



# 2SA2013 / 2SC5566 — PNP / NPN Epitaxial Planar Silicon Transistors

## DC / DC Converter Applications

### Applications

- Relay drivers, lamp drivers, motor drivers, flash.

### Features

- Adoption of FBET and MBIT processes.
- High current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.
- Ultrasmall package facilitates miniaturization in end products.
- High allowable power dissipation.

### Specifications ( ) : 2SA2013

#### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CB0</sub>		(-50)100	V
Collector-to-Emitter Voltage	V <sub>CES</sub>		(-50)100	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		(-)50	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		(-)6	V
Collector Current	I <sub>C</sub>		(-)4	A
Collector Current (Pulse)	I <sub>CP</sub>		(-)7	A
Base Current	I <sub>B</sub>		(-)600	mA
Collector Dissipation	P <sub>C</sub>	Mounted on a ceramic board (250mm <sup>2</sup> X0.8mm)	1.3	W
		T <sub>c</sub> =25°C	3.5	W
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

#### Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> =(-)40V, I <sub>E</sub> =0A			(-)1	μA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =(-)4V, I <sub>C</sub> =0A			(-)1	μA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)500mA	200		560	
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =(-)10V, I <sub>C</sub> =(-)500mA		(360)400		MHz

Marking : 2SA2013 : AT 2SC5566 : FC

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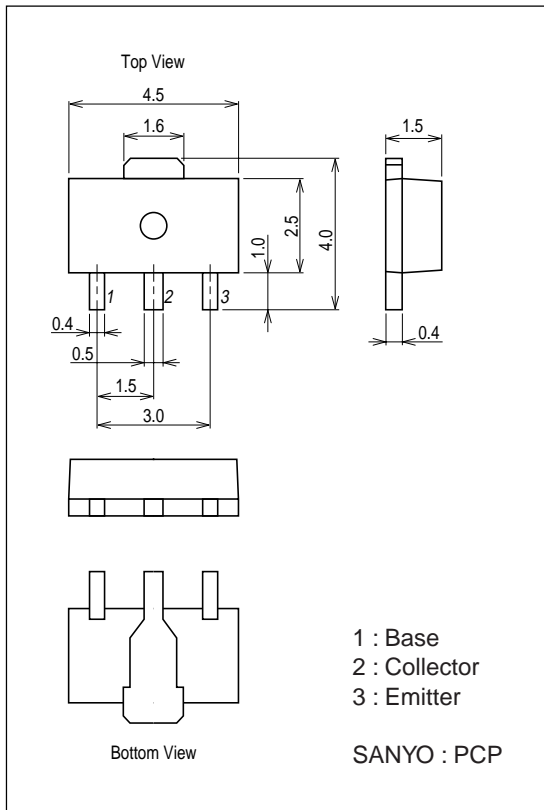
# 2SA2013 / 2SC5566

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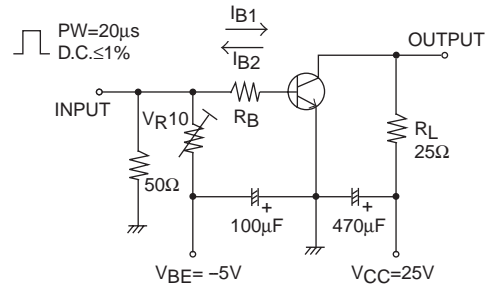
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Capacitance	Cob	$V_{CB} = (-)10V, f = 1MHz$		(24)15		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C = (-)1A, I_B = (-)50mA$		(-105)85	(-180)130	mV
	$V_{CE(sat)2}$	$I_C = (-)2A, I_B = (-)100mA$		(-200)150	(-340)225	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = (-)2A, I_B = (-)100mA$		(-)0.89	(-)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = (-)10\mu A, I_E = 0A$	(-50)100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C = (-)100\mu A, R_{BE} = 0\Omega$	(-50)100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = (-)1mA, R_{BE} = \infty$	(-)50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = (-)10\mu A, I_C = 0A$	(-)6			V
Turn-On Time	$t_{on}$	See specified Test Circuit.		(30)35		ns
Storage Time	$t_{stg}$	See specified Test Circuit.		(230)300		ns
Fall Time	$t_f$	See specified Test Circuit.		(15)20		ns

