2SD2213

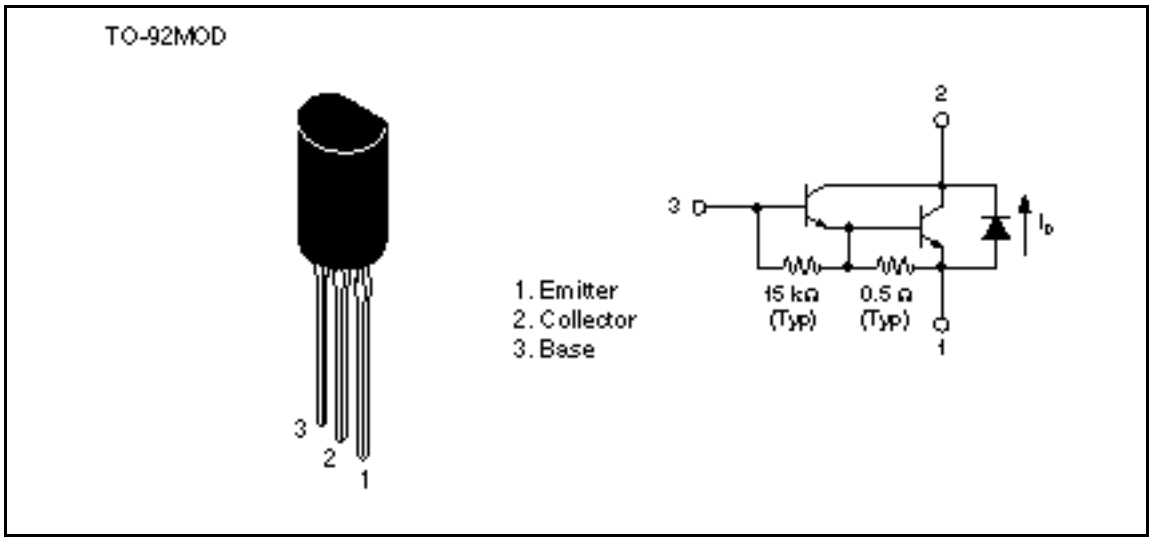
Silicon NPN Epitaxial, Darlington

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	$ic_{(peak)}$	3	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

