

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

2SA1160

Strobe Flash Applications

Medium Power Amplifier Applications

Unit: mm

- 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)

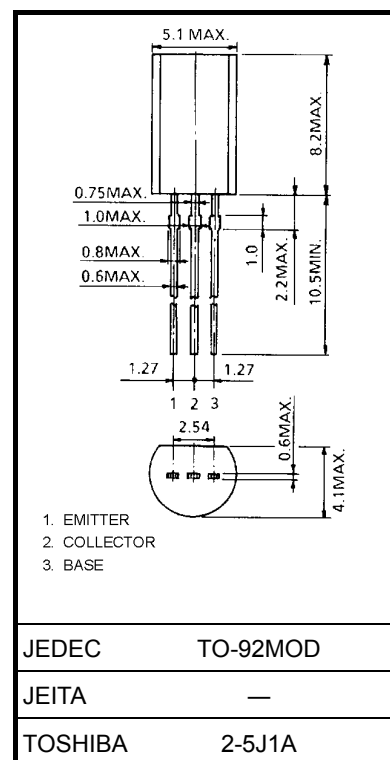
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

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

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).



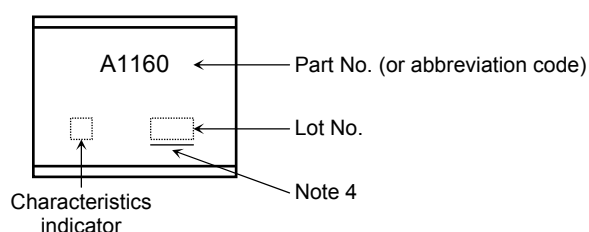
Weight: 0.36 g (typ.)

Electrical Characteristics (Ta = 25°C)

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

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

Marking

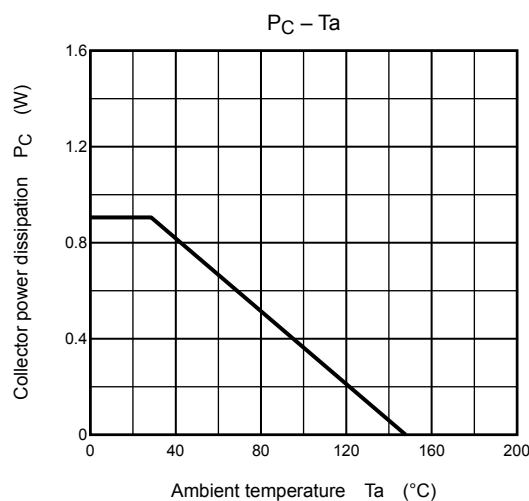
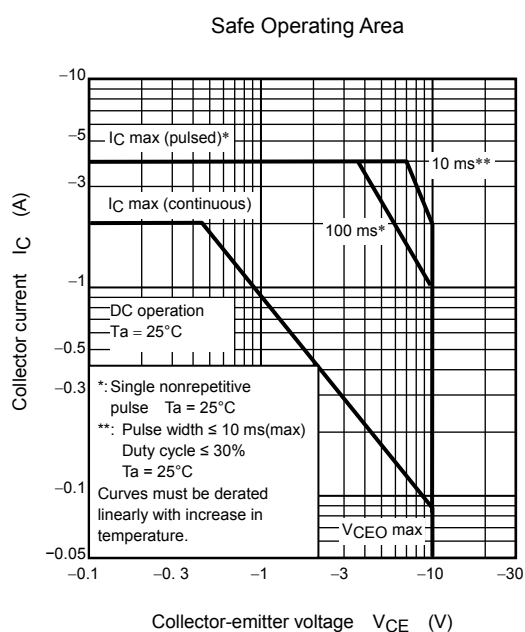
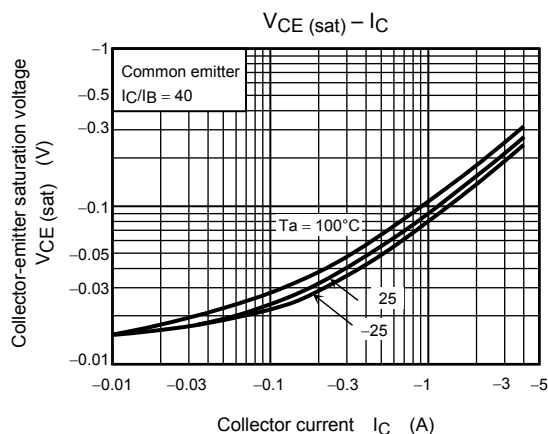
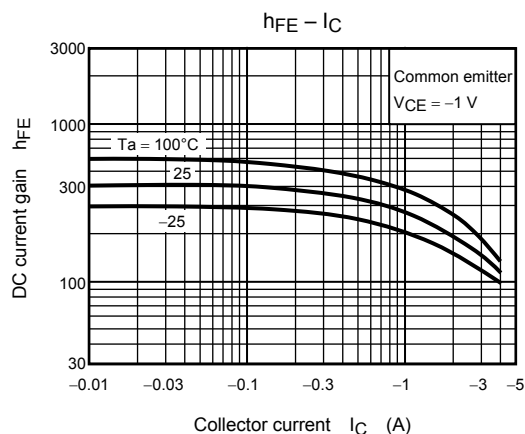
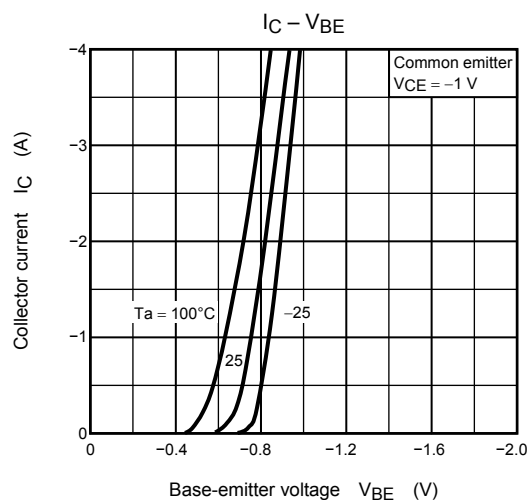
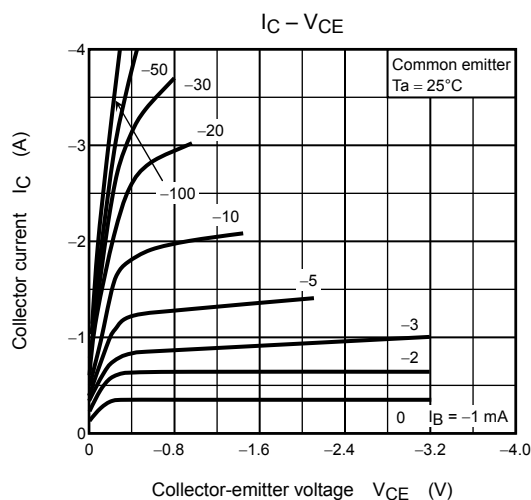


Note 4: A line under a Lot No. identifies the indication of product Labels.

Not underlined: $[[Pb]]/INCLUDES > MCV$

Underlined: $[[G]]/RoHS COMPATIBLE$ or $[[G]]/RoHS [[Pb]]$

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.



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