Ordering number : EN6344C

CPH3115/CPH3215

Bipolar Transistor
(–)30V, (–)1.5A, Low V_{CE}(sat), (PNP)NPN Single CPH3

ON Semiconductor®
http://onsemi.com

Applications

- Relay drivers, lamp drivers, motor drivers, and strobes

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 : 0.9mm)
- High allowable power dissipation
- Halogen free compliance

Specifications ( ): CPH3115

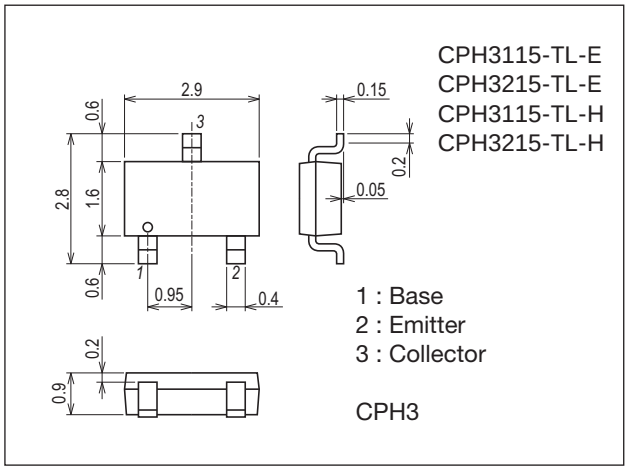
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–30)40	V
Collector-to-Emitter Voltage	V_{CEO}		(–)30	V
Emitter-to-Base Voltage	V_{EBO}		(–)5	V
Collector Current	I_C		(–)1.5	A
Collector Current (Pulse)	I_{CP}		(–)3	A
Base Current	I_B		(–)300	mA
Collector Dissipation	P_C	When mounted on ceramic substrate (600mm^2×0.8mm)	0.9	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

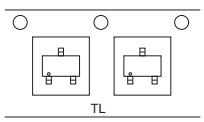
unit : mm (typ)
7015A-003



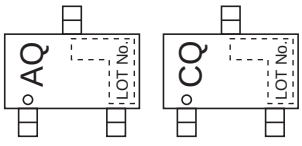
Product & Package Information

- Package : CPH3
- JEITA, JEDEC : SC-59, TO-236, SOT-23
- Minimum Packing Quantity : 3,000 pcs./reel

Packing Type: TL

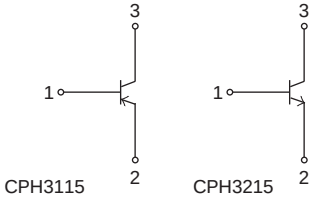


Marking



CPH3115 CPH3215

Electrical Connection

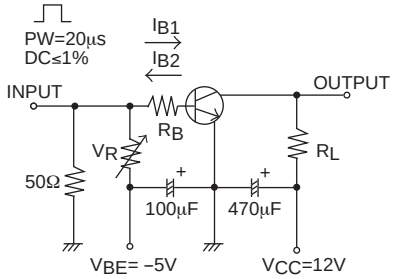


CPH3115 CPH3215

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(−)30V, I_E=0A			(−)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(−)4V, I_C=0A			(−)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(−)2V, I_C=(−)100mA	200		560	
Gain-Bandwidth Product	f_T	V_{CE}=(−)10V, I_C=(−)300mA		(450)500		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(9)8		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(−)750mA, I_B=(−)15mA		(−250)150	(−375)225	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(−)750mA, I_B=(−)15mA		(−)0.85	(−)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(−)10μA, I_E=0A	(−30)40			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(−)1mA, R_{BE}=∞	(−)30			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(−)10μA, I_C=0A	(−)5			V
Turn-On Time	t_{on}	See specified Test Circuit.		35		ns
Storage Time	t_{stg}			(115)205		ns
Fall Time	t_f			30		ns

