

Bipolar Transistor

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

CPH6123, CPH6223

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

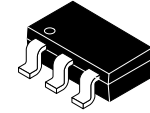
Applications

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

ABSOLUTE MAXIMUM RATINGS (at $T_A = 25^\circ\text{C}$)

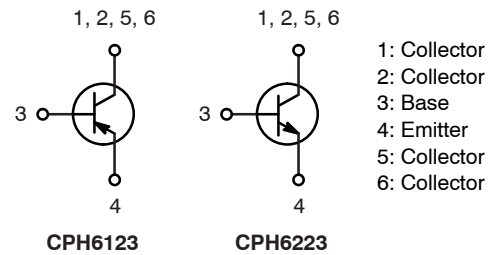
Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector-to-Base Voltage		(–)100	V
V_{CES}	Collector-to-Emitter Voltage		(–)100	V
V_{CEO}	Collector-to-Emitter Voltage		(–)50	V
V_{EBO}	Emitter-to-Base Voltage		(–)6	V
I_C	Collector Current		(–)3	A
I_{CP}	Collector Current (Pulse)		(–)6	A
I_B	Base Current		(–)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.

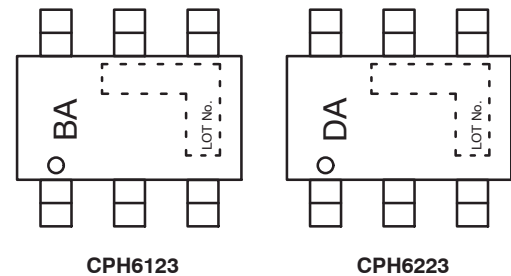


CPH6
CASE 318BD

ELECTRICAL CONNECTION



MARKING DIAGRAMS



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

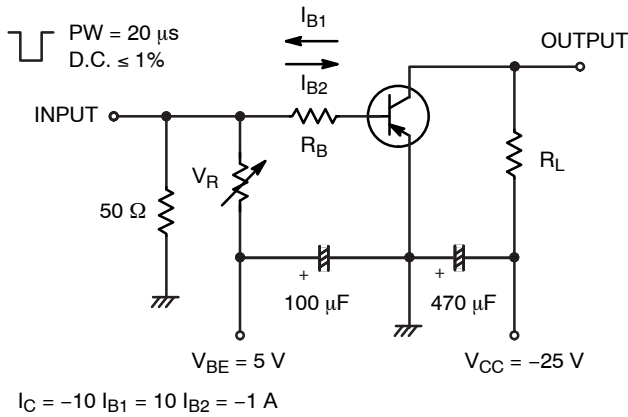
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

