Ordering number : ENA0196

SANYO Semiconductors
DATA SHEET

CPH5516 — PNP / NPN Epitaxial Planar Silicon Transistors
High-Current Switching Applications

Applications

- Relay drivers, Lamp drivers, Motor drivers, IGBT gate drive.

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		(-) 2	A
Collector Current (Pulse)	I_{CP}	PW≤1s	(-) 6	A
Base Current	I_B		(-) 400	mA
Collector Dissipation	P_C	Mounted on a ceramic board (600mm²×0.8mm)	0.9	W
Total Power Dissipation	P_T	Mounted on a ceramic board (600mm²×0.8mm)	1.2	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

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-Bandwideth Product	f_T	V_{CE}=(-) 10V, I_C=(-) 300mA		(440) 400		MHz
Output Capacitance	Cob	V_{CB}=(-) 10V, f=1MHz		(17) 12		pF

Marking : EK

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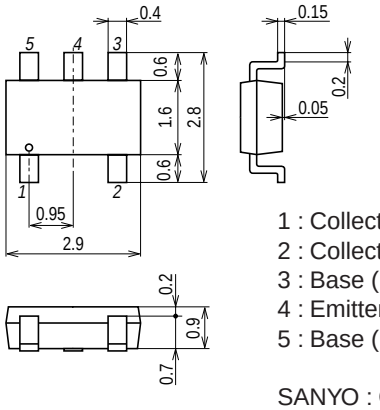
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(-) 1.5A, I_B=(-) 75mA		(-170) 160	(-260) 240	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(-) 1.5A, I_B=(-) 75mA		(-) 0.94	(-) 1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	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.		(45) 40		ns
Storage Time	t_{stg}	See specified Test Circuit.		(200) 350		ns
Fall Time	t_f	See specified Test Circuit.		(23) 30		ns

Package Dimensions

unit : mm

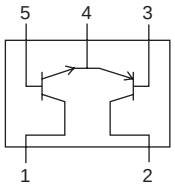
7017-009



1 : Collector (NPN TR)
2 : Collector (PNP TR)
3 : Base (PNP TR)
4 : Emitter Common
5 : Base (NPN TR)

SANYO : CPH5

Electrical Connection



1 : Collector (NPN TR)
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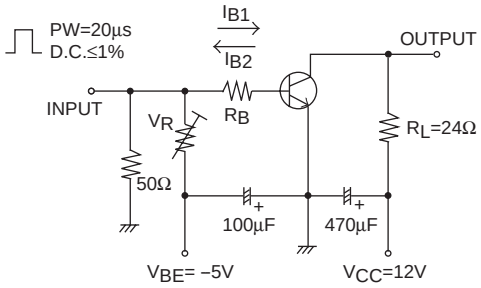
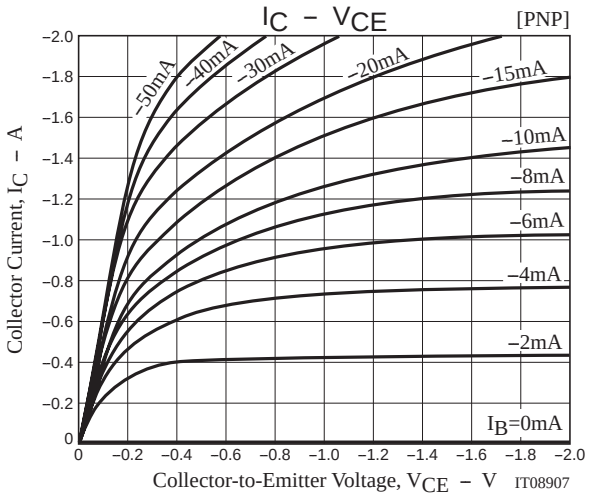
Top view

