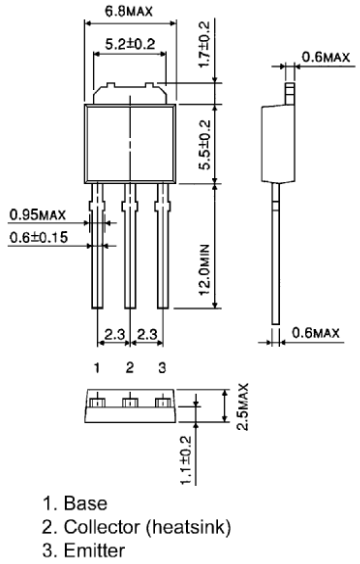
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Darlington)

2SD1224

Pulse 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



JEDEC	—
JEITA	—
TOSHIBA	2-7B1A

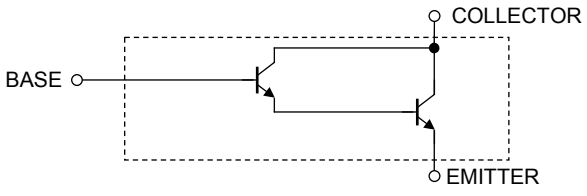
Weight: 0.36 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

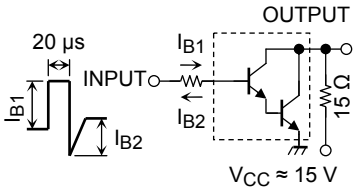
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	30	V
Collector-emitter voltage		V_{CEO}	30	V
Emitter-base voltage		V_{EBO}	10	V
Collector current		I_C	1.5	A
Base current		I_B	0.15	A
Collector power dissipation	Ta = 25°C	P_C	1.0	W
	Tc = 25°C		10	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°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).

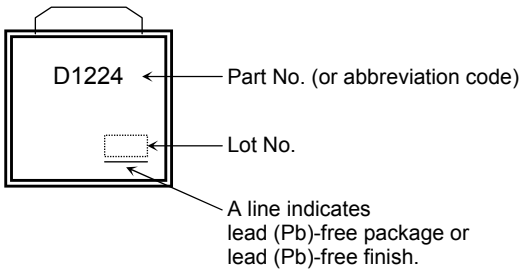
Equivalent Circuit



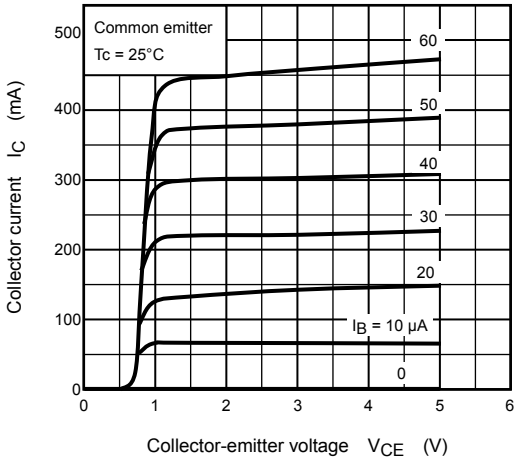
Electrical Characteristics (Ta = 25°C)

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}		—	0.18	—	μs
	Storage time	t_{stg}		—	0.6	—	
	Fall time	t_f	$I_{B1} = -I_{B2}$ = 1 mA, DUTY CYCLE ≤ 1%	—	0.3	—	