CPH6123, CPH6223

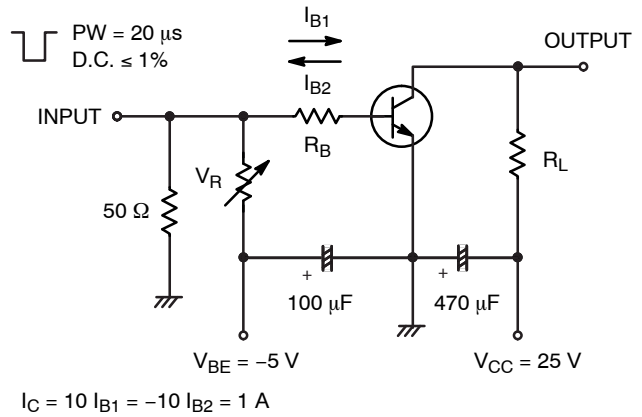
ELECTRICAL CHARACTERISTICS (at $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I_{CBO}	Collector Cutoff Current	$V_{CB} = (-)40\text{ V}, I_E = 0\text{ A}$			$(-)1$	μA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = (-)4\text{ V}, I_C = 0\text{ A}$			$(-)1$	μA
h_{FE}	DC Current Gain	$V_{CE} = (-)2\text{ V}, I_C = (-)100\text{ mA}$	200		560	
f_T	Gain-Bandwidth Product	$V_{CE} = (-)10\text{ V}, I_C = (-)500\text{ mA}$		(390) 380		MHz
C_{ob}	Output Capacitance	$V_{CB} = (-)10\text{ V}, f = 1\text{ MHz}$		(24) 13		pF
$V_{CE(sat)1}$	Collector-to-Emitter Saturation Voltage	$I_C = (-)1\text{ A}, I_B = (-)50\text{ mA}$		(-115) 90	(-230) 130	mV
$V_{CE(sat)2}$		$I_C = (-)2\text{ A}, I_B = (-)100\text{ mA}$		(-240) 160	(-650) 240	mV
$V_{BE(sat)}$	Base-to-Emitter Saturation Voltage	$I_C = (-)2\text{ A}, I_B = (-)100\text{ mA}$		(-)0.88	(-)1.2	V
$V_{(BR)CBO}$	Collector-to-Base Breakdown Voltage	$I_C = (-)10\text{ }\mu\text{A}, I_E = 0\text{ A}$	(-50) 100			V
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	$I_C = (-)100\text{ }\mu\text{A}, R_{BE} = 0\text{ }\Omega$	(-50) 100			V
$V_{(BR)CEO}$	Collector-to-Emitter Breakdown Voltage	$I_C = (-)1\text{ mA}, R_{BE} = \infty$	(-)50			V
$V_{(BR)EBO}$	Emitter-to-Base Breakdown Voltage	$I_E = (-)10\text{ }\mu\text{A}, I_C = 0\text{ A}$	(-)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.