## Package Dimensions

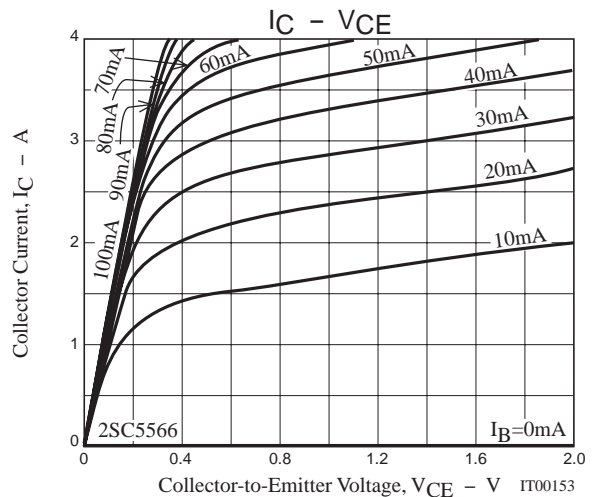
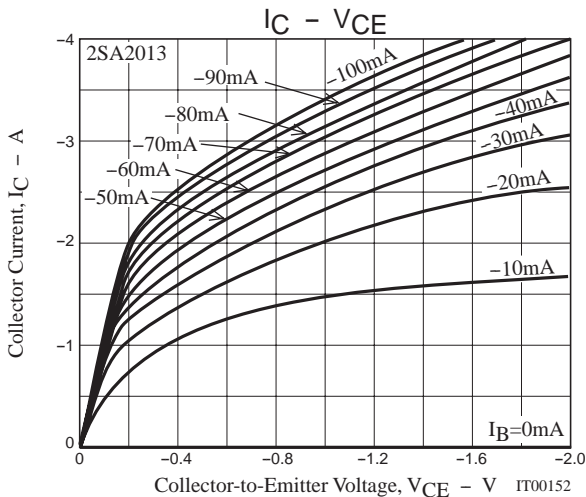
unit : mm  
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