

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

# 2SA1933

## High-Current Switching Applications

- Low collector saturation voltage:  $V_{CE(sat)} = -0.4\text{ V (max)}$  ( $I_C = -2\text{ A}$ )
- High-speed switching time:  $t_{stg} = 1.0\text{ }\mu\text{s (typ.)}$
- Complementary to 2SC5175

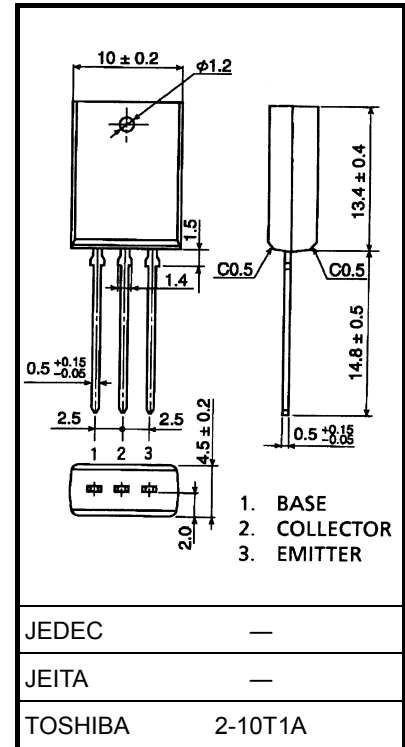
## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-60	V
Collector-emitter voltage	$V_{CEO}$	-50	V
Emitter-base voltage	$V_{EBO}$	-7	V
Collector current	$I_C$	-5	A
Base current	$I_B$	-1	A
Collector power dissipation	$P_C$	1.8	W
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$

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).