CPH6123



CPH6223

Figure 1. Switching Time Test Circuit

TYPICAL PERFORMANCE CHARACTERISTICS

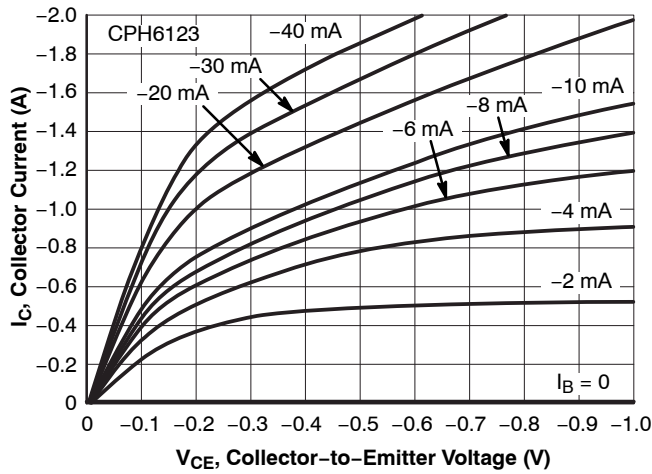


Figure 2. $I_C - V_{CE}$

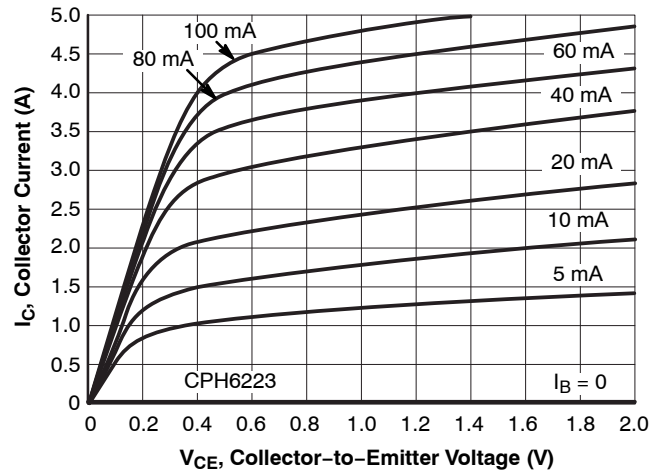


Figure 3. $I_C - V_{CE}$

