Bipolar Transistor (–)50 V, (–)3 A, Low V_{CE}(sat), (PNP)NPN Single

NSVS50030SB3, NSVS50031SB3

This device is bipolar junction transistor featuring high current, low saturation voltage, and high speed switching.

Suitable for motor driver, relay driver, DC–DC converter of automotive applications. AEC–Q101qualified and PPAP capable.

Features

- Large Current Capacitance
- Low Collector to Emitter Saturation Voltage
- High–Speed Switching
- High Allowable Power Dissipation
- AEC–Q101Qualified and PPAP Capable
- Pb–Free, Halogen Free and RoHS Compliance
- Ultra Small Package Facilitates Miniaturization in End Products (Mounting Height: 0.9 mm)

Typical Applications

- DC / DC Converter
- Relay Drivers, Lamp Drivers, Motor Drivers
- Camera Flash

Specifications

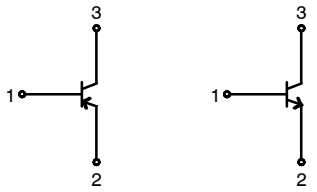
ABSOLUTE MAXIMUM RATINGS at T_A = 25°C

Parameter	Symbol	Value	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	(–)3	A
Collector Current (Pulse)	I_{CP}	(–)6	A
Base Current	I_B	(–)600	mA
Collector Dissipation (Note 1)	P_C	1.1	W
Junction Temperature	Tj	175	°C
Storage Temperature	Tstg	–55 to +175	°C

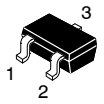
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on ceramic substrate. (600 mm^2 x 0.8 mm)

ELECTRICAL CONNECTION



NSVS50030SB3 NSVS50031SB3



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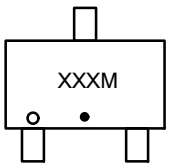
MARKING DIAGRAMS



XXX = HAE: NSVS50030SB3
= HCE: NSVS50031SB3
M = Single Digit Date Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing) †
NSVS50030SB3T1G	HAE	CPH3 (Pb−Free / Halogen Free)	3,000/ Tape & Reel
NSVS50031SB3T1G	HCE		

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Parameter	Symbol	Conditions	Value			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 = (−)100 mA	200		560	
Gain−Bandwidth Product	f_T	V_{CE} = (−)10 V, I_C = (−)500 mA		(360) 380		MHz
Output Capacitance	Cob	V_{CB} = (−)10 V, f = 1 MHz		(24) 13		pF
Collector to Emitter Saturation Voltage	V_{CE}(sat)	I_C = (−)1 A, I_B = (−)50 mA		(−100) 80	(−200) 120	mV
		I_C = (−)2 A, I_B = (−)100 mA		(−185) 140	(−500) 210	mV
Base to Emitter Saturation Voltage	V_{BE}(sat)	I_C = (−)2 A, I_B = (−)100 mA		(−)0.88	(−)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 Fig.1		(30) 35		ns
Storage Time	t_{stg}			(230) 300		ns
Fall Time	t_f			(15) 22		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.