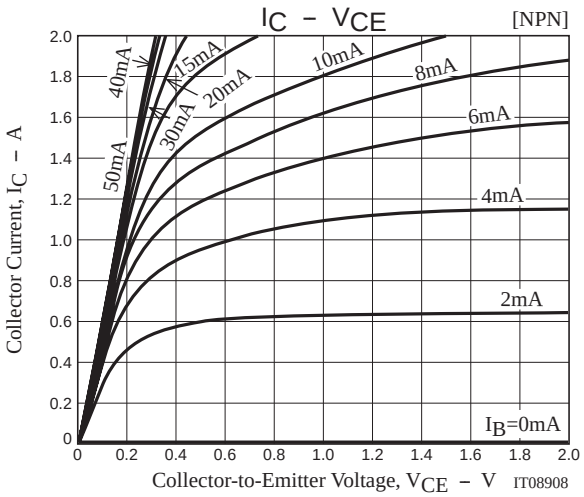
Switching Time Test Circuit

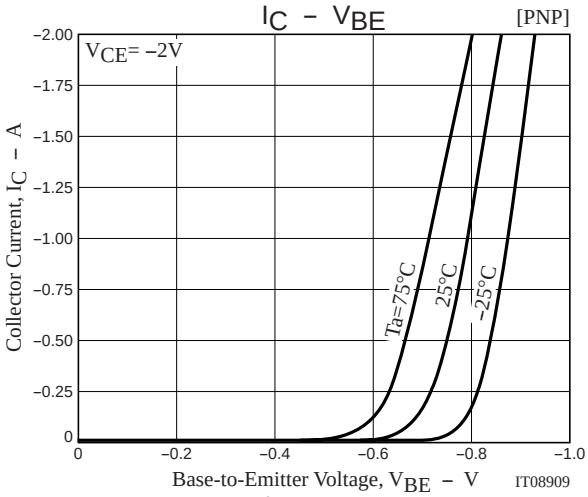


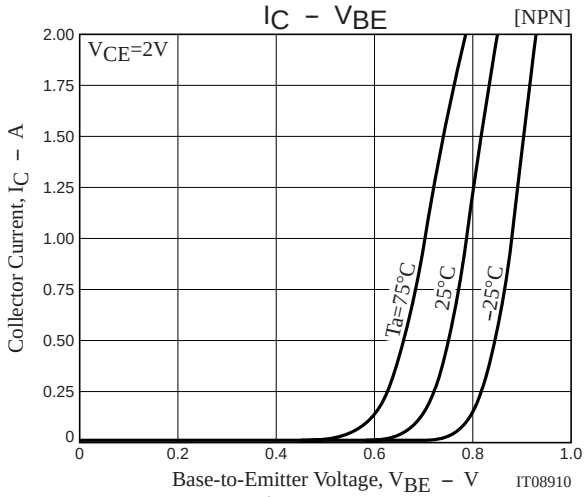
I_C=20I_{B1}= −20I_{B2}=500mA

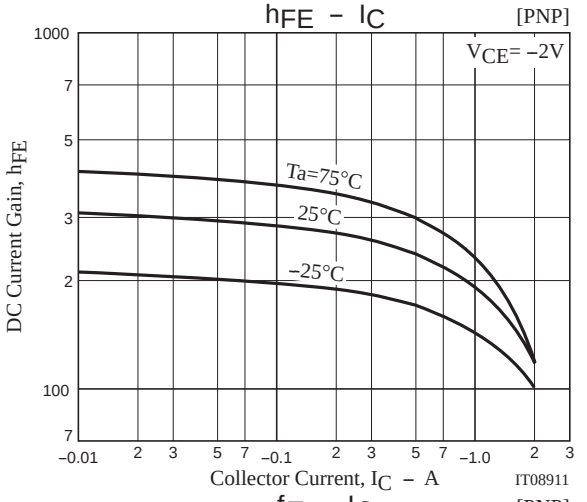
For PNP, the polarity is reversed.

