Ordering number : EN8223A

CPH5541

Bipolar Transistor
(−)30V, (−)3A, Low V_{CE}(sat) Complementary Dual CPH5

ON Semiconductor®
http://onsemi.com

Applications

- MOSFET gate drivers, relay drivers, lamp drivers, motor drivers

Features

- Composite type with a PNP transistor and an NPN transistor contained in one package, facilitating high-density mounting
- Ultrasmall package facilitate miniaturization in end products. (0.9mm mounting height)

Specifications ( ): PNP

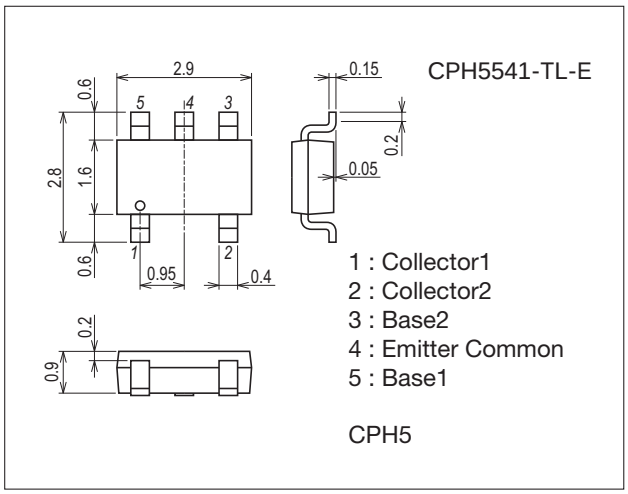
Absolute Maximum Ratings at Ta=25°C

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		(−)700	mA
Collector Current (Pulse)	I_{CP}	PW≤10μs	(−)3	A
Collector Dissipation	P_C	Mounted on a ceramic board (600mm²×0.8mm)	0.6	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

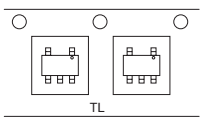
unit : mm (typ)
7017A-006



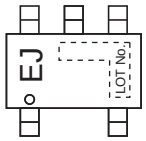
Product & Package Information

- Package : CPH5
- JEITA, JEDEC : SC-74A, SOT-25
- Minimum Packing Quantity : 3,000 pcs./reel

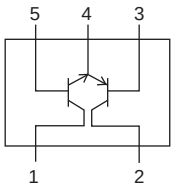
Packing Type : TL



Marking



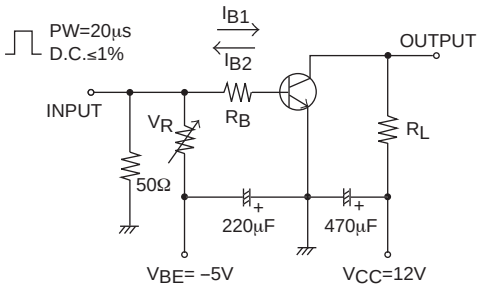
Electrical Connection



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			(−)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(−)4V, I_C=0A			(−)100	nA
DC Current Gain	h_{FE}	V_{CE}=(−)2V, I_C=(−10)50mA	(200)300		(500)800	
Gain-Bandwidth Product	f_T	V_{CE}=(−)2V, I_C=(−)50mA		(520)540		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(4.7)3.3		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(−)200mA, I_B=(−)10mA		(−110)85	(−220)190	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(−)200mA, I_B=(−)10mA		(−)0.9	(−)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}			(125)255		ns
Fall Time	t_f			(25)40		ns