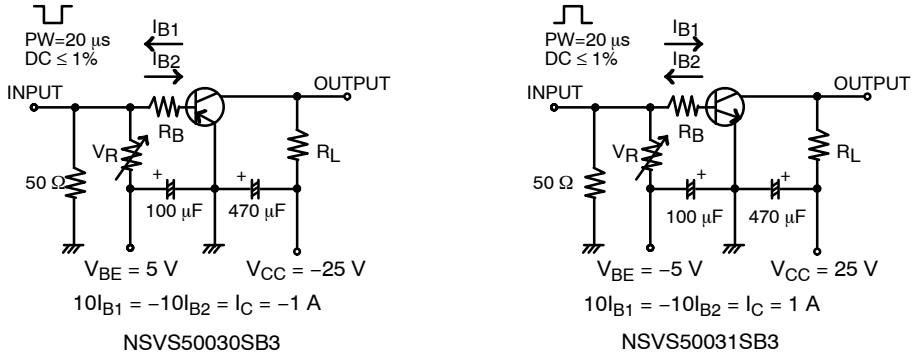


Figure 1. Switching Time Test Circuit

TYPICAL PERFORMANCE CHARACTERISTICS

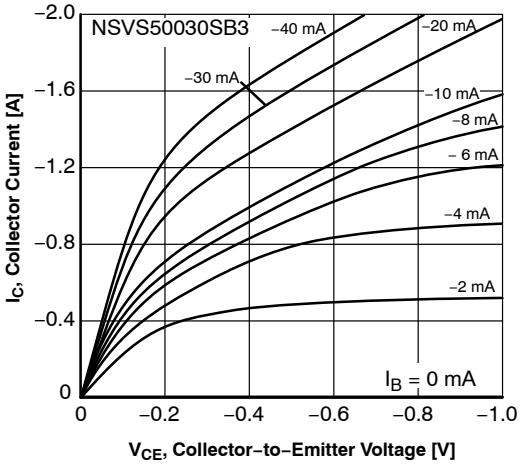


Figure 2. I_C – V_{CE}

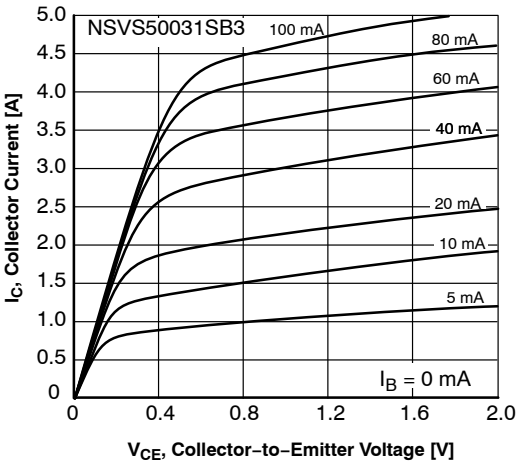


Figure 3. I_C – V_{CE}

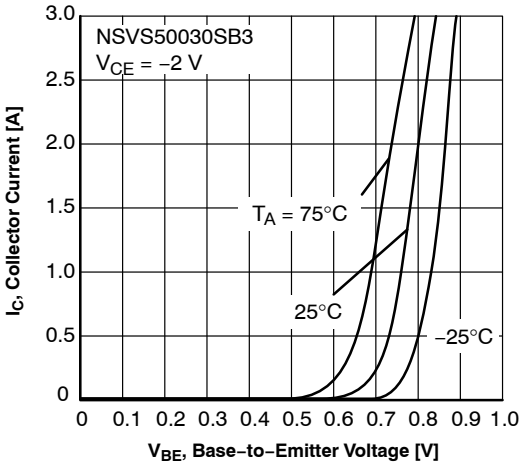


