

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

2SD1784

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

- High DC current gain:  $h_{FE} = 4000$  (min) ( $V_{CE} = 2\text{ V}$ ,  $I_C = 150\text{ mA}$ )
- Low saturation voltage:  $V_{CE(sat)} = 1.5\text{ V}$  (max) ( $I_C = 1\text{ A}$ ,  $I_B = 1\text{ mA}$ )

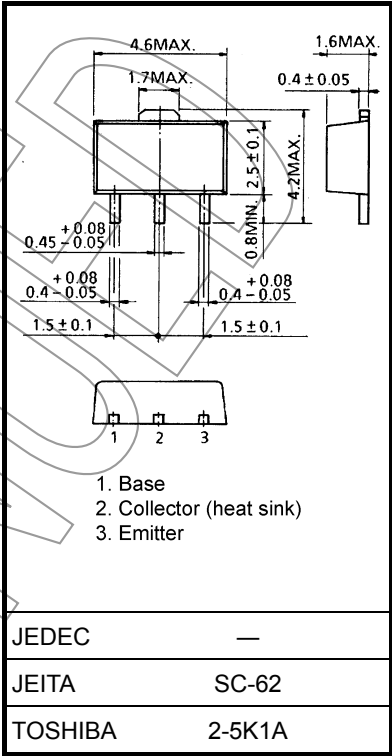
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	30	V
Collector-emitter voltage	$V_{CEO}$	30	V
Emitter-base voltage	$V_{EBO}$	10	V
Collector current	$I_C$	1.5	A
Base current	$I_B$	50	mA
Collector power dissipation	$P_C$ (Note 1)	1000	mW
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-55 to 150	°C

Note 1: 2SD1784 mounted on a ceramic substrate (250-mm<sup>2</sup> × 0.8 mm)

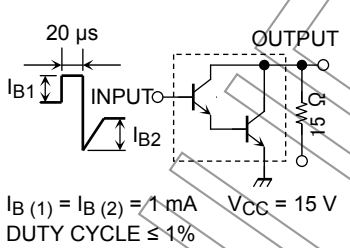
Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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

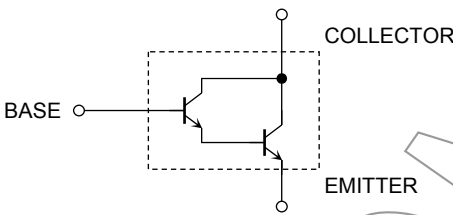


Weight: 0.05 g (typ.)

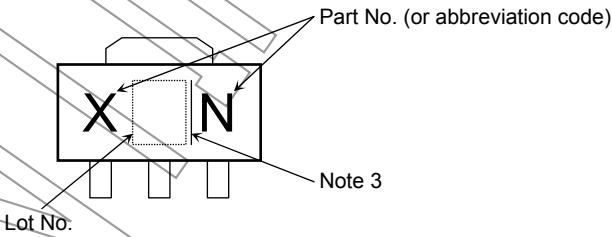
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		ICBO	V <sub>CB</sub> = 30 V, I <sub>E</sub> = 0	—	—	10	μA
Emitter cut-off current		IEBO	V <sub>EB</sub> = 10 V, I <sub>C</sub> = 0	—	—	10	μA
Collector-emitter breakdown voltage		V (BR) CEO	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0	30	—	—	V
DC current gain		hFE	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 150 mA	4000	—	—	—
Collector-emitter saturation voltage		V <sub>CE</sub> (sat)	I <sub>C</sub> = 1 A, I <sub>B</sub> = 1 mA	—	—	1.5	V
Base-emitter saturation voltage		V <sub>BE</sub> (sat)	I <sub>C</sub> = 1 A, I <sub>B</sub> = 1 mA	—	—	2.2	V
Switching time	Turn-on time	t <sub>on</sub>	 I <sub>B</sub> (1) = I <sub>B</sub> (2) = 1 mA DUTY CYCLE ≤ 1%	—	0.20	—	μs
	Storage time	t <sub>stg</sub>		—	0.6	—	
	Fall time	t <sub>f</sub>		—	0.3	—	

