

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

2SD1140

Micro Motor Drive, Hammer Drive Applications

Switching Applications

Power Amplifier Applications

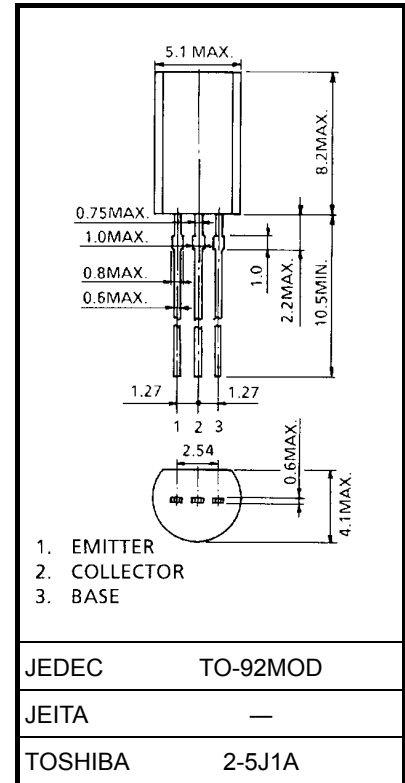
- High DC current gain: $h_{FE} = 4000$ (min) ($V_{CE} = 2\text{ V}$, $I_C = 150\text{ mA}$)
- Low saturation voltage: $V_{CE(sat)} = 1.5\text{ V}$ (max) ($I_C = 1\text{ A}$, $I_B = 1\text{ mA}$)

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

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	900	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

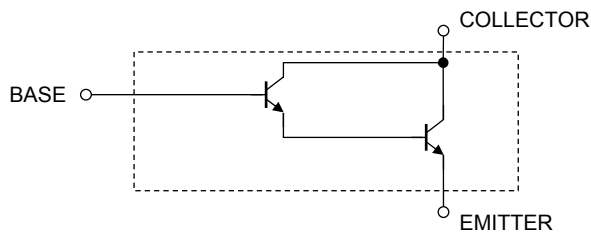
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Unit: mm

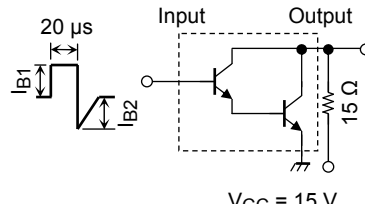


Weight: 0.36 g (typ.)

