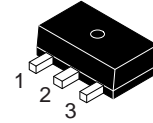


Bipolar Transistor

(-)50 V, (-)4 A, Low VCE(sat), (PNP) NPN
Single PCP

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Features

- Adoption of FBET and MBIT Processes
- Low Collector-to-Emitter Saturation Voltage
- Ultrasmall Package Facilitates Miniaturization in End Products
- High Allowable Power Dissipation
- Large Current Capacity
- High-speed Switching

Applications

- Relay Drivers, Lamp Drivers, Motor Drivers, Flash

Specifications

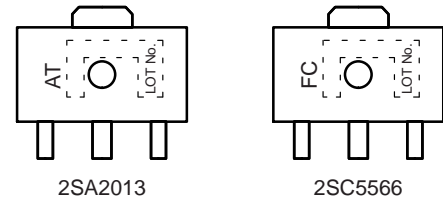
(): 2SA2013

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V _{CBO}		(-50) 100	V
Collector-to-Emitter Voltage	V _{CES}		(-50) 100	V
Collector-to-Emitter Voltage	V _{CEO}		(-)50	V
Emitter-to-Base Voltage	V _{EBO}		(-)6	V
Collector Current	I _C		(-)4	A
Collector Current (Pulse)	I _{CP}		(-)7	A
Base Current	I _B		(-)600	mA
Collector Dissipation	P _C	When mounted on ceramic substrate (250 mm ² x 0.8 mm)	1.3	W
		T _c = 25°C	3.5	W
Junction Temperature	T _j		150	°C
Storage Temperature	T _{stg}		-55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

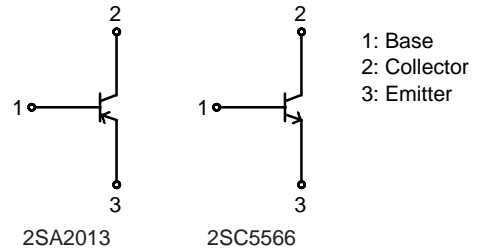
MARKING DIAGRAM



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ELECTRICAL CONNECTION



2SA2013

2SC5566

ORDERING INFORMATION

Device	Package Type (JEITA, JEDEC)	Shipping†
2SA2013-TD-E	PCP (Pb-Free)	1000 / Tape & Reel
2SC5566-TD-E		

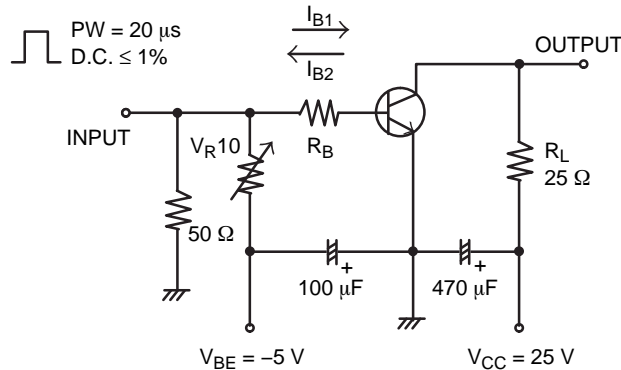
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I _{CBO}	V _{CB} = (-)40 V, I _E = 0 A	-	-	(-)1	μA
Emitter Cutoff Current	I _{EBO}	V _{EB} = (-)4 V, I _C = 0 A	-	-	(-)1	μA
DC Current Gain	h _{FE}	V _{CE} = (-)2 V, I _C = (-)500 mA	200	-	560	
Gain-Bandwidth Product	f _T	V _{CE} = (-)10 V, I _C = (-)500 mA	-	(360) 400	-	MHz
Output Capacitance	C _{ob}	V _{CB} = (-)10 V, f = 1 MHz	-	(24) 15	-	pF
Collector-to-Emitter Saturation Voltage	V _{CE(sat)1}	I _C = (-)1 A, I _B = (-)50 mA	-	(-105) 85	(-180) 130	mV
	V _{CE(sat)2}	I _C = (-)2 A, I _B = (-)100 mA	-	(-200) 150	(-340) 225	mV
Base-to-Emitter Saturation Voltage	V _{BE(sat)}	I _C = (-)2 A, I _B = (-)100 mA	-	(-) 0.89	(-)1.2	V
Collector-to-Base Breakdown Voltage	V _{(BR)CBO}	I _C = (-)10 μA, I _E = 0 A	(-50) 100	-	-	V
Collector-to-Emitter Breakdown Voltage	V _{(BR)CES}	I _C = (-)100 μA, R _{BE} = 0 Ω	(-50) 100	-	-	V
Collector-to-Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = (-)1 mA, R _{BE} = ∞	(-)50	-	-	V
Emitter-to-Base Breakdown Voltage	V _{(BR)EBO}	I _E = (-)10 μA, I _C = 0 A	(-)6	-	-	V
Turn-ON Time	t _{on}	See specified Test Circuit.	-	(30) 35	-	ns
Storage Time	t _{stg}		-	(230) 300	-	ns
Fall Time	t _f		-	(15) 20	-	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Switching Time Test Circuit



