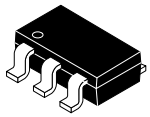
Bipolar Transistor

(–)50 V, (–)3 A, Low $V_{CE(sat)}$, (PNP)NPN Single CPH6

CPH6123, CPH6223



CPH6
CASE 318BD

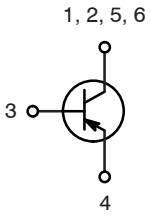
Features

- Adoption of MBIT Process
- 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

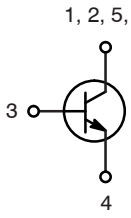
Applications

- DC−DC Converters, Relay Drivers, Lamp Drivers, Motor Drivers, Strobe

ELECTRICAL CONNECTION



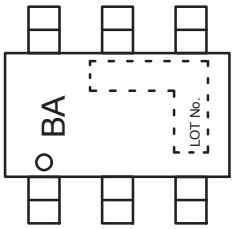
CPH6123



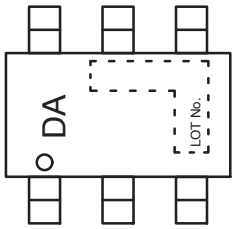
CPH6223

1: Collector
2: Collector
3: Base
4: Emitter
5: Collector
6: Collector

MARKING DIAGRAMS



CPH6123



CPH6223

ABSOLUTE MAXIMUM RATINGS (at T_A = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector−to−Base Voltage		(−50)100	V
V_{CES}	Collector−to−Emitter Voltage		(−50)100	V
V_{CEO}	Collector−to−Emitter Voltage		(−)50	V
V_{EBO}	Emitter−to−Base Voltage		(−)6	V
I_C	Collector Current		(−)3	A
I_{CP}	Collector Current (Pulse)		(−)6	A
I_B	Base Current		(−)600	mA
P_C	Collector Dissipation	When mounted on ceramic substrate (600 mm^2 × 0.8 mm)	1.3	W
T_j	Junction Temperature		150	°C
T_{stg}	Storage Temperature		−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†
CPH6123−TL−E	CPH6 (Pb−Free)	3 000 / Tape & Reel
CPH6223−TL−E	CPH6 (Pb−Free)	3 000 / Tape & Reel

†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.

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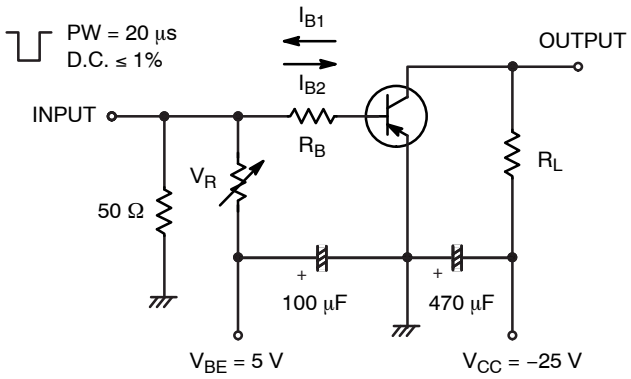
ELECTRICAL CHARACTERISTICS (at T_A = 25°C)