Switching Time Test Circuit

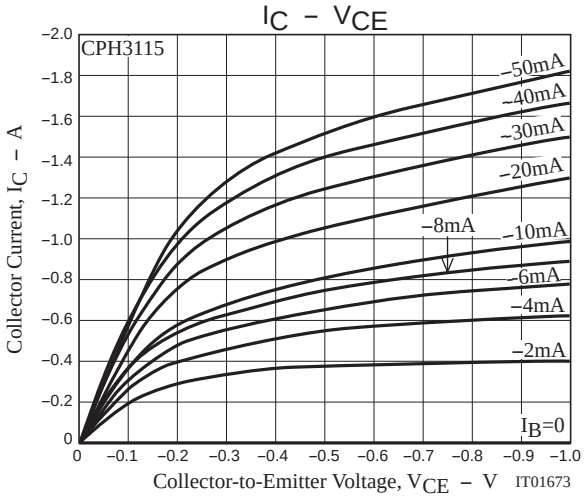


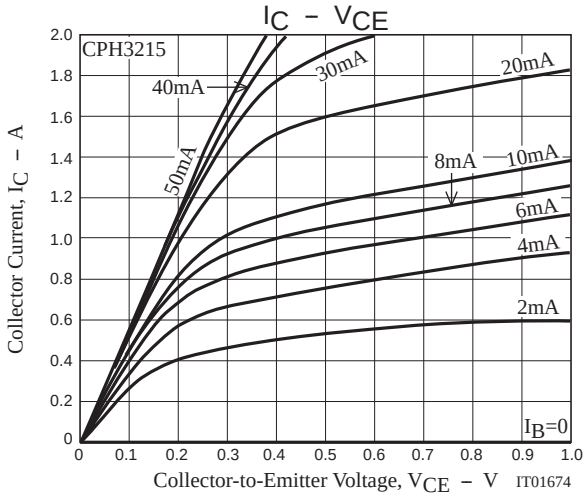
I_C=20I_{B1}= −20I_{B2}=750mA

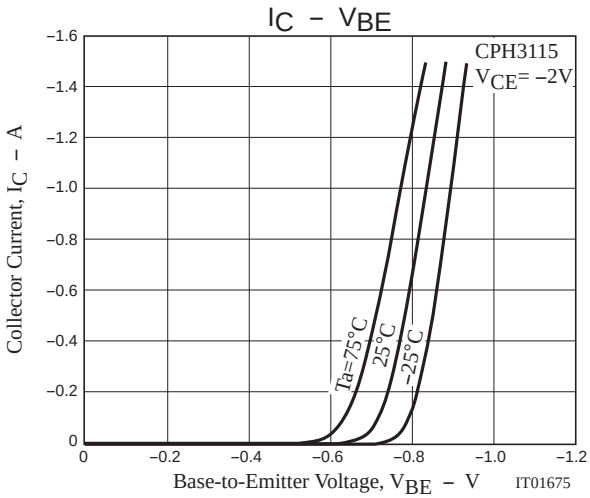
(For PNP, the polarity is reversed.)

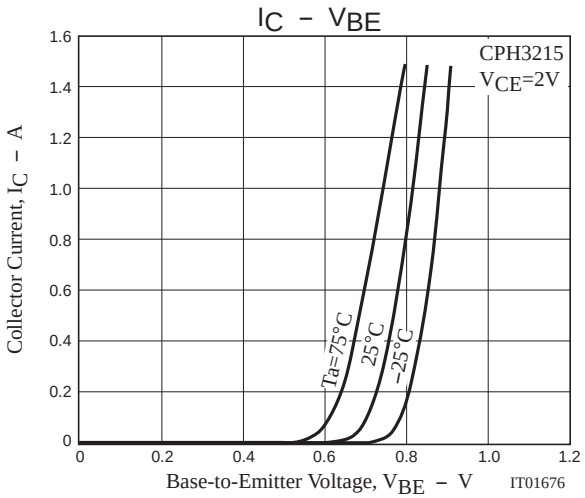
Ordering Information

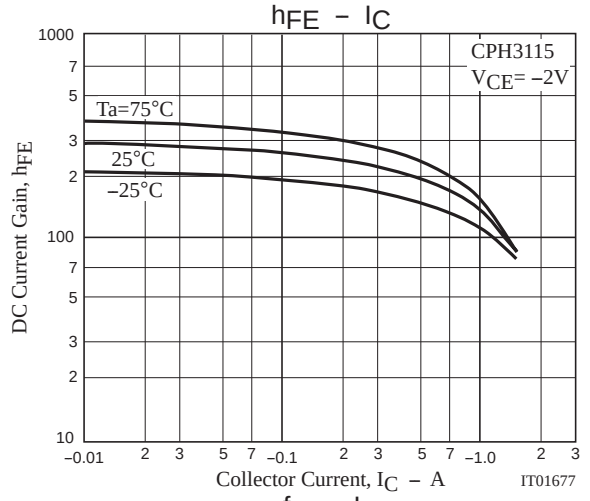
Device	Package	Shipping	memo
CPH3115-TL-E	CPH3	3,000pcs./reel	Pb Free
CPH3215-TL-E	CPH3	3,000pcs./reel	Pb Free
CPH3115-TL-H	CPH3	3,000pcs./reel	Pb Free and Halogen Free
CPH3215-TL-H	CPH3	3,000pcs./reel	Pb Free and Halogen Free

