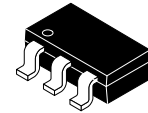


Bipolar Transistor

**(-)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

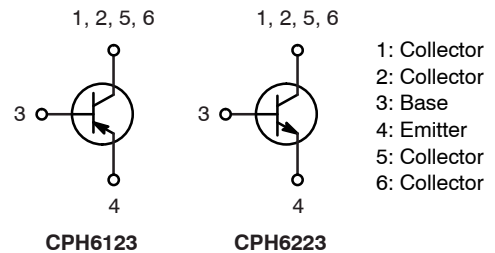
- DC-DC Converters, Relay Drivers, Lamp Drivers, Motor Drivers, Strobe

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

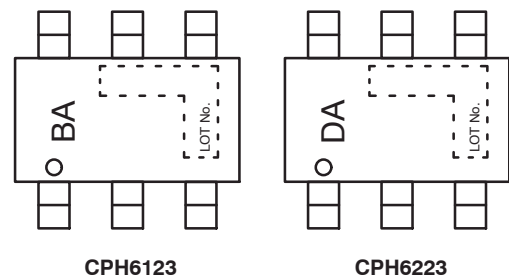
Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector-to-Base Voltage		(-50)100	V
V_{CES}	Collector-to-Emitter Voltage		(-50)100	V
V_{CEO}	Collector-to-Emitter Voltage		(-)50	V
V_{EBO}	Emitter-to-Base Voltage		(-)6	V
I_C	Collector Current		(-)3	A
I_{CP}	Collector Current (Pulse)		(-)6	A
I_B	Base Current		(-)600	mA
P_C	Collector Dissipation	When mounted on ceramic substrate (600 mm ² x 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.

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.

