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2SC1472(K)

Silicon NPN Epitaxial, Darlington

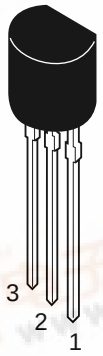
HITACHI

Application

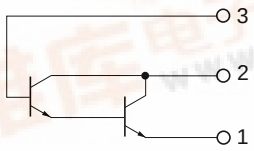
High gain amplifier

Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base



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Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	40	V
Collector to emitter voltage	V_{CEO}	30	V
Emitter to base voltage	V_{EBO}	10	V
Collector current	I_C	300	mA
Collector peak current	$i_{C(peak)}$	500	mA
Collector power dissipation	P_C	500	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

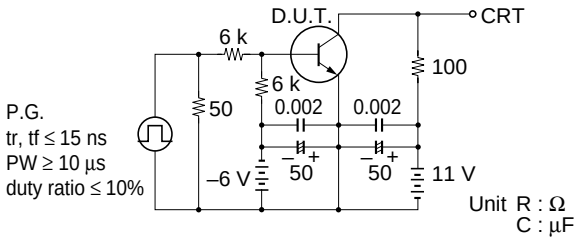
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	30	—	—	V	I_C = 1 mA, R_{BE} = ∞
Collector cutoff current	I_{CBO}	—	—	100	nA	V_{CB} = 30 V, I_E = 0
Emitter cutoff current	I_{EBO}	—	—	100	nA	V_{EB} = 10 V, I_C = 0
DC current transfer ratio	h_{FE1}*1	2000	—	100000		I_C = 10 mA, V_{CE} = 5 V
	h_{FE2}*1	3000	—	—		I_C = 100 mA, V_{CE} = 5 V (Pulse Test)
	h_{FE3}*1	3000	—	—		I_C = 400 mA, V_{CE} = 5 V (Pulse Test)
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	1.5	V	I_C = 100 mA, I_B = 0.1 mA
Base to emitter voltage	$V_{BE(sat)}$	—	—	2.0	V	I_C = 100 mA, I_B = 0.1 mA
Gain bandwidth product	f_T	50	—	—	MHz	V_{CE} = 5 V, I_C = 10 mA
Collector output capacitance	Cob	—	—	10	pF	V_{CB} = 10 V, I_E = 0, f = 1 MHz
Turn on time	t_{on}	—	60	—	ns	V_{CC} = 11 V I_C = 100 I_{B1} = 100 mA I_{B2} = –I_{B1}
Turn off time	t_{off}	—	800	—	ns	
Storage time	t_{stg}	—	350	—	ns	

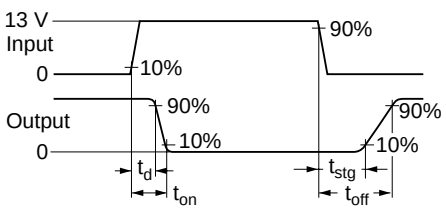
Note: 1. The 2SC1472(K) is grouped by h_{FE} as follows.

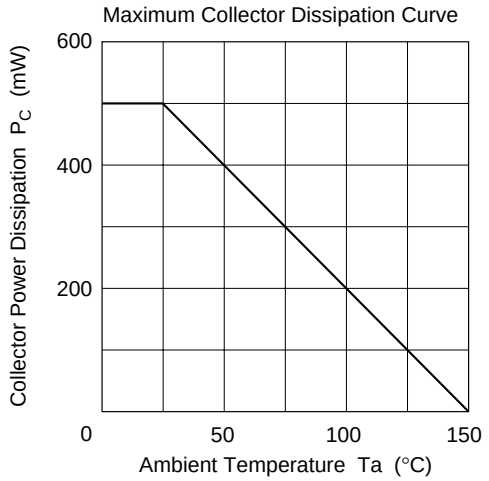
	A	B
h_{FE1}	2000 to 100000	5000 to 100000
h_{FE2}	3000 min	10000 min
h_{FE3}	3000 min	10000 min