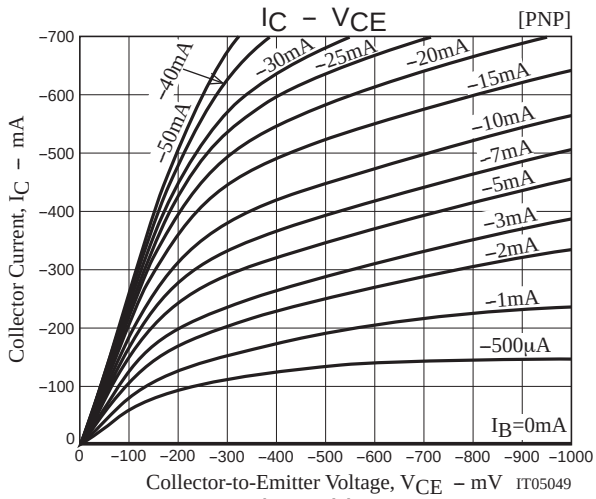
Switching Time Test Circuit

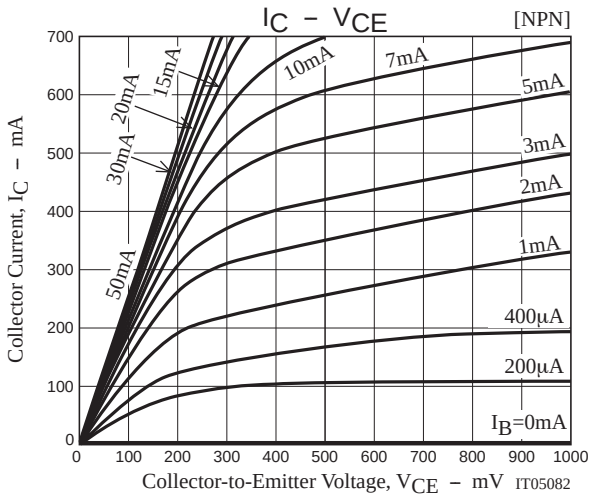


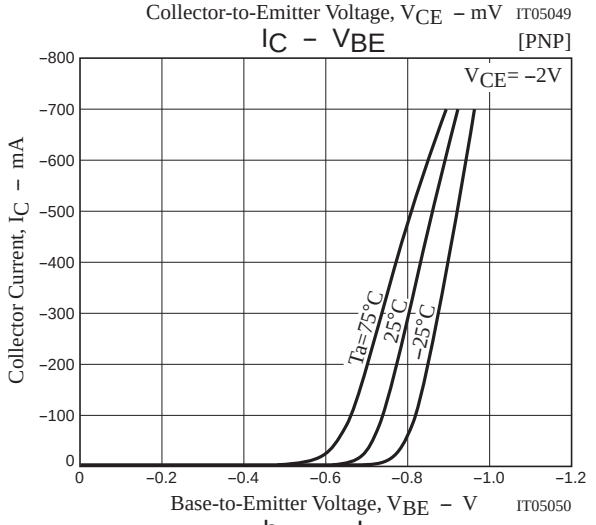
$20I_{B1}$= **−**$20I_{B2}$=I_C=300mA
For PNP, minus sign is omitted.

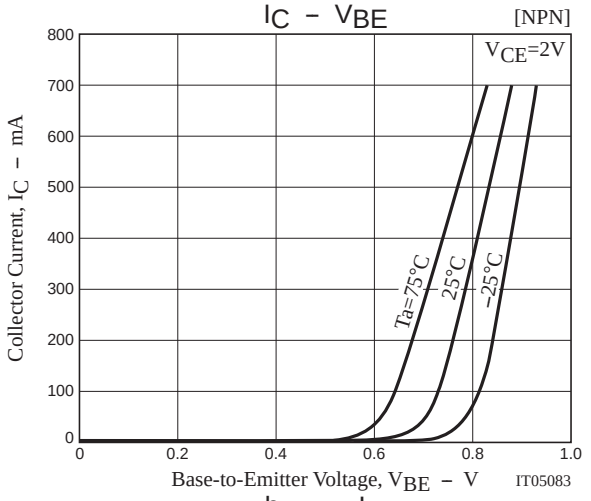
Ordering Information

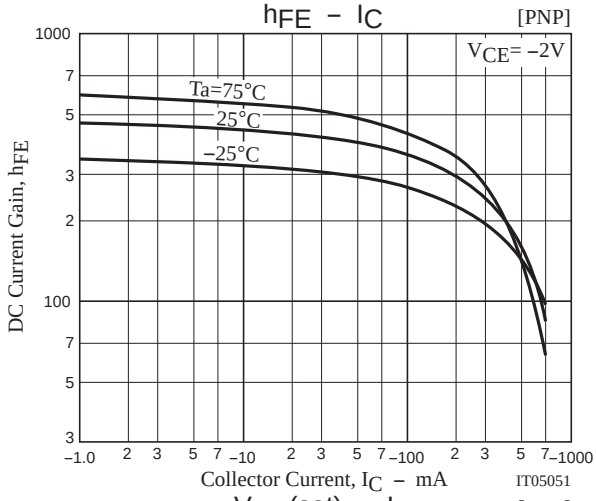
Device	Package	Shipping	memo
CPH5541-TL-E	CPH5	3,000pcs./reel	Pb Free