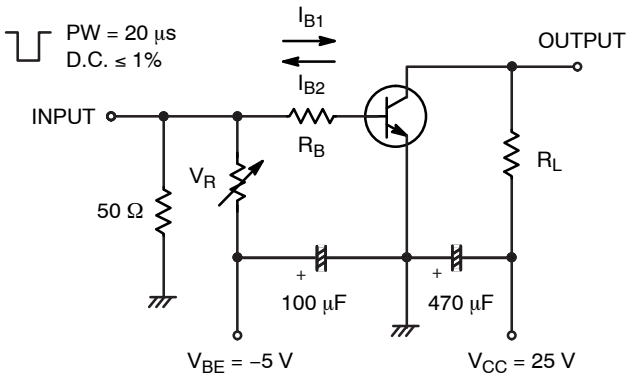
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I_{CBO}	Collector Cutoff Current	V_{CB} = (−)40 V, I_E = 0 A			(−)1	μA
I_{EBO}	Emitter Cutoff Current	V_{EB} = (−)4 V, I_C = 0 A			(−)1	μA
h_{FE}	DC Current Gain	V_{CE} = (−)2 V, I_C = (−)100 mA	200		560	
f_T	Gain−Bandwidth Product	V_{CE} = (−)10 V, I_C = (−)500 mA		(390) 380		MHz
C_{ob}	Output Capacitance	V_{CB} = (−)10 V, f = 1 MHz		(24) 13		pF
V_{CE}(sat)1	Collector−to−Emitter Saturation Voltage	I_C = (−)1 A, I_B = (−)50 mA		(−115) 90	(−230) 130	mV
V_{CE}(sat)2		I_C = (−)2 A, I_B = (−) 100 mA		(−240) 160	(−650) 240	mV
V_{BE}(sat)	Base−to−Emitter Saturation Voltage	I_C = (−)2 A, I_B = (−)100 mA		(−)0.88	(−)1.2	V
$V_{(BR)CBO}$	Collector−to−Base Breakdown Voltage	I_C = (−)10 μA, I_E = 0 A	(−50) 100			V
$V_{(BR)CES}$	Collector−to−Emitter Breakdown Voltage	I_C = (−)100 μA, R_{BE} = 0 Ω	(−50) 100			V
$V_{(BR)CEO}$	Collector−to−Emitter Breakdown Voltage	I_C = (−)1 mA, R_{BE} = ∞	(−)50			V
$V_{(BR)EBO}$	Emitter−to−Base Breakdown Voltage	I_E = (−)10 μA, I_C = 0 A	(−)6			V
t_{on}	Turn−On Time	See specified Test Circuit.		(30) 35		ns
t_{stg}	Storage Time			(230) 300		ns
t_f	Fall Time			(18) 25		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 = −10 I_{B1} = 10 I_{B2} = −1 A

