Ordering number : EN6405F

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

CPH3116 / CPH3216 — DC / DC Converter Applications

PNP / NPN Epitaxial Planar Silicon Transistor

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

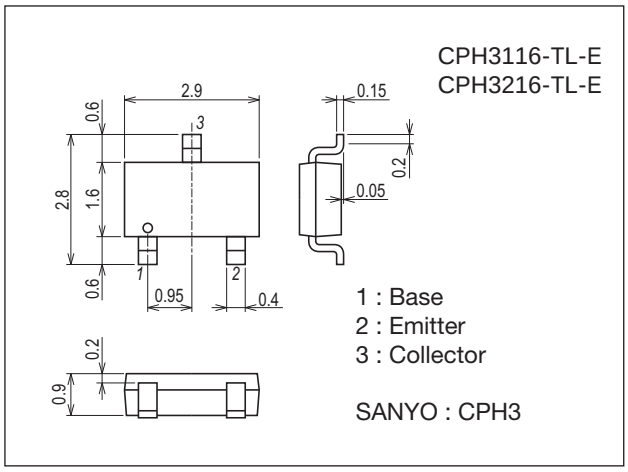
Absolute Maximum Ratings at Ta=25°C

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

Package Dimensions

unit : mm (typ)

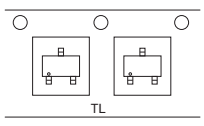
7015A-003



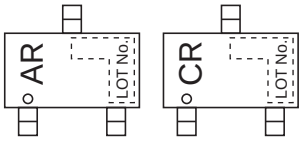
Product & Package Information

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

Packing Type: TL

