TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

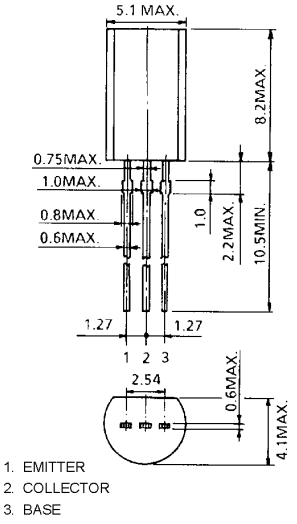
2SA1160

Strobe Flash Applications

Medium Power Amplifier Applications

- High DC current gain and excellent h_{FE} linearity
  : $h_{FE\ (1)}$ = 140 to 600 (V_{CE} = −1 V, I_C = −0.5 A)
  : $h_{FE\ (2)}$ = 60 (min), 120 (typ.) (V_{CE} = −1 V, I_C = −4 A)
- Low saturation voltage
  : $V_{CE\ (sat)}$ = −0.5 V (max) (I_C = −2 A, I_B = −50 mA)

Unit: mm



JEDEC	TO-92MOD
JEITA	—
TOSHIBA	2-5J1A

Weight: 0.36 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	−20	V
Collector-emitter voltage		V_{CEO}	−10	V
Emitter-base voltage		V_{EBO}	−6	V
Collector current	DC	I_C	−2	A
	Pulsed (Note 1)	I_{CP}	−4	
Base current		I_B	−2	A
Collector power dissipation		P_C	900	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note 1: Pulse width = 10 ms (max), duty cycle = 30% (max)

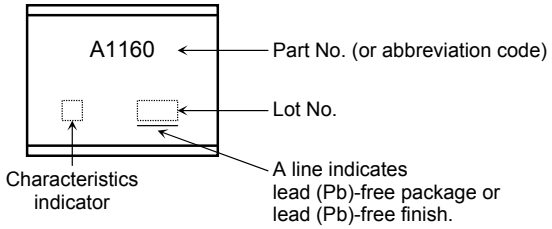
Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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)

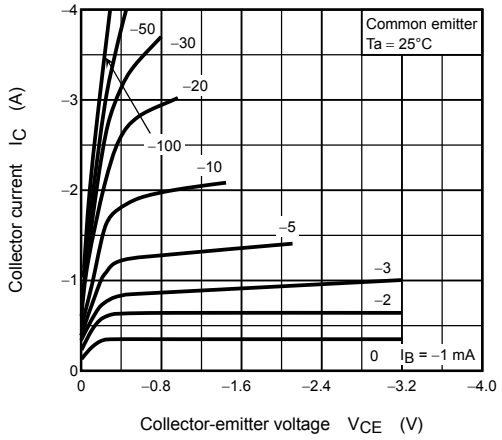
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = −20 V, I_E = 0	—	—	−100	nA
Emitter cut-off current	I_{EBO}	V_{EB} = −6 V, I_C = 0	—	—	−100	nA
Collector-emitter breakdown voltage	$V_{(BR)\ CEO}$	I_C = −10 mA, I_B = 0	−10	—	—	V
Emitter-base breakdown voltage	$V_{(BR)\ EBO}$	I_E = −1 mA, I_C = 0	−6	—	—	V
DC current gain	$h_{FE\ (1)}$ (Note 3)	V_{CE} = −1 V, I_C = −0.5 A	140	—	600	
Collector-emitter saturation voltage	$h_{FE\ (2)}$	V_{CE} = −1 V, I_C = −4 A	60	120	—	
Base-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = −2 A, I_B = −50 mA	—	−0.20	−0.50	V
Base-emitter voltage	V_{BE}	V_{CE} = −1 V, I_C = −2 A	—	−0.83	−1.5	V
Transition frequency	f_T	V_{CE} = −1 V, I_C = −0.5 A	—	140	—	MHz
Collector output capacitance	C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	50	—	pF