CPH6123



I_C = 10 I_{B1} = −10 I_{B2} = 1 A

CPH6223

Figure 1. Switching Time Test Circuit

TYPICAL PERFORMANCE CHARACTERISTICS

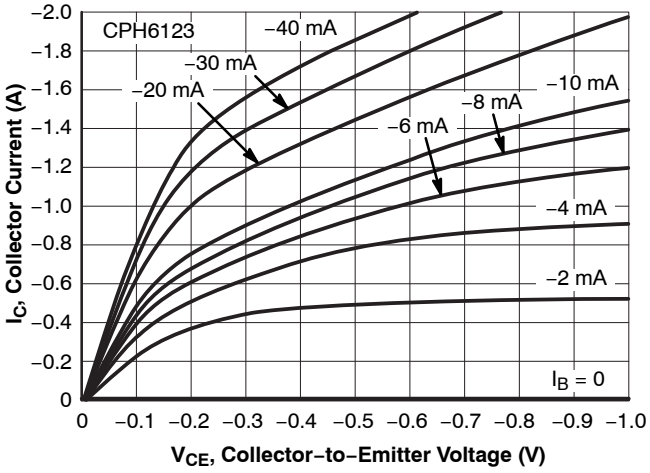


Figure 2. I_C − V_{CE}

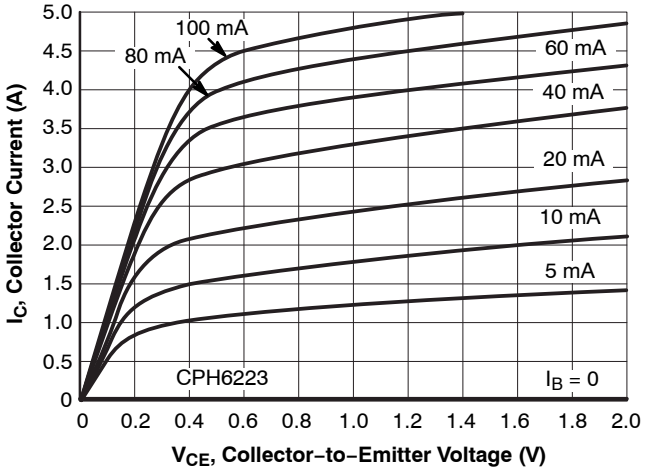


Figure 3. I_C − V_{CE}

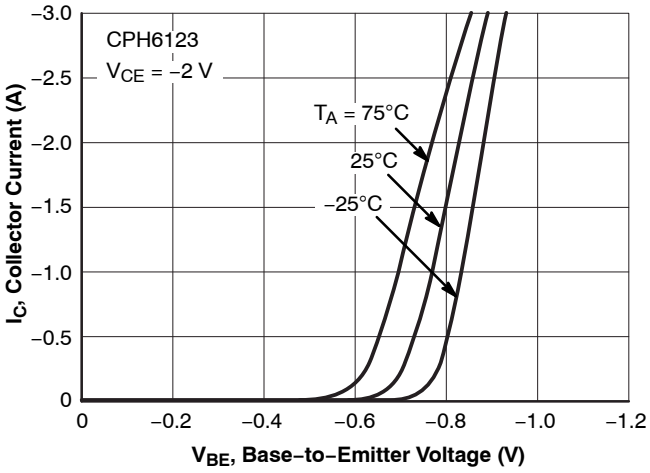


Figure 4. I_C − V_{BE}

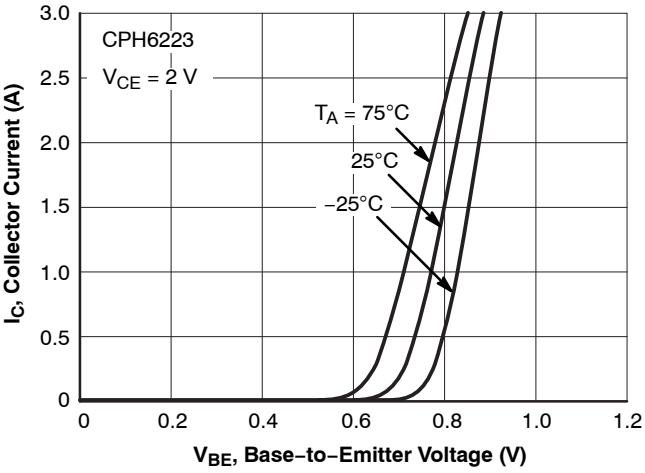


Figure 5. I_C − V_{BE}

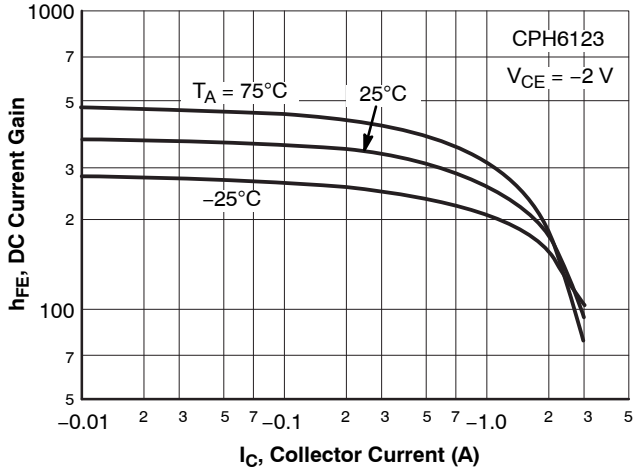


Figure 6. h_{FE} − I_C

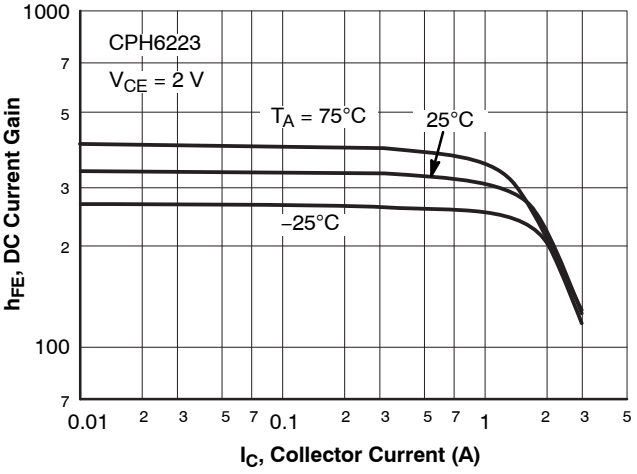


Figure 7. h_{FE} − I_C

