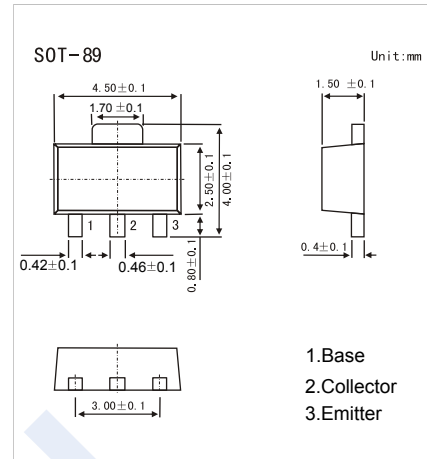## NPN Transistors
2SC4409

■ Features

● Low collector saturation voltage

● High speed switching time

● Small flat package

● P_C = 1~2 W (Mounted on a ceramic substrate)

● Complementary to 2SA1681

SOT-89   Unit:mm

1.Base
2.Collector
3.Emitter

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	V_{CBO}	80	V
Collector - Emitter Voltage	V_{CEO}	50	
Emitter - Base Voltage	V_{EBO}	6	
Collector Current - Continuous	I_C	2	A
Base Current	I_B	0.2	
Collector Power Dissipation (Note.1)	P_C	500	mW
		1000	
Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{stg}	-55 to 150	

Note.1: 2SC4409 mounted on a ceramic substrate (250 mm^2 × 0.8 t)

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V_{CBO}	I_C= 100 uA, I_E= 0	80			V
Collector- emitter breakdown voltage	V_{CEO}	I_C= 10 mA, I_B= 0	50			
Emitter - base breakdown voltage	V_{EBO}	I_E= 100μA, I_C= 0	6			
Collector-base cut-off current	I_{CBO}	V_{CB}= 80V, I_E= 0			0.1	uA
Emitter cut-off current	I_{EBO}	V_{EB}= 6V , I_C=0			0.1	
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=1A, I_B=50mA			0.5	V
Base - emitter saturation voltage	$V_{BE(sat)}$	I_C=1A, I_B=50mA			1.2	
DC current gain	h_{FE}	V_{CE}= 2V, I_C= 100mA	120		400	
		V_{CE}= 2V, I_C= 1.5A	40			
Turn-on time	t_{on}	I_{B1} = −I_{B2} = 0.05 A, Duty cycle ≤1%		0.1		us
Storage time	t_{stg}			0.5		
Fall time	t_{off}			0.1		
Collector output capacitance	C_{ob}	V_{CB}= 10V, I_E=0,f=1MHz			14	pF
Transition frequency	f_T	V_{CE}= 2V, I_C=100mA		100		MHz

■ Marking

Marking	K*A

NPN Transistors
2SC4409

■ Typical Characterisitics

$I_C - V_{CE}$

Common emitter
Ta = 25°C

Collector current I_C (A)

Collector-emitter voltage V_{CE} (V)

$I_B = 2$ mA

$h_{FE} - I_C$

DC current gain h_{FE}

Common emitter
$V_{CE} = 2$ V

Ta = 100°C

Collector current I_C (mA)

$V_{CE (sat)} - I_C$

Collector-emitter saturation
voltage $V_{CE (sat)}$ (V)

Common emitter
$I_C/I_B = 20$

Ta = 100°C

Collector current I_C (mA)

$V_{BE (sat)} - I_C$

Base-emitter saturation
voltage $V_{BE (sat)}$ (V)

Ta = −25°C

Common emitter
$I_C/I_B = 20$

Collector current I_C (mA)

Safe operating area

Collector current I_C (A)

I_C max (pulsed)*
I_C max (continuous)
1 ms*
10 ms*
100 ms*

DC Operation
(Ta = 25°C)

*: Single nonrepetitive pulse
Ta = 25°C
Curves must be derated linearly
with increase in temperature.

V_{CEO} max

Collector-emitter voltage V_{CE} (V)

$I_C - V_{BE}$

Common emitter
$V_{CE} = 2$ V

Collector current I_C (A)

Ta = 100°C − 25 − −25

Base-emitter voltage V_{BE} (V)