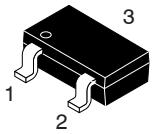
Bipolar Transistor

(–)50 V, (–)1 A, Low V_{CE}(sat), (PNP)NPN Single CPH3

CPH3116, CPH3216



1: Base
2: Emitter
3: Collector

CPH3
CASE 318BA

Features

- Adoption of MBIT Processes
- Large Current Capacity
- Low Collector−to−emitter Saturation Voltage
- High−speed Switching
- Ultrasmall Package Facilitates Miniaturization in End Products (Mounting Height : 0.9 mm)
- High Allowable Power Dissipation
- These are Pb−Free Devices

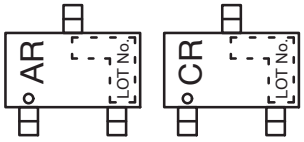
Applications

- Relay Drivers, Lamp Drivers, Motor Drivers, Flash

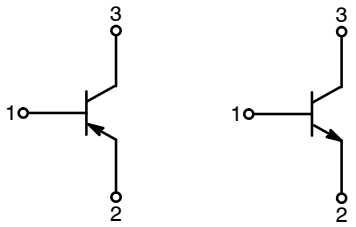
Specifications

( ): CPH3116

MARKING DIAGRAMS



ELECTRICAL CONNECTION



CPH3116 CPH3216

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Collector−to−Base Voltage	V_{CBO}		(−50)80	V
Collector−to−Emitter Voltage	V_{CES}		(−50)80	V
Emitter−to−Base Voltage	V_{CEO}		(−)50	V
	V_{EBO}		(−)5	V
Collector Current	I_C		(−)1.0	A
Collector Current (Pulse)	I_{CP}		(−)3	A
Base Current	I_B		(−)200	mA
Collector Dissipation	P_C	When mounted on ceramic substrate (600 $mm^2 \times 0.8$ mm)	0.9	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−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.

ORDERING INFORMATION

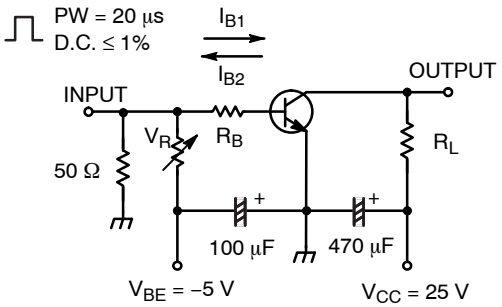
Device	Package	Shipping†
CPH3116−TL−E	CPH3 (Pb−Free)	3000 / Tape & Reel
CPH3216−TL−E	CPH3 (Pb−Free)	3000 / Tape & Reel

†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 (Ta = 25°C)

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	V_{CB} = (–)40 V, I_E = 0 A	–	–	(–)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = (–)4 V, I_C = 0 A	–	–	(–)0.1	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 = (–)300 mA	–	420	–	MHz
Output Capacitance	Cob	V_{CB} = (–)10 V, f = 1 MHz	–	(9)6	–	pF
Collector–to–Emitter Saturation Voltage	V_{CE}(sat)1	I_C = (–)500 mA, I_B = (–)10 mA	–	(–280)130	(–430)190	mV
	V_{CE}(sat)2	I_C = (–)300 mA, I_B = (–)6 mA	–	(–145)90	(–220)135	mV
Base–to–Emitter Saturation Voltage	V_{BE}(sat)	I_C = (–)500 mA, I_B = (–)10 mA		(–)0.81	(–)1.2	V
Collector–to–Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = (–)10 μA, I_E = 0 A	(–50)80	–	–	V
Collector–to–Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C = (–)100 μA, R_{BE} = 0 Ω	(–50)80	–	–	V
	$V_{(BR)CEO}$	I_C = (–)1 mA, R_{BE} = ∞	(–)50	–	–	V
Emitter–to–Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = (–)10 μA, I_C = 0 A	(–)5	–	–	V
Turn–On Time	t_{on}	See specified Test Circuit	–	35	–	ns
Storage Time	t_{stg}		–	(170)330	–	ns
Fall Time	t_f		–	(30)40	–	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.