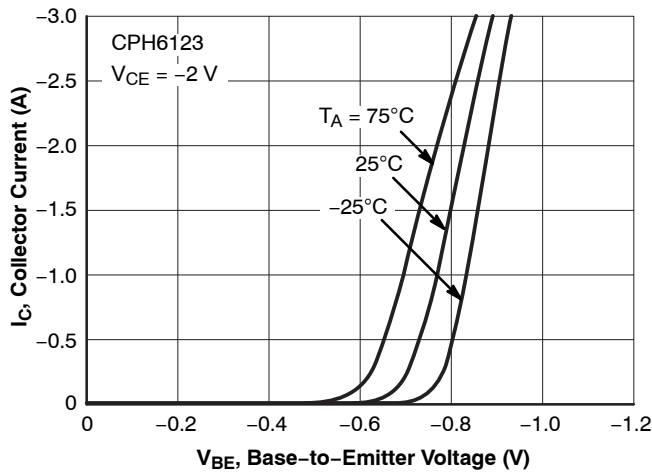


Figure 4. $I_C - V_{BE}$

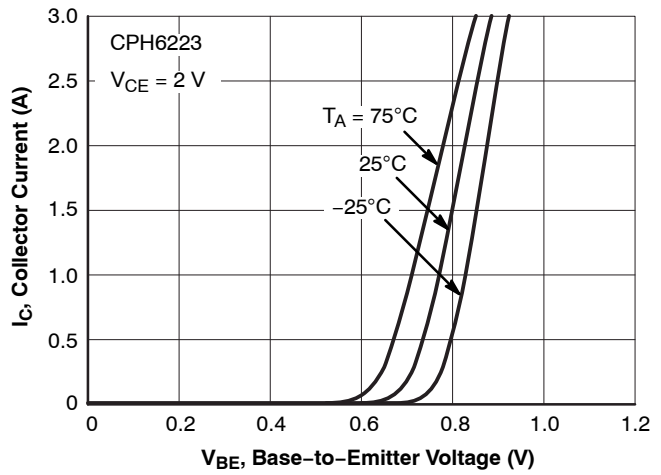


Figure 5. $I_C - V_{BE}$

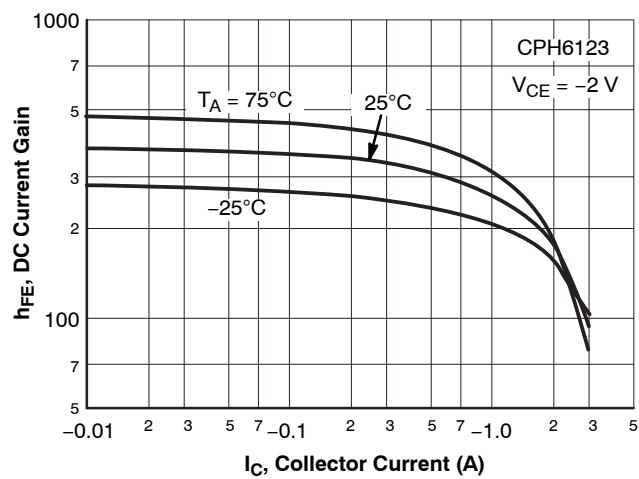


Figure 6. $h_{FE} - I_C$

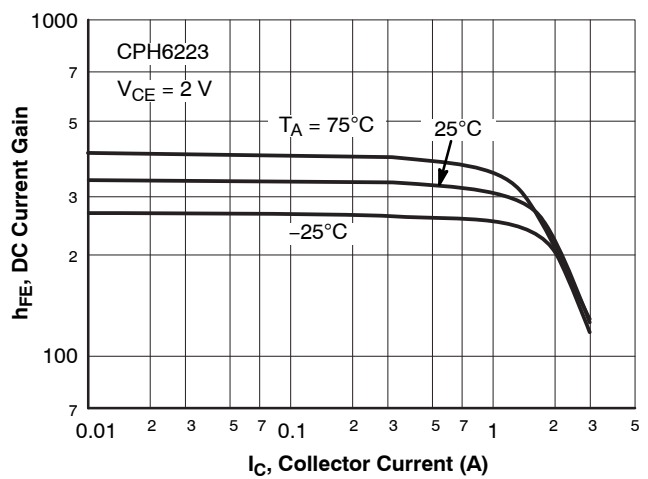


