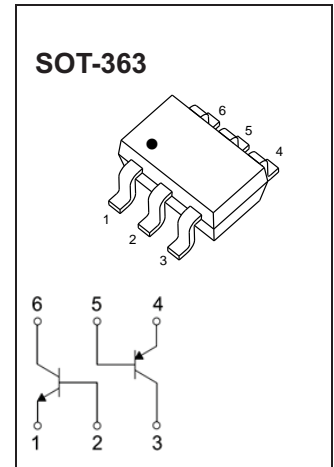


### Features

- Epoxy meets UL-94 V-0 flammability rating
- Surface mount package ideally Suited for Automatic Insertion
- NPN/PNP
- Compliant to Halogen-free
- Suffix "-Q1" for AEC-Q101

### Mechanical Data

- **Package:** SOT-363
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** K46



### Maximum Ratings NPN (Ta=25°C Unless otherwise specified)

Symbol	Parameter	Value	Units
V <sub>CB0</sub>	Collector-Base Voltage	60	V
V <sub>CEO</sub>	Collector-Emitter Voltage	40	V
V <sub>EBO</sub>	Emitter-Base Voltage	6	V
I <sub>C</sub>	Collector Current -Continuous	0.2	A
P <sub>C</sub>	Collector Power Dissipation	0.2	W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55~+150	°C

### TR1 NPN Pin1、2、6 Electrical Characteristics (Ta=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = 10μA, I <sub>E</sub> =0	60		V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 1mA, I <sub>B</sub> =0	40		V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> = 10μA, I <sub>C</sub> =0	6		V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 30 V, I <sub>E</sub> =0		0.05	μA
Collector cut-off current	I <sub>CEO</sub>	V <sub>CE</sub> = 30 V, I <sub>B</sub> =0		0.5	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 5V, I <sub>C</sub> =0		0.05	μA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> = 1V, I <sub>C</sub> = 0.1mA	40		
	h <sub>FE(2)</sub>	V <sub>CE</sub> = 1V, I <sub>C</sub> = 1mA	70		
	h <sub>FE(3)</sub>	V <sub>CE</sub> = 1V, I <sub>C</sub> = 10mA	100	300	
	h <sub>FE(4)</sub>	V <sub>CE</sub> = 1V, I <sub>C</sub> = 50mA	60		
	h <sub>FE(5)</sub>	V <sub>CE</sub> = 1V, I <sub>C</sub> = 100mA	30		
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> =10 mA, I <sub>B</sub> = 1mA		0.2	V
	V <sub>CE(sat)2</sub>	I <sub>C</sub> =50 mA, I <sub>B</sub> = 5mA		0.3	V
Base-emitter saturation voltage	V <sub>BE(sat)1</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1mA	0.65	0.85	V
	V <sub>BE(sat)2</sub>	I <sub>C</sub> = 50 mA, I <sub>B</sub> = 5mA		0.95	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =20V, I <sub>C</sub> =20mA, f=100MHz	300		MHz
Output capacitance	C <sub>ob</sub>	V <sub>CB</sub> =5V, I <sub>E</sub> =0, f=1MHz		4	pF
Delay time	t <sub>d</sub>	V <sub>CC</sub> =3V, V <sub>BE</sub> =0.5V		35	nS
Rise time	t <sub>r</sub>	I <sub>C</sub> =10mA, I <sub>B1</sub> =- I <sub>B2</sub> =1mA		35	nS
Storage time	t <sub>s</sub>	V <sub>CC</sub> =3V, I <sub>C</sub> =10mA		200	nS
Fall time	t <sub>f</sub>	I <sub>B1</sub> =-I <sub>B2</sub> = 1mA		50	nS

