Ordering number : EN6405F

CPH3116/CPH3216

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

ON Semiconductor®
http://onsemi.com

Applications

- Relay drivers, lamp drivers, motor drivers, flash

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

Specifications ( ): CPH3116

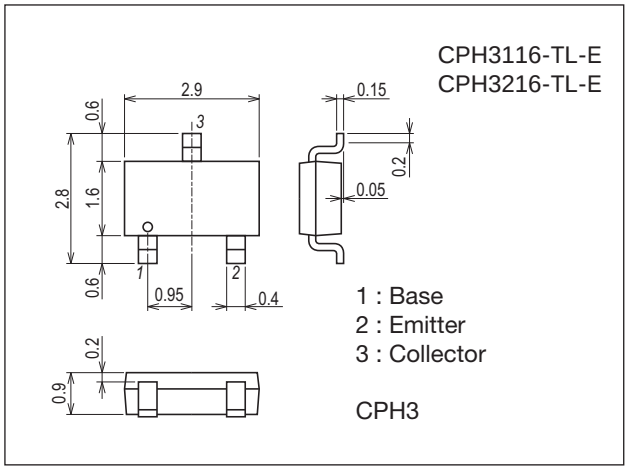
Absolute Maximum Ratings at Ta=25°C

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
Emitter-to-Base Voltage	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 (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

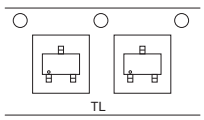
unit : mm (typ)
7015A-003



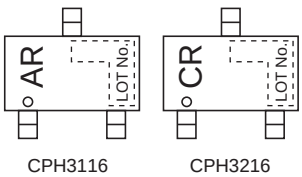
Product & Package Information

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

Packing Type: TL

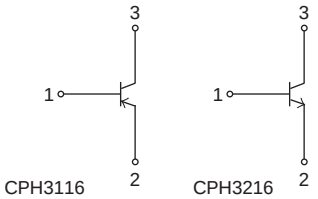


Marking



CPH3116 CPH3216

Electrical Connection

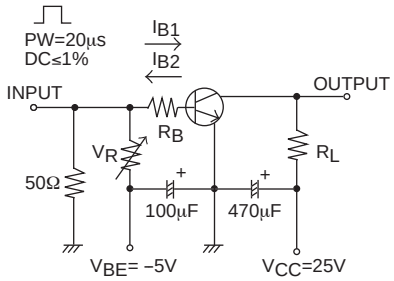


CPH3116 CPH3216

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(−)40V, 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		420		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(9)6		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)1	I_C=(−)500mA, I_B=(−)10mA		(−280)130	(−430)190	mV
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)2	I_C=(−)300mA, I_B=(−)6mA		(−145)90	(−220)135	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(−)500mA, I_B=(−)10mA		(−)0.81	(−)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(−)10μA, I_E=0A	(−50)80			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=(−)100μA,R_{BE}=0Ω	(−50)80			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(−)1mA, R_{BE}=∞	(−)50			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}			(170)330		ns
Fall Time	t_f			(30)40		ns