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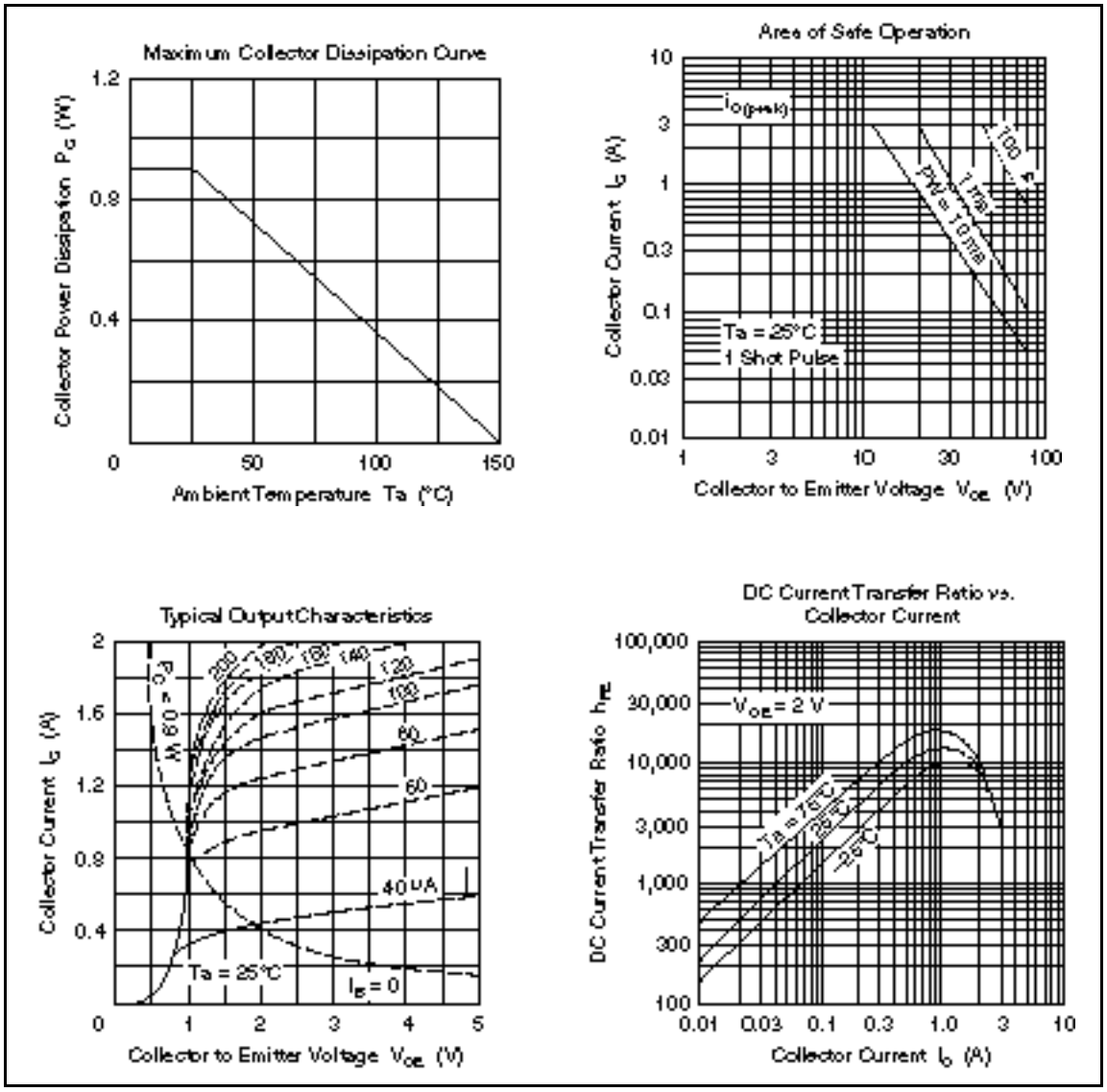
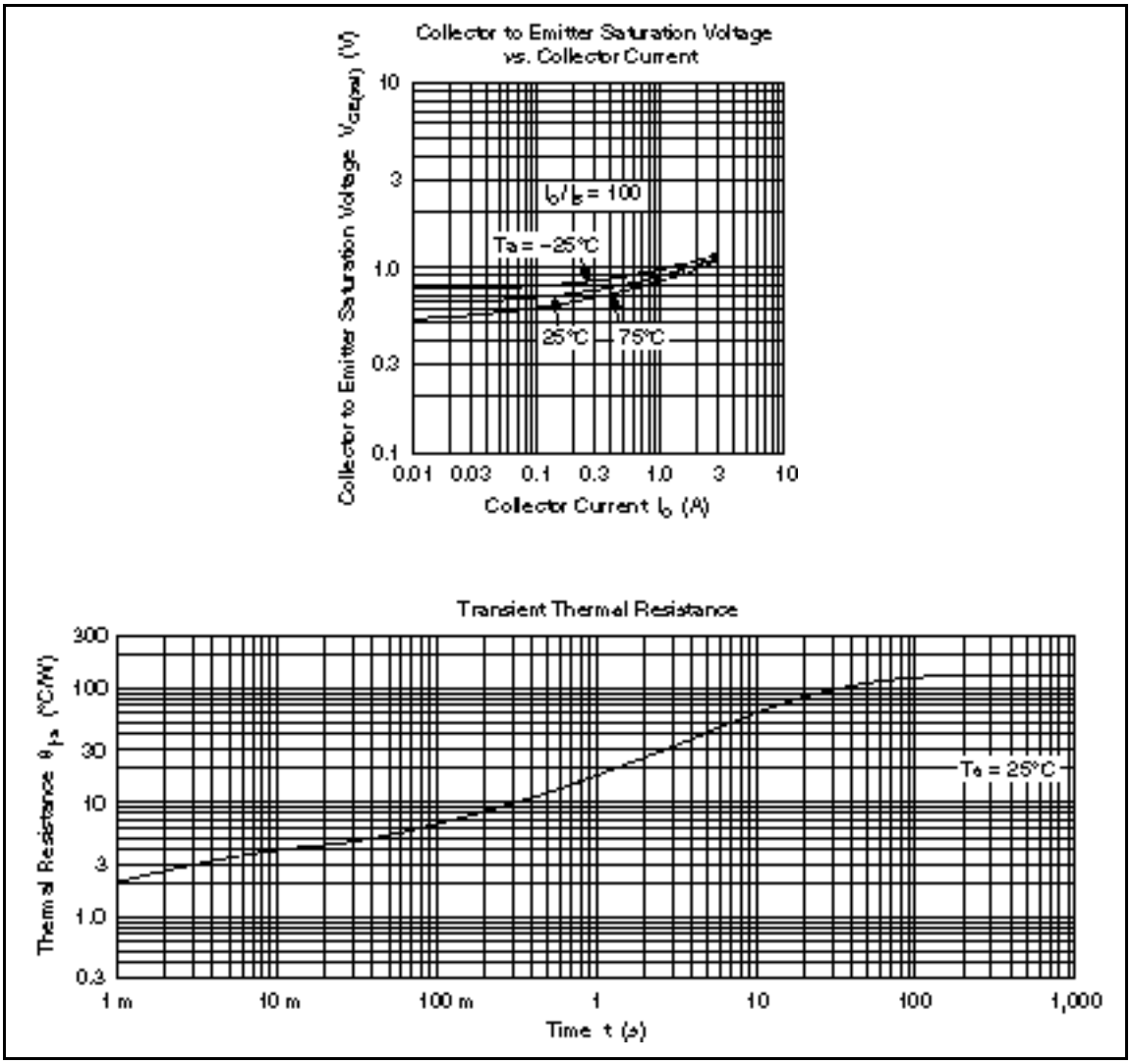
Electrical Characteristics (Ta = 25°C)