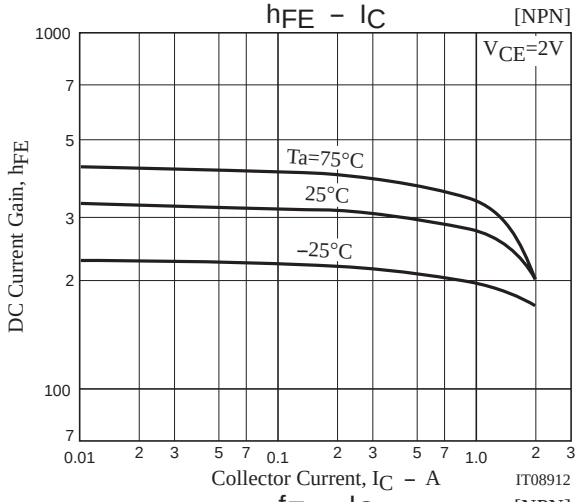


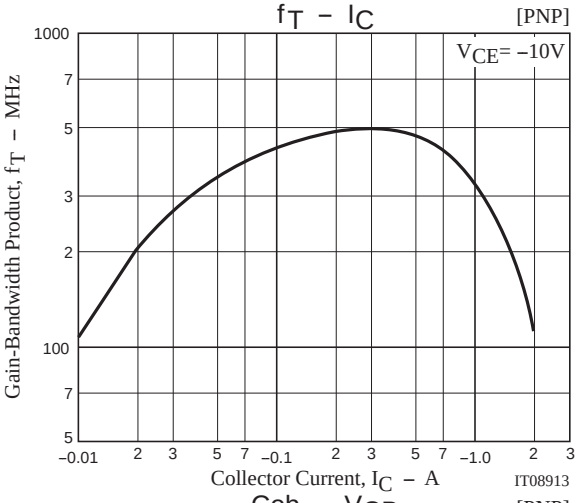


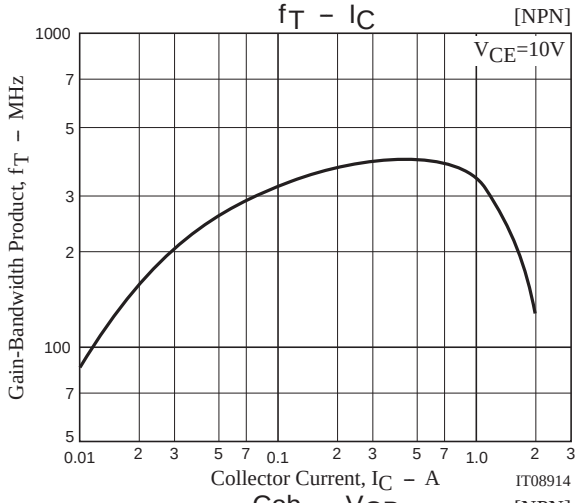

IC – VBE
[PNP]
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT08909

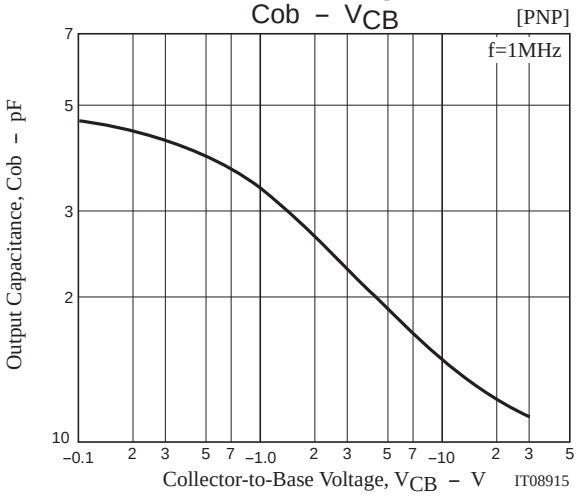

IC – VBE
[NPN]
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
IT08910

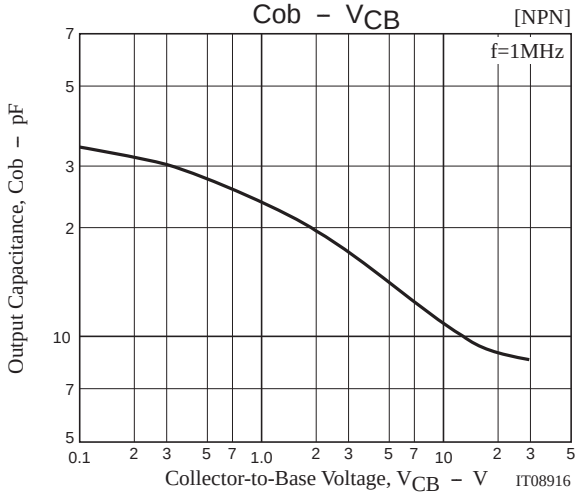

hFE – IC
[PNP]
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT08911

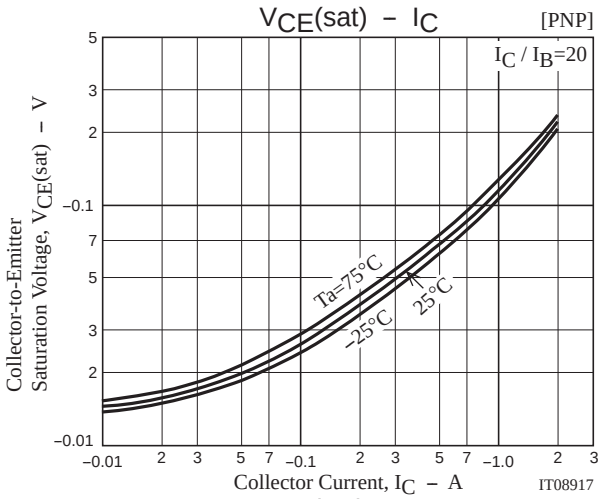

hFE – IC
[NPN]
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
IT08912

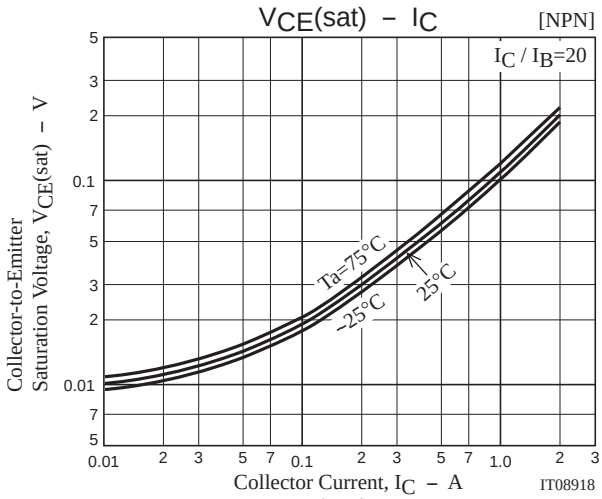