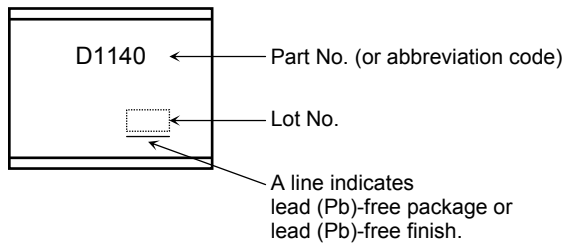
Equivalent Circuit

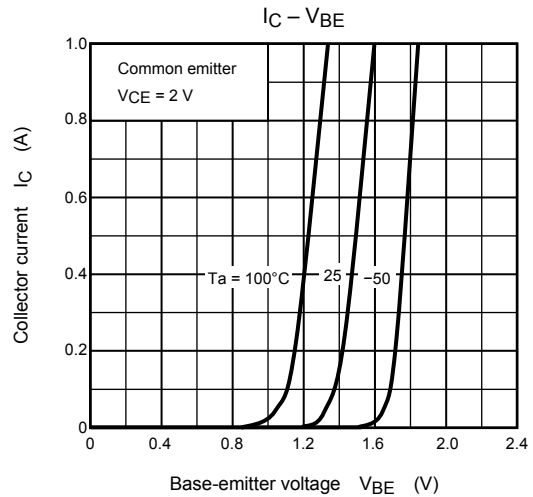
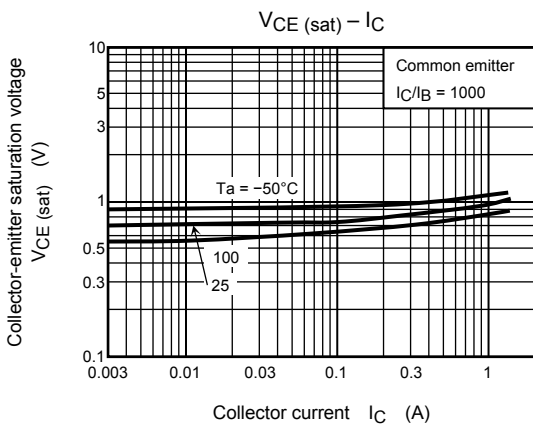
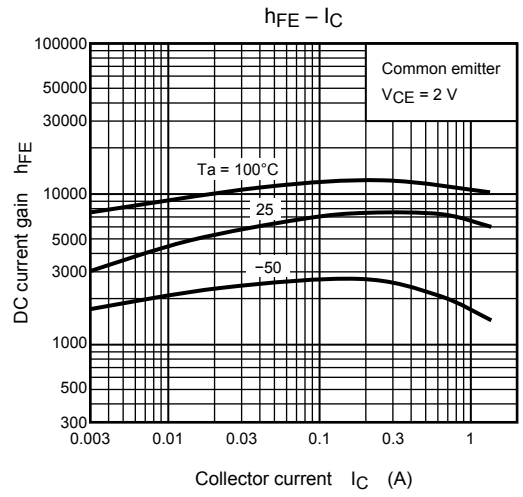
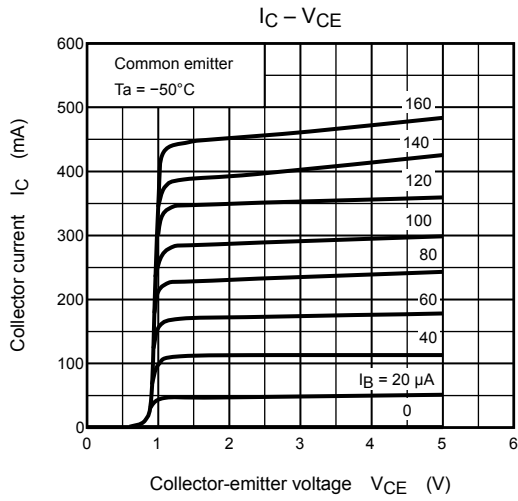
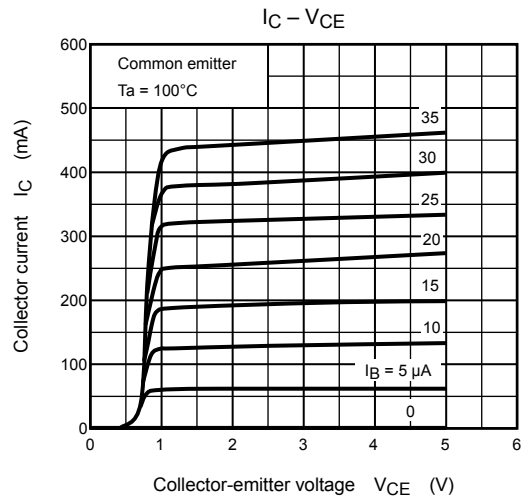
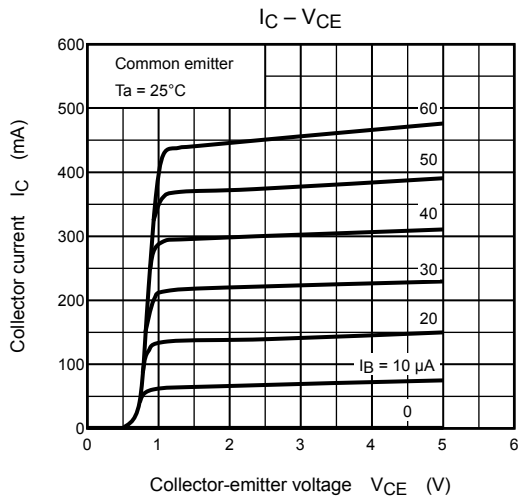