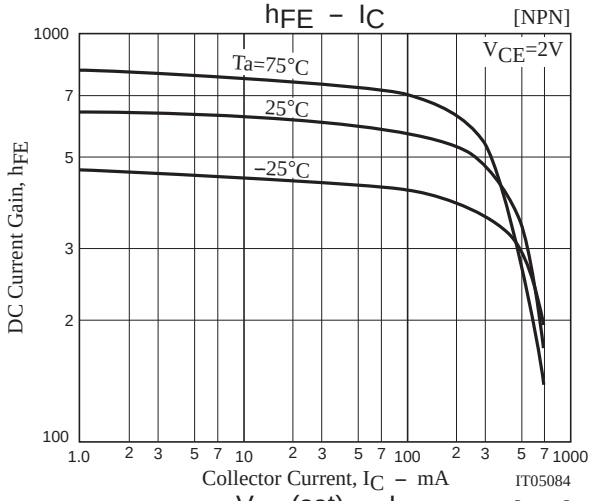

IC – VCE
[PNP]
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – mV
IT05049
–40mA
–30mA
–25mA
–20mA
–15mA
–10mA
–7mA
–5mA
–3mA
–2mA
–1mA
–500µA
–50mA
IB=0mA

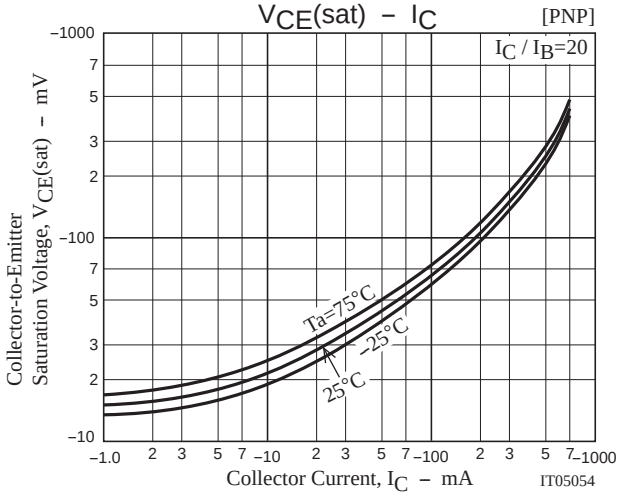

IC – VCE
[NPN]
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – mV
IT05082
10mA
7mA
5mA
3mA
2mA
1mA
400µA
200µA
20mA
15mA
30mA
50mA
IB=0mA

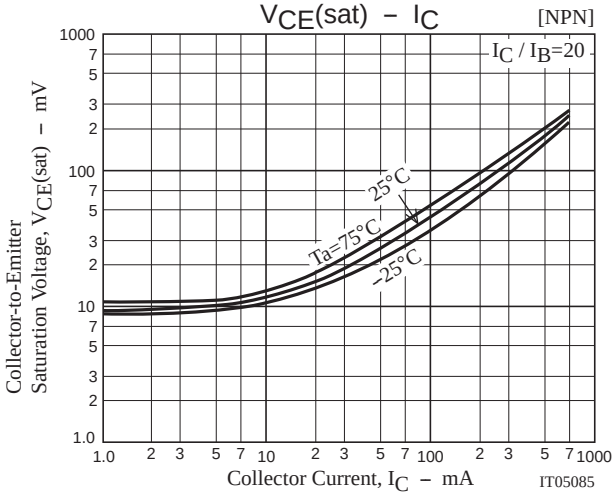

IC – VBE
[PNP]
VCE= –2V
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
IT05050
Ta=75°C
25°C
–25°C

