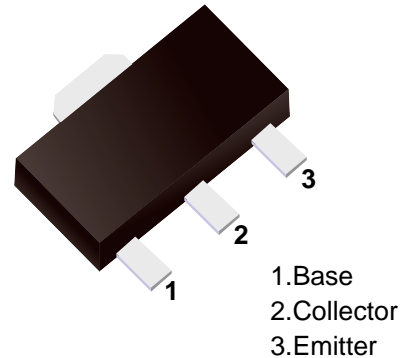


■ NPN Transistors

■ Features

- Low Collector-Emitter Saturation Voltage
- Large Collector Power Dissipation and Current
- Mini Power Type Package



■ Simplified outline(SOT-89)

■ Absolute Maximum Ratings Ta = 25°C

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	V <sub>CB0</sub>	40	V
Collector - Emitter Voltage	V <sub>CE0</sub>	20	
Emitter - Base Voltage	V <sub>EB0</sub>	7	
Collector Current - Continuous	I <sub>c</sub>	5	A
Collector Power Dissipation	P <sub>c</sub>	750	mW
Thermal Resistance From Junction To Ambient	R <sub>θJA</sub>	167	°C/W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to 150	

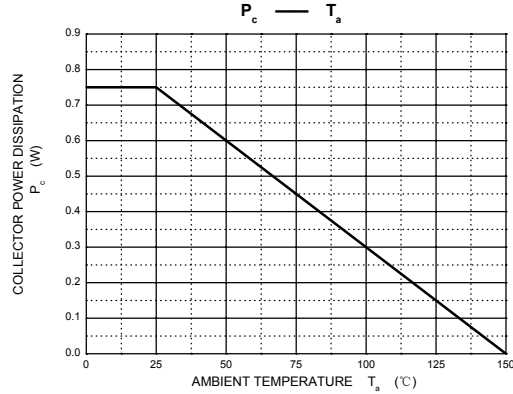
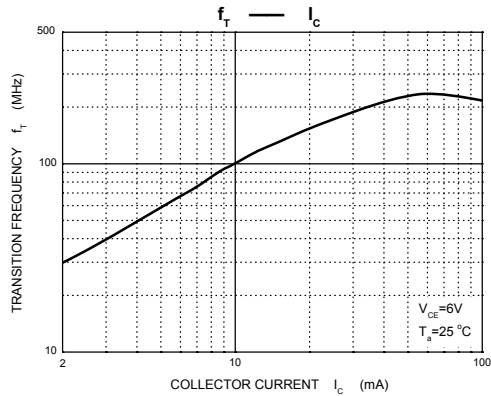
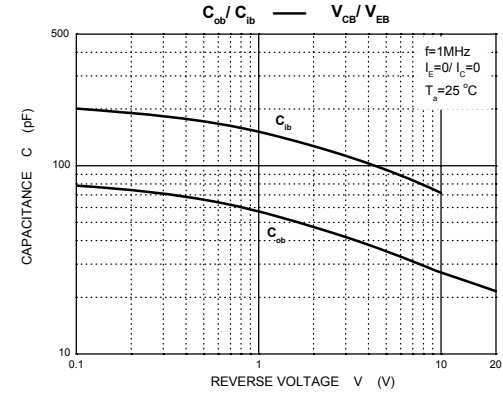
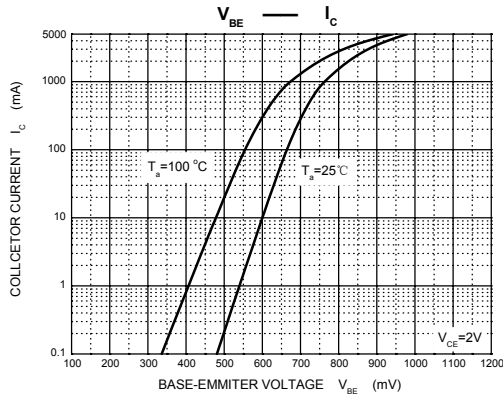
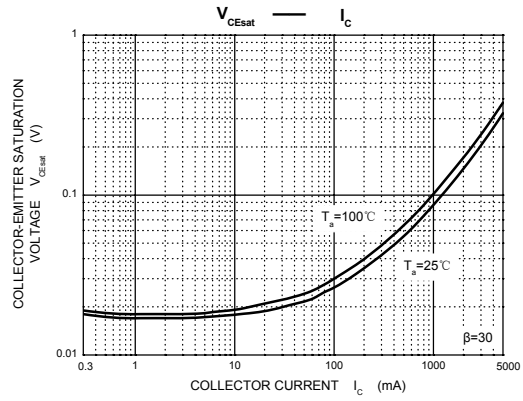
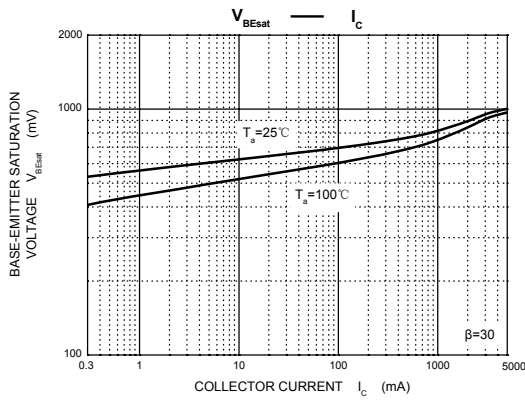
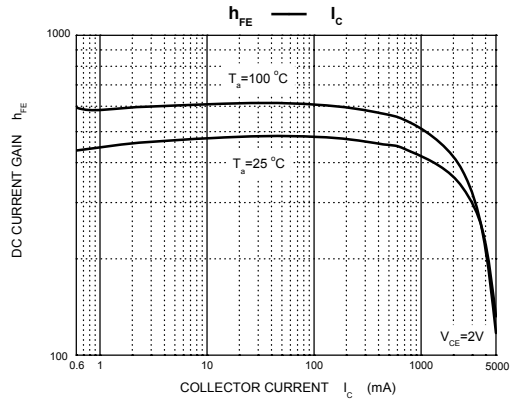
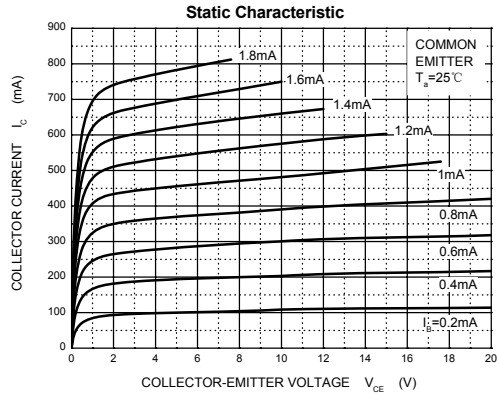
■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V <sub>CB0</sub>	I <sub>c</sub> = 100 μA, I <sub>E</sub> = 0	40			V
Collector- emitter breakdown voltage	V <sub>CE0</sub>	I <sub>c</sub> = 1 mA, I <sub>B</sub> = 0	20			
Emitter - base breakdown voltage	V <sub>EB0</sub>	I <sub>E</sub> = 100 μA, I <sub>c</sub> = 0	7			
Collector-base cut-off current	I <sub>CB0</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0			100	nA
Emitter cut-off current	I <sub>EB0</sub>	V <sub>EB</sub> = 7V, I <sub>c</sub> =0			100	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>c</sub> =3 A, I <sub>B</sub> =100mA			1	V
Base - emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>c</sub> =3 A, I <sub>B</sub> =100mA			1.2	
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> = 2V, I <sub>c</sub> = 1mA		200		
	h <sub>FE(2)</sub>	V <sub>CE</sub> = 2V, I <sub>c</sub> = 500mA	230		950	
	h <sub>FE(3)</sub>	V <sub>CE</sub> = 2V, I <sub>c</sub> = 2A	150			
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 20V, I <sub>E</sub> = 0, f=1MHz			50	pF
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 6V, I <sub>c</sub> = 50mA, f=200MHz		150		MHz