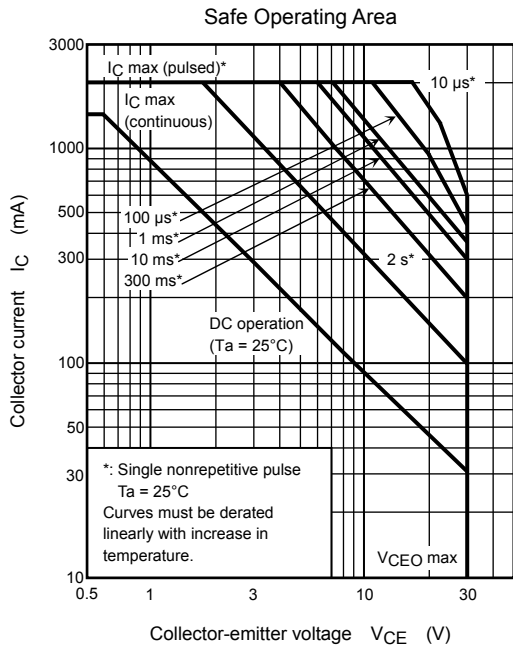
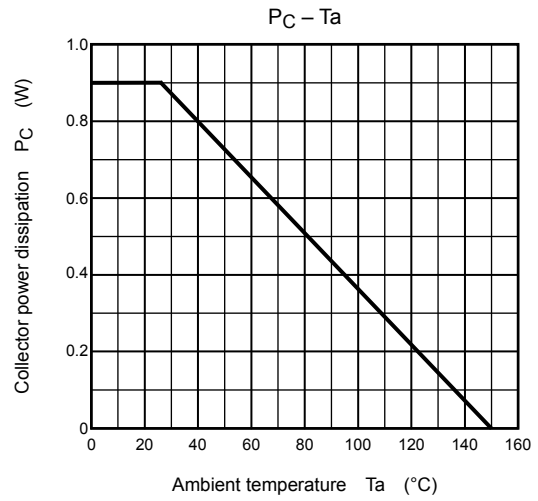
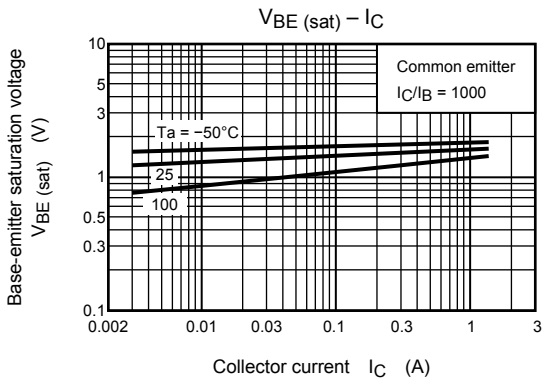
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 30\text{ V}, I_E = 0$	—	—	10	μA
Emitter cut-off current		I_{EBO}	$V_{EB} = 10\text{ V}, I_C = 0$	—	—	10	μA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	30	—	—	V
DC current gain		h_{FE}	$V_{CE} = 2\text{ V}, I_C = 150\text{ mA}$	4000	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 1\text{ mA}$	—	—	1.5	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 1\text{ mA}$	—	—	2.2	V
Switching time	Turn-on time	t_{on}	 <p style="text-align: center;">$V_{CC} = 15\text{ V}$</p> <p style="text-align: center;">$I_{B1} = -I_{B2} = 1\text{ mA}, \text{ duty cycle } \leq 1\%$</p>	—	0.2	—	μs
	Storage time	t_{stg}		—	0.6	—	
	Fall time	t_f		—	0.3	—	

Marking







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20070701-EN

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