2SC4499(L)/(S)

Silicon NPN Triple Diffused

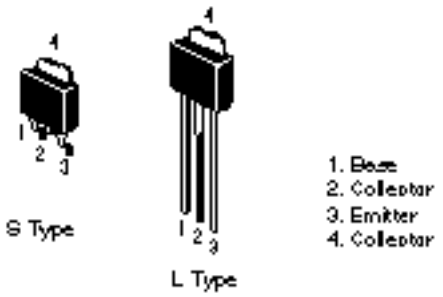
HITACHI

Application

High speed and high voltage switching

Outline

D PAK



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	500	V
Collector to emitter voltage	V_{CEO}	400	V
Emitter to base voltage	V_{EBO}	10	V
Collector current	I_C	0.5	A
Collector peak current	$I_{C(peak)}$	1.0	A
Collector power dissipation	P_C	0.75	W
	P_C*[1]	10	
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

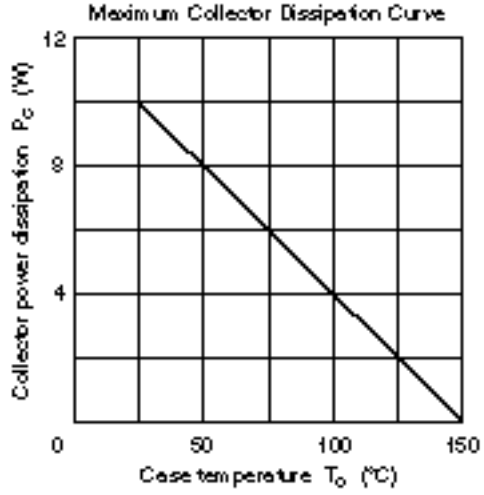
Note: 1. Value at T_C = 25°C.

Electrical Characteristics (Ta = 25°C)

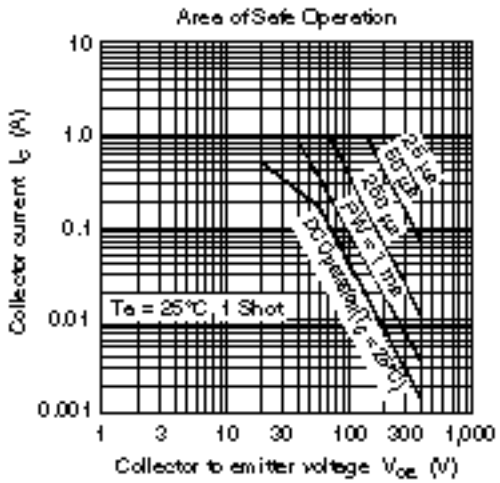
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter sustain voltage	$V_{CEO(sus)}$	400	—	—	V	I_C = 0.1 A, R_{BE} = ∞ L = 100 mH
Emitter to base breakdown voltage	$V_{(BR)EBO}$	10	—	—	V	I_E = 10 mA, I_C = 0
Collector cutoff current	I_{CBO}	—	—	20	µA	V_{CB} = 400 V, I_E = 0
	I_{CEO}	—	—	50		V_{CE} = 350 V, R_{BE} = ∞
DC current transfer ratio	h_{FE1}	12	—	—		V_{CE} = 5 V, I_C = 0.25 A*[1]
	h_{FE2}	5	—	—		V_{CE} = 5 V, I_C = 0.5 A*[1]
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	1.0	V	I_C = 0.25 A, I_B = 0.05 A*[1]
Base to emitter saturation voltage	$V_{BE(sat)}$	—	—	1.5	V	I_C = 0.25 A, I_B = 0.05 A*[1]
Turn on time	t_{on}	—	—	1.0	µs	I_C = 0.5 A, I_{B1} = $-I_{B2}$ = 0.1 A,
Storage time	t_{stg}	—	—	2.0	µs	V_{CC} 150 V
Fall time	t_f	—	—	1.0	µs	

Note: 1. Pulse test.