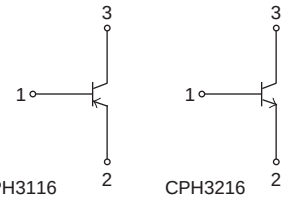


Marking



CPH3116 CPH3216

Electrical Connection

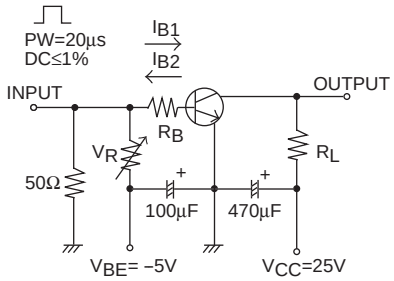


CPH3116 CPH3216

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

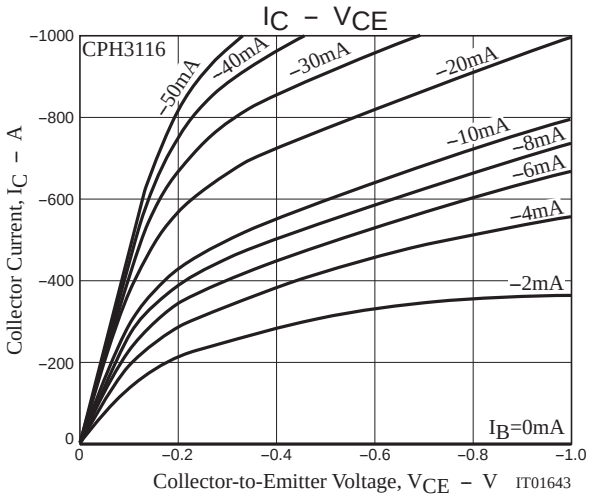
Switching Time Test Circuit

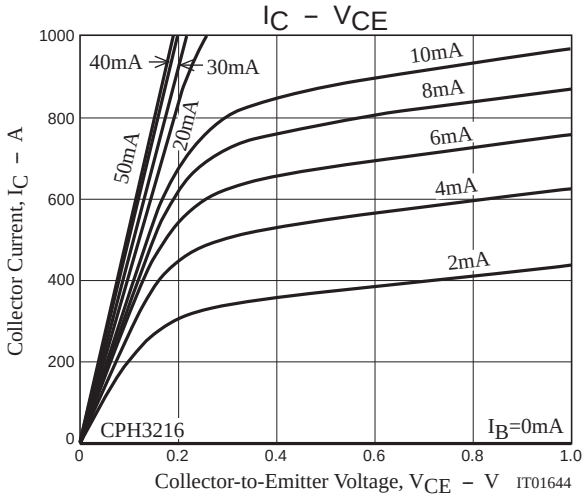


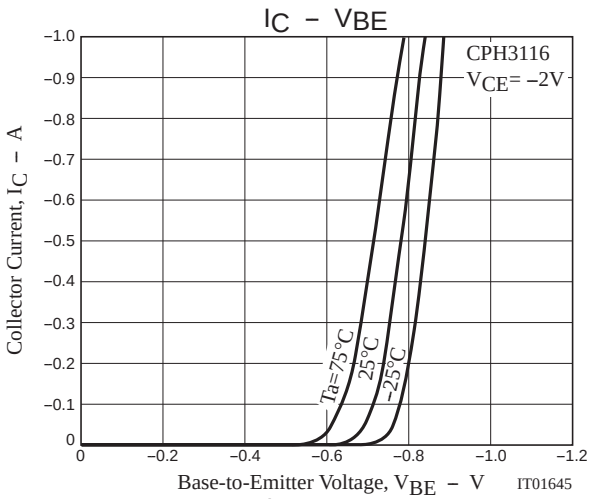
I_C=20I_{B1}= −20I_{B2}=500mA
(For PNP, the polarity is reversed.)

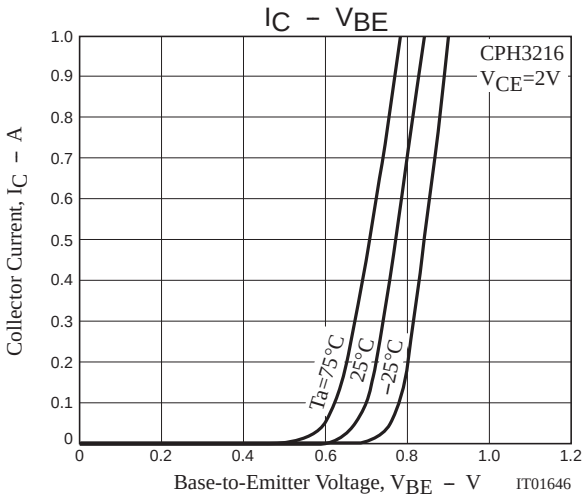
Ordering Information

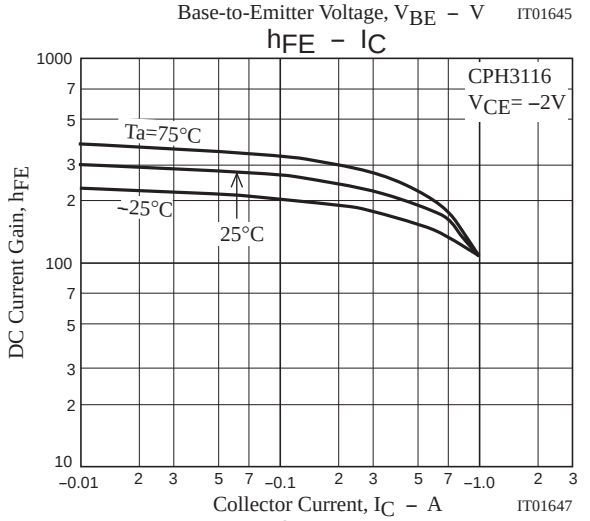
Device	Package	Shipping	memo
CPH3116-TL-E	CPH3	3,000pcs./reel	Pb Free
CPH3216-TL-E	CPH3	3,000pcs./reel	Pb Free