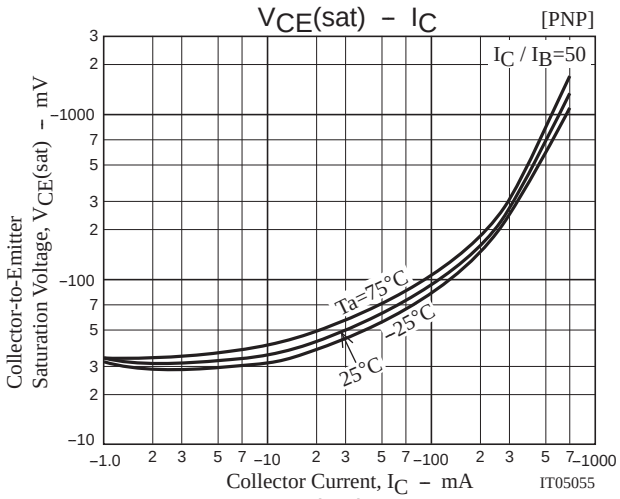

IC – VBE
[NPN]
VCE=2V
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
IT05083
Ta=75°C
25°C
–25°C

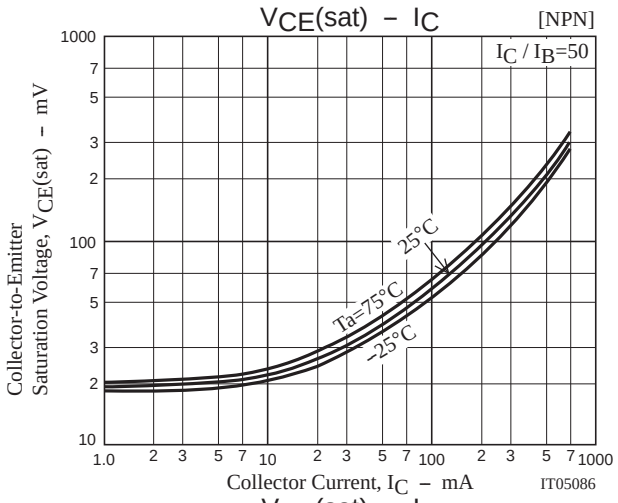

hFE – IC
[PNP]
VCE= –2V
DC Current Gain, hFE
Collector Current, IC – mA
IT05051
Ta=75°C
25°C
–25°C

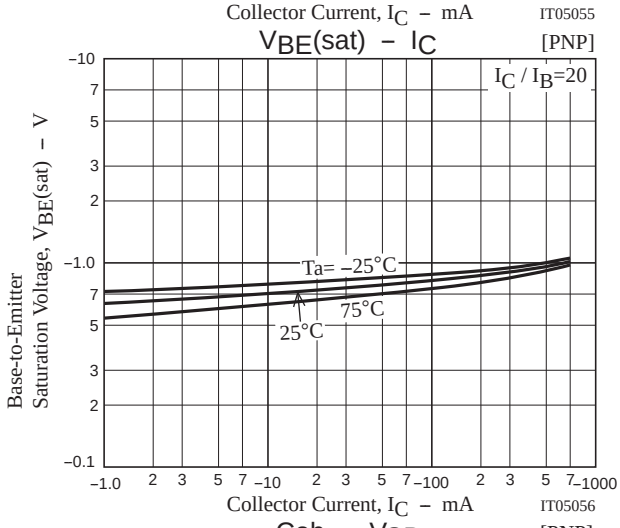

hFE – IC
[NPN]
VCE=2V
DC Current Gain, hFE
Collector Current, IC – mA
IT05084
Ta=75°C
25°C
–25°C

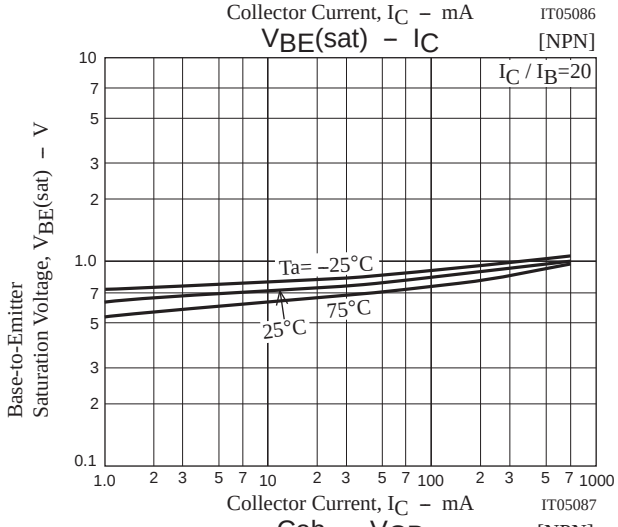

VCE(sat) – IC
[PNP]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05054
Ta=75°C
–25°C
25°C

