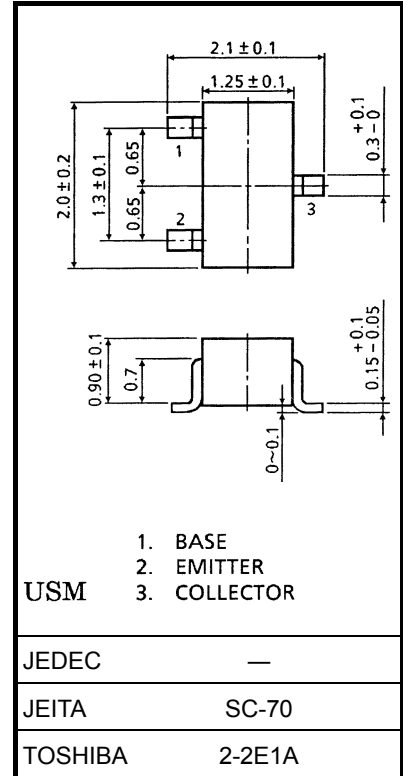
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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

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.

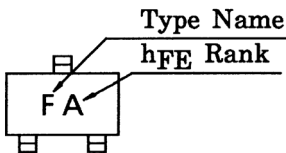
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm

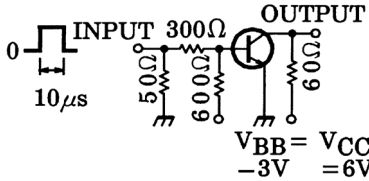


Weight: 0.006 g (typ.)

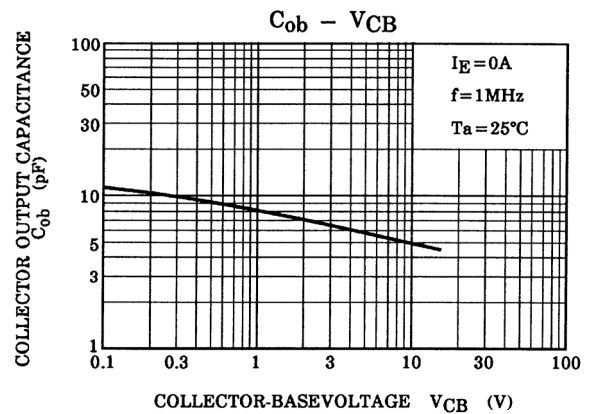
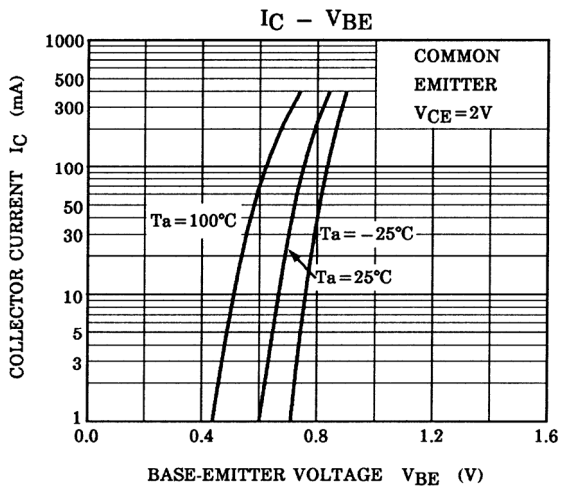
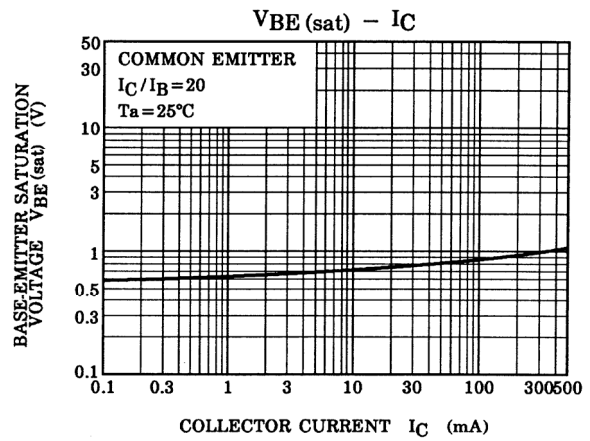
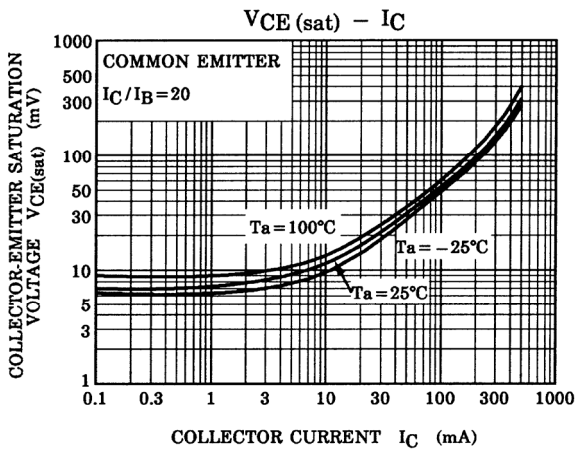
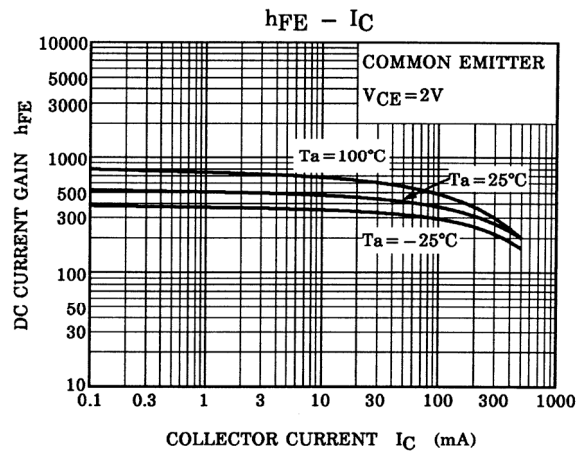
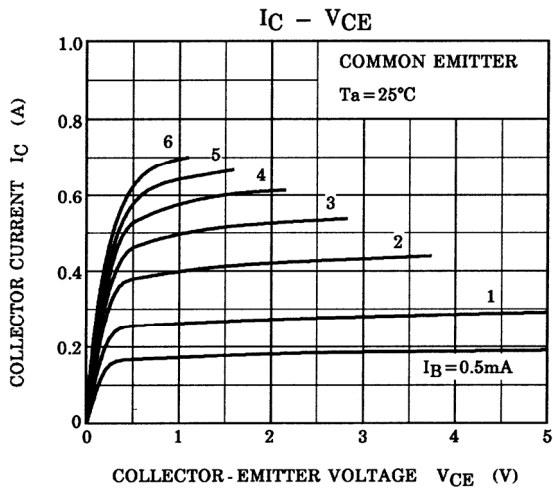
### Marking