Figure 4. I_C – V_{BE}

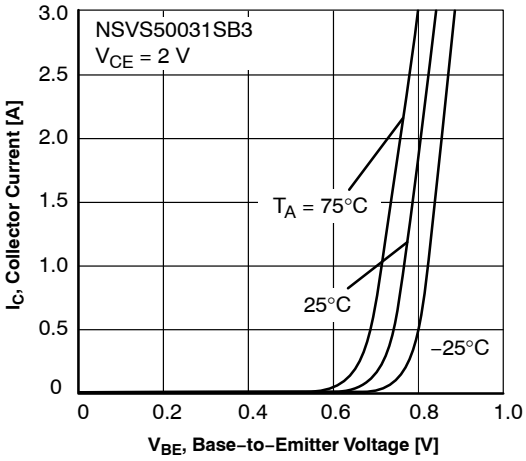


Figure 5. I_C – V_{BE}

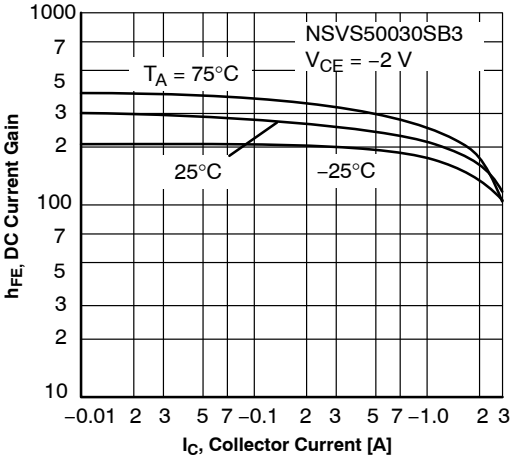


Figure 6. h_{FE} – I_C

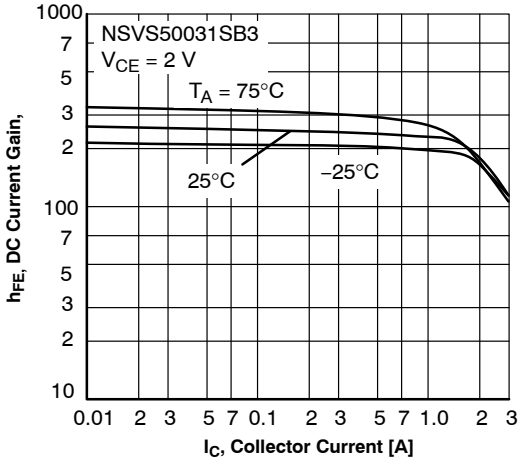


Figure 7. h_{FE} – I_C

TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)

