50C02CH

Bipolar Transistor
50V, 0.5A, Low VCE(sat), NPN Single

ON Semiconductor®

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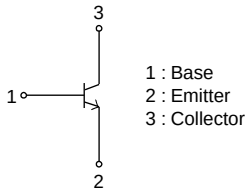
Features

- Large Current Capacitance
- Low Collector to Emitter Saturation Voltage (Resistance): R_{CE}(sat) typ=175mΩ [I_C=0.5A, I_B=50mA]
- Ultrasmall Package Facilitates Miniaturization in End Products
- Small ON-Resistance (Ron)

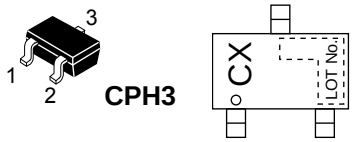
Typical Applications

- Low-Frequency Amplifier
- High Speed Switching
- Small Motor Drive
- Muting Circuit

ELECTRICAL CONNECTION



MARKING



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

SPECIFICATIONS

ABSOLUTE MAXIMUM RATING at Ta = 25°C (Note 1, 2)

Parameter	Symbol	Value	Unit
Collector to Base Voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	50	V
Emitter to Base Voltage	V_{EBO}	5	V
Collector Current	I_C	500	mA
Collector Current (Pulse)	I_{CP}	1.0	A
Collector Dissipation (Note 2)	P_C	700	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 to +150	°C

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

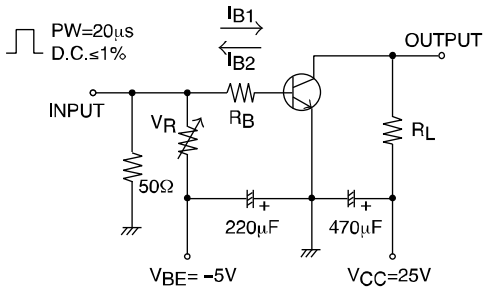
Note 2 : Surface mounted on ceramic substrate(600mm^2 × 0.8mm)

ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 3)

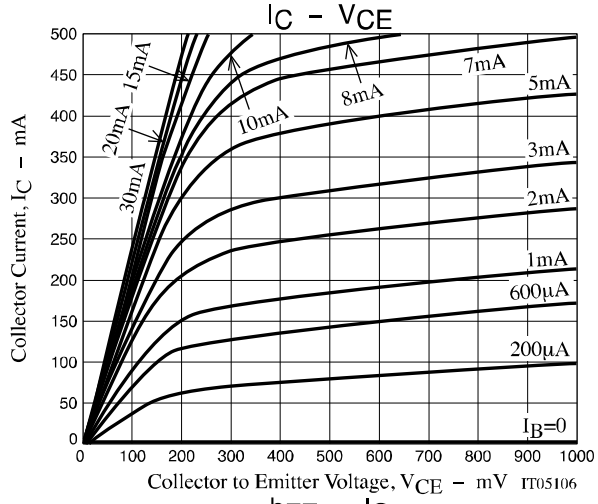
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0A			100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0A			100	nA
DC Current Gain	h_{FE}	V_{CE}=2V, I_C=10mA	300		800	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=50mA		500		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		2.8		pF
Collector to Emitter Saturation Voltage	V_{CE}(sat)	I_C=100mA, I_B=10mA		50	100	mV
Base to Emitter Saturation Voltage	V_{BE}(sat)	I_C=100mA, I_B=10mA		0.9	1.2	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0A	60			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		30		ns
Storage Time	t_{stg}			340		ns
Fall Time	t_f			55		ns

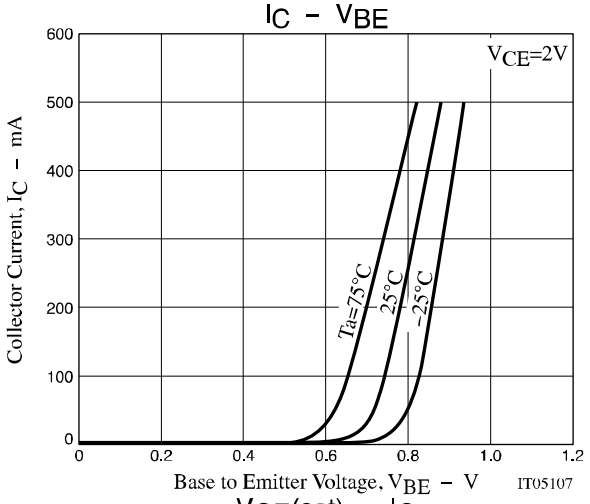
Note 3 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

