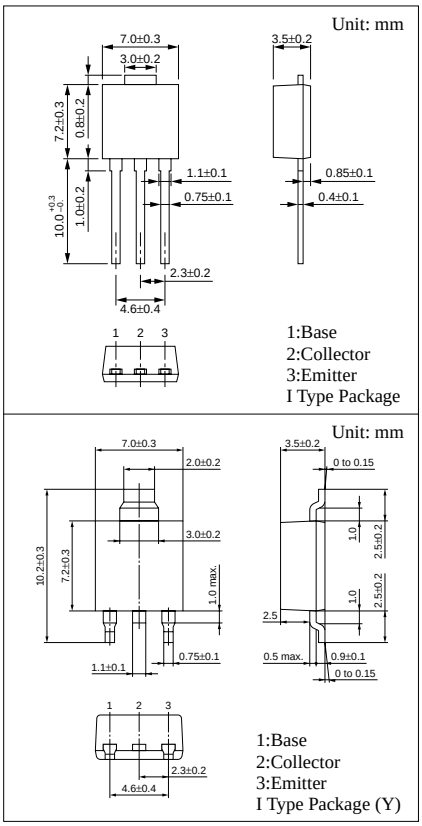
2SD2209

Silicon NPN triple diffusion planar type Darlington

For power amplification and switching



Features

- 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		V_{CBO}	100±15	V
Collector to emitter voltage		V_{CEO}	100±15	V
Emitter to base voltage		V_{EBO}	5	V
Peak collector current		I_{CP}	8	A
Collector current		I_C	4	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

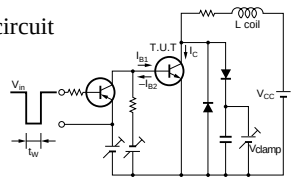
Electrical Characteristics (T_C=25˚C)

Parameter	Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 85V, I_E = 0			100	µA
Emitter cutoff current	I_{EBO}	V_{EB} = 5V, I_C = 0			2	mA
Collector to emitter voltage	V_{CEO}	I_C = 5mA, I_B = 0	85		115	V
Forward current transfer ratio	h_{FE1}	V_{CE} = 3V, I_C = 0.5A	1000			
	h_{FE2} *1	V_{CE} = 3V, I_C = 3A	1000		10000	
Collector to emitter saturation voltage	$V_{CE(sat)}$	I_C = 3A, I_B = 12mA			2	V
		I_C = 5A, I_B = 20mA			4	
Base to emitter saturation voltage	$V_{BE(sat)}$	I_C = 3A, I_B = 12mA			2.5	V
Transition frequency	f_T	V_{CE} = 10V, I_C = 0.5A, f = 1MHz		20		MHz
Turn-on time	t_{on}	I_C = 3A, I_{B1} = 12mA, I_{B2} = –12mA, V_{CC} = 50V			0.3	µs
Storage time	t_{stg}				3.0	µs
Fall time	t_f				1.0	µs
Energy handling capability	$E_{s/b}$ *2	I_C = 1A, L = 100mH, R_{BE} = 100Ω		50		mJ

