2SD2019

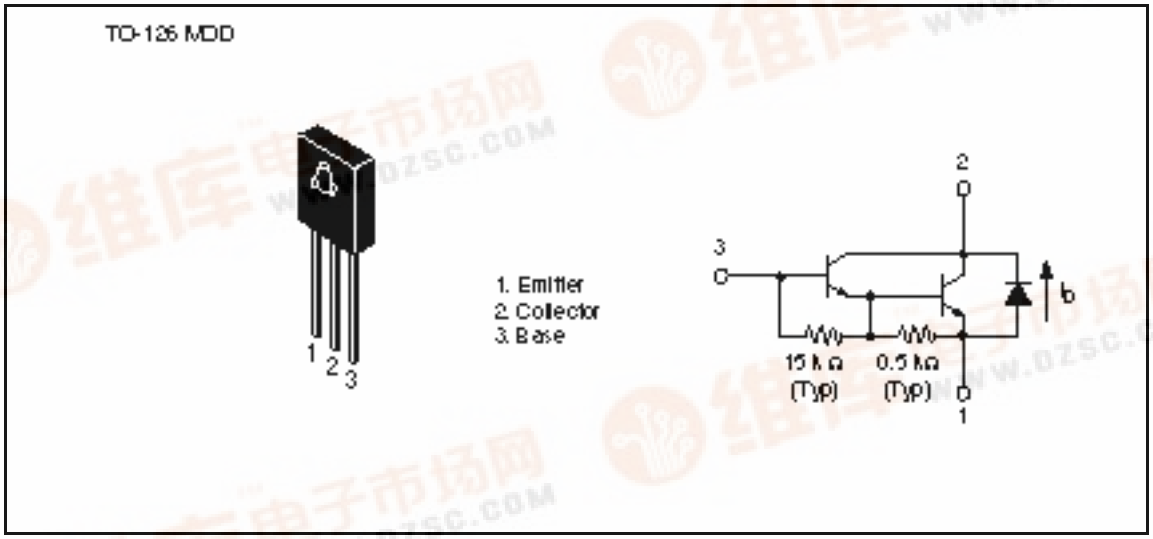
Silicon NPN Epitaxial

HITACHI

Application

Low frequency power amplifier

Outline



Absolute Maximum Ratings (Ta = 25°C)

