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2SD1978

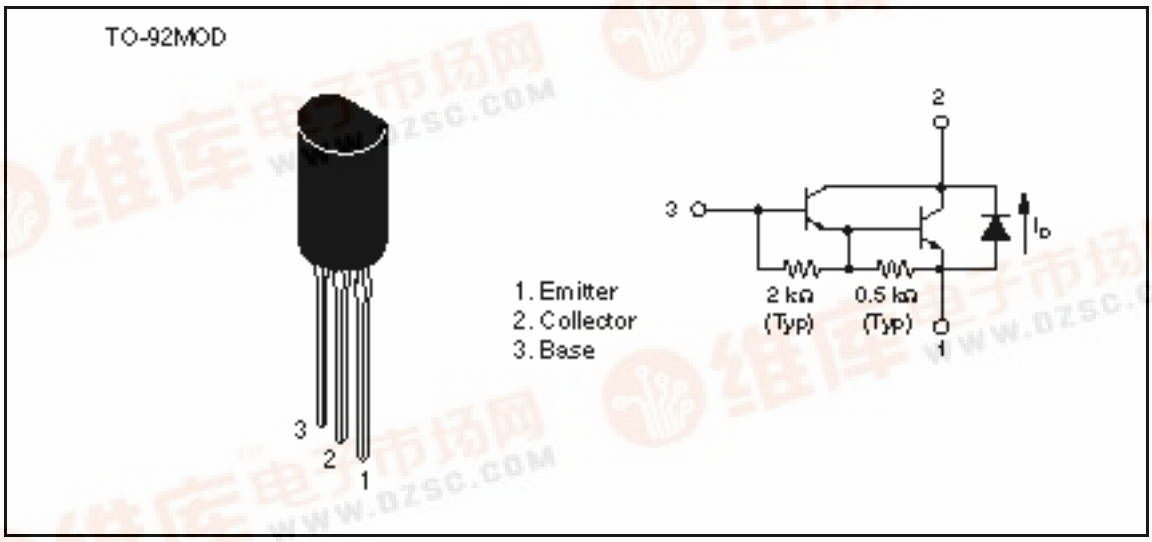
Silicon NPN Epitaxial, Darlington

HITACHI

Application

- Low frequency power amplifier
- Complementary pair with 2SB1387

Outline



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2SD1978

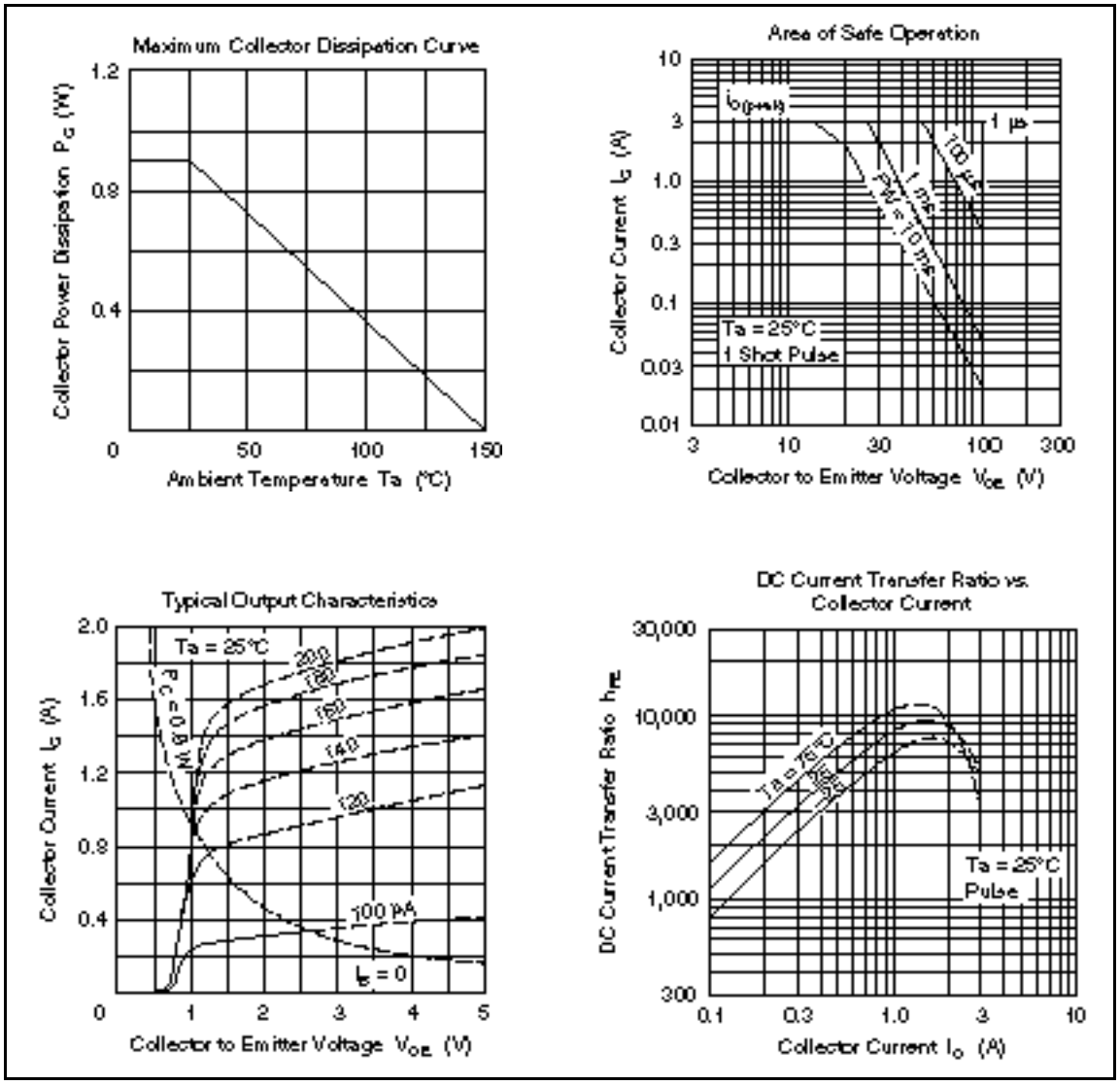
Absolute Maximum Ratings (Ta = 25°C)

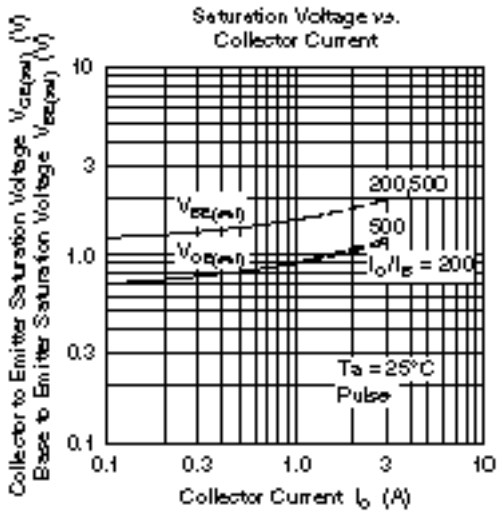
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	120	V
Collector to emitter voltage	V_{CEO}	120	V
Emitter to base voltage	V_{EBO}	7	V
Collector current	I_C	1.5	A
Collector peak current	$ic_{(peak)}$	3.0	A
Collector power dissipation	P_C	0.9	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C
E to C diode forward current	I_D	1.5	A