I_C = 10I_{B1} = -10I_{B2} = 1 A
 For PNP, the polarity is reversed.

Figure 1. Switching Time Test Circuit

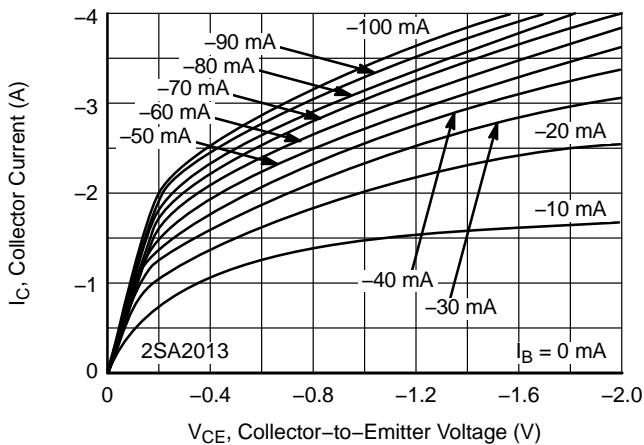


Figure 2. $I_C - V_{CE}$

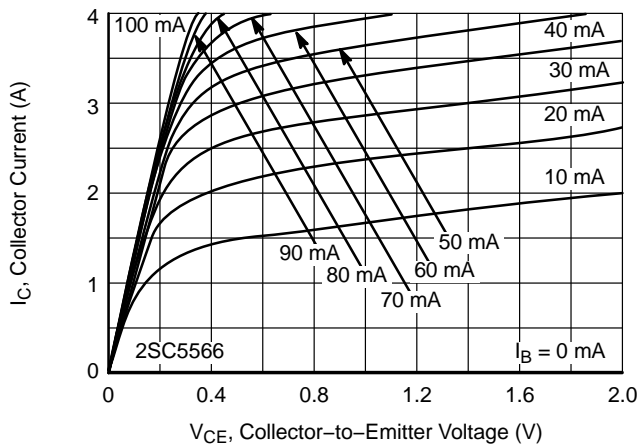


Figure 3. $I_C - V_{CE}$

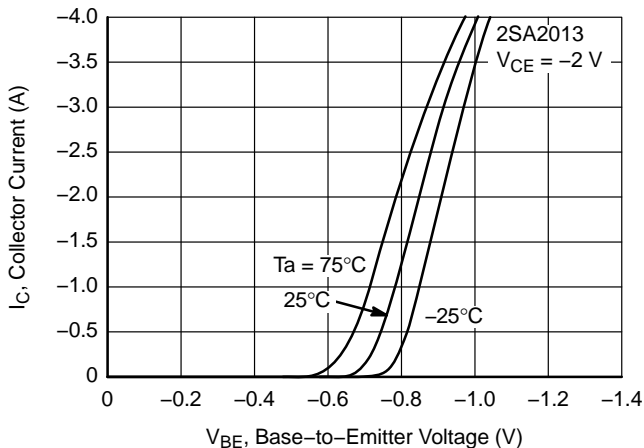


Figure 4. $I_C - V_{BE}$

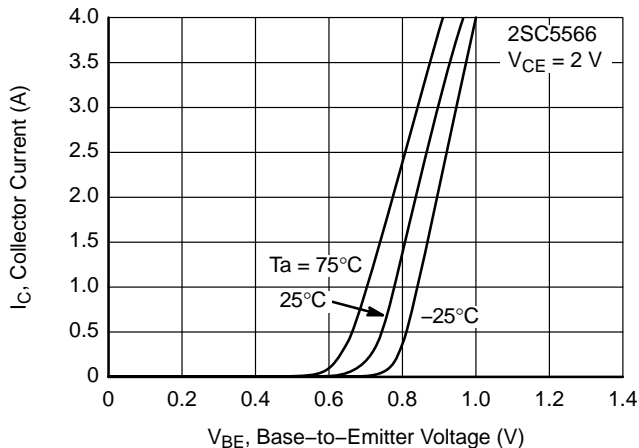