$I_C = 20I_{B1} = -20I_{B2}$ = 500 mA
(For PNP, the polarity is reversed.)

Figure 1. Switching Time Test Circuit

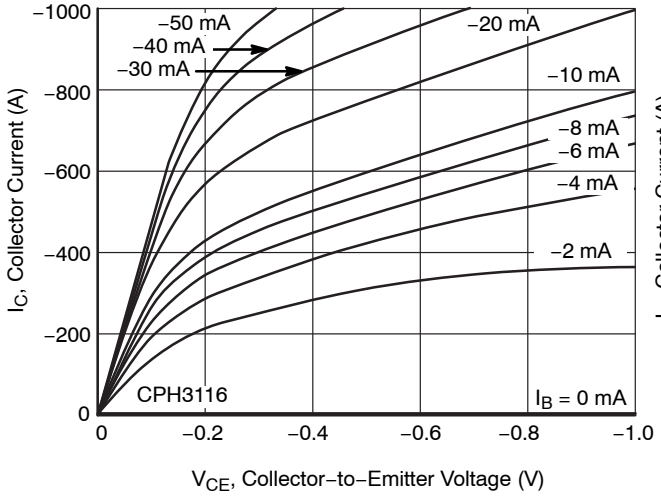


Figure 2. I_C – V_{CE}

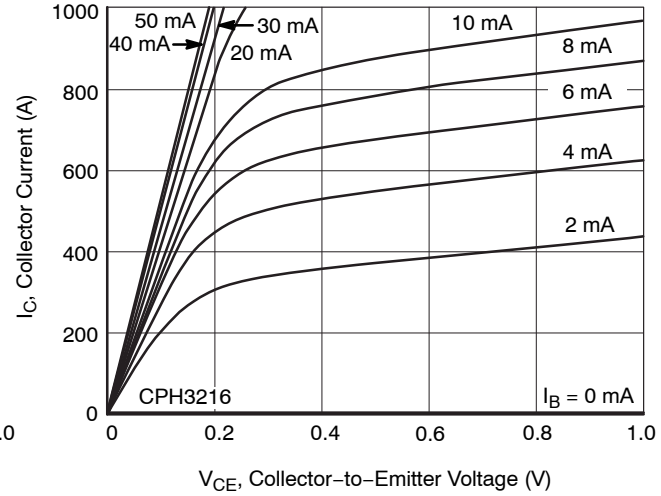


Figure 3. I_C – V_{CE}