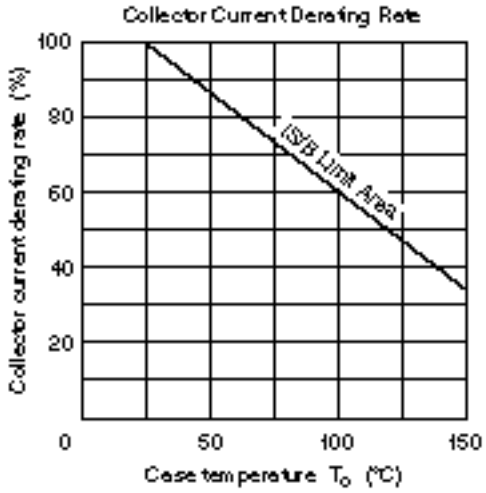
Maximum Collector Dissipation Curve



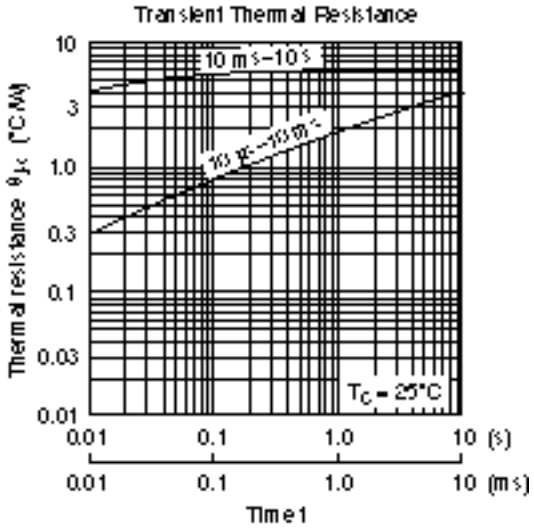
Area of Safe Operation

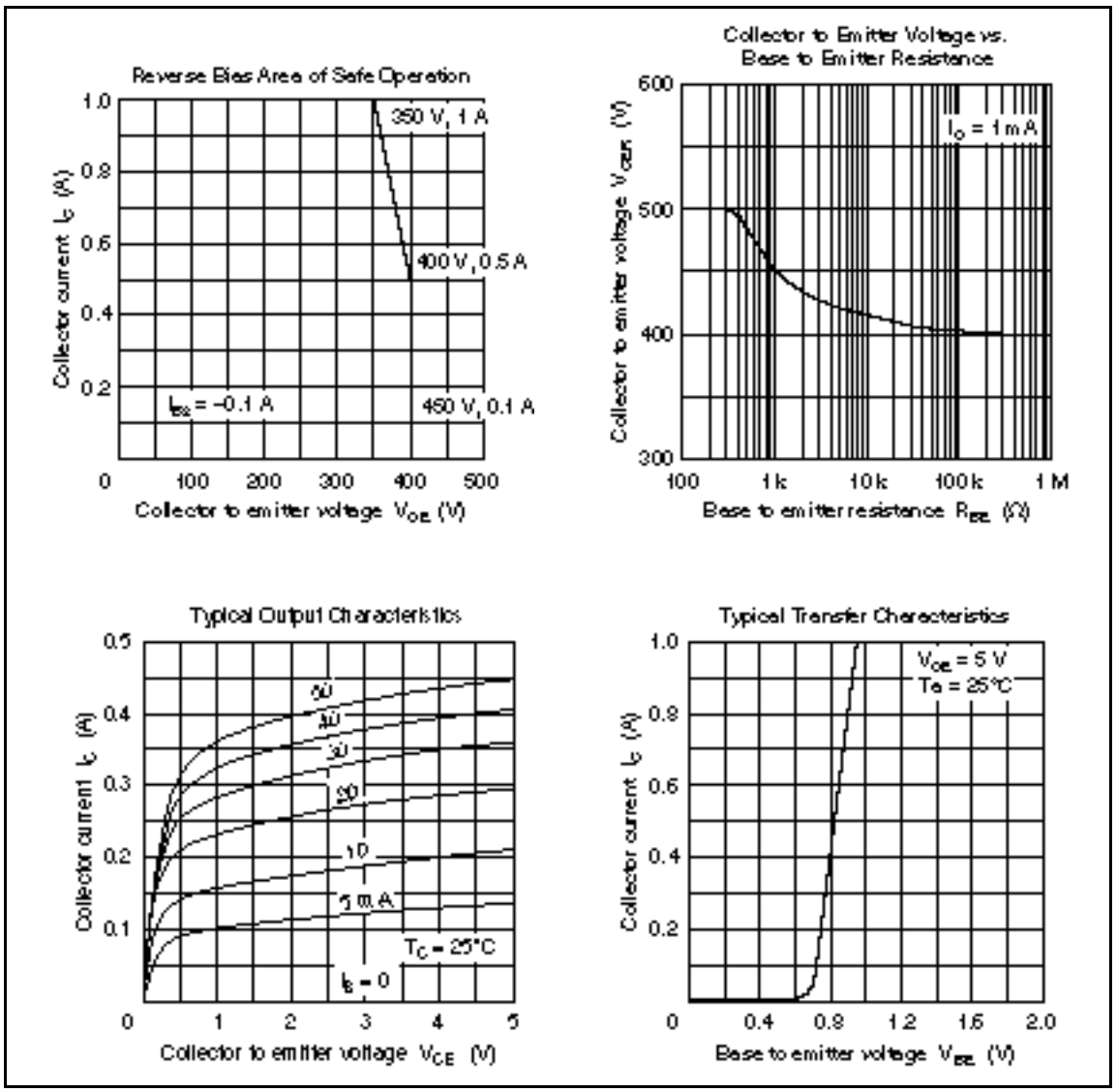


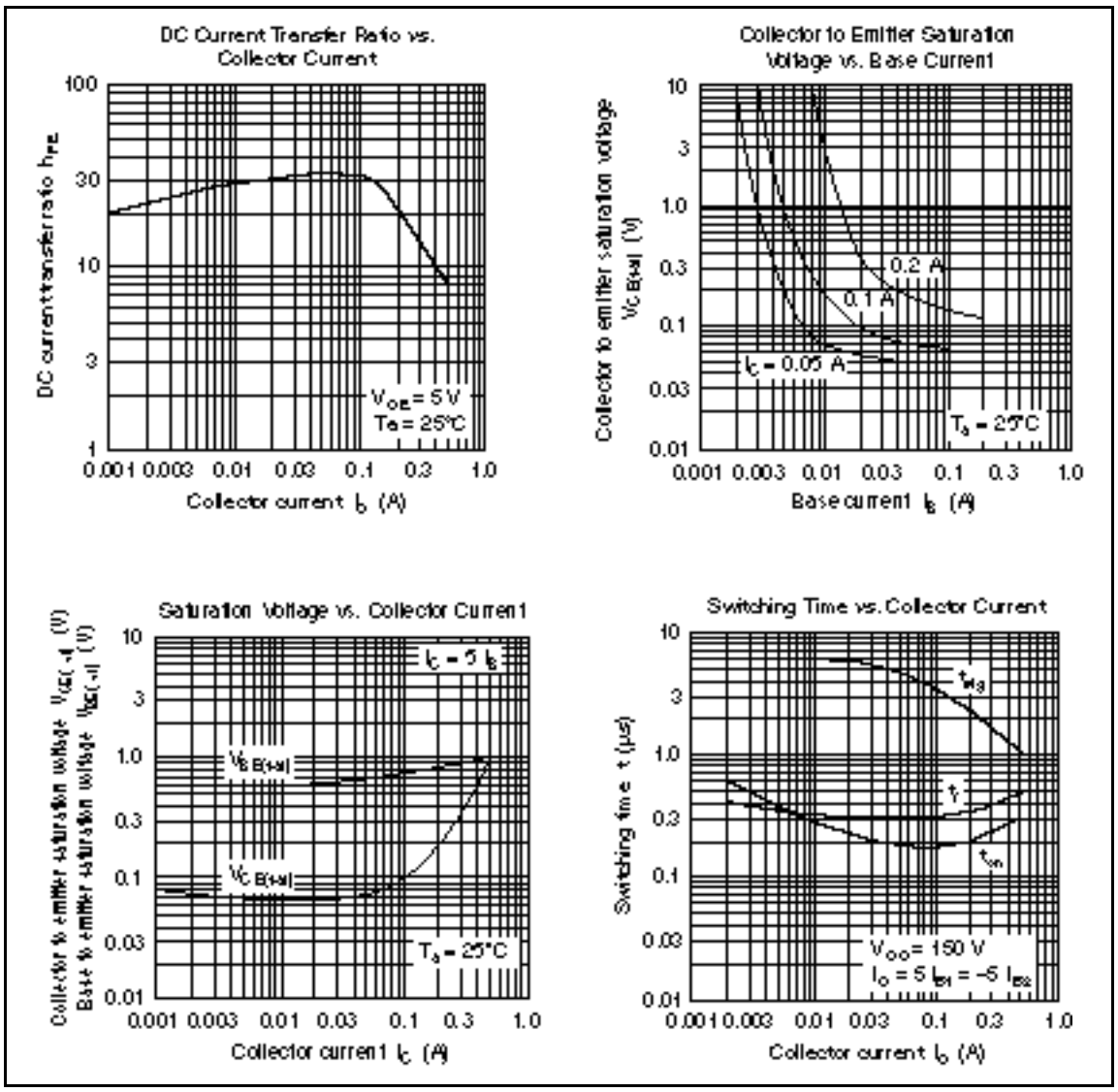
Collector Current Derating Rate

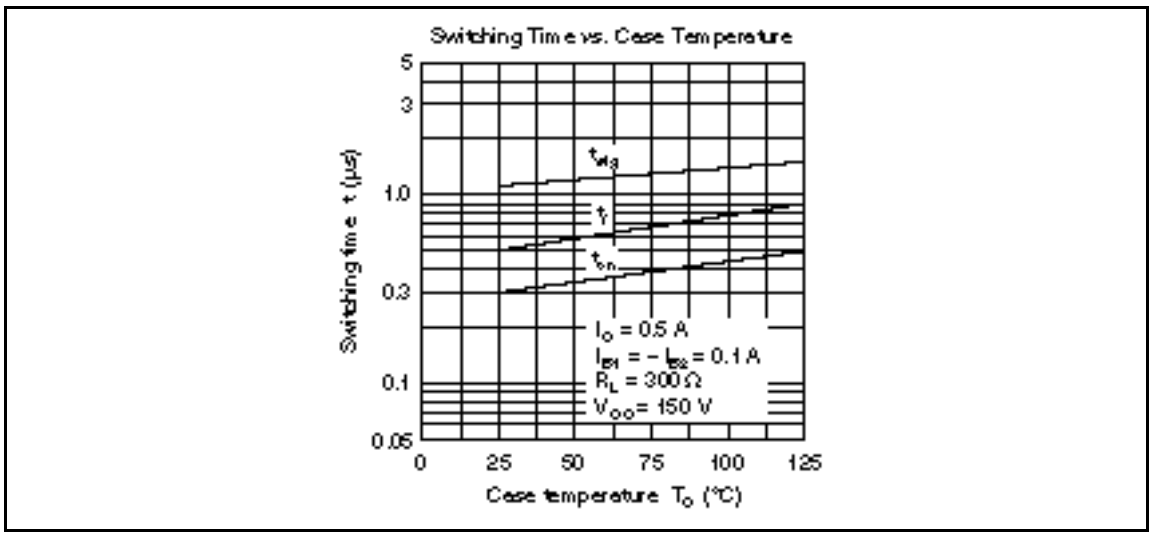


Transient Thermal Resistance




Reverse Bias Area of Safe Operation
Collector current I_C (A)
Collector to emitter voltage V_{CE} (V)
350 V, 1 A
400 V, 0.5 A
450 V, 0.1 A
I_{B2} = −0.1 A
Collector to Emitter Voltage vs. Base to Emitter Resistance
Collector to emitter voltage V_{CER} (V)
Base to emitter resistance R_{BE} (Ω)
I_C = 1 mA
Typical Output Characteristics
Collector current I_C (A)
Collector to emitter voltage V_{CE} (V)
50
40
30
20
10
5 mA
T_C = 25°C
I_B = 0
Typical Transfer Characteristics
Collector current I_C (A)
Base to emitter voltage V_{BE} (V)
V_{CE} = 5 V
Ta = 25°C


DC Current Transfer Ratio vs. Collector Current