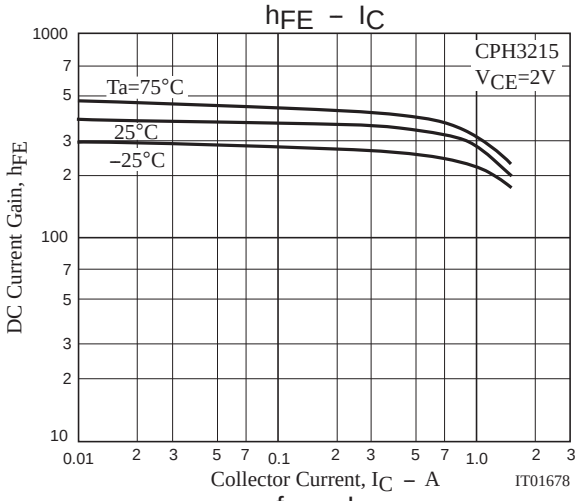


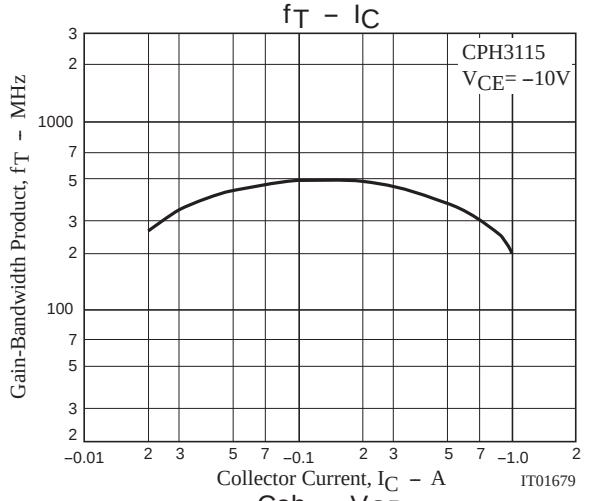


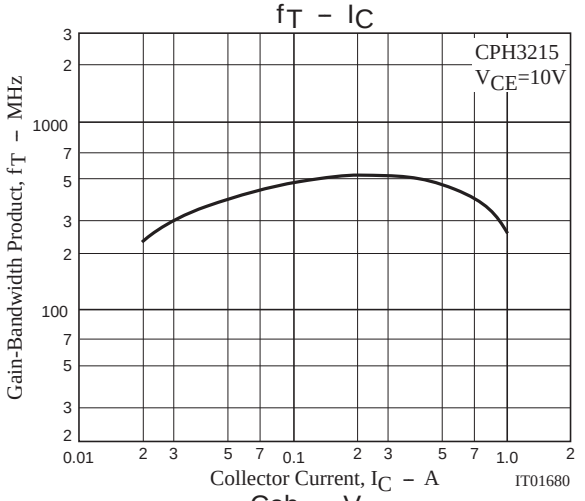

IC – VBE
CPH3115
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01675

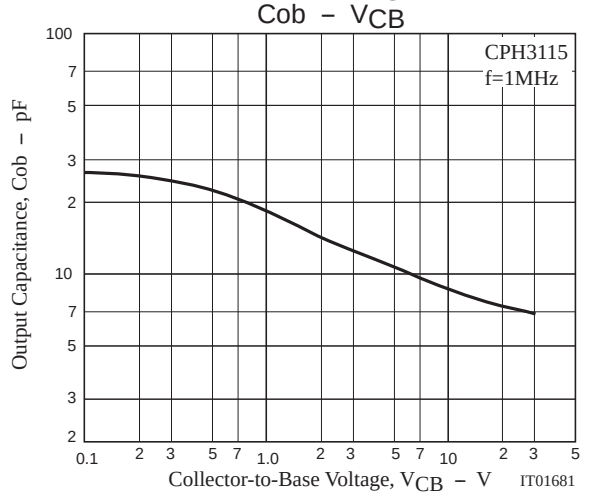

IC – VBE
CPH3215
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01676

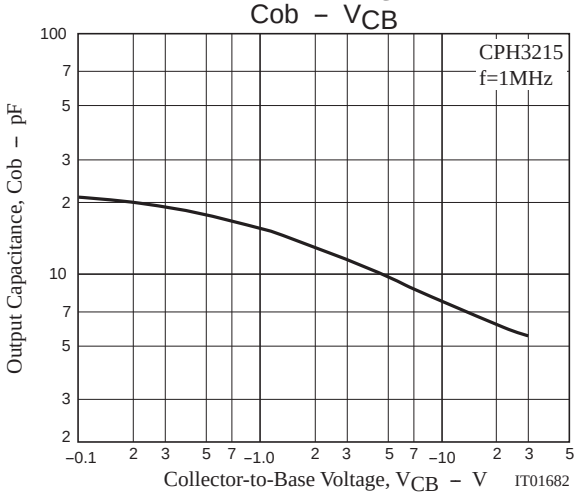

hFE – IC
CPH3115
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01677

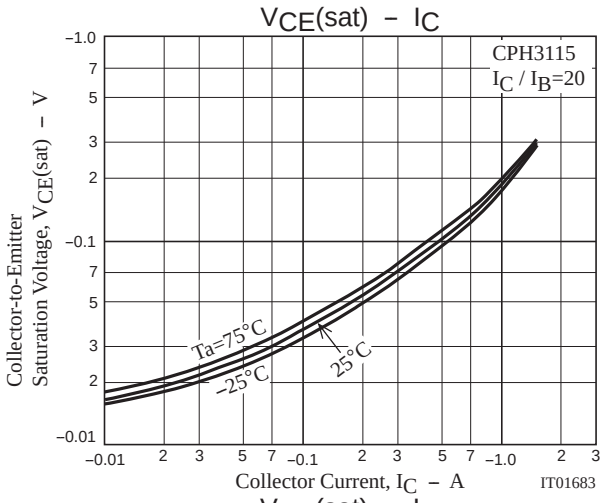

hFE – IC
CPH3215
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01678

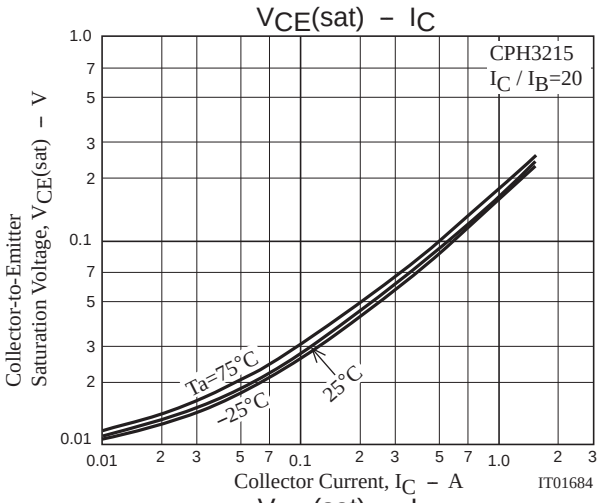

fT – IC
CPH3115
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01679