Figure 5. $I_C - V_{BE}$

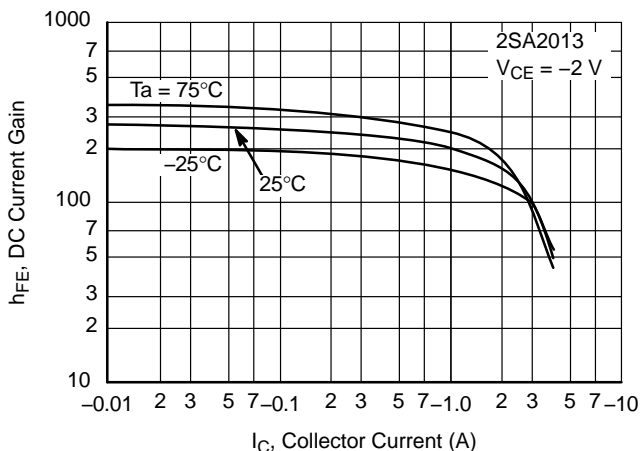


Figure 6. $h_{FE} - I_C$

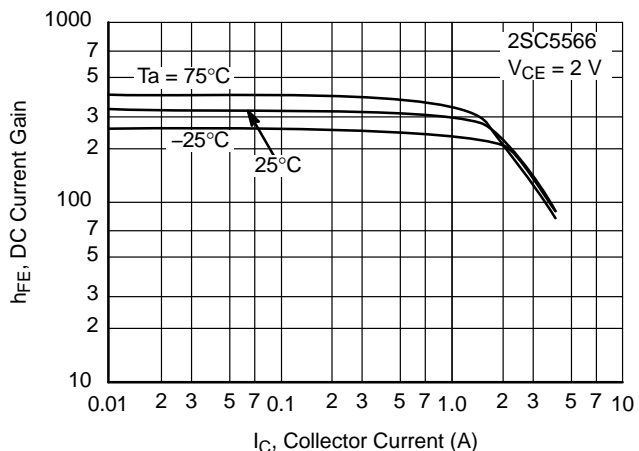


Figure 7. $h_{FE} - I_C$

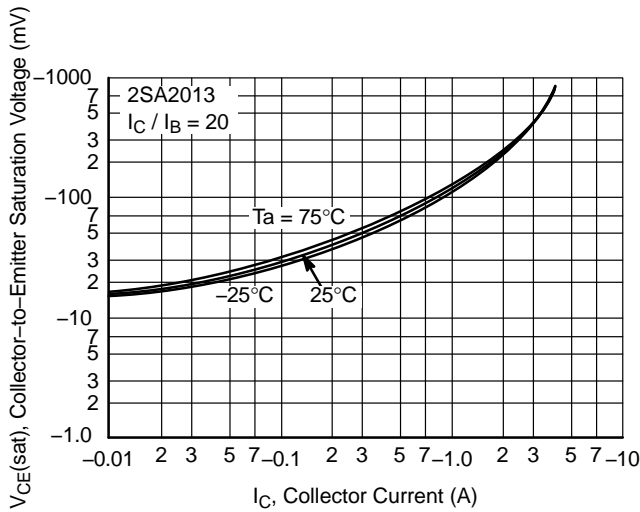


Figure 8. $V_{CE(sat)} - I_C$

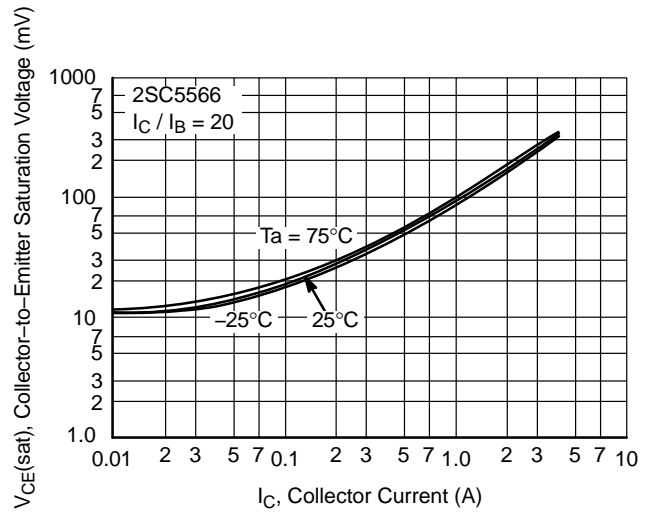


Figure 9. $V_{CE(sat)} - I_C$

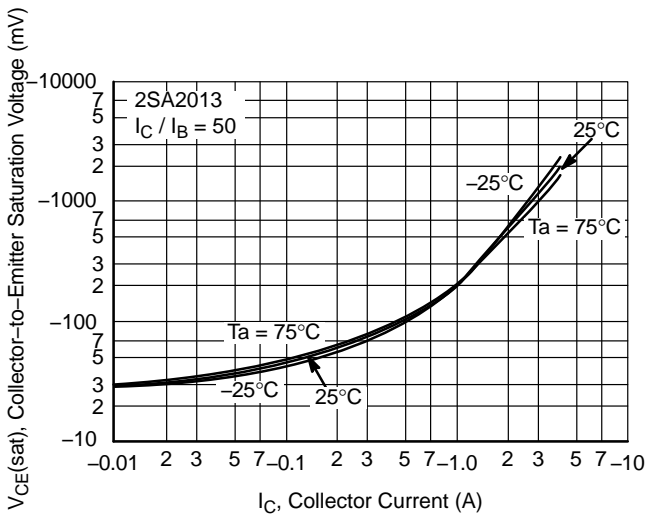