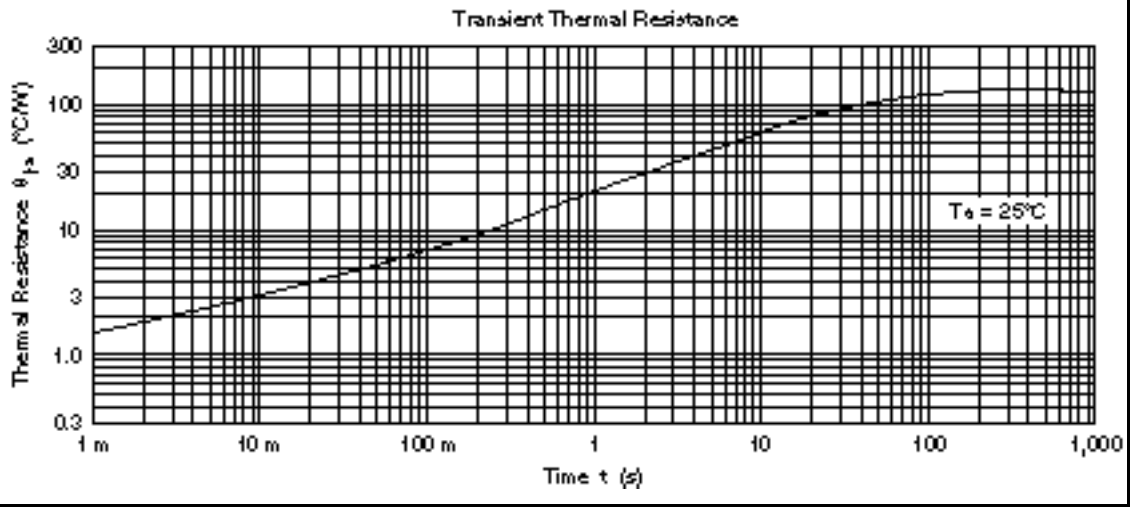
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	120	—	—	V	I_C = 0.1 mA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	120	—	—	V	I_C = 10 mA, R_{BE} = ∞
Emitter to base breakdown voltage	$V_{(BR)EBO}$	7	—	—	V	I_E = 50 mA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	1.0	µA	V_{CB} = 100 V, I_E = 0
	I_{CEO}	—	—	10	µA	V_{CE} = 100 V, R_{BE} = ∞
DC current transfer ratio	h_{FE}	2000	—	30000		V_{CE} = 3 V, I_C = 1 A*[1]
Collector to emitter saturation voltage	$V_{CE(sat)1}$	—	—	1.5	V	I_C = 1 A, I_B = 1 mA*[1]
	$V_{CE(sat)2}$	—	—	2.0	V	I_C = 1.5 A, I_B = 1.5 mA*[1]
Base to emitter saturation voltage	$V_{BE(sat)1}$	—	—	2.0	V	I_C = 1 A, I_B = 1 mA*[1]
	$V_{BE(sat)2}$	—	—	2.5	V	I_C = 1.5 A, I_B = 1.5 mA*[1]
E to C diode forward voltage	V_D	—	—	3.0	V	I_D = 1.5 A*[1]

Note: 1. Pulse test


Maximum Collector Dissipation Curve
Collector Power Dissipation P_C (W)
Ambient Temperature Ta (°C)
Area of Safe Operation
Collector Current I_C (A)
Collector to Emitter Voltage V_{CE} (V)
Ta = 25°C
1 Shot Pulse
1 μs
100 μs
1 ms
10 ms
Typical Output Characteristics
Collector Current I_C (A)
Collector to Emitter Voltage V_{CE} (V)
Ta = 25°C
200
180
160
140
120
100 μA
I_B = 0
DC Current Transfer Ratio vs. Collector Current
DC Current Transfer Ratio h_{FE}
Collector Current I_C (A)
Ta = 25°C
Pulse


Saturation Voltage vs.
Collector Current
Collector to Emitter Saturation Voltage $V_{CE(sat)}$ (V)
Base to Emitter Saturation Voltage $V_{BE(sat)}$ (V)
10
3
1.0
0.3
0.1
$V_{BE(sat)}$
$V_{CE(sat)}$
200,500
500
I_C/I_B = 200
Ta = 25°C
Pulse
0.1
0.3
1.0
3
10
Collector Current I_C (A)


Transient Thermal Resistance
Thermal Resistance θ_{j-a} (°C/W)
300
100
30
10
3
1.0
0.3
Ta = 25°C
1 m
10 m
100 m
1
10
100
1,000
Time t (s)

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