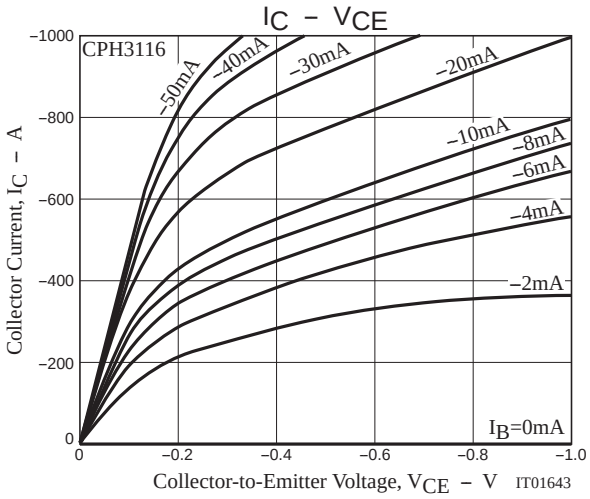
Switching Time Test Circuit

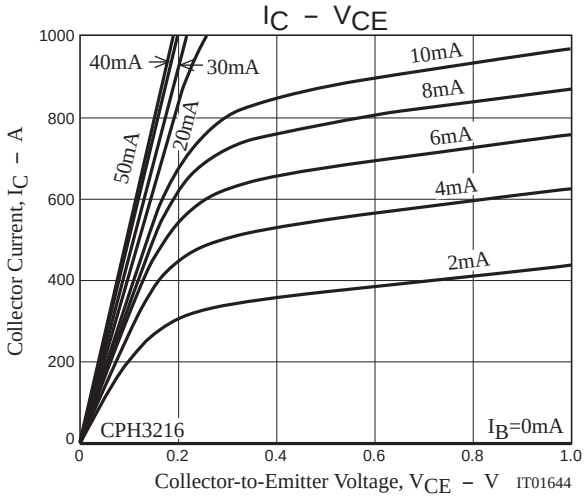


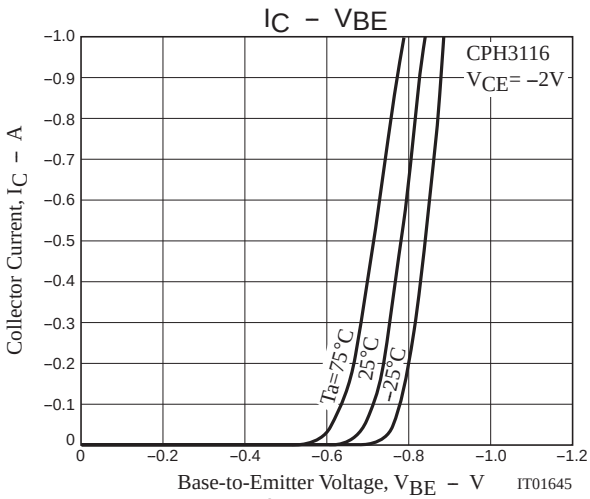
I_C=20I_{B1}= −20I_{B2}=500mA
(For PNP, the polarity is reversed.)

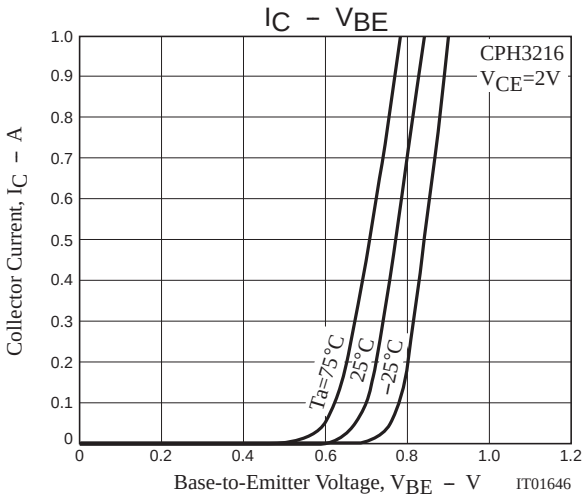
Ordering Information

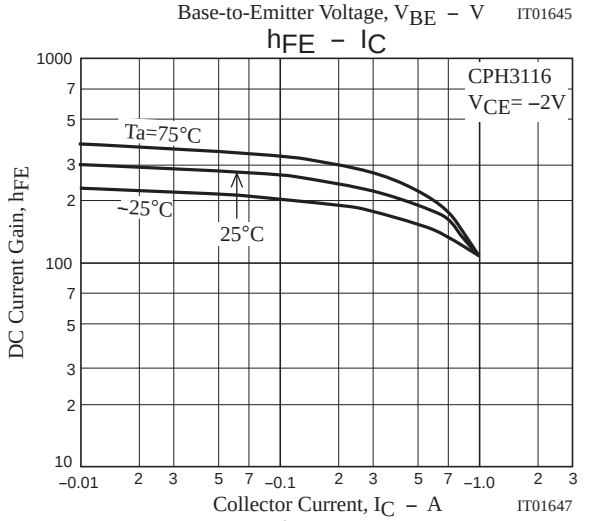
Device	Package	Shipping	memo
CPH3116-TL-E	CPH3	3,000pcs./reel	Pb Free
CPH3216-TL-E	CPH3	3,000pcs./reel	Pb Free

