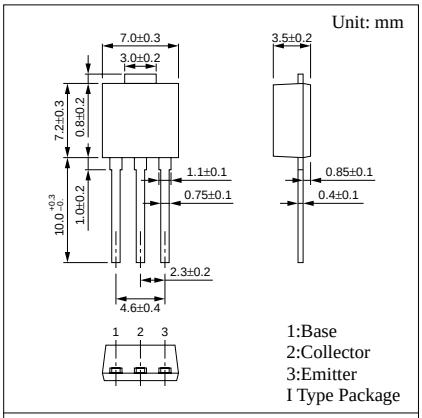
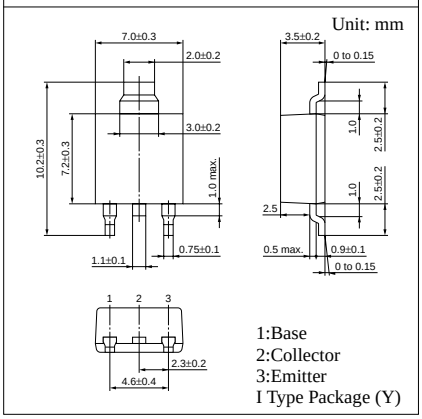
2SD1752, 2SD1752A

Silicon NPN epitaxial planar type

For power amplification and low-voltage switching

Complementary to 2SB1148 and 2SB1148A





Features

- Low collector to emitter saturation voltage $V_{CE(sat)}$
- High-speed switching
- Satisfactory linearity of foward current transfer ratio h_{FE}
- Large collector current I_C
- I type package enabling direct soldering of the radiating fin to the printed circuit board, etc. of small electronic equipment.

Absolute Maximum Ratings (T_C=25˚C)

Parameter		Symbol	Ratings	Unit
Collector to base voltage	2SD1752	V_{CBO}	40	V
	2SD1752A		50	
Collector to emitter voltage	2SD1752	V_{CEO}	20	V
	2SD1752A		40	
Emitter to base voltage		V_{EBO}	5	V
Peak collector current		I_{CP}	20	A
Collector current		I_C	10	A
Collector power dissipation	T_C=25°C	P_C	15	W
	Ta=25°C		1.3	
Junction temperature		T_j	150	˚C
Storage temperature		T_{stg}	–55 to +150	˚C

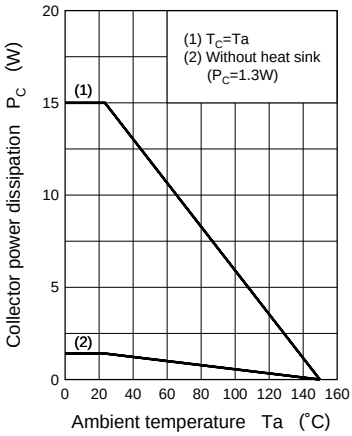
Electrical Characteristics (T_C=25˚C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	2SD1752	I_{CBO}	V_{CB} = 40V, I_E = 0			50	μA
	2SD1752A		V_{CB} = 50V, I_E = 0			50	
Emitter cutoff current		I_{EBO}	V_{EB} = 5V, I_C = 0			50	μA
Collector to emitter voltage	2SD1752	V_{CEO}	I_C = 10mA, I_B = 0	20			V
	2SD1752A			40			
Forward current transfer ratio		h_{FE1}	V_{CE} = 2V, I_C = 0.1A	45			
		h_{FE2}*	V_{CE} = 2V, I_C = 3A	90		260	
Collector to emitter saturation voltage		$V_{CE(sat)}$	I_C = 10A, I_B = 0.33A			0.6	V
Base to emitter saturation voltage		$V_{BE(sat)}$	I_C = 10A, I_B = 0.33A			1.5	V
Transition frequency		f_T	V_{CE} = 10V, I_C = 0.5A, f = 10MHz		120		MHz
Collector output capacitance		C_{ob}	V_{CB} = 10V, I_E = 0, f = 1MHz		200		pF
Turn-on time		t_{on}	I_C = 3A, I_{B1} = 0.1A, I_{B2} = – 0.1A, V_{CC} = 20V		0.3		μs
Storage time		t_{stg}			0.4		μs
Fall time		t_f			0.1		μs