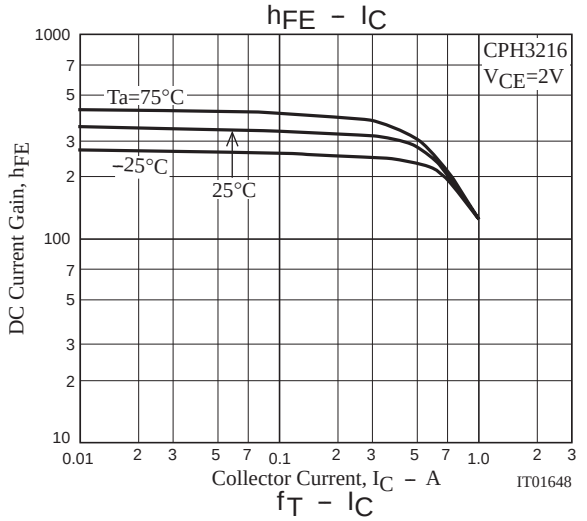


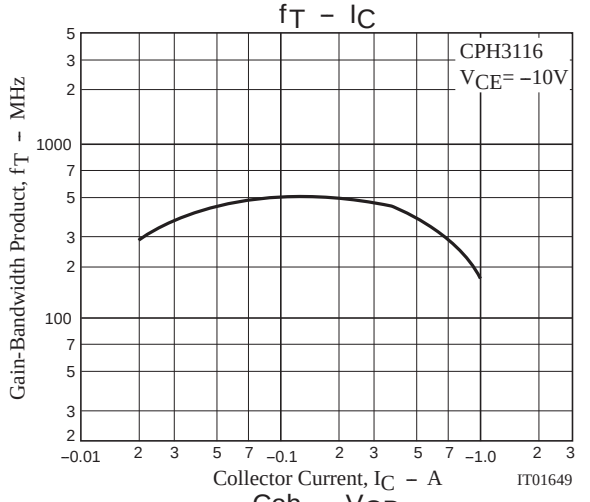


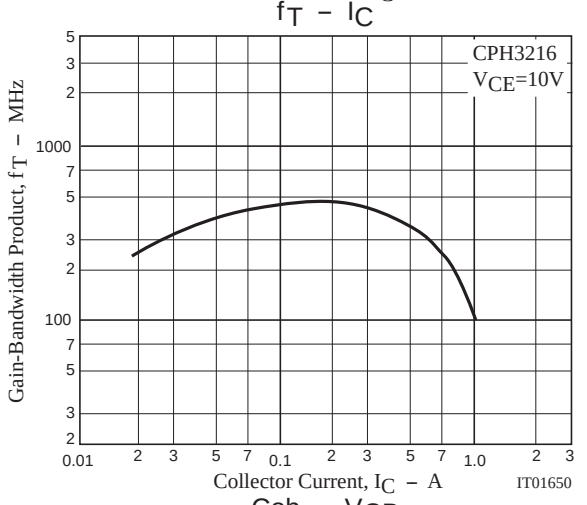

IC – VBE
CPH3116
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01645

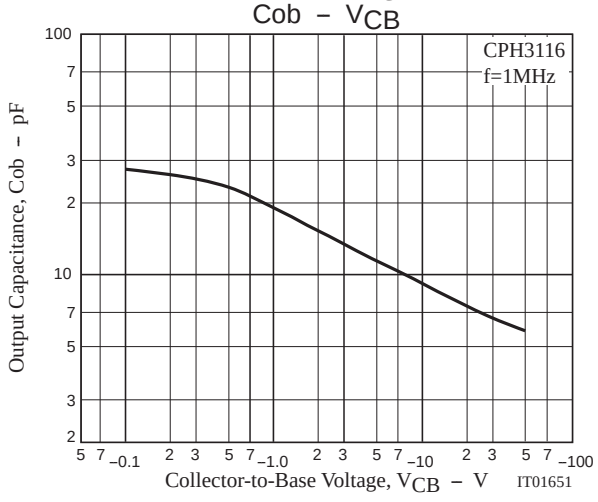

IC – VBE
CPH3216
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT01646

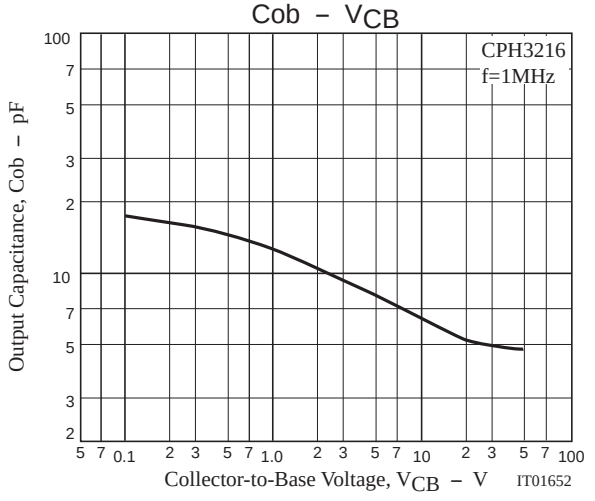

hFE – IC
CPH3116
VCE= –2V
Ta=75°C
–25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01647

