

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Darlington power transistor)

# 2SD1140

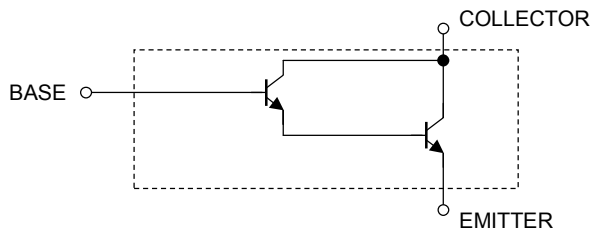
Micro Motor Drive, Hammer Drive Applications  
 Switching Applications  
 Power Amplifier Applications

- 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) ( $I_C = 1\text{ A}$ ,  $I_B = 1\text{ mA}$ )

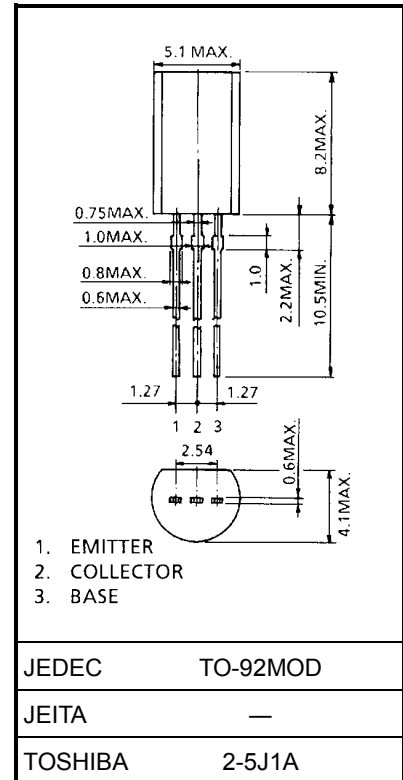
### Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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	$^\circ\text{C}$

### Equivalent Circuit



Unit: mm

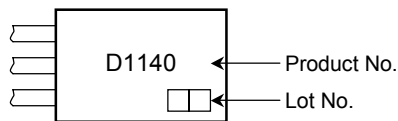


Weight: 0.36 g (typ.)

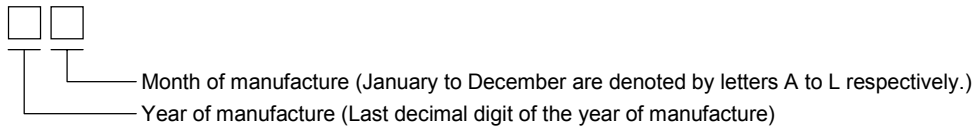
## Electrical Characteristics (Ta = 25°C)

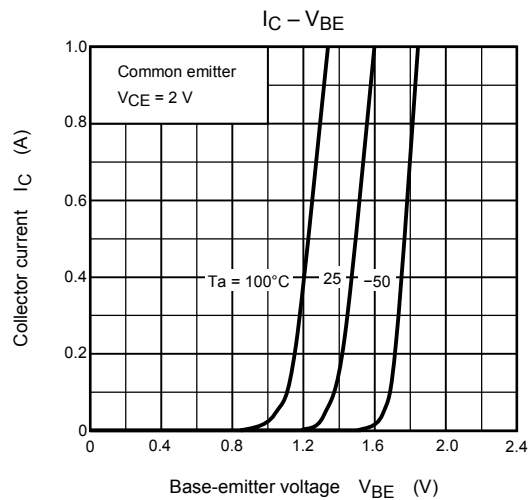
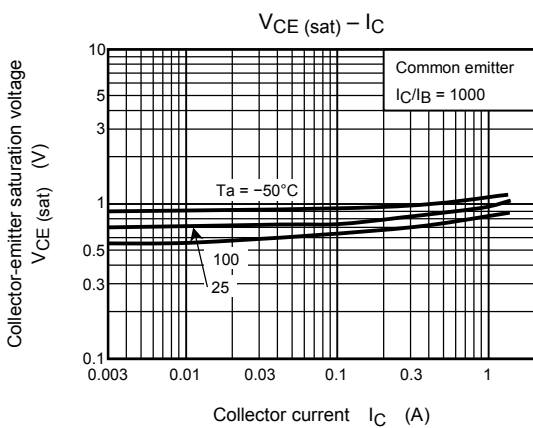
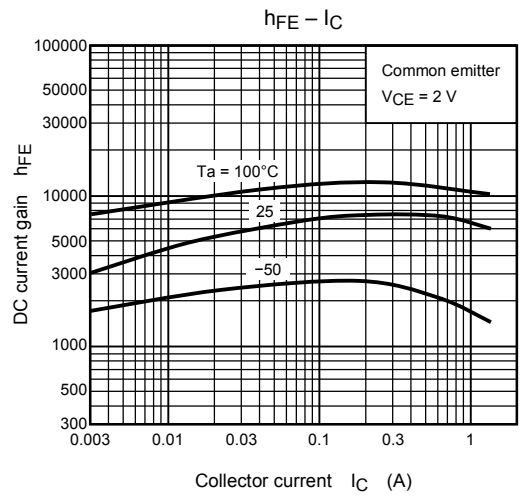
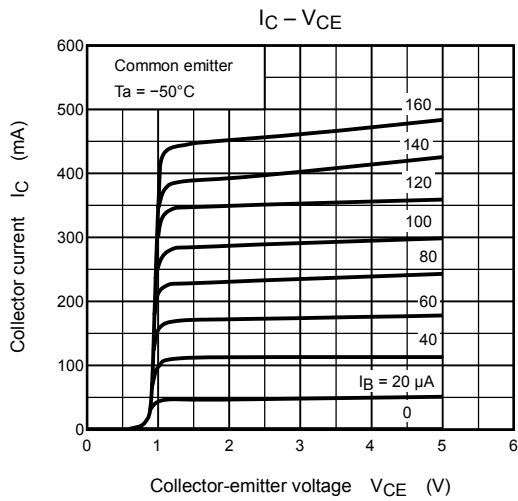
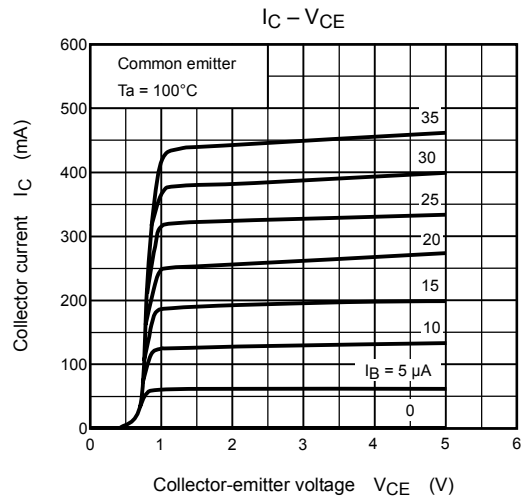
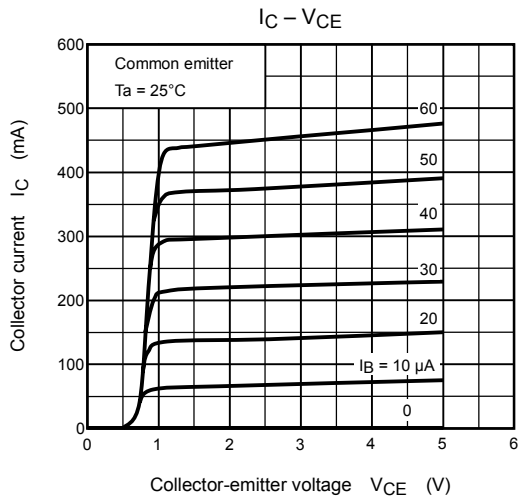
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 30\text{ V}, I_E = 0$	—	—	10	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 10\text{ V}, I_C = 0$	—	—	10	$\mu\text{A}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	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;"><math>V_{CC} = 15\text{ V}</math></p> <p style="text-align: center;"><math>I_{B1} = -I_{B2} = 1\text{ mA}, \text{ duty cycle } \leq 1\%</math></p>	—	0.2	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	0.6	—	
	Fall time	$t_f$		—	0.3	—	