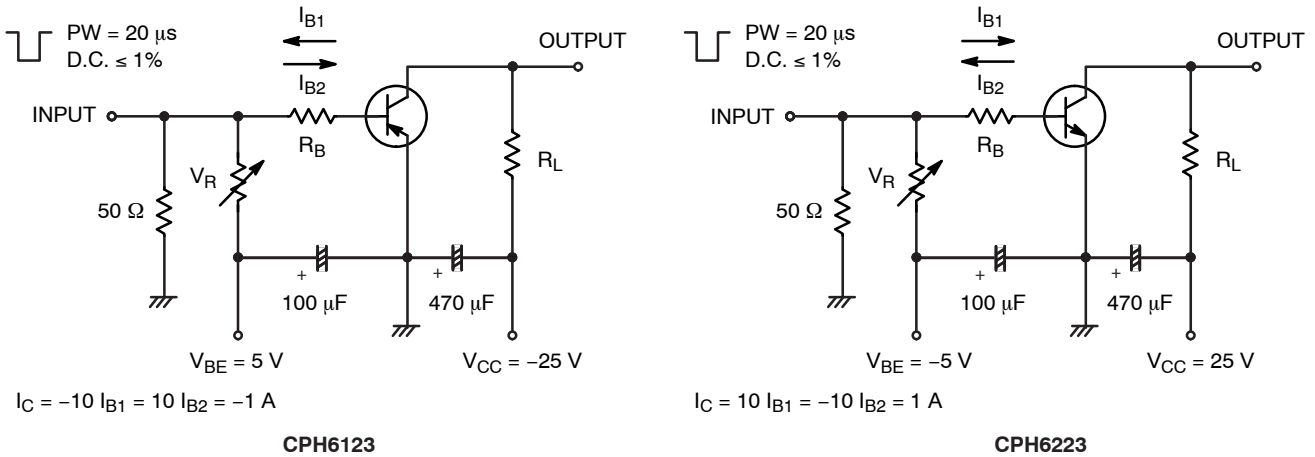


Figure 1. Switching Time Test Circuit

TYPICAL PERFORMANCE CHARACTERISTICS

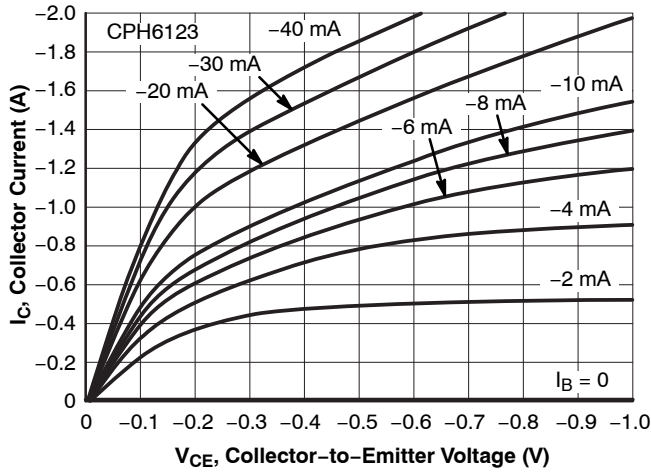


Figure 2. $I_C - V_{CE}$

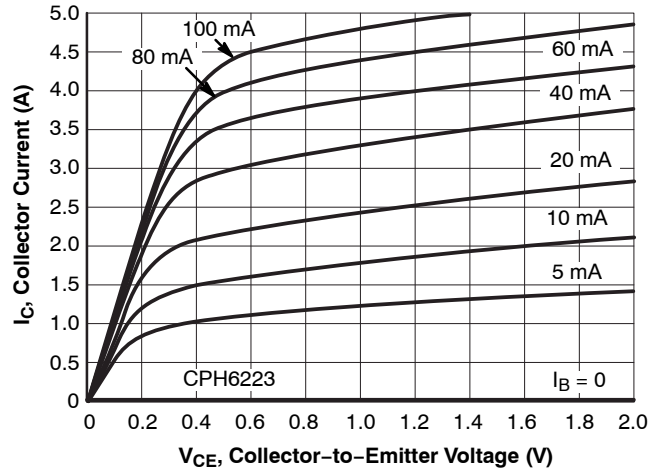


Figure 3. $I_C - V_{CE}$