Equivalent Circuit



Marking

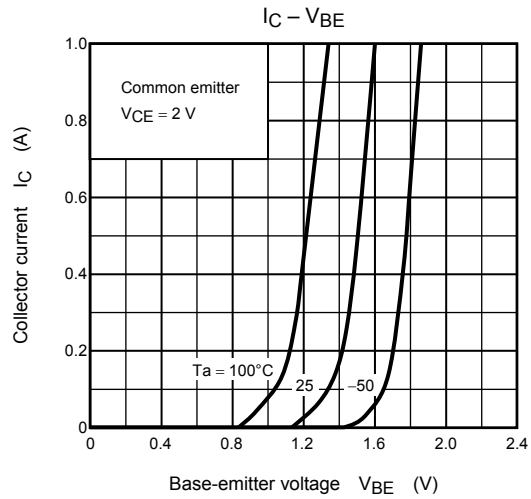
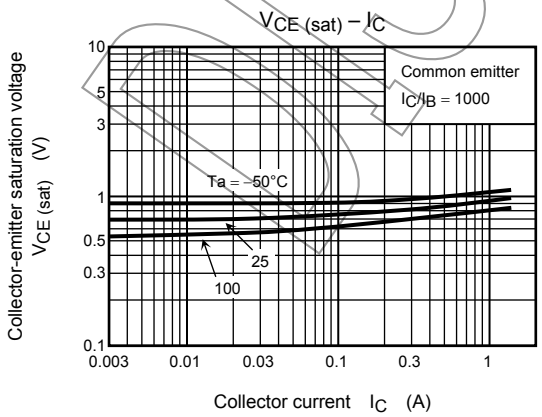
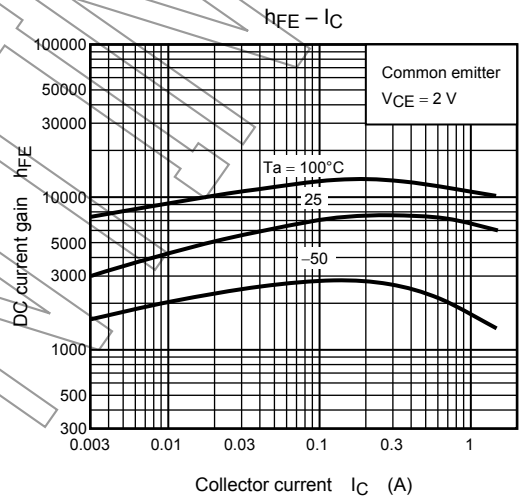
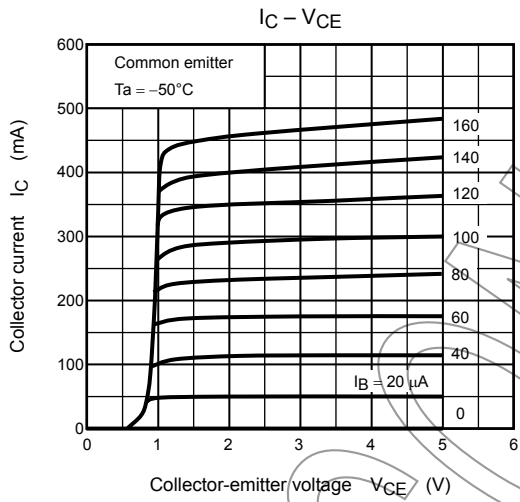
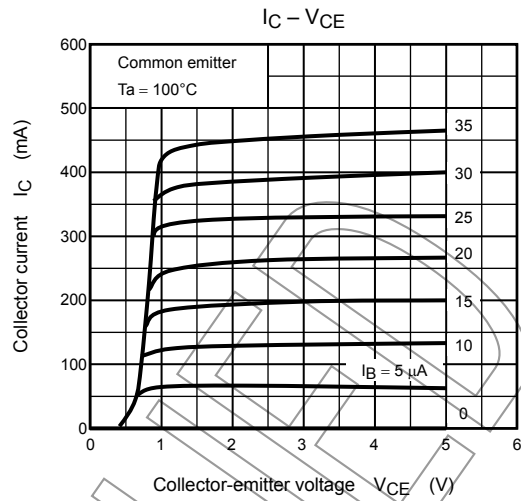
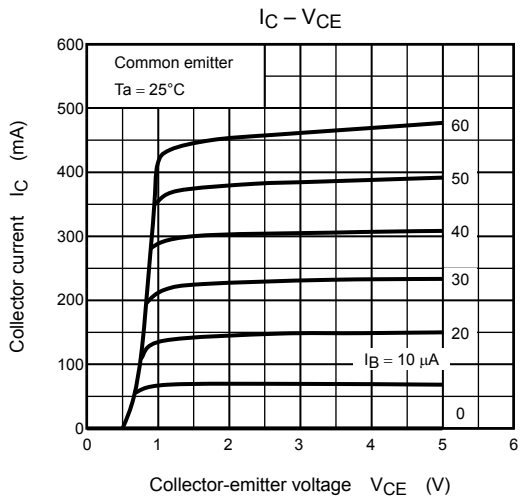