Figure 7. $h_{FE} - I_C$

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

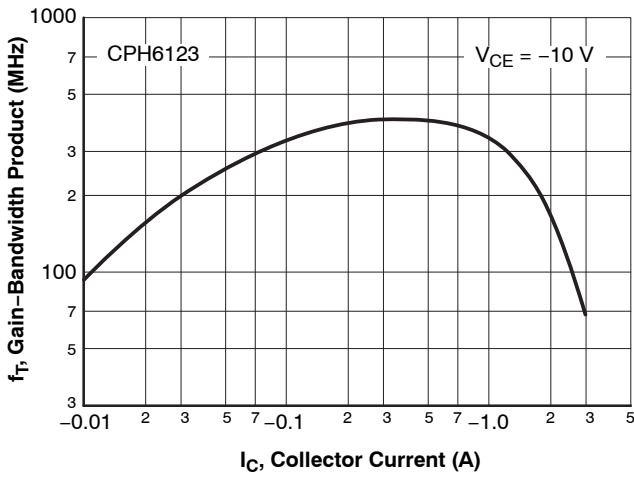


Figure 8. $f_T - I_C$

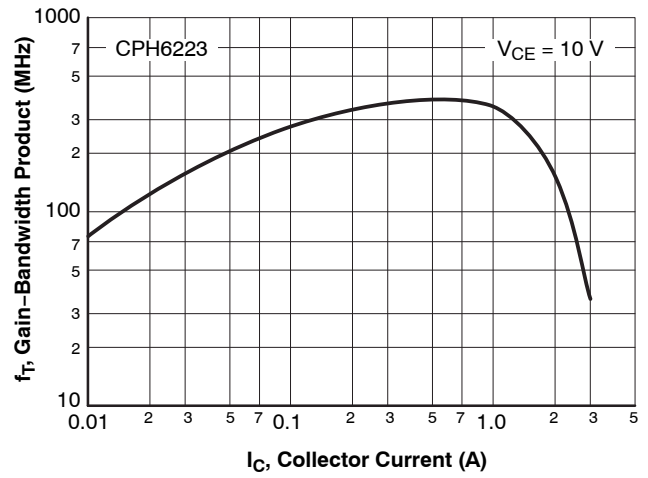


Figure 9. $f_T - I_C$

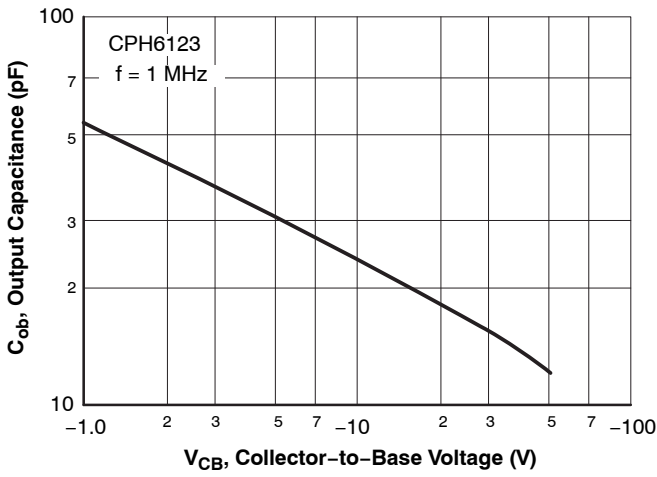