### Maximum Ratings PNP (Ta=25°C Unless otherwise specified)

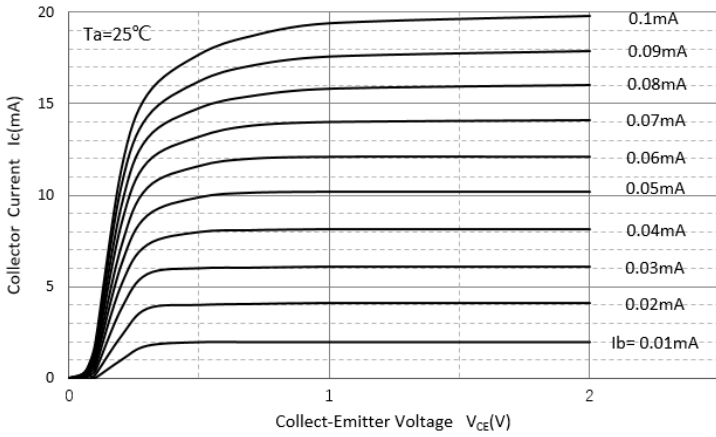
Symbol	Parameter	Value	Units
V <sub>CB0</sub>	Collector-Base Voltage	-40	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-40	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>C</sub>	Collector Current -Continuous	-0.2	A
P <sub>C</sub>	Collector Power Dissipation	0.2	W
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55~+150	°C

### TR2 PNP Pin3、4、5 Electrical Characteristics (Ta=25°C unless otherwise specified)

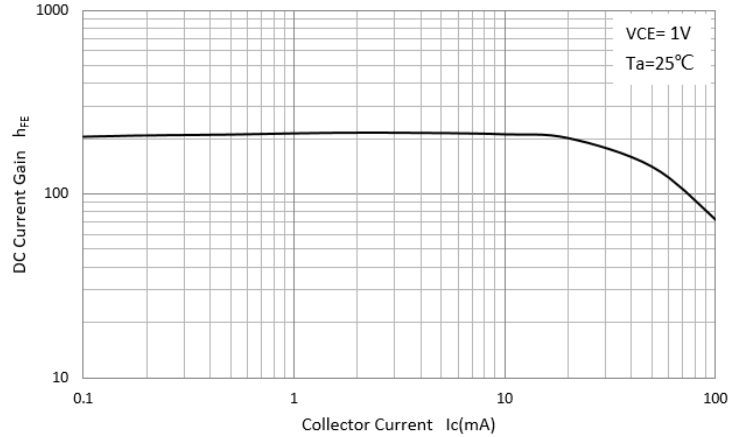
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =-10μA, I <sub>E</sub> =0	-40			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =-1mA, I <sub>B</sub> =0	-40			V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-10μA, I <sub>C</sub> =0	-5			V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =-30V, I <sub>E</sub> =0			-0.05	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =-5V, I <sub>C</sub> =0			-0.05	μA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-0.1mA	40			
	h <sub>FE(2)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-1mA	70			
	h <sub>FE(3)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA	100		300	
	h <sub>FE(4)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-50mA	60			
	h <sub>FE(5)</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA	30			
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA			-0.25	V
	V <sub>CE(sat)2</sub>	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA			-0.4	V
Base-emitter saturation voltage	V <sub>BE(sat)1</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA	-0.65		-0.85	V
	V <sub>BE(sat)2</sub>	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA			-0.95	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-20V, I <sub>C</sub> =-10mA, f=100MHz	250			MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> =-5V, I <sub>E</sub> =0, f=1MHz			4.5	pF
Delay time	t <sub>d</sub>	V <sub>CC</sub> =-3V, V <sub>BE</sub> =-0.5V			35	nS
Rise time	t <sub>r</sub>	I <sub>C</sub> =-10mA, I <sub>B1</sub> =-I <sub>B2</sub> =-1mA			35	nS
Storage time	t <sub>s</sub>	V <sub>CC</sub> =-3V, I <sub>C</sub> =-10mA			225	nS
Fall time	t <sub>f</sub>	I <sub>B1</sub> =-I <sub>B2</sub> =-1mA			75	nS