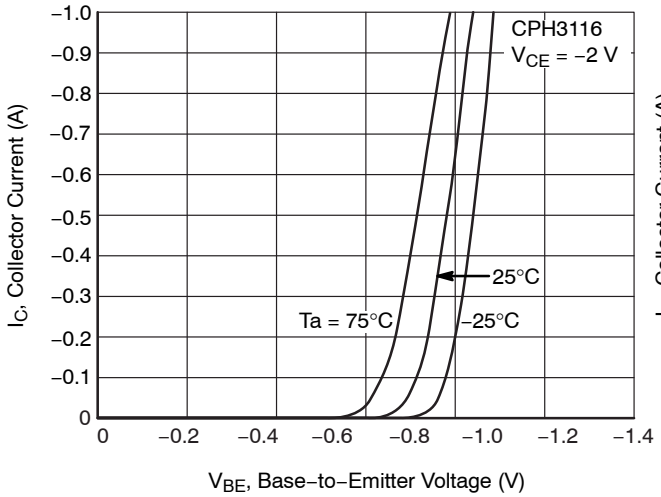


Figure 4. I_C – V_{BE}

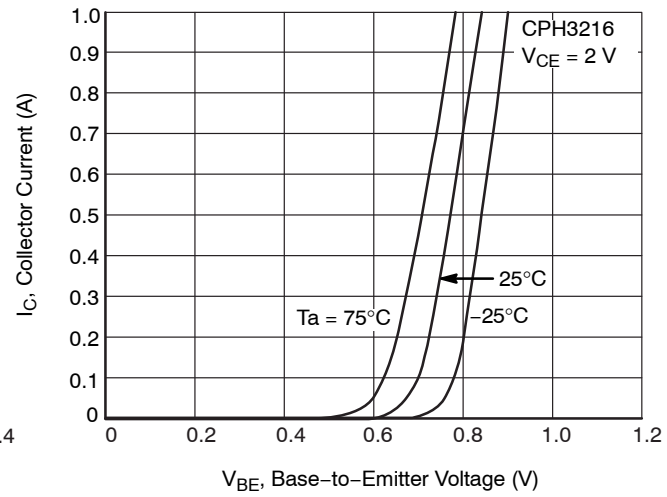


Figure 5. I_C – V_{BE}

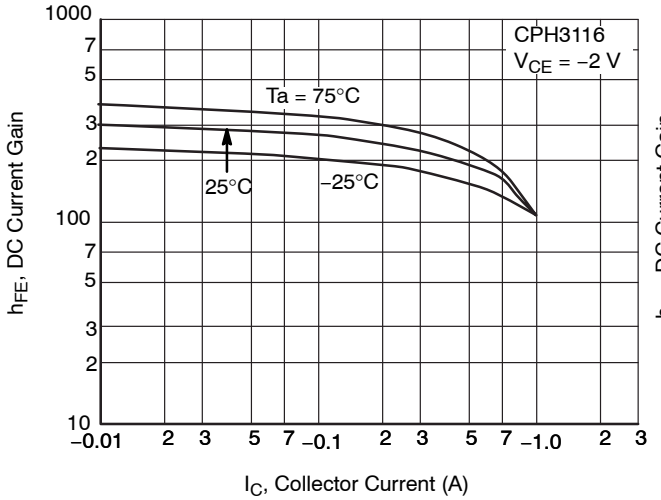


Figure 6. h_{FE} – I_C

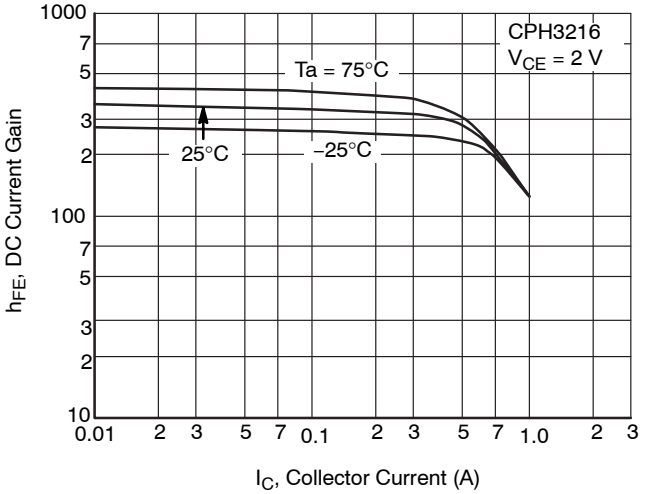