Figure 10. $C_{ob} - V_{CB}$

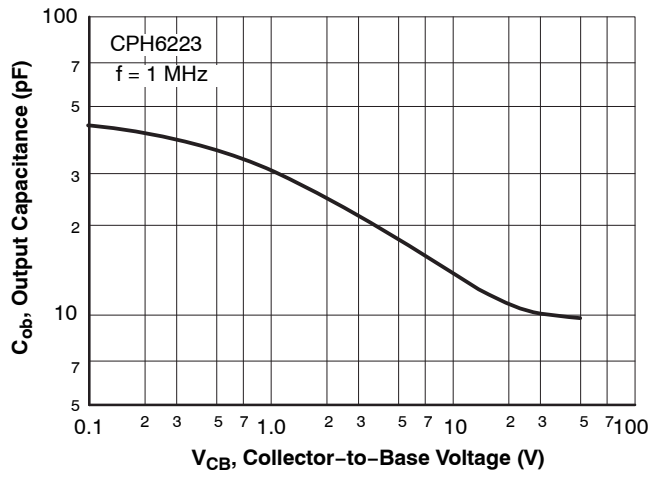


Figure 11. $C_{ob} - V_{CB}$

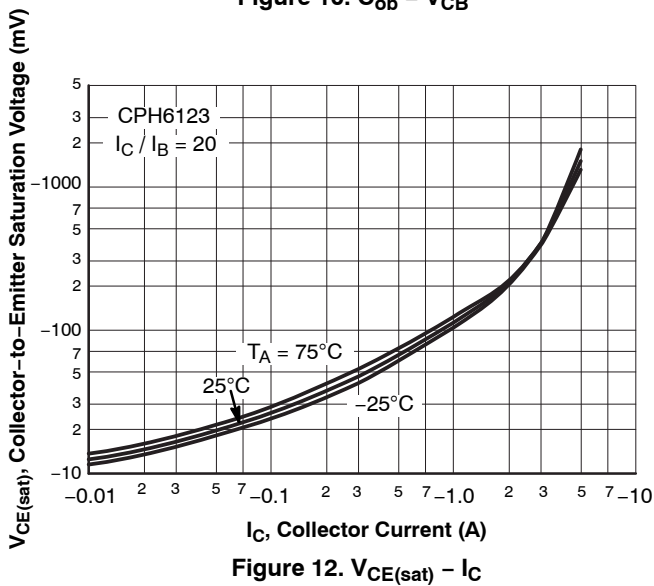


Figure 12. $V_{CE(sat)} - I_C$

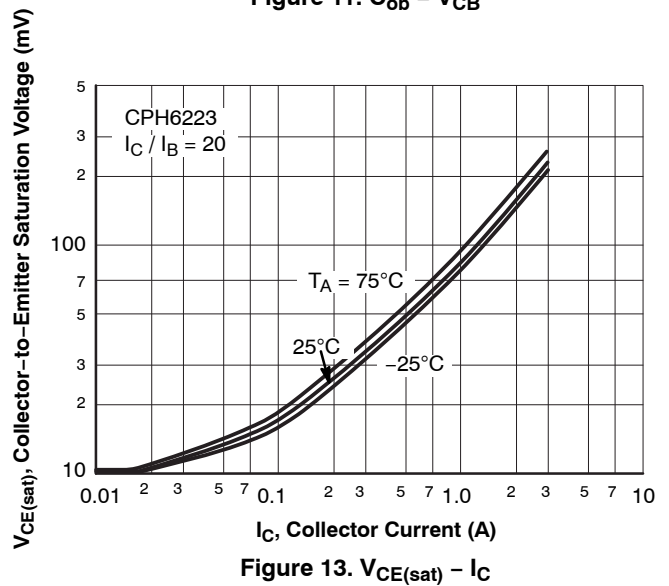