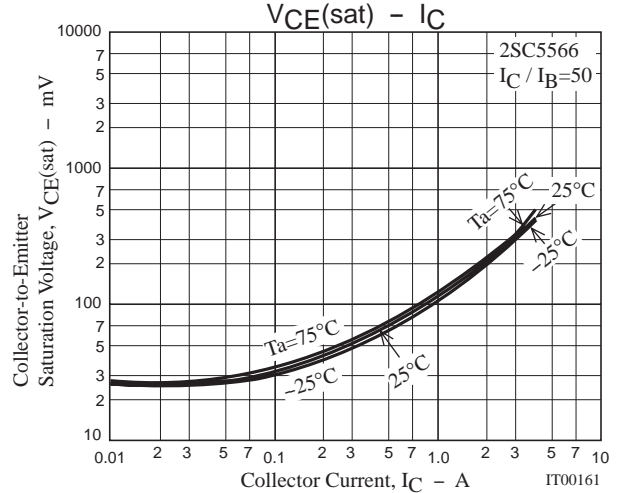
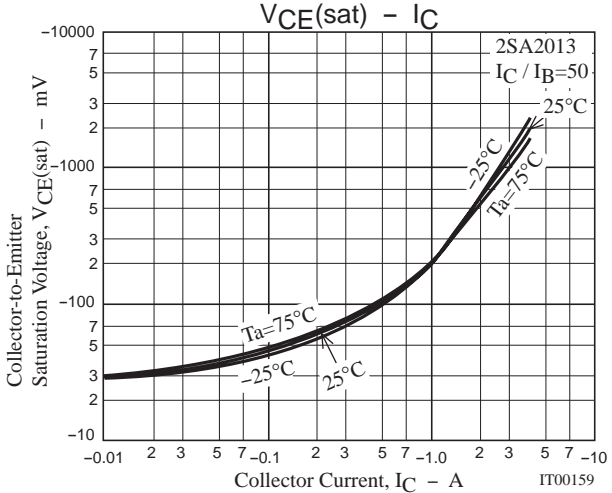
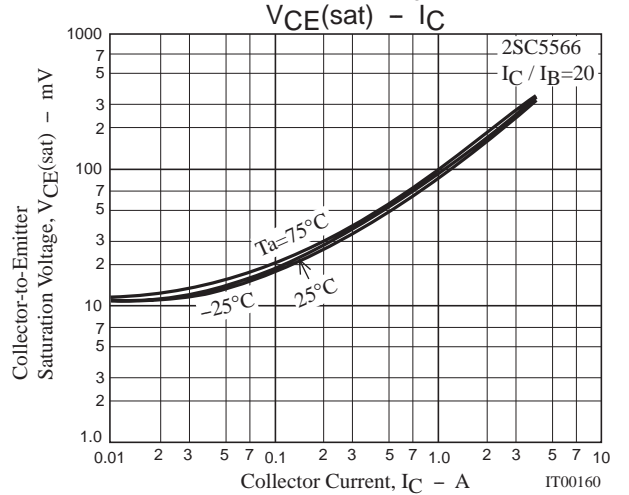
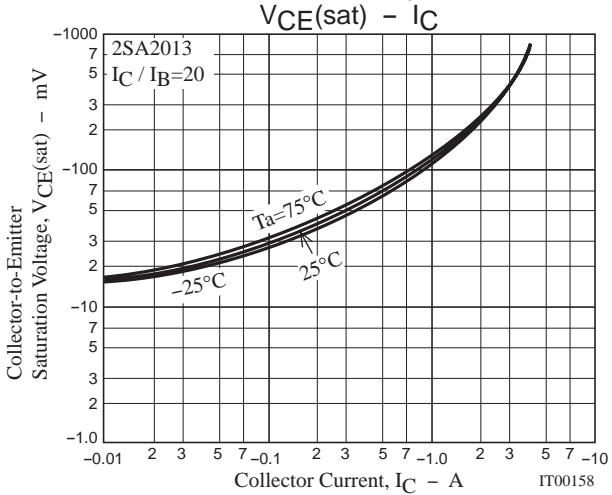