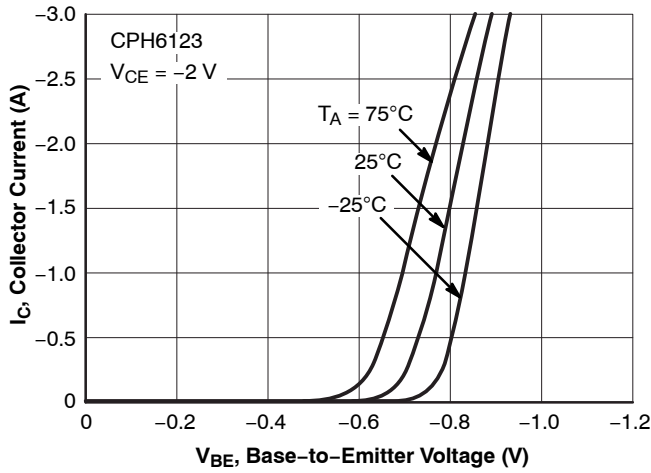


Figure 4. $I_C - V_{BE}$

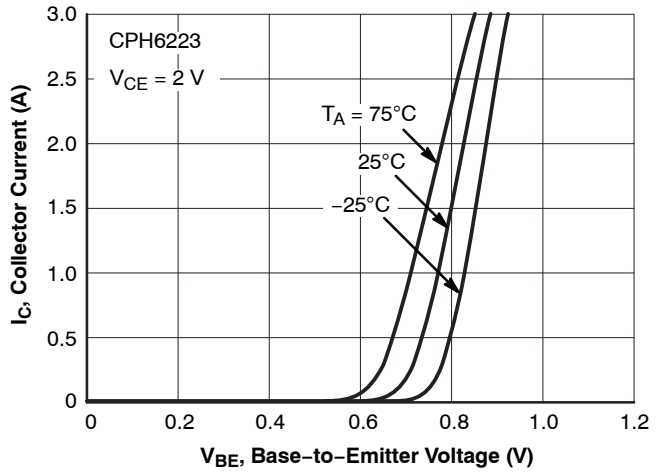


Figure 5. $I_C - V_{BE}$

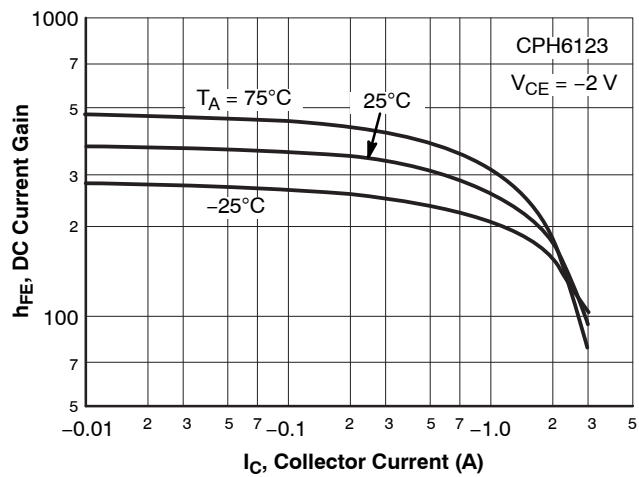


Figure 6. $h_{FE} - I_C$

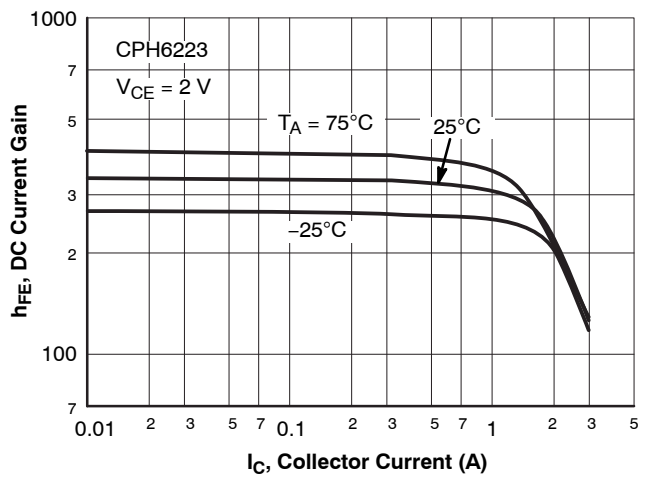