Figure 7. h_{FE} – I_C

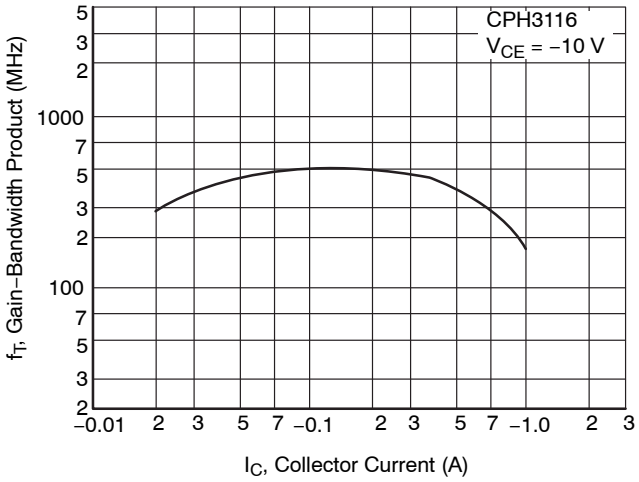


Figure 8. f_T – I_C

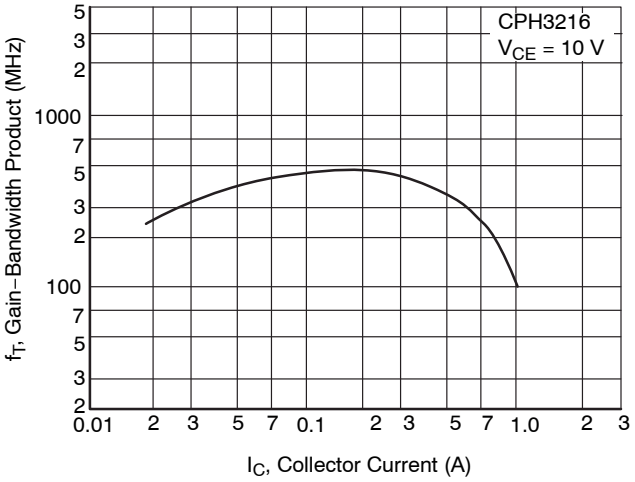


Figure 9. f_T – I_C

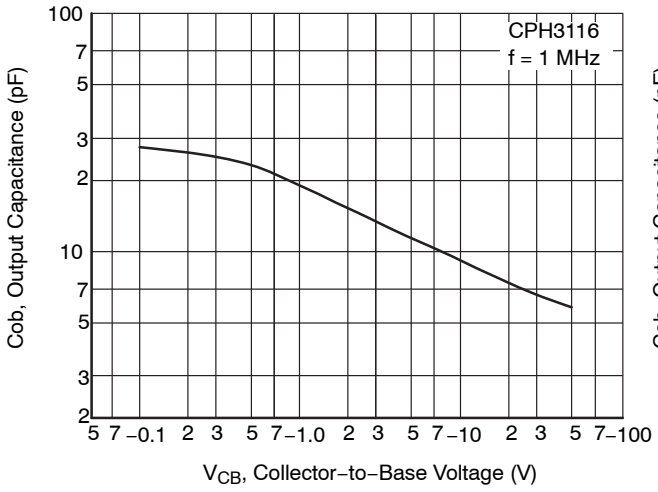


Figure 10. Cob – V_{CB}

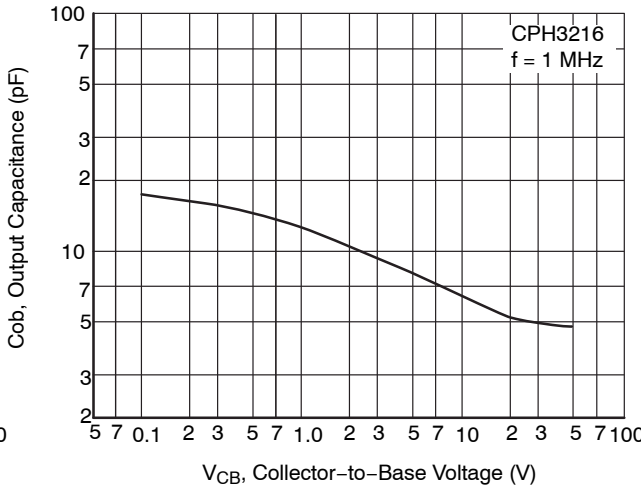