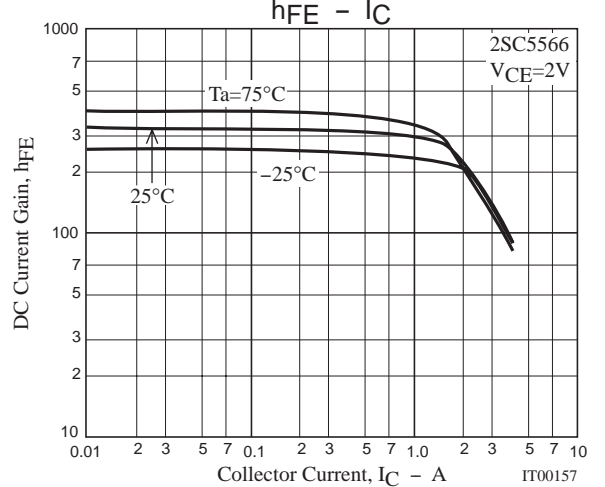
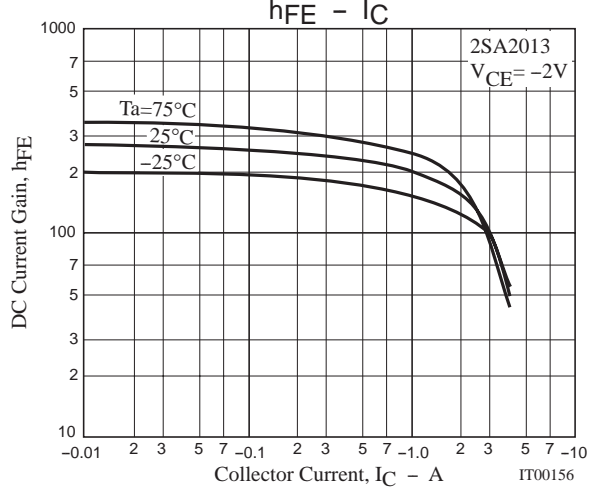
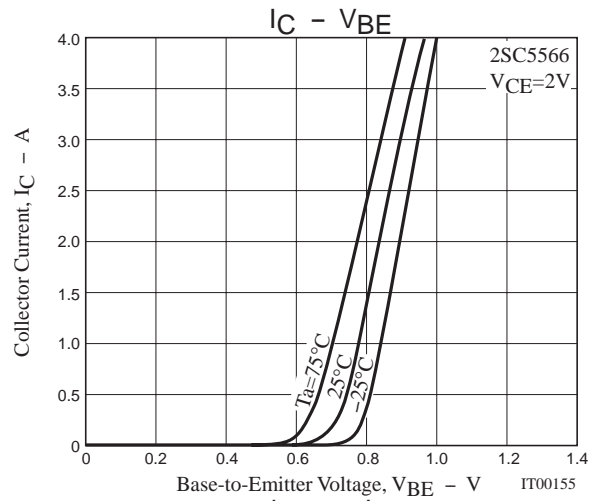
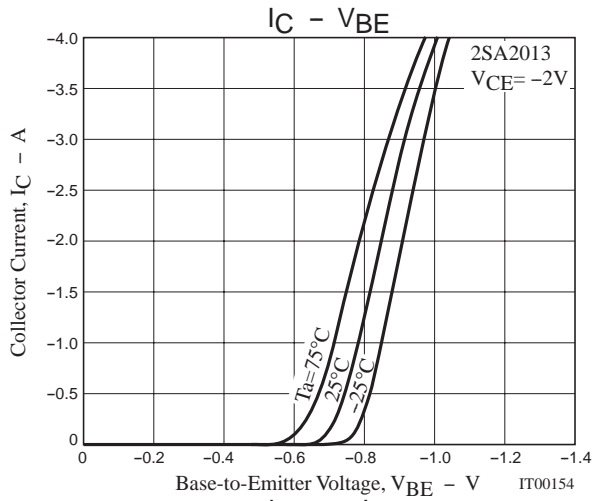