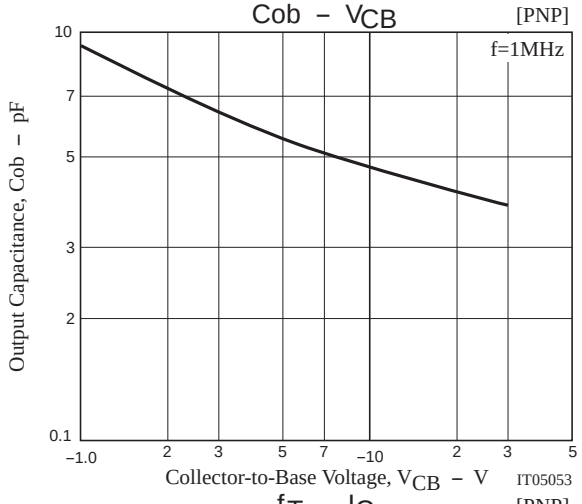

VCE(sat) – IC
[NPN]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05085
25°C
Ta=–75°C
–25°C

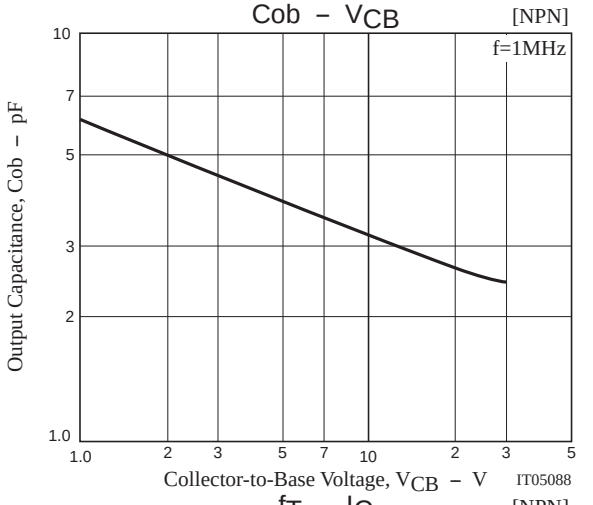

VCE(sat) – IC
[PNP]
IC / IB=50
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05055

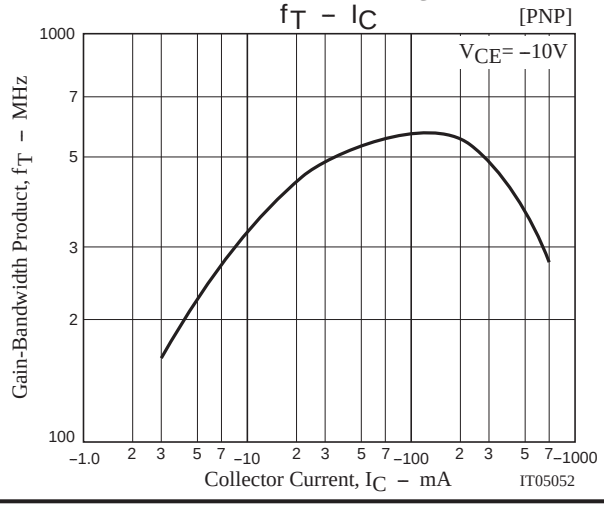

VCE(sat) – IC
[NPN]
IC / IB=50
25°C
Ta=75°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05086