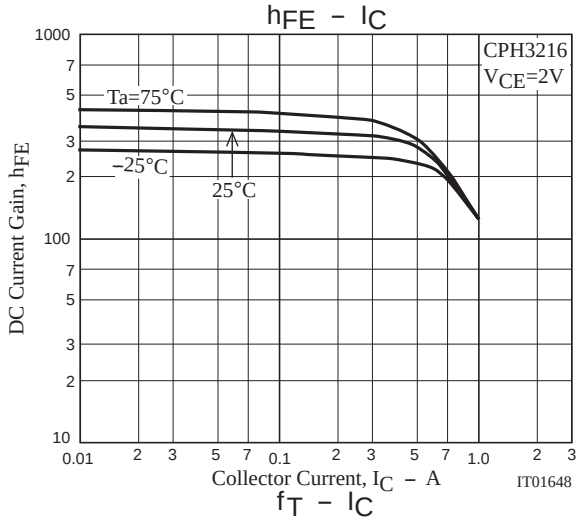


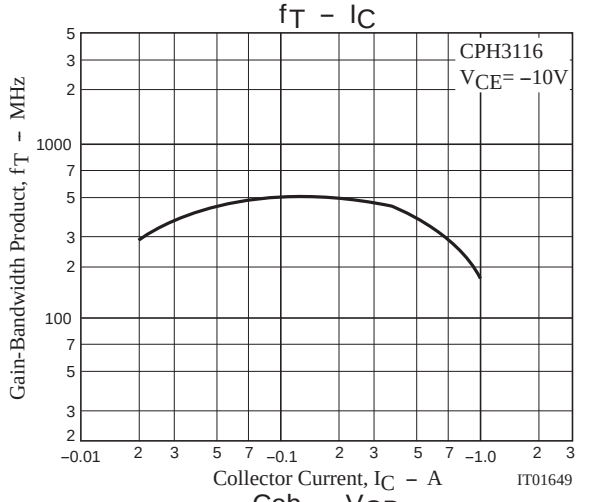


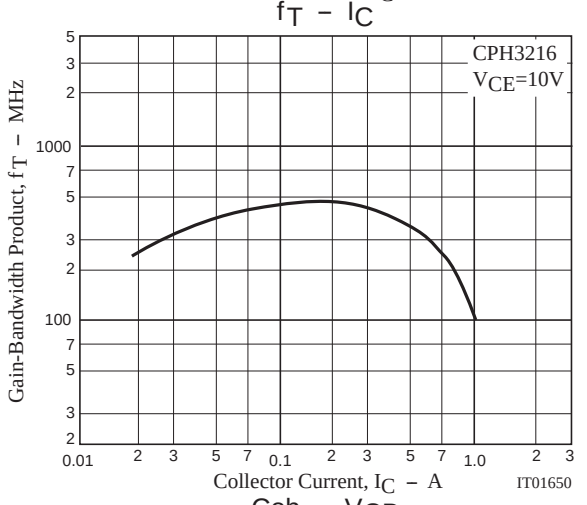

IC – VBE
CPH3116
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01645

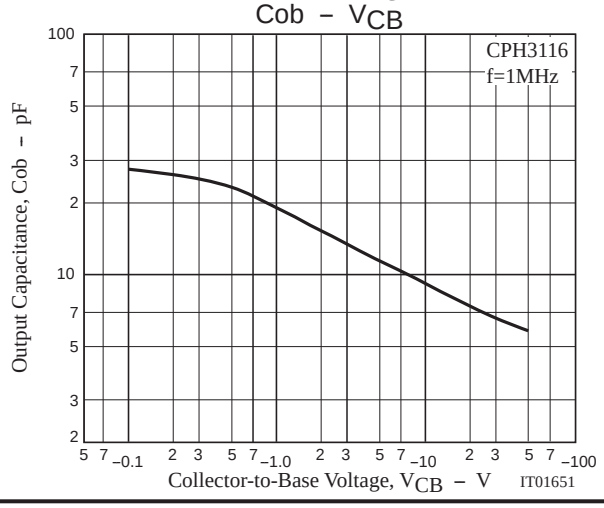

IC – VBE
CPH3216
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01646