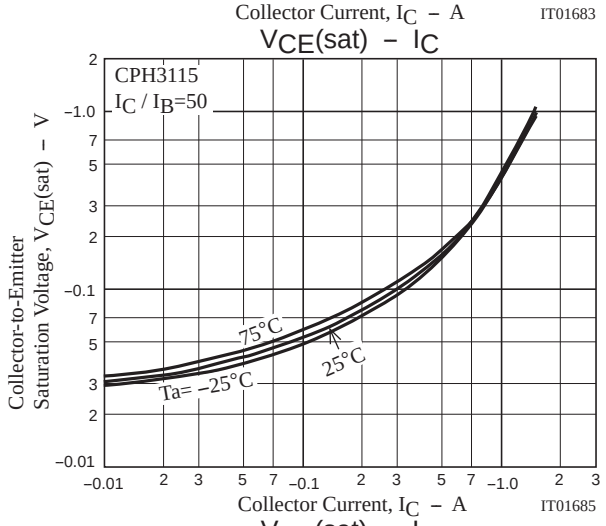

fT – IC
CPH3215
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01680

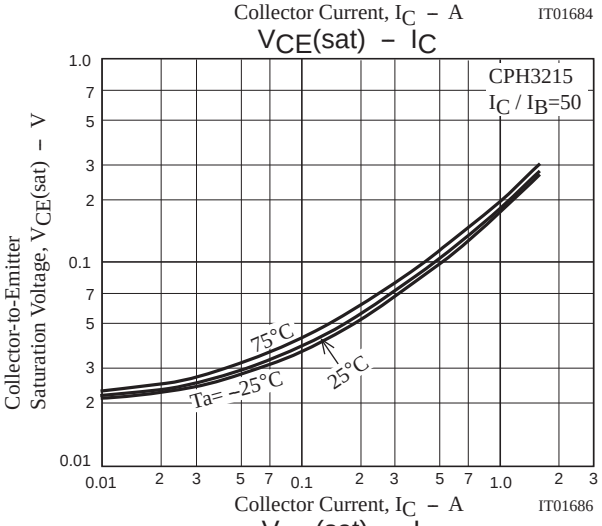

Cob – VCB
CPH3115
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01681

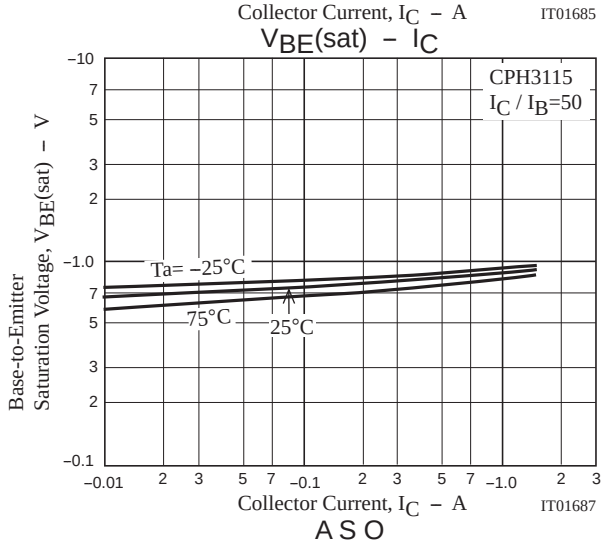

Cob – VCB
CPH3215
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01682

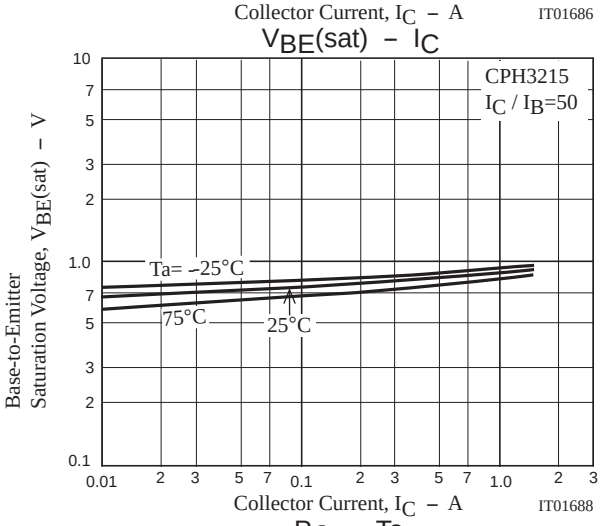

VCE(sat) – IC
CPH3115
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01683

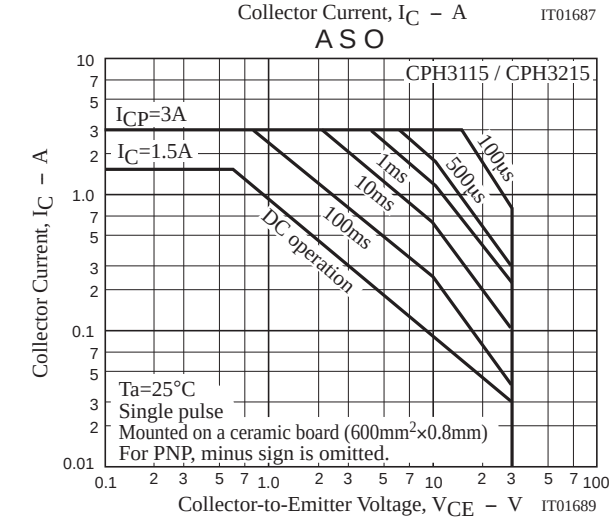

VCE(sat) – IC
CPH3215
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01684

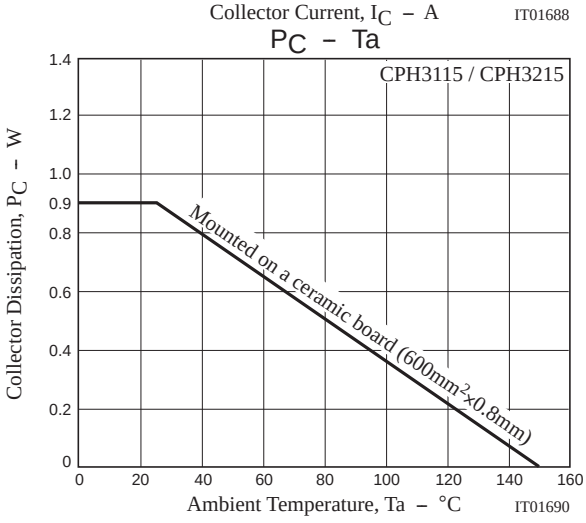