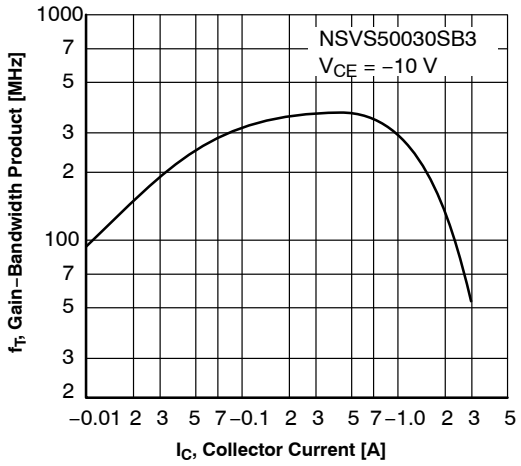


Figure 8. f_T – I_C

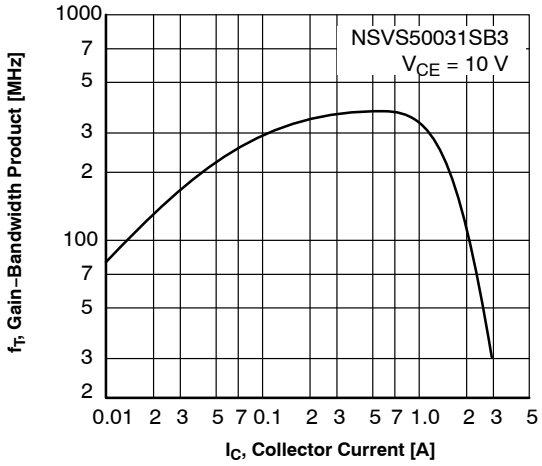


Figure 9. f_T – I_C

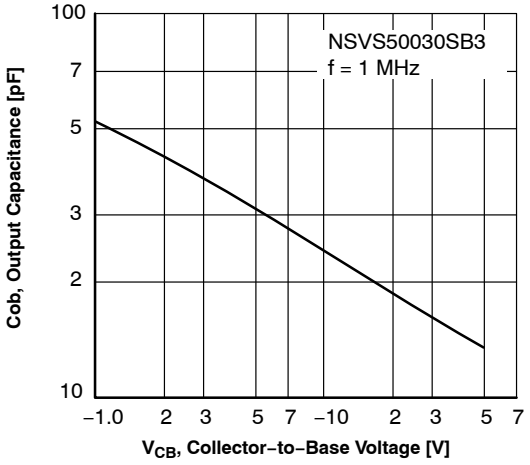


Figure 10. Cob – V_{CB}

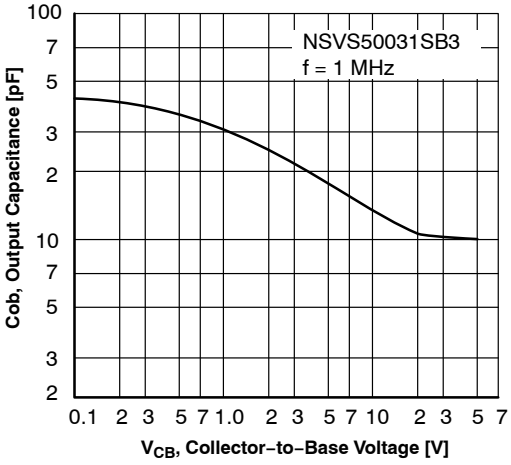


Figure 11. Cob – V_{CB}

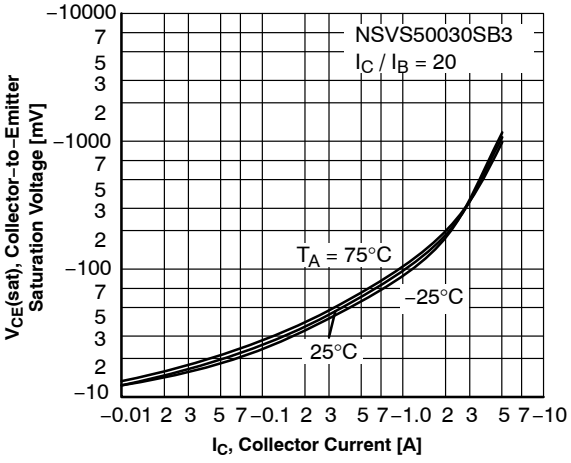


Figure 12. V_{CE}(sat) – I_C

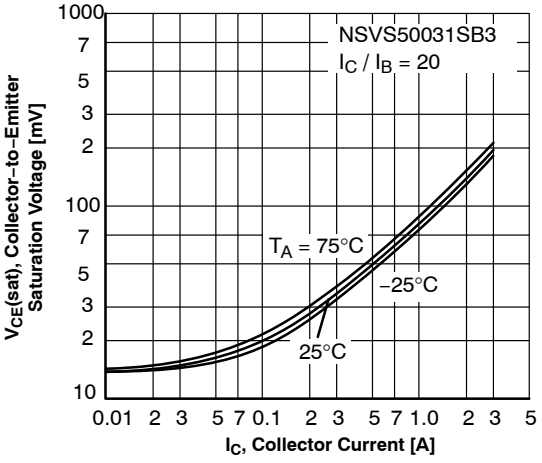


Figure 13. V_{CE}(sat) – I_C

TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)

