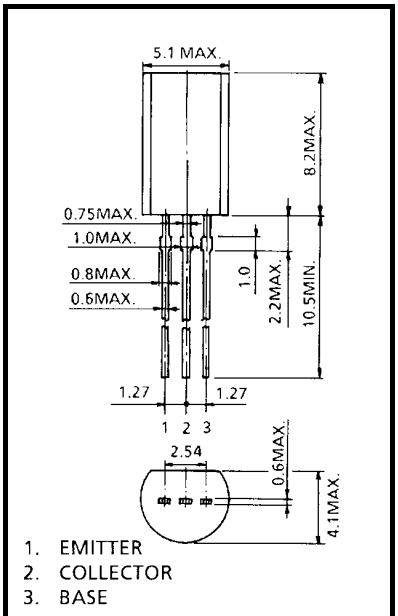
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

2SC3328

Power Amplifier Applications
Power Switching Applications

Unit: mm



JEDEC	TO-92MOD
JEITA	—
TOSHIBA	2-5J1A

Weight: 0.36 g (typ.)

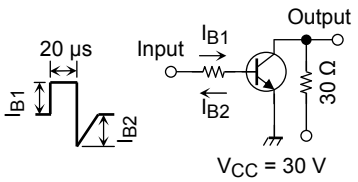
- Low saturation voltage: $V_{CE\ (sat)}$ = 0.5 V (max) (I_C = 1 A)
- High-speed switching: t_{stg} = 1.0 μs (typ.)
- Complementary to 2SA1315

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	80	V
Collector-emitter voltage	V_{CEO}	80	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	2	A
Base current	I_B	1	A
Collector power dissipation	P_C	900	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

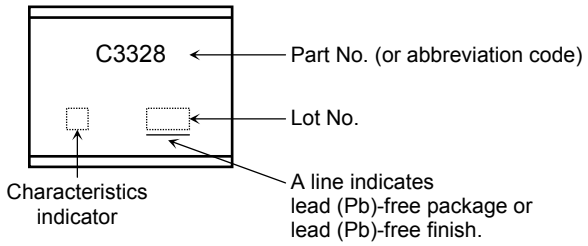
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

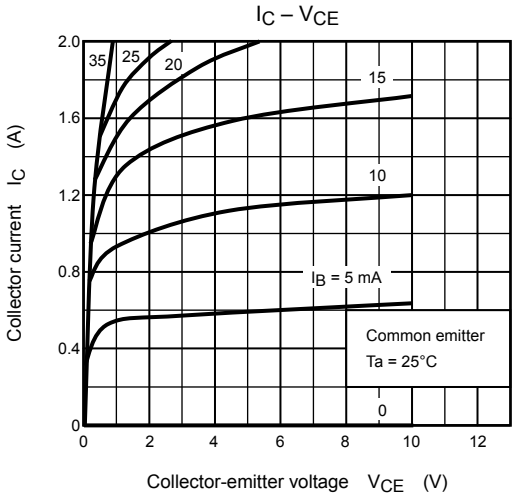
Electrical Characteristics (Ta = 25°C)

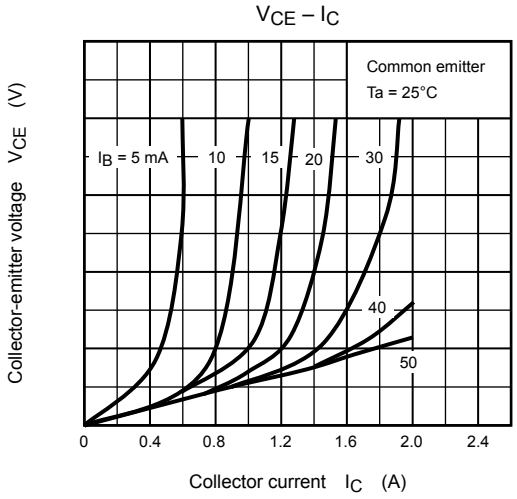
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 80 V, I_E = 0	—	—	1.0	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	1.0	μA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	80	—	—	V
DC current gain		$h_{FE\ (1)}$ (Note)	V_{CE} = 2 V, I_C = 0.5 A	70	—	240	
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 1.5 A	40	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 1 A, I_B = 0.05 A	—	0.15	0.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 1 A, I_B = 0.05 A	—	0.9	1.2	V
Transition frequency		f_T	V_{CE} = 2 V, I_C = 0.5 A	—	100	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	30	—	pF
Switching time	Turn-on time	t_{on}	 I_{B1} = −I_{B2} = 0.05 A, duty cycle ≤ 1%	—	0.2	—	μs
	Storage time	t_{stg}		—	1.0	—	
	Fall time	t_f		—	0.2	—	