fT – IC
[PNP]
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT08913

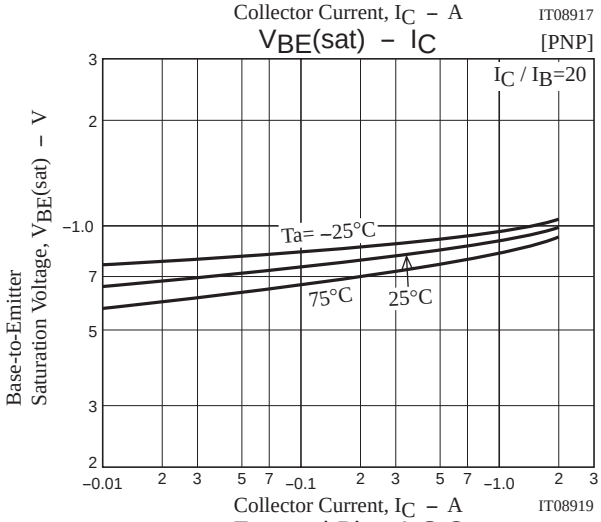

fT – IC
[NPN]
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT08914

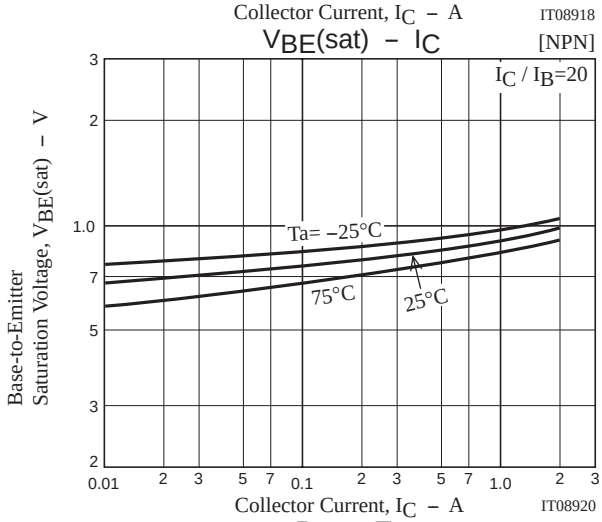

Cob – VCB
[PNP]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT08915

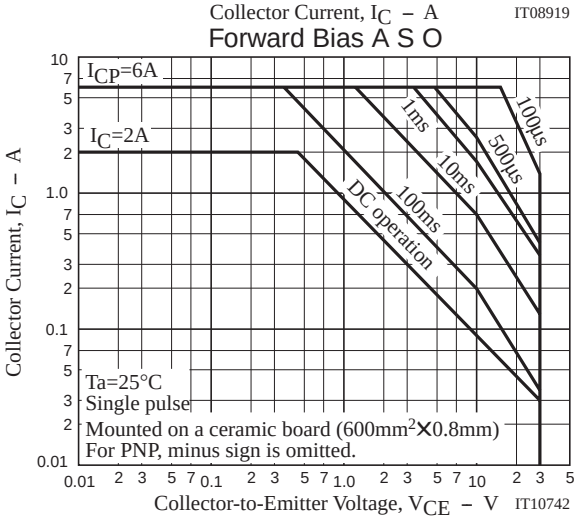

Cob – VCB
[NPN]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT08916

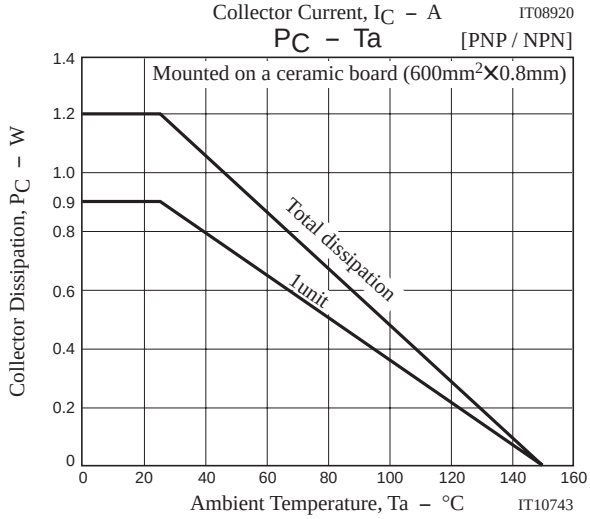

VCE(sat) – IC
[PNP]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
IT08917


VCE(sat) – IC
[NPN]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
IT08918


VBE(sat) – IC
[PNP]
IC / IB=20
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Ta= –25°C
75°C
25°C
Collector Current, IC – A
IT08919


VBE(sat) – IC
[NPN]
IC / IB=20
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Ta= –25°C
75°C
25°C
Collector Current, IC – A
IT08920


Forward Bias A S O
ICP=6A
IC=2A
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
IT10742


PC – Ta
[PNP / NPN]
Mounted on a ceramic board (600mm2×0.8mm)
Total dissipation
1unit
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
IT10743