Figure 11. Cob – V_{CB}

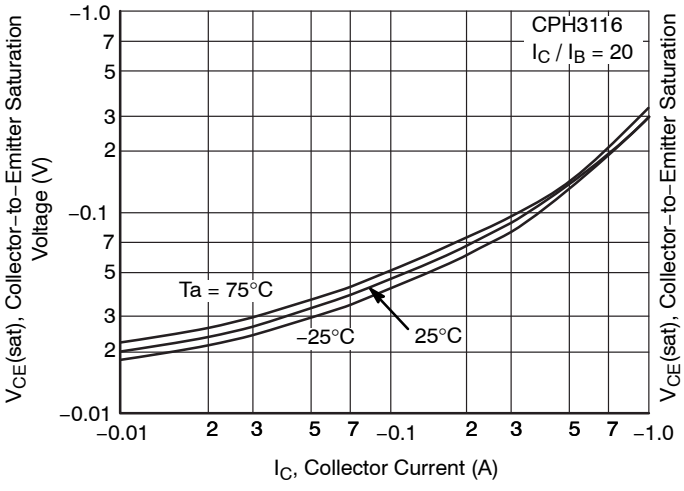


Figure 12. V_{CE}(sat) – I_C

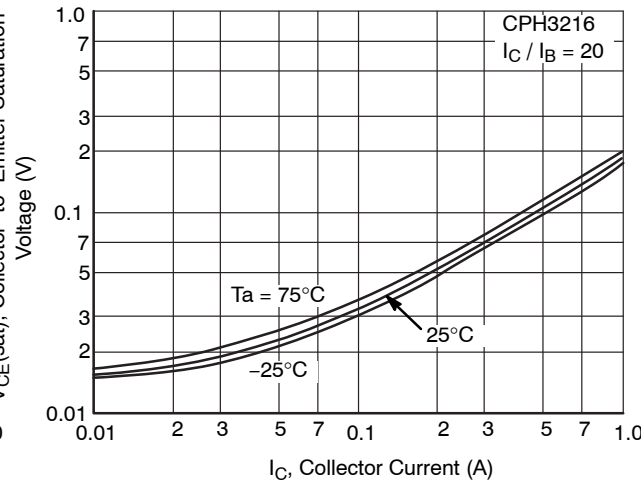


Figure 13. V_{CE}(sat) – I_C

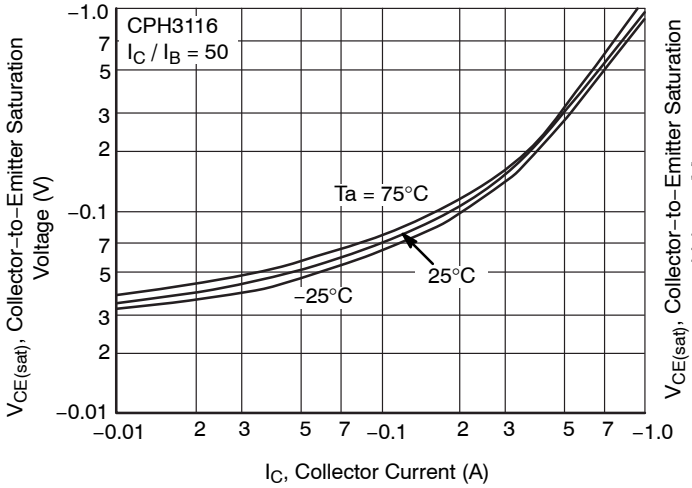


Figure 14. $V_{CE}(sat) - I_C$