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	$V_{(BR)EBO}$	8	—	—	V	I_E = 50 mA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	5.0	µA	V_{CB} = 120 V, I_E = 0
	I_{CEO}	—	—	5.0	µA	V_{CE} = 65 V, I_E = ∞
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*[1], I_B = 1 mA
Base to emitter saturation voltage	$V_{BE(sat)}$	—	—	2.0	V	I_C = 1 A*[1], I_B = 1 mA
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)
1.2
0.8
0.4
0
50
100
150
Ambient Temperature Ta (°C)
Area of Safe Operation
Collector Current I_C (A)
10
3
1
0.3
0.1
0.03
0.01
$i_{o(peak)}$
100 ms
1 ms
PW = 10 ms
Ta = 25°C
1 Shot Pulse
1
3
10
30
100
Collector to Emitter Voltage V_{CE} (V)
Typical Output Characteristics
Collector Current I_C (A)
2
1.6
1.2
0.8
0.4
0
1
2
3
4
5
Collector to Emitter Voltage V_{CE} (V)
I_B = 0
40 μA
60
80
100
120
140
160
180
200
220
Ta = 25°C
DC Current Transfer Ratio vs. Collector Current
DC Current Transfer Ratio h_{FE}
100,000
30,000
10,000
3,000
1,000
300
100
V_{CE} = 2 V
Ta = 75°C
25°C
−25°C
0.01
0.03
0.1
0.3
1.0
3
10
Collector Current I_C (A)


Collector to Emitter Saturation Voltage vs. Collector Current
Collector to Emitter Saturation Voltage $V_{CE(sat)}$ (V)
10
3
1.0
0.3
0.1
I_C/I_B = 100
Ta = −25°C
25°C
75°C
0.01 0.03 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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