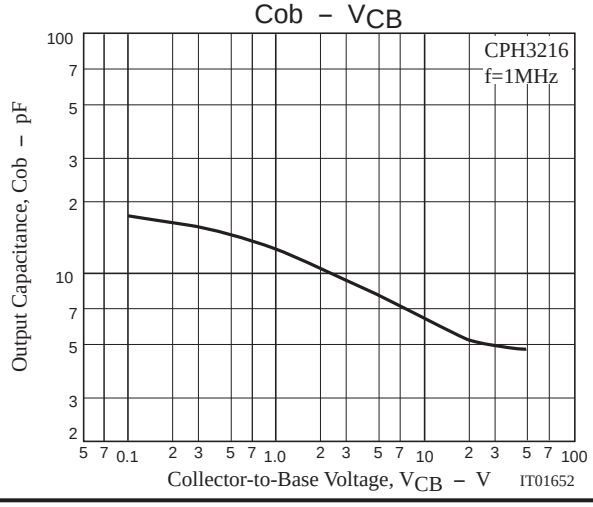

hFE – IC
CPH3116
VCE= –2V
Ta=75°C
–25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01647

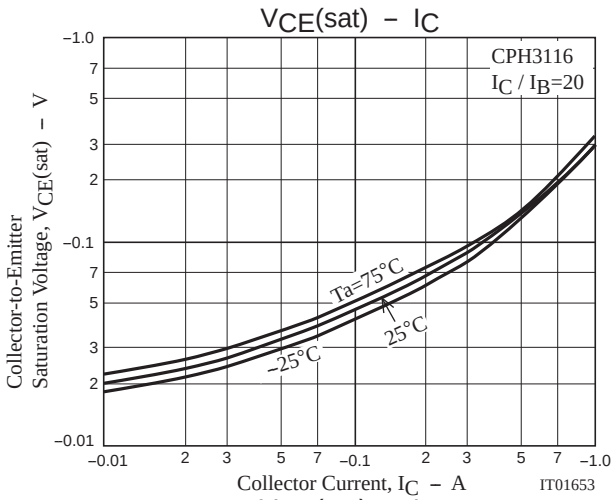

hFE – IC
CPH3216
VCE=2V
Ta=75°C
–25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01648

