

Bipolar Transistors Silicon PNP Epitaxial Type

2SA1241

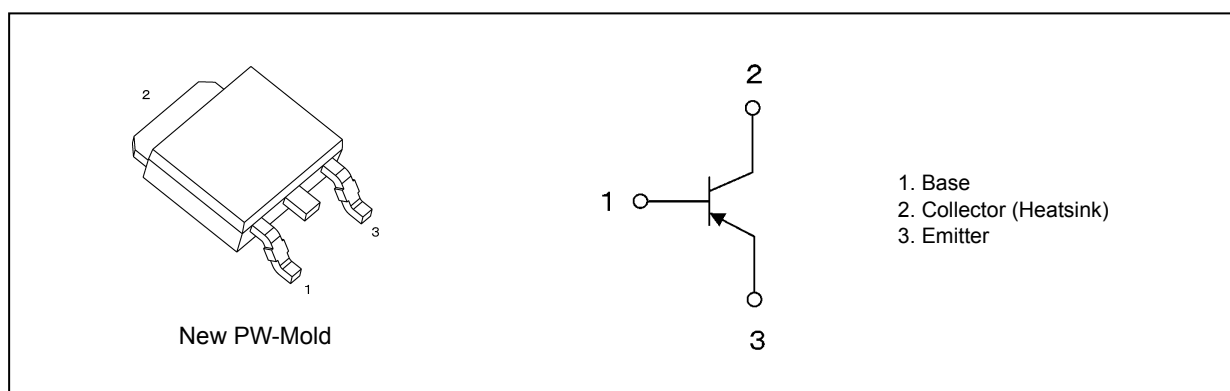
1. Applications

- Power Amplifiers
- Power Switching

2. Features

- (1) Low collector-emitter saturation voltage: $V_{CE(sat)} = -0.5 \text{ V (max)}$ ($I_C = -1.0 \text{ A}$, $I_B = -50 \text{ mA}$)
- (2) High-speed switching: $t_{stg} = 1.0 \mu\text{s (typ.)}$
- (3) Complementary to 2SC3076

3. Packaging and Internal Circuit



4. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25 \text{ }^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-50	V
Collector-emitter voltage	V_{CEO}	-50	
Emitter-base voltage	V_{EBO}	-5	
Collector current (DC)	(Note 1) I_C	-2	A
Collector current (pulsed)	(Note 1) I_{CP}	-3	
Base current	I_B	-1	
Collector power dissipation	($T_a = 25 \text{ }^\circ\text{C}$) P_C	1	W
Collector power dissipation	($T_c = 25 \text{ }^\circ\text{C}$) P_C	10	
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to 150	

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).

Note 1: Ensure that the junction temperature does not exceed $150 \text{ }^\circ\text{C}$.

Start of commercial production

1981-08

5. Thermal Characteristics

Characteristics	Symbol	Max	Unit
Junction-to-case thermal resistance	$R_{th(j-c)}$	12.5	°C/W
Junction-to-ambient thermal resistance	$R_{th(j-a)}$	125	

6. Electrical Characteristics

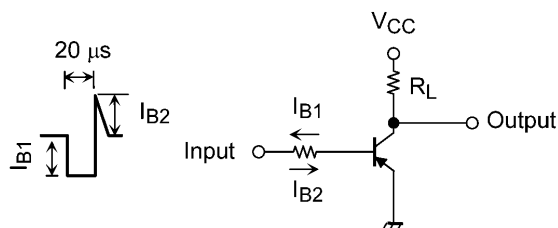
6.1. Static Characteristics (Unless otherwise specified, $T_a = 25\text{ °C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = -50\text{ V}, I_E = 0\text{ A}$	—	—	-1.0	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = -5\text{ V}, I_C = 0\text{ A}$	—	—	-1.0	μA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -10\text{ mA}, I_B = 0\text{ A}$	-50	—	—	V
DC current gain	$h_{FE(1)}$ (Note 2)	$V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$	70	—	240	—
	$h_{FE(2)}$	$V_{CE} = -2\text{ V}, I_C = -1.5\text{ A}$	40	—	—	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -1.0\text{ A}, I_B = -50\text{ mA}$	—	—	-0.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -1.0\text{ A}, I_B = -50\text{ mA}$	—	—	-1.2	V