Figure 10. $V_{CE(sat)} - I_C$

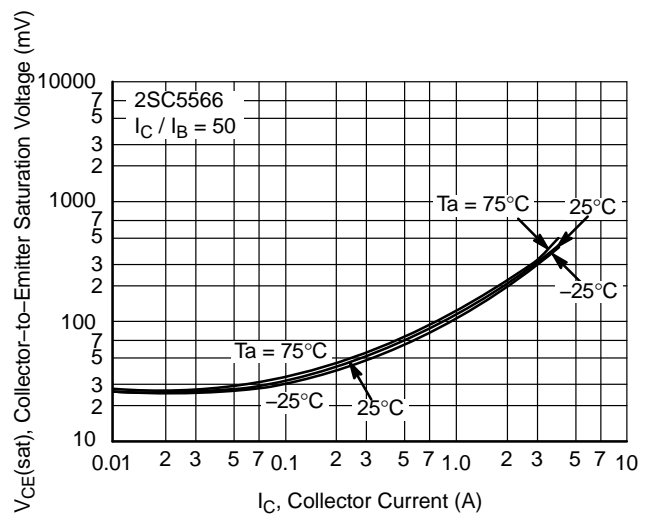


Figure 11. $V_{CE(sat)} - I_C$

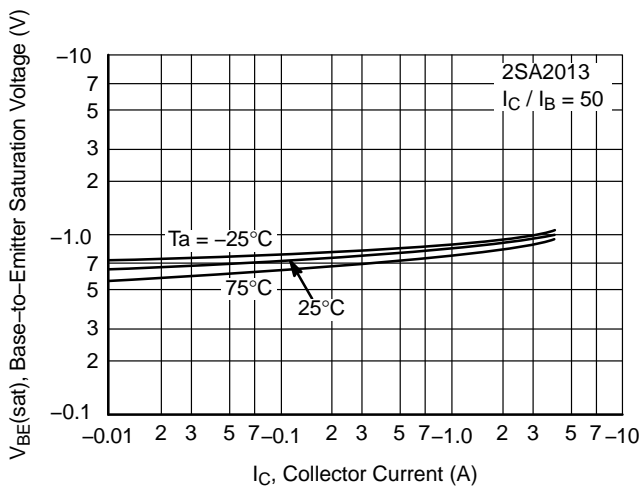


Figure 12. $V_{BE(sat)} - I_C$

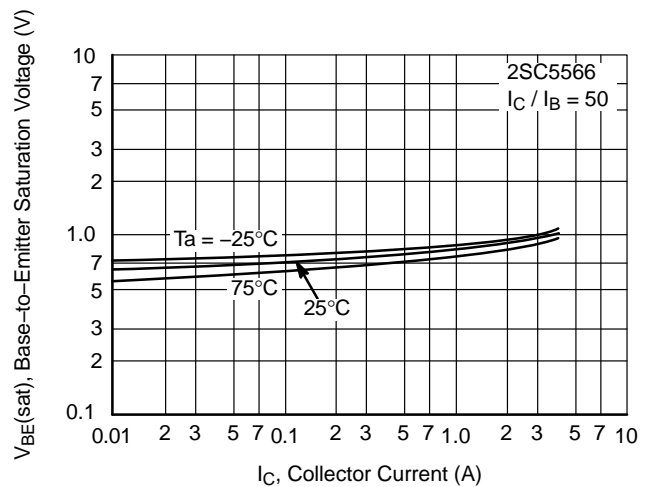


Figure 13. $V_{BE(sat)} - I_C$

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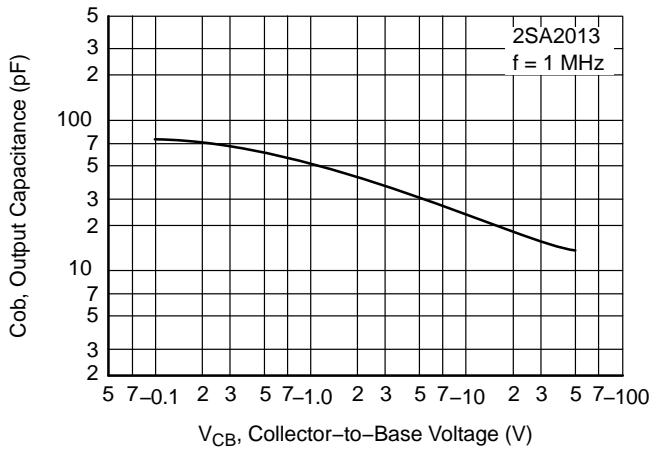