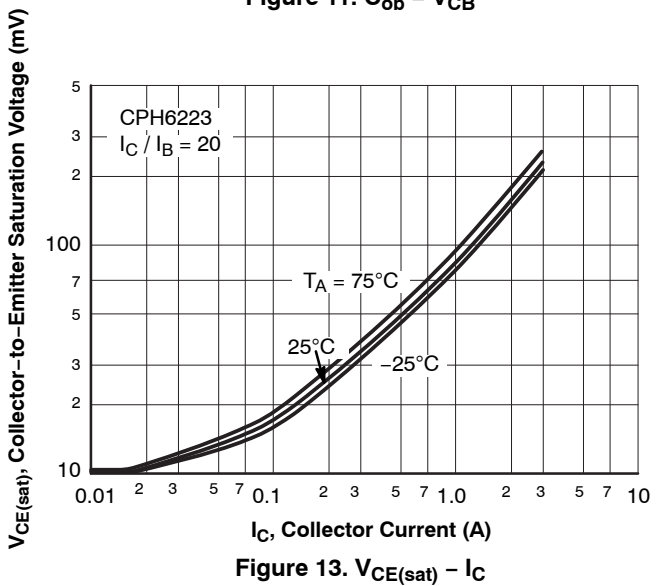
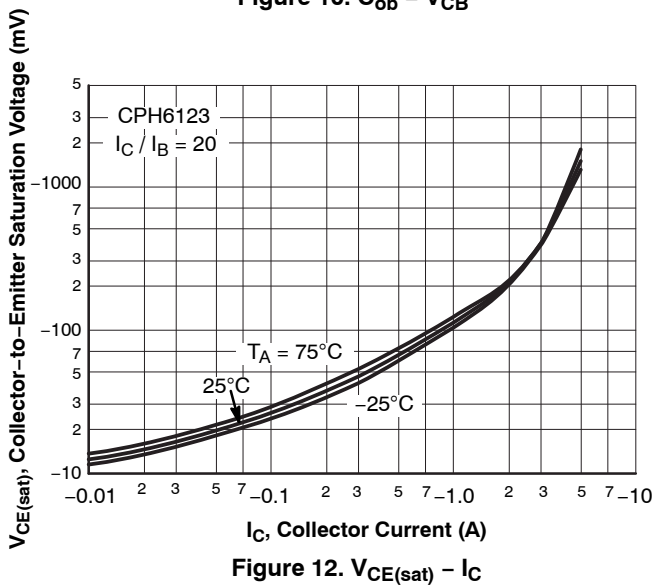
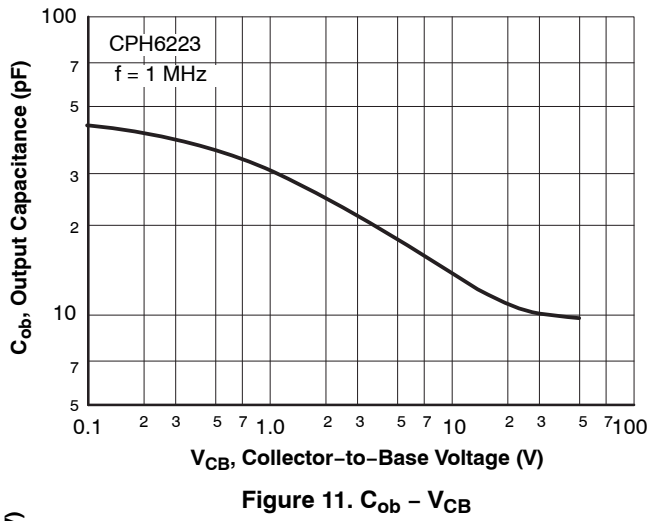
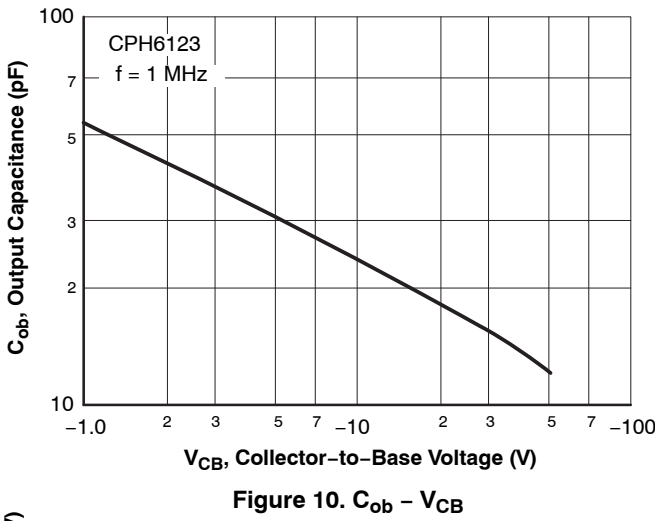
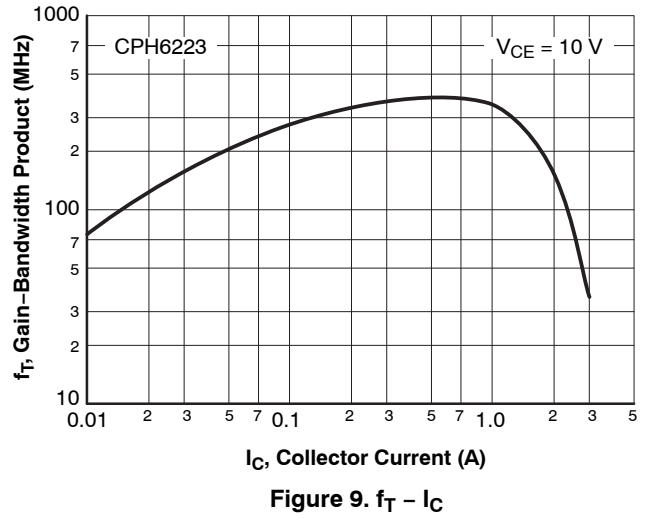
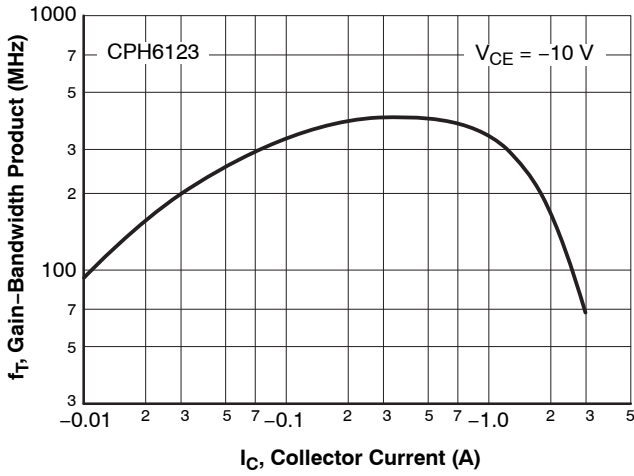