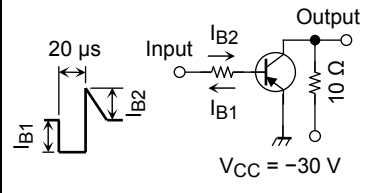
Industrial Applications

Unit: mm

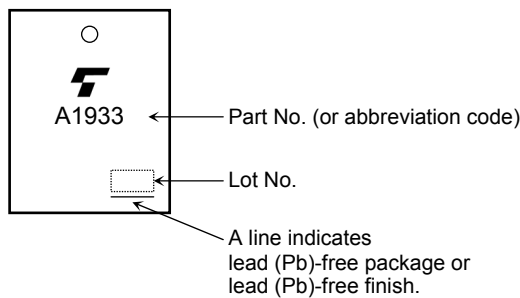


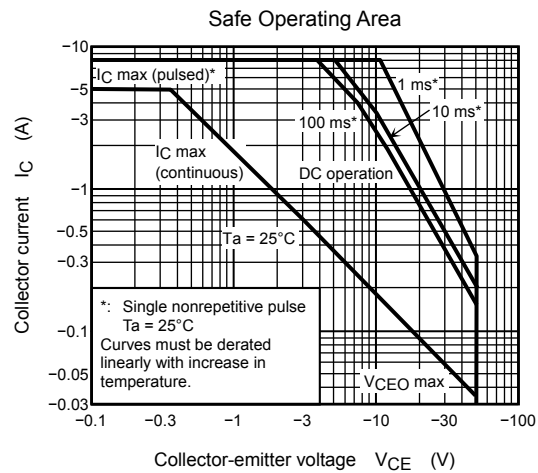
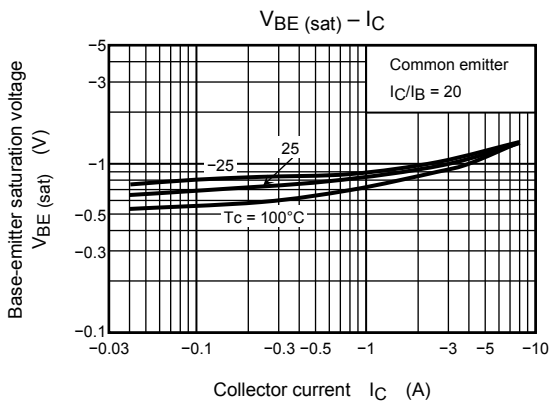
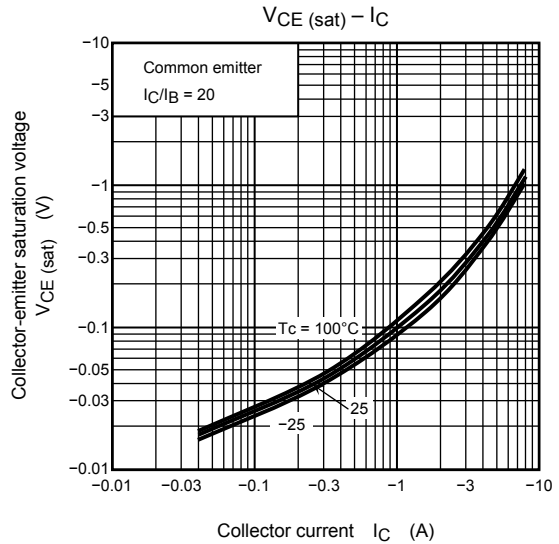
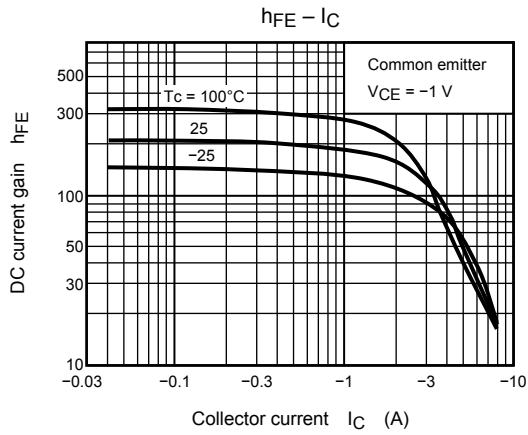
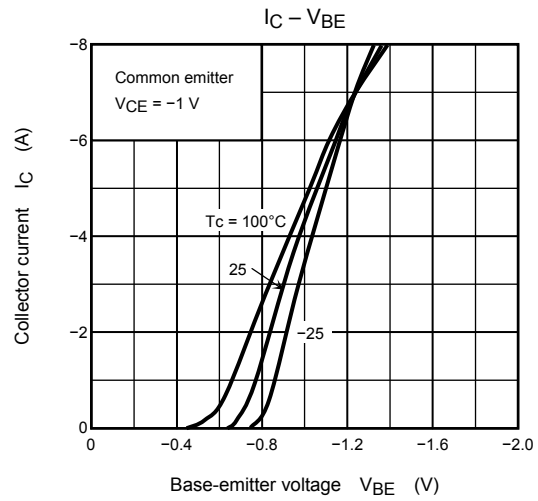
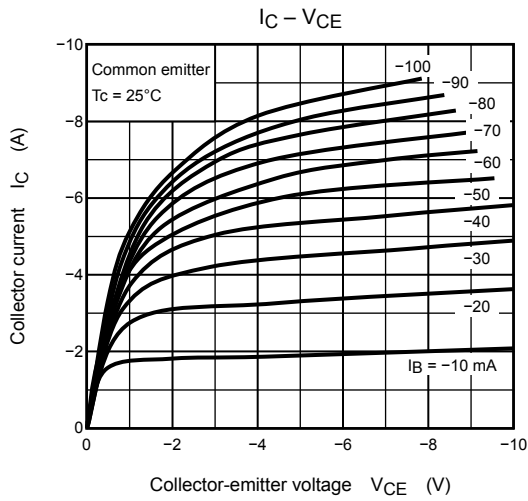
Weight: 1.5 g (typ.)

## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = -50\text{ V}, I_E = 0$	—	—	-1	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = -7\text{ V}, I_C = 0$	—	—	-1	$\mu\text{A}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = -10\text{ mA}, I_B = 0$	-50	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = -1\text{ V}, I_C = -1\text{ A}$	70	—	320		
	$h_{FE(2)}$	$V_{CE} = -1\text{ V}, I_C = -3\text{ A}$	60	—	—		
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = -2\text{ A}, I_B = -0.15\text{ A}$	—	-0.2	-0.4	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = -2\text{ A}, I_B = -0.15\text{ A}$	—	-0.9	-1.5	V
Transition frequency		$f_T$	$V_{CE} = -4\text{ V}, I_C = -1\text{ A}$	—	60	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	170	—	pF
Switching time	Turn-on time	$t_{on}$	 <p><math>V_{CC} = -30\text{ V}</math></p> <p><math>-I_{B1} = I_{B2} = 0.15\text{ A}, \text{duty cycle} \leq 2\%</math></p>	—	0.1	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	1.0	—	
	Fall time	$t_f$		—	0.1	—	

## Marking





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