Note 3: $h_{FE\ (1)}$ Classification A: 140 to 280, B: 200 to 400, C: 300 to 600

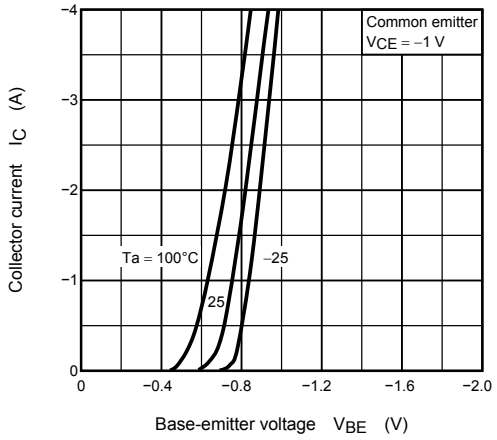
Marking



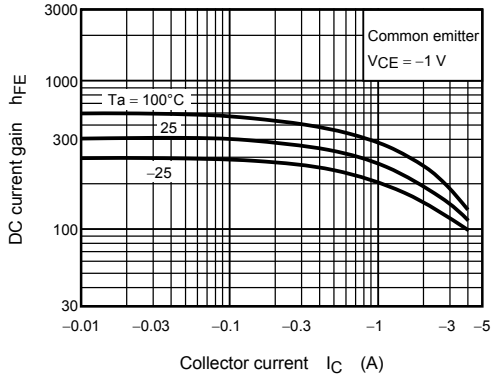
$I_C - V_{CE}$



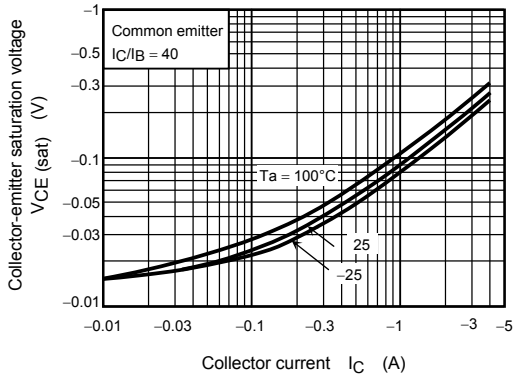
$I_C - V_{BE}$



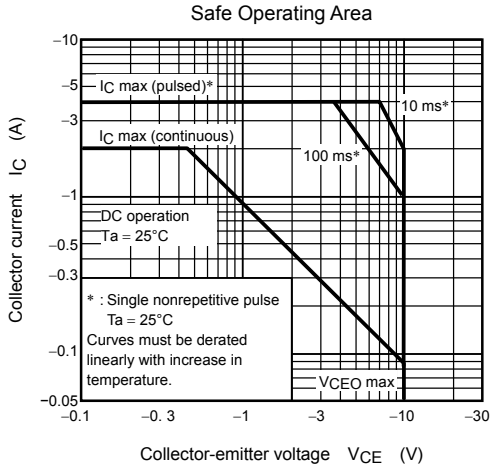
$h_{FE} - I_C$



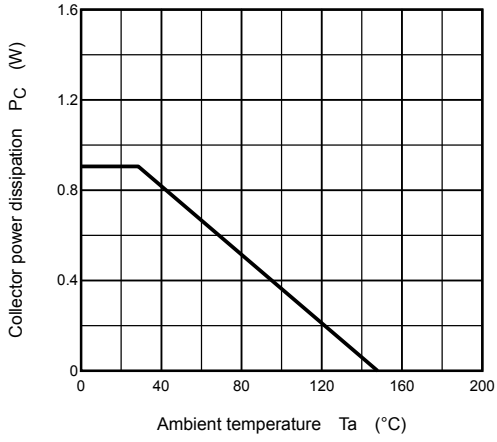
$V_{CE\ (sat)} - I_C$



Safe Operating Area



$P_C - Ta$



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