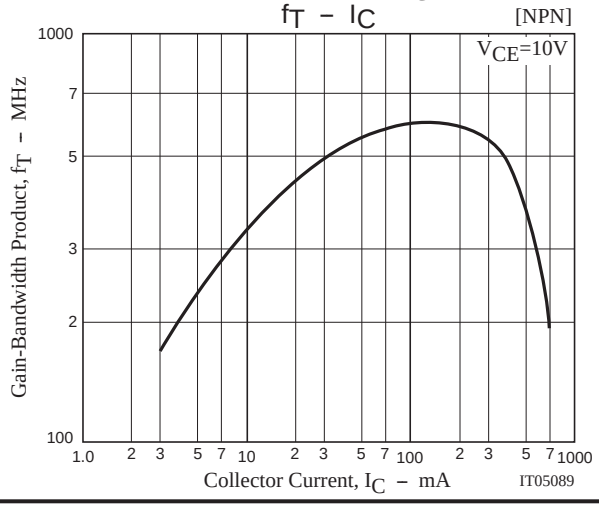

VBE(sat) – IC
[PNP]
IC / IB=20
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05056

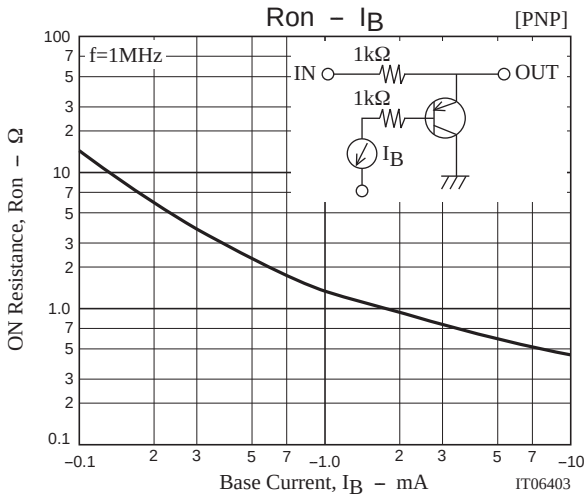

VBE(sat) – IC
[NPN]
IC / IB=20
Ta= –25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05087