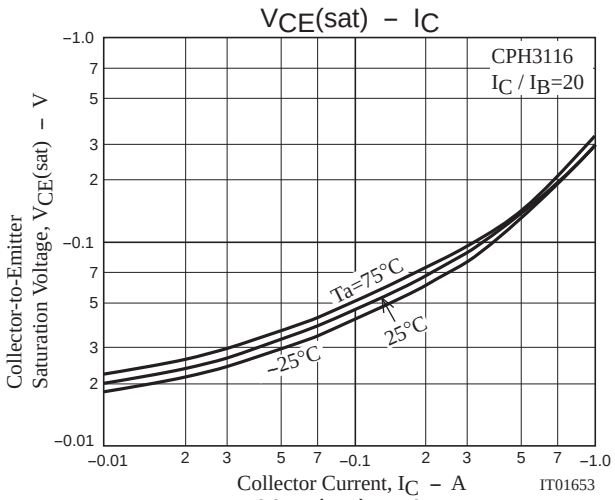

hFE – IC
CPH3216
VCE=2V
Ta=75°C
–25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A
IT01648

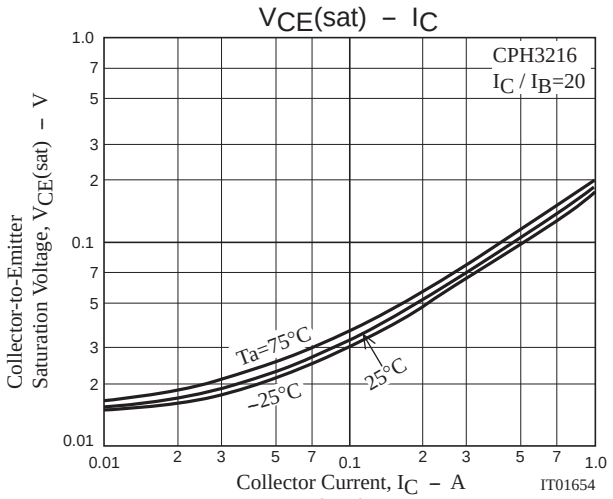

fT – IC
CPH3116
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01649

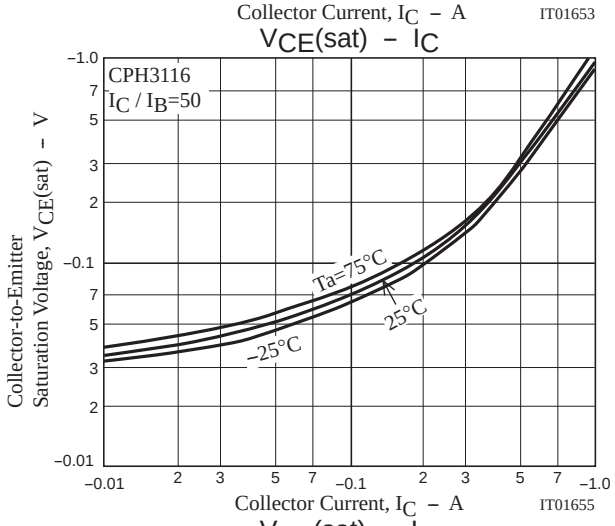

fT – IC
CPH3216
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT01650

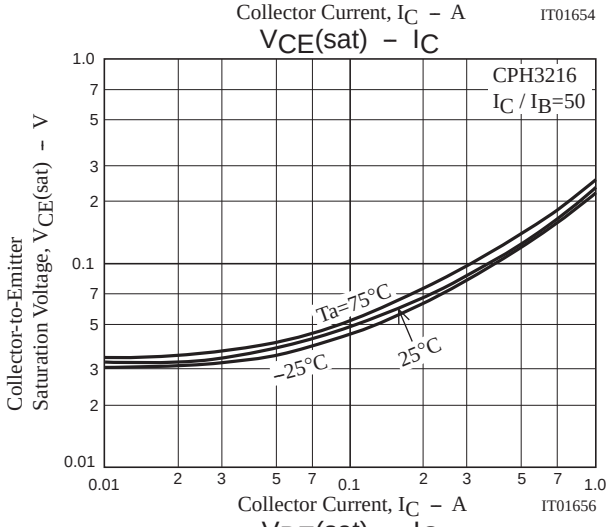

Cob – VCB
CPH3116
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01651