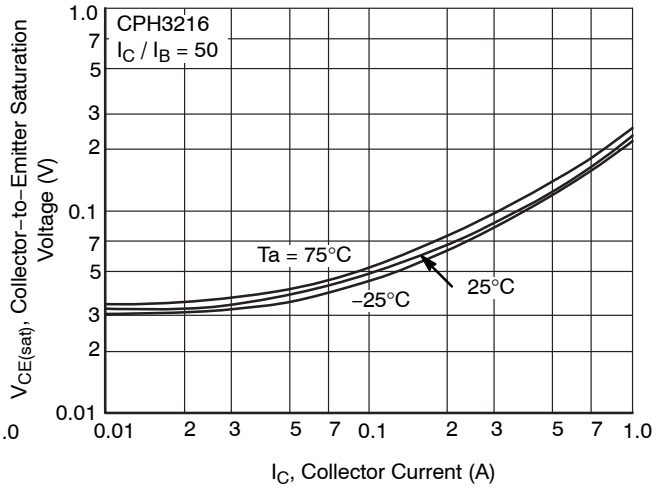


Figure 15. $V_{CE}(sat) - I_C$

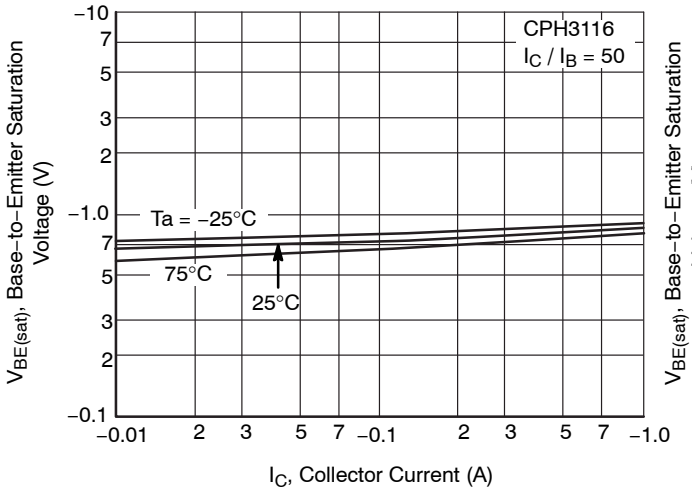


Figure 16. $V_{BE}(sat) - I_C$

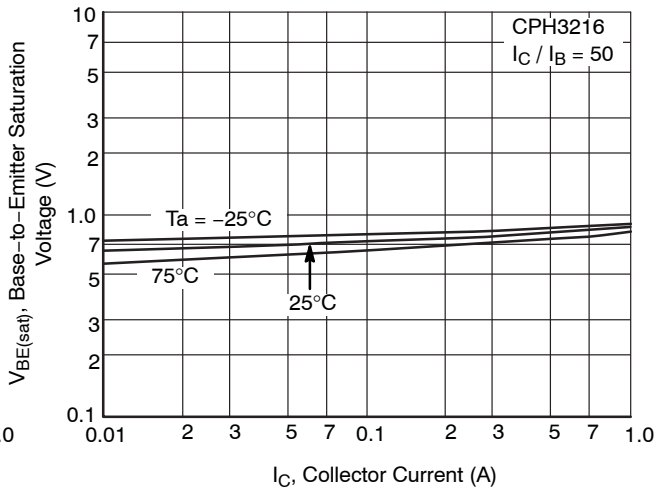


Figure 17. $V_{BE}(sat) - I_C$

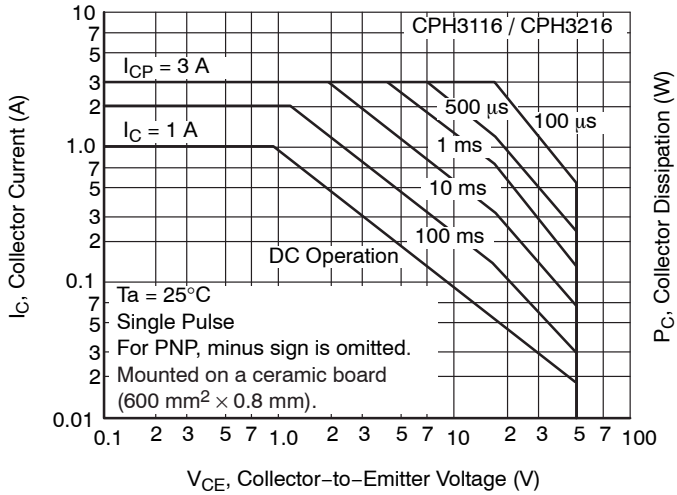