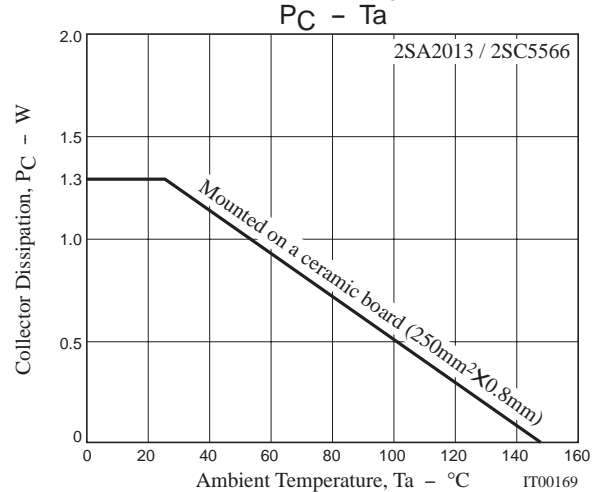
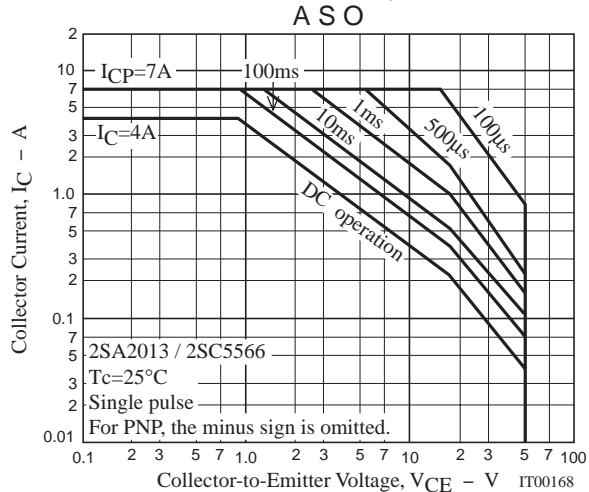
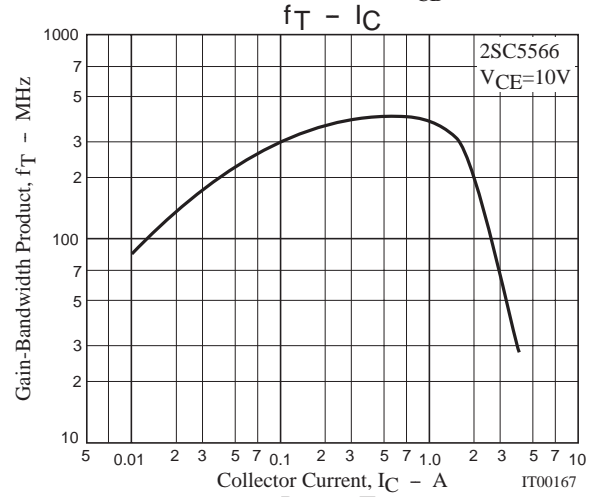
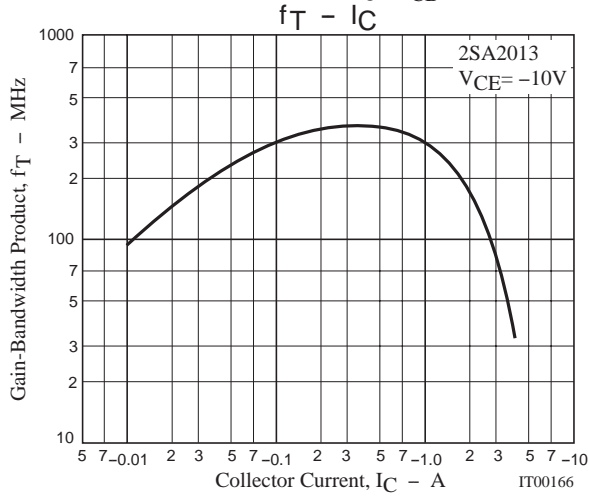
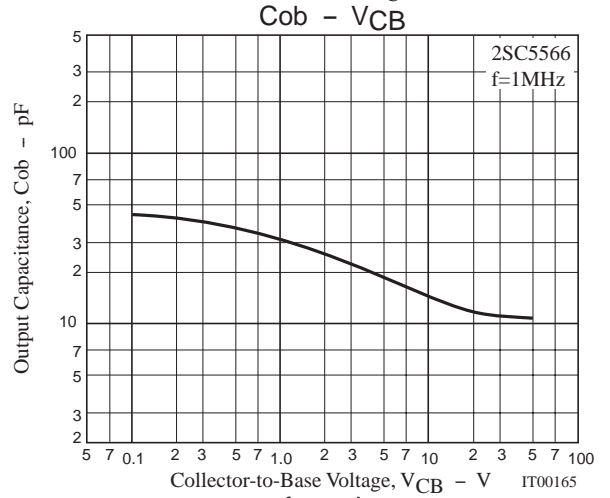
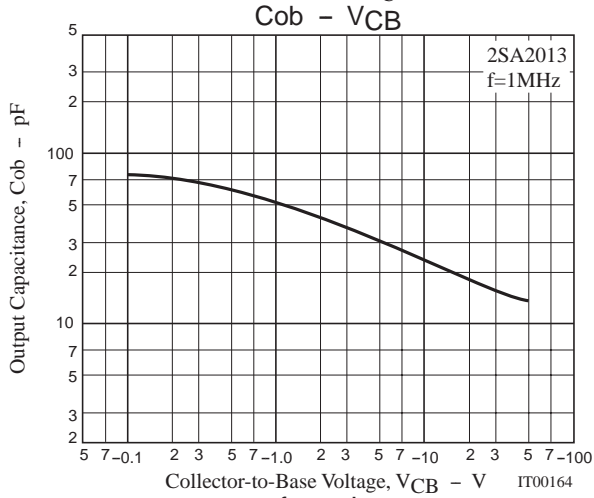
