

TOSHIBA Transistor Silicon NPN Epitaxial Type (Darlington Power Transistor)

2SD2088

Micro Motor Drive, Hammer Drive Applications

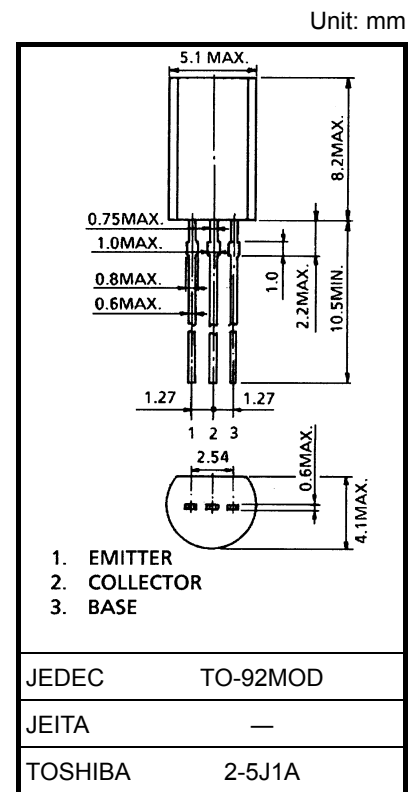
Switching Applications

Power Amplifier Applications

- High DC current gain: $h_{FE} = 2000$ (min) ($V_{CE} = 2\text{ V}$, $I_C = 1\text{ A}$)
- Low saturation voltage: $V_{CE(sat)} = 1.5\text{ V}$ (max) ($I_C = 1\text{ A}$, $I_B = 1\text{ mA}$)
- Zener diode included between collector and base

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

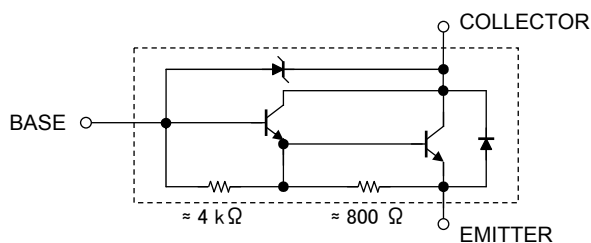
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	60 ± 10	V
Collector-emitter voltage	V_{CEO}	60 ± 10	V
Emitter-base voltage	V_{EBO}	8	V
Collector current	I_C	2	A
Base current	I_B	0.5	A
Collector power dissipation	P_C	0.9	W
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$



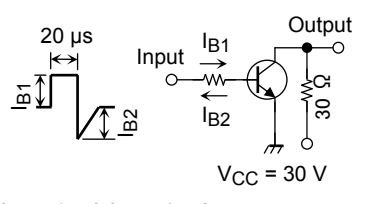
Weight: 0.36 g (typ.)

Note1: 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).

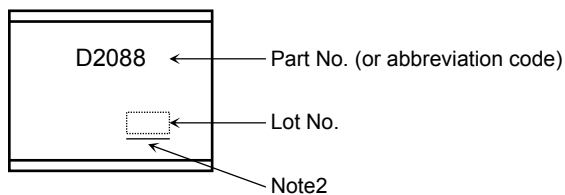
Equivalent Circuit



Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 45\text{ V}, I_E = 0$	—	—	10	μA
Emitter cut-off current		I_{EBO}	$V_{EB} = 8\text{ V}, I_C = 0$	—	—	4	mA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	50	60	70	V
DC current gain		h_{FE}	$V_{CE} = 2\text{ V}, I_C = 1\text{ A (pulse)}$	2000	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 1\text{ mA (pulse)}$	—	—	1.5	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 1\text{ mA (pulse)}$	—	—	2.0	V
Transition frequency		f_T	$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A (pulse)}$	—	100	—	MHz
Collector output capacitance		C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	20	—	pF
Unclamped inductive load energy		$E_{S/B}$	$L = 10\text{ mH}, I_C = 1.3\text{ A}, I_B = \pm 50\text{ mA}$	8.4	—	—	mJ
Switching time	Turn-on time	t_{on}		—	0.4	—	μs
	Storage time	t_{stg}		—	4.0	—	
	Fall time	t_f		$I_{B1} = 1\text{ mA}, I_{B2} = 1\text{ mA}$ duty cycle $\leq 1\%$	—	0.6	