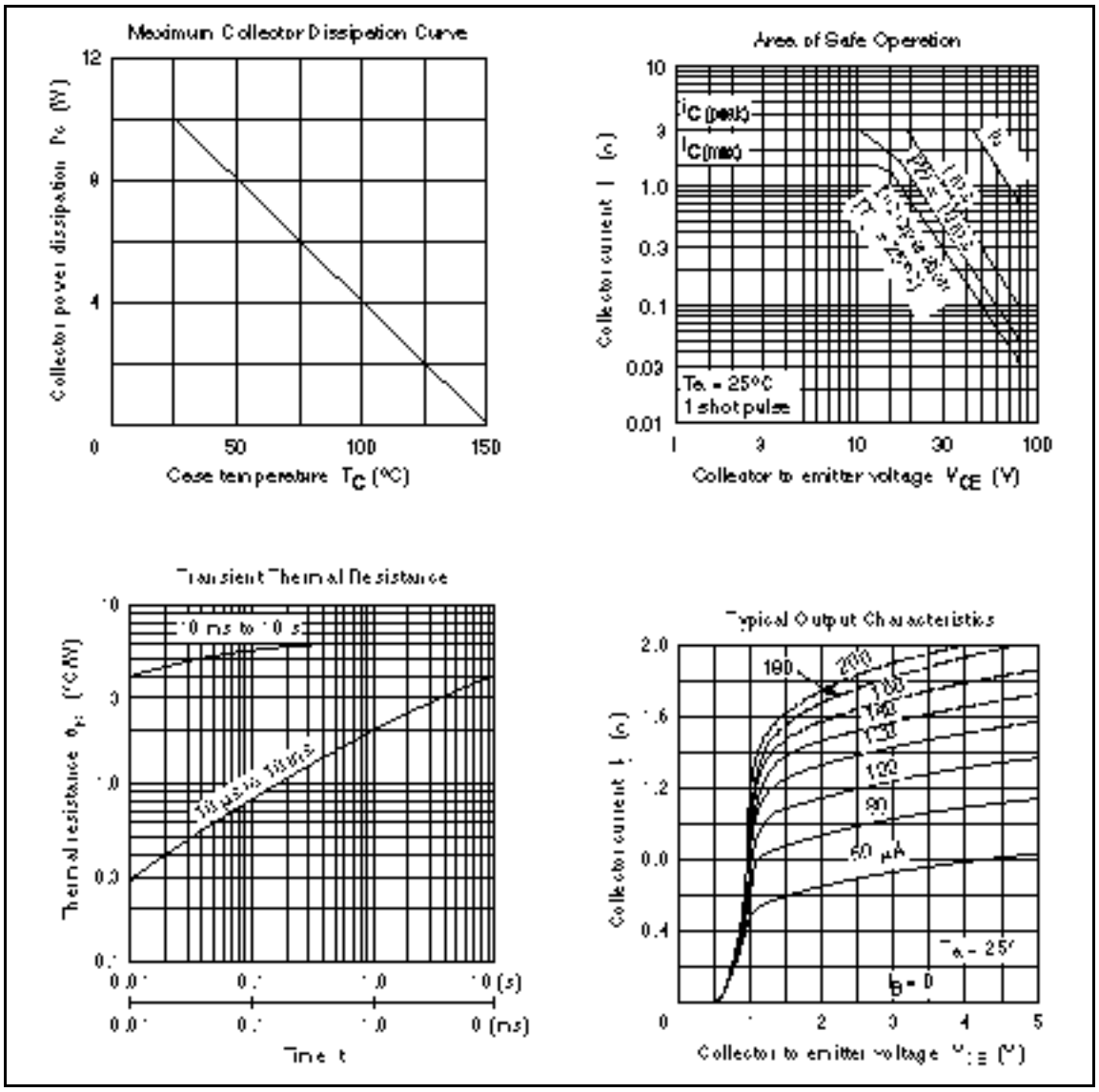
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	150	V
Collector to emitter voltage	V_{CEO}	80	V
Emitter to base voltage	V_{EBO}	8	V
Collector current	I_C	1.5	A
Collector peak current	$I_{C(peak)}$	3	A
Collector power dissipation	P_C*[1]	10	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C
C to E diode forward current	I_D*[1]	1.5	A

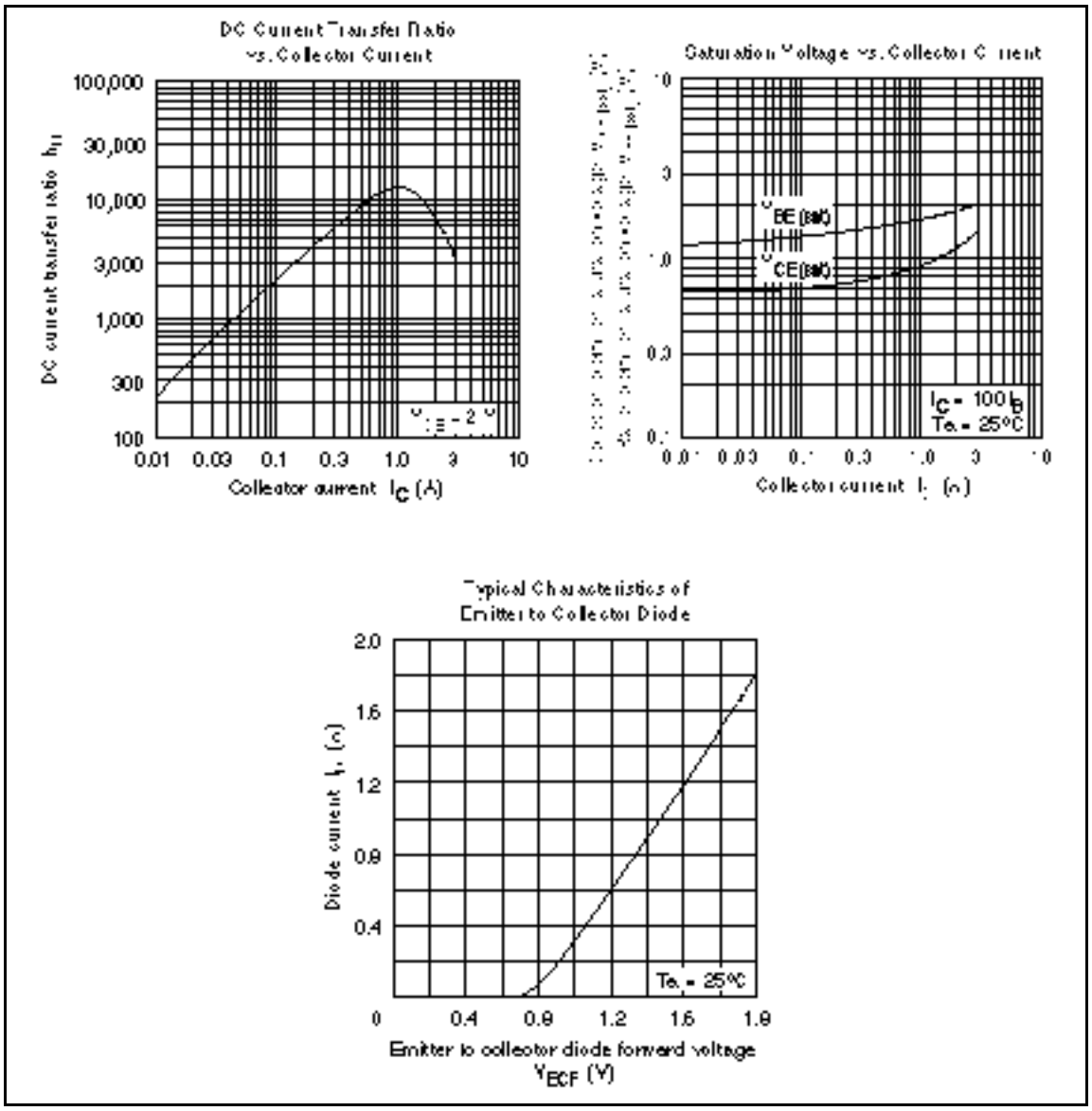
Note: 1. Value at T_C = 25°C.

Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	150	—	—	V	I_C = 1 mA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	80	—	—	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}	—	—	5	µA	V_{CB} = 120 V, I_E = 0
	I_{CEO}	—	—	5	µA	V_{CE} = 65 V, R_{BE} = ∞
DC current transfer ratio	h_{FE}	2000	—	—		V_{CE} = 2 V, I_C = 0.15 A*[1]
	h_{FE}	5000	—	30000		V_{CE} = 2 V, I_C = 1 A*[1]
	h_{FE}	1000	—	—		V_{CE} = 2 V, I_C = 1.5 A*[1]
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	1.5	V	I_C = 1 A, I_B = 1 mA*[1]
Base to emitter saturation voltage	$V_{BE(sat)}$	—	—	2.0	V	I_C = 1 A, I_B = 1 mA*[1]
C to E 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)
12
8
4
0
50
100
150
Case temperature T_C (°C)
Area of Safe Operation
10
3
1.0
0.3
0.1
0.03
0.01
$I_{C(peak)}$
$I_{C(max)}$
T_a = 25°C
1 shot pulse
1
3
10
30
100
Collector to emitter voltage V_{CE} (V)
Transient Thermal Resistance
Thermal resistance θ_{j-c} (°C/W)
10 ms to 10 s
1 ms to 10 ms
0.0
0.2
0.4
0.6
0.8
1.0
0.01
0.02
0.05
0.1
0.2
0.5
1.0
2.0
5.0
10 (s)
0.01
0.02
0.05
0.1
0.2
0.5
1.0
2.0
5.0
10 (ms)
Time t
Typical Output Characteristics
Collector current I_C (A)
2.0
1.6
1.2
0.8
0.4
0
160
200
140
120
100
80
60 μA
T_a = 25°C
I_B = 0
1
2
3
4
5
Collector to emitter voltage V_{CE} (V)


DC Current Transfer Ratio
vs. Collector Current
100,000
30,000
10,000
3,000
1,000
300
100
0.01
0.09
0.1
0.3
1.0
3
10
Collector current I_C (A)
V_{CE} = 2 V
Saturation Voltage vs. Collector Current
$V_{BE(sat)}$
$V_{CE(sat)}$
I_C = 100 I_B
Ta = 25°C
Collector current I_C (A)
Typical Characteristics of
Emitter to Collector Diode
2.0
1.6
1.2
0.9
0.4
0
0.4
0.8
1.2
1.6
1.9
Ta = 25°C
Emitter to collector diode forward voltage
V_{ECF} (V)

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