### TR1 NPN Pin1、2、6 Characteristics (Typical)

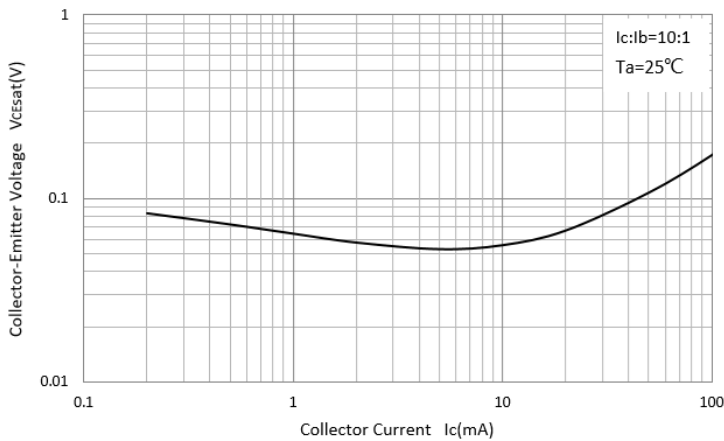
Static Characteristic



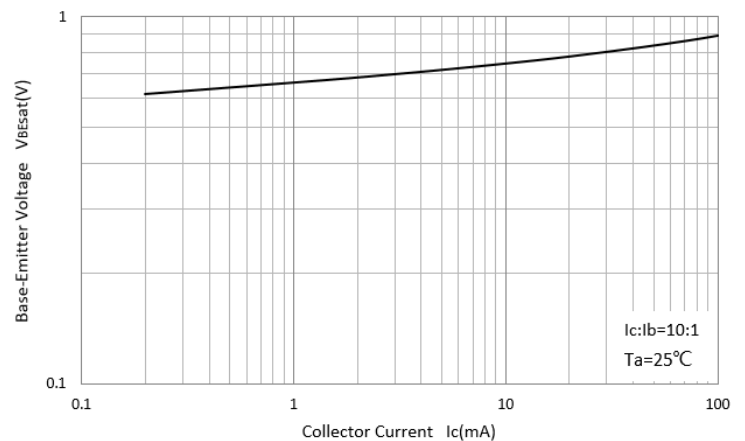
DC Current Gain



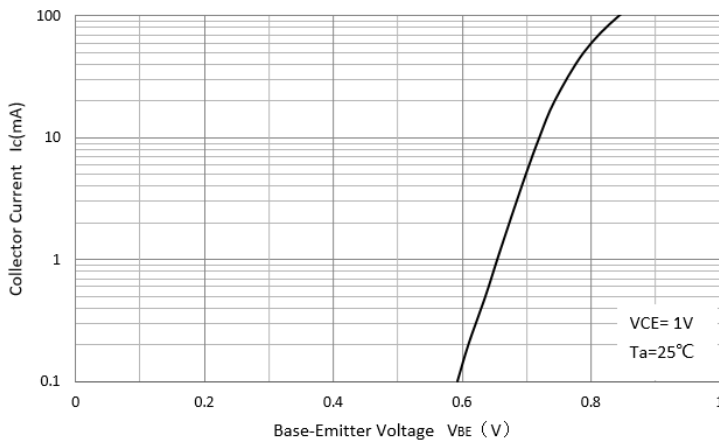
Collector-Emittor Saturation Voltage



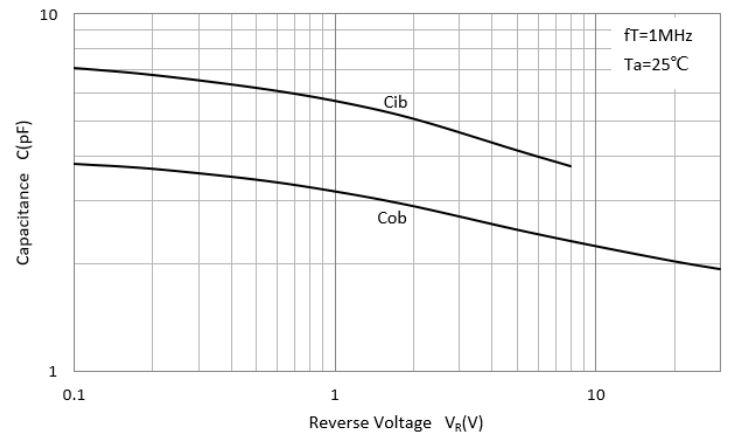
Base-Emittor Saturation Voltage



Base-Emittor On Voltage

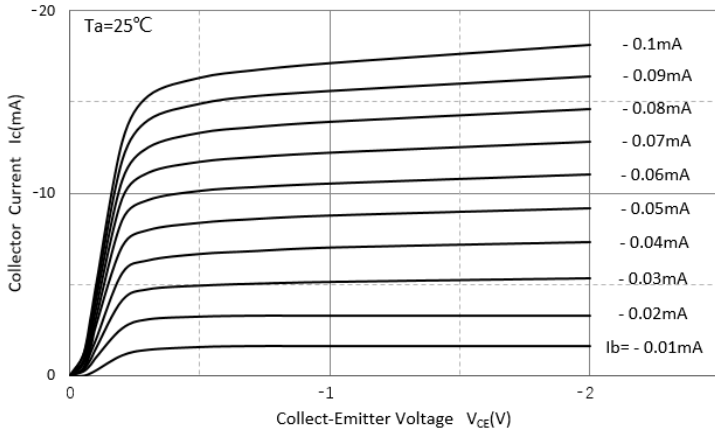