Note 2: $h_{FE(1)}$ classification O: 70 to 140, Y: 120 to 240

6.2. Dynamic Characteristics (Unless otherwise specified, $T_a = 25\text{ °C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$	—	100	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = -10\text{ V}, I_E = 0\text{ A}, f = 1\text{ MHz}$	—	40	—	pF
Switching time (rise time)	t_r	See Fig. 6.2.1 $V_{CC} \approx -30\text{ V}, R_L = 30\ \Omega,$ $I_{B1} = -50\text{ mA}, I_{B2} = 50\text{ mA},$	—	0.1	—	μs
Switching time (storage time)	t_{stg}		—	1.0	—	
Switching time (fall time)	t_f		—	0.1	—	



Duty cycle $\leq 1\%$

Fig. 6.2.1 Switching Time Test Circuit

7. Marking

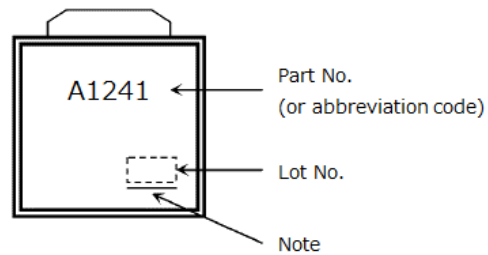


Fig. 7.1 Marking

Note: 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 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