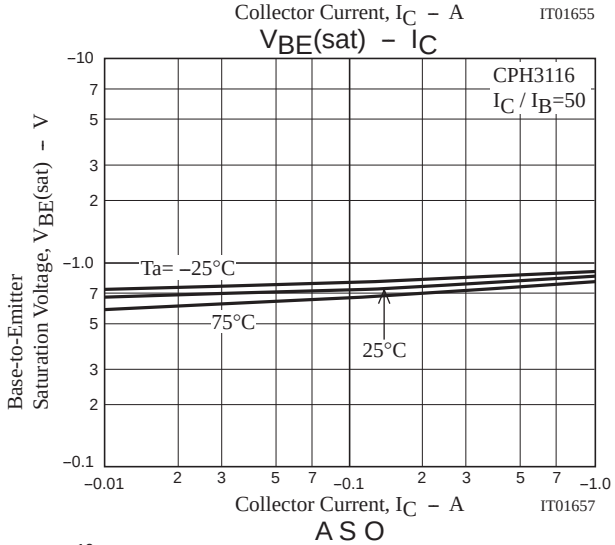

Cob – VCB
CPH3216
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT01652

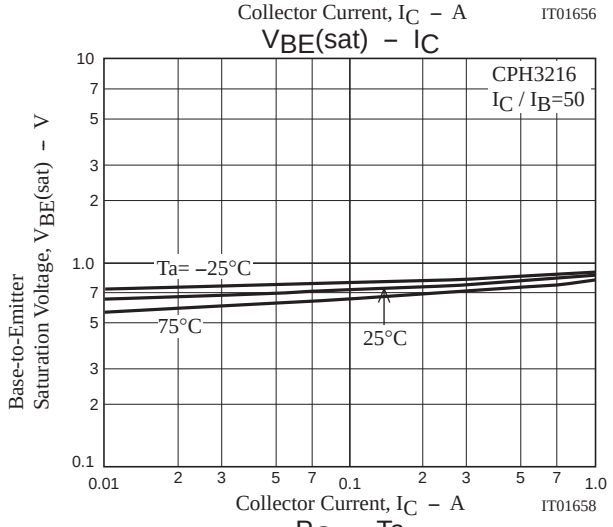

VCE(sat) – IC
CPH3116
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01653

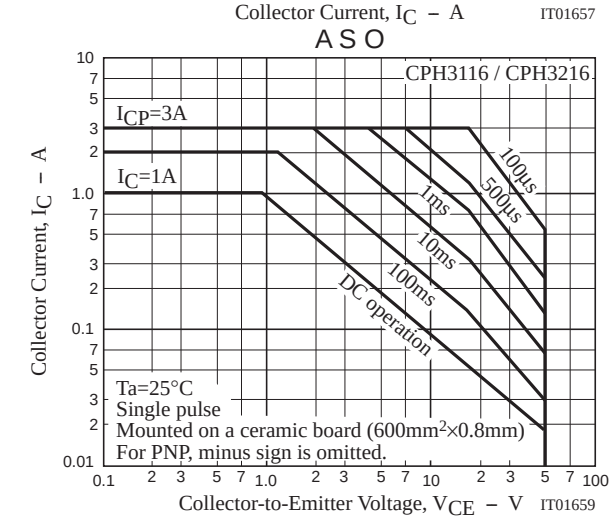

VCE(sat) – IC
CPH3216
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01654

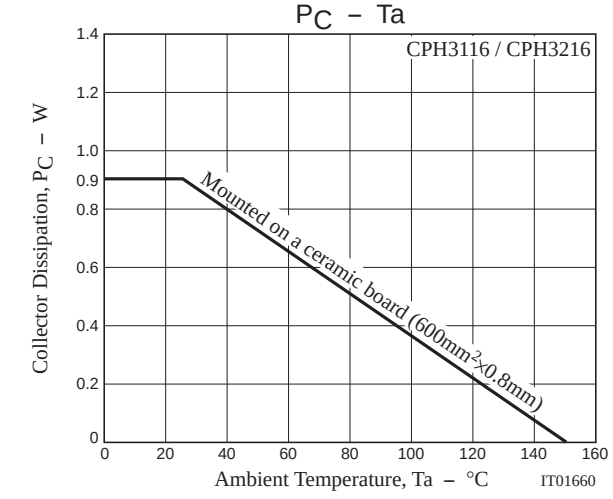

VCE(sat) – IC
CPH3116