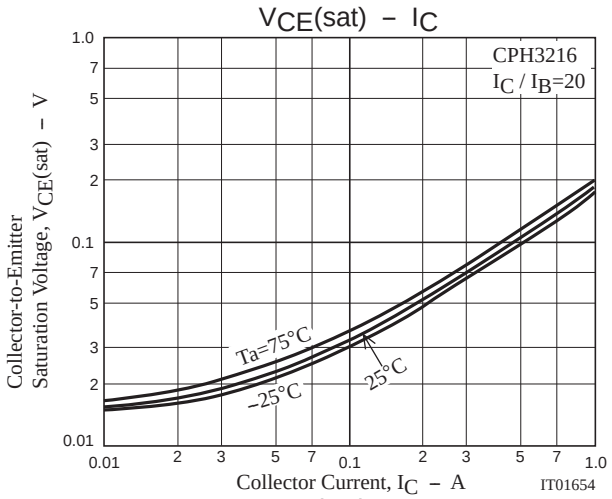

fT – IC
CPH3116
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01649

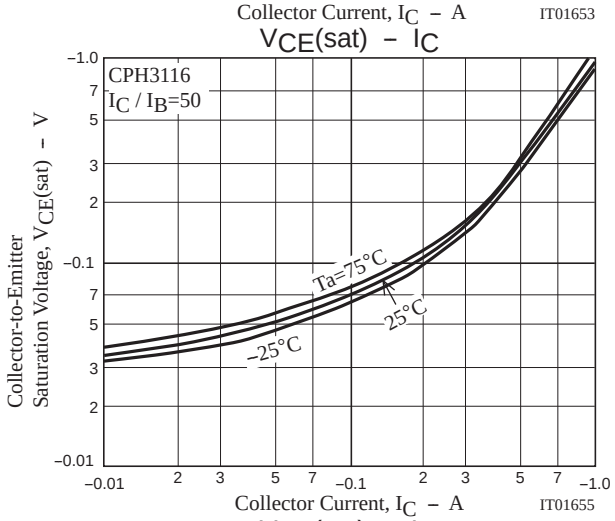

fT – IC
CPH3216
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01650

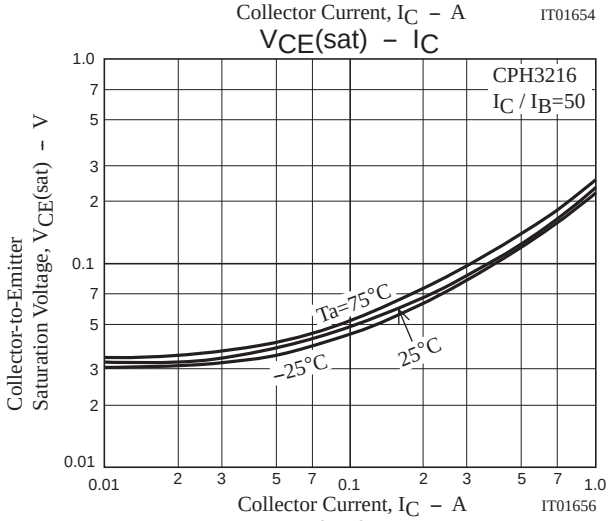

Cob – VCB
CPH3116
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01651

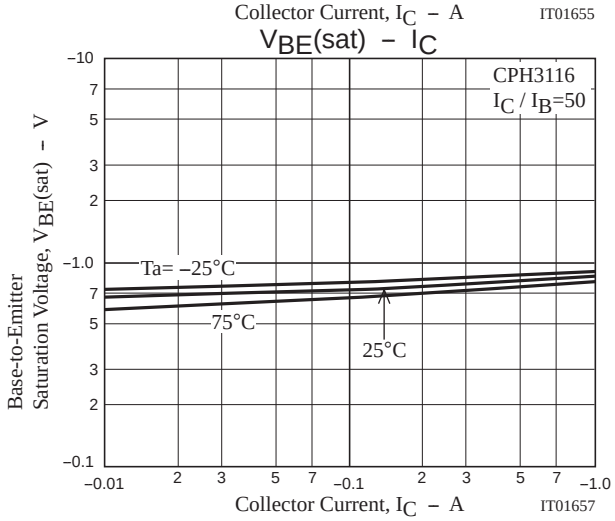

Cob – VCB
CPH3216
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01652

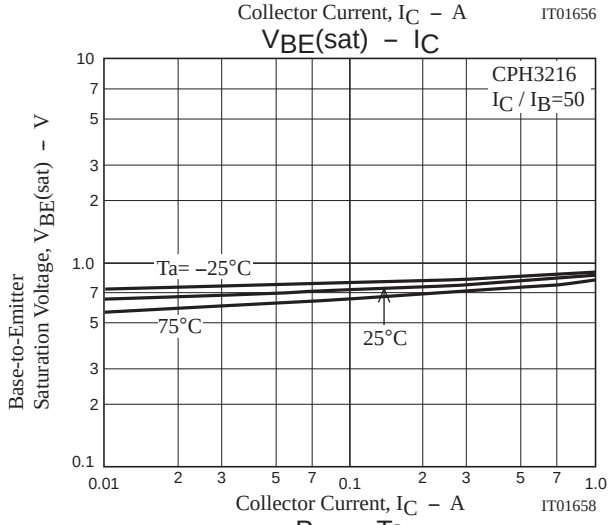

VCE(sat) – IC
CPH3116
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01653

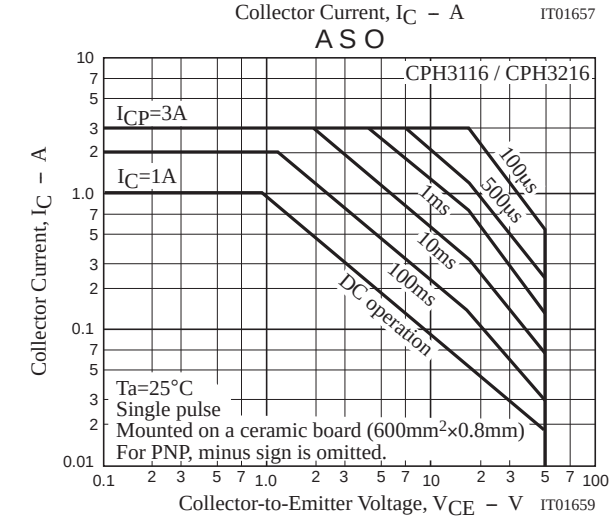

VCE(sat) – IC
CPH3216
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01654

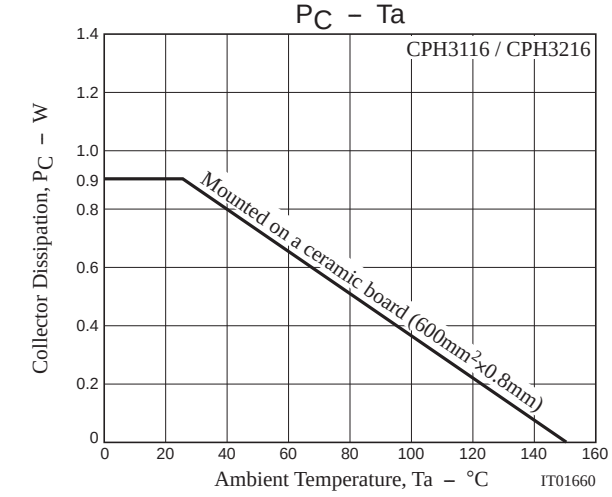

VCE(sat) – IC
CPH3116
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01655


VCE(sat) – IC
CPH3216