Figure 7. $h_{FE} - I_C$

CPH6123, CPH6223

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

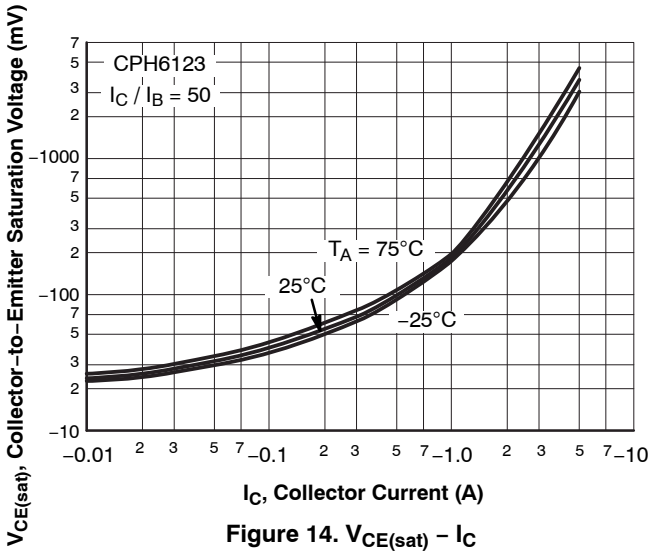


Figure 14. $V_{CE(sat)} - I_C$

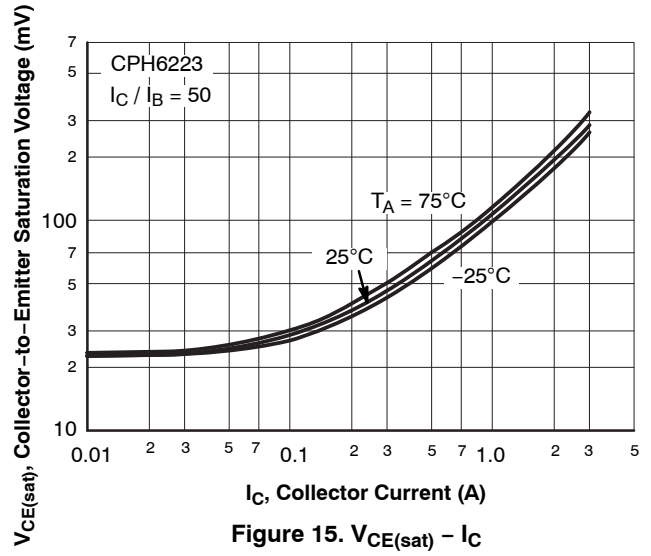


Figure 15. $V_{CE(sat)} - I_C$

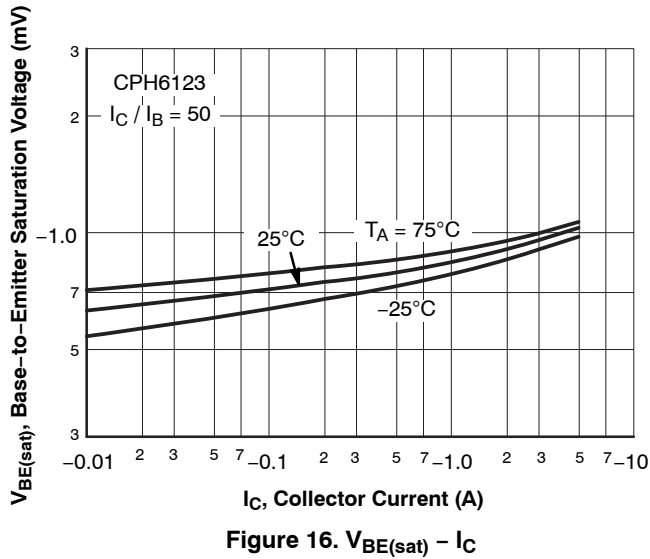