DC current transfer ratio h_{FE}
100
30
10
3
1
0.001 0.003 0.01 0.03 0.1 0.3 1.0
Collector current I_C (A)
V_{CE} = 5 V
Ta = 25°C
Collector to Emitter Saturation Voltage vs. Base Current
Collector to emitter saturation voltage $V_{CE(sat)}$ (V)
10
3
1.0
0.3
0.1
0.03
0.01
0.001 0.003 0.01 0.03 0.1 0.3 1.0
Base current I_B (A)
0.2 A
0.1 A
I_C = 0.05 A
T_a = 25°C
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
0.03
0.01
0.001 0.003 0.01 0.03 0.1 0.3 1.0
Collector current I_C (A)
I_C = 5 I_B
$V_{BE(sat)}$
$V_{CE(sat)}$
T_a = 25°C
Switching Time vs. Collector Current
Switching time t (µs)
10
3
1.0
0.3
0.1
0.03
0.01
0.001 0.003 0.01 0.03 0.1 0.3 1.0
Collector current I_C (A)
t_{stg}
t_f
t_{on}
V_{CC} = 150 V
I_C = 5 I_{B1} = −5 I_{B2}


Switching Time vs. Case Temperature
Switching time t (µs)
5
3
1.0
0.3
0.1
0.05
0
25
50
75
100
125
Case temperature T_C (°C)
t_{stg}
t_f
t_{on}
I_C = 0.5 A
I_{B1} = − I_{B2} = 0.1 A
R_L = 300 Ω
V_{CC} = 150 V

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HITACHI

Hitachi, Ltd.
Semiconductor & IC Div.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100, Japan
Tel: Tokyo (03) 3270-2111
Fax: (03) 3270-5109

For further information write to:

Hitachi America, Ltd.
Semiconductor & IC Div.
2000 Sierra Point Parkway
Brisbane, CA. 94005-1835
U.S.A.
Tel: 415-589-8300
Fax: 415-583-4207

Hitachi Europe GmbH
Electronic Components Group
Continental Europe
Dornacher Straße 3
D-85622 Feldkirchen
München
Tel: 089-9 91 80-0
Fax: 089-9 29 30 00

Hitachi Europe Ltd.
Electronic Components Div.
Northern Europe Headquarters
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA
United Kingdom
Tel: 0628-585000
Fax: 0628-778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 0104
Tel: 535-2100
Fax: 535-1533

Hitachi Asia (Hong Kong) Ltd.
Unit 706, North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon
Hong Kong
Tel: 27359218
Fax: 27306071