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01656


VBE(sat) – IC
CPH3116
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
IT01657


VBE(sat) – IC
CPH3216
IC / IB=50
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
IT01658


A S O
CPH3116 / CPH3216
ICP=3A
IC=1A
100µs
500µs
1ms
10ms
100ms
DC operation
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
IT01659


PC – Ta
CPH3116 / CPH3216
Mounted on a ceramic board (600mm²×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
IT01660

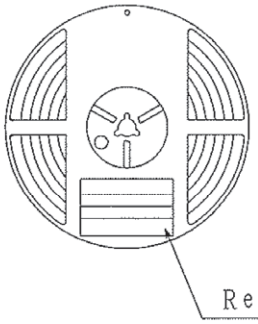
Embossed Taping Specification

CPH3116-TL-E, CPH3216-TL-E

1. Packing Format

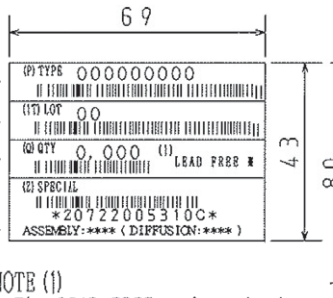
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
CPH3	CPH3	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Packing method



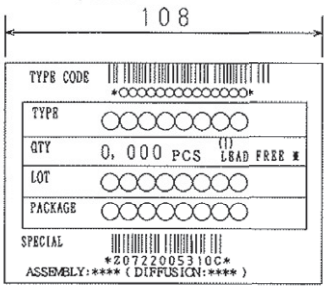
Reel label

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.