Figure 16. $V_{BE(sat)} - I_C$

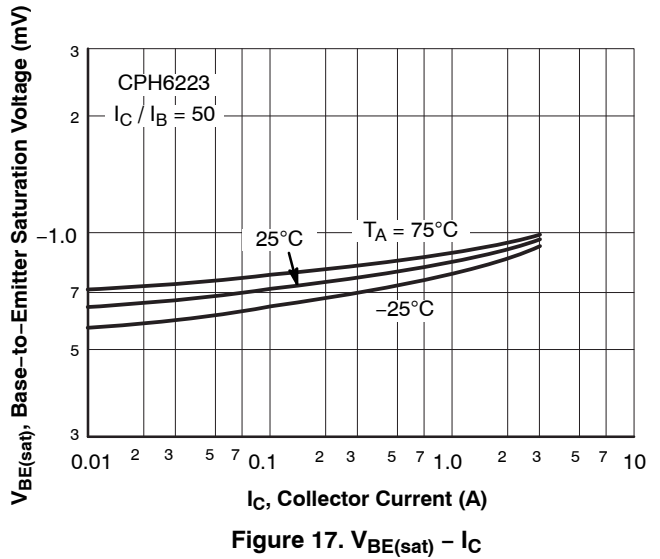


Figure 17. $V_{BE(sat)} - I_C$

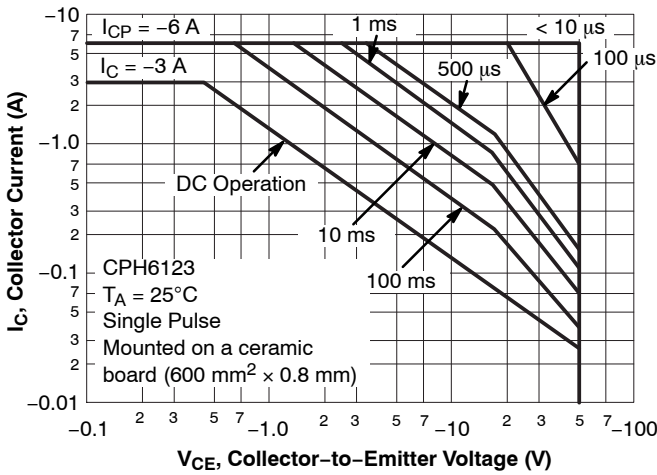


Figure 18. ASO

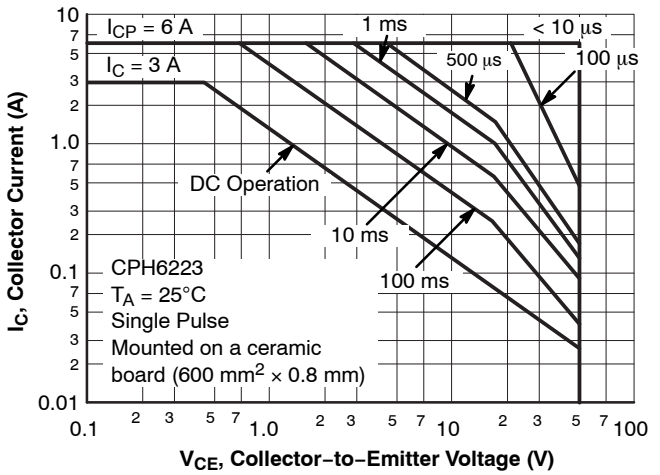


Figure 19. ASO

CPH6123, CPH6223

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