Figure 14. Cob - VCB

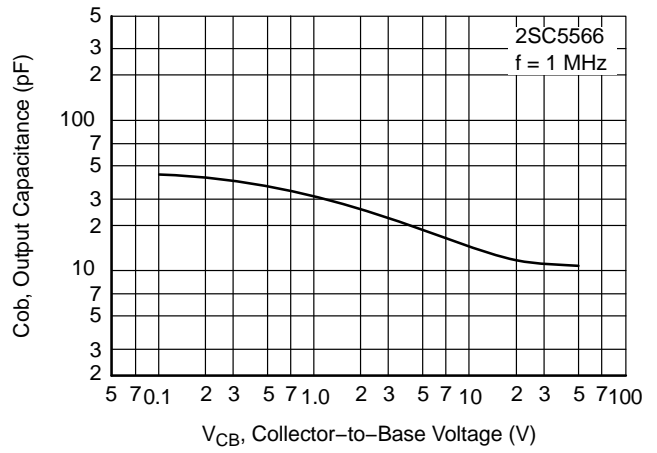


Figure 15. Cob - VCB

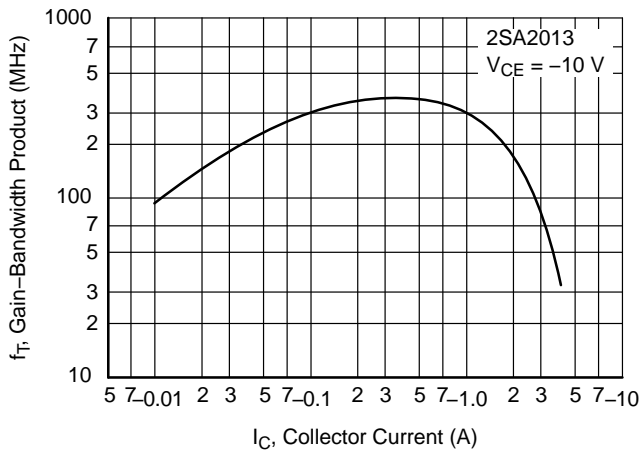


Figure 16. fT - IC

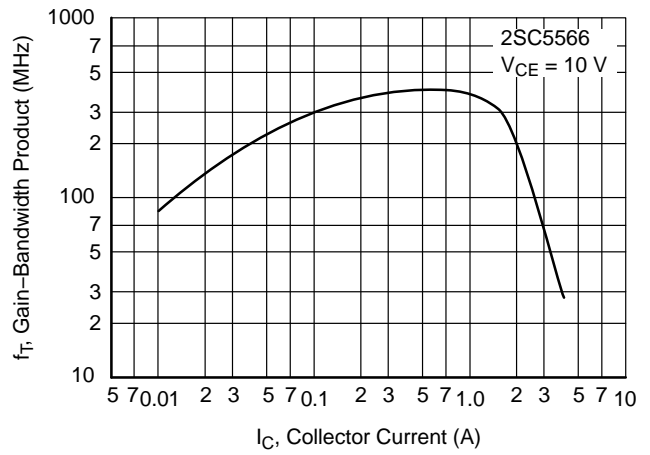