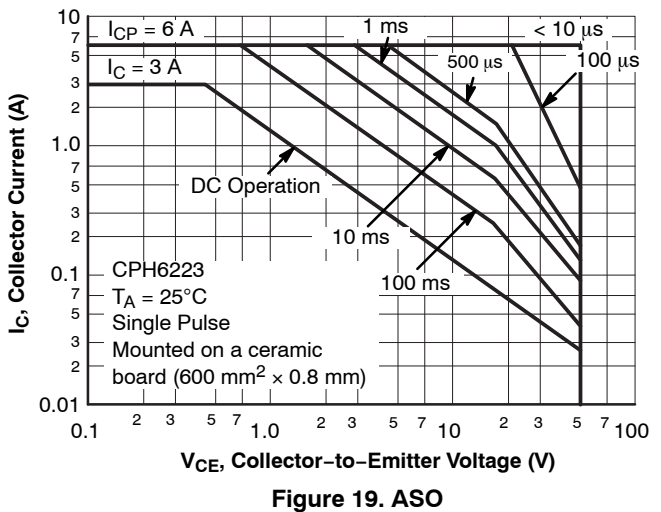
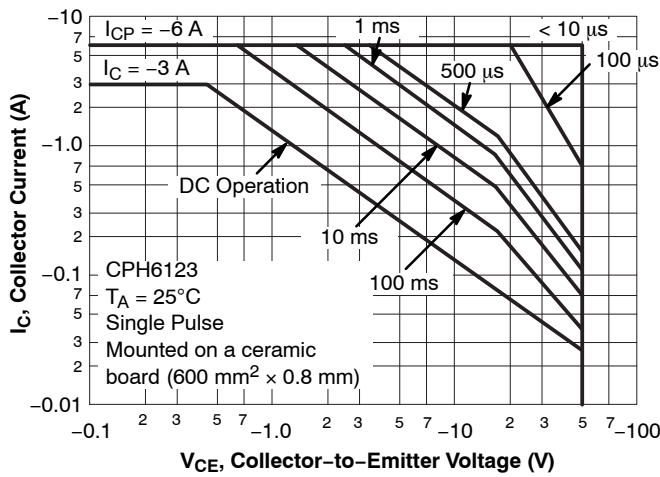
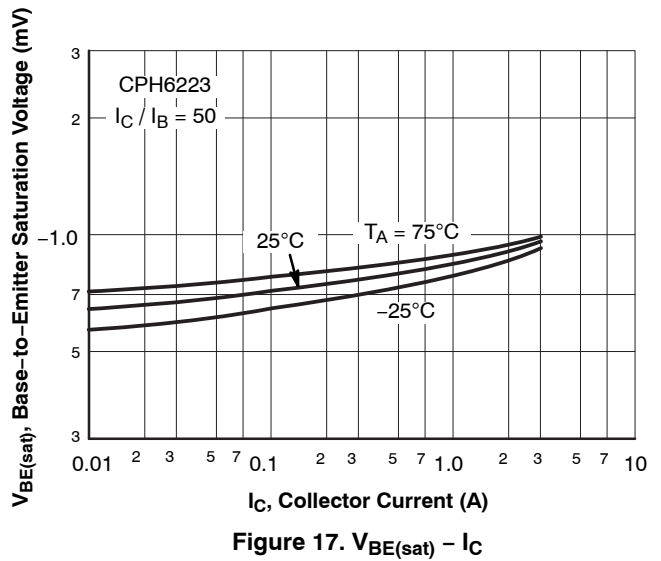
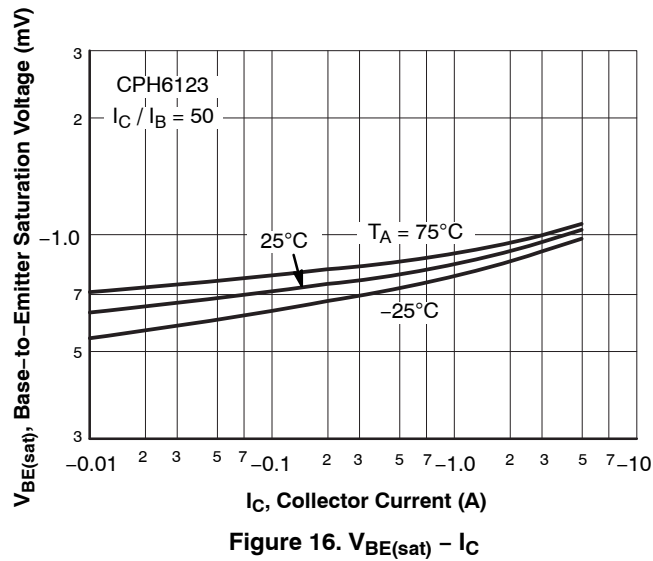
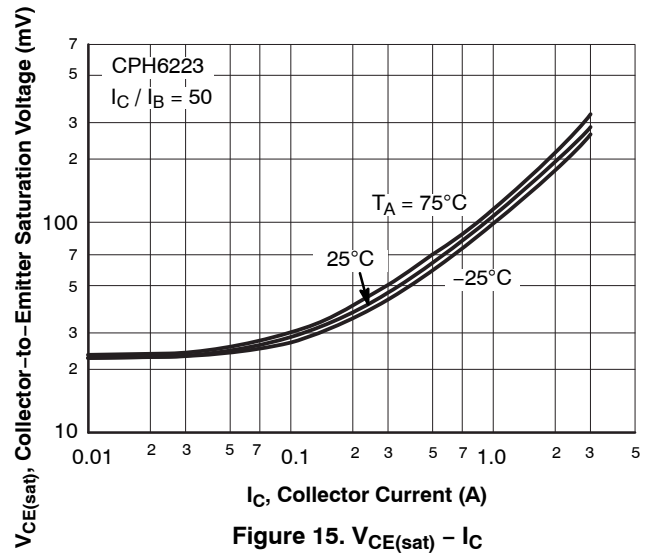
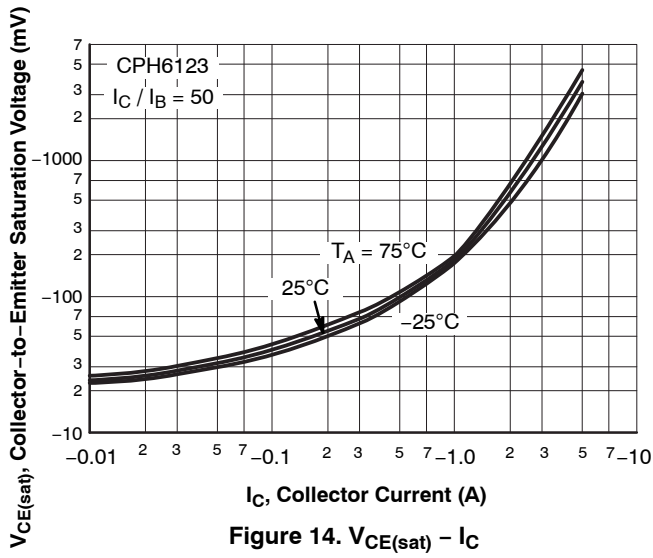