Marking

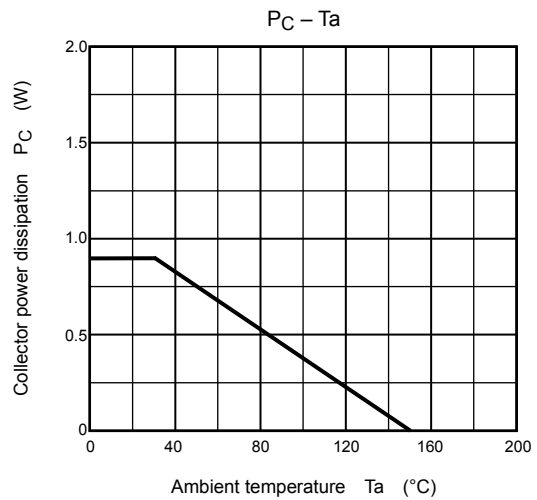
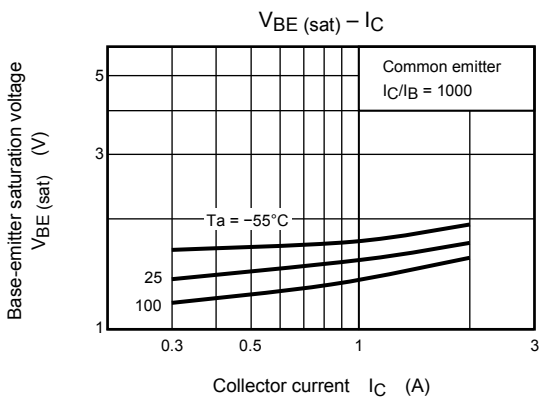
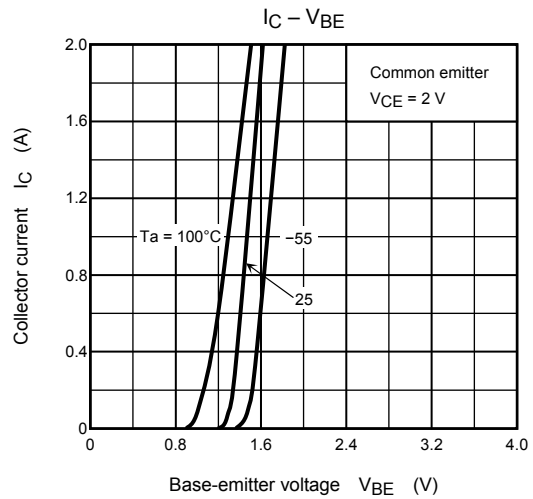
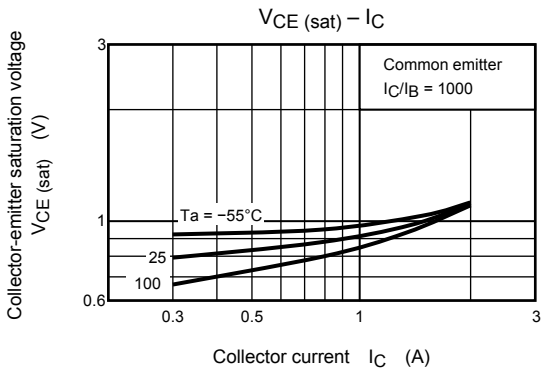
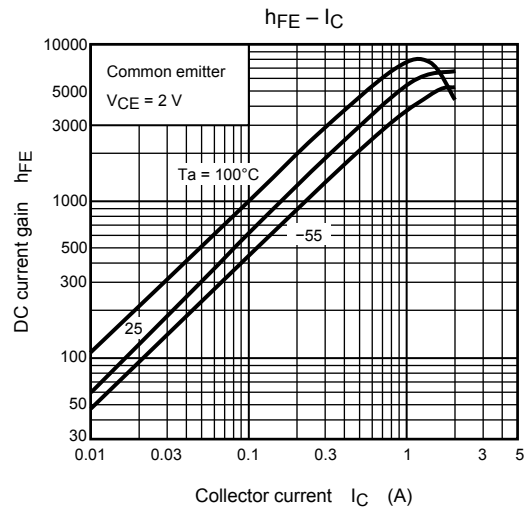
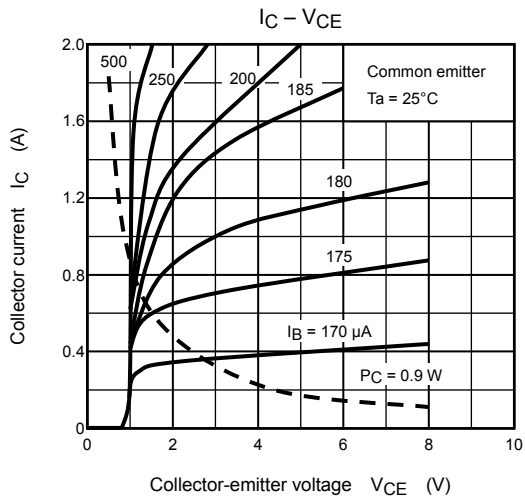


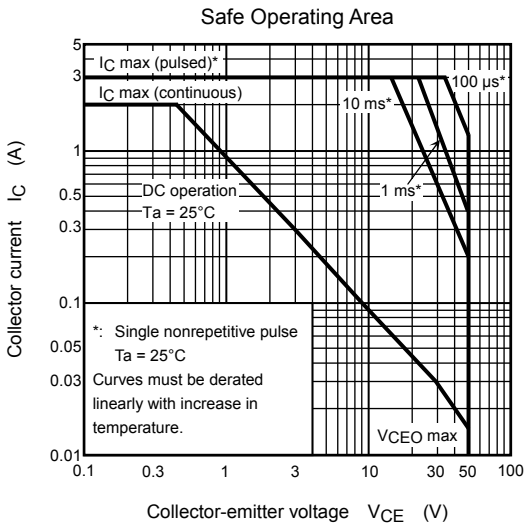
Note2: A line under a Lot No. identifies the indication of product Labels.

Not underlined: $[[\text{Pb}]]/\text{INCLUDES} > \text{MCV}$

Underlined: $[[\text{G}]]/\text{RoHS COMPATIBLE}$ or $[[\text{G}]]/\text{RoHS} [[\text{Pb}]]$

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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