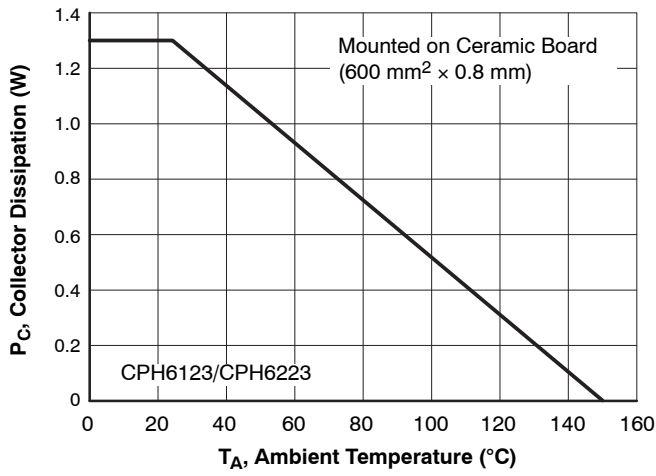
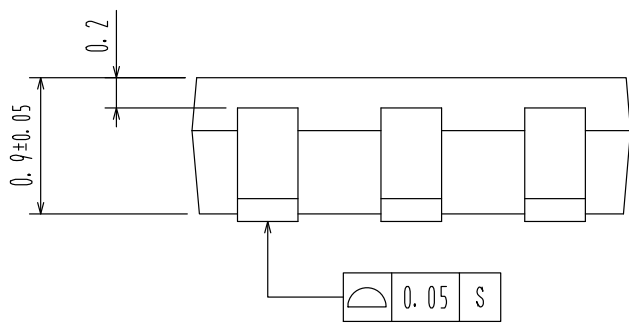
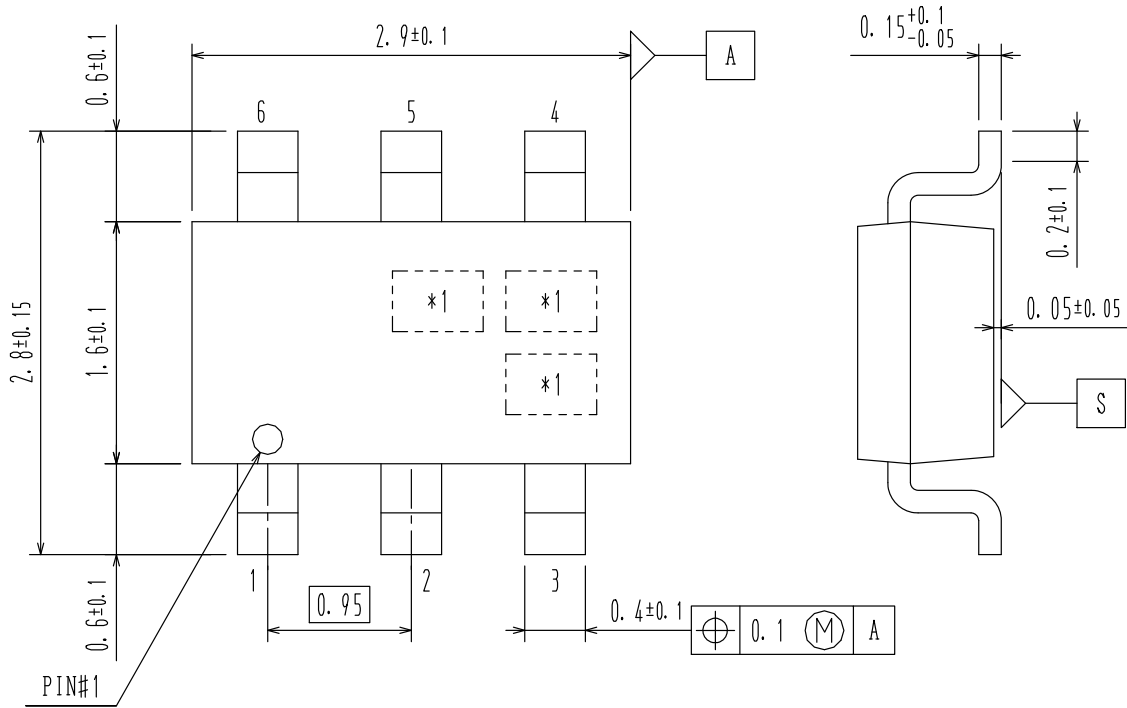


Figure 20. $P_C - T_A$

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

CPH6
CASE 318BD
ISSUE O

DATE 30 NOV 2011



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