Figure 17. fT - IC

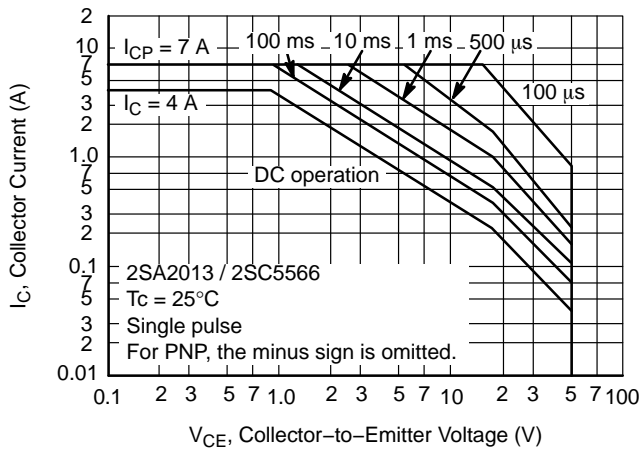


Figure 18. ASO

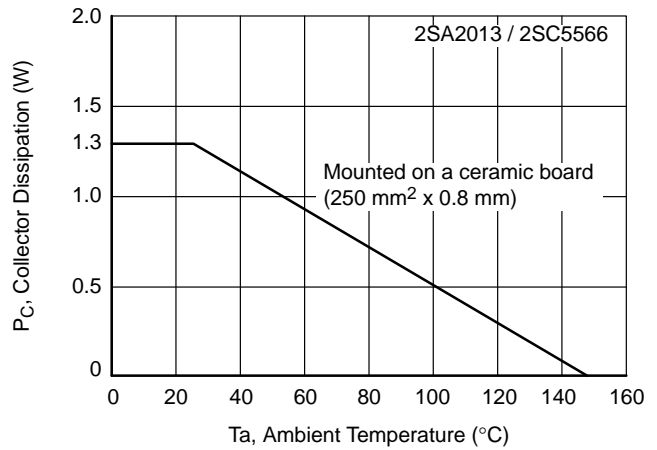


Figure 19. PC - Ta

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