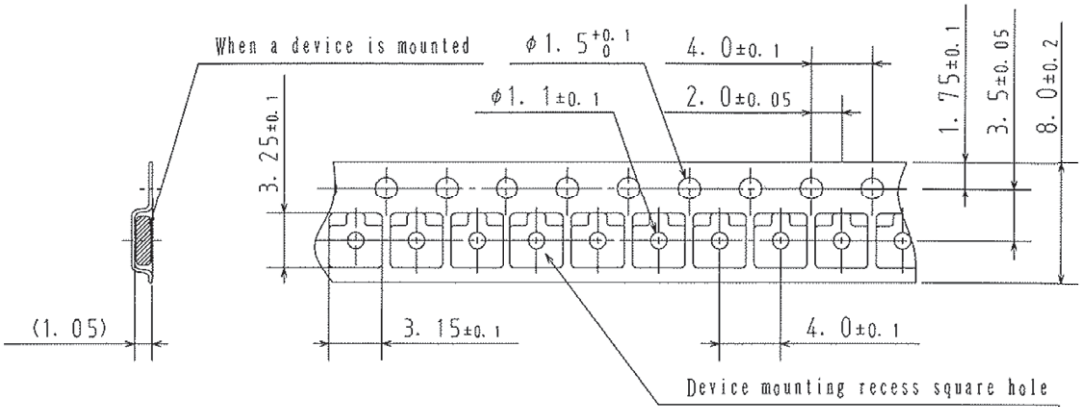


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

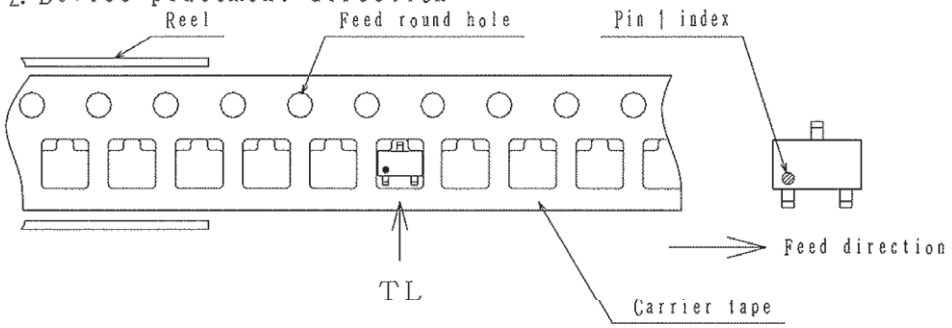
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



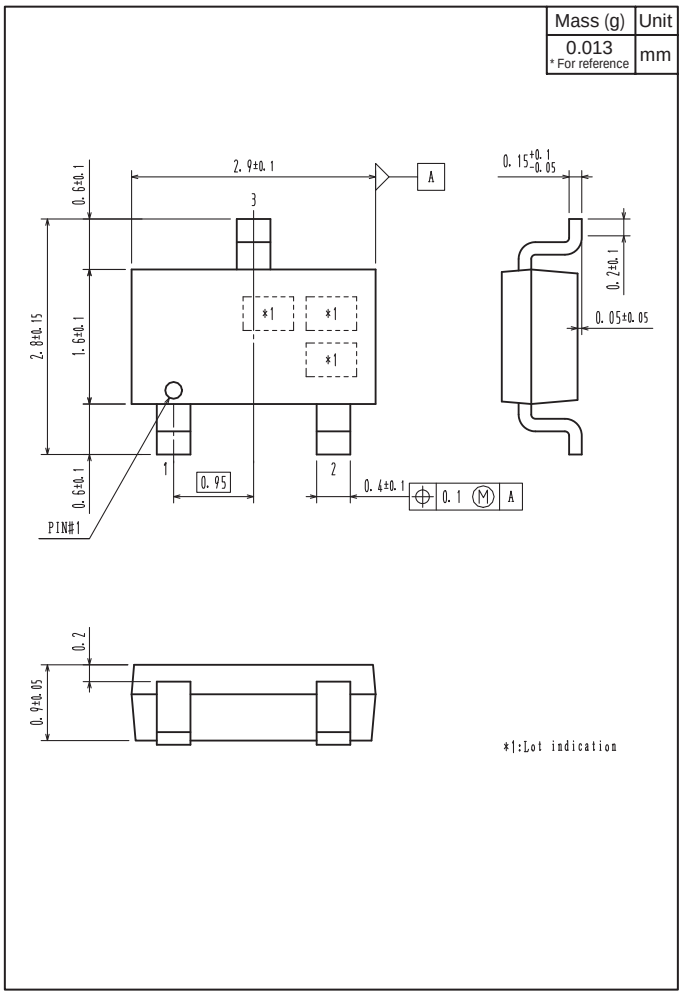
2-2. Device placement direction



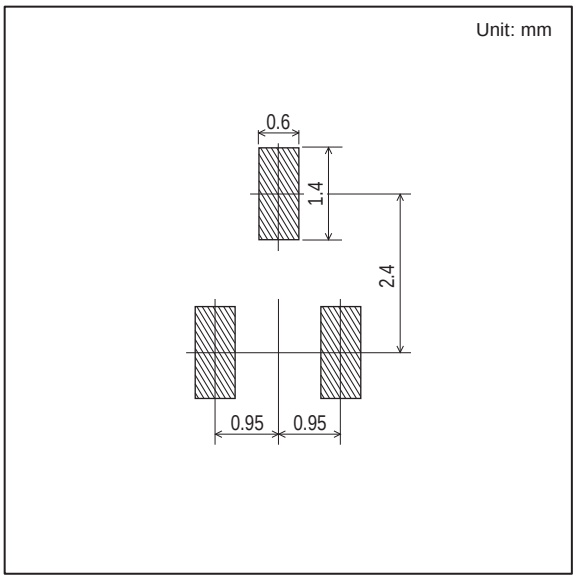
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

CPH3116-TL-E, CPH3216-TL-E



Land Pattern Example



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