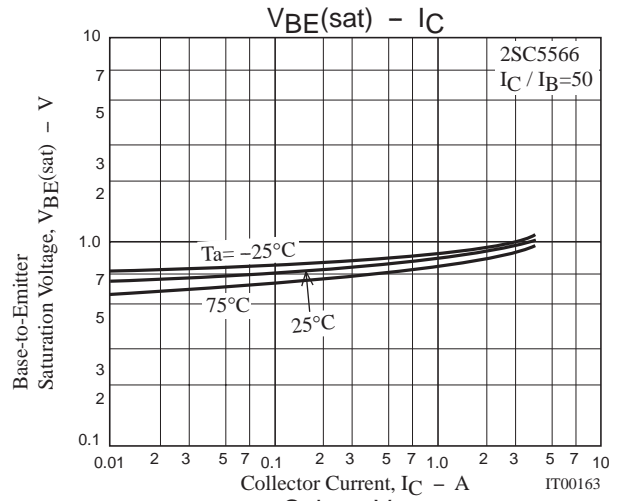
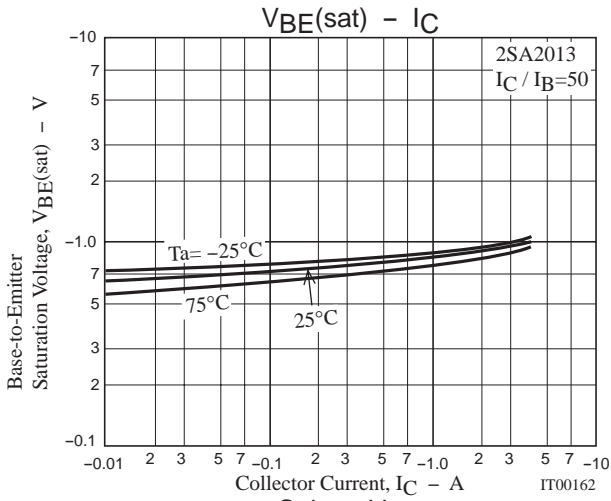
## Switching Time Test Circuit

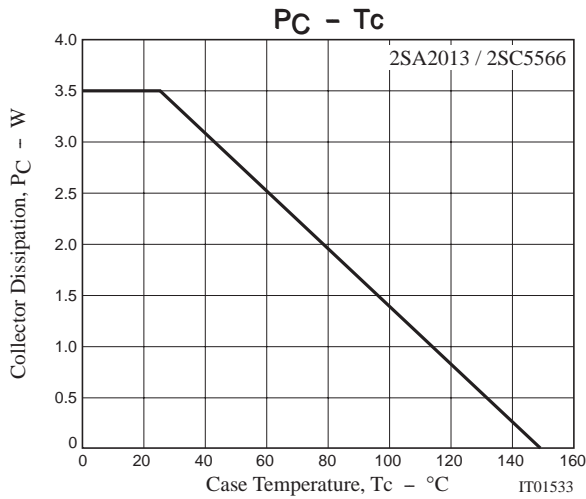


$I_C = 10I_B1 = -10I_B2 = 1A$   
For PNP, the polarity is reversed.









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