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

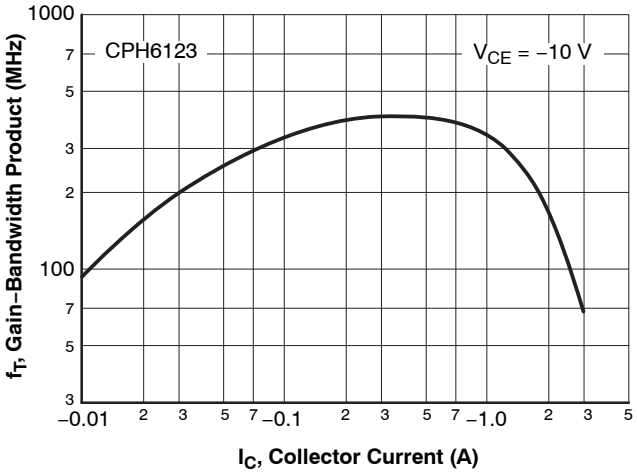


Figure 8. f_T – I_C

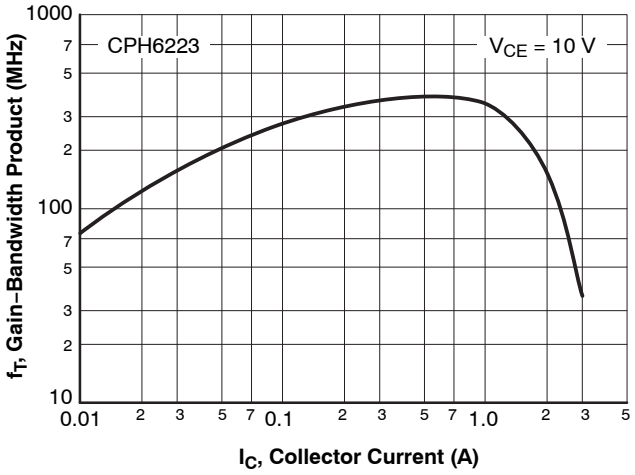


Figure 9. f_T – I_C

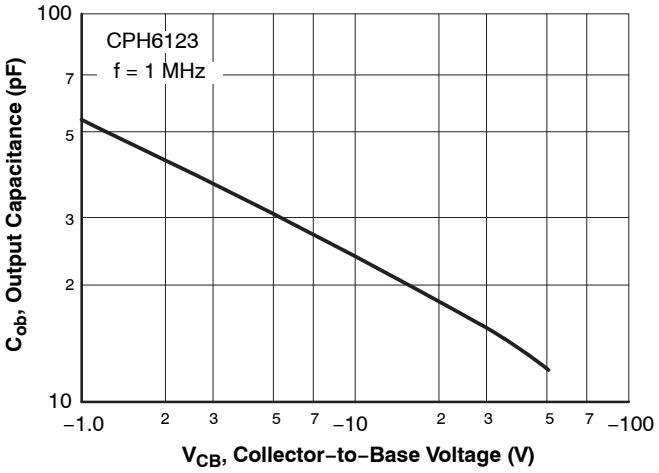


Figure 10. C_{ob} – V_{CB}

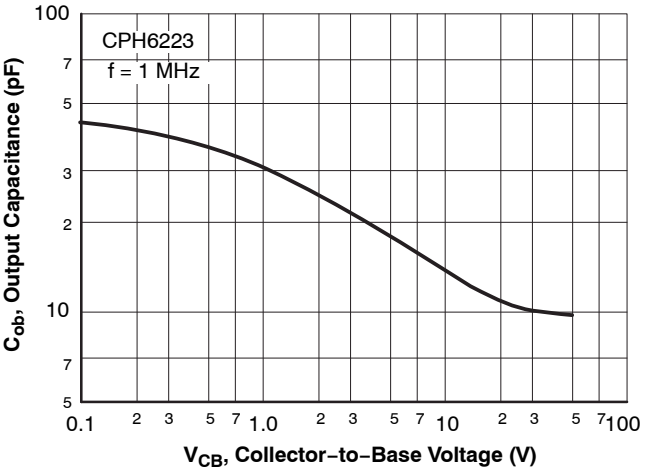


Figure 11. C_{ob} – V_{CB}

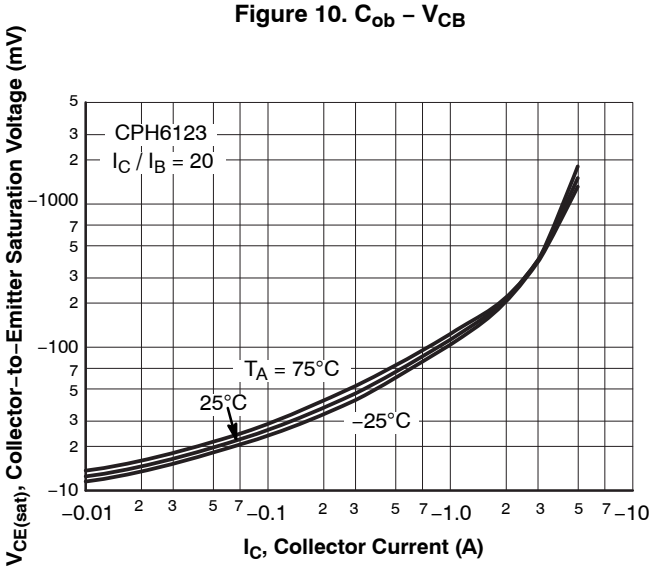


Figure 12. $V_{CE(sat)}$ – I_C

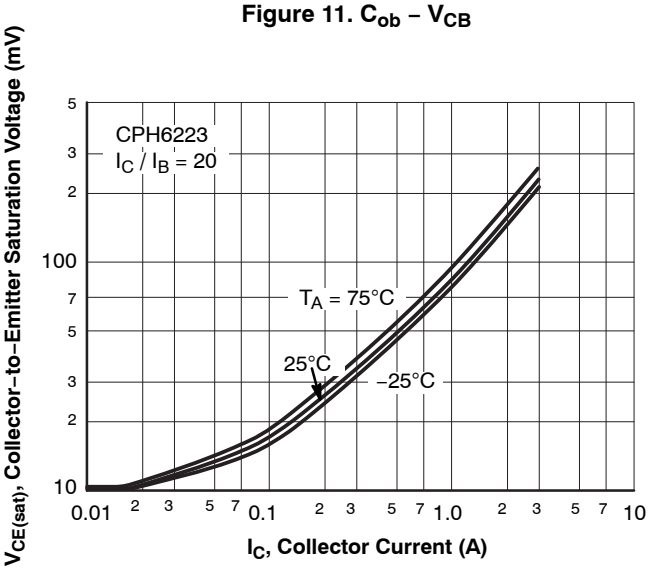


Figure 13. $V_{CE(sat)}$ – I_C

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

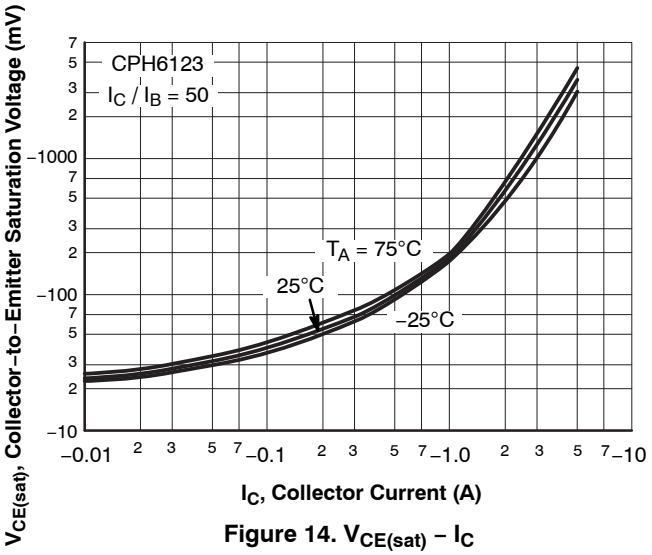