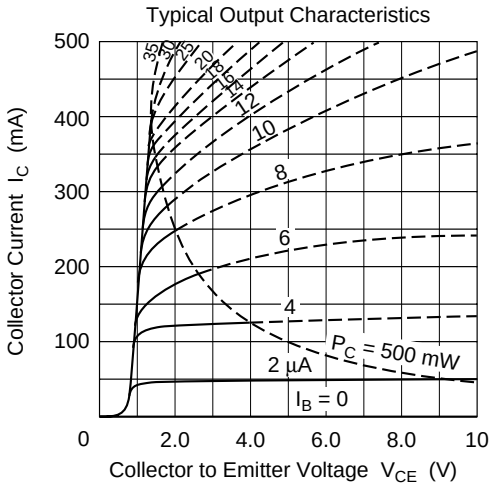
Switching Time Test Circuit

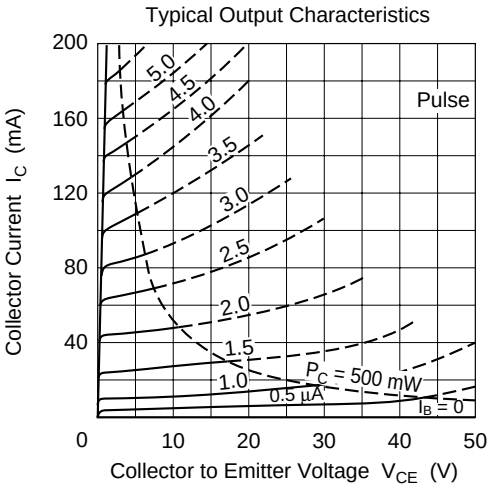


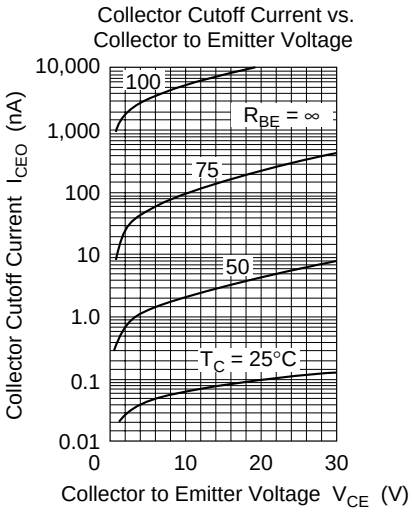
Response Waveform

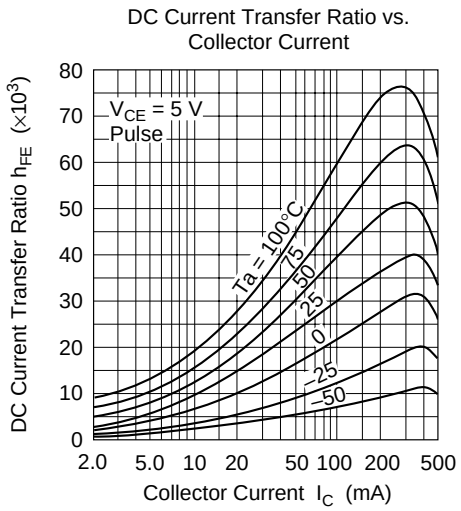


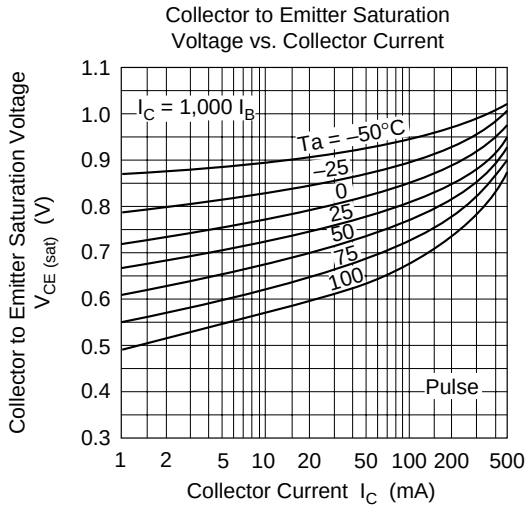

Maximum Collector Dissipation Curve
Collector Power Dissipation P_C (mW)
600
400
200
0
50
100
150
Ambient Temperature Ta (°C)

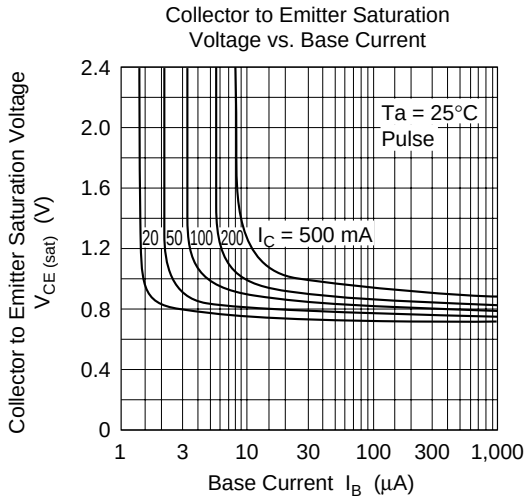

Typical Output Characteristics
Collector Current I_C (mA)
500
400
300
200
100
0
2.0
4.0
6.0
8.0
10
Collector to Emitter Voltage V_{CE} (V)
35
30
25
20
15
12
10
8
6
4
2 μA
P_C = 500 mW
I_B = 0