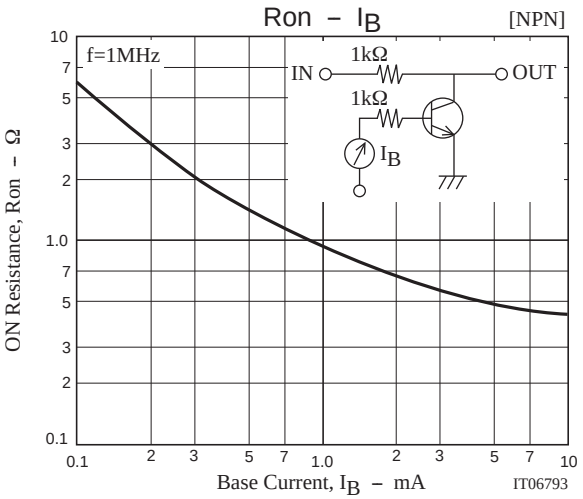

Cob – VCB
[PNP]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05053

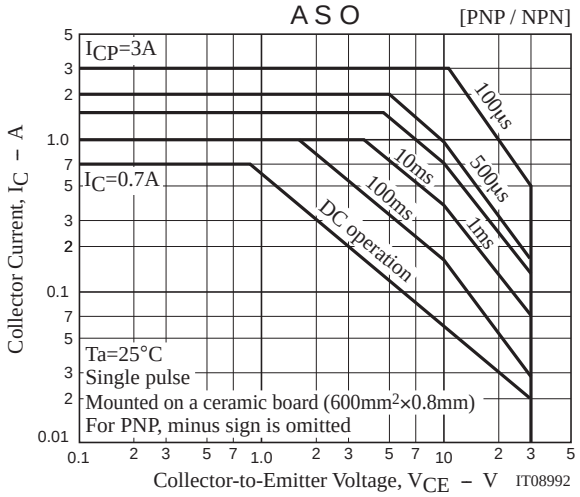

Cob – VCB
[NPN]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05088

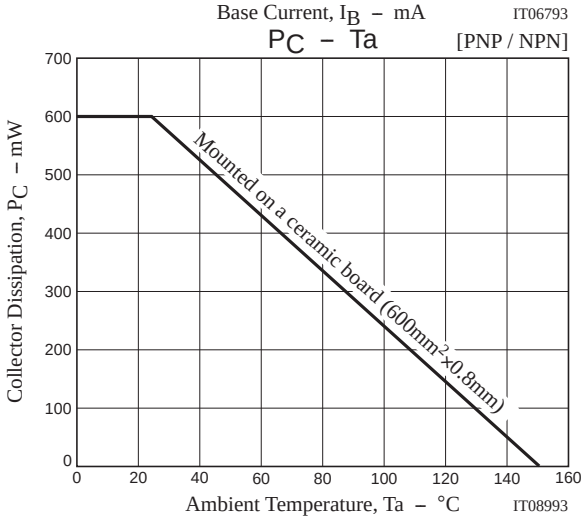

fT – IC
[PNP]
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05052


fT – IC
[NPN]
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05089


Ron – IB
[PNP]
f=1MHz
1kΩ
IN
OUT
1kΩ
IB
ON Resistance, Ron – Ω
Base Current, IB – mA
IT06403


Ron – IB
[NPN]
f=1MHz
1kΩ
IN
OUT
1kΩ
IB
ON Resistance, Ron – Ω
Base Current, IB – mA
IT06793


A S O
[PNP / NPN]
ICP=3A
IC=0.7A
100μs
500μs
10ms
100ms
1ms
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
IT08992


PC – Ta
[PNP / NPN]
Mounted on a ceramic board (600mm2×0.8mm)
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT08993

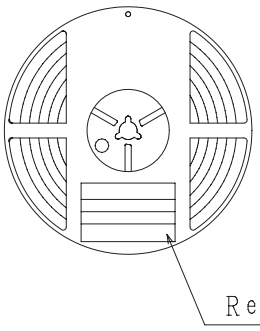
Embossed Taping Specification

CPH5541-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)
CPH5	CPH6	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

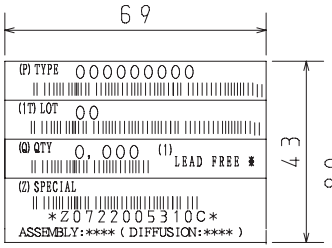
Packing method



Reel label

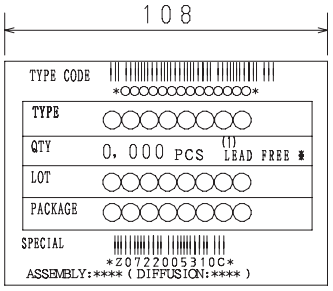
Reel label, Inner box label

(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.



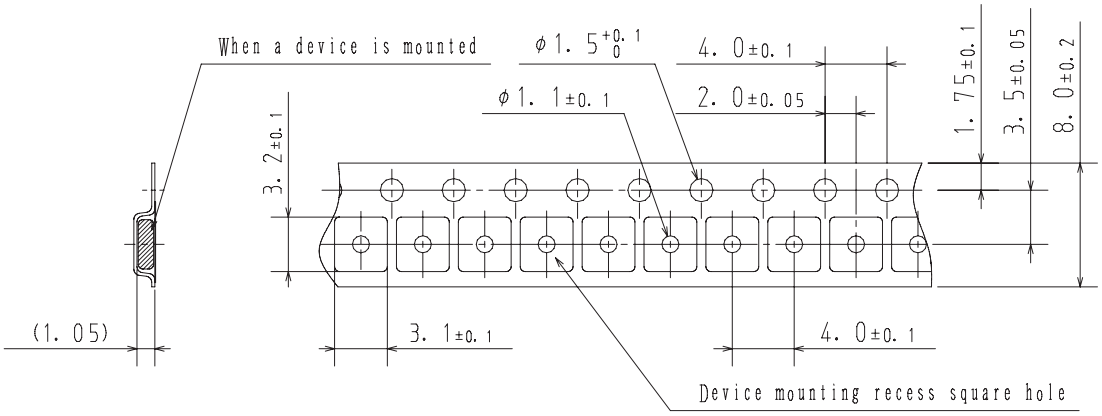
NOTE (1)