Figure 18. ASO

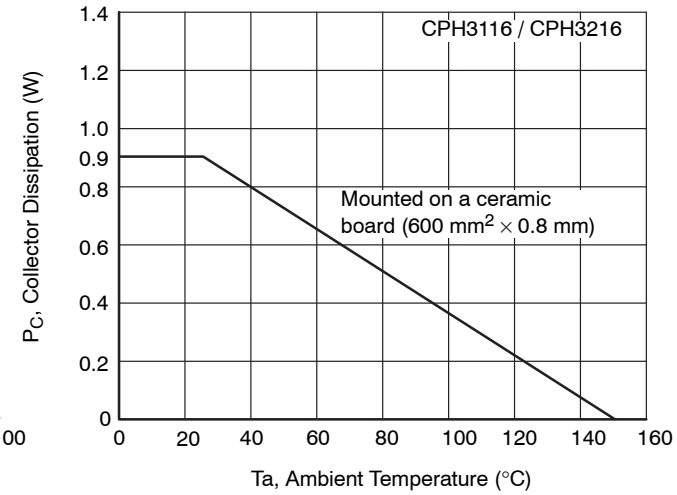


Figure 19. P_C − Ta

CPH3
CASE 318BA
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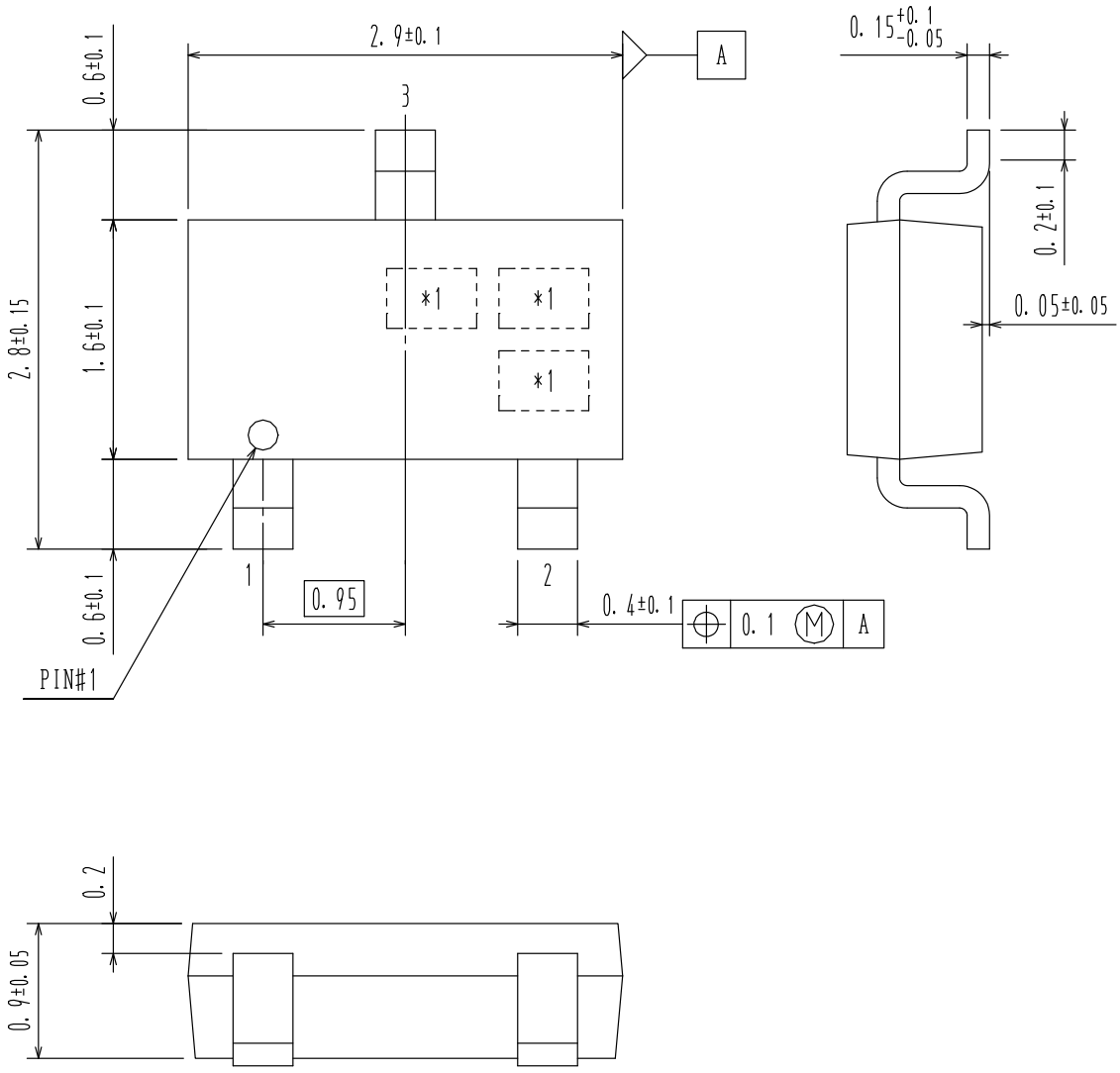

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