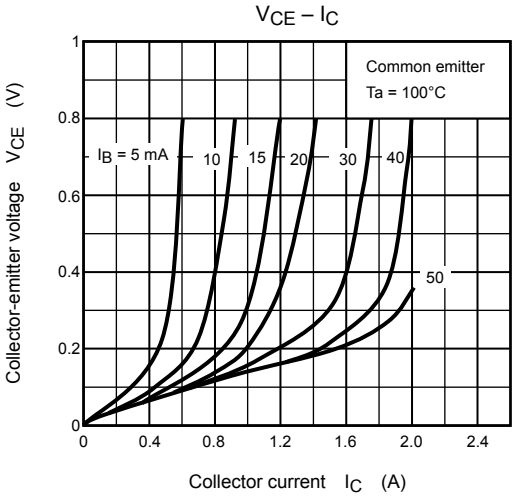
Note: $h_{FE\ (1)}$ classification O: 70 to 140, Y: 120 to 240

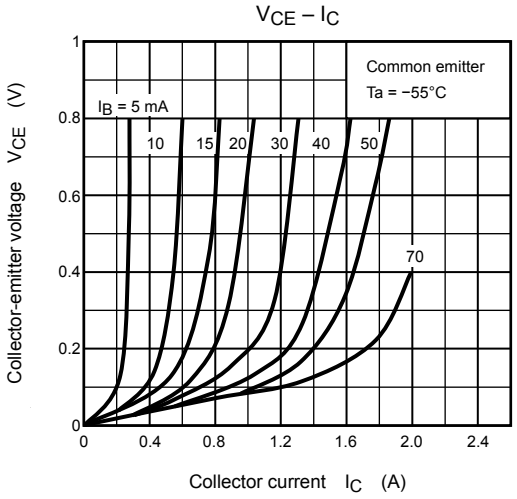
Marking

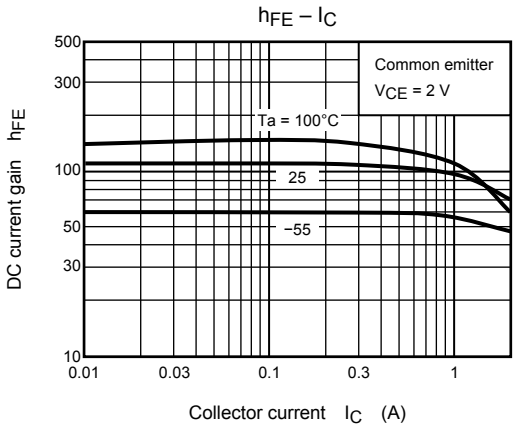


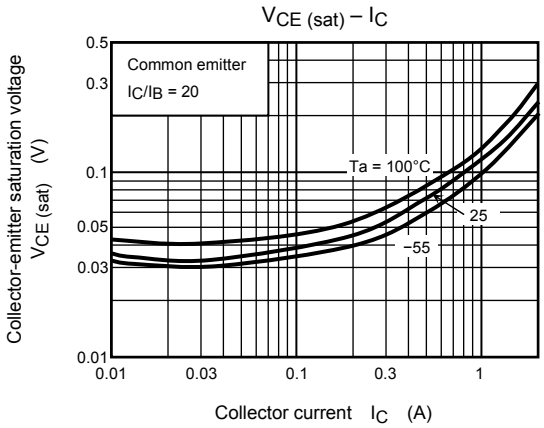

IC – VCE
Collector current IC (A)
Collector-emitter voltage VCE (V)
35
25
20
15
10
IB = 5 mA
0
Common emitter
Ta = 25°C