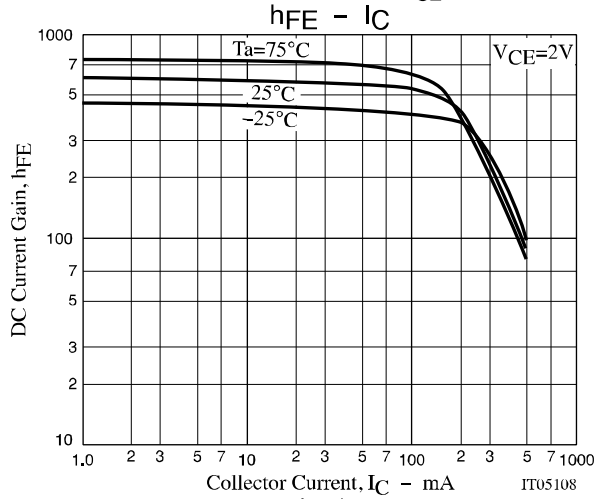
Switching Time Test Circuit

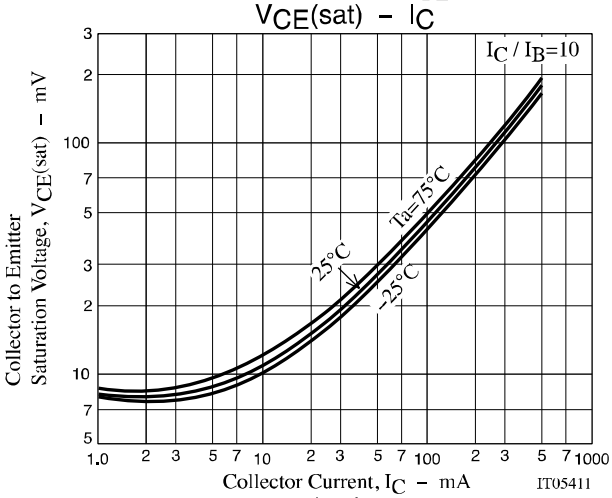


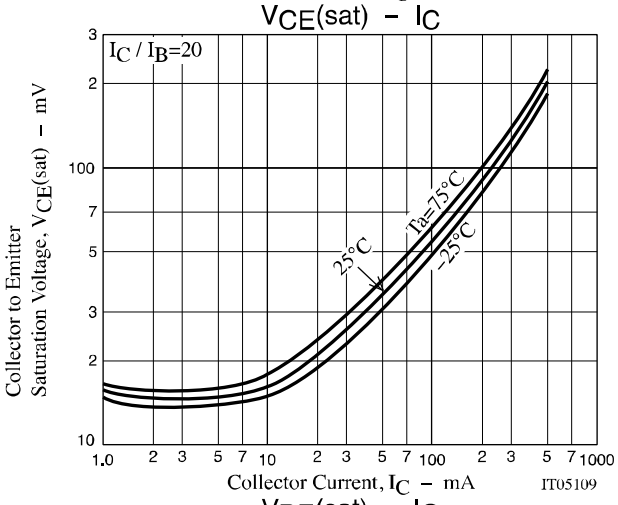
I_C=20I_{B1}= −20I_{B2}=200mA

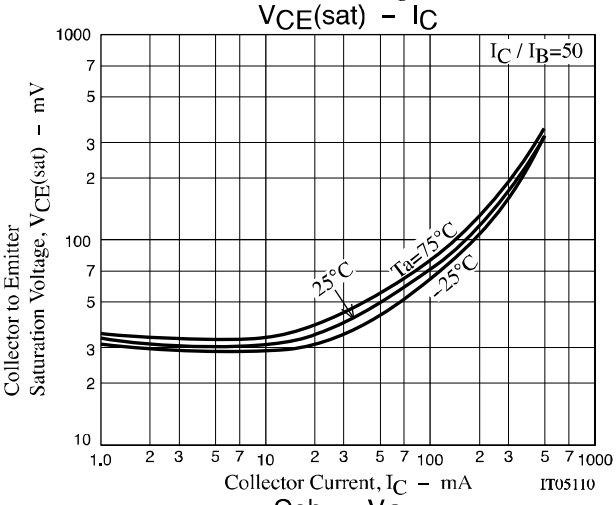

IC – VCE
Collector Current, IC – mA
Collector to Emitter Voltage, VCE – mV
IT05106
7mA
5mA
3mA
2mA
1mA
600µA
200µA
IB=0
15mA
20mA
30mA
10mA
8mA