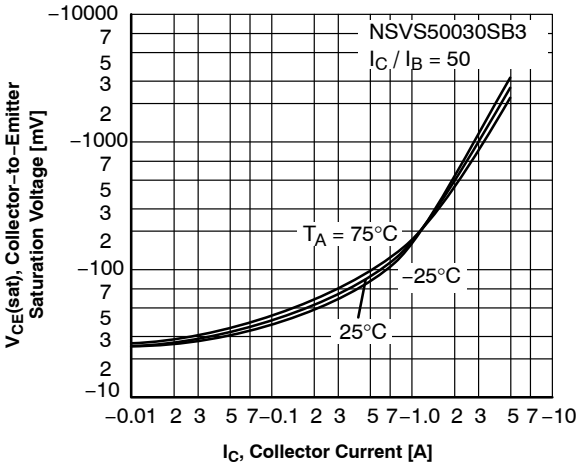


Figure 14. $V_{CE}(sat) - I_C$

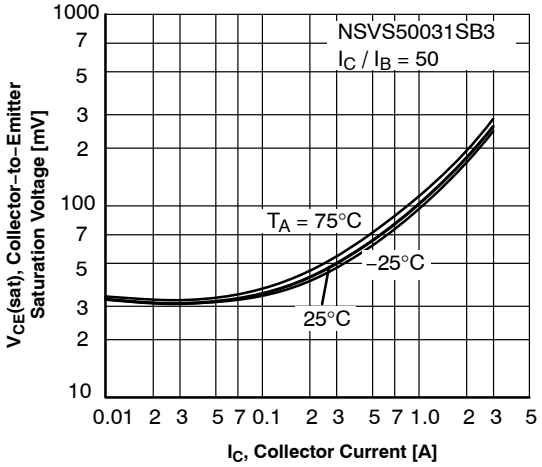


Figure 15. $V_{CE}(sat) - I_C$

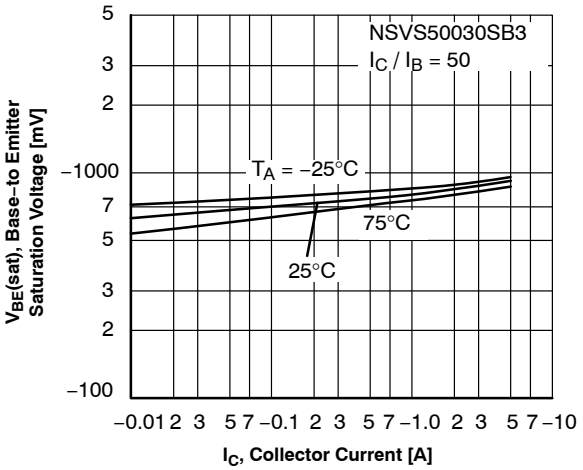


Figure 16. $V_{BE}(sat) - I_C$

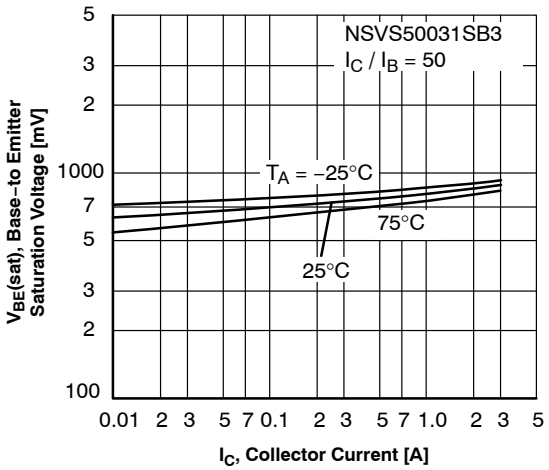


Figure 17. $V_{BE}(sat) - I_C$