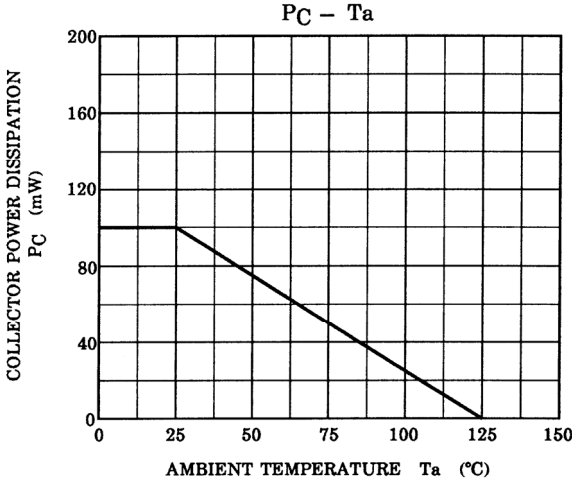


## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 15\text{ V}, I_E = 0$	—	—	0.1	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 5\text{ V}, I_C = 0$	—	—	0.1	$\mu\text{A}$
DC current gain		$h_{FE}$ (Note)	$V_{CE} = 2\text{ V}, I_C = 10\text{ mA}$	300	—	1000	
Collector-emitter saturation voltage		$V_{CE(sat)}(1)$	$I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$	—	15	30	mV
		$V_{CE(sat)}(2)$	$I_C = 200\text{ mA}, I_B = 10\text{ mA}$	—	110	250	
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 200\text{ mA}, I_B = 10\text{ mA}$	—	0.87	1.2	V
Transition frequency		$f_T$	$V_{CE} = 2\text{ V}, I_C = 10\text{ mA}$	80	130	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	4.2	—	pF
Collector-emitter on resistance		$R_{on}$	$I_B = 1\text{ mA}, V_{in} = 1\text{ V}_{rms}, f = 1\text{ kHz}$	—	0.9	—	$\Omega$
Switching time	Turn-on time	$t_{on}$	 <p>Duty cycle <math>\leq 2\%</math> <math>I_{B1} = -I_{B2} = 5\text{ mA}</math></p>	—	85	—	ns
	Storage time	$t_{stg}$		—	170	—	
	Fall time	$t_f$		—	40	—	

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





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20070701-EN GENERAL

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