■ Classification of h<sub>fe(2)</sub>

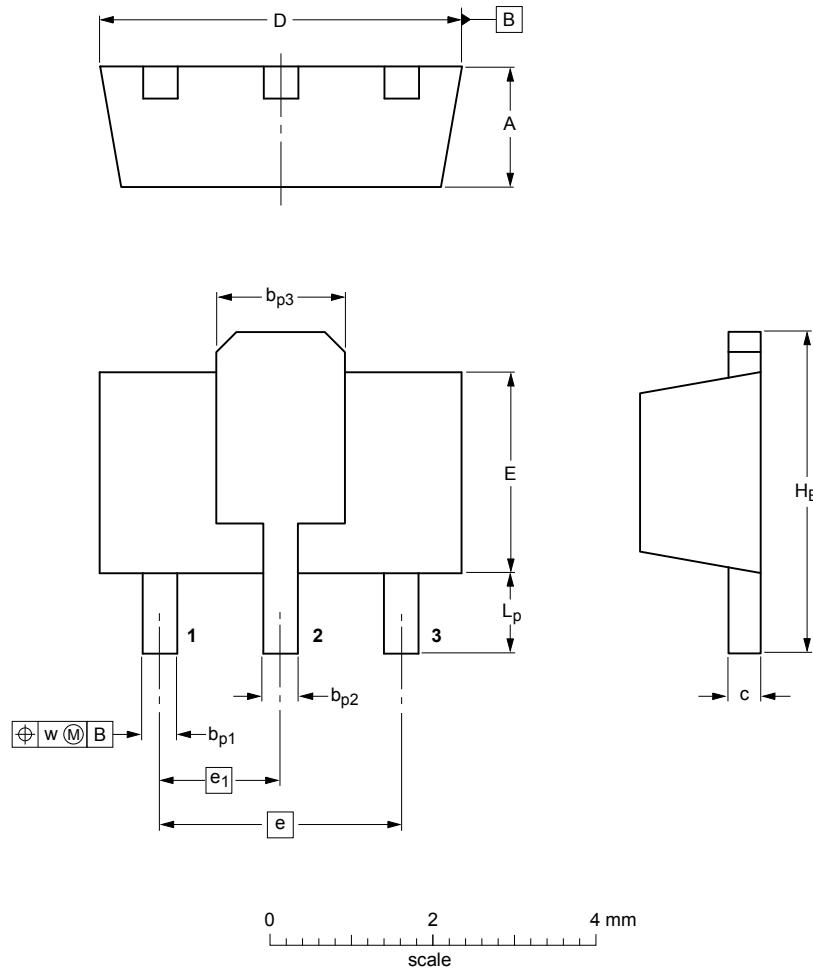
Type	2SD965-Q	2SD965-R	2SD965-S	2SD965-T
Range	230-380	340-600	560-800	560-950
Marking	965Q	965R	965S	965T

■ Typical Characteristics



Package Outline

SOT-89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p1</sub>	b <sub>p2</sub>	b <sub>p3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.23	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	1.2 0.8	0.13

Summary of Packing Options

Package	Package Description	Packing Quantity	Industry Standard
SOT-89	Tape/Reel, 7" reel	1000	EIA-481-1