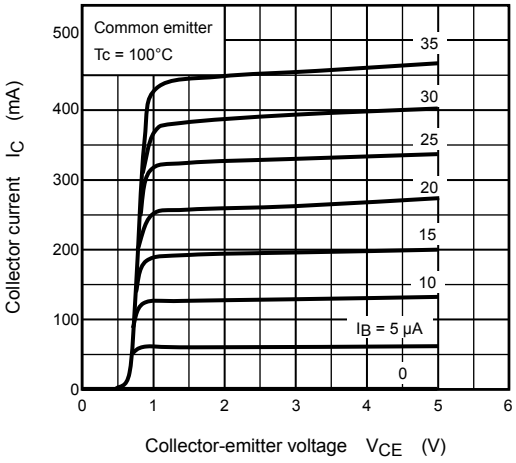
Marking



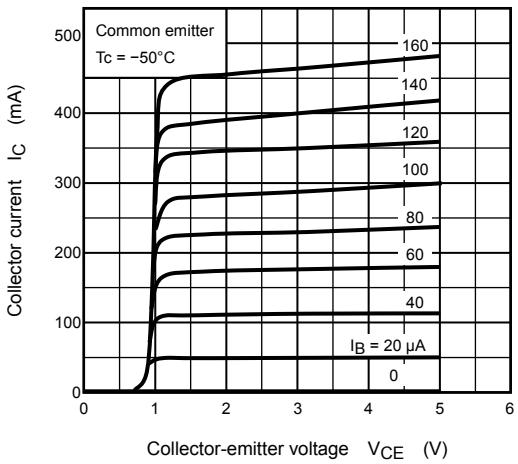
$I_C - V_{CE}$



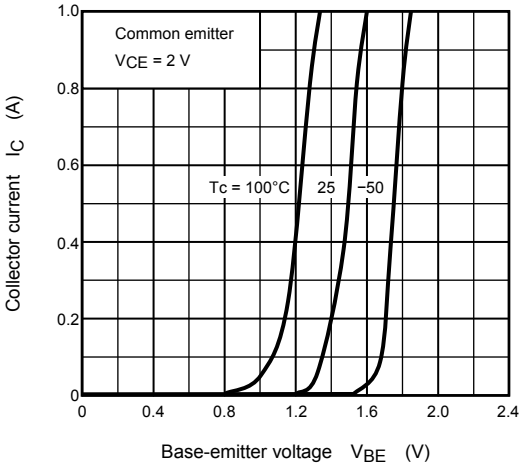
$I_C - V_{CE}$



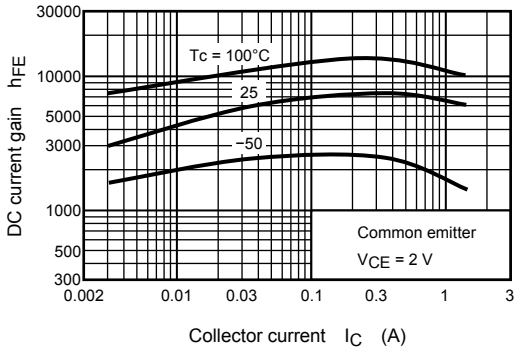
$I_C - V_{CE}$



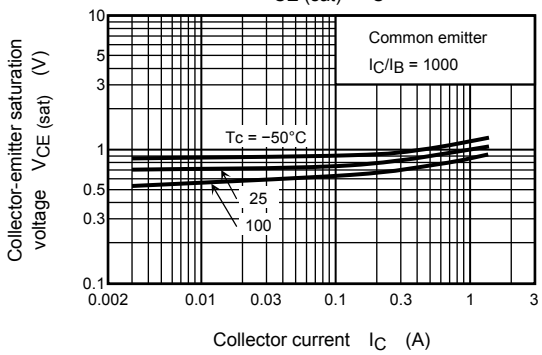
$I_C - V_{BE}$



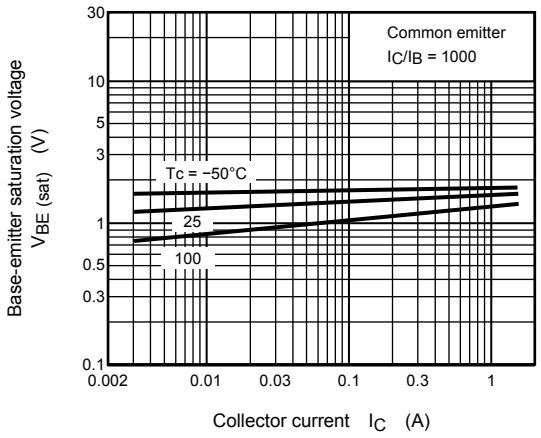
$h_{FE} - I_C$



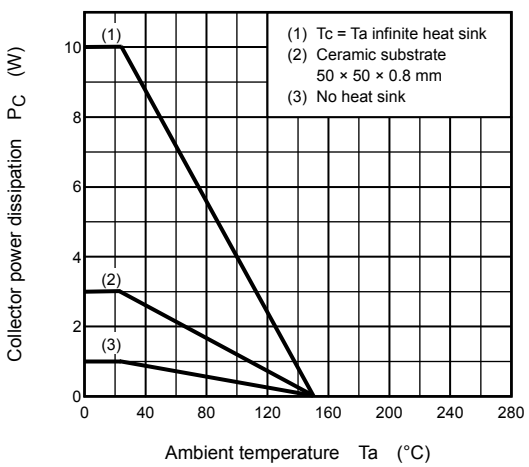
$V_{CE\ (sat)} - I_C$



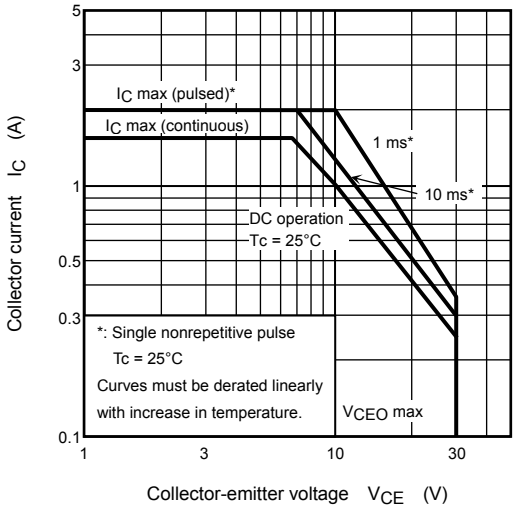
$V_{BE\ (sat)} - I_C$



$P_C - Ta$



Safe Operating Area



RESTRICTIONS ON PRODUCT USE

20070701-EN

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