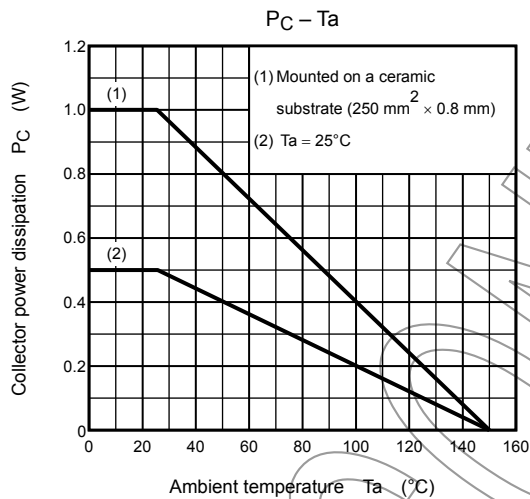
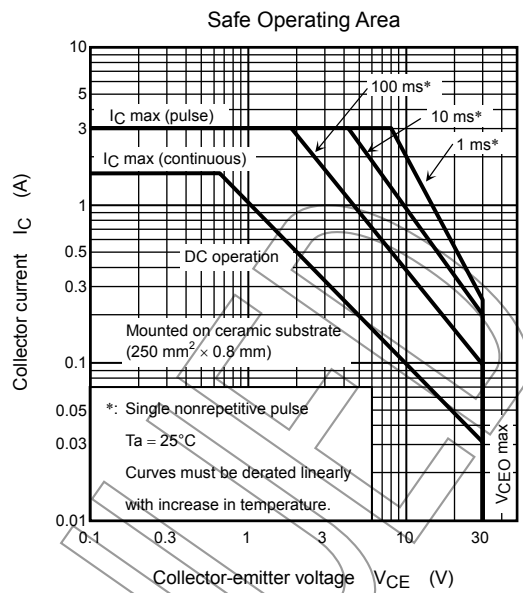
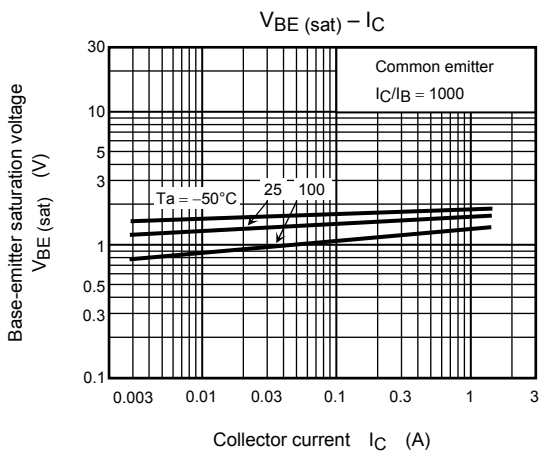
Note 3: A line beside a Lot No. identifies the indication of product Labels.

Without a line: [[Pb]]/INCLUDES > MCV

With a line: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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