8. Characteristics Curves (Note)

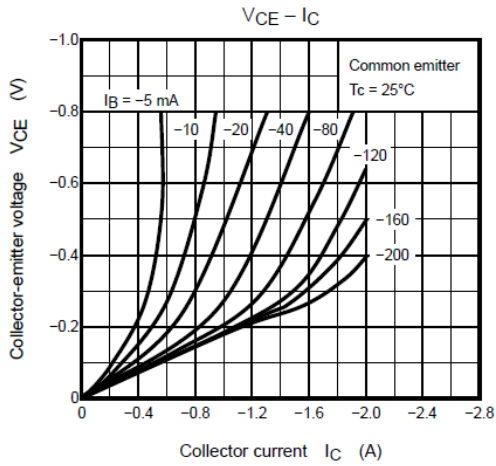


Fig. 8.1 $V_{CE} - I_C$

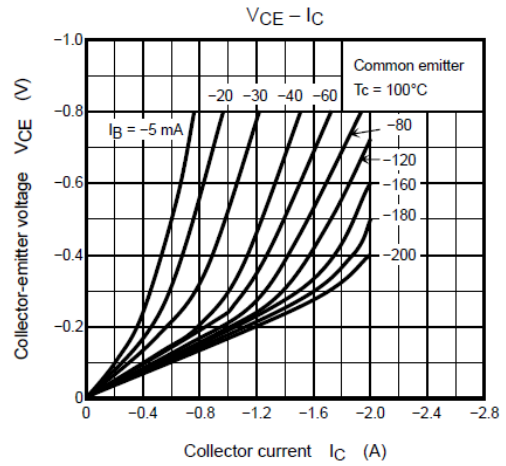


Fig. 8.2 $V_{CE} - I_C$

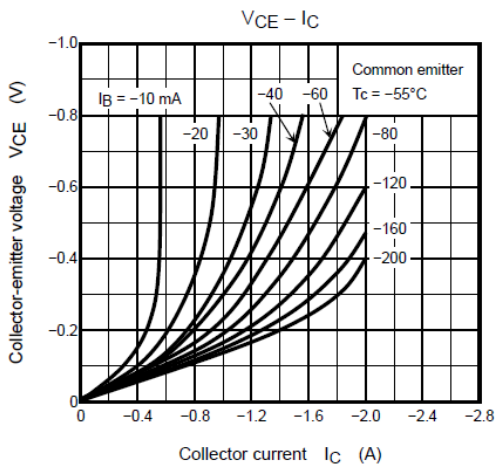


Fig. 8.3 $V_{CE} - I_C$

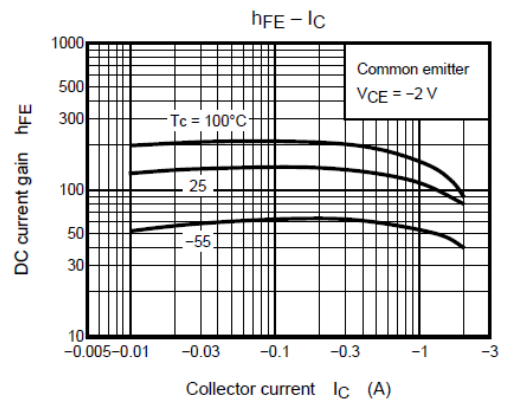


Fig. 8.4 $h_{FE} - I_C$

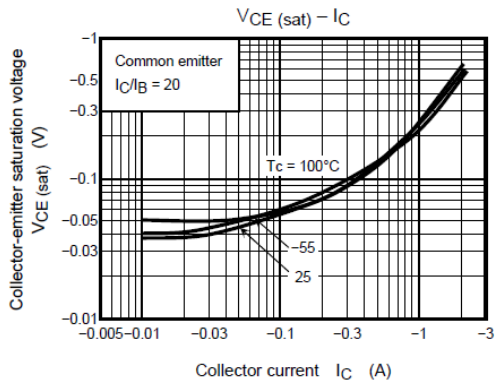


Fig. 8.5 $V_{CE(sat)} - I_C$

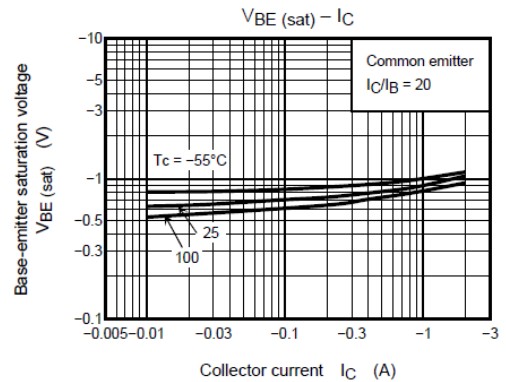


Fig. 8.6 $V_{BE(sat)} - I_C$

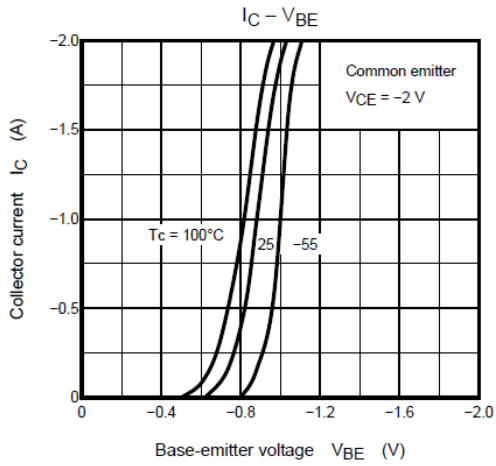
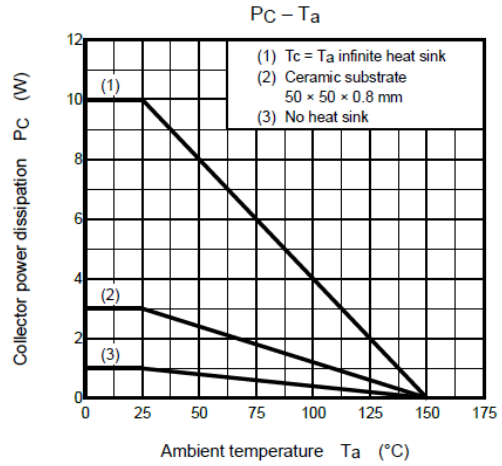
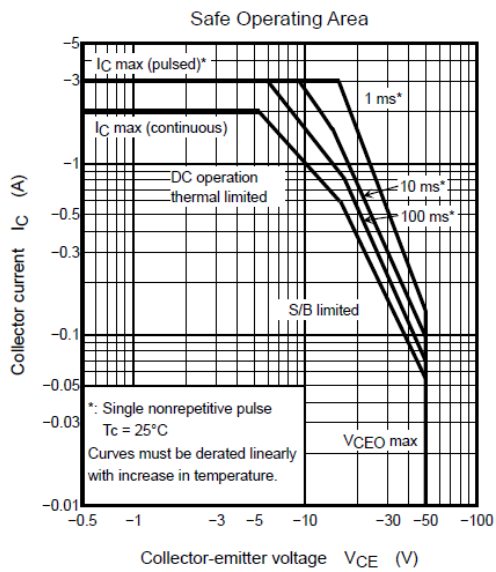