$C_{ob}/C_{ib}-V_{CB}/V_{EB}$

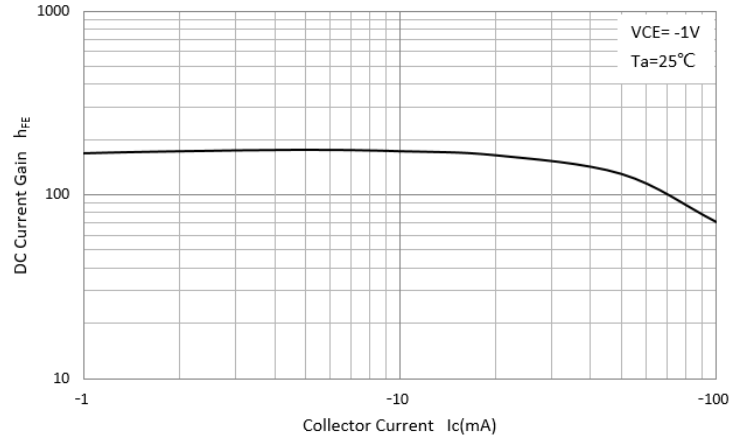


### TR2 PNP Pin3、4、5 Characteristics (Typical)

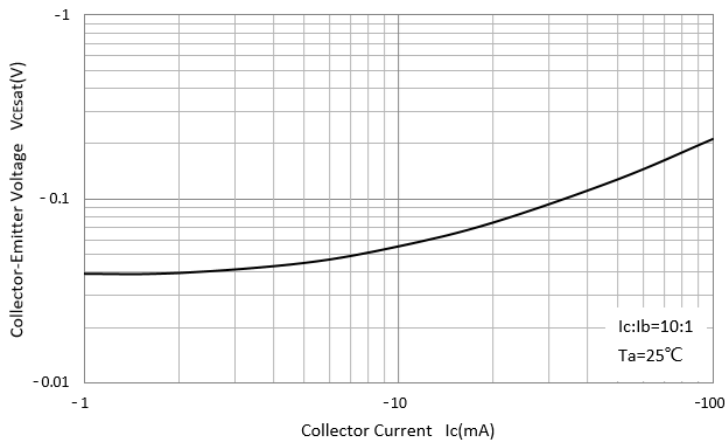
Static Characteristic



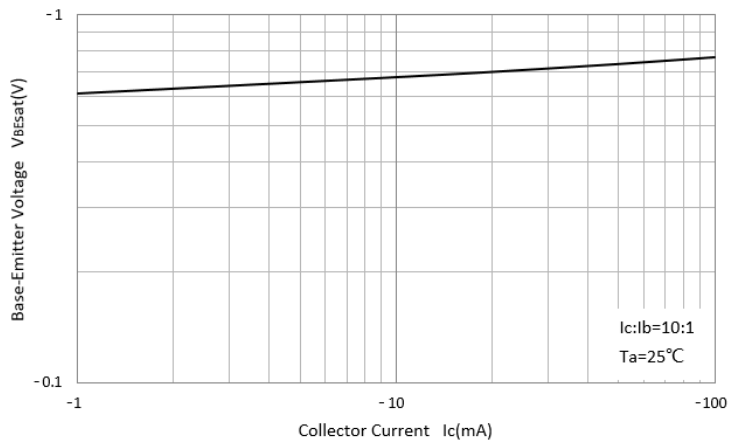
DC Current Gain



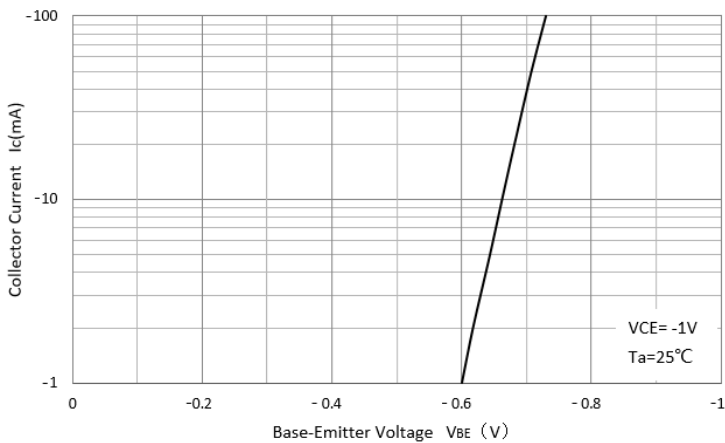
Collector-Emmitter Saturation Voltage



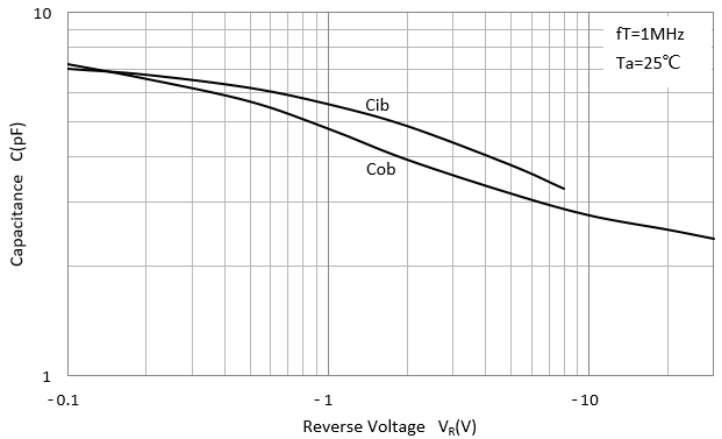
Base-Emmitter Saturation Voltage