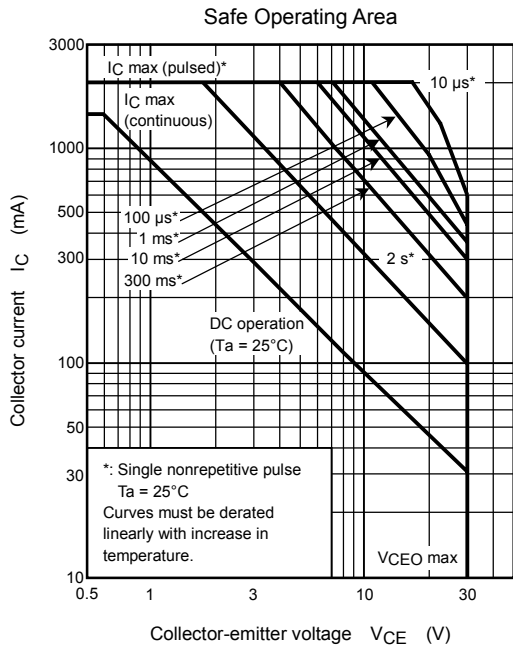
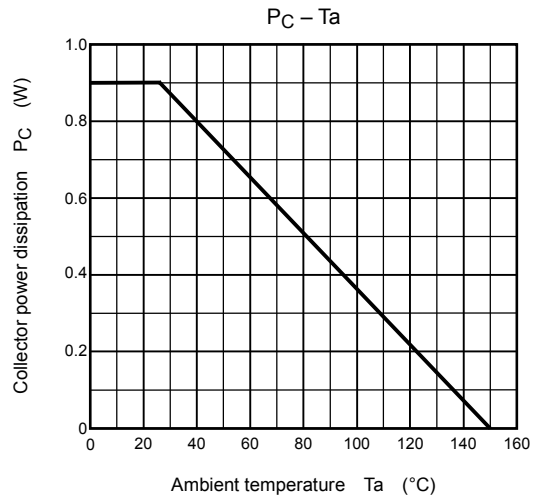
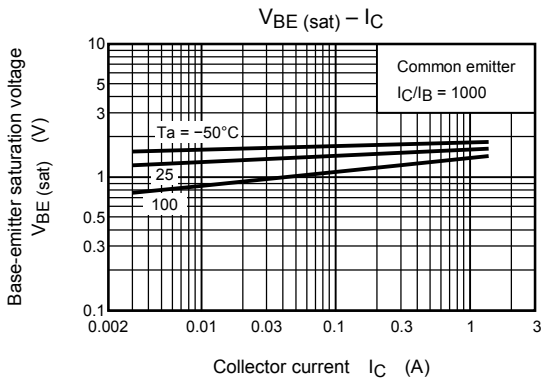
## Marking



## Explanation of Lot No.







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