Fig. 8.7 $I_C - V_{BE}$



**Fig. 8.8 $P_C - T_a$
(Guaranteed Maximum)**

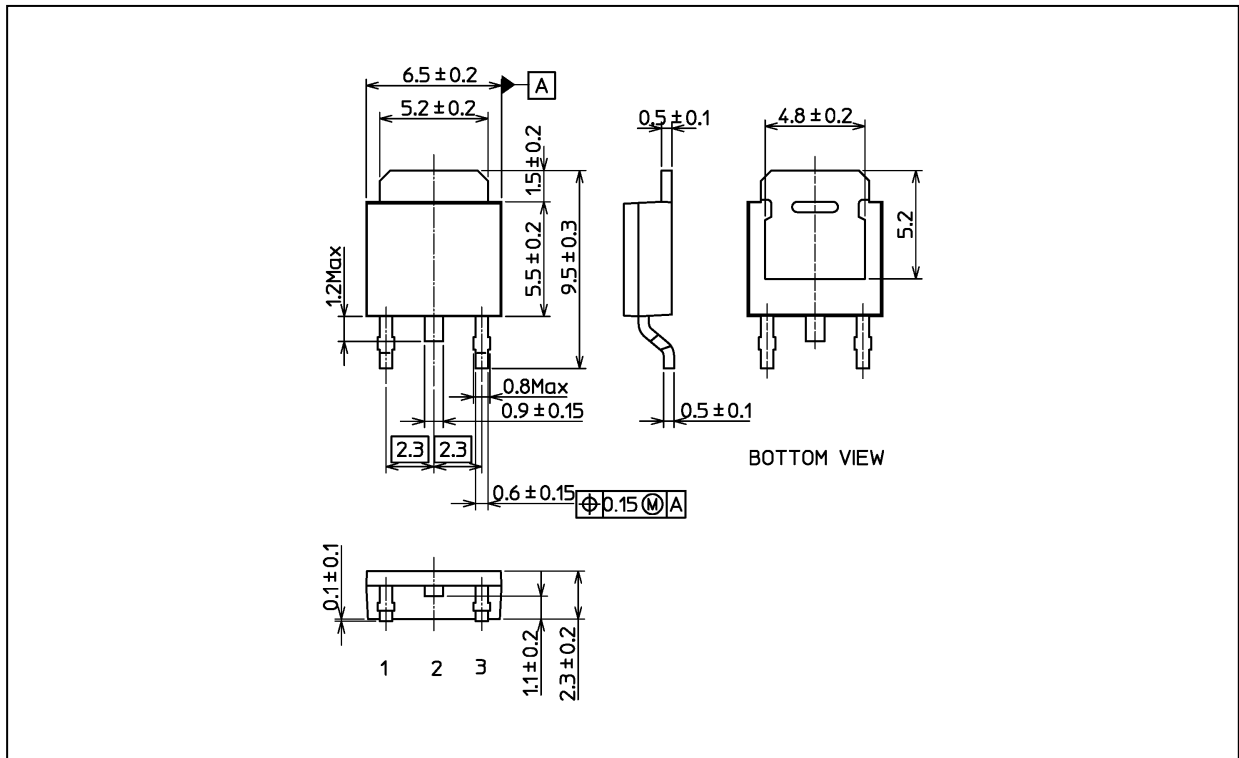


**Fig. 8.9 Safe Operating Area
(Guaranteed Maximum)**

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 0.36 g (typ.)

Package Name(s)
TOSHIBA: 2-7J1S
Nickname: New PW-Mold

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