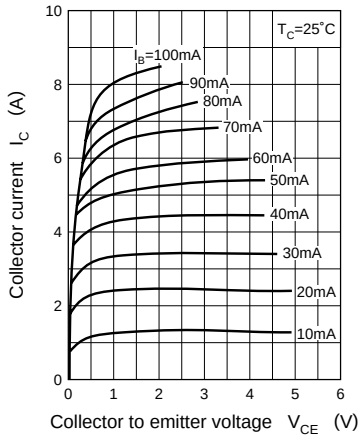
*h_{FE2} Rank classification

Rank	Q	P
h_{FE2}	90 to 180	130 to 260

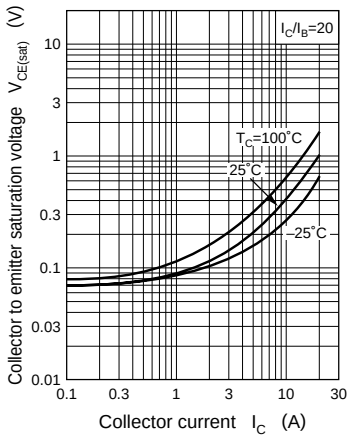
P_C — Ta



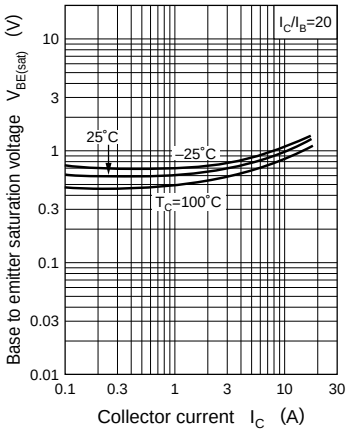
I_C — V_{CE}



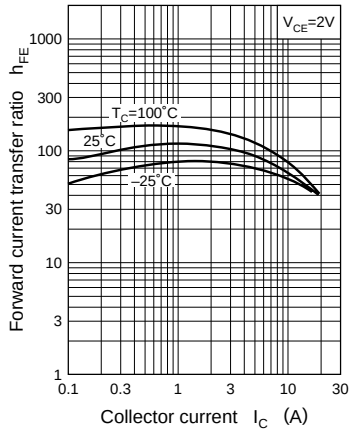
$V_{CE(sat)}$ — I_C



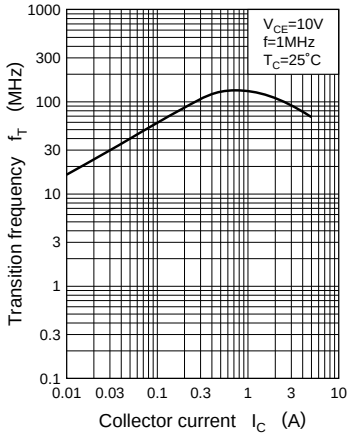
$V_{BE(sat)}$ — I_C



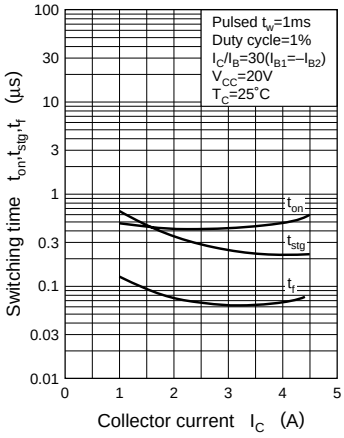
h_{FE} — I_C



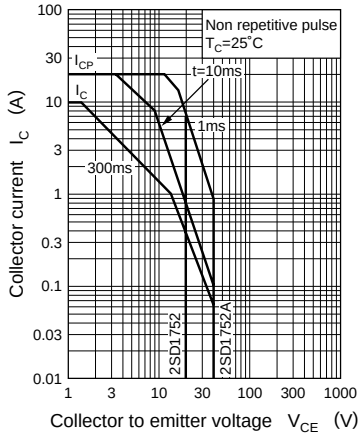
f_T — I_C

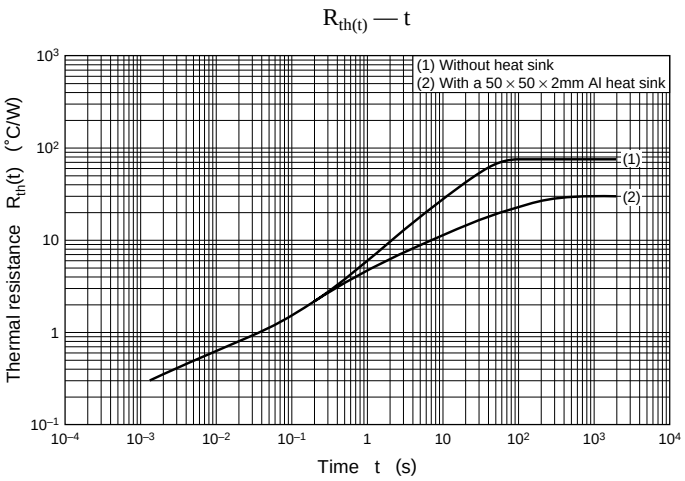


t_{on}, t_{stg}, t_f — I_C



Area of safe operation (ASO)




$R_{th(t)}$ — t
(1) Without heat sink
(2) With a 50 × 50 × 2mm Al heat sink
Thermal resistance $R_{th}(t)$ (°C/W)
10^3
10^2
10
1
10^{-1}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
10
10^2
10^3
10^4
Time t (s)
(1)
(2)