Figure 14. $V_{CE(sat)} - I_C$

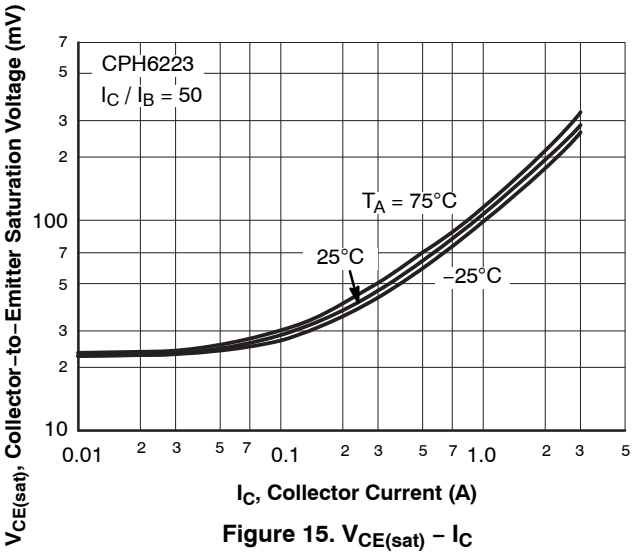


Figure 15. $V_{CE(sat)} - I_C$

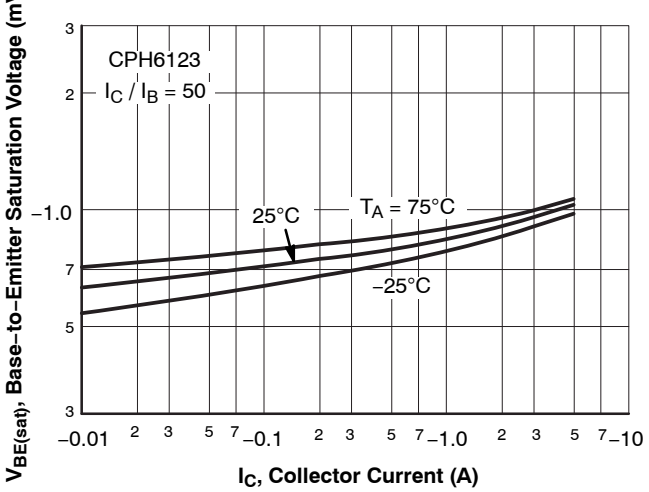


Figure 16. $V_{BE(sat)} - I_C$

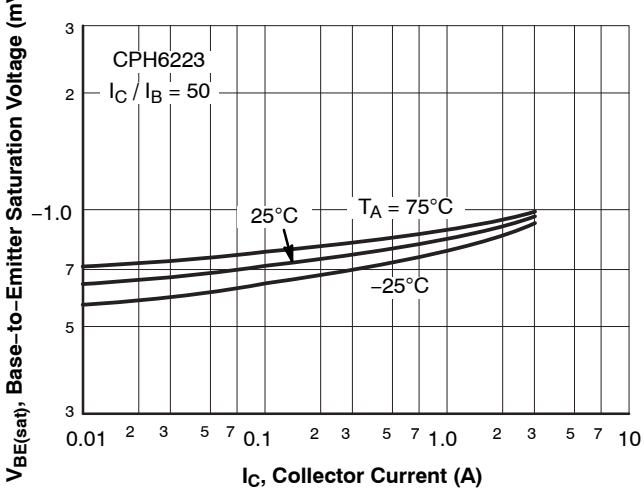


Figure 17. $V_{BE(sat)} - I_C$

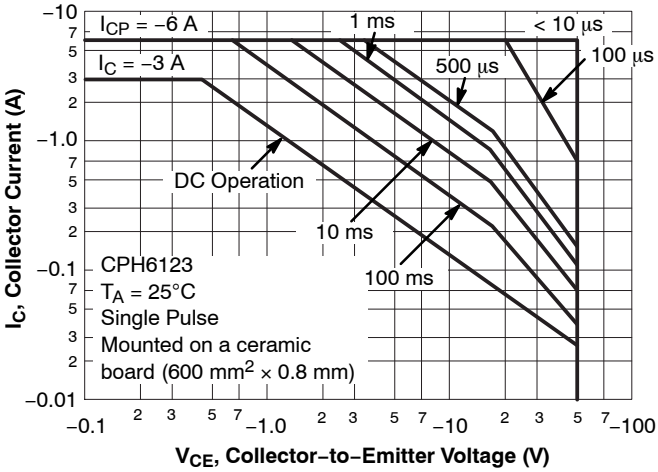


Figure 18. ASO

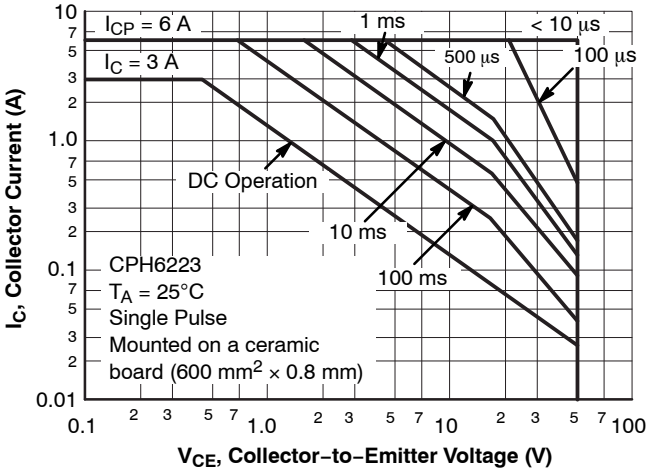


Figure 19. ASO

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

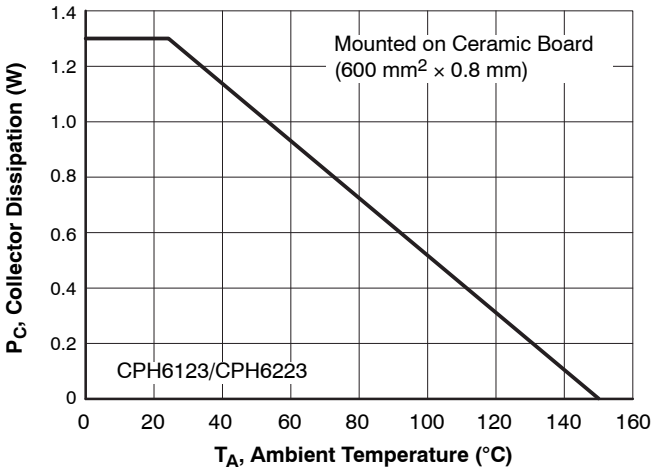
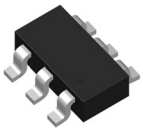