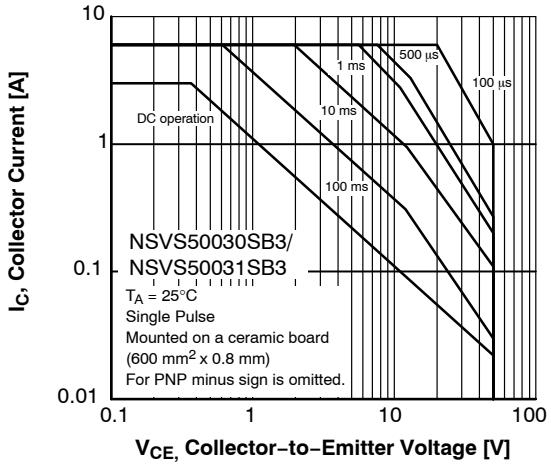


Figure 18. ASO

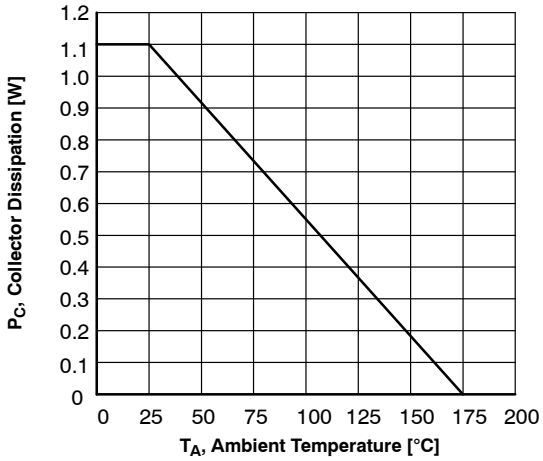


Figure 19. $P_C - T_A$

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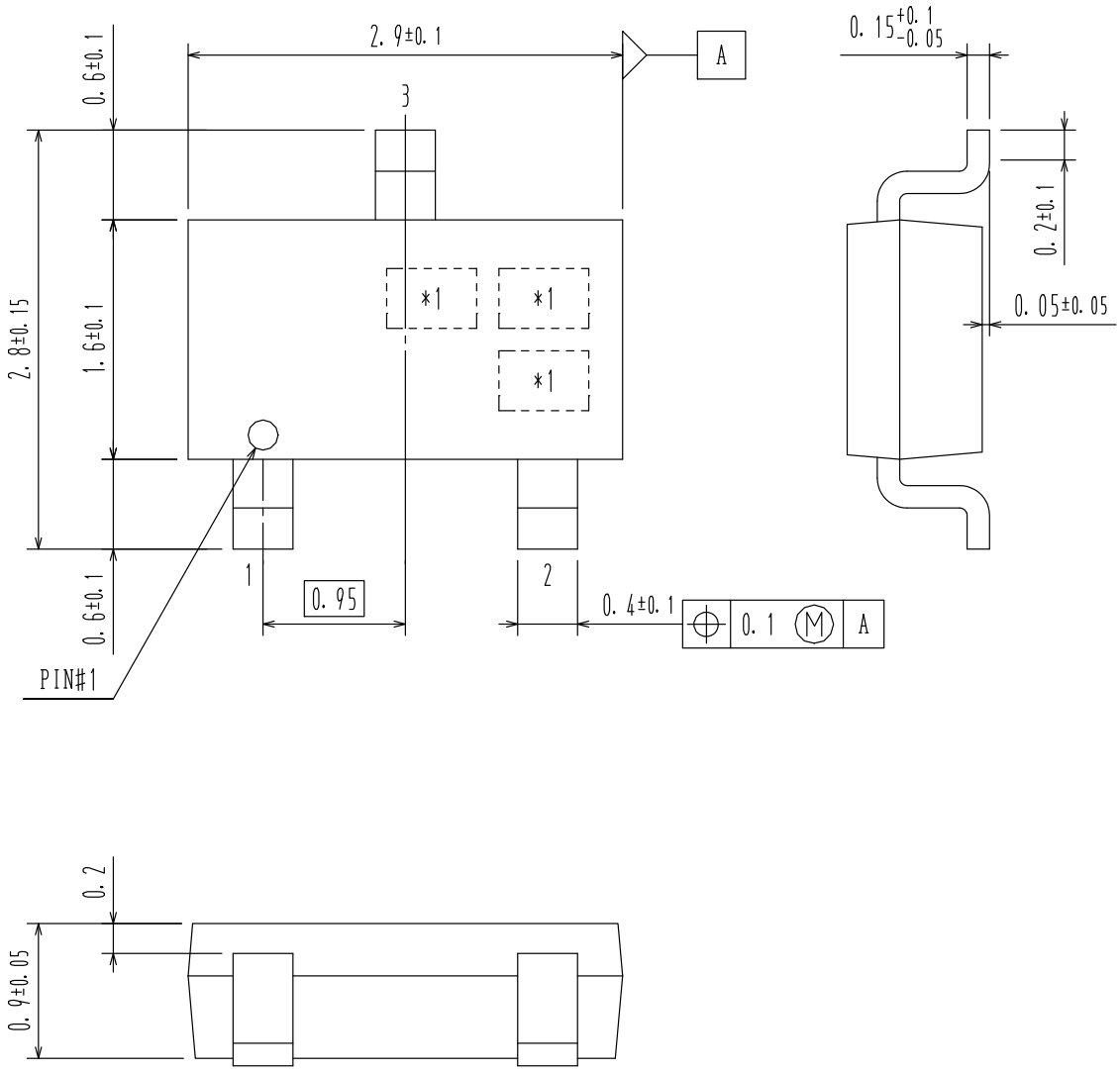

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