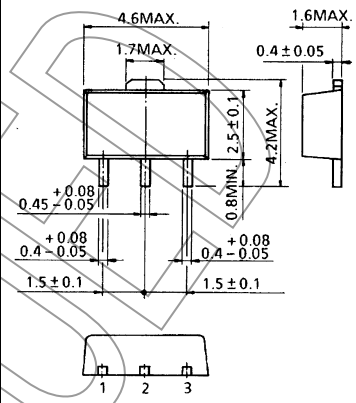
TOSHIBA Field Effect Transistor Silicon NPN Epitaxial Type (PCT Process) (Darlington)

2SD1784

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

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

Unit: mm



1. Base
2. Collector (heat sink)
3. Emitter

JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1A

Weight: 0.05 g (typ.)

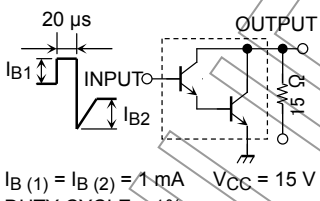
Absolute Maximum Ratings (Ta = 25°C)

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

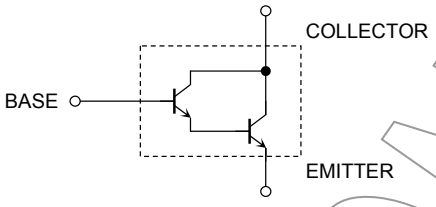
Note 1: 2SD1784 mounted on a ceramic substrate (250 mm^2 × 0.8 mm)

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).

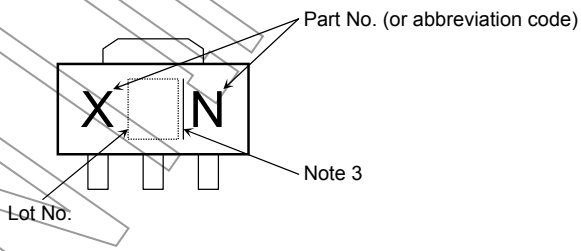
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 30 V, I_E = 0	—	—	10	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 10 V, I_C = 0	—	—	10	μA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	30	—	—	V
DC current gain		h_{FE}	V_{CE} = 2 V, I_C = 150 mA	4000	—	—	—
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 1 A, I_B = 1 mA	—	—	1.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 1 A, I_B = 1 mA	—	—	2.2	V
Switching time	Turn-on time	t_{on}		—	0.20	—	μs
	Storage time	t_{stg}		—	0.6	—	
	Fall time	t_f		—	0.3	—	

Equivalent Circuit



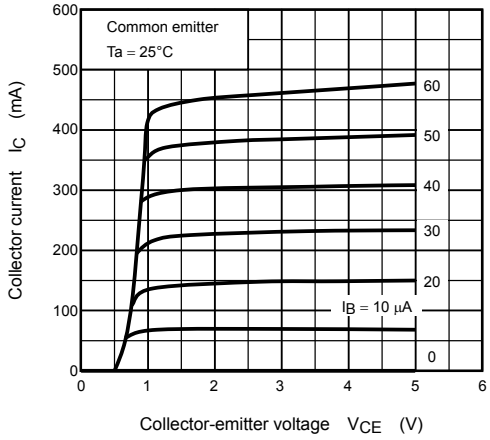
Marking



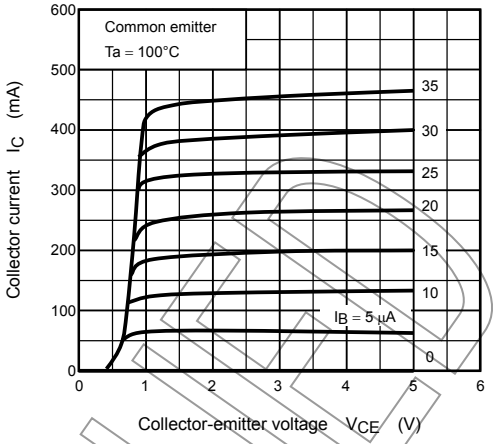
Note 3: A line beside a Lot No. identifies the indication of product Labels.
Without a line: [[Pb]]/INCLUDES > MCV
With a line: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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.