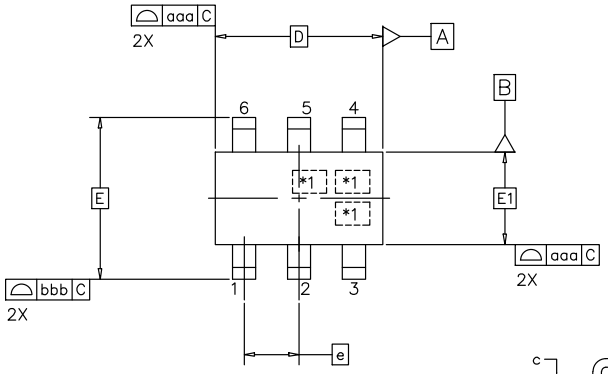


Figure 20. $P_C - T_A$

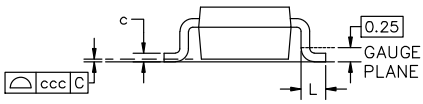


CPH6 2.90x1.60x0.90, 0.95P
CASE 318BD
ISSUE A

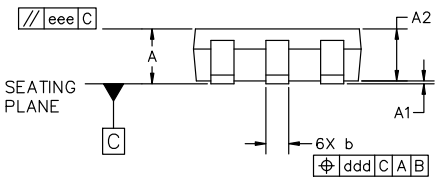
DATE 20 SEPT 2024



TOP VIEW



END VIEW

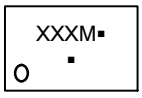


SIDE VIEW

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.85	0.95	1.05
A1	0.00	0.05	0.10
A2	0.85	0.90	0.95
b	0.30	0.40	0.50
c	0.10	0.15	0.25
D	2.90 BSC		
E	2.80 BSC		
E1	1.60 BSC		
e	0.95 BSC		
L	0.10	0.20	0.30
TOLERANCE FORM AND POSITION			
aaa	0.10		
bbb	0.15		
ccc	0.05		
ddd	0.10		
eee	0.10		

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS
3. *1 IS FOR LOT INDICATION

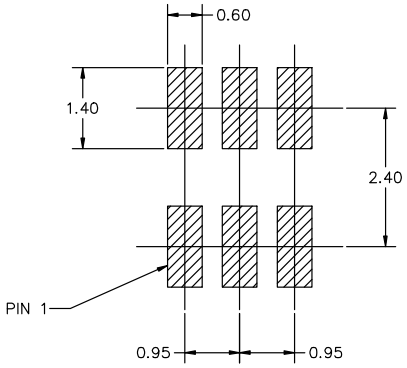
GENERIC
MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

* For additional information on our Pb−Free strategy and soldering details, please downloadd the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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DESCRIPTION:	**CPH6 2.90x1.60x0.90, 0.95P**		**PAGE 1 OF 1**

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