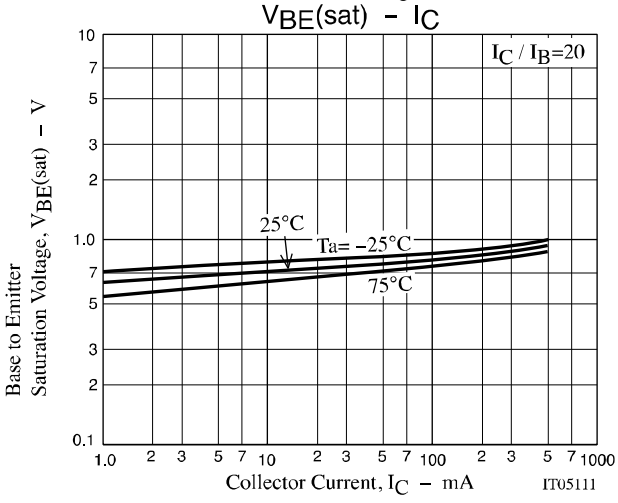

IC – VBE
VCE=2V
Collector Current, IC – mA
Base to Emitter Voltage, VBE – V
IT05107
Ta=75°C
25°C
–25°C

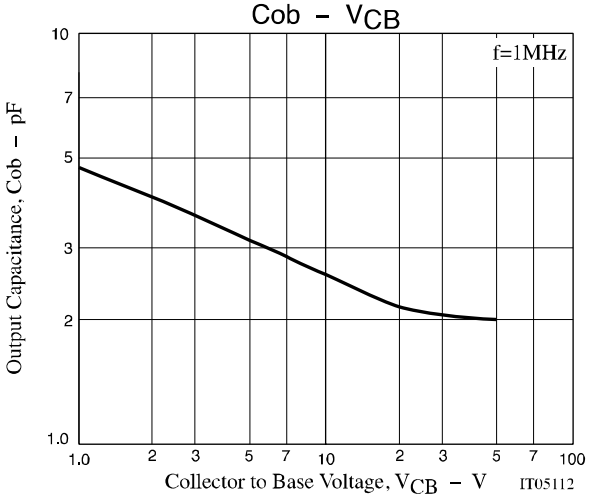

hFE – IC
DC Current Gain, hFE
Collector Current, IC – mA
IT05108
Ta=75°C
25°C
–25°C
VCE=2V

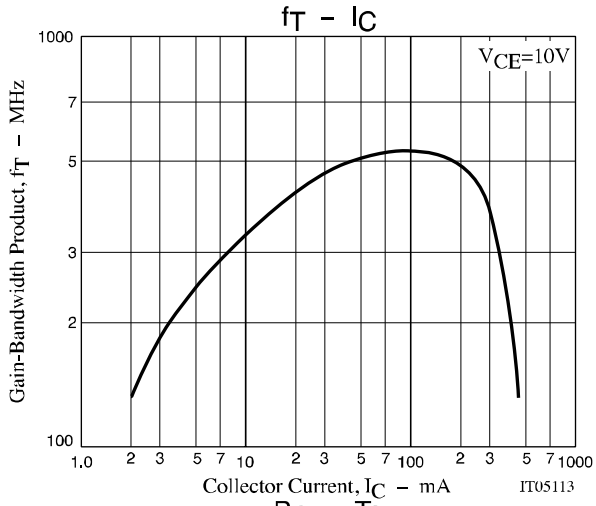

VCE(sat) – IC
IC / IB=10
Collector to Emitter
Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05411
Ta=75°C
25°C
–25°C

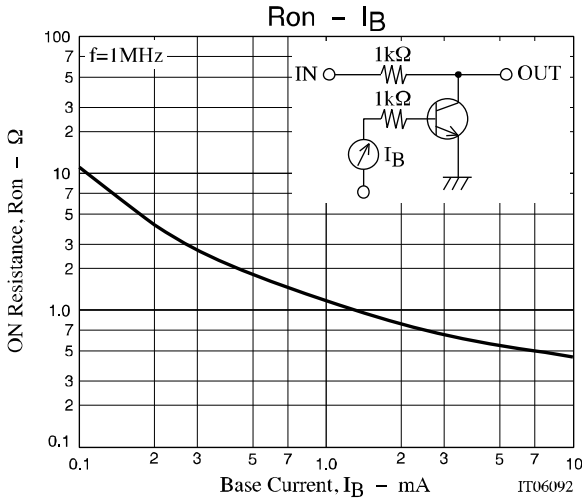

VCE(sat) – IC
IC / IB=20
Collector to Emitter
Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05109
Ta=75°C
25°C
–25°C