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

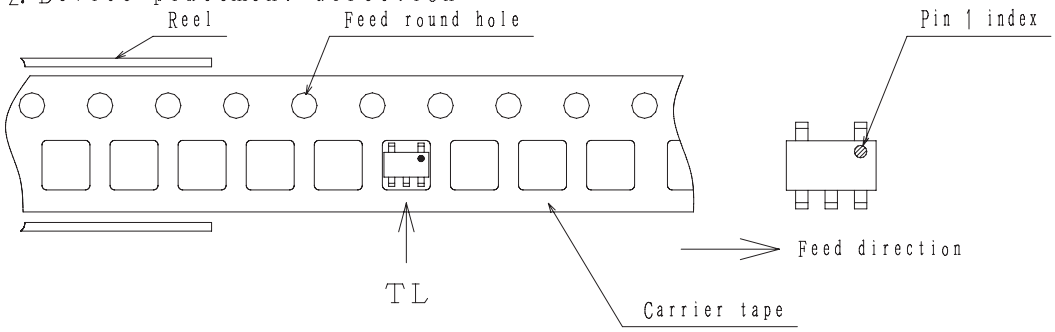
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



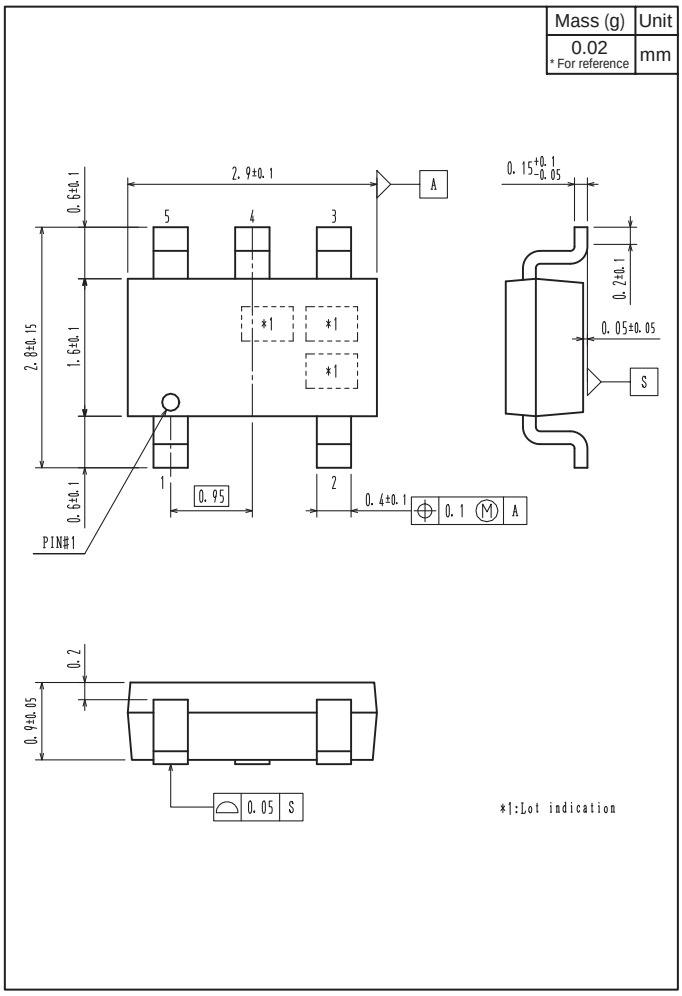
2-2. Device placement direction



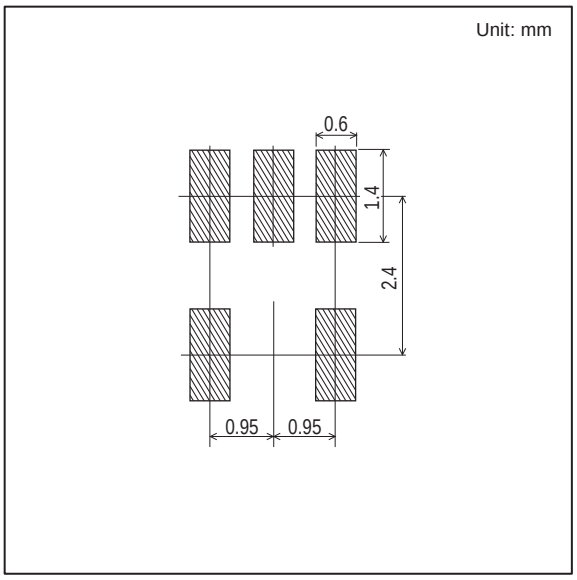
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

CPH5541-TL-E



Land Pattern Example



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