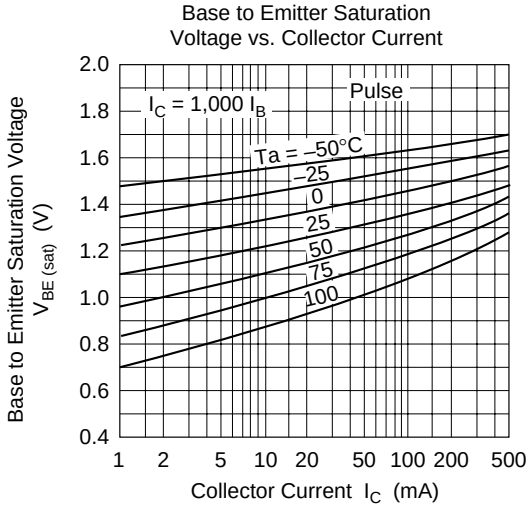

Typical Output Characteristics
Collector Current I_C (mA)
200
160
120
80
40
0
10
20
30
40
50
Collector to Emitter Voltage V_{CE} (V)
Pulse
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5 μA
P_C = 500 mW
I_B = 0

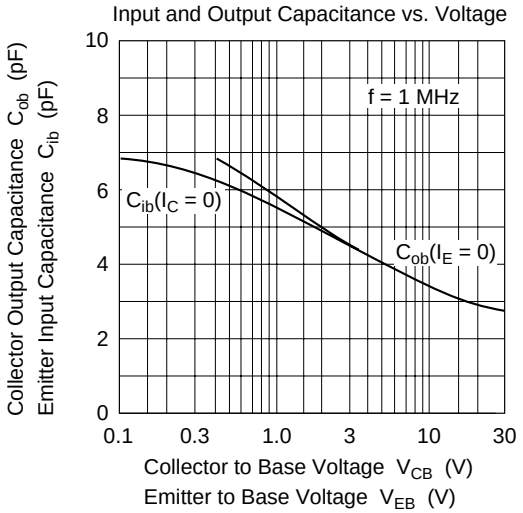

Collector Cutoff Current vs.
Collector to Emitter Voltage
Collector Cutoff Current I_{CEO} (nA)
10,000
1,000
100
10
1.0
0.1
0.01
0
10
20
30
Collector to Emitter Voltage V_{CE} (V)
100
R_{BE} = ∞
75
50
T_C = 25°C

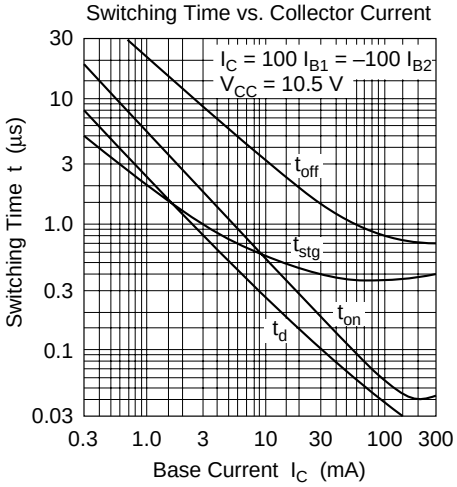

DC Current Transfer Ratio vs.
Collector Current
DC Current Transfer Ratio h_{FE} (×10³)
V_{CE} = 5 V
Pulse
Ta = 100°C
75
50
25
0
–25
–50
80
70
60
50
40
30
20
10
0
2.0
5.0
10
20
50
100
200
500
Collector Current I_C (mA)

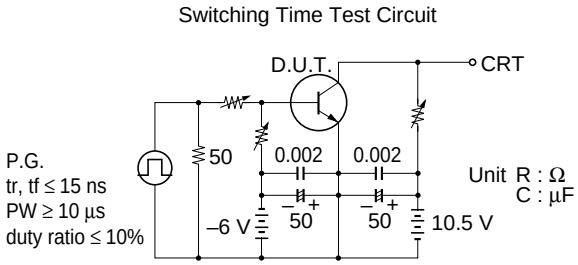

Collector to Emitter Saturation
Voltage vs. Collector Current
Collector to Emitter Saturation Voltage
$V_{CE\ (sat)}$ (V)
I_C = 1,000 I_B
Ta = –50°C
–25
0
25
50
75
100
Pulse
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
1
2
5
10
20
50
100
200
500
Collector Current I_C (mA)