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
IT01655


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

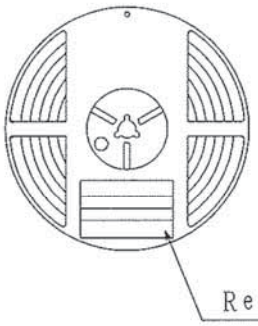
Embossed Taping Specification

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

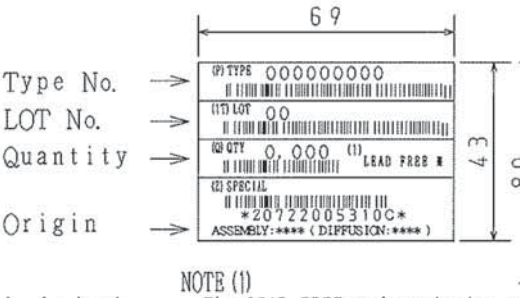
Packing method



Reel label

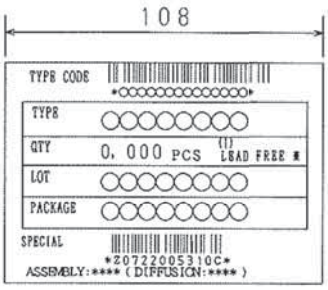
Reel label, Inner box label

(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.



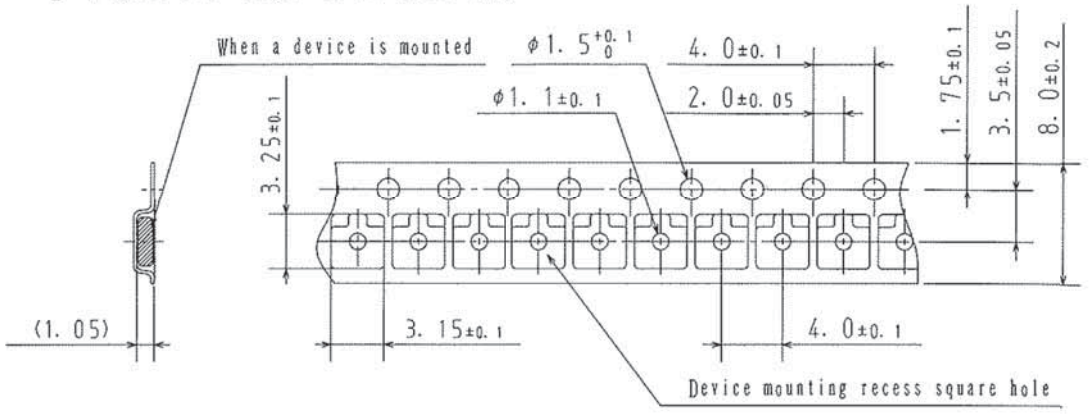
NOTE (1)