Figure 13. $V_{CE(sat)} - I_C$

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

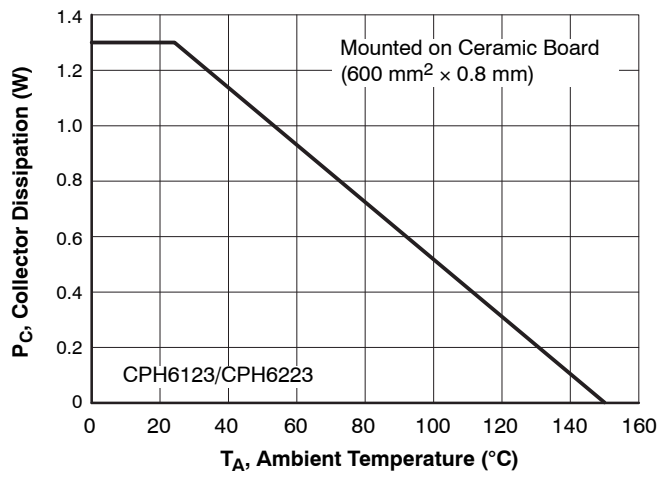
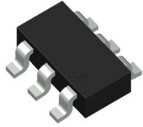
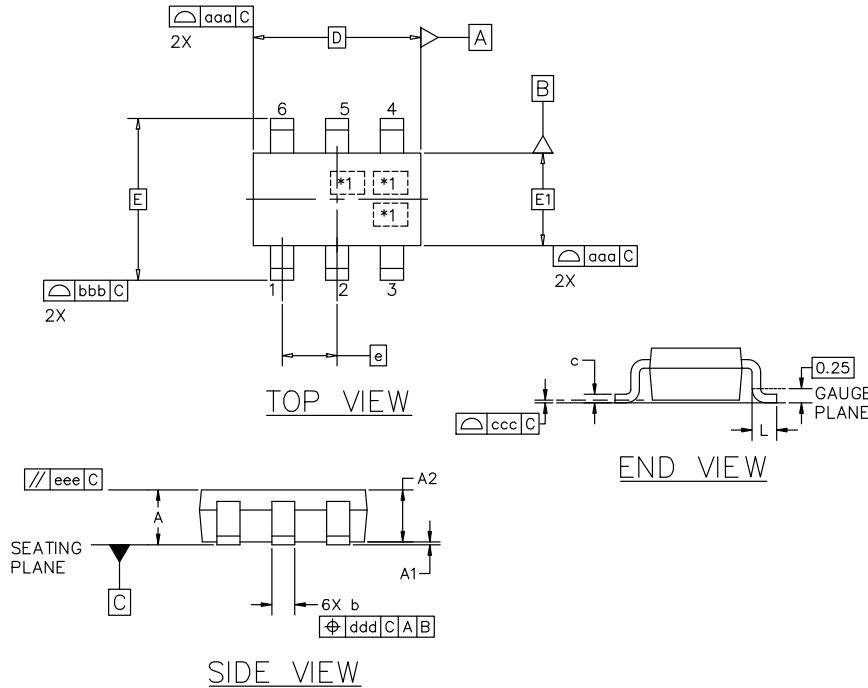


Figure 20. P_C – T_A



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

DATE 20 SEPT 2024

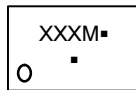


MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.85	0.95	1.05
A1	0.00	0.05	0.10
A2	0.85	0.90	0.95
b	0.30	0.40	0.50
c	0.10	0.15	0.25
D	2.90 BSC		
E	2.80 BSC		
E1	1.60 BSC		
e	0.95 BSC		
L	0.10	0.20	0.30
TOLERANCE FORM AND POSITION			
aaa	0.10		
bbb	0.15		
ccc	0.05		
ddd	0.10		
eee	0.10		

NOTES:

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

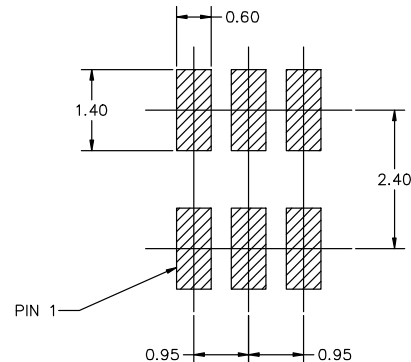
GENERIC
MARKING DIAGRAM*



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 download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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