VCE – IC
Collector-emitter voltage VCE (V)
Collector current IC (A)
Common emitter
Ta = 25°C
IB = 5 mA
10
15
20
30
40
50

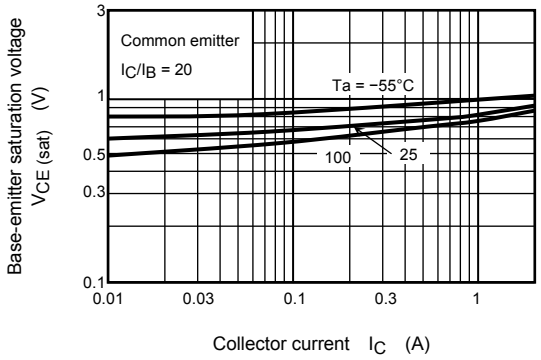

VCE – IC
Collector-emitter voltage VCE (V)
Collector current IC (A)
Common emitter
Ta = 100°C
IB = 5 mA
10
15
20
30
40
50


VCE – IC
Collector-emitter voltage VCE (V)
Collector current IC (A)
Common emitter
Ta = −55°C
IB = 5 mA
10
15
20
30
40
50
70

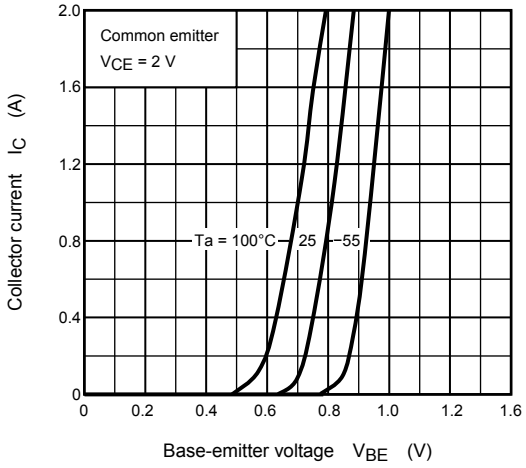

hFE – IC
DC current gain hFE
Collector current IC (A)
Common emitter
VCE = 2 V
Ta = 100°C
25
−55


VCE (sat) – IC
Collector-emitter saturation voltage VCE (sat) (V)
Collector current IC (A)
Common emitter
IC/IB = 20
Ta = 100°C
25
−55

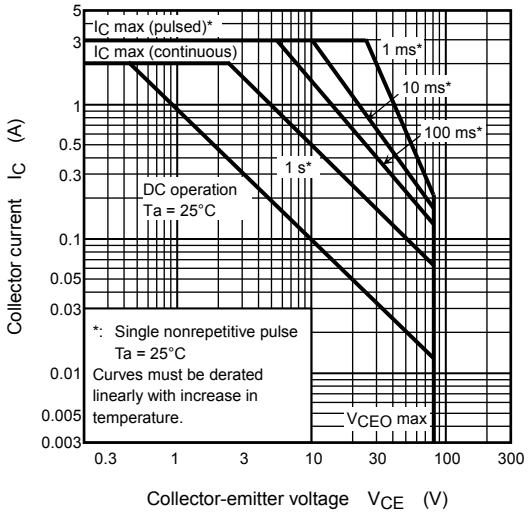
$V_{BE\ (sat)} - I_C$



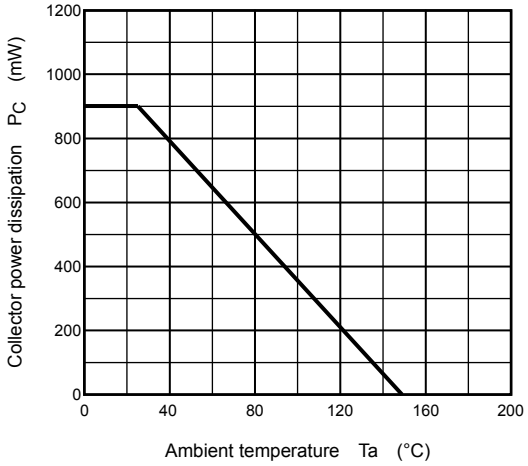
$I_C - V_{BE}$



Safe Operating Area



$P_C - Ta$



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