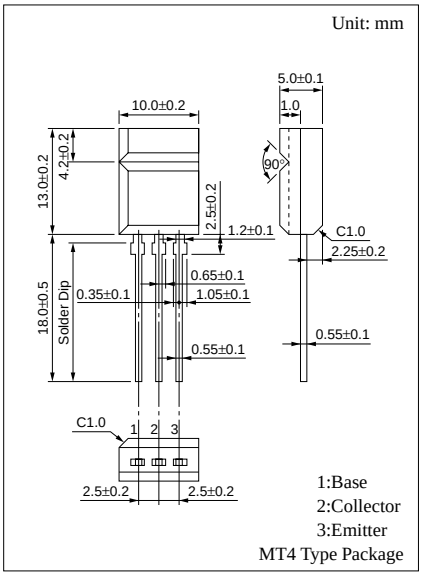
2SD2138, 2SD2138A

Silicon NPN triple diffusion planar type Darlington

For power amplification

Complementary to 2SB1418 and 2SB1418A



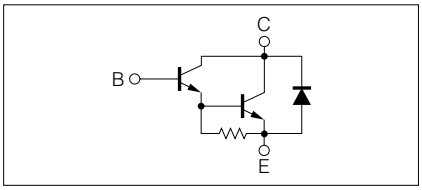
Features

- High forward current transfer ratio h_{FE} which has satisfactory linearity
- Allowing supply with the radial taping

Absolute Maximum Ratings (T_C=25˚C)

Parameter		Symbol	Ratings	Unit
Collector to base voltage	2SD2138	V_{CBO}	60	V
	2SD2138A		80	
Collector to emitter voltage	2SD2138	V_{CEO}	60	V
	2SD2138A		80	
Emitter to base voltage		V_{EBO}	5	V
Peak collector current		I_{CP}	4	A
Collector current		I_C	2	A
Collector power dissipation	T_C=25°C	P_C	15	W
	Ta=25°C		2	
Junction temperature		T_j	150	˚C
Storage temperature		T_{stg}	–55 to +150	˚C

Internal Connection



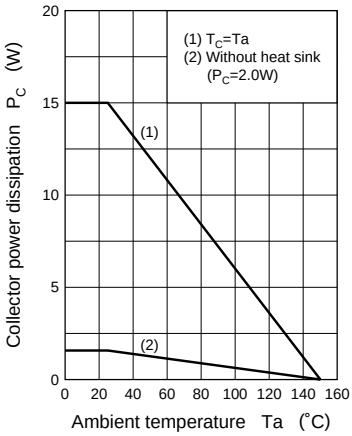
Electrical Characteristics (T_C=25˚C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	2SD2138	I_{CBO}	V_{CE} = 60V, I_E = 0			100	μA
	2SD2138A		V_{CE} = 80V, I_E = 0			100	
Collector cutoff current	2SD2138	I_{CEO}	V_{CE} = 30V, I_B = 0			100	μA
	2SD2138A		V_{CE} = 40V, I_B = 0			100	
Emitter cutoff current		I_{EBO}	V_{EB} = 5V, I_C = 0			100	μA
Collector to emitter voltage	2SD2138	V_{CEO}	I_C = 30mA, I_B = 0	60			V
	2SD2138A			80			
Forward current transfer ratio		h_{FE1}	V_{CE} = 4V, I_C = 1A	1000			
		h_{FE2}*	V_{CE} = 4V, I_C = 2A	2000		10000	
Base to emitter voltage		V_{BE}	V_{CE} = 4V, I_C = 2A			2.8	V
Collector to emitter saturation voltage		$V_{CE(sat)}$	I_C = 2A, I_B = 8mA			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 = 2A, I_{B1} = 8mA, I_{B2} = –8mA,		0.4		μs
Turn-off time		t_{off}	V_{CC} = 50V		4		μs

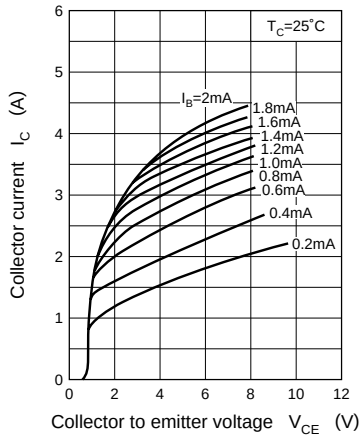
*h_{FE2} Rank classification

Rank	Q	P
h_{FE2}	2000 to 5000	4000 to 10000

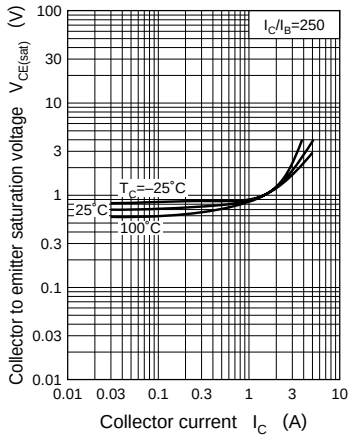
P_C — Ta



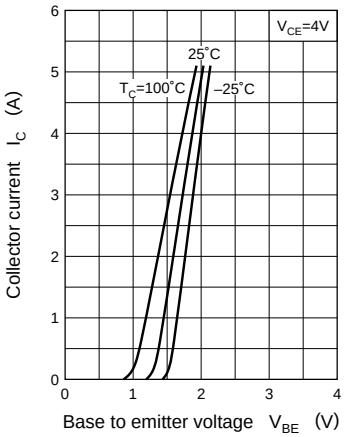
I_C — V_{CE}



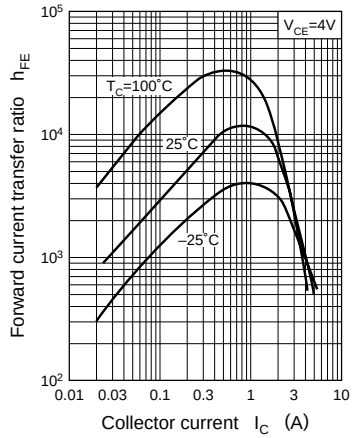
$V_{CE(sat)}$ — I_C



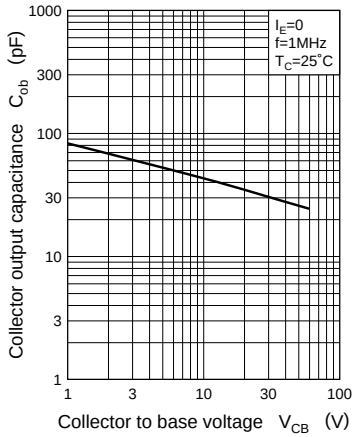
I_C — V_{BE}



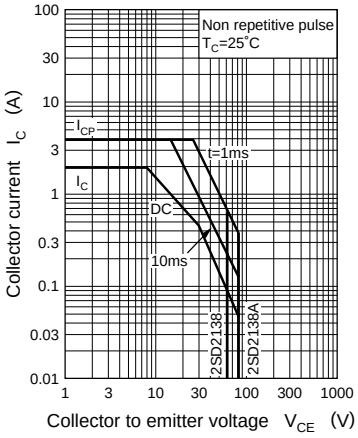
h_{FE} — I_C



C_{ob} — V_{CB}



Area of safe operation (ASO)



$R_{th(t)}$ — t