VCE(sat) – IC
CPH3115
IC / IB=50
75°C
25°C
Ta= –25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01685


VCE(sat) – IC
CPH3215
IC / IB=50
75°C
25°C
Ta= –25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01686


VBE(sat) – IC
CPH3115
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
IT01687


VBE(sat) – IC
CPH3215
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
IT01688


A S O
CPH3115 / CPH3215
ICP=3A
IC=1.5A
1ms
10ms
100ms
DC operation
100µs
500µs
Ta=25°C
Single pulse
Mounted on a ceramic board (600mm2×0.8mm)
For PNP, minus sign is omitted.
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT01689


PC – Ta
CPH3115 / CPH3215
Mounted on a ceramic board (600mm2×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
IT01690

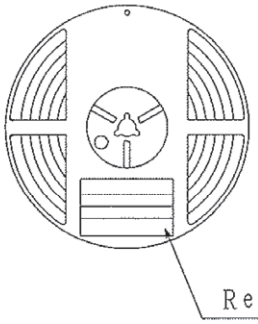
Embossed Taping Specification

CPH3115-TL-E, CPH3215-TL-E, CPH3115-TL-H, CPH3215-TL-H

1. Packing Format

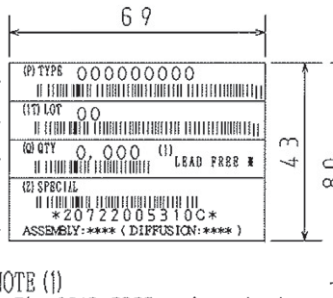
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
CPH3	CPH3	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Packing method



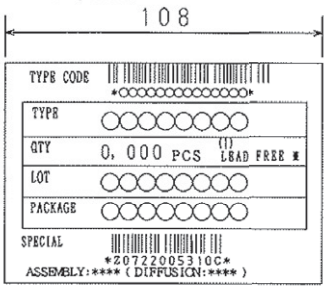
Reel label

Reel label, Inner box label (unit:mm)



Outer box label

It is a label at the time of factory shipments. The form of a label may change in physical distribution process.

