TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Darlington)

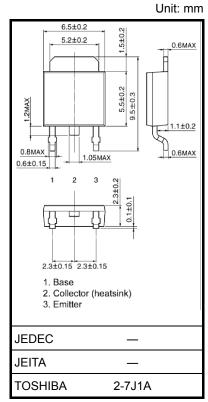
# 2SD1223

Switching Applications Hammer Drive, Pulse Motor Drive Applications Power Amplifier Applications

- High DC current gain:  $h_{FE} = 2000 \text{ (min)} (V_{CE} = 2 \text{ V}, I_{C} = 1 \text{ A})$
- Low saturation voltage:  $V_{CE}$  (sat) = 1.5 V (max) (I<sub>C</sub> = 3 A)
- Complementary to 2SB908.

#### Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Collector-base voltage		V <sub>CBO</sub>	100	V	
Collector-emitter voltage		V <sub>CEO</sub>	80	V	
Emitter-base voltage		V <sub>EBO</sub>	5	V	
Collector current		Ι <sub>C</sub>	4	А	
Base current		Ι <sub>Β</sub>	0.4	А	
Collector power dissipation	Ta = 25°C	D.	1.0	W	
	Tc = 25°C	P <sub>C</sub>	15		
Junction temperature		Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	



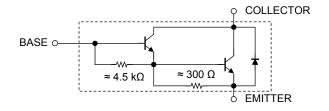
Weight: 0.36 g (typ.)

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).

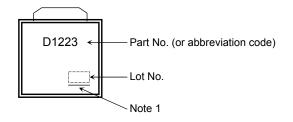
### **Equivalent Circuit**



Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current		I <sub>CBO</sub>	V <sub>CB</sub> = 100 V, I <sub>E</sub> = 0	_	_	20	μA
Emitter cut-off current		I <sub>EBO</sub>	V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0	_		2.5	mA
Collector-emitter breakdown voltage		V (BR) CEO	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0	80	_	_	V
DC current gain		h <sub>FE (1)</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 1 A	2000	_	_	
		h <sub>FE (2)</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 A	1000	_	_	
Collector-emitter saturation voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 3 A, I <sub>B</sub> = 6 mA	-	_	1.5	V
Base-emitter saturation voltage		V <sub>BE (sat)</sub>	I <sub>C</sub> = 3 A, I <sub>B</sub> = 6 mA	-	_	2.0	V
Switching time	Turn-on time	t <sub>on</sub>	20 $\mu$ s $I_{B1}$ OUTPUT $I_{B2}$ $I_{B2}$ $I_{B2}$ $I_{B2}$ $I_{B2}$ $V_{CC} = 30 V$ $I_{B1} = -I_{B2} = 6 \text{ mA, DUTY CYCLE} \le 1\%$	_	0.2	_	
	Storage time	t <sub>stg</sub>		_	1.5	_	μs
	Fall time	t <sub>f</sub>		_	0.6	_	

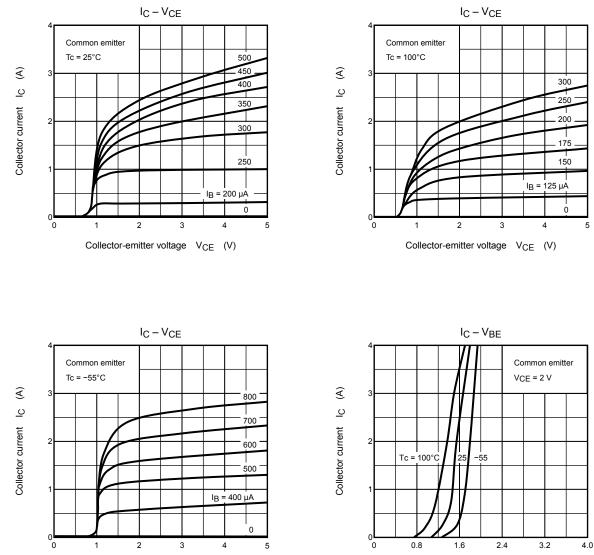
#### Marking

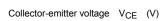


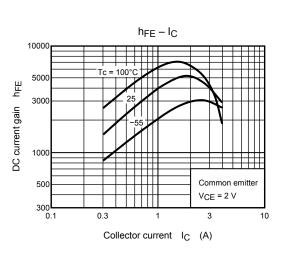
Note 1: A line under a Lot No. identifies the indication of product Labels. Not underlined: [[Pb]]/INCLUDES > MCV Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

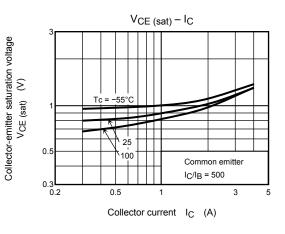
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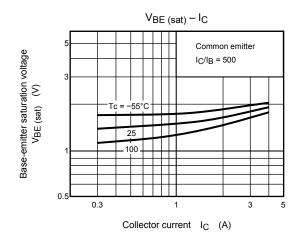


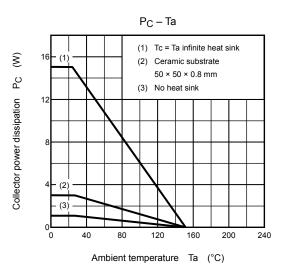


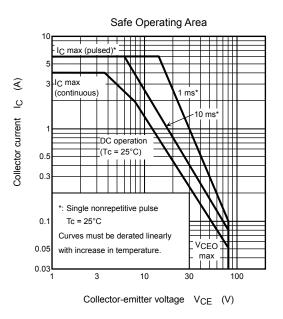


Base-emitter voltage V<sub>BE</sub> (V)

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