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

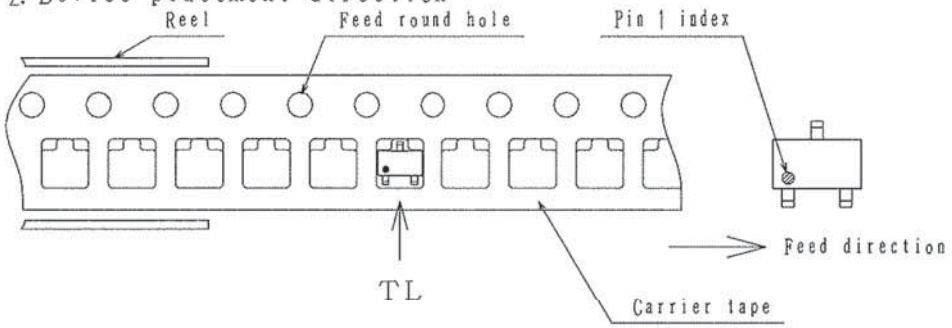
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



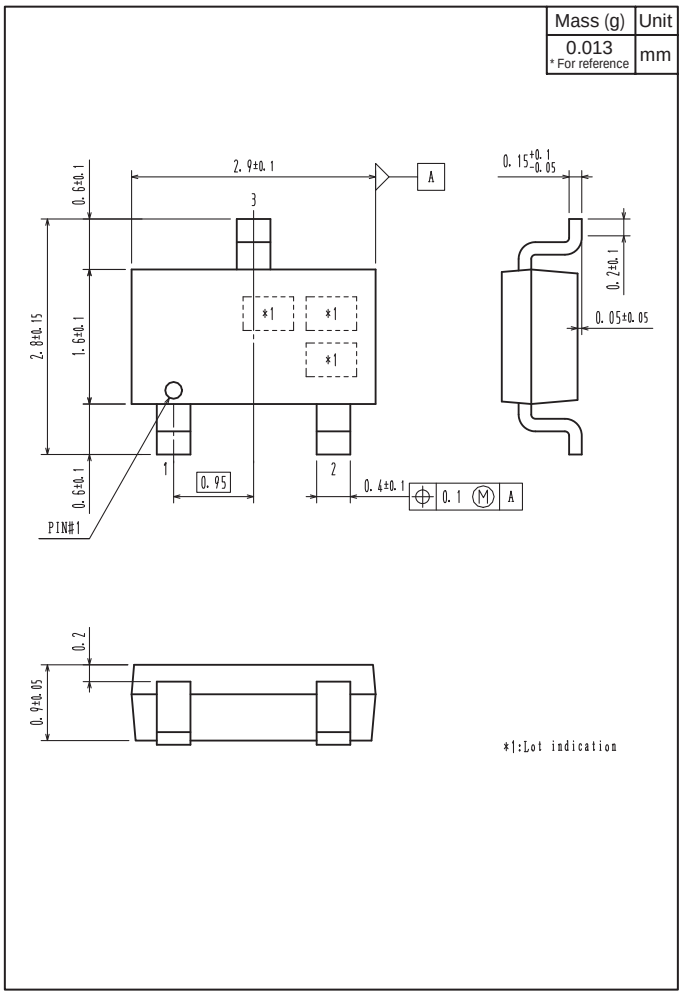
2-2. Device placement direction



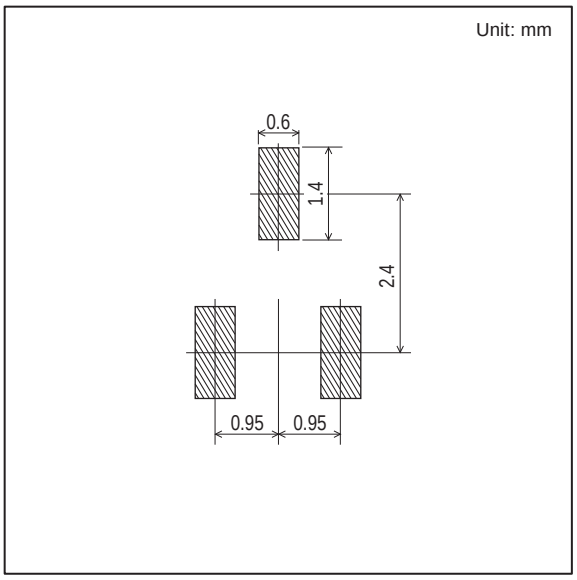
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

CPH3116-TL-E, CPH3216-TL-E



Land Pattern Example



This catalog provides information as of October, 2012. Specifications and information herein are subject to change without notice.