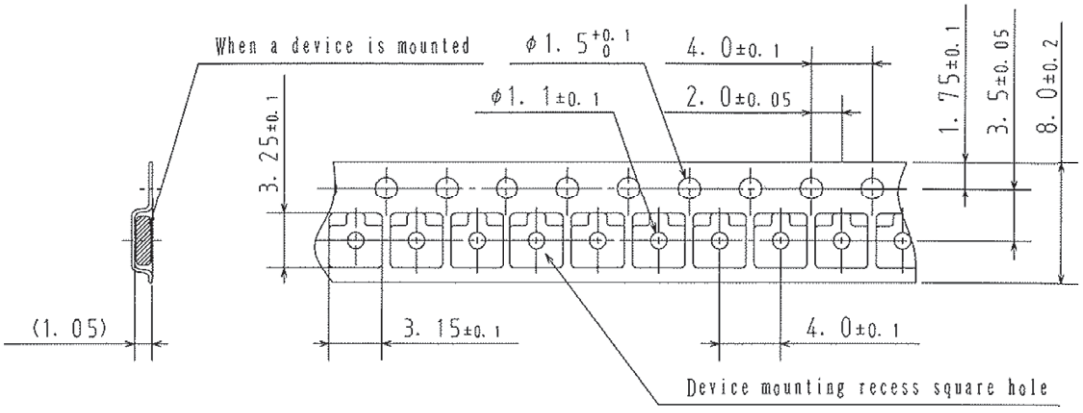


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

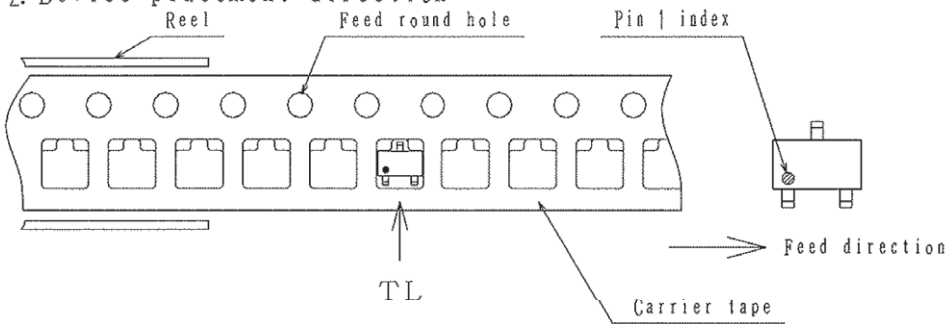
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

2-1. Carrier tape size (unit:mm)



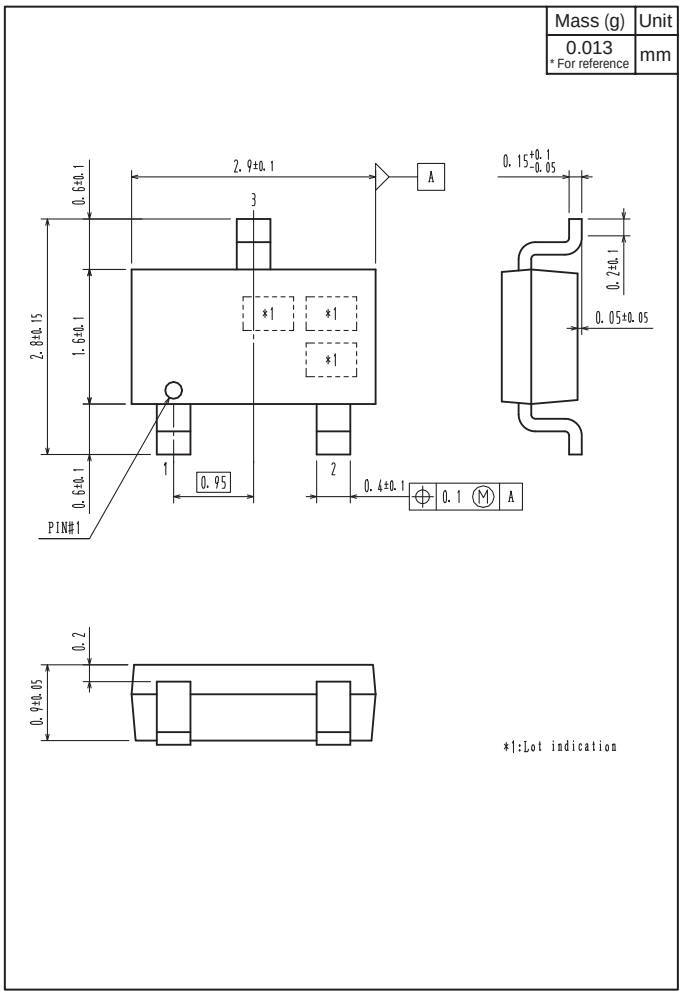
2-2. Device placement direction



Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

CPH3115-TL-E, CPH3215-TL-E, CPH3115-TL-H, CPH3215-TL-H



Land Pattern Example