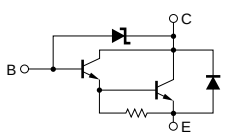
*1 h_{FE2} Rank classification

Rank	Q	P
h_{FE2}	1000 to 5000	2000 to 10000

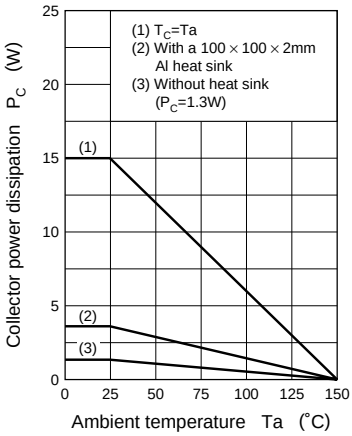
*2 $E_{s/b}$ Test circuit



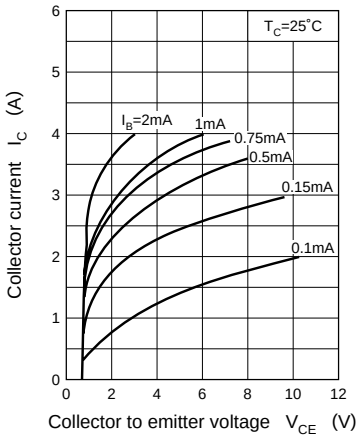
Internal Connection



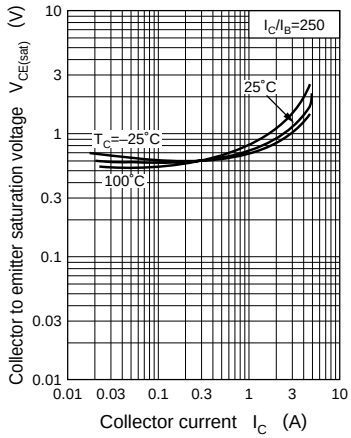
P_C — Ta



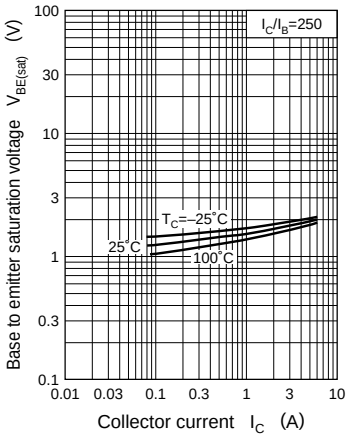
I_C — V_{CE}



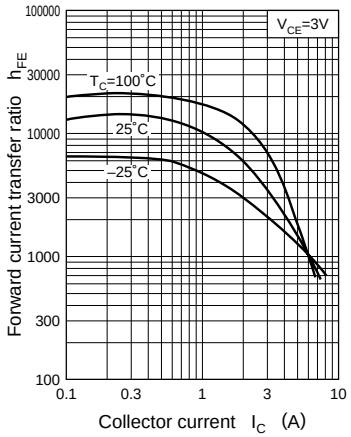
$V_{CE(sat)}$ — I_C



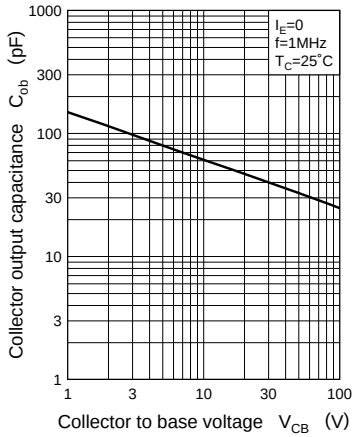
$V_{BE(sat)}$ — I_C



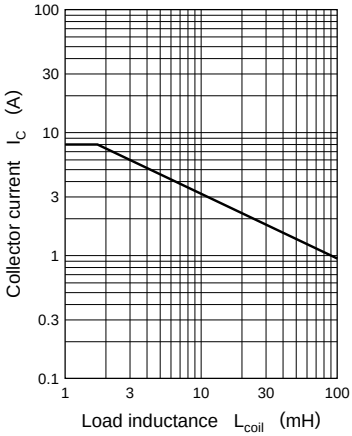
h_{FE} — I_C



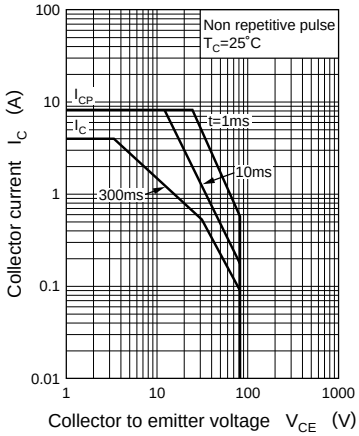
C_{ob} — V_{CB}



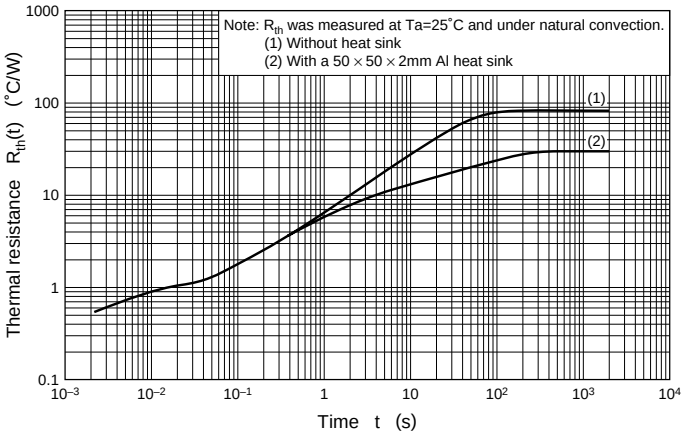
I_C — L_{coil}



Area of safe operation (ASO)



$R_{th(t)}$ — t


Note: R_{th} was measured at Ta=25˚C and under natural convection.
(1) Without heat sink
(2) With a 50 × 50 × 2mm Al heat sink
(1)
(2)
Thermal resistance $R_{th}(t)$ (˚C/W)
1000
100
10
1
0.1
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
10^{4}
Time t (s)