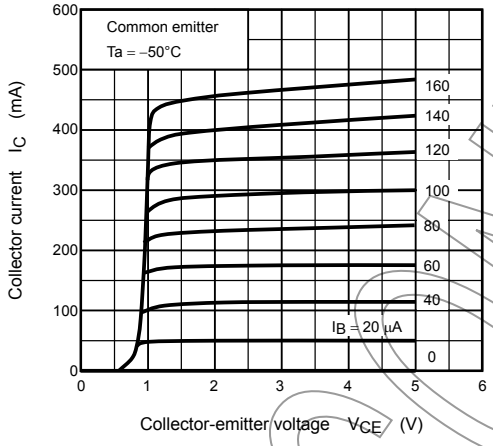
$I_C - V_{CE}$



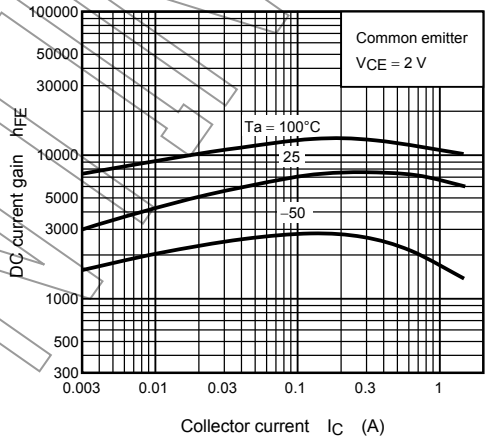
$I_C - V_{CE}$



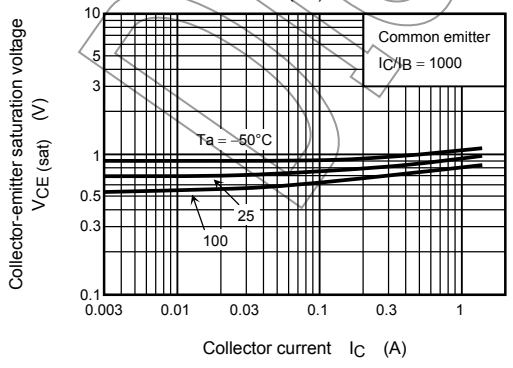
$I_C - V_{CE}$



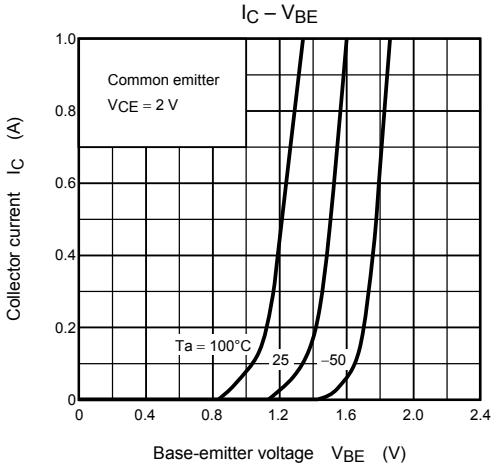
$h_{FE} - I_C$



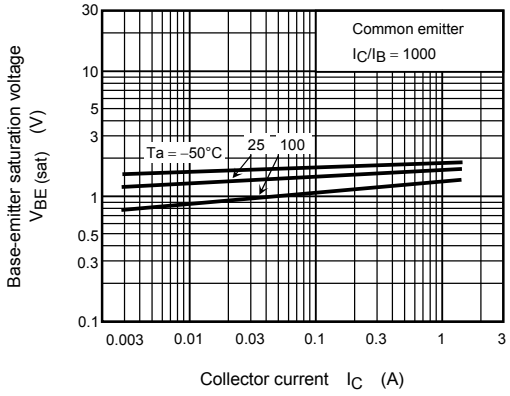
$V_{CE\ (sat)} - I_C$



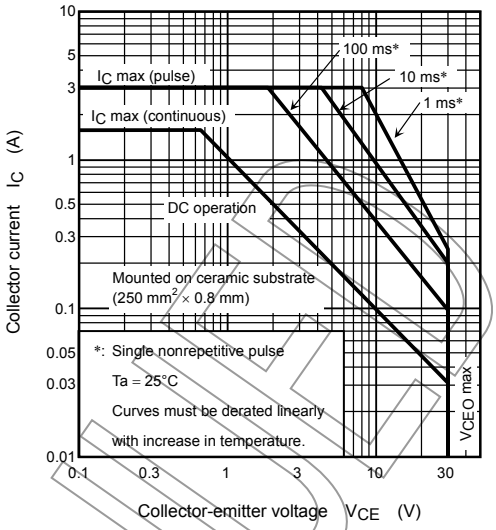
$I_C - V_{BE}$



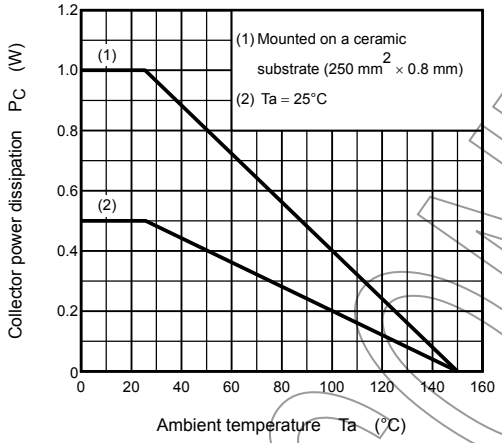
$V_{BE\ (sat)} - I_C$



Safe Operating Area



$P_C - Ta$



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