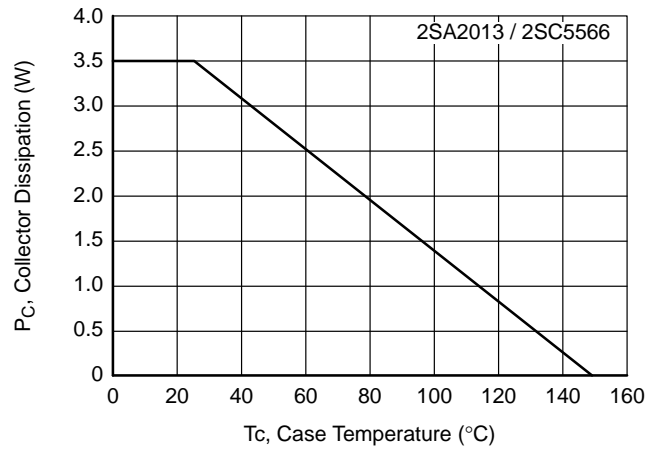
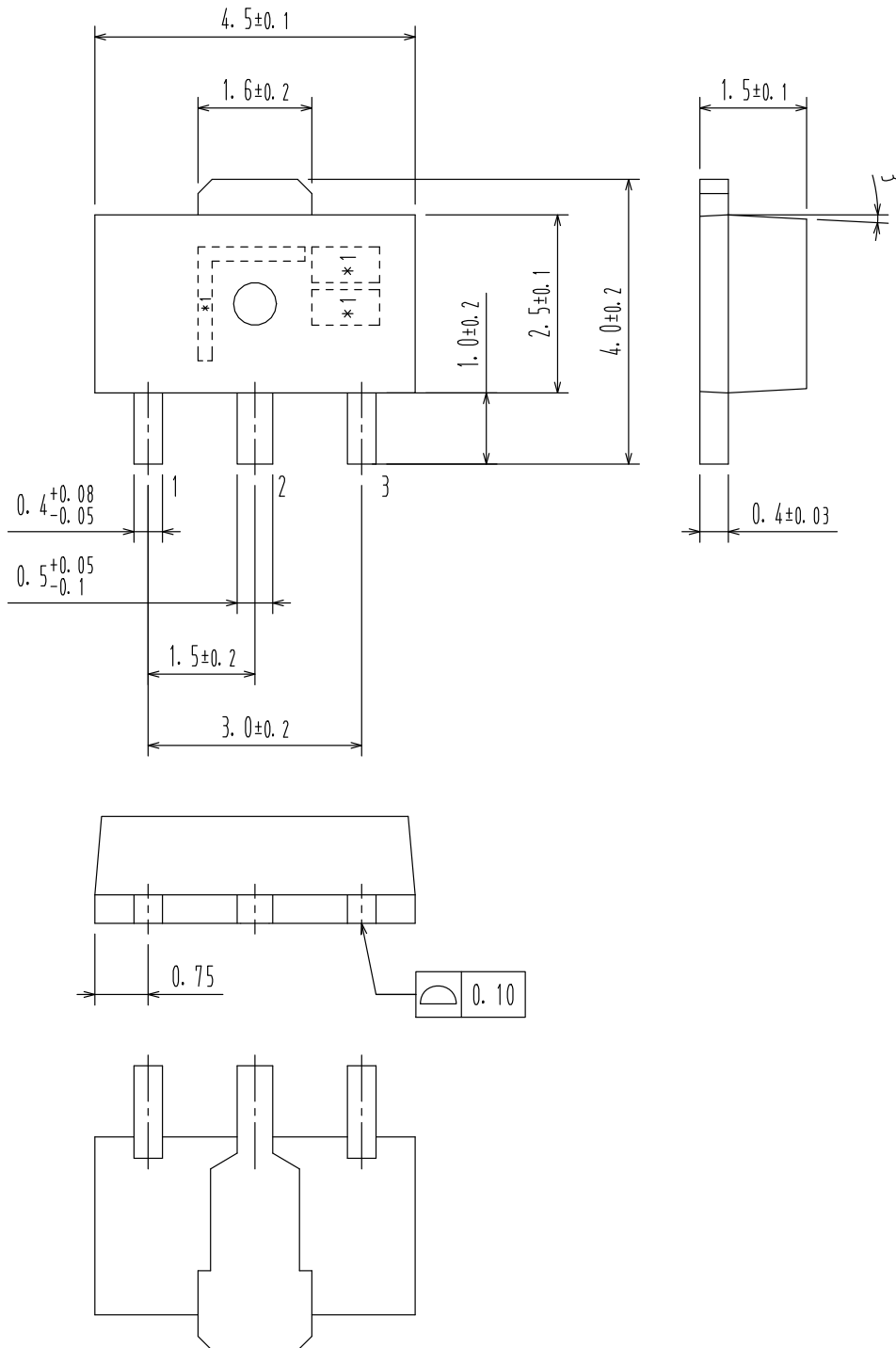


Figure 20. $P_C - T_c$

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