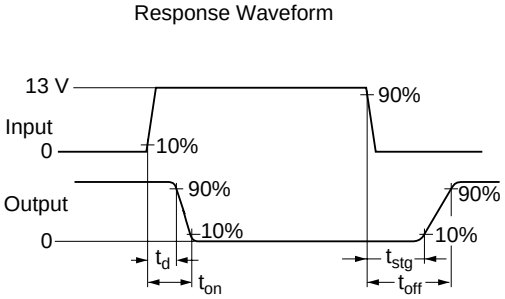

Collector to Emitter Saturation
Voltage vs. Base Current
Collector to Emitter Saturation Voltage
$V_{CE\ (sat)}$ (V)
Ta = 25°C
Pulse
20
50
100
200
I_C = 500 mA
2.4
2.0
1.6
1.2
0.8
0.4
0
1
3
10
30
100
300
1,000
Base Current I_B (μA)


Base to Emitter Saturation
Voltage vs. Collector Current
Base to Emitter Saturation Voltage
$V_{BE\ (sat)}$ (V)
I_C = 1,000 I_B
Pulse
Ta = –50°C
–25
0
25
50
75
100
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
1
2
5
10
20
50
100
200
500
Collector Current I_C (mA)

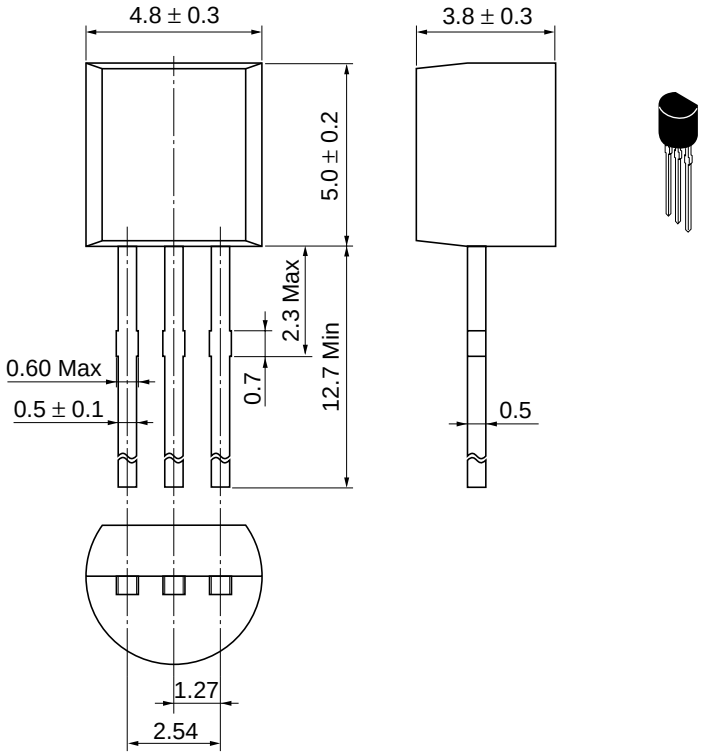

Input and Output Capacitance vs. Voltage
Collector Output Capacitance Cob (pF)
Emitter Input Capacitance Cib (pF)
f = 1 MHz
Cib(IC = 0)
Cob(IE = 0)
10
8
6
4
2
0
0.1
0.3
1.0
3
10
30
Collector to Base Voltage VCB (V)
Emitter to Base Voltage VEB (V)


Switching Time vs. Collector Current
IC = 100 IB1 = –100 IB2
VCC = 10.5 V
toff
tstg
ton
td
Switching Time t (µs)
30
10
3
1.0
0.3
0.1
0.03
0.3
1.0
3
10
30
100
300
Base Current IC (mA)


Switching Time Test Circuit
D.U.T.
CRT
P.G.
tr, tf ≤ 15 ns
PW ≥ 10 µs
duty ratio ≤ 10%
50
0.002
0.002
–6 V
50
50
10.5 V
Unit R : Ω
C : µF


Response Waveform
13 V
Input
0
10%
90%
Output
0
90%
10%
90%
10%
td
ton
tstg
toff

Unit: mm



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