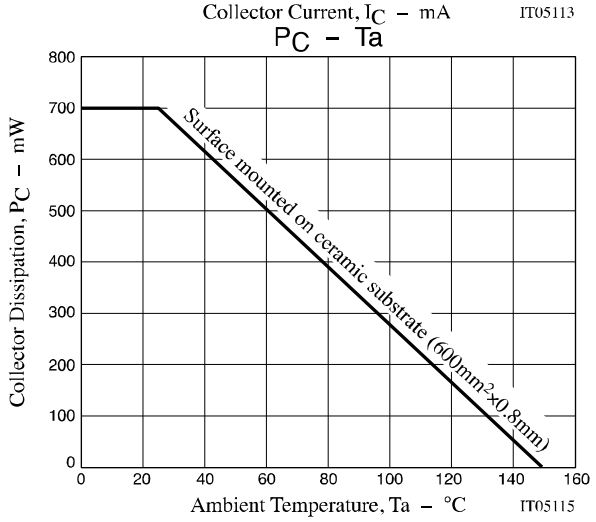

VCE(sat) – IC
IC / IB=50
Collector to Emitter
Saturation Voltage, VCE(sat) – mV
Collector Current, IC – mA
IT05110
Ta=75°C
25°C
–25°C


VBE(sat) – IC
IC / IB=20
Base to Emitter
Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05111
25°C
Ta= –25°C
75°C


Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector to Base Voltage, VCB – V
IT05112


fT – IC
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05113

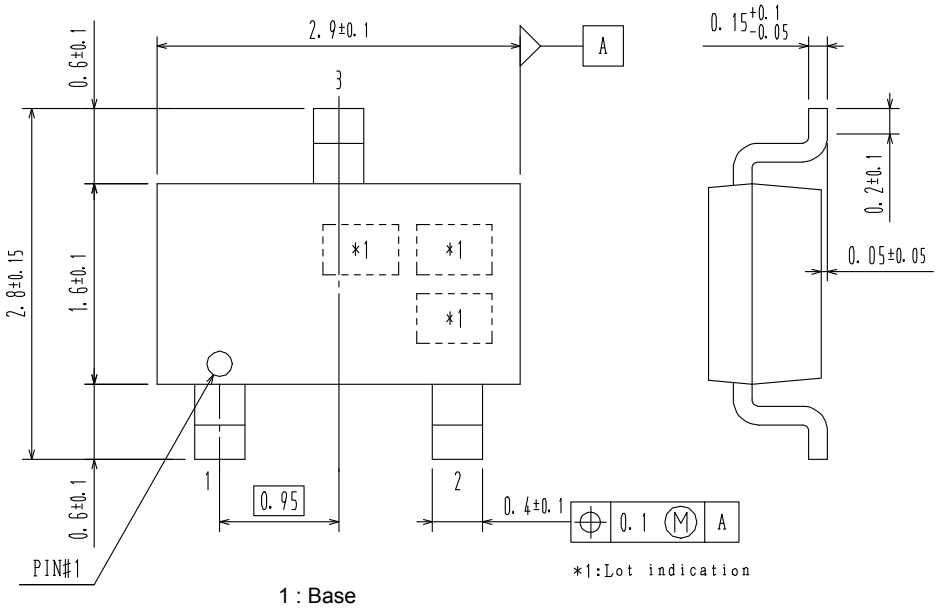

Ron – IB
f=1MHz
1kΩ
IN
OUT
1kΩ
IB
ON Resistance, Ron – Ω
Base Current, IB – mA
IT06092


PC – Ta
Surface mounted on ceramic substrate (600mm2×0.8mm)
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
IT05115

PACKAGE DIMENSIONS

unit : mm

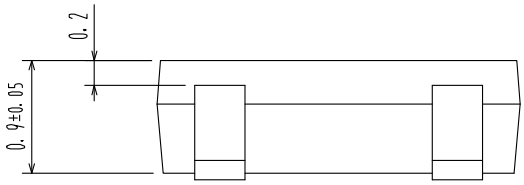
CPH3
CASE 318BA
ISSUE O



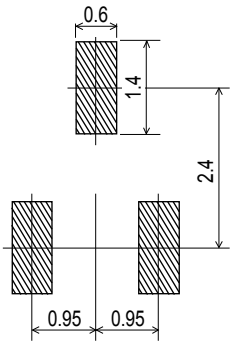
1 : Base

2 : Emitter

3 : Collector



Recommended Soldering Footprint



ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
50C02CH-TL-E	CX	CPH3 (Pb-Free)	3,000 / Tape & Reel

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

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50C02CH-TL-E