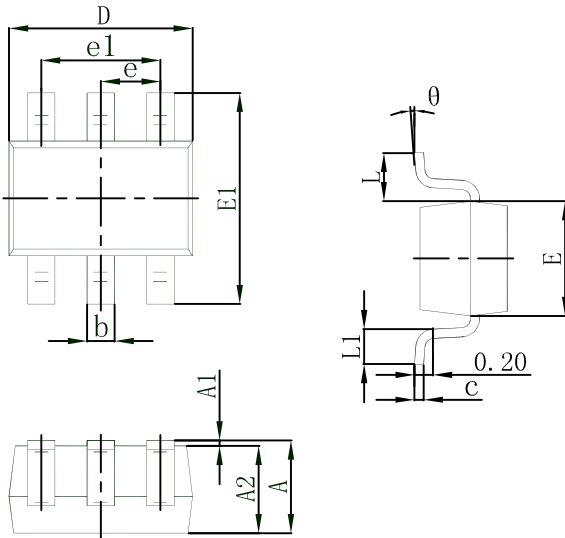
Base-Emmitter On Voltage



$C_{ob}/C_{ib}-V_{CB}/V_{EB}$

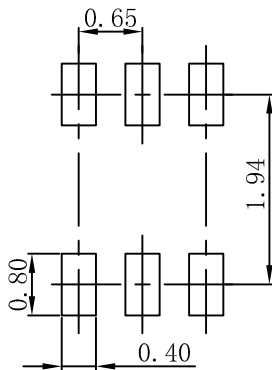


### Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.050	0.250	